

GLENBROOK STATION

TRAFFIC, TRANSPORT AND ACCESS ASSESSMENT

Prepared for:

Transport for New South Wales

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Transport for New South Wales (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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DOCUMENT CONTROL

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EXECUTIVE SUMMARY

Background and upgrade works

Transport for NSW (TfNSW) has proposed the Glenbrook Station Upgrade (the 'Proposal'). The Proposal forms part of the Transport Access Program (TAP). TAP is a New South Wales (NSW) Government initiative to improve existing transport infrastructure, such as train stations, so they are modern, accessible, and secure. The primary aim is to improve station access and surrounding transport networks so they are more accessible for the mobility impaired, elderly persons, parents and carers, and persons with a disability.

The Proposal involves an upgrade of Glenbrook Station, which will improve accessibility and amenity for customers. The Proposal would include the following key elements:

- installation of a new lift on the platform to provide access to the existing footbridge (footbridge and stairs to be retained)
- provision of a new station entrance which would include demolition of the existing (non-compliant) ramp from the footbridge to Burfitt Parade to be replaced with new stairs and a new accessible path from the existing footbridge extending east to the raised pedestrian crossing
- landscaping around the station entrance
- internal reconfiguration of the station building to allow for a new Family Accessible Toilet, a new ambulant toilet, communications room and staff facilities
- installation of an external glass canopy at the entrance to the Family Accessible Toilet to provide weather protection
- new formalised kiss and ride on Burfitt Parade
- installation of a pad mount electrical transformer adjacent to the new stairs
- ancillary works including lighting, fencing, new bin storage, minor drainage works, seating adjustments, improvement to station communication systems (including CCTV cameras), hearing loops, installation of wayfinding signage and other signage to identify existing and new accessible features including installation of new tactile ground surface indicators (TGSIs).

Existing conditions

Based on 2013 data, Glenbrook Station was the 182nd busiest railway station on the NSW network, with 1,140 trips reported on a typical weekday. Existing station facilities include the following:

- bike locker with capacity for four bicycles
- footbridge linking the station entry on the southern side of Burfitt Parade to a single stair that facilities access to a single central island platform accommodating access to both in and outbound train services
- no formal kiss and ride facility
- no formal taxi facility
- one pedestrian shelter on Burfitt Parade that is very lowly utilised (one bus service per day).

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On-site and desktop observations indicate that there is a high demand for commuter car parking as both off-street facilities are highly utilised and that there is a noteworthy number of vehicles parked on-street in the surrounding area.

Informal kiss and ride activity was observed during on-site observations along both kerbs with vehicles partially obstructing the nearby traffic lanes.

The existing pedestrian footpaths constructed in the public road verges surrounding the station can generally be described as being narrow and not of a consistent width. Several examples were noted of localised constrictions caused by utility poles and sign posts which further reduce the available path width such that it would be impossible or very difficult for a person travelling in a wheelchair or a parent/carer walking with a pram.

Operational impacts

Forecast station patronage data provided by TfNSW indicates that the Glenbrook Station annual customer demand will increase by 24% between 2012 and 2036 from 325,960 persons to 402,836 persons. Typical daily (weekday) patronage is projected to increase from 1,140 persons to 1,724 persons (51%) during the same period.

The Proposal would provide adequate capacity to accommodate this expected growth whilst also enabling more direct, legible and safe pedestrian routes. The Proposal will also improve compliance with the *Disability Discrimination Act* (DDA) and *Disability Standards for Accessible Public Transport* (DSAPT). Overall, the user experience including amenity and convenience will improve.

No new taxi or bicycle parking improvements are planned as part of the Proposal.

Changes to existing traffic capacity and performance are projected to be insignificant given the relatively minor nature and scale of the improvements delivered as part of the Proposal. Whilst there would be some increase in station utilisation as a result of improvements to accessibility and amenity, it is expected that these incremental increases would not result in a material increase in traffic demand.

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Construction impacts

The following key construction-stage impacts are likely to be generated:

- increased construction vehicle traffic including light and heavy vehicles within the station precinct and along local streets, most likely in particular Ross Street, Euroka Street, and Cowdery Street for crane deliveries of large construction elements to the southern unnamed road located in the rail corridor
- temporary loss of 10 existing commuter car parking spaces in the Burfitt Parade car park
- increased demand for all-day parking for construction staff
- potential confusion and loss of amenity to customers accessing the station via temporary and changed facilities during construction
- minor travel delays on account of likely Traffic Control Plan (TCP) implementation requiring some users to stop for construction traffic.

Whilst Blue Mountain Council officers have confirmed that there is no load limit in place for the Cowdery Street bridge, it is understood that the bridge is under the jurisdiction of Sydney Trains. It is understood that due to structural constraints of the bridge only cranes of appropriate size and weight will access the Proposal site via the Cowdery Street route. Larger cranes would access the Proposal site via Burfitt Parade and would be confirmed with the construction contractor prior to construction.

Based on the scale of the Proposal and projected intensity of construction activities (i.e. concentrated over rail possession weekends over the period of around one year), these impacts are considered to be manageable subject to the preparation and implementation of a Construction Environmental Management Plan inclusive of a Construction Traffic Management Plan which also include Traffic Control Plans which when combined will review issues and risks and identify solutions and arrangement to avoid, mitigate, and manage risk involving construction activities, users of the transport system and local residents.

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Glossary of terms

Term Meaning	Term Meaning
AADT	Annual Average Daily Traffic
ABS	Australian Bureau of Statistics
AS	Australian Standards
ASA	Asset Standards Authority
BTS	Bureau of Transport Statistics, a division of Transport for NSW
CBD	Central Business District
CEMP	Construction Environmental Management Plan
CTMP	Construction Traffic Management Plan
DDA	<i>Disability Discrimination Act 1992</i> (Commonwealth)
DP&E	New South Wales – Department of Planning and Environment
DSAPT	Disability Standards for Accessible Public Transport
Fruin	John J Fruin, who pioneered studies on pedestrian flows and crowding levels. Fruin defined six levels of crowding for queueing areas, walkways and stairways, and given in terms of Levels of Service (LOS).
HV	Heavy vehicles
I & S	Infrastructure and Services, a division of Transport for NSW (formerly Transport Projects Division)
JTW	Journey to Work
LEP	Local Environmental Plan
LGA	Local Government Area
LOS	Level of Service – a qualitative measure of flow and crowding, with LOS A as the ‘most pleasant’ and F the ‘least pleasant’ in terms of pedestrian flow and crowding.
m	metres
mm	millimetres
NSW	State of New South Wales
OOHW	Out of Hours Works
PEA	Preliminary Environmental Assessment
PLC	Presbyterian Ladies College
pmm	pedestrians per metre per minute, a measure of pedestrian flow rate
Rail possession	Possession is the term used by railway building/maintenance contractors to indicate that they have taken possession of the track (usually a block of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.
RailCorp	Rail Corporation New South Wales (now Sydney Trains)
REF	Review of Environmental Factors
Roads Act	<i>Roads Act 1993</i> (NSW)
TAP	Transport Access Program
TCP	Traffic Control Plan
TfNSW	Transport for New South Wales

Term Meaning	Term Meaning
TT&AIA	Traffic, Transport and Access Impact Assessment (this report)
TGSI	Tactile Ground Surface Indicator
TZ	Travel zone – a geographical unit used as a basis for travel data analysis and statistics.

1 Introduction

1.1 Background

Transport for NSW (TfNSW) has proposed the Glenbrook Station Upgrade (the 'Proposal'). The Proposal forms part of the Transport Access Program (TAP). TAP is a New South Wales (NSW) Government initiative to improve existing transport infrastructure, such as train stations, so they are modern, accessible, and secure. The primary aim is to improve station access and surrounding transport networks so they are more accessible for the mobility impaired, elderly persons, parents and carers, and persons with a disability.

In early 2018, Caldis Cook Group (commissioned by TfNSW) produced accessibility upgrade concept plans for Glenbrook Station. These CCG plans were reviewed by Cardno (commissioned by TfNSW) in their preparation of a *Traffic, Transport and Access Impact Assessment* (6 April 2018) which is understood to have formed part of the Preliminary Environmental Assessment (PEA) project phase.

The concept design has progressed with minor amendments; however, the majority of the Cardno findings remain valid in consideration for the Review of Environmental Factors (REF). Accordingly, this report references and builds upon the prior Cardno assessment.

1.2 Proposal overview

The Proposal involves an upgrade of Glenbrook Station which will improve accessibility and amenity for customers. The Proposal would include the following key elements:

- installation of a new lift on the platform to provide access to the existing footbridge (footbridge and stairs to be retained)
- provision of a new station entrance which would include demolition of the existing (non-compliant) ramp from the footbridge to Burfitt Parade to be replaced with new stairs and a new accessible path from the existing footbridge extending east to the raised pedestrian crossing
- landscaping around the station entrance
- internal reconfiguration of the station building to allow for a new Family Accessible Toilet, a new ambulant toilet, communications room and staff facilities
- installation of a glass canopy at the entrance to the Family Accessible Toilet
- new formalised kiss and ride on Burfitt Parade
- installation of a pad mount electrical transformer adjacent to the new stairs
- ancillary works including lighting, fencing, new bin storage, minor drainage works, seating adjustments, improvement to station communication systems (including CCTV cameras), hearing loops, installation of wayfinding signage and other signage to identify existing and new accessible features including installation of new tactile ground surface indicators (TGSIs).

The key features of the proposal plan is included at Figure 17.

1.3 TAP objectives

The overall objectives of TAP include:

- stations that are accessible to people with a disability, limited mobility 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.

1.4 Study scope

SLR Consulting (SLR) has been commissioned by TfNSW to prepare this Traffic, Transport and Access Impact Assessment which will form part of the Proposal REF.

Given the noteworthy volume of pre-existing materials prepared by Cardno during the concept design development, particularly that related to the existing situation and consideration of the initial concept, it was determined that SLR would first undertake a gap analysis of the prior assessment. This process leveraged the prior assessment effort but also sought to ensure that the findings were valid with respect to the amended concept design.

This report details consideration of the anticipated traffic, transport and access matters associated with the Proposal for inclusion in the REF. This consideration includes the following:

- existing traffic, transport and access conditions and facilities
- operational traffic impacts associated with the proposed facilities
- construction impacts associated with the Proposal
- potential mitigation measures recommended to avoid, mitigate or manage impacts.

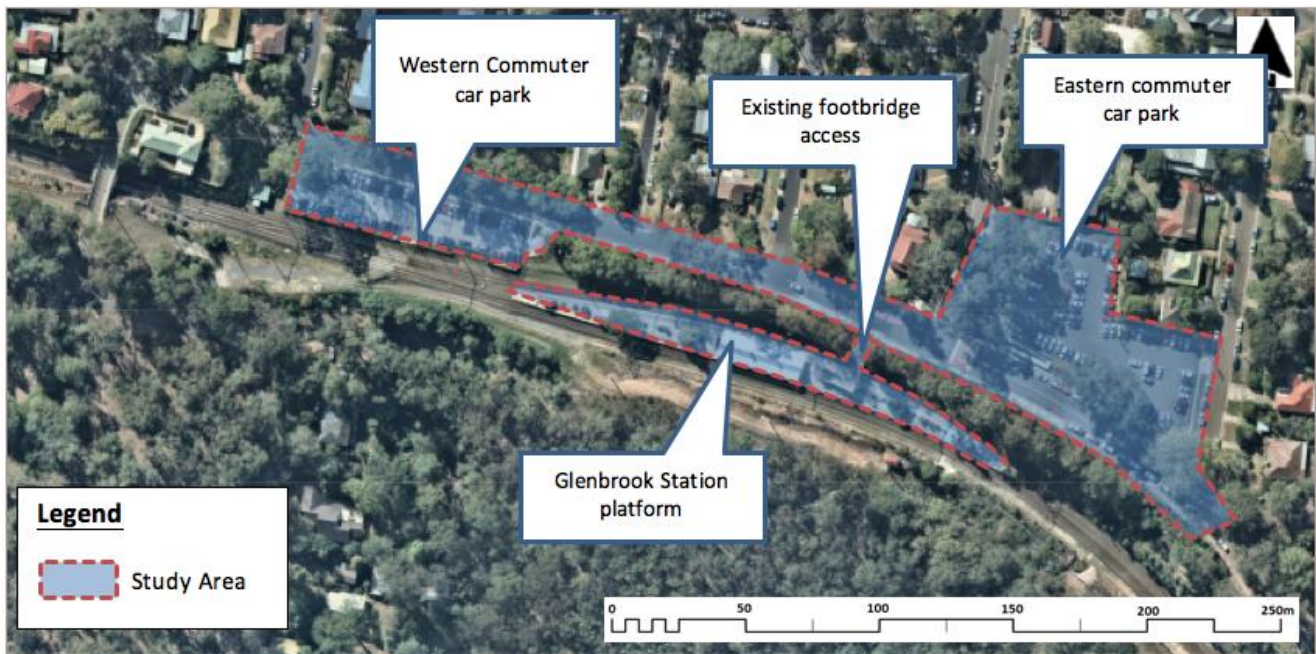
This assessment has been prepared noting the following:

- stakeholder consultation was not conducted by SLR as part of this study
- construction activity assumptions were provided by TfNSW
- no traffic, pedestrian, cyclist or parking demands surveys were conducted
- no traffic modelling was undertaken as part of this project, nor by other consultants during the concept design development phase given the Proposal is not anticipated to generate any significant additional or changes traffic demand.

1.5 Study area

Figure 1 illustrates the study area in its immediate local area context. It incorporates the station and the immediate fronting road network and two commuter car park facilities. Additional consideration is made for the area immediately surrounding the Figure 1 study area; however, it is not considered the primary area influenced by this particular Proposal.

Figure 1 Glenbrook Station – study area



Source (basemap): Nearmap (accessed 2 August 2018)

1.6 References

The following documents were used as reference as a part of this assessment:

- Australian Standards AS2890 – Part 1 (2004): Off-street car parking
- Australian Standards AS2890 – Part 6 (2009): Off-street car parking for people with disabilities
- NSW Roads and Maritime Services – Technical Direction – Stopping and Parking Restrictions at Intersections and Crossings TDT02002/12c
- an inspection of the Proposal area and its surroundings undertaken by Cardno; and
- RailCorp (May 2010). *Engineering Standard: Stations and Buildings – Station Design Standard Requirements: ESB 003 – Station Functional Spaces*
- Transport for New South Wales. (2 March 2018). *Glenbrook Station Upgrade Preliminary Environmental Assessment*
- Cardno. (6 April 2018). *Glenbrook Station Traffic, Transport and Access Impact Assessment*. From RPS correspondence dated 11 July 2018.

2 Existing conditions

2.1 Surrounding land uses

Glenbrook Station is situated on the Blue Mountains Line and is approximately 67 kilometres from Central Station. It is located within the Blue Mountains local government area to which the *Blue Mountains Local Environment Plan 2015* (BMLEP 2015) applies.

The station is bound by Burfitt Parade to the north and the Blue Mountains National Park to the south.

The Proposal is mostly located in the area zoned as SP2 Infrastructure (Rail) under BMLEP 2015, with the potential works on Burfitt Parade within an area zoned 'Deferred Matter'. The land immediate to the north of the Proposal area is zoned as Deferred Matter and is indicated to be 'Living – General' under the BMLEP 2005 and is predominantly residential.

Figure 2 Glenbrook Station – surrounding land use zoning



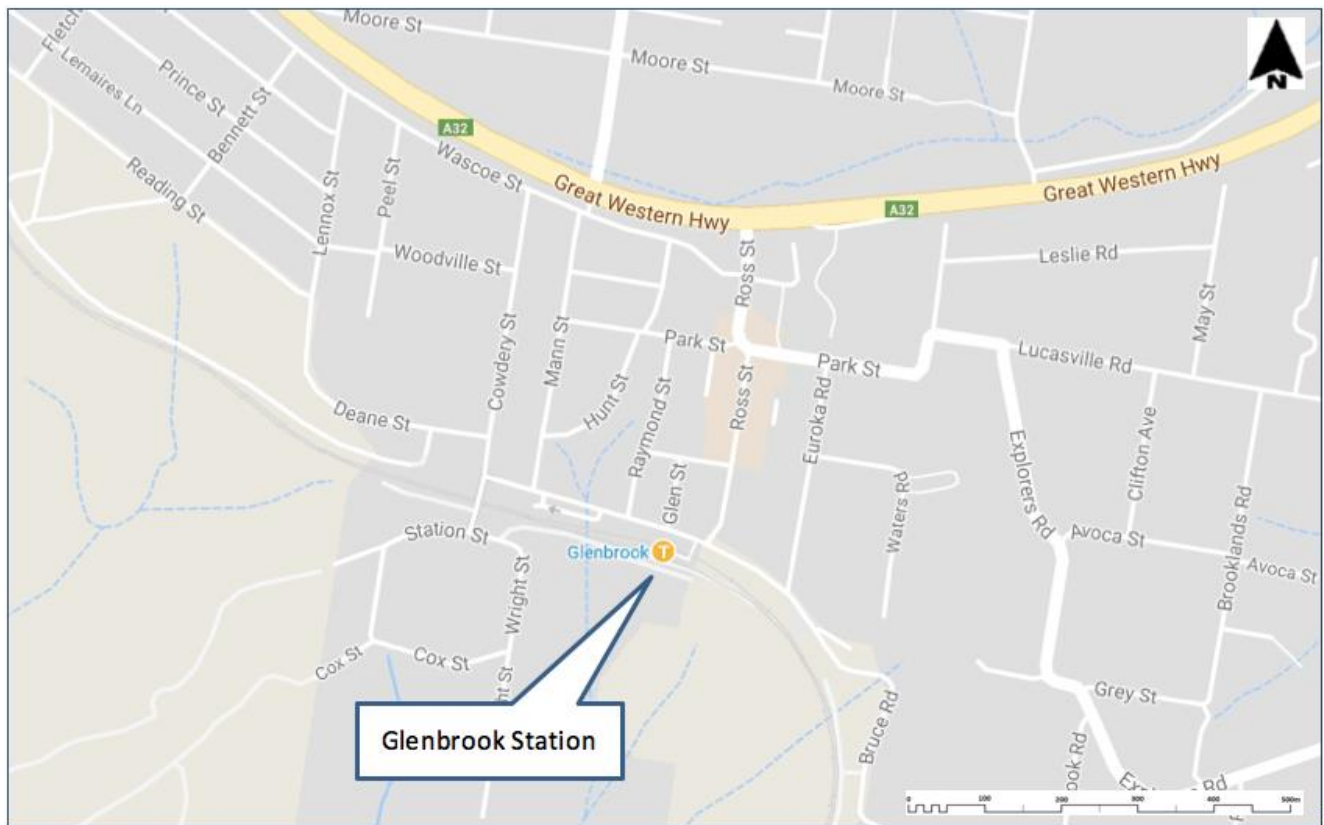
Source: Transport for NSW (2018) [modified]

2.2 Surrounding road network

Glenbrook Station is bound to the north by Burfitt Parade which has a pavement width approximating 11 metres and includes segments where kerbside parking is permitted. There are a number of roads that connect Burfitt Parade to the higher order Great Western Highway; including, Cowdery Street, Mann St, Ross Street and Station St.

The location of Glenbrook Station in the local area and road network context is illustrated in Figure 3. Table 1 summarises the specifics of a selection of key roads discussed throughout this report.

Figure 3 Glenbrook Station – surrounding road network



Source (basemap): Google Maps (accessed 2 August 2018)

Table 1 Glenbrook Station surrounding road network

Road name	Classification	Posted speed limit	School zone	Configuration
Burfitt Parade	District Road	50km/h	No	Two lane, two-way undivided
Cowdery Street	Access Road	50km/h	Yes	Two lane, two-way undivided
Mann Street	Access Road	50km/h	No	Two lane, two-way undivided
Ross Street	Collector Road	50km/h	Yes	Two lane, two-way undivided
Great Western Highway	State Road	80km/h	No	Four lanes, two-way median separated
Station Street	Access Street	50km/h	No	Two lane, two-way undivided

Road name	Classification	Posted speed limit	School zone	Configuration
Unnamed Road	N/A – unsealed/unformed		No	Unsealed / unformed

Whilst Blue Mountain Council officers have confirmed that there is no load limit in place for the Cowdery Street bridge, it is understood that the bridge is under the jurisdiction of Sydney Trains. It is understood that due to structural constraints of the bridge only cranes of appropriate size and weight will access the Proposal site via the Cowdery Street route. Larger cranes would access the Proposal site via Burfitt Parade and would be confirmed with the construction contractor prior to construction.

2.3 Station access and facilities

2.3.1 Pedestrians

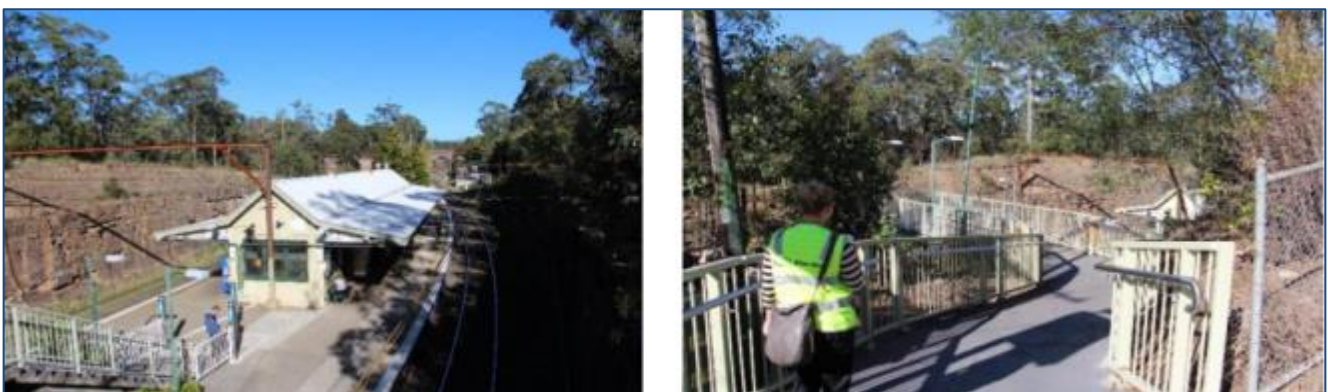
2.3.1.1 Glenbrook Station access

Pedestrian access to the station building and platform is currently only possible from the northern side of the rail line via Burfitt Parade. The station is accessed via a pedestrian ramp that is not compliant with disability standards and which leads down from the Burfitt Parade verge. The existing footbridge is approximately 2.5 metres wide and crosses over the inbound rail track with an underside clearance of 4.5 metre measured to the rail line beneath.

The station platform is an island formation which facilitates access to both the directions (in and outbound) of rail service. Pedestrian access to the existing island platform is possible via a single set of stairs which connect to the footbridge to/from Burfitt Parade.

Accordingly, the station is currently accessible via one route which is not wheelchair accessible or compliant with disability standards and also poses issues for other vulnerable customers including aged persons, parents and carers, and those with a disability.

Figure 4 Glenbrook Station – existing pedestrian access and facilities



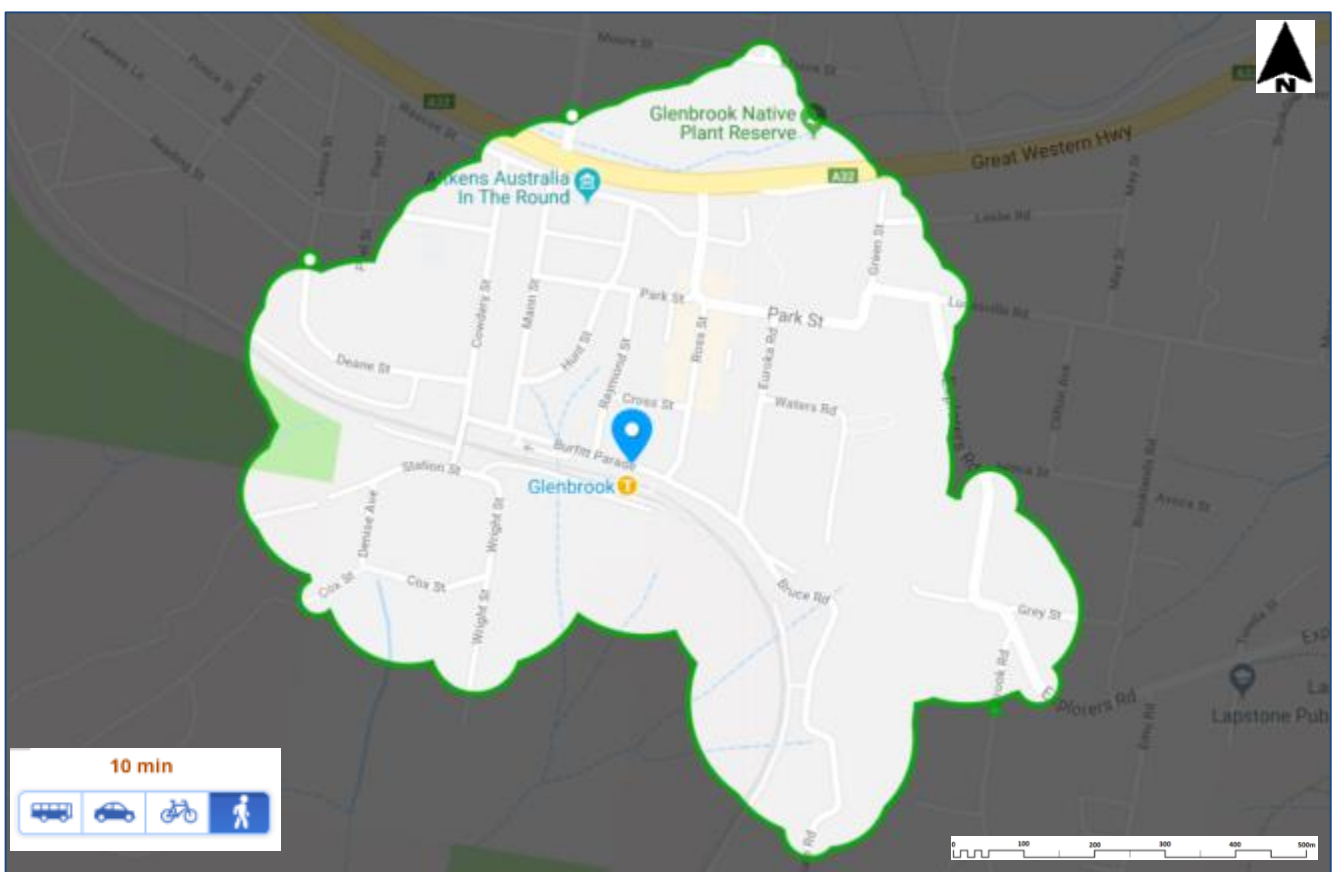


Source: Cardno (2018)

2.3.1.2 External movement network

The 10 minute walkable catchment is illustrated in Figure 5.

Figure 5 Glenbrook Station – 10 minute walking catchment



Source: walkscore.com (accessed 2 August 2018)

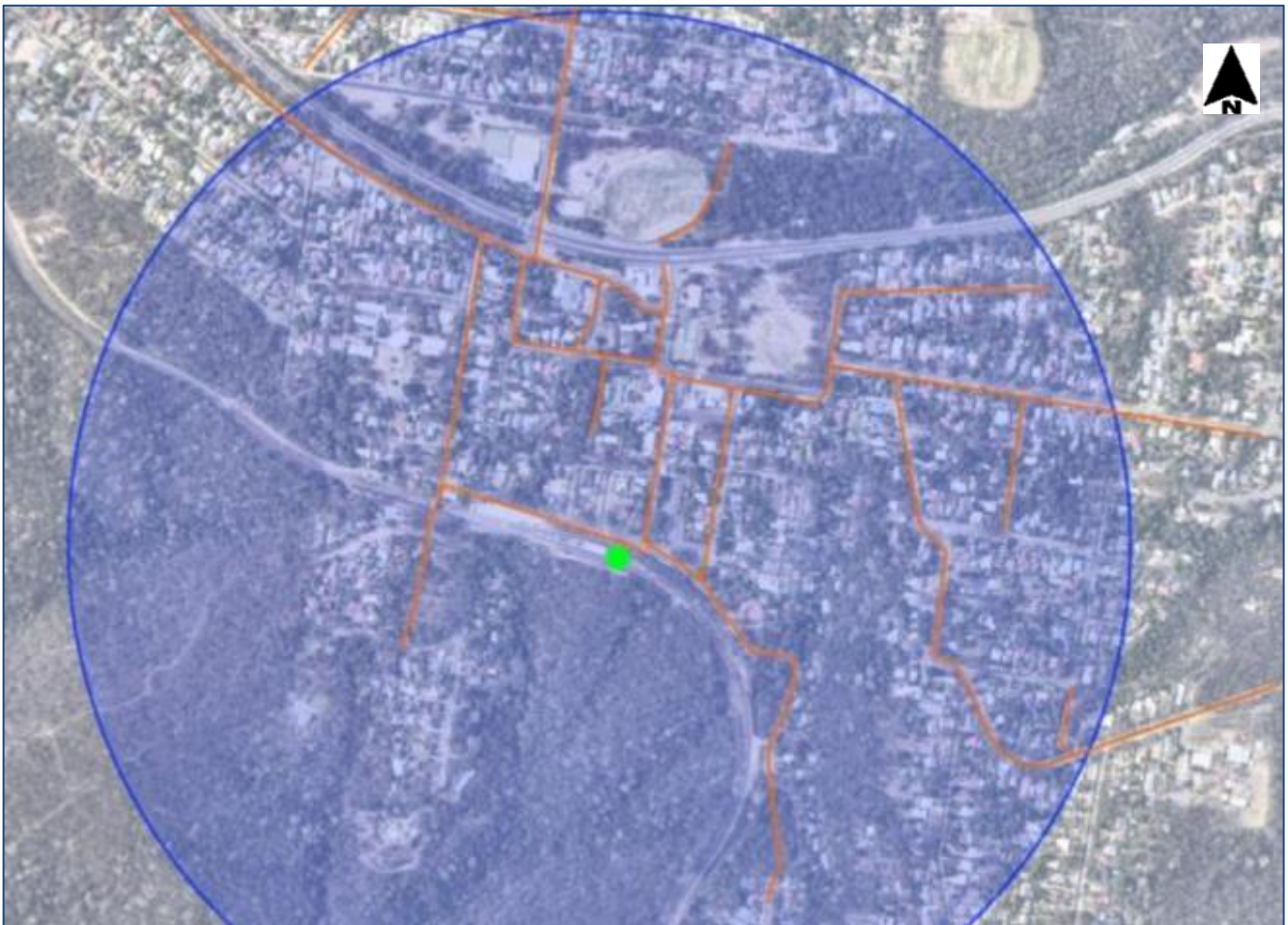
Based on a review of the local area and likely home-based origins and vehicle trip-ends, customers of station can be assumed to arrive and depart to the following locations:

- Blue Mountains Council commuter car park on the corner of Burfitt Parade and Euroka Road, east of Ross Street

- Sydney Trains commuter car park on the southern side of Burfitt Parade, west of Raymond Street
- on-street parking along Burfitt Parade
- on-street parking and further afield land uses crossing Burfitt Parade via either:
 - Cowdery Street
 - Mann Street
 - Ross Street.

Cardno's prior investigations identified the existing pedestrian network consisted of the footpaths summarised in Figure 6. They also noted the most significant north-south desire line was along Ross Street to which SLR generally agrees.

Figure 6 Glenbrook – existing pedestrian path network (Cardno 10 minute walking catchment)



Source: Cardno (2018) –

Based on a desktop review, existing footpaths appear to be generally narrow and only in the order of 1.2-1.5 metre wide.

Cardno noted further the following pedestrian infrastructure during their inspections of the Proposal area:

- two pedestrian crossings across Burfitt Parade, consisting of:
 - wombat (raised) crossing east of Ross Street

- refuge island and kerb ramps west of Ross Street.

There is a missing section of pedestrian path that should otherwise connect the western Ross Street path to the central refuge ramps (see Figure 7).

Figure 7 Burfitt Parade – missing section of pedestrian path



Source: Nearmap (accessed 2 August 2018)

Cardno observed that the “refuge island is rarely used as it is not located directly on the desire line (approximately 10 metre lateral detour) and traffic volumes are sufficiently low that a direct crossing along the desire line is convenient to interchange users.” (Cardno 2018 page 5).

It can also be observed in the Cardno reporting that there are several power utility poles located in the middle of the footpath on the southern side of Burfitt Parade. These narrow obstructed paths (seen in Figure 8) make it difficult or impossible to traverse in a wheelchair or with a pram etc.

Figure 8 Glenbrook Station – Burfitt Parade (south) – existing utility pole constraints



Source: Nearmap (accessed 2 August 2018)

2.3.2 Cyclists

2.3.2.1 Glenbrook Station access

At present, there are no means of transporting a bicycle to the station platform without having to carry it down the stairs noted earlier herein.

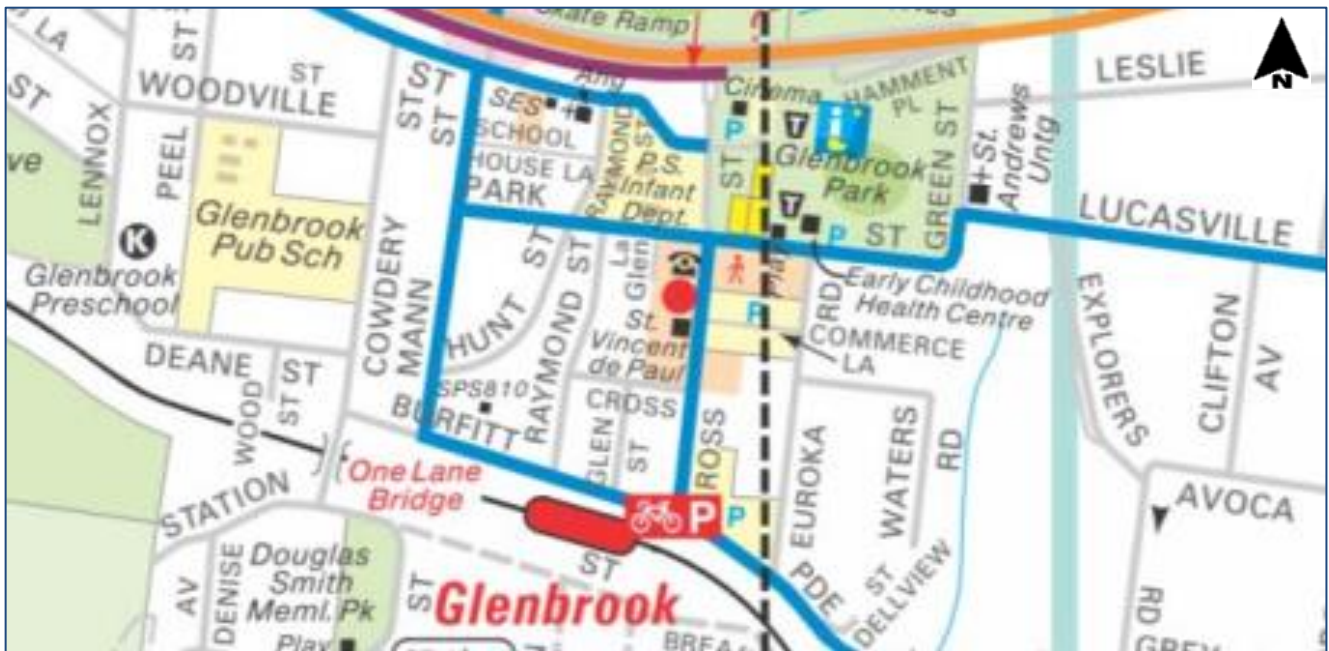
“There is a bike locker located in the Council commuter car park with capacity for 4 bicycles. These lockers are hired for long periods (e.g. 1 year) for a fee by completing an online registration form and therefore suit regular commuter cyclists rather than casual users. BMCC advised that generally 3 of the 4 lockers are hired at any one time. No other bicycle parking is provided at the interchange (e.g. u-rails, bicycle cage) which is suitable for casual users; as a result, bicycles were observed chained to fences and poles.” (Cardno 2018, Page 6)

2.3.2.2 External movement network

“City of Blue Mountains has developed a cycleway map for the use of the general public to identify the most cycle-friendly routes to travel by bike. An extract of the City of Blue Mountains Bike Plan is shown in Figure 2-13. The railway station which is highlighted by red symbol is directly accessible via on-road cycle route along Burfitt Parade which is connected to other paths along Bruce Road in the south east side of the side station and also through Ross Street and Mann Street on the north side of the station to the off road cycle lane and regional on road cycle lane along Great Western Highway.

It is noted, however, that the cycle routes illustrated on this map are not necessarily supported by infrastructure on the ground. There are no cycle lanes or shared paths on any approach route to the interchange; accordingly cyclists are required to either ride in traffic or use the footpaths illegally.” (Cardno 2018, Page 7)

Figure 9 Glenbrook Station – Blue Mountains City Council – bicycle routes



Source: Cardno (2018)

2.4 Public transport

2.4.1 Train

2.4.1.1 Services

Glenbrook Station forms part of the NSW TrainLink Blue Mountain Line which connects Sydney Central Station to Katoomba and Lithgow Stations, with one service per day in each direction extending to Bathurst. Other key stations along this line include Redfern, Strathfield, Parramatta, and Penrith.

Table 2 Glenbrook Station – number and frequency of train services

Service To/From	Operating days	Numbers of services	Service frequency
Bathurst and Lithgow to Central	Monday to Friday	32	every 60 min (approx.) in off peak every 15 min (approx.) in peak
	Weekends and holidays	26	every 60 min (approx.) in off peak every 15 min (approx.) in peak
Central to Lithgow and Bathurst	Monday to Friday	32	every 60 min (approx.) in off peak every 30 min (approx.) in peak
	Weekends and holidays	26	every 60 min (approx.) every 30 min (approx.) in peak

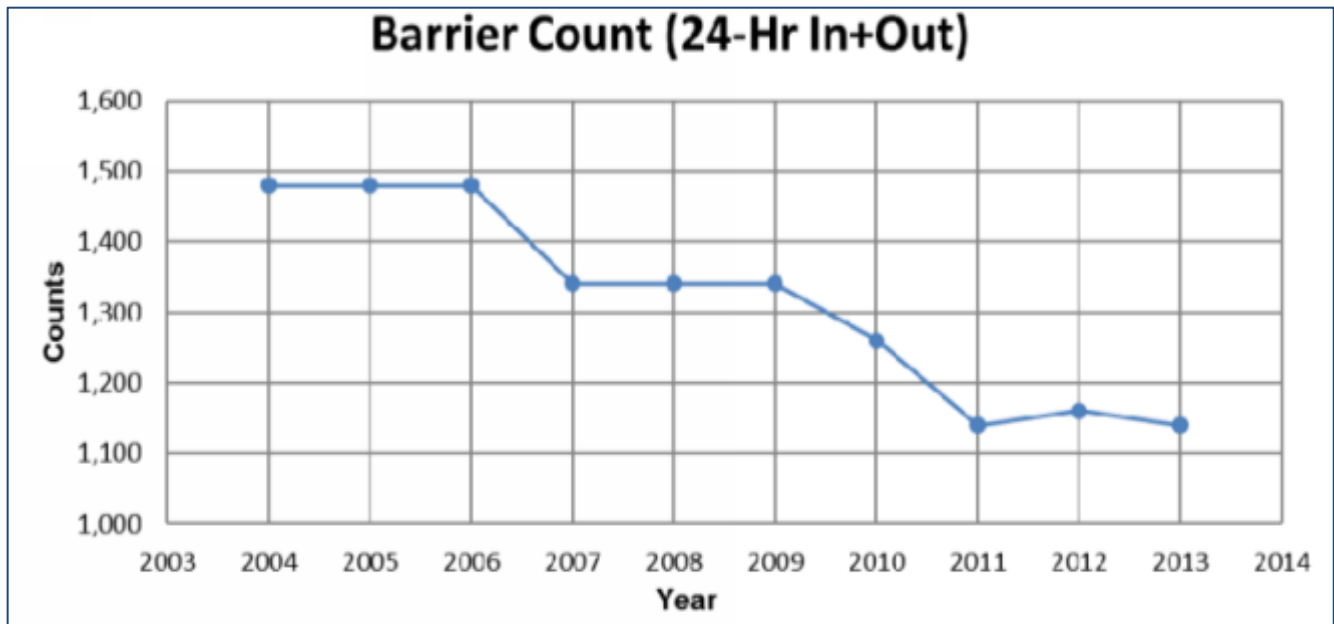
Source: <https://transportnsw.info/documents/timetables/93-BMT-Blue-Mountains-Line-20180125.pdf> (accessed 2 August 2018)

2.4.1.2 Patronage

Glenbrook Interchange is the 182nd busiest railway station on the NSW rail network; according to the NSW Bureau of Transport Statistics (BTS), rail station barrier counts, there were around 1,140 trips on a typical weekday in 2013. The trend in patronage between 2004 and 2013, by barrier counts, is shown in Figure [10]. (Cardno 2018, Page 8).

As Figure [10] shows, there were periods between 2006 and 2007 as well as between 2009 and 2011 where there was a noticeable decline of approximately 9.5% and 15% respectively. Examining the data for the other years in the series, the patronage is declining steadily from 1,480 to 1,140 between 2004 and 2013. Overall, a downward trend in patronage level is observed for Glenbrook station. (Cardno 2018, Page 9).

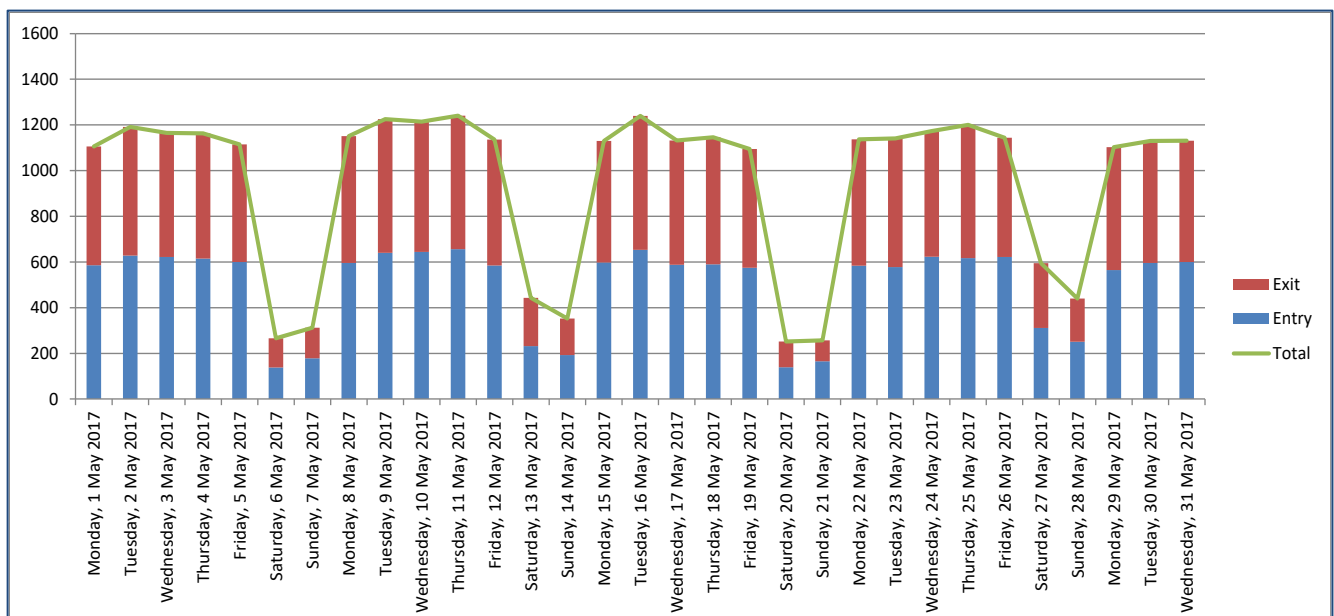
Figure 10 Glenbrook Station - rail patronage: 2004-2013, typical weekday patronage



Source: Cardno (2018)

More recent OPAL Card data collected for May 2017 has been evaluated and confirms that the prior 2011-2013 trend data for the typical weekday patronage previously reported by Cardno remains generally unchanged. The typical weekday patronage for the 23 days which form the one month period charted in Figure 11 is 1,157 persons per day.

Figure 11 Glenbrook Station - rail patronage: May 2017



Data source: Transport for NSW (email via RPS 9 August 2018)

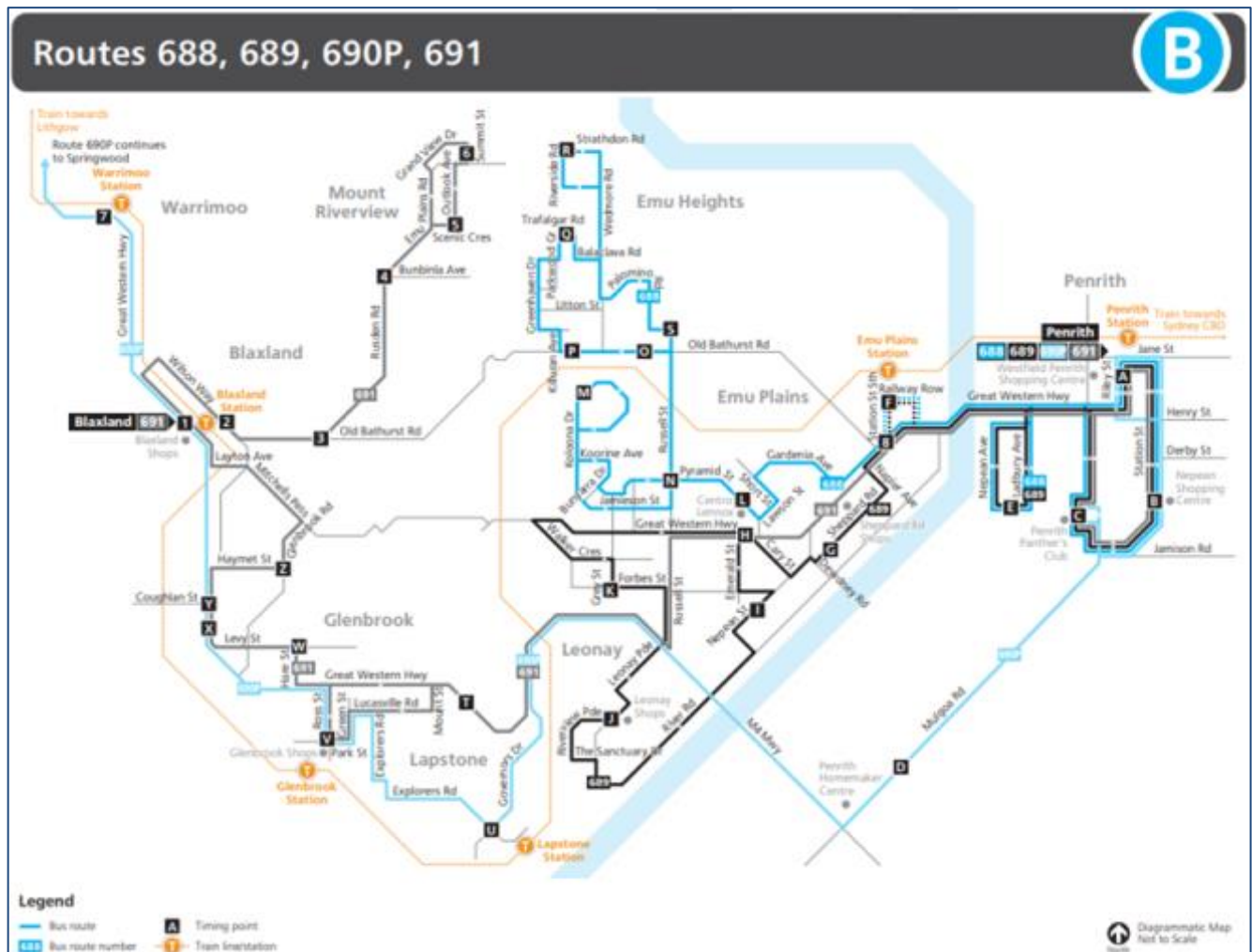
2.4.2 Bus

2.4.2.1 Services and stops

“Blue Mountains Bus Company operates the bus routes in the Blue Mountain region. A network map for Lower Mountains is shown in Figure [12]. Currently 691P which connects from Penrith to Riverview serve the Glenbrook Interchange.” (Cardno 2018, page 9)

The existing bus shelter is frequented by the 691 service operated by Blue Mountains Buses. On-site observations made by Cardno indicate that the kerbside space is primarily *“used as a taxi waiting area.”* (Cardno, 2018 page 11). This is likely a result of the very infrequent servicing consisting of one service at 5:43pm. All other 691 and 690 services occur via the bus stop located on Park Street opposite Glenbrook Park which is a 300 metre or 4-5minute walk from the station.

Figure 12 Glenbrook Station – lower mountains bus network



Source: cdcbus.com.au/blue-mtns-timetables-and-maps (accessed 2 August 2018)

Table 3 Glenbrook bus service frequency

Bus service	Day of week	Glenbrook Station	Park Street opposite Glenbrook Park
691	Weekday	5:43pm	7:50am; 8:20am; 10:26am; 12:26pm; 3:13pm
	Saturday	-	9:03am; 10:24am; 13:01am
	Sunday and holidays	-	9:57am; 12:37pm; 1:59pm
690P	Weekday	-	9:00am; 10:09am; 10:28am; 11:29am; 12:33pm; 1:30pm; 2:28pm
	Saturday	-	10:54am; 12:53pm; 2:34pm; 3:59pm
	Sunday and holidays	-	10:29am; 2:29pm

Source: <https://www.cdcbus.com.au/blue-mtns-timetables-and-maps> (accessed 2 August 2018)

2.5 Taxis

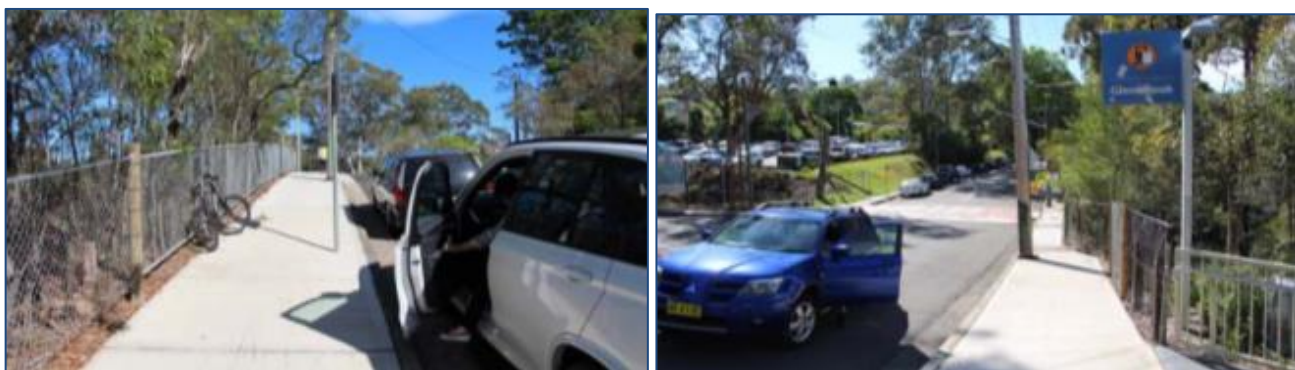
Cardno noted a taxi zone is located on the southern side of Burfitt Parade east of Ross Street. The 691 bus shelter is used by passengers waiting for a taxi. SLR Consulting notes that the desktop review did not indicate any current signage or line marking that confirm this kerbside area is formalised as a taxi stand.

2.6 Kiss and ride

“Formal kiss and ride facilities do not currently exist at Glenbrook Interchange. Two-hour time limited parking spaces are provided on both sides of Ross Street, north of Burfitt Parade, which could be utilised by kiss and ride patrons.

However, on-site observations indicated that kiss and ride activity was generally happening in the ‘No Stopping’ zone on the southern side of Burfitt Parade, west of Ross Street. This location is preferred by interchange users as it drops passengers much closer to the station entrance. (Cardno 2018, Page 11).

Figure 13 Glenbrook Station – existing kiss and ride activity



Source: Cardno (2018)

2.7 Commuter car parking

There are two commuter car parks located near Glenbrook Station, illustrated in Figure 14.

Figure 14 Glenbrook Station – existing off-street commuter parking



Source (basemap): Nearmap (accessed 10 August 2018)

“A council owned car park located on the corner of Burfitt Parade and Euroka Road. Capacity 69 bays plus 2 disabled bays. A Sydney Trains owned car park located in the rail corridor on the southern side of Burfitt Street, west of Raymond Street. Capacity 56 bays.

In addition, unrestricted on-street parking is available on Burfitt Street and Euroka Road to the east of the interchange.

The Council owned car park includes 2 disabled bays at the eastern end of the car park, adjacent to Euroka Road. These bays are not compliant with current standards and no compliant pathway is provided between them and the interchange entrance.” (Cardno 2018, page 11-12).

Observations made subsequent to the 2018 Cardno review confirm that the two existing disabled car spaces are compliant.

On-street parking without any regulated time restriction is currently available in two sections of Burfitt Parade. Approximately 19-20 cars can park parallel to the roadway within the Figure 1 study area.

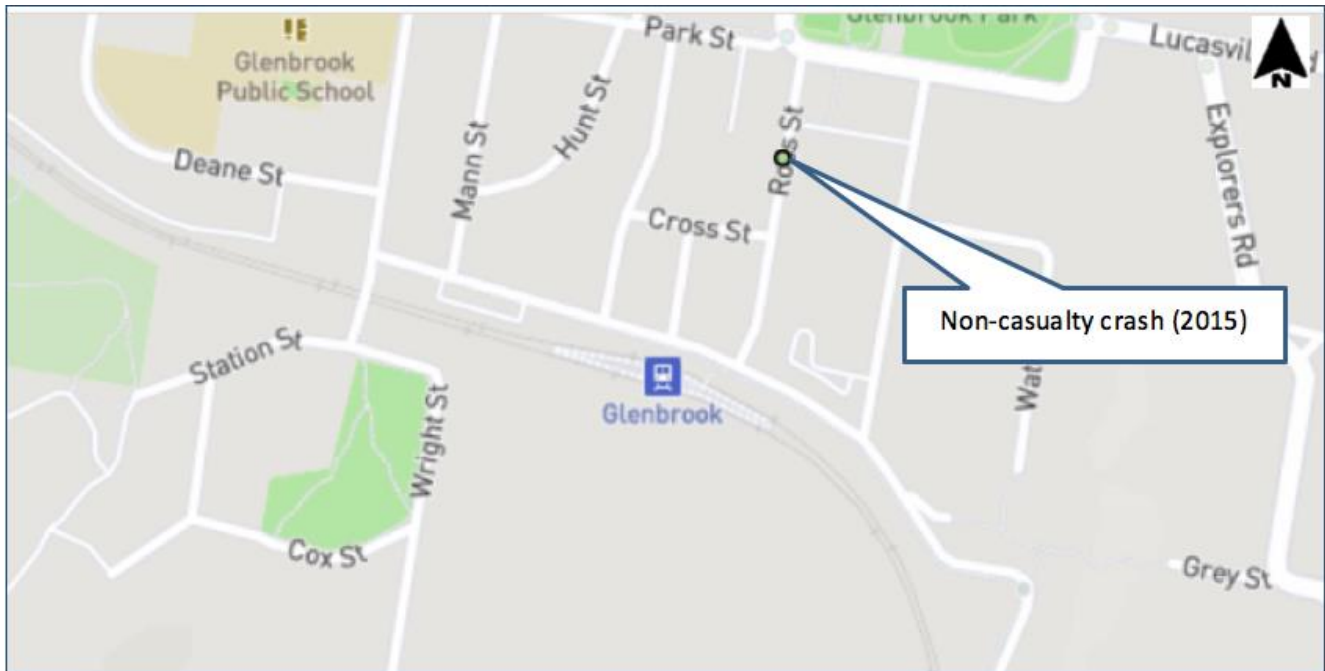
2.8 Traffic, car parking, pedestrian and cyclist demands

No demand surveys were completed by Cardno during the prior investigations and none were deemed to be warranted to inform the REF.

2.9 Transport safety

Crash information has been sourced from NSW Roads and Maritime Services for the period 2013-2017 (inclusive) for an area measuring 250 metres from the station. The data indicates only one crash was reported for the queried region. The summary results are illustrated in Figure 15 and Table 4.

Figure 15 Glenbrook – NSW RMS crash record (2013-2017 inclusive)



Source: roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats (accessed 2 August 2018)

Table 4 Glenbrook – NSW RMS crash record (2013-2017 inclusive)

Crash year	Crash location	Crash ID	Crash severity	Crash description
2015	Ross Street, between Cross Street and Park Street	1059101	Non-casualty (tow away)	Reversing into object

Source: roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats (accessed 2 August 2018)

The crash record does not indicate an existing deficiency or hazard that presents as an elevated crash rate or with non-standard or recurrent crashes.

Irrespective of the above crash record not pointing to a data-driven safety deficiency or reoccurring issue, the following transport safety concerns were noted in the immediate vicinity of the station from a desktop review:

1. generally poor quality pedestrian pathways that are narrow and cluttered with poles, posts and other obstructions
2. constrained sight distance at existing pedestrian refuge west of Ross Street
3. limited separation between pedestrian pathways and adjacent roadways
4. constrained two-way roadways where there is evidence of vehicles regularly travelling on the adjoining unsealed surface.

Figure 16 Glenbrook - safety issues noted during desktop audit



Narrow and cluttered footpaths



Constrained sight distance to/from existing crossing



Parking demand blocking pedestrian movement in the verge and forcing them into the roadway.



Narrow roadways requiring vehicles to travel in the unsealed verge adjacent to pedestrian footpath.

2.10 Existing situation summary

The existing traffic, transport and access issues can be summarised as follows based on the combined investigations undertaken by Cardno (April 2018) and SLR:

“A review of the current environment of the Glenbrook Station interchange has been undertaken in assessing the current needs of the interchange. Site observations identified the following issues:

- *there is currently no formal accessible path to the platform*
- *Burfitt Parade (which provides access to the Glenbrook interchange) has quite steep grades which makes manoeuvring difficult to and from the interchange for commuters*
- *no formal kiss-and-ride zone is provided as part of the interchange. Commuters are currently using the southern verge of Burfitt Parade, west of the interchange access, as an informal kiss-and-ride zone*

In addition to the Cardno findings reproduced above, SLR notes the following:

- bus interchange opportunities are limited in both *proximity* and *service frequency*
- there is evidence that Glenbrook Station customer parking demand far exceeds the 127 off-street parking spaces that are available across the combined council and Sydney Trains parking areas
- there is no observable safety hazard or risk evident in the reported crash records published by NSW RMS; however, the following safety issues were noted from a desktop audit of the surrounding locale:

- generally narrow and sometimes cluttered/obstructed pedestrian footpaths
- constrained sight distance at existing pedestrian refuge west of Ross Street
- limited separation between pedestrian pathways and adjacent roadways
- constrained two-way roadways with evidence that vehicles travel on the adjoining unsealed verge.

3 Proposal description

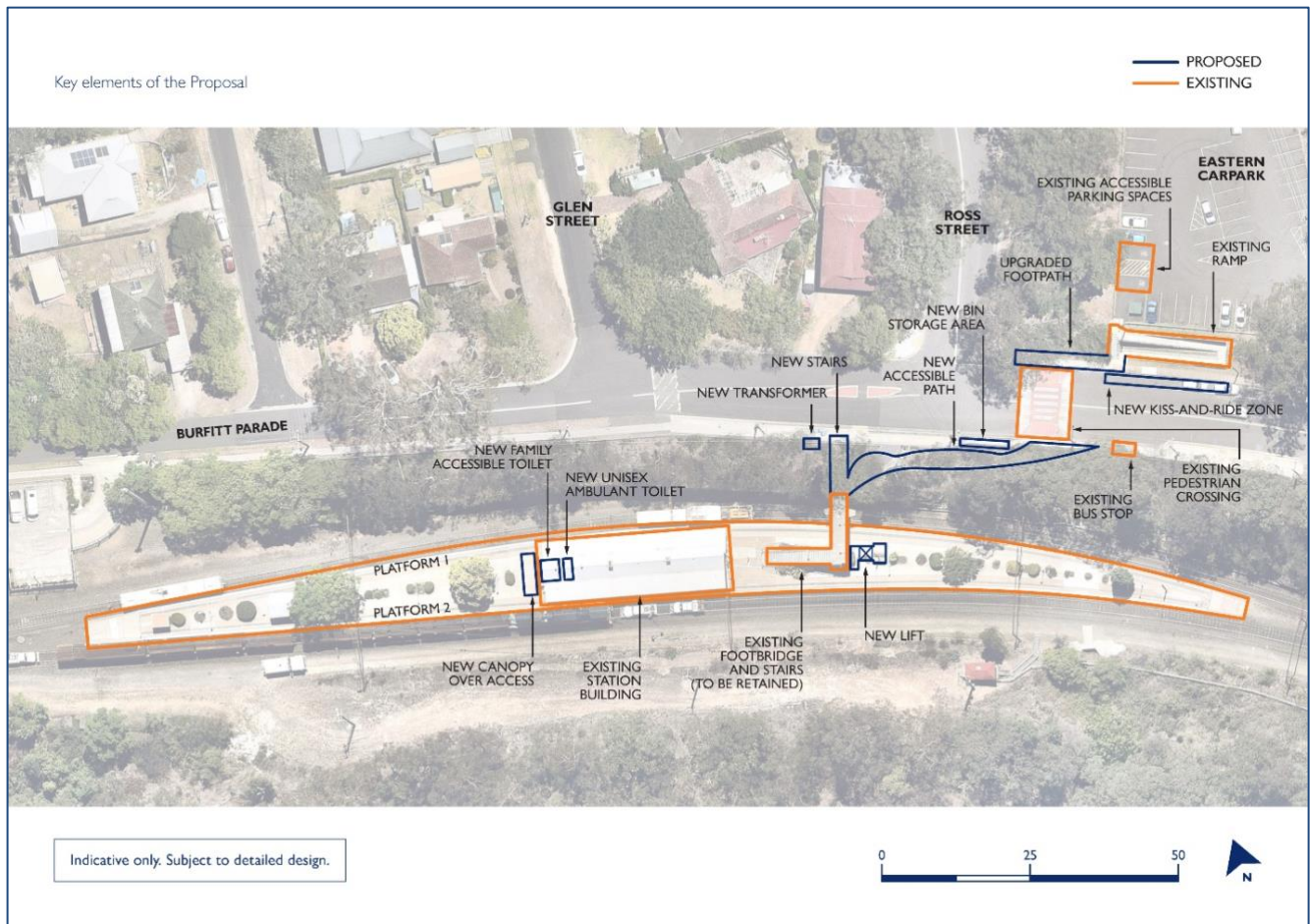
3.1 Proposal overview

The Proposal involves an upgrade of Glenbrook Station which will improve accessibility and amenity for customers. The Proposal would include the following key elements:

- installation of a new lift on the platform to provide access to the existing footbridge (footbridge and stairs to be retained)
- provision of a new station entrance which would include demolition of the existing (non-compliant) ramp from the footbridge to Burfitt Parade to be replaced with new stairs and a new accessible path from the existing footbridge extending east to the raised pedestrian crossing
- landscaping around the station entrance
- internal reconfiguration of the station building to allow for a new Family Accessible Toilet, a new ambulant toilet, communications room and staff facilities
- installation of a glass canopy at the entrance to the Family Accessible Toilet
- new formalised kiss and ride on Burfitt Parade
- installation of a pad mount electrical transformer adjacent to the new stairs
- ancillary works including lighting, fencing, new bin storage, minor drainage works, seating adjustments, improvement to station communication systems (including CCTV cameras), hearing loops, installation of wayfinding signage and other signage to identify existing and new accessible features including installation of new tactile ground surface indicators (TGSIs).

The Proposal key element plan is included at Figure 17.

Figure 17 Glenbrook Station – key features of the Proposal



Source: RPS

3.2 Station access

Details of the proposed access works to take place at the station to improve accessibility and customer experience would include:

- construction and installation of a lift on the island platform that would connect to a small extension to the existing footbridge (with covered waiting bay)
- existing footbridge and stairs to the platform to be retained but with new handrails, nosings and TSGIs installed to achieve DDA compliance
- demolition of the existing (non-compliant) ramp from the footbridge to Burfitt Parade to be replaced with new stairs and construction of a new accessible path extending further east to connect to the raised pedestrian crossing and car park
- construction of a new accessible path extending further east to connect to the raised pedestrian crossing and car park
- installation of wayfinding signage and other signage to identify existing and new accessible features including installation of TSGIs.

3.3 Station facilities

3.3.1 Bicycle parking

The Proposal does not include any new, expanded, or improved provision for end-of-trip bicycle parking beyond that which already exists on the northern side of Burfitt Parade in the council car park.

3.3.2 Taxi

No changes to the existing taxi provision forms part of the Proposal.

3.3.3 Parking

No operational changes to the existing car parking situation form part of the Proposal.

3.4 Fronting Station Facilities

3.4.1 Kiss and ride

The Proposed includes the formalisation of kiss and ride parking on the northern side of Burfitt Parade, immediately east of the existing pedestrian crossing. The passenger set-down/pick-up zone is approximately 20m long which is sufficient to accommodate three passenger vehicles. The kiss and ride facility will replace existing unrestricted kerbside parking.

3.4.2 Footpaths

The footpath located on the northern side of Burfitt Parade spanning the 20m segment between the existing pedestrian crossing and accessible ramp up/down to the eastern car park will be upgraded.

4 Operational impacts

4.1 Future station patronage

Forecast station patronage data provide by TfNSW indicates that the patronage of the Glenbrook Station will increase by 24% from 325,960 persons per year in 2012 to 402,836 persons per year in 2036. Daily patronage is projected to increase from 1,140 persons to 1,724 persons (51%).

4.2 Public transport

The relatively minor scope of works that form part of the Proposal are not anticipated to be significant enough that they would induce a material change to the existing public transport utilisation and/or capacity. Accordingly, the Proposal impacts to public transport, if any, would be minor but broadly positive given they would contribute to making travel by rail more accessible for the local community.

4.3 Pedestrians

The proposed station access improvements, including the new lift with canopy, new stairs, and new relocated accessible path to Burfitt Parade would offer pedestrian benefits. Of particular note would be an improvement to the customer experience and amenity.

The new lift to the station platform and the improved accessible path would ensure that the station is accessible from Burfitt Parade by mobility and vision impaired persons where this is not currently possible. The Proposal would also provide improved access for the elderly, people with a disability, and also people with parents and carers with prams.

The new (relocated) accessible pedestrian path would improve the station access grade to/from Burfitt Parade. The new path would also align with the existing raised crossing across Burfitt Parade which would improve legibility, wayfinding, and convenience. The improved route would better align with existing pedestrian desire lines across Burfitt Parade which appear to have been a prior issue based on the installation of kerbside fencing to physically control pedestrians crossing at locations other than the desired crossing/s.

The additional pedestrian access and egress route to Burfitt Parade created through the combination of the new accessible path and new stairs would provide some capacity benefit. Actual noticeable improvements would be marginal, if any, given the very low pedestrian demand.

The proposed access improvements on the fronting Burfitt Parade will also improve pedestrian amenity and accessibility for users travelling from the new kiss and ride facility or the existing eastern car park.

The projected increase in station patronage would increase pedestrian demand via the new accessible pathway and stairs. Noting that the existing footpaths in Burfitt Parade are already narrow and/or obstructed by utility poles and sign posts.

A pedestrian Level of Service (capacity) analysis was undertaken with respect to the both the existing footbridge that is retained and the new (relocated) pedestrian path connecting the existing bridge to Burfitt Parade. The assessment was undertaken in accordance with RailCorp's *Engineering Standard: Stations and Buildings – Station Design Standard Requirements: ESB 003 – Station Functional Spaces*, which specifies [pedestrian] "circulation during the peak (am or pm) to be designed for Fruin Level of Service C". (RailCorp, 2010 page 34)

The assessment used Fruin Theory which relies on the Pedestrian Flow Rate measured in pedestrians per-metre-per-minute (pmm).

Table 5 Pedestrian level of service on walkways

Level of Service (LOS)	Pedestrian Flow Rate (pmm)
A	0–23
B	23–33
C	33–49
D	49–66
E	66–82

The results of the pedestrian LOS assessment are summarised in Table 6 for the retained footbridge and the new accessible pathway. The pathway widths are based on the Proposal plans and the peak demands are estimated from a conservative future station patronage that exceeds that projected by TfNSW. To ensure a conservative assessment, a peak demand of 300 persons per hour and flow conversion factor of 0.5 was used to convert 15 minute demands into one minute demands instead of 0.0666.

Table 6 Glenbrook Station - pedestrian level of service assessment

Path Location	Peak Demand (p/60 min)	Design Demand (p/15 min)	Design Demand (p/ min)	Pathway Width	Pedestrian Flow Rate (pmm)	Level of Service
Existing (retained) footbridge	300	75	38	2.65	14-15	A
New (relocated) pedestrian path	300	75	38	2.00	19	A

The Table 6 results indicate that the retained bridge and new accessible pathway would operate well within typically adopted performance thresholds with a LOS A noted during a design peak event.

4.4 Cyclists

No new bicycle facilities are provided as part of the Proposal. Whilst the Proposal in and of itself will not directly impact bicycle users, the lack of new or improved end-of-trip parking would exacerbate the current observed issues whereby bicycles are locked against fences, sometimes obstructing pedestrian movement in and along the footpaths. This current behaviour resulting from a shortfall in bicycle parking is projected to worsen incrementally as the station patronage increases into the future.

4.5 Taxis

No new or improved taxi facilities are provided as part of the Proposal. Whilst the Proposal is not anticipated to generate any direct impact with respect to taxis, except that there may be a minor increase in demand arising from an increase in station utilisation by aged persons and those with a disability whom are more likely to rely on travel by taxi, the impact of the current general lack of taxi facilities is projected to worsen as the station patronage increases into the future.

4.6 Kiss and ride

The kiss and ride facility that forms part of the Proposal will improve pedestrian amenity and accessibility by reducing the distance of walking trips. Additionally, the facility will provide a safer alternative to the current ad-hoc set-down/pick-up behaviours that have been identified. The formalisation of this facility will also improve vehicle flow and safety as motorists are not required to prop fully or partially within the Burfitt Parade traffic lane.

The kiss and ride facility will reduce the current supply of on-street car parking by three spaces. This loss is considered reasonable when viewed in the context of customers served by the kerbside space:

- existing situation = 3 long-term car parking spaces – likely only three customers served by day
- proposed situation = 3 kiss and ride spaces – projected 50-100 persons per day based on observations.

4.7 Road network

The Proposal would increase accessibility to Glenbrook Station and improve the customer experience and amenity, likely leading to a minor increase in utilisation and patronage. This would manifest in customers either travelling by train where they did not before, or by changing from another nearby station.

Accordingly, there may be some minor increase in traffic generation; however, it is projected to be minor and would have a negligible impact on the surrounding road network or the amenity of local residents. Importantly, the Proposal would not bring about a change in motorist behaviour nor will it introduce or require changes in current travel behaviours and patterns.

4.8 Car parking

The Proposal will result in a loss of three existing on-street car parking spaces on the northern side of Burfitt Parade so as to accommodate the new kiss and ride facility. As noted above, this change is not projected to have a material impact on parking and the change will result in an overall improvement given the formalisation of set-down/pick-up parking.

Similar to the discussion relating to traffic generation, the Proposal has the potential to increase parking demand by some minor amount given the accessibility improvements may lead to a small increase in station utilisation and patronage.

4.9 Property access

The Proposal is not expected to have any impact on existing access to properties in the vicinity of the Glenbrook Station.

4.10 Transport safety

The Proposal should improve pedestrian safety given the relocation of the station access such that it better aligns with the existing raised crossing across Burfitt Parade. The natural pedestrian desire line would be further supported which should reinforce improved user behaviours which in turn will limit the length of Burfitt Street through which there are conflicts between pedestrians and vehicles.

5 Construction impacts

5.1 Construction works

The key construction activities for the Glenbrook Station Upgrade can be summarised as follows:

- construction of a new lift on the platform island
- demolition of the existing (non-compliant) station pedestrian access ramp
- construction of new station access stairs
- construction of new pedestrian access path
- install new wayfinding signage
- install new TGSIs and stair handrails
- internal construction/reconfiguration of existing station building
- ancillary works (electrical wiring, minor drainage works, CCTV and communications improvements, landscaping).

5.2 Construction hours

Most of works required for the Proposal would be undertaken during standard (NSW) Environment Protection Authority (EPA) construction hours, which are as follows:

- 7.00 am to 6.00 pm Monday to Friday
- 8.00 am to 1.00 pm Saturdays
- no work on Sundays or public holidays.

Certain works may need to occur outside standard hours and would include night works and works during routine rail shutdowns, which are scheduled closures that would occur regardless of the Proposal when part of the rail network is temporarily closed and trains are not operating.

Out of hours works are required in some cases to minimise disruptions to customers, pedestrians, motorists and nearby sensitive receivers; and to ensure the safety of railway workers and operational assets. It is estimated that approximately three rail shutdowns would be utilised to facilitate the following:

- electrical upgrades (such as the installation of transformer)
- excavation and installation of the lift
- works to the footbridge (extension, waiting bay, hand rails etc)
- platform works (such as regrading, trenching for power/communications systems)

Out of hours works may also be scheduled outside rail shutdown periods. Approval from TfNSW would be required for any out of hours work and the affected community would be notified as outlined in TfNSW's *Construction Noise and Vibration Strategy* (TfNSW, 2018b).

5.3 Construction period

Subject to approval, construction is expected to commence in early 2019 and would require approximately 12 months to complete. The timing is dependent on track possessions. The construction methodology will be further developed during the detailed design of the Proposal by the nominated Contractor in consultation with TfNSW.

The proposed construction activities for the Proposal are identified in Table 7. This staging is indicative and is based on the current concept design and may change as the design is progressed with a detailed methodology. The staging would also be dependent on the nominated Contractor's preferred methodology, program and sequencing of work.

Table 7 Indicative construction staging for key activities

Construction Phase	Construction Activities
Site establishment and enabling works - Stage 1	<ul style="list-style-type: none"> ▪ establishment of site compound (erect fencing, tree protection zones, site offices, amenities and plant/material storage areas etc) ▪ removal of vegetation to allow for construction of new accessible path and stairs ▪ removal of minor landscaping, where required, on the platform to enable lift installation ▪ service/utility relocation/upgrade where required ▪ installation of safety barriers and hoarding around the nominated work zones on the platform
Access ramp, lift and stairs construction - Stages 2 and 3	<ul style="list-style-type: none"> ▪ demolition of existing structures such as the ramp and stairs ▪ construction of lift well and installation of lift ▪ construction/installation of accessible path and stairs including upgrade of hand rails, treads and fencing ▪ installation of fixtures, lighting and CCTV cameras in the areas of the upgrade such as the lift
Platform and station building works - Stage 4	<ul style="list-style-type: none"> ▪ platform resurfacing and raising/regrading ▪ installation of TGSIs ▪ construction of Family Accessible Toilet and associated canopy (mechanical/electrical fit out and drainage works) ▪ modifications to ticket/customer information window ▪ removal of minor landscaping, where required, on the platform adjacent to the station building ▪ removal, relocation and installation of seating adjacent to the lift area ▪ installation of lighting, hearing loop and CCTV
Interchange works – Stage 4	<ul style="list-style-type: none"> ▪ creation of the formal kiss and ride ▪ bin storage area relocation ▪ replanting/landscaping, fencing adjustments and bollards at the station entrance and where appropriate on the platform
Electrical upgrades – Stage 4	<ul style="list-style-type: none"> ▪ electrical and power supply upgrade works – such as installation of the transformer
Signage – Stage 4	<ul style="list-style-type: none"> ▪ installation of wayfinding signage
Testing and commissioning – Stage 5	<ul style="list-style-type: none"> ▪ testing of all new systems and the lift ▪ removal of all construction hoarding ▪ removal of the site compound ▪ defect resolution.

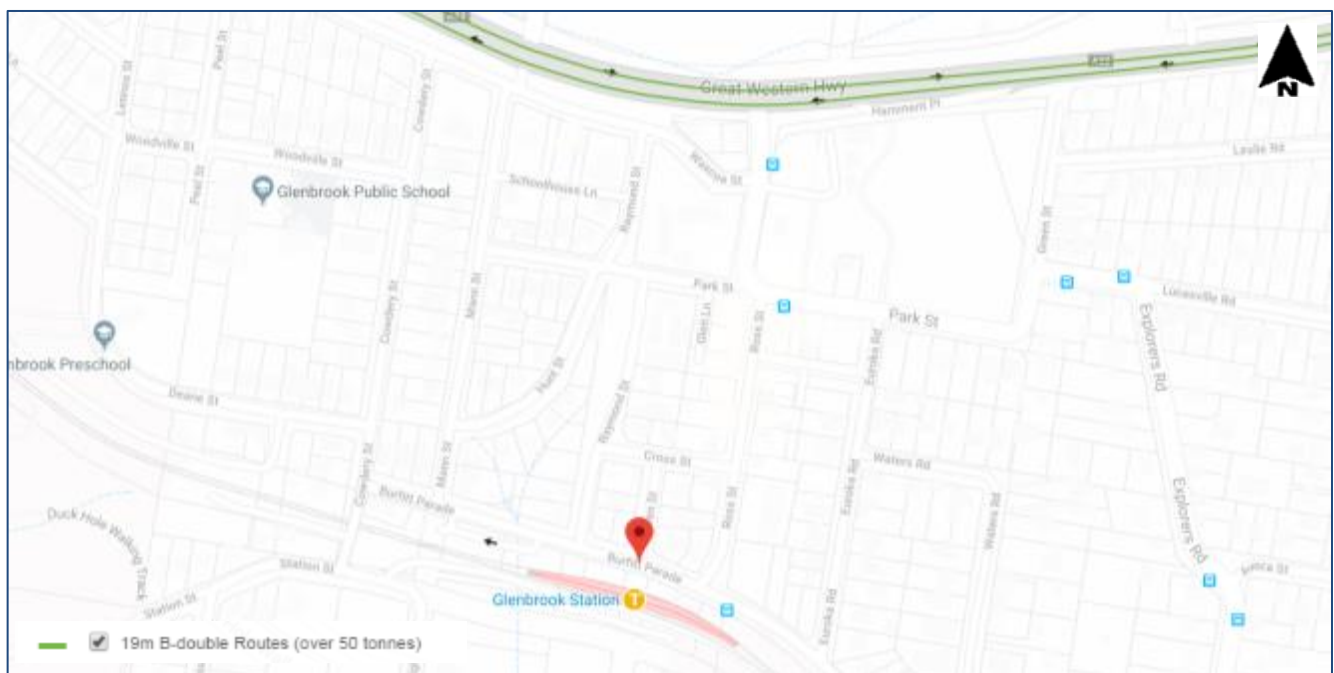
5.4 Haulage routes

Glenbrook Station is surrounded by lower order roads and streets which facilitate a combination of:

- direct property access
- local town centre (main street)
- School Zones.

Mapping prepared by the National Heavy Vehicle Regulator (NHVR) illustrates that the Great Western Highway can accommodate some larger vehicles including High Mass Limit 19 metre B-Doubles / Performance Based Standard Level 1 trucks.

Figure 18 NSW RMS approved 19 metre B-Double GML/CML network

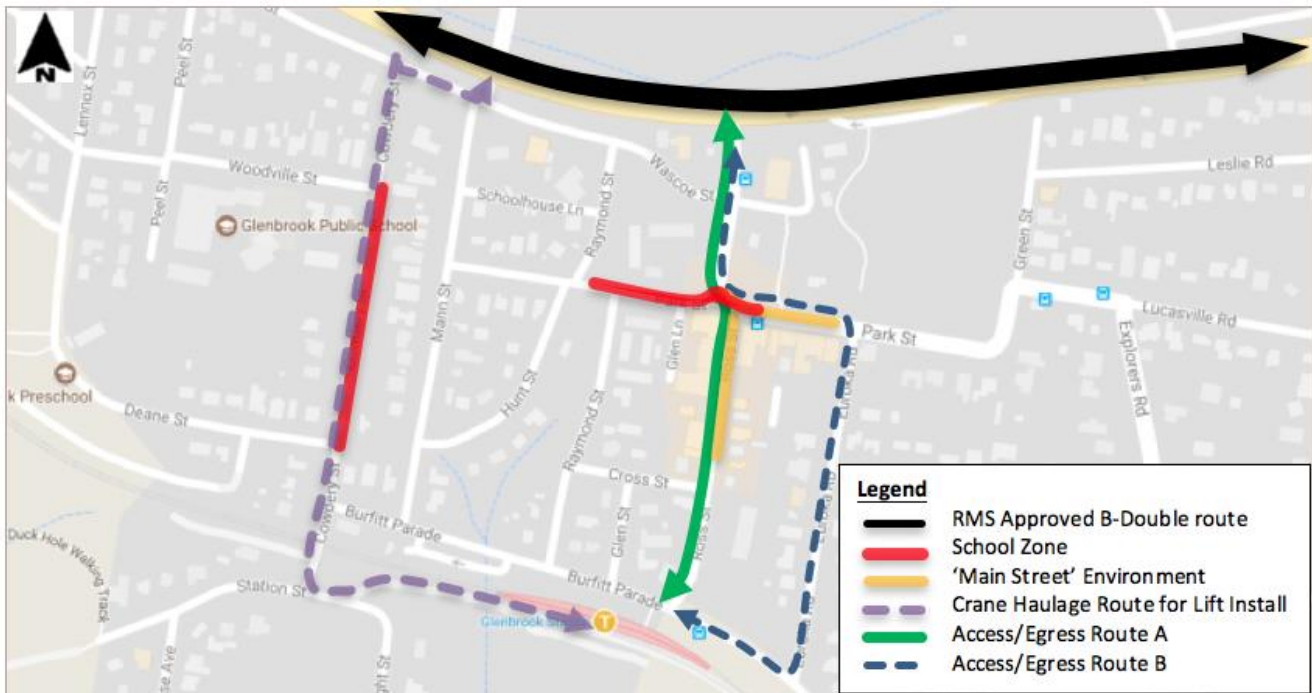


Source: <http://www.rms.nsw.gov.au/business-industry/heavy-vehicles/maps/restricted-access-vehicles-map/map/index.html> (accessed 2 August 2018)

Figure 19 illustrates a preliminary consideration of construction traffic routes that should be refined and resolved by the nominated Contractor as the detailed planning progresses. The routes are based on the observations and findings reported herein and seek to use higher order street connections whilst also avoiding unnecessary travel, interactions with other users of the transport system and sensitive land uses.

TfNSW have proposed that the delivery of large construction elements including the new lift would occur via a crane travelling over the existing Cowdery Street bridge. Blue Mountains Council officers have confirmed that they are not aware of any load limits for this section of road. For the purposes of the Proposal TfNSW have advised that only cranes of an appropriate size and weight would be used along the Cowdery Street bridge due to the structural constraints of the bridge. Should a larger crane be required it would access the Proposal area via Burfitt Parade. Crane sizes would be confirmed with the construction contractor prior to construction.

Figure 19 Preliminary large construction vehicle routes



Source (basemap): Google Maps

5.5 Work induction

All workers and subcontractors involved in the construction works will be required to undertake a site induction before commencing work. It is recommended that work induction include the permitted access routes, driver and worker protocols, emergency procedures, WHS requirements and environmental measures. All workers, including construction and traffic controllers, are to hold all appropriate licences.

5.6 Pedestrian impacts

The following impacts to pedestrians/ rail customers are anticipated to arise from construction activities:

- longer temporary walking distances during the demolition of the existing station access ramp and construction of new stairs and access path
- potential higher levels of platform congestion arising from localised restrictions/narrowing of portions of the platform temporarily fenced off during construction of the lift and internal station building modifications
- elevated frequency of pedestrian and truck interaction on Burfitt Parade and local road network during the construction period
- potential confusion and loss of amenity for customers during the temporary relocation or station entrances; and, potential footpath closures and/or diversions where strictly necessary
- delays to customers arising during construction including management of traffic and work activities
- higher road safety risk levels associated with construction vehicle-pedestrian interaction, particularly on Burfitt Parade.

These impacts are considered to be manageable subject to a detailed Construction Environmental Management Plan (CEMP) being prepared by a suitably qualified person or agency, either directly or in partnership with the nominated Contractor. The CEMP would be prepared in the next phase of the Proposal as construction activities and works programmes are resolved and should identify strategies, work practices, and traffic control plans that avoid, reduce and mitigate safety risks for all users of the transport system including customers of the Glenbrook Station.

5.7 Traffic impacts

The following is a summary of vehicular-based construction, plant, and equipment that is likely to be used:

- trucks (various types and sizes e.g. skip trucks and suction trucks)
- mulcher
- piling rig
- franna/ mobile cranes (75 up to 300 tonnes)
- bobcat
- excavator
- concrete pump
- concrete truck
- lighting tower
- road based elevated work platform
- forklift
- vibrating roller/compaction plate.

The types, sizes, duration of stay, and demand for each of these envisaged vehicle types will vary depending on the required use and can only be confirmed once the nominated Contractor has been confirmed and resolved their construction approach and programme.

Typically, construction trucks travelling on the external road network would consist of medium and large rigid vehicles and articulated vehicles. Specific oversize vehicles may be required for specialist construction activities; however, specific permits would be required for such movements.

The traffic generated during construction activities is likely to vary during the construction period and will increase during weekend possession works which would occur throughout the construction period. The exact number and type of construction vehicle movements is not known at this time. It is noted that based on the relatively minor nature of the construction activities and lower order nature of vehicle and person movements in the immediate vicinity of the site, that traffic impacts arising from the Proposal during construction would be minor and manageable subject to the preparation and activation of Construction Traffic Management Plans (CTMPs) that would be prepared as part of a broader Construction Environmental Management Plan (CEMP).

The CEMP and CTMP would need to be prepared by a suitably qualified practitioner and consider special or at-elevated risk land uses including schools and lower order residential routes. Consideration should be made to avoid construction vehicle activity in Ross Street (north of Park Street) during School Zone periods.

The CTMPs would need to detail how the interaction between the work sites and street frontages (including traffic and pedestrians) would be managed. Typically, accredited personnel would need to be deployed to ensure safety for all users at all times.

The CTMPs would need to detail how construction associated with works on weekends would be managed. In particular, potential weekend road closures relating to track possessions need to be identified in the CTMPs and suitable alternative access routes provided in consultation with NSW RMS and Blue Mountains City Council.

5.8 Parking impacts

A temporary construction compound would be required to accommodate a site office, amenities, laydown and storage area for materials. An area for a construction compound has been proposed within the western car park on Burfitt Parade (see Figure 20). The area nominated for the compound is on land owned by RailCorp.

Figure 20 Proposed construction compound



Source: RPS

The proposed use of the car park as a site compound would result in a temporary reduction of approximately 10 parking spaces available to Glenbrook Station customers during the construction period. Whilst not insignificant, this parking supply reduction can be accommodated in the surrounding street network.

Given the location for the proposed compound and the fact that parking demands are already high in the surrounding locale, it is recommended that construction workers should be encouraged to travel via non-private vehicle modes or to travel with workmates/carpool where possible. Construction workers should be strongly persuaded from parking in the council or Sydney Trains car parking facilities, or in other nearby streets that would be most convenient for station customers.

Prior notice should be given if additional material temporary losses in existing public car parking is planned during the construction period.

5.9 Recommended mitigation measures

Irrespective of the anticipated construction period impacts being seen as manageable, of construction on traffic operation of the surrounding network, a CTMP inclusive of detail Traffic Control Plans (TCP) would need to be prepared and submitted to the NSW RMS and/or Council.

The Contractor should prepare CTMP for each phase of construction. The CTMP should specify the following:

- construction approach and staging
- construction traffic demands
- construction parking strategy
- construction vehicle travel routes
- road closures and alternative routes
- compound access and egress locations.

TCPs incorporate standard signage informing users of the transport system of temporary changes implemented to accommodate construction activity including heavy vehicle movements, lane/path closures and/or diversions, changes in speed limits, and the possible need to stop if directed, etc. This should include static signage installed in advance of, and throughout the works precinct.

Other possible mitigation measures to minimise traffic impacts during construction of the station upgrade should generally include:

- appropriate traffic management, including static signs, manual traffic control and provision of temporary barriers to control the proposed work areas and minimise delays
- establishment of safe access points to work areas from the adjacent road network including safety measures such as barriers and warnings to pedestrians, maintaining sight distance requirements and signage and the provision of traffic management measures such as those identified above
- establishment of temporarily realigned vehicle and/or pedestrian facilities
- use of traffic controllers to negotiate pedestrian and construction vehicle priority and access, if required
- limit Cowdrey St overbridge access usage to off-peak hours periods including non-school zone periods
- allocate construction parking within the rail corridor access road south of the station to avoid impact on local resident street parking availability.

6 Summary, conclusions and recommendations

The relatively minor scope of the Proposal is not anticipated to result in any material operational impacts. The Proposal will improve pedestrian connectivity and amenity, for all users including persons who experience mobility impairments.

- new kiss and ride will provide convenient a direct facility for customers travelling to/from the station as a vehicle passenger
- new stairs and accessible path will improve user accessibility and amenity by providing a wider paths routes with flatter grades
- new lift will improve user accessibility and amenity by providing an alternative to stairs to the platform
- upgraded footpath on Burfitt Parade (north) will improve accessibility and amenity between the station and the existing eastern car park and new kiss and ride facility by providing a wider path with flatter grades

The following key construction-stage impacts are likely to be generated:

- increased construction vehicle traffic including light and heavy vehicles within the station precinct and along local streets, most likely in particular Ross Street and Euroka Street
- loss of 10 existing commuter car parking spaces in the Sydney Trains car park
- increased demand for all-day parking for construction staff
- potential confusion and loss of amenity to customers accessing the station via temporary and changed facilities during construction
- minor travel delays on account of likely TCP implementation requiring some users to stop for construction traffic
- reduced access to Cowdrey St overbridge.

It is recommended that a Construction Traffic Management Plan be prepared during detailed design prior to construction.

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