NSW GOVERNMENT | Transport for NSW

Harris Park Station Upgrade

Review of Environmental Factors

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Harris Park Station Upgrade Review of Environmental Factors

Transport Access Program
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Abbreviations

Term	Meaning
AHIMS	Aboriginal Heritage Information Management System
ASA	Assets Standards Authority (refer to Definitions)
CBD	Central Business District
CCTV	Closed Circuit TV
CEMP	Construction Environmental Management Plan
CLM Act	*Contaminated Land Management Act 1997*
CNVMP	Construction Noise and Vibration Management Plan
CPTED	Crime Prevention Through Environmental Design
CTMP	Construction Traffic Management Plan
DBH	Diameter Breast Height
DDA	*Disability Discrimination Act 1992* (Commonwealth)
DSAPT	Disability Standards for Accessible Public Transport
ECM	Environmental Control Map
EMS	Environmental Management System
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development (refer to Definitions)
FM Act	*Fisheries Management Act 1994*
Heritage Act	*Heritage Act 1977*
ICNG	*Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009)
Infrastructure SEPP	*State Environmental Planning Policy (Infrastructure) 2007*
LEP	Local Environmental Plan

Term	Meaning
LGA	Local Government Area
NCA	Noise Construction Area
NES	National Environmental Significance
NML	Noise Management Level
Noxious Weeds Act	*Noxious Weeds Act 1993*
NPW Act	*National Parks and Wildlife Act 1974*
NSW	New South Wales
OEH	NSW Office of the Environment and Heritage
PoEO Act	*Protection of the Environment Operations Act 1997*
RailCorp	Rail Corporation of NSW
RBL	Rating Background Level
REF	Review of Environmental Factors (this document)
Roads Act	*Roads Act 1993*
Roads and Maritime	NSW Roads and Maritime Services (formerly Roads and Traffic Authority)
SEPP	State Environmental Planning Policy
TfNSW	Transport for NSW
TPZ	Tree Protection Zone
TSC Act	*Threatened Species Conservation Act 1995*
UDLP	Urban Design and Landscaping Plan
VOC	Volatile organic compound
WARR Act	*Waste Avoidance and Resource Recovery Act 2001*

Definitions

Term	Meaning
Assets Standard Authority	The ASA is an independent body within TfNSW, responsible for engineering governance, assurance of design safety, and ensuring the integrity of transport and infrastructure assets. Design Authority functions formerly performed by RailCorp are now exercised by ASA.
Concept design	The concept design is the preliminary design presented in the REF, which would be refined by the Contractor (should the Proposal proceed) to a design suitable for construction (subject to TfNSW acceptance). TfNSW contracts a single entity (the Contractor) to further develop the concept design to a level suitable for construction. The Contractor therefore becomes responsible for all work on the project.
Design and construct contract	A method to deliver a project in which the design and construction services are contracted by a single entity known as the Contractor. The Contractor completes the project by refining the Concept Design presented in the REF (subject to TfNSW acceptance) to be suitable for construction. The Contractor is therefore responsible for all work on the project, both design and construction.
Disability Standards for Accessible Public Transport	The Commonwealth *Disability Standards for Accessible Public Transport 2002* ("Transport Standards") (as amended) are a set of legally enforceable standards, authorised under the Commonwealth *Disability Discrimination Act 1992* (DDA) for the purpose of removing discrimination 'as far as possible' against people with disabilities. The Transport Standards cover premises, infrastructure and conveyances, and apply to public transport operators and premises providers.
Ecologically Sustainable Development	As defined by clause 7(4) Schedule 2 of the EP&A Regulation. Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends are maintained, and the total quality of life, now and in the future, can be increased.
Feasible	A work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements.
Interchange	Transport interchange refers to the area/s where passengers transit between vehicles or between transport modes. It includes the pedestrian pathways and cycle facilities in and around an interchange.
Noise sensitive receiver	In addition to residential dwellings, noise sensitive receivers include, but are not limited to, hotels, entertainment venues, pre-schools and day care facilities, educational institutions (such as schools, TAFE colleges), health care facilities (such as nursing homes, hospitals), recording studios and places of worship/religious facilities (such as churches).
Opal card	The integrated ticketing smartcard being introduced by TfNSW.
Proponent	A person or body proposing to carry out an activity under Part 5 of the EP&A Act - in this instance, TfNSW.
Proposal site	The immediate location of the Proposal, which is the area that has the potential to be directly disturbed during construction.

Term	Meaning
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.
Reasonable	Selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure.
Sensitive receivers	Land uses which are sensitive to potential noise, air and visual impacts, such as residential dwellings, schools and hospitals.
Study area	Consists of land in the vicinity of the proposal site, including land that has the potential to be indirectly impacted by the Proposal.
Sydney Trains	From 1 July 2013, Sydney Trains replaced CityRail as the provider of metropolitan train services for Sydney.
Tactiles	Tactile tiles or tactile ground surface indicators (TGSIs) are textured ground surface indicators to assist pedestrians who are blind or visually impaired. They are found on many footpaths, stairs and train station platforms.
The Proposal	The construction and operation of the Harris Park Station Upgrade.
Vegetation Offset Guide	The TfNSW guide that applies where there is vegetation clearing proposed, and where the impact of the proposed clearing is not deemed 'significant' for the purposes of section 111 of the EP&A Act. The guide provides for planting of a minimum of eight trees for each large tree cleared with a diameter at breast height (DBH) of more than 60 cm, four trees where the DBH is 15-60 cm, or two trees where DBH is less than 15 cm.

Executive summary

Overview

Transport for NSW (TfNSW) is the government agency responsible for the delivery of major transport infrastructure projects in NSW and is the proponent for the Harris Park Station Upgrade (the Proposal).

The Proposal is part of the Transport Access Program which is a NSW Government initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure where it is needed most.

This Review of Environmental Factors (REF) has been prepared to assess the environmental impacts associated with the construction and operation of the Proposal under the provisions of Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Description of the Proposal

The key features of the Proposal are summarised as follows:

- retention and refresh of the existing station concourse including a new family accessible toilet
- new ramp and stairs at the western station entrance
- new lift and stairs at the eastern station entrance
- installation of new canopies on stairs, platforms and station entrances for weather protection
- installation of two new platform lifts
- upgrade of shared path from Station Street East to the station and a partial upgrade of the path between Cambridge Street and the station
- provision of interchange facilities along adjacent streets including kiss and ride zones and taxi waiting facilities
- installation of sheltered bicycle racks at both station entrances
- ancillary works including minor drainage works, adjustments to lighting and ticketing machines, improvements to station communication systems with new infrastructure (including additional CCTV cameras) and wayfinding signage.

Subject to approval, construction is expected to commence in 2017 and take approximately 18 months to complete.

A detailed description of the Proposal is provided in Chapter 3 of this REF.

Need for the Proposal

Improving transport customer experience is the focus of the NSW Government transport initiatives. Transport interchanges, train stations and commuter car parks are important gateways to the transport system and as such play a critical role in shaping the customer experience and perception of public transport.

The upgrades are designed to drive a stronger customer experience outcome, to deliver improved travel to and between modes, encourage greater public transport use and better integrate interchanges with the role and function of town centres. The Proposal would also

assist in responding to forecasted growth in the region and as such would support growth in commercial and residential development.

The Proposal fulfils the program objectives by proposing to provide:

- improved accessibility for customers at Harris Park Station by providing an accessible route to station platforms through the provision of lifts
- improved customer amenity and facilities at the station including a family accessible toilet, canopies over the pedestrian bridge, stairs and platforms along with new tactiles and wayfinding signage
- improved transport interchange facilities including new formalised kiss and ride areas, taxi zones and sheltered bicycle facilities on both sides of the station.

The Proposal is also consistent with planning strategies in NSW, including *NSW 2021 – Making NSW Number One* (Department of Premier and Cabinet, 2011) and the *NSW Long Term Transport Master Plan* (TfNSW, 2012a).The Proposal would also ensure that Harris Park Station would meet legislative requirements under the Disability Standards for Accessible Public Transport (DSAPT).

Design options considered

Options for improving the access to, and amenity of, Harris Park Station were developed following a succession of workshops between TfNSW, relevant stakeholders and the project design team.

Three concept design options were developed to address accessibility and customer experience needs and other design principles. All options included similar interchange improvements. Broadly, these are summarised below:

- Option 1 which involved the retention of the existing overhead station concourse, provision of four lifts and regrading the eastern shared path to improve accessibility, and the introduction of interchange facilities for bicycles, taxis and kiss and ride.
- Option 2 which involved the retention of the existing overhead station concourse, provision of two platform lifts, stairs and ramps at both station entrances, regrading the eastern shared path to improve accessibility, and the introduction of interchange facilities for bicycles, taxis and kiss and ride.
- Option 3 which involved a new overhead station concourse requiring the demolition of the existing overhead station concourse, two platform lifts, stairs and ramps at both station entrances and regrading the eastern shared path to improve accessibility, and the introduction of interchange facilities for bicycles, taxis and kiss and ride.

Option 2 was further refined to replace the ramp at the eastern station entrance with a lift. This option received the highest score for customer experience, urban form, land-use integration, service operations and engineering constraints compared to Options 1 and 3. More information on the options assessment and further design refinements are provided in Section 2.3.

Statutory considerations

The EP&A Act provides for the environmental impact assessment of development in NSW. Part 5 of the EP&A Act generally specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as TfNSW, which do not require development consent.

The *State Environmental Planning Policy (Infrastructure) 2007* (the Infrastructure SEPP) is the primary environmental planning instrument relevant to the proposed development and is the key environmental planning instrument which determines that this Proposal is permissible without consent and therefore is to be assessed under Part 5 of the EP&A Act.

Clause 79 of the Infrastructure SEPP allows for the development of 'rail infrastructure facilities' by or on behalf of a public authority without consent on any land. Clause 78 defines 'rail infrastructure facilities' as including elements such as 'railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms', 'public amenities for commuters' and 'associated public transport facilities for railway stations'.

As TfNSW is a public authority and the proposed activity falls within the definition of rail infrastructure facilities under the Infrastructure SEPP, the Proposal is permissible without consent. Consequently the environmental impacts of the Proposal have been assessed under Part 5 of the EP&A Act.

This REF has been prepared to assess the construction and operational environmental impacts of the Proposal. The REF has been prepared in accordance with clause 228 of the *Environment Planning and Assessment Regulation 2000* (the EP&A Regulation).

In accordance with section 111 of the EP&A Act, TfNSW, as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

Chapter 6 of this REF presents the environmental impact assessment for the Harris Park Station Upgrade, in accordance with these requirements.

Community and stakeholder consultation

Under the Infrastructure SEPP, consultation is required with local councils or public authorities in certain circumstances, including where Council-managed infrastructure is affected. Preliminary consultation has been undertaken with Parramatta City Council, Holroyd City Council and Sydney Trains during the development of design options and the preferred option. Consultation with these stakeholders would continue through the detailed design and construction of the Proposal.

TfNSW is also proposing to undertake the following consultation for the Proposal:

- direct notification to community stakeholders
- public display of the REF.

Community consultation activities for the Proposal would be undertaken during the public display period of this REF. The REF would be displayed for a period of two weeks. Further information about these specific activities is included in Section 4.5 of this REF.

During this period, the REF would also be available for viewing at Parramatta City Library, the Parramatta City Council Office and the TfNSW Community Information Centre. The REF

would also be available to download from the TfNSW website[1] and a Project Infoline (1800 684 490) would be available for members of the public to make enquiries.

TfNSW would review and assess all feedback received during the public display period, prior to determining whether or not to proceed with the Proposal.

Should the Proposal proceed to construction, the community would be kept informed throughout the duration of the construction period. Figure 1 presents an overview of the consultation and planning process and the current status of the Proposal.

Figure 1 Planning approval and consultation process for the Proposal

[1] http://www.transport.nsw.gov.au/projects

Environmental impact assessment

This REF identifies the potential environmental benefits and impacts of the Proposal and outlines the mitigation measures to reduce the identified impacts.

The following key impacts have been identified should the Proposal proceed:

- temporary changes to vehicle and pedestrian movements during construction
- temporary noise and vibration impacts during construction
- removal of trees/vegetation that would require vegetation offsets
- introduction of new elements such as the new lifts, ramp, stairs and canopies into the visual environment
- longer term benefits include improved accessibility to the station and improved station and interchange facilities.

Further information regarding these impacts is provided in Chapter 6 of the REF.

Conclusion

This REF has been prepared having regard to sections 111 and 112 of the EP&A Act, and clause 228 of the EP&A Regulation, to ensure that TfNSW takes into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The detailed design of the Proposal would also be designed in accordance with the *NSW Sustainable Design Guidelines – Version 3.0* (TfNSW, 2013a) taking into account the principles of ecologically sustainable development (ESD).

Should the Proposal proceed, any potential associated adverse impacts would be appropriately managed in accordance with the mitigation measures outlined in this REF, and the Conditions of Approval imposed in the Determination Report. This would ensure the Proposal is delivered to maximise benefit to the community and minimise any adverse impacts on the environment.

In considering the overall potential impacts and proposed mitigation measures outlined in this REF, the Proposal is unlikely to significantly affect the environment including critical habitat or threatened species, populations, ecological communities or their habitats.

1 Introduction

Transport for NSW (TfNSW) was established in 2011 as the lead agency for the integrated delivery of public transport services across all modes of transport in NSW. TfNSW is the proponent for the Harris Park Station Upgrade (the Proposal), to be delivered by the Infrastructure and Services Division.

1.1 Overview of the Proposal

1.1.1 The need for the Proposal

The NSW Government is committed to facilitating and encouraging the use of public transport, such as trains, by making stations more accessible, and improving interchanges with other modes of transport such as cars and bicycles.

Harris Park Station does not currently meet key requirements of the *Disability Standards for Accessible Public Transport* (DSAPT) or the Commonwealth *Disability Discrimination Act 1992* (DDA).

The lack of a compliant ramp or lift on the western station entrance and the steep grade of the existing ramp leading to the eastern station entrance do not facilitate access for people with reduced mobility and parents/carers with prams. Furthermore, there is no ramp or lift access to the station platforms from the concourse, with stairs being the only method of gaining access to the station platforms.

The Harris Park Station Upgrade (the Proposal) is required to provide safe and equitable access to the station and to improve customer facilities and amenity. The improvements would in turn assist in supporting the growth in public transport use and would provide an improved customer experience for existing and future users of the station.

The expected increase in customers has been taken into consideration during design development. The 2014 barrier counts indicated a daily patronage of 3420 trips which is expected to increase to 5305 by 2036. It is anticipated that Harris Park Station may experience a significant growth in patronage as a result of the Auto Alley Urban Renewal project. The additional trips expected to be generated by the nearby Auto Alley Urban Renewal project have been considered as part of the design development.

1.1.2 Key features of the Proposal

The key features of the Proposal are summarised as follows:

- retention and upgrade of the existing station concourse which includes a new family accessible toilet
- new ramp and stairs at the western station entrance
- new lift and stairs at the eastern station entrance
- installation of two new platform lifts
- installation of new canopies on stairs, platforms and station entrances for weather protection
- upgrade of shared path from Station Street East to the station and a partial upgrade of the path between Cambridge Street and the station
- provision of interchange facilities along adjacent streets including kiss and ride zones and taxi waiting facilities

- installation of sheltered bicycle racks at both station entrances
- ancillary works including minor drainage works, adjustments to lighting and ticketing machines, improvements to station communication systems with new infrastructure (including additional CCTV cameras) and wayfinding signage.

Subject to planning approval, construction is expected to commence in early 2017 and is anticipated to take approximately 18 months to complete.

A detailed description of the Proposal is provided in Chapter 3 of this Review of Environmental Factors (REF).

1.2 Location of the Proposal

The Proposal is located in the suburb of Harris Park and in the Parramatta Local Government Area (LGA) approximately 23 kilometres west of Sydney's Central Business District (CBD). The location of the Proposal in the regional context is shown in Figure 2.

Harris Park Station is serviced by the T1 North Shore and Western Line and T5 Cumberland Line providing connections to the metropolitan train network. The station is the 130th busiest station on the Sydney Trains network, with an average weekday patronage of 3420 trips (NSW Bureau of Transport Statistics barrier counts, 2014.

The Proposal includes upgrades to Harris Park Station and the shared path on the eastern side of the station which are located on land owned by RailCorp and operated and maintained by Sydney Trains. Minor works would also be undertaken along the footpaths and road reserves of Station Street West, Station Street East and Cambridge Street in areas owned and managed by Parramatta City Council. The western section of Cambridge Street (south-western side of the study area) is managed by Holroyd City Council.

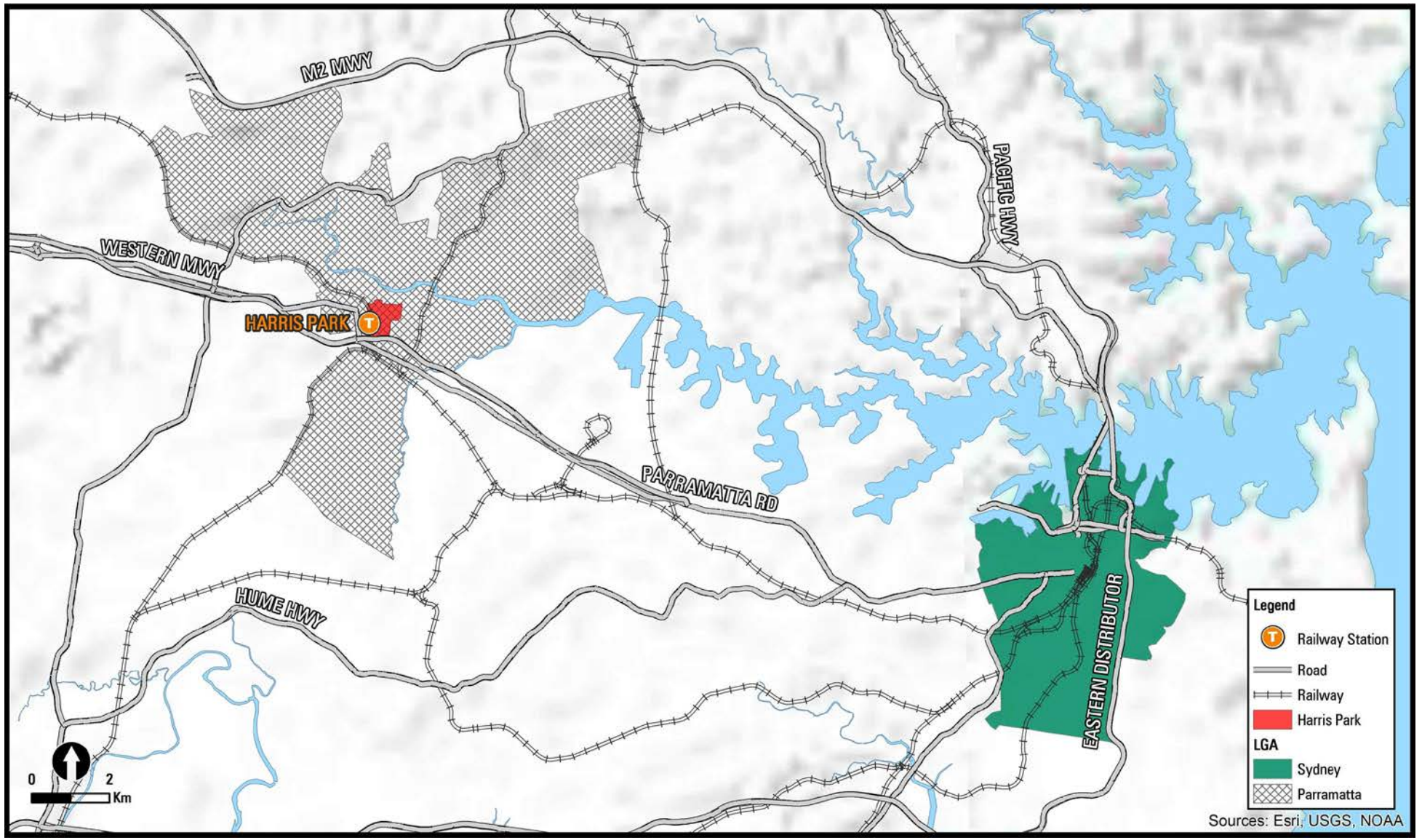


Figure 2 Regional context

1.3 Existing infrastructure and land uses

Land use surrounding Harris Park Station is comprised of a mixture of commercial and residential zones. The areas to the west and east of the station are characterised by a mixture of high, medium and low density residential dwellings.

The Harris Park town centre with various small scale retail, business and community services is located approximately 90 metres north-east of the proposal site. The Auto Alley (Church Street) corridor, which has been subject to strategic planning investigations for the development of medium to high density residential and commercial uses, is situated approximately 300 metres west of the proposal site.

Educational and religious facilities in the broader area include:

- St Oliver's Primary School and Catholic Church which are situated approximately 100 metres east of the proposal site
- Alphacrucis College which is situated approximately 200 metres north-west of the proposal site
- Nan Tien Temple which is situated approximately 190 metres north-west of the proposal site.

Key features of the study area are shown in Figure 3.

Harris Park Station consists of two platforms, providing services on the North Shore & Western Line and Cumberland Line. Platforms 1 and 3 provide services to Berowra via Central and Platforms 2 and 4 provide services to Richmond and Emu Plains and Schofields. Limited train services currently use Platforms 1 and 2, which are mainly used during the morning peak.

There are a number of existing customer facilities within the station including: ticket vending machines located on the concourse level, Opal card readers, female and male toilets (non-accessible) and canopies for weather protection on parts of the station platforms.

Pedestrian access to Harris Park Station is provided at two entry points located on Station Street West (western entrance) and from a path connecting Cambridge Street and Station Street East (eastern entrance). The entrances are linked by stairs (western) and a ramp (eastern) which lead to an overhead concourse providing access to the platforms via stairs. The overhead concourse is also used as a means to cross the rail corridor and provides connectivity to the town centre to the east and to the Auto Alley corridor to the west.

On the western side of the station, a footpath is provided on the western side of Station Street West. On the eastern side of the station, footpaths are present along both sides of Cambridge Street and Station Street East as well as other streets surrounding the station. These two streets are connected by an off-road shared path leading to the eastern entrance of the station.

Pedestrian crossing facilities are located on Cambridge Street and Station Street East to provide access to the shared path leading to the eastern entrance, and on Station Street West in close proximity to the western entrance. The three pedestrian crossing facilities are in the form of a zebra crossing providing a crossing point to and from the station.

There are currently no transport interchange facilities provided at Harris Park Station. Existing time-limited parking zones on Station Street West and Station Street East are used as informal kiss and ride zones. There are no bicycle, taxi or bus interchange facilities as part of the existing arrangements.

Photographs of the existing station are provided in photos 1 to 3.

Figure 3 Key features of the study area

Photo 1 View towards the Proposal from Station Street West looking south

Photo 2 View towards the Proposal from Station Street West looking north-east

Photo 3 View towards the Proposal from Station Street East looking south-east

1.4 Purpose of this Review of Environmental Factors

This REF has been prepared by TfNSW to assess the potential impacts of the Proposal. For the purposes of these works, TfNSW is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of this REF is to describe the Proposal, to assess the likely impacts of the Proposal having regard to the provisions of section 111 of the EP&A Act, and to identify mitigation measures to reduce the likely impacts of the Proposal. This REF has been prepared in accordance with clause 228 of the *Environment Planning and Assessment Regulation 2000* (the EP&A Regulation).

This assessment has also considered the relevant provisions of other relevant environmental legislation, including the *Threatened Species Conservation Act 1995* (TSC Act), *Fisheries Management Act 1994* (FM Act) and the *Roads Act 1993* (Roads Act).

Having regard to the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), this REF considers the potential for the Proposal to have a significant impact on matters of National Environmental Significance (NES) or Commonwealth land, and the need to make a referral to the Commonwealth Department of the Environment for any necessary approvals under the EPBC Act. Refer to Chapter 4 for more information on statutory considerations.

2 Need for the Proposal

Chapter 2 discusses the need and objectives of the Proposal, having regard to the objectives of the Transport Access Program and the specific objectives of the Proposal. This chapter also provides a summary of the options that have been considered during development of the Proposal and why the preferred option has been selected.

2.1 Strategic justification

2.1.1 Overview

Improving transport customer experience is the focus of the NSW Government's transport initiatives. Transport interchanges and train stations are the important gateways to the transport system and as such play a critical role in shaping the customer's experience and perception of public transport.

The Harris Park Station Upgrade, the subject of this REF, forms part of the Transport Access Program. This program is designed to drive a stronger customer experience outcome to deliver seamless travel to and between modes, encourage greater public transport use and better integrate station interchanges with the role and function of town centres within the metropolitan area and developing urban centres in regional areas of NSW.

The Proposal is consistent with the NSW Government's commitment to deliver an efficient and effective transport system around Sydney and NSW as detailed in *NSW 2021 – A Plan to Make NSW Number One* (Department of Premier and Cabinet, 2011).

NSW 2021 is the NSW Government's ten year plan to guide budget and decision making in NSW. NSW 2021 includes the following goals, targets and priority actions relevant to the Proposal:

- reduce travel times
- minimise public transport waiting times for customers
- improve co-ordination and integration between transport modes
- grow patronage on public transport
- improve public transport reliability
- improve customer experience with transport services.

The NSW Government has developed a *Long Term Transport Master Plan* (TfNSW, 2012a). This plan provides a comprehensive strategy for all modes of transport across NSW over the next 20 years, while also delivering on current commitments.

Data forecasts indicate that there would be significant growth in population and employment from 2016 up to 2036 in the area within the Harris Park Station catchment and the proposed upgrade would help to accommodate this growth and changing travel patterns.

The *Disability Action Plan 2012-2017* (TfNSW, 2012b) was developed by TfNSW, in consultation with the Accessible Transport Advisory Committee, which is made up of representatives from peak disability and ageing organisations within NSW. The Disability Action Plan discusses the challenges, the achievements to date, the considerable undertaking that is required to finish the job and provides a solid and practical foundation for future progress over the next five years. The Proposal has been developed in consideration of the objectives outlined in this Plan.

Public transport is viewed as critical to urban productivity, expanding employment opportunities by connecting people to jobs, reducing congestion, and supporting delivery of urban renewal. Further details of the application of NSW Government policies and strategies are discussed in Section 4.5 of this REF.

2.1.2 Objectives of the Transport Access Program

The Transport Access Program is a NSW Government initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure. The program aims to provide:

- stations that are accessible to those with disabilities, the ageing and parents/carers with prams
- modern buildings and facilities for all modes that meet the needs of a growing population
- modern interchanges that support an integrated network and allow seamless transfers between all modes for all customers
- safety improvements including extra lighting, lift alarms, 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.

2.1.3 Objectives of the Proposal

The specific objectives of the Proposal are to:

- provide a station that is accessible to those with mobility impairments and parents/carers with prams
- improve customer experience and amenity through canopies for weather protection, provision of a family accessible toilet and wayfinding in and around the station
- improve interchange facilities to include formal kiss and ride and taxi waiting areas
- improve customer safety.

2.2 Design development

AECOM was engaged by TfNSW to develop a concept design for an upgrade at Harris Park that would improve accessibility in and around the station, and meet key architectural, engineering and urban design objectives. The design development also accommodated the forecast Sydney Trains patronage growth (which is the estimated 2036 daily customer patronage plus 15 per cent), additional trips expected to be generated by the Auto Alley Urban Renewal project and changing travel patterns.

An assessment of Harris Park Station and surrounds was undertaken to identify key deficiencies and opportunities with regards to accessibility and customer experience. The assessment identified the following deficiencies with the existing station:

- lack of an accessible path of travel to the station concourse and to the station platforms
- lack of accessible facilities at the station including family accessible toilet
- non-compliant platform levels and cross falls and no tactile indicators on platform edges
- lack of weather protection shelters on platform stairs and platforms
- lack of an accessible path of travel from station entrances to other transport modes (i.e. steep gradients and/or non-compliant cross falls, no rest points, handrails or tactile indicators and trip hazards)
- lack of interchange facilities (no formalised kiss and ride area or taxi waiting area) and lack of clear wayfinding signage
- no bicycle storage facilities at the station.

The needs and opportunities for Harris Park Station were then considered in the development of options for the concept design (refer to Section 2.3).

2.3 Alternative options considered

Options for improving the access to, and amenity of, Harris Park Station were developed following a succession of workshops with TfNSW, relevant stakeholders (including Sydney Trains) and the project design team.

Three concept design options were developed to address accessibility and customer experience needs and other design principles. There were improvements which were common to all options including a new family accessible toilet, upgraded footpaths and access to station, improved canopy coverage, formal kiss and ride zones, new signage to improve wayfinding, new bicycle racks and platform regrading.

The following options were considered:

- Option 1 which involved the retention of the existing overhead station concourse, provision of four lifts and regrading the eastern shared path to improve accessibility, and the introduction of interchange facilities for bicycles, taxis and kiss and ride.
- Option 2 which involved the retention of the existing overhead station concourse, provision of two platform lifts, stairs and ramps at both station entrances, regrading the eastern shared path to improve accessibility, and the introduction of interchange facilities for bicycles, taxis and kiss and ride.
- Option 3 which involved a new overhead station concourse requiring the demolition of the existing overhead station concourse, two platform lifts, stairs and ramps at both station entrances and regrading the eastern shared path to improve accessibility, and the introduction of interchange facilities for bicycles, taxis and kiss and ride.

Option 2 was later refined to replace the ramp at the eastern station entrance with a lift.

2.3.1 The ‘do-nothing’ option

Under a ‘do-nothing’ option, existing access to the station and other transport modes would remain the same and there would be no changes to the way the station and interchange areas currently operate.

The NSW Government has identified the need for improving the accessibility of transport interchanges, train stations and commuter car parks across NSW as a priority under the Transport Access Program.

The ‘do nothing‘ option was not considered a feasible alternative as it is inconsistent with NSW Government objectives and would not help encourage the use of public transport and would not meet the immediate needs of the Harris Park community.

2.3.2 Assessment of identified options

All three options were assessed in a multi-criteria analysis that included consideration of factors such as customer experience, accessibility, engineering constraints, modal integration and cost to select a preferred option.

2.4 Justification for the preferred option

Based on the multi-criteria analysis, the revised Option 2 received the highest score for customer experience, urban form, land-use integration, service operations and engineering constraints compared to Options 1 and 3.

Option 1 was considered to have higher engineering constraints and operational costs compared to the revised Option 2.

Option 3 was considered the least preferred option due to the constraints associated with the complete replacement of the concourse building which would require substantial demolition works, increased track possessions, longer construction period and the modification of overhead wiring. The option was considered to have the highest impact on the local community and the highest cost compared to the other options.

Overall Option 2 was considered to meet the Transport Access Project objectives in the most cost-efficient manner, with the least impacts compared to Options 1 and 3.

A description of the Proposal (Option 2 including design refinements) is presented in Chapter 3.

3 Description of the Proposal

Chapter 3 describes the Proposal and summarises key design parameters, construction method, and associated infrastructure and activities. The description of the Proposal is based on the concept design, and is subject to detailed design.

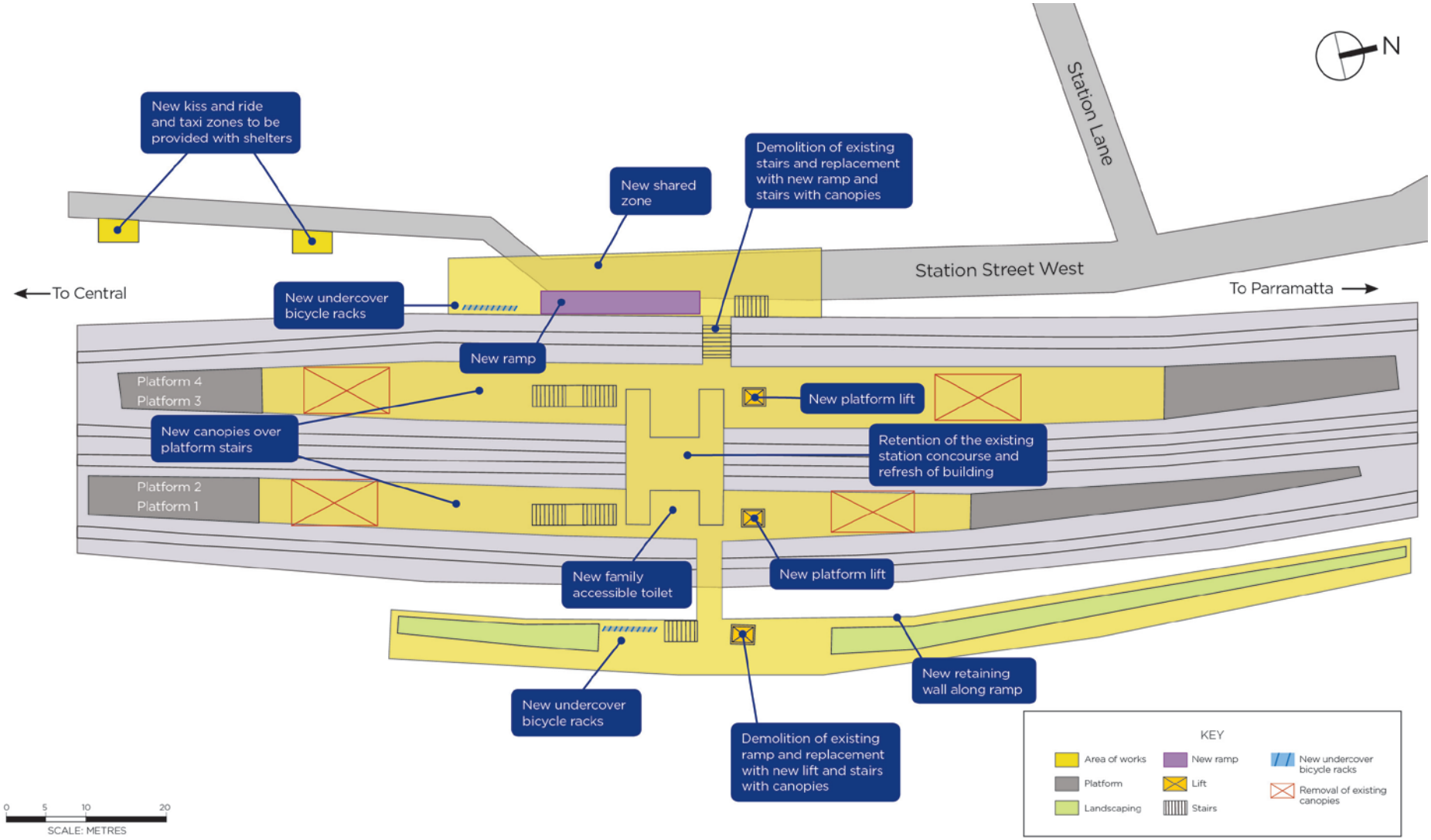
3.1 The Proposal

As described in Section 1.1, the Proposal involves an upgrade of Harris Park Station as part of the Transport Access Program, which would improve accessibility and amenities for customers.

The Proposal would provide a number of improved features to provide an accessible station and improved interchange facilities. The Proposal would include the following key elements:

- retention and refresh of the existing station concourse including a new family accessible toilet
- new ramp and stairs at the western station entrance
- new lift and stairs at the eastern station entrance
- installation of two new platform lifts
- installation of new canopies on stairs, platforms and station entrances for weather protection
- upgrade of ramp from Station Street East to the station and a partial upgrade of the path between Cambridge Street and the station
- provision of interchange facilities along adjacent streets including kiss and ride zones and taxi waiting facilities
- installation of sheltered bicycle racks at both station entrances
- ancillary works including minor drainage works, adjustments to lighting and ticketing machines, improvements to station communication systems with new infrastructure (including additional CCTV cameras) and wayfinding signage.

The key elements of the Proposal are shown in Figure 4.



Indicative only, subject to detailed design

Figure 4 Key elements of the Proposal

3.1.1 Design features

Station upgrade

Details of the proposed upgrade works at the station to improve accessibility and customer experience include:

- refresh of existing station concourse including:
  - conversion of existing toilet facilities to a family accessible toilet and staff room
  - conversion of existing station manager's office to a switch and communications room
  - conversion of ticket window to a new customer service window
- installation of roof and anti-throw screens on station concourse
- demolition of existing stairs at the western entrance and replacement with a new ramp (to achieve a 1 in 14 grade) and new stairs with canopies
- demolition of existing non-compliant ramp at the eastern entrance and replacement with a new lift and stairs with canopies
- installation of two new platform lifts with lift landings
- provision of new canopies and anti-throw screens on both existing platform stairs
- isolation of area under first flight of platform stairs to improve security
- demolition of existing platform shelters to be replaced with new extended platform canopies
- regrading/resurfacing of platforms to achieve the compliant maximum 1 in 40 cross fall
- ancillary works including services diversion and/or relocation, station power supply upgrade, minor drainage works, adjustments to lighting and fencing, adjustments to tactiles, adjustments to platform furniture, improvements to station communication systems with new infrastructure (including additional CCTV cameras), adjustments to station ticketing facilities and wayfinding signage.

Interchange facilities

Details of the proposed works at the interchanges to improve accessibility and customer experience include:

- provision of an accessible pathway from Station Street East to the eastern station entrance (1 in 21 grade with landings at 15 metre intervals) which would require the construction of a retaining wall
- provision of formal kiss and ride zones at:
  - Station Street East (with shelter) requiring the conversion of one no-parking zone to a kiss and ride during peak hours
  - Station Street West (with shelter) and Cambridge Street requiring the conversion of two time restricted parking spaces to kiss and ride zones during peak hours (two proposed on each street)
- provision of taxi zones with shelters at Station Street East (one space) and Station Street West (two spaces)

- provision of approximately 20 sheltered bicycle racks near the western and eastern station entrances (10 on each side)
- provision of a shared zone along Station Street West
- new wayfinding signage and provision of other signage including statutory/regulatory signage
- ancillary works including landscaping, pavement upgrades, kerb realignment, drainage upgrades and installation of bollards.

Materials and finishes

Materials and finishes for the Proposal have been selected based on the criteria of durability, low maintenance and cost effectiveness, to minimise visual impacts, and to be aesthetically pleasing.

Availability and constructability are also important criteria to ensure that materials are readily available and to ensure the structure can be built with ease and efficiently. Materials are also selected for their application based on their suitability to meet the design and maintenance requirements.

Each of the upgraded or new station facilities would be constructed of a range of different materials, with a different palette for each architectural element. Subject to detailed design, these would include:

- lifts – off-form concrete with fibre cement sheet cladding and aluminium louvres and constructed of scratch resilient glass and/or glazing
- concourse – precast concrete with steel structure, fibre cement sheet cladding, metal roof and anti-throw screens. Stairs would have ribbed precast concrete
- stairs – concrete base with anti-throw screens and metal sheet roof
- retaining wall along eastern ramp – gabion wall.

The design would be submitted to TfNSW's Design and Sustainability Review Panel for comment, and the Urban Design and Landscaping Plan (UDLP) would need to be accepted by TfNSW prior to finalisation of the design.

3.1.2 Engineering constraints

A number of constraints have influenced the design of the Proposal. These are discussed below.

Existing structures: the placement and integrity of existing structures needed to be considered during the development of the design – these structures included the platforms and station buildings.

Sydney Trains requirements: modifications for existing structures and new structures within the rail corridor must be designed and constructed with consideration of train impact loads, structural clearances to the track, and safe working provisions.

Utilities: The following utilities in the vicinity of the proposal site were identified from the Dial Before You Dig search:

- electrical services (aboveground)
- telecommunication services (underground)
- gas
- stormwater

- water and sewer
- rail utilities, including signalling cabling and overhead wiring.

Other considerations:

- consideration of the recently remediated retaining wall on the western rail cutting (which was constructed to replace the rail embankment that collapsed due to a landslide in 2013)
- lack of vehicular access on the eastern side of the station from Station Street East
- the station is located within a rail cutting and station platforms are generally lower than street level.

3.1.3 Design standards

The Proposal would be designed with regards to the following:

- *Disability Standards for Accessible Public Transport* (2002) (issued under the Commonwealth *Disability Discrimination Act 1992*)
- Building Code of Australia
- relevant Australian Standards
- Asset Standard Authority standards
- Sydney Trains standards
- *NSW Sustainable Design Guidelines – Version 3.0* (TfNSW, 2013a)
- *Guidelines for the Development of Public Transport Interchange Facilities* (Ministry of Transport, 2008)
- Crime Prevention Through Environmental Design (CPTED) principles
- relevant Council codes and standards.

3.1.4 Sustainability in design

The development of the concept design for the Proposal has been undertaken in accordance with the project targets identified in TfNSW's Environmental Management System (EMS) and the *NSW Sustainable Design Guidelines - Version 3.0* (TfNSW, 2013a) which groups sustainability into seven themes:

- energy and greenhouse gases
- climate resilience
- materials and waste
- biodiversity and heritage
- water
- pollution control
- community benefit.

Within each theme, potential initiatives are prioritised into two categories of requirements:

- **compulsory** – the initiative is required to be implemented when applicable to the project as they refer to a corporate target, or are fundamental to the delivery of sustainable assets
- **discretionary** – the initiative has benefits to be implemented, however may not be the most appropriate.

A shortlist of compulsory initiatives has been developed by TfNSW specifically for Transport Access Program projects, which includes the Proposal. These compulsory initiatives have been reviewed and incorporated into the concept design (unless otherwise justified) and documented in a Sustainability Checklist that was approved by TfNSW (refer to Appendix C). The Sustainability Checklist and the initiatives contained within would be reviewed again at the detailed design and construction phases, and submitted for approval to TfNSW.

3.2 Construction activities

3.2.1 Work methodology

Subject to approval, construction is expected to commence in early 2017 and take approximately 18 months to complete. The construction methodology would 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 listed in Table 1. The proposed methodology is indicative and based on the current preliminary design. The methodology is dependent on the Contractor's preferred methodology, program and sequencing of the work and therefore may be subject to changes prior to construction commencing.

Due to the site constraints (such as limited access on the eastern side and topography) a number of options are being considered for the construction phase of the Proposal. These options include:

- weekend track diversion throughout the project with train services diverted to one of the two platforms, to enable works to proceed on the other
- extended weekend possessions.

The options would be investigated further as the design progresses in consultation with Sydney Trains.

Construction activities would be undertaken within the study area shown on Figure 3.

Table 1 Indicative construction staging for key activities

	Stage	Activities
1	Site establishment and enabling works	• establishment of site compound (erect fencing, tree protection zones, site offices, amenities and plant/material storage areas etc.) • establishment of temporary alternative pedestrian access • removal of trees and vegetation • service relocations
2	Lift, footbridge and platform upgrades	• demolition of existing structures as required • platform modifications including construction of footings for bridge columns/lift shafts • construction of retaining wall on eastern side and stormwater drainage works • construction of lift shafts • construction of stairs, lift shaft, canopies and anti-throw screens • installation of lifts • installation of fixtures, lighting and CCTV cameras for affected areas • platform resurfacing and raising/regrading (if required)
3	Station building works	• reconfiguration of internal station buildings to allow for a new communications/equipment room and new Family Accessible Toilet and conversion of ticket window • upgrade of station building • installation of solar panels (if viable)
4	Interchange works	• construction of accessible ramp on the western side of the station • upgrade of footpath on eastern side of the station • conversion of ‘no parking’ zone on Station Street to kiss and ride (peak hours only) • conversion of two hour restricted parking spaces on Station Street West and Cambridge Street to kiss and ride (peak hours only) • creation of taxi waiting areas on Station Street East and Station Street West (shared with kiss and ride)
5	Finalisation	• installation of new sheltered bicycle racks on both sides of the station • installation of wayfinding signage • upgrade of electrical and power supply • replanting/landscaping and fencing adjustments/bollards
6	Testing and commissioning	

3.2.2 Plant and equipment

Plant and equipment likely to be used during construction includes:

- trucks
- chainsaw
- mulcher
- generator
- bobcat
- excavators
- demolition saw
- jackhammer
- grinder
- concrete pump
- concrete trucks
- crane
- manitou
- scissor lift
- franna crane
- balloon wheel dump truck
- hi rail
- vibratory roller
- wacker packer
- coring machine
- rattle gun/nail gun
- hand tools
- generators
- lighting towers.

3.2.3 Working hours

The majority of construction works would be undertaken during standard construction hours, in accordance with the *Interim Construction Noise Guidelines* (Department of Environment, Climate Change and Water, 2009) as follows:

- 7am to 6pm Monday to Friday
- 8am to 1pm 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 track possessions (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 and motorists; and to ensure the safety of railway workers and operational assets. It is estimated that at least six possessions would be required to facilitate the following:

- detailed site survey, services investigations and/or geotechnical investigations within and around the tracks
- construction works including site establishment, demolition of existing structures, excavation and installation of lift shafts, stormwater/drainage works, service relocations, platform resurfacing/regrading and trenching in platforms
- testing and commissioning of communications systems and equipment, along with testing and commissioning/cutover of new lifts and upgraded power supply.

Out of hours works may also be scheduled outside possession 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 Strategy* (TfNSW, 2012c) (refer to Section 6.3 for further details).

3.2.4 Earthworks

Excavations and earthworks would generally be required for the following:

- the pits for the proposed lift shafts which would require open cut excavations through the station platforms and excavation into soil/fill and sandstone rock to a depth of approximately five metres
- the construction of upgraded footpath areas and reformation of batters and retaining walls on the eastern side of the station
- other minor civil works including footings and foundations for structures, drainage/stormwater works, and trenching activities for service adjustments and relocations.

Excavated material would be reused onsite where possible or disposed of in accordance with relevant legislative requirements. Waste management is discussed further in Section 6.11.

3.2.5 Source and quantity of materials

The source and quantity of materials would be determined during the detailed design phase of the Proposal, and would consider the requirements of the *NSW Sustainable Design Guidelines – Version 3.0* (TfNSW, 2013a). Materials would be sourced from local suppliers where practicable. Reuse of existing and recycled materials would be undertaken where practicable.

3.2.6 Traffic access and vehicle movements

Traffic and transport impacts associated with the Proposal are assessed in Section 6.1 of this REF. The potential traffic and access impacts expected during the construction of the Proposal include:

- minor increase in traffic on the local road network
- temporary traffic diversions and partial road closures
- temporary disruptions to pedestrian movements into the station and on adjacent footpaths
- loss of parking spaces due to the construction compound
- temporary loss of kerbside parking on adjacent streets.

It is expected that approximately three heavy vehicle movements per day would be required for during the construction period. This would increase to approximately 16 vehicle movements per day during the weekend possessions and excavation activities.

A detailed construction methodology and associated management plans (such as a Construction Environmental Management Plan (CEMP)) would be developed during the detailed design phase of the Proposal to manage potential traffic and access impacts.

3.2.7 Ancillary facilities

A temporary construction compound would be required to accommodate a site office, amenities, laydown and storage area for materials. The following two locations have been considered for the location of the construction compound:

- vacant land owned by Parramatta City Council on Station Street West approximately 50 metres north-west of the station
- existing carpark on Station Street West approximately 60 metres north-west of the station.

A temporary material and plant laydown area may also be established on the western side of Station Street West on land owned by Parramatta City Council.

Impacts associated with utilising the potential areas have been considered in the environmental impact assessment including requirements for rehabilitation. The final compound location would be determined during detailed construction planning.

3.2.8 Public utility adjustments

An upgraded electrical supply from Station Street West is required to accommodate new infrastructure (such as new lifts). The existing main switchboard at the station would need to be replaced with a new Installation Supply Main Switchboard (ISMSB) and an upgraded isolation transformer would be required. In addition an upgraded supply would need to be provided from the supply authority. The arrangement of the upgraded supply would be confirmed during detailed design in consultation with the supply authority, though it is expected that a new kiosk substation may be required.

A range of other utilities are located on or adjacent to the proposal site. A utility investigation has been undertaken during the concept design stage and is discussed in Section 3.1.2.

The Proposal has the potential to impact services through direct impact from excavation activities or operation of other equipment, if services are not appropriately identified and protected or relocated. The Proposal has been designed to avoid relocation of services where feasible, however further investigation may be required. It is likely some services may require relocation, including existing electrical infrastructure or rail utilities, but such relocations are unlikely to occur outside the study area assessed in this REF. In the event that works would be required outside of this footprint, further assessment would be undertaken and additional approvals obtained if required, including any additional mitigation measures.

Relocation or other works that may affect services would be undertaken in consultation with the respective utility authorities.

3.3 Property acquisition

A section of the proposed ramp on the western station entrance may extend to the Station Street West road reserve, which is owned by Parramatta City Council. Depending on the extent of encroachment, acquisition of a small section of the roadway may be required. Any property acquisition would be undertaken in consultation with Parramatta City Council.

If one of the proposed compound locations listed in Section 3.2.7 is selected for the Proposal, the site would be leased from the landowner for the duration of the construction period.

3.4 Operation management and maintenance

The future operation and maintenance of the upgraded station and surrounds is subject to further discussions with Sydney Trains, TfNSW and Parramatta City Council. Structures directly associated with the station as part of the Proposal would be maintained by Sydney Trains.

The proposed landscaped area adjoining the footpath on the eastern side of the station would be maintained by Sydney Trains.

It is expected that facilities provided on Station Street West, Cambridge Street and Station Street East would be maintained by the relevant council.

4 Statutory considerations

Chapter 4 provides a summary of the statutory considerations relating to the Proposal including a consideration of NSW Government polices/strategies, NSW legislation (particularly the EP&A Act), environmental planning instruments, and Commonwealth legislation.

4.1 Commonwealth legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The (Commonwealth) EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places - defined in the EPBC Act as 'matters of National Environmental Significance (NES)'. The EPBC Act requires the assessment of whether the Proposal is likely to significantly impact on matters of NES or Commonwealth land. These matters are considered in full in Appendix A.

The Proposal would not impact on any matters of NES or on Commonwealth land. Therefore a referral to the Commonwealth Minister for the Environment is not required.

4.2 NSW legislation and regulations

4.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act establishes the system of environmental planning and assessment in NSW. This Proposal is subject to the environmental impact assessment and planning approval requirements of Part 5 of the EP&A Act. Part 5 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as TfNSW, which do not require development consent under Part 4 of the Act.

In accordance with section 111 of the EP&A Act, TfNSW, as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the Proposal.

Clause 228 of the EP&A Regulation defines the factors which must be considered when determining if an activity assessed under Part 5 of the EP&A Act has a significant impact on the environment. Chapter 6 of the REF provides an environmental impact assessment of the Proposal in accordance with clause 228 and Appendix B specifically responds to the factors for consideration under clause 228.

4.2.2 Other NSW legislation and regulations

Table 2 provides a list of other relevant legislation applicable to the Proposal.

Table 2 Other legislation applicable to the Proposal

Applicable legislation	Considerations
Contaminated Land Management Act 1997 (CLM Act) (NSW)	Section 60 of the CLM Act imposes a duty on landowners to notify the Office of Environment and Heritage (OEH), and potentially investigate and remediate land if contamination is above NSW EPA guideline levels. The site has not been declared under the CLM Act as being significantly contaminated (refer to Section 6.8).
Crown Lands Act 1987 (NSW)	The Proposal does not involve works on any Crown land.
Disability Discrimination Act 1992 (DDA) (Commonwealth)	The Proposal would be designed having regard to the requirements of this Act.
Heritage Act 1977 (Heritage Act) (NSW)	• Sections 57 and 60 (approval) where items listed on the State Heritage Register are to be impacted. • Sections 139 and 140 (permit) where relics are likely to be exposed. • Section 170 where items listed on a government agency Heritage and Conservation Register are to be impacted. The proposal site is not located within an area that is listed on the State Heritage Register and while the station is listed as an archaeological site on the S170 State agency heritage register, the heritage assessment concluded that there is a low risk of the proposed works to expose historical archaeological relics and that no archaeological approvals under the Heritage Act would be required (Umwelt, 2015). Refer to Section 6.5 for more information.
National Parks and Wildlife Act 1974 (NPW Act) (NSW)	Sections 86, 87 and 90 of the NPW Act require consent from OEH for the destruction or damage of Indigenous objects. The Proposal is unlikely to disturb any Indigenous objects (refer Section 6.4). However, if unexpected archaeological items or items of Indigenous heritage significance are discovered during the construction of the Proposal, all works would cease and appropriate advice sought.
Noxious Weeds Act 1993 (NSW)	Three noxious weeds have been identified in the study area. Appropriate management methods would be implemented during construction (refer to Section 6.7).
Protection of the Environment Operations Act 1997 (PoEO Act) (NSW)	The Proposal does not involve a 'scheduled activity' under Schedule 1 of the PoEO Act. Accordingly, an environment protection licence (EPL) is not required for the Proposal. However, in accordance with Part 5 of the PoEO Act, TfNSW would notify the EPA of any pollution incidents that occur onsite. This would be managed through the CEMP to be prepared and implemented by the Contractor.

Applicable legislation	Considerations
Roads Act 1993 (Roads Act) (NSW)	Section 138 of the Roads Act requires consent from the relevant road authority for the carrying out of work in, on or over a public road. However, clause 5(1) in Schedule 2 of the Roads Act states that public authorities do not require consent for works on unclassified roads. The Proposal would involve works on Station Street West, Station Street East and Cambridge Street which are local roads under the control of Parramatta City Council and Holroyd City Council. Consent under the Roads Act is not required however Road Occupancy Licence/s would be obtained from the relevant council for temporary road closures to facilitate works. Refer to Section 6.1 for more information.
Sydney Water Act 1994 (NSW)	The Proposal would not involve discharge of wastewater to the sewer.
Threatened Species Conservation Act 1995 (TSC Act) (NSW)	The site does not contain suitable habitat for any listed threatened species or community and is unlikely to have a significant impact on any threatened species or community (refer to Section 6.7).
Waste Avoidance and Resource Recovery Act 2001 (WARR Act) (NSW)	TfNSW would carry out the Proposal having regard to the requirements of the WARR Act. A site specific Waste Management Plan would be prepared.
Water Management Act 2000 (NSW)	The Proposal would not involve any water use, water management works, drainage or flood works, controlled activities or aquifer interference.

4.3 State Environmental Planning Policies

4.3.1 State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP is the key environmental planning instrument which determines the permissibility of the Proposal and which part of the EP&A Act an activity or development may be assessed.

Clause 79 of the Infrastructure SEPP allows for the development of 'rail infrastructure facilities' by or on behalf of a public authority without consent on any land (i.e. assessable under Part 5 of the EP&A Act). Clause 78 defines 'rail infrastructure facilities' as including elements such as '*railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms', 'public amenities for commuters' and 'associated public transport facilities for railway stations'*.

Consequently, development consent is not required for the Proposal which is classified as a rail infrastructure facility, however the environmental impacts of the Proposal have been assessed under the provisions of Part 5 of the EP&A Act.

Part 2 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils and other agencies prior to the commencement of certain types of development. Section 5.2 of this REF discusses the consultation undertaken under the requirements of the Infrastructure SEPP.

It is noted that the Infrastructure SEPP prevails over all other environmental planning instruments except where *State Environmental Planning Policy (Major Development) 2005*, *State Environmental Planning Policy No 14 – Coastal Wetlands* or *State Environmental Planning Policy No 26 – Littoral Rainforest* applies. The Proposal does not require consideration under these SEPPs and therefore they do not require further consideration as part this REF.

4.3.2 State Environmental Planning Policy 55 – Remediation of Land

SEPP 55 provides a State-wide approach to the remediation of contaminated land for the purpose of minimising the risk of harm to the health of humans and the environment.

In accordance with Clause 7(1) of SEPP 55, a consent authority must not consent to the carrying out of development on any land unless:

> *'(a) it has considered whether the land is contaminated.*
>
> *(b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or would be suitable, after remediation) for the purpose for which the development is proposed to be carried out.*
>
> *(c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land would be remediated before the land is used for that purpose.'*

Section 6.8 of this REF contains an assessment of the potential contamination impacts of the Proposal. It is unlikely that any large-scale remediation (Category 1) work would be required as part of the Proposal. The proposed land use does not differ to the existing use and is, therefore, unlikely to be affected by any potential contaminants that exist within the rail corridor.

4.4 Local environmental planning instrument and development controls

The Proposal is located within the Parramatta LGA and Holroyd LGA. The provisions of the Infrastructure SEPP mean that Local Environmental Plans (LEPs) prepared by councils for an LGA, do not apply. However, during the preparation of this REF, the provisions of the *Parramatta City Centre Local Environmental Plan 2007* (Parramatta City Centre LEP 2007), *Parramatta Local Environmental Plan 2011* (Parramatta LEP 2011) and *Holroyd Local Environmental Plan 2013* (Holroyd LEP) were considered.

4.4.1 Local environmental plans

The western side of Harris Park, including Harris Park Station and the proposal site is subject to the Parramatta City Centre LEP 2007. The rail corridor is zoned as SP2 Special Infrastructure under the Parramatta City Centre LEP 2007. Land to the west of the station is zoned as B4 Mixed use development.

The eastern side of Parramatta is subject to the Parramatta LEP 2011. Land on the eastern side of the proposal site is zoned for high density residential development. The Harris Park neighbourhood centre (B4) is located to the north-east of the station.

A small section of the Cambridge Street overpass is situated within the Holroyd LGA and is zoned as SP2 Infrastructure under the Holroyd LEP.

Table 3 summarises the relevant aspects of the Parramatta City Centre LEP 2007 applicable to the Proposal.

Figure 5 shows the relevant section of the zoning map from the LEPs, with the indicative location of the Proposal.

Table 3 Relevant provisions of the Parramatta City Centre LEP 2007

Provision description	Relevance to the Proposal
Zone objectives and Land Use Table	The rail corridor is zoned as SP2 Infrastructure – Railway. The Proposal is consistent with the objectives of the SP2 Infrastructure zoning.
Clause 34 – Preservation of trees or vegetation	Clause 34 of the Parramatta City LEP 2007 is aimed at the preservation of trees and development consent is required for tree removal is most instances. However by virtue of clause 5(3) and 79 of the Infrastructure SEPP, the clearing of vegetation for the Proposal is permissible without development consent and would be approved by Part 5 of the EP&A Act. Tree replanting is discussed in Section 6.7.
Clause 35 – Heritage conservation	The Parramatta City LEP 2007 aims to conserve heritage significance of heritage items within the LGA. Harris Park Station is not listed on Schedule 5 of the Parramatta LEP. Several locally listed heritage properties are located within the vicinity of the study area. A discussion of potential impacts to local heritage is discussed in Section 6.5.

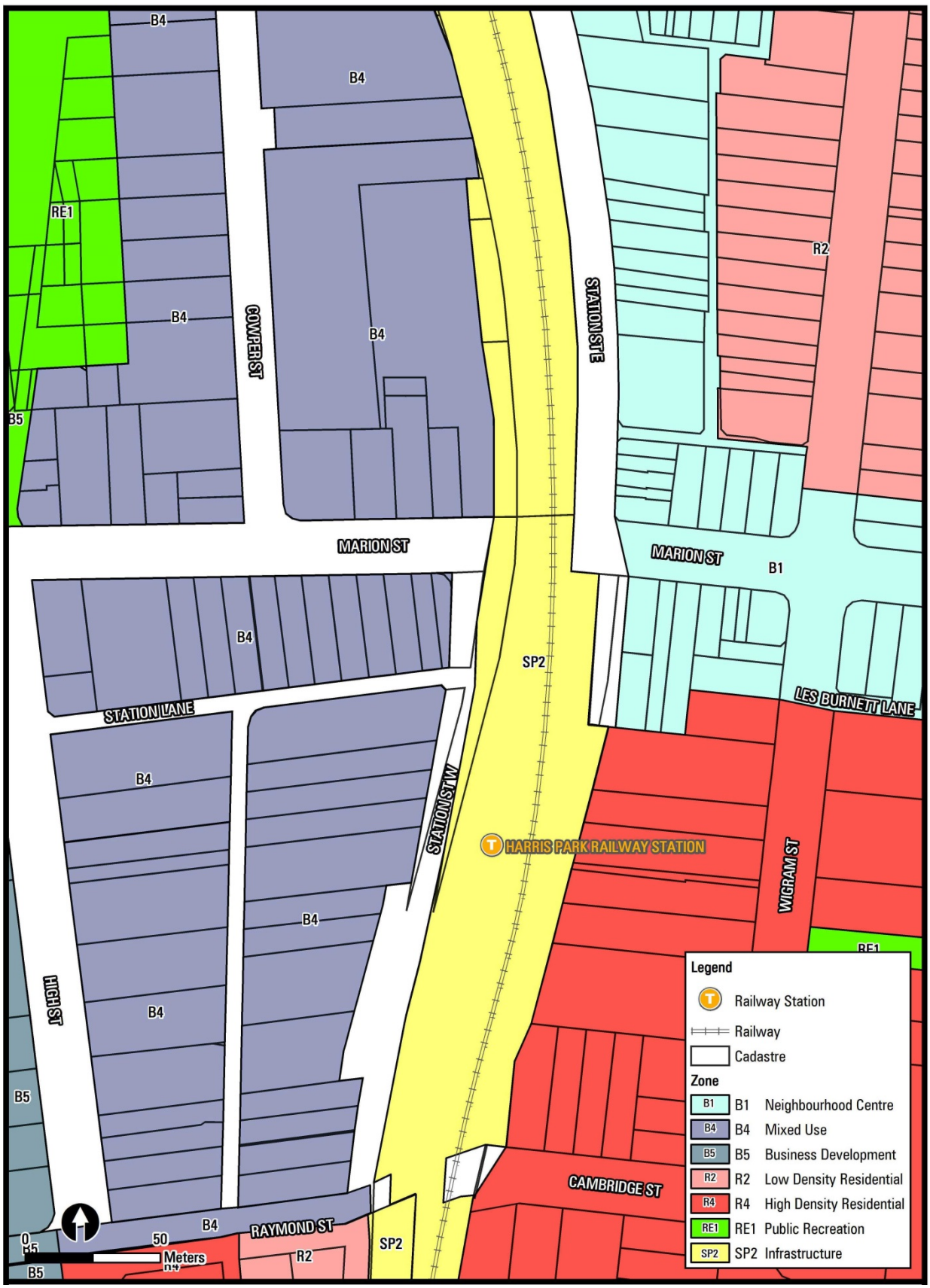


Figure 5 Parramatta City Centre LEP 2007, Parramatta LEP 2011, and Holroyd LEP zoning

4.5 NSW Government policies and strategies

Table 4 provides an overview of other NSW Government policies and strategies

Table 4 NSW Government policies and strategies applicable to the Proposal

Policy/Strategy	Commitment	Comment
NSW 2021 – A Plan to Make NSW Number One (Department of Premier and Cabinet, 2011)	*NSW 2021 – A Plan to Make NSW Number One* is a ten-year plan developed in 2011 and outlines the high level strategic priorities and associated goals for government and its respective agencies. A key aspect in the transport strategy includes: • the return of quality transport and community services • building infrastructure that improves peoples' lives • strengthening our local environments. NSW 2021 includes the following goals, targets and priority actions relevant to the Proposal: • reduce travel times • minimise public transport waiting times for customers • improve co-ordination and integration between transport modes • grow patronage on public transport • improve public transport reliability • improve customer experience with transport services.	The Proposal is consistent with the NSW Government's commitment to: • grow patronage on public transport • improve customer experience with transport services. In particular, the Proposal is consistent with *Goal 7 – Reduce travel times*, and *Goal 20 – Build liveable centres.* The Proposal also contributes to *Goal 14 – Increase opportunities for people with a disability, by improving transport access.* The Proposal also supports active transport by contributing to the development of cycle facilities as part of an integrated local network.
Rebuilding NSW – State Infrastructure Strategy 2014 (NSW Government, 2014)	*Rebuilding NSW* is a plan to deliver $20 billion in new productive infrastructure to sustain productivity growth in our major centres and regional communities. *Rebuilding NSW* will support overall population growth in Sydney and NSW. Public transport is viewed as critical to urban productivity, expanding employment opportunities by connecting people to jobs, reducing congestion, and supporting delivery of urban renewal.	The Proposal supports investment in rail infrastructure, and aligns with the reservation of $8.9 billion for urban public transport to support Sydney's population, which is expected to reach almost six million by 2031.

Policy/Strategy	Commitment	Comment
NSW Long Term Transport Master Plan (TfNSW, 2012a)	The *NSW Long Term Transport Master Plan* identifies a planned and co-ordinated set of actions to address transport challenges and will guide the NSW Government's transport funding priorities over the next 20 years. The Master Plan would meet a number of challenges to building an integrated transport system for Sydney and NSW, including: • customer-focussed integrated transport planning • integrated modes to meet customer needs • getting Sydney Moving Again • sustaining Growth in Greater Sydney. The Master Plan links to NSW 2021, the Metropolitan Strategy for Sydney, the State Infrastructure Strategy, regional and sub-regional strategies, and national plans.	The Proposal implements the following key themes in the Master Plan: • improving customers' journey experience • making better use of existing assets • providing accessible transport to help address social exclusion.
A Plan for Growing Sydney (Department of Planning and Environment, 2014)	*A Plan For Growing Sydney* superseded the draft *Metropolitan Strategy for Sydney 2036.* The Plan provides information on the strategies to accommodate an additional 664,000 homes and 689,000 jobs by 2031, which in part will be helped by a more integrated transport network. The Proposal is located in the West Central subregion and in the Greater Parramatta Strategic Centre. The Department of Planning and Environment are currently preparing new subregional plans to translate the objectives of the new metropolitan plan for *Sydney: A Plan for Growing Sydney*. A significant amount of employment and housing growth is projected for this area. Greater Parramatta has the potential to reach 100,000 jobs over the next 20 years, which involves integrating Parramatta CBD, Westmead, Parramatta North, Rydalmere and Camelia.	The Proposal is consistent with the objectives of this Plan and would deliver improved and accessible footpath connections from the station to interchange facilities. The Proposal also takes into account potential future growth in the area.

Policy/Strategy	Commitment	Comment
Disability Action Plan 2012-2017 (TfNSW, 2012b)	The *Disability Action Plan 2012-2017* was developed by TfNSW in consultation with the Accessible Transport Advisory Committee, which is made up of up of representatives from peak disability and ageing organisations within NSW. The Disability Plan discusses the challenges, the achievements to date, the considerable undertaking that is required to finish the job, and provides a solid and practical foundation for future progress over the next five years.	The Proposal has been developed with consideration of the objectives outlined in this Plan and seeks to improve and provide equitable access to public transport facilities.
Sydney's Walking Future - Connecting people and places (TfNSW, 2013b)	*Sydney's Walking Future* outlines the NSW government's efforts to: • promote walking for transport • connect people to places through safe walking networks around activity centres and public transport interchanges.	The Proposal would facilitate walking by removing physical barriers to accessible public transport and associated footpath upgrades.
Sydney's Cycling Future - Cycling for everyday transport □ (TfNSW, 2013c)	*Sydney's Cycling Future* outlines the NSW government's commitment to a safe and connected network of bicycle paths as an important part of Sydney's integrated transport system. The government wants to make bike riding a convenient and enjoyable option by improving access to towns and centres, and investing in bicycle facilities at transport hubs.	The Proposal supports the government's Bike and Ride initiative that better integrates bicycle riding with other modes of transport, making it convenient to ride to transport hubs, park bicycles securely and transfer to public transport as part of longer transport journeys. Bicycle parking for approximately 10 bicycles would be provided on each side of the station (total capacity for 20 bicycles).
Draft Auto Alley Planning Framework 2014	Auto Alley (Church Street) has been subject to strategic planning investigations and planning options, with UrbanGrowth NSW and local councils (Parramatta and Holroyd) aiming to drive positive development in the area. The 14.8 ha precinct is located within walking distance of Harris Park Station (300 m east) and aims to provide an office precinct for 26,000 workers in coming years.	Harris Park Station is predicted to experience a significant growth in patronage as a result of the Auto Alley Urban Renewal project. The predicted increase patronage to be generated by the Auto Alley Urban Renewal has been considered as part of the concept design.

4.6 Ecologically sustainable development

TfNSW is committed to ensuring that its projects are implemented in a manner that is consistent with the principles of ecologically sustainable development (ESD). The principles of ESD are generally defined under the provisions of clause 7(4) of Schedule 2 to the EP&A Regulation as:

- the precautionary principle – If there are threats of serious or irreversible damage, a lack of full scientific uncertainty should not be used as a reason for postponing measures to prevent environmental degradation
- intergenerational equity – the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations
- conservation of biological diversity and ecological integrity – the diversity of genes, species, populations and their communities, as well as the ecosystems and habitats they belong to, should be maintained or improved to ensure their survival
- improved valuation, pricing and incentive mechanisms – environmental factors should be included in the valuation of assets and services.

The principles of ESD have been adopted by TfNSW throughout the development and assessment of the Proposal. Section 3.1.4 summarises how ESD would be incorporated in the design development of the Proposal. Section 6.13 includes an assessment of the Proposal on climate change and sustainability, and Section 7.2 lists mitigation measures to ensure ESD principles are incorporated during the construction phase of the Proposal.

5 Community and stakeholder consultation

Chapter 5 discusses the consultation undertaken to date for the Proposal and the consultation proposed for the future. This chapter discusses the consultation strategy adopted for the Proposal and the results of consultation with the community, relevant government agencies and stakeholders.

5.1 Stakeholder consultation during concept design

As part of the development of concept design options, TfNSW consulted with Sydney Trains, Parramatta City Council and Holroyd City Council. Sydney Trains were involved in the TfNSW workshops to identify key issues and decide on a preferred option.

A meeting was held with Parramatta City Council and Holroyd City Council on 11 November 2014. A second meeting was held with Parramatta City Council on 16 October 2015. The following key issues were raised for consideration during the development of the preferred option:

- need for improved safety and security at the station, including improved passive surveillance and lighting
- safety, wayfinding, security and permeability considered to be the key issues in the area
- improved access to the station
- low frequency of train services at Harris Park Station
- the area is undergoing gentrification and increasing urban density. The Auto Alley redevelopment would have a substantial impact on this area of Parramatta. Good connectivity with Auto Alley would be beneficial
- planned public domain works by Parramatta City Council with the increase in visitors to Harris Park restaurants. Harris Park has the potential to be a destination with a strong restaurant district.

The preferred option incorporates many of these considerations including access improvements to and within the station and improved customer amenity and facilities at the station. CCTV and lighting requirements would also be reviewed during detailed design to consider improving surveillance and security. The Proposal would improve the amenity of the local area and complement other proposed upgrades within the locality.

5.2 Consultation requirements under the Infrastructure SEPP

Part 2, Division 1 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Clauses 13, 14, 15 and 16 of the Infrastructure SEPP require that public authorities undertake consultation with councils and other agencies, when proposing to carry out development without consent.

Table 5 provides details of consultation requirements under the Infrastructure SEPP for the Proposal.

Table 5 Infrastructure SEPP consultation requirements

Clause	Clause particulars	Relevance to the Proposal
Clause 13 | Consultation with Councils – development with impacts on council related infrastructure and services	Consultation is required where the Proposal would result in: • substantial impact on stormwater management services • generating traffic that would place a local road system under strain • involve connection to or impact on a council owned sewerage system • involve connection to and substantial use of council owned water supply • significantly disrupt pedestrian or vehicle movement • involve significant excavation to a road surface or footpath for which Council has responsibility.	The Proposal includes works that would: • require connections or impacts the stormwater system • disrupt pedestrian and vehicle movements • impact on road pavements under Council's care and control • impact on Council-operated footpaths. Preliminary consultation with Parramatta City Council and Holroyd City Council has been undertaken, and would continue throughout the detailed design and construction phases. Consultation with Parramatta City Council and Holroyd City Council is required with regard to clause 13 of the Infrastructure SEPP.
Clause 14 | Consultation with Councils – development with impacts on local heritage	Where works: • substantially impact on local heritage item (if not also a State heritage item) • substantially impact on a heritage conservation area.	The Proposal would not impact on local heritage listed items. Accordingly, consultation with Council is not required in regard to this aspect. Refer to Section 6.5.
Clause 15 | Consultation with Councils – development with impacts on flood liable land	Where works: • impact on land that is susceptible to flooding – reference would be made to *Floodplain Development Manual: the management of flood liable land.*	The Proposal is not located on land that is susceptible to flooding. Accordingly, consultation with Council is not required in regard to this aspect. Refer to Section 6.9.
Clause 16 | Consultation with public authorities other than Councils	For *specified development* which includes consultation with OEH for development that is undertaken adjacent to land reserved under the *National Parks and Wildlife Act 1974*, and other agencies specified by the Infrastructure SEPP where relevant. Although not a specific Infrastructure SEPP requirement, other agencies TfNSW may consult with could include: • Roads and Maritime • Sydney Trains • OEH.	The Proposal is not located adjacent to land reserved under the *National Parks and Wildlife Act 1974*. Accordingly, consultation with OEH is not required.

5.3 Consultation strategy

Ensuring the community and key stakeholders are fully informed and given the opportunity to provide feedback during the planning process is fundamental to the success of a project.

The consultation strategy for the Proposal was developed to encourage stakeholder and community involvement and foster interaction between stakeholders, the community and the project team. The consultation strategy that was developed, having regard to the requirements of the planning process ensures that stakeholders, customers and the community are informed of the Proposal and have the opportunity to provide input.

The objectives of the consultation strategy are to:

- provide accurate and timely information about the Proposal and REF process to relevant stakeholders
- raise awareness of the various components of the Proposal and the specialist environmental investigations
- ensure that the directly impacted community are aware of the REF and consulted where appropriate
- provide opportunities for stakeholders and the community to express their view about the Proposal
- understand and access valuable local knowledge from the community and stakeholders
- record the details and input from community engagement activities
- build positive relations with identified community stakeholders
- ensure a comprehensive and transparent approach.

5.4 Public display

The REF display strategy adopts a range of consultation mechanisms, including:

- public display of the REF at various locations
- distribution of a project update up to a radius of approximately 500 metres to the station to local community and rail commuters, where appropriate, outlining the Proposal and inviting feedback on the REF
- advertisement of REF public display in local newspapers with a link to the TfNSW website that includes a summary of the Proposal and information on how to provide feedback
- consultation with Parramatta City Council, Holroyd City Council, Sydney Trains, and other non-community stakeholders.

Community consultation activities for the Proposal would be undertaken during the public display of this REF. The display period of the REF would be advertised in the week that the public display commences. The REF would be displayed for a period of two weeks.

The REF would be placed on public display at the following locations:

1. Parramatta City Library, 1-3 Fitzwilliam Street, Parramatta
2. Parramatta City Council Office, 126 Church Street, Parramatta
3. TfNSW Community Information Centre, Ground Floor, 388 George Street, Sydney.

The REF would also be available on the TfNSW website[2]. Information on the Proposal would be available through the Project Infoline (1800 684 490) or by email[3].

During this time feedback is invited. Following consideration of feedback received during the public display period, TfNSW would determine whether to proceed with the Proposal and what conditions would be imposed on the project should it be determined to proceed.

5.5 Aboriginal community involvement

An archaeological assessment was prepared by Umwelt for the Proposal (Umwelt, 2015) which included an extensive Aboriginal Heritage Information Management System (AHIMS) search. The assessment did not identify any sites within or in the vicinity of the proposal site.

The extensive landscape modification that has occurred across the study area suggests that intact evidence of Aboriginal land use is unlikely to occur within the boundaries of the study area. Similarly, the high level of disturbance would suggest that the archaeological potential of the area is low (Umwelt, 2015). Therefore, consultation with the Aboriginal community was not considered necessary.

5.6 Ongoing consultation

At the conclusion of the public display period for this REF, TfNSW would acknowledge receipt of feedback from each respective respondent. The issues raised by the respondents would be considered by TfNSW before determining whether to proceed with the Proposal (refer to Figure 1).

Should TfNSW determine to proceed with the Proposal, the determination report would be made available on the TfNSW website and would summarise the key impacts identified in this REF; demonstrate how TfNSW considered issues raised during the public display period, and include a summary of mitigation measures proposed to minimise the impacts of the Proposal.

Should TfNSW determine to proceed with the Proposal, the project team would keep the community, Council and other key stakeholders informed of the process, identify any further issues as they arise, and develop additional mitigation measures to minimise the impacts of the Proposal. The interaction with the community would be undertaken in accordance with a Community Liaison Plan by the Contractor to be developed prior to the commencement of construction.

[2] http://www.transport.nsw.gov.au/projects
[3] projects@transport.nsw.gov.au

6 Environmental impact assessment

Chapter 6 of the REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the Proposal. For each potential impact, the existing environment is characterised and then an assessment is undertaken as to how the Proposal would impact on the existing environment.

This environmental impact assessment has been undertaken in accordance with clause 228 of the EP&A Regulation. A checklist of clause 228 factors and how they have been specifically addressed in this REF is included at Appendix B.

6.1 Traffic and transport

A Traffic, Transport and Access Impact Assessment was prepared by AECOM for the Proposal (AECOM, 2015). The assessment included a desktop analysis and site inspection. Detailed traffic counts or modelling were not considered necessary as the Proposal is focused on the station area and is unlikely to have major impacts to the surrounding road network. The findings of the assessment are summarised in this section.

6.1.1 Existing environment

Harris Park Station

Harris Park Station is serviced by the North Shore and Western Line (T1) providing services between Emu Plains or Richmond and Berowra via Central, and the Cumberland Line (T5) providing services between Schofields and Campbelltown. Station barrier counts show that Harris Park Station was ranked the 130th busiest station on the Sydney Trains Network, recording a total of 3420 entry and exit passenger movements during a typical weekday in 2014 (Bureau of Travel Statistics, 2014).

The station consists of two island platforms with four tracks. Platforms 1 and 2 provide services to Berowra via Central (T1) and to Campbelltown via Liverpool (T5). Platforms 3 and 4 provide services to Schofields (T5) and Emu Plains and Richmond (T1). During the two hour morning and evening peak periods, the number of trains varies between 10 and 13 trains on the North Shore and Western Line (T1) and four trains on the Cumberland Line (T5).

The station concourse can be accessed from the west by a pedestrian stairway and from the east by a relatively steep ramp. Station staff and ticket vending machines are provided within the station concourse. The two island platforms are only accessible by stairs.

There are currently no transport interchange facilities within the station precinct.

Road network and traffic

The road network in the vicinity of the proposal site is shown in Figure 3 (Section 1.3) and includes Station Street West, Marion Street, Cambridge Street and Station Street East.

Station Street West is a one-way (northbound), one-lane, local road, which runs along the western side of the rail corridor between Raymond Street and Marion Street. It provides access to residential properties along the road, a carpark and Harris Park Station. Station Street West has a posted speed limit of 50 kilometres per hour.

Marion Street is a local road with one traffic lane in each direction. The road extends on both the western and eastern sides of the rail corridor providing access to residential and commercial properties. Marion Street has a posted speed limit of 50 kilometres per hour.

Cambridge Street is a local road with one traffic lane in each direction, which provides access between Station Street West and Wigram Street. Cambridge Street has a posted speed limit of 50 kilometres per hour.

Station Street East is a local road with one traffic lane in each direction which runs along the eastern side of the rail corridor, to the north of Harris Park Station, and provides access to residential properties and the Harris Park local commercial centre. It has a posted speed limit of 50 kilometres per hour.

Classified roads within proximity to the proposal site include the M4 Western Motorway and Church Street which are located about 250 metres south and 450 metres west of Harris Park Station respectively.

Parking

There are currently no commuter parking spaces at Harris Park Station. A metered at-grade carpark with 197 spaces and two accessible spaces is provided by Parramatta City Council on Marion Street, approximately 60 metres north-west of the station. In addition, a limited number of short-term, on-street car parking spaces are provided in the immediate vicinity of the station with one-hour parking on both sides of Station Street East, two-hour parking on the western side of Station Street West and either two or four-hour parking on both sides of Cambridge Street. Short-term (four-hour) metered parking is also provided on either side of Marion Street.

Taxi waiting areas and kiss and ride facilities

There are currently no formal kiss and ride or taxi waiting areas at Harris Park Station. The no-stopping zone and short-term (two-hour) parking zones at the western station entrance on Station Street West are used as informal kiss and ride areas. Similarly, the time restricted parking zones on Station Street East and Cambridge Street are used as informal kiss and ride areas.

Bus operations

Harris Park Station is not directly serviced by buses, with no bus stops present around or within convenient walking distance of the station. The nearest bus stops are located on Harris Street and the Great Western Highway about 500 metres from the station. Rail customers requiring access to a rail interchange by bus are more likely to use the Parramatta Transport Interchange located about 700 metres north of Harris Park Station.

The bus stops on Harris Street and the Great Western Highway are serviced by three bus routes (routes 906, 907 and M91) operated by Transdev. Route 906 operates from Fairfield to Parramatta, route 907 operates from Bankstown to Parramatta and the M91 operates from Hurstville to Parramatta.

Pedestrian facilities

Pedestrian access to Harris Park Station is provided at two entry points: on Station Street West (western entrance) and from a path connecting Cambridge Street with Station Street East (eastern entrance). A pedestrian movement survey conducted by Skyhigh (2014) showed that in 2014 about 51 per cent of passengers used the western entrance and 49 per cent used the eastern entrance. Twelve per cent of these movements were recorded as cross corridor movements.

Footpaths are present along both sides of Cambridge and Station Street East as well as most other streets surrounding the station. These two streets are connected by an off-road shared pedestrian and cycle path leading to the eastern entrance of the station. A footpath is also present on the western side of Station Street West.

One formal pedestrian crossing is located on the western side of the station on Station Street West, directly opposite the station entrance. Two formal pedestrian crossings are situated on the eastern side of the station on Cambridge Street and Station Street East.

Bicycle network and facilities

The bicycle network in Harris Park is comprised of a number of on-road and off-road bicycle routes. There are a number of key roads which provide on-road facilities on the eastern side of the station, including Allen Street, Wigram Street, Marion Street and Station Street East. The off-road path on the eastern side of the station provides a formal connection between the station, Cambridge Street and Station Street East.

There are no formal bicycle routes that provide direct access to the western side of the station. Current routes on the western side direct cyclists to the off-road shared path on the eastern side of the station via Cambridge Street.

There are no formal bicycle storage facilities provided at Harris Park Station. Informal bicycle storage is evident at the station with bicycles secured against fences, indicating that additional or improved facilities are required.

6.1.2 Potential impacts

Construction

Road network

Figure 6 shows the potential vehicle routes to be used during construction. Access to the proposal site would likely be via Church Street and Raymond Street.

The M4 Motorway, Parramatta Road, Church Street and The Great Western Highway are RMS approved B-double routes that would facilitate access to and from the site.

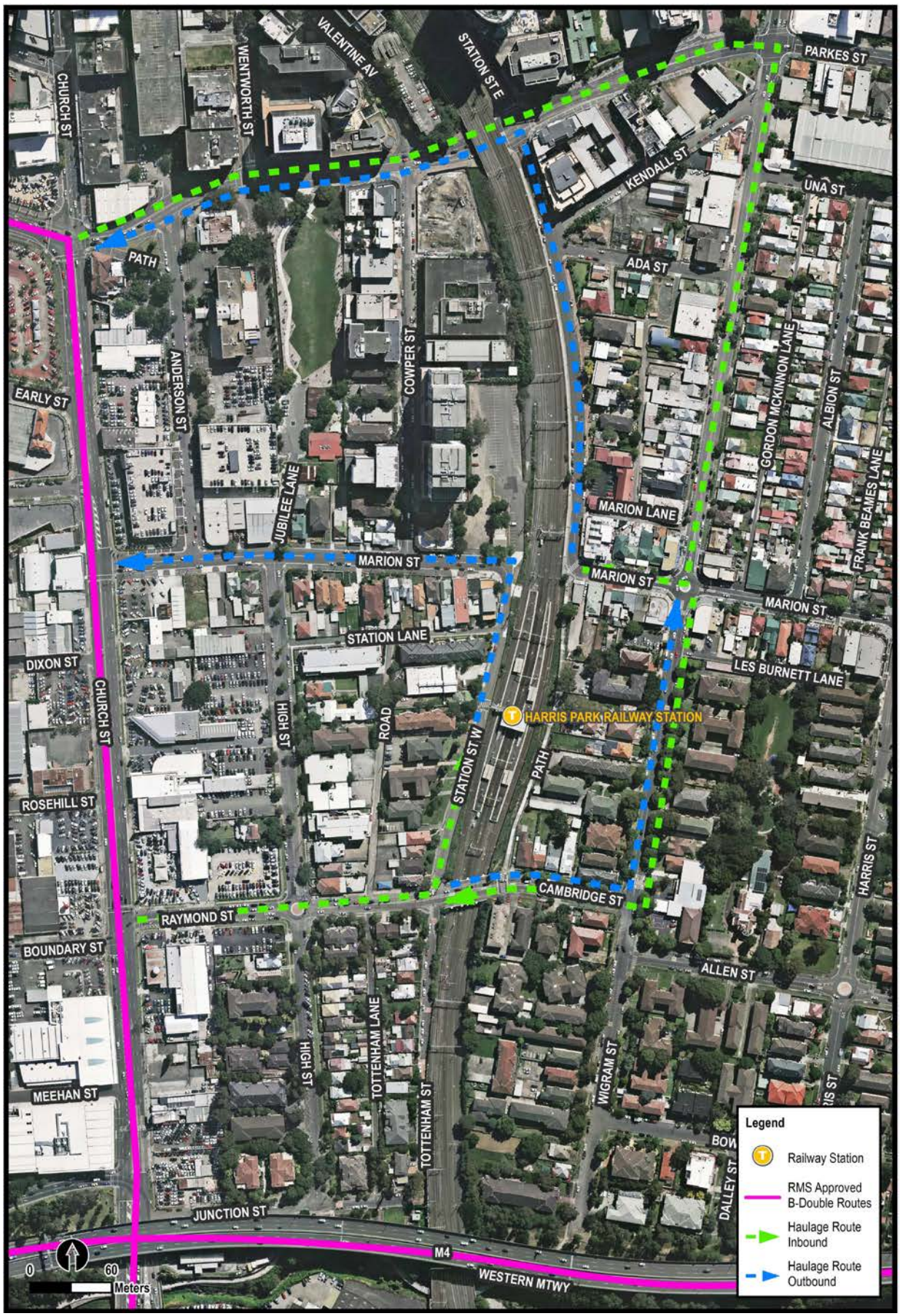


Figure 6 Potential construction vehicle routes

Traffic

Construction of the proposal would result in a minor temporary increase in traffic as a result of the following:

- delivery of construction materials
- delivery and removal of construction equipment and machinery
- spoil removal
- movement of construction personnel.

As discussed in Section 3.2.6, it is expected that approximately three heavy vehicle movements per day would be required during the construction period. This would increase to approximately 16 vehicle movements per day during weekend possessions and peak construction periods. Heavy vehicles would be restricted to non-peak periods where possible, to minimise disruptions to traffic.

Light vehicle movements would vary depending on the construction stage but is unlikely to be significant. Construction personnel would be encouraged to car-pool or utilise public transport to minimise impacts on the local road network.

The estimated traffic that would be generated during construction would result in a minor increase in proportion to the existing traffic levels on the local road network and therefore it is unlikely that the predicted traffic movements would substantially impact upon the operation of the road network.

As described in Section 3.1, the Proposal would also require minor works within the road reserve of Station Street West, Station Street East and Cambridge Street which may result in temporary partial lane closures and/or traffic diversions.

Road works would be undertaken progressively and in the minimum area required to undertake the activity. Signage would be displayed around work areas to inform the public of any diversions.

Parking

Construction works are likely to result in the temporary loss of some time-restricted car parking spaces on Station Street West, Station Street East and Cambridge Street to allow for construction works or to maintain traffic flow. The number of parking spaces to be impacted would depend on the nature of the works and would most likely occur during weekend track possessions when major construction works are proposed to be undertaken.

Construction works may also result in the temporary loss of a small number of time-restricted parking spaces in the Council car park on Marion Street if the location is selected for the establishment of the construction compound.

The number of parking spaces to be affected during construction would be confirmed during construction planning and would be minimised as much as practicable. It is expected that on-street parking on other parts of the road network would be sufficient to cater for the temporary loss of parking during construction.

Given that parking is generally in high demand in the area around the station, construction workers would be encouraged to carpool and make use of the available public transport for travel to and from the proposal site.

Property access

Pedestrian access to properties adjacent to the site would be maintained at all times.

Vehicular access to properties along Station Street West would be disrupted for short periods during the proposed works. Residents with temporarily restricted vehicular access to their properties would be given notice in advance of the construction works being undertaken in that location.

As noted in Section 3.2.2, truck-mounted cranes would be required to deliver materials and equipment to the proposal site. The positioning of the cranes would need to be confirmed by the construction Contractor in consultation with TfNSW during detailed design and construction planning.

Pedestrian and bicycle access

Construction activities may result in temporary disruptions to pedestrian access along Station Street West, Station Street East and Cambridge Street. Suitable detours would be provided as part of the traffic control measures.

In order to facilitate construction activities along the eastern side of the station, the eastern station entrance and shared ramp between Station Street East and Cambridge Street would be closed for the duration of construction. A temporary diversion would be provided to direct pedestrians and cyclists to the western station entrance via Station Street East, Wigram Street and Cambridge Street. The temporary detour would result in a longer walking distance and additional travel time to access the western station entrance (approximately 600 metres and five to ten minute walk).

In general, construction works would be short in duration and would result in temporary impacts on local traffic and access. Potential impacts would be minimised with the implementation of management measures provided in Table 18.

Operation

The Proposal would result in positive impacts in terms of contributing towards making railway transport more accessible to the community. A summary of the operational traffic, transport and access impacts is summarised below.

Customer and public access

The Proposal would result in the following access improvements:

- upgraded access to the station concourse (new ramp and stairs on the western entrance and stairs and lift on the eastern entrance) would provide equitable access for commuters with reduced mobility and parents/carers with prams
- regraded shared ramp on the eastern side of the station would provide equitable access for commuters with reduced mobility and parents/carers with prams
- new platform lifts would provide equitable access to the station platforms
- formalised interchange facilities (kiss and ride/taxi zones) on Station Street West, Cambridge Street and Station Street East
- new bicycle storage facilities would provide improved facilities for cyclists.

The Proposal would primarily improve access to the station platforms from the concourse with the installation of the lifts. Access from the street to the concourse would also be improved with the installation of the ramps and stairs.

Traffic

Given that the Proposal would provide a higher level of station accessibility and usability, the improved customer experience and upgraded facilities are likely to attract a higher patronage demand at the station. As a result, traffic activity is likely to marginally increase as a result of the Proposal. The potential traffic increase during operation is anticipated to have a negligible impact on the surrounding road network.

Parking

The Proposal is not expected to increase the level of car parking demand. However, the proposed establishment of formalised kiss and ride and taxi zones would result in the loss of up to five time-restricted car parking spaces during peak periods (two car parking spaces on Station Street West, two car parking spaces on Cambridge Street and one car parking space on Station Street East). It is anticipated that the loss of restricted parking for the Proposal could be supported by existing kerbside parking on the broader road network.

Bicycle facilities

The Proposal includes the provision of bicycle storage facilities with capacity for 20 bicycles at the station. This would be adequate to cater for the current and likely future demands.

Property access

The Proposal would not result in impacts on existing access to properties in the vicinity of the station.

6.1.3 Mitigation measures

A Construction Traffic Management Plan (CTMP) would be prepared by the Contractor in consultation with TfNSW, and provided to Parramatta City Council and Holroyd City Council (and RMS as required). The CTMP would be the primary management tool to manage potential traffic impacts associated with construction. The CTMP, at a minimum, would include a description of:

- procedures for preparing and implementing Traffic Control Plans (TCPs) and in particular for detours and traffic control to manage temporary road disruptions on Station Street West, Station Street East and Cambridge Street
- final construction traffic approach and departure routes
- location of accesses to and from the local road network and contractor parking
- scheduling of works/deliveries to avoid peak times (such as construction of shared zone at night and generally limiting works in the road carriageway as much as practicable)
- measures to:
    - limit temporary parking losses
    - maintain customer access to and from the station at all times
    - to maintain private property access unless otherwise agreed
- details of construction signage, traffic controllers and other community notifications.

Refer to Table 18 in Section 7.2 for a list of proposed mitigation measures.

6.2 Urban design, landscape and visual amenity

This section provides a summary of the visual impact assessment undertaken by Green Bean Design (GBD, 2015).

The assessment included a desktop analysis, site inspection and preparation of photomontages to provide an indication of what the Proposal may look like once complete.

6.2.1 Existing environment

Landscape character

The landscape character surrounding Harris Park Station is typical of a suburban residential setting with mixed development within a local commercial centre. Residential areas to the west and east of Harris Park Station are defined by a mix of single storey detached dwellings with front and rear gardens and medium to high residential developments. Dwellings are set back from street frontages with tree plantings along nature strips.

The station precinct and adjoining road corridors contain mature indigenous and non-indigenous tree plantings which provide some degree of screening within proximity to, and beyond the station. Tree plantings continue along local residential street nature strips and throughout residential garden areas.

Viewshed

The viewshed for the Proposal has been divided into a series of bands extending across the landscape from the Harris Park Station. The viewshed is illustrated in Figure 7.

The primary viewshed extends in a north to south orientation following the main parallel view corridors of both the rail line and the Station Street West corridor. In addition, view corridors extend perpendicular to the rail corridor from Marion Street to the north and Cambridge Street to the south.

The viewshed beyond the station precinct is contains both mature tree plantings and built development to the east and west of the rail corridor and results in a restricted extent of visual penetration. The residential interface to the rail corridor is generally setback and partially visually separated by mature tree plantings.

Visual receivers

Visual receivers are individuals and/or groups of people whose views may be affected by the Proposal. Representative viewpoints within a reasonable distance of the Proposal and within the viewshed were selected. These include residential dwellings, commercial properties, road corridors and pedestrian footpaths.

Sensitive viewpoints are illustrated in Figure 8.

The most sensitive visual receivers are considered to be residential properties and transient receivers on Station Street West and Wigram Street with a moderate sensitivity rating.

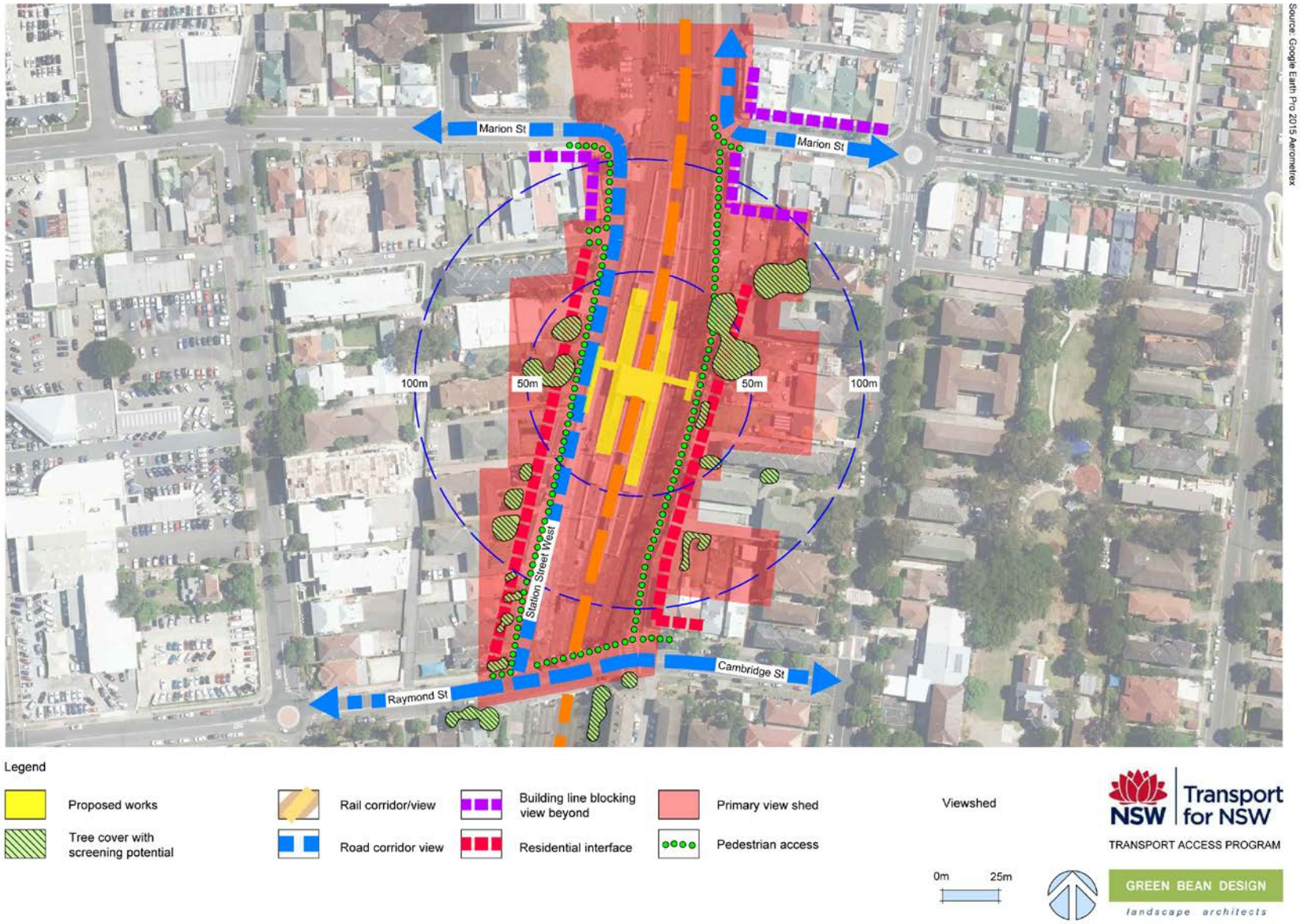


Figure 7 Viewshed (GBD, 2015)

Figure 8 Sensitive visual receiver locations (GBD, 2015)

6.2.2 Potential impacts

Construction

During construction, the positioning of the work site and the site compound would result in some short-term impacts on the visual amenity for nearby sensitive receivers.

Temporary features typically introduced during construction include:

- fencing and hoardings
- storage of materials
- road barriers and signage
- cranes and other construction plant
- scaffolding
- temporary site office and amenities.

Some construction activities, such as night works would require temporary lighting for operational, safety and security purposes. Lighting would be placed to avoid light spill to adjoining road corridors and residential areas.

Overall, the potential visual impacts of construction activities are considered to be minimal as the works would be temporary and short-term in nature.

Operation

The concept design for the Proposal has been prepared with regard to urban design and visual considerations. Photomontages of the Proposal from the adjacent residential areas are provided in Figures 9-11.

The design elements represented in the photomontages are conceptual and subject to further detailed design.

Note: Design is indicative and subject to detailed design

Figure 9 View towards the Proposal from Station Street West looking south

Note: Design is indicative and subject to detailed design

Figure 10 View towards the Proposal from Station Street West looking north-east

Note: Design is indicative and subject to detailed design

Figure 11 View towards the Proposal from Station Street East looking south-west

Landscape character

The Proposal would form a visible element within the surrounding landscape but is unlikely to constitute a marked effect on existing views. The Proposal would complement the scale, landform and pattern of the surrounding urban landscape and would not create a noticeable deterioration in the existing view. The Proposal's visual effect would be positively mitigated through a range of appropriate measures at detailed design (such as material selection, minimising the bulk and scale of proposed elements), construction and operational stages.

The overall magnitude of the Proposal would result in a minor loss and alteration to pre-development views and the introduction of new constructed elements would not be uncharacteristic with existing urban landscape features.

The existing station viewshed is not expected to increase to any significant measure as a result of the Proposal and would continue to be defined and contained by surrounding built development.

The character of the existing urban landscape surrounding the station results in a relatively high visual absorption capacity and would readily absorb the expected changes to the visual environment associated with the Proposal.

Visual impact assessment

Views towards the station would continue to be visually filtered and partially screened by existing tree plantings adjoining the station precinct as well as by trees within adjoining private properties.

A summary of the results of the visual impact assessment in relation to the potential impacts on visual receptors is provided in Table 6.

The visual impact assessment concluded that the majority of receiver viewpoints including single storey and multi storey residential dwellings, commercial buildings and road corridors have been determined to have an overall negligible visual impact with regard to the Proposal. This is primarily due to the screening effect of buildings and some existing tree plantings between the receiver viewpoints and the Proposal.

The most affected sensitive visual receivers were considered to be residential properties with direct views of the Proposal on Wigram Street (R5 and R6) and Station Street West (R15, R17, R20 and R21) which were determined to have an overall moderate-low visual impact with regard to the Proposal.

Less sensitive receivers within surrounding commercial developments and transient receivers (such as pedestrians/motorists) travelling along local road corridors would not experience any significant change with regard to the Proposal.

The Proposal would enhance the station interface at Station Street West and create a greater degree of visual clarity around pedestrian entries to the east and west of the station precinct. Pedestrians and motorists travelling along local roads, as well as commuters walking through the station precinct, would experience an overall positive impact through the enhancement of layout, materials and design features within the station.

Lighting

The Proposal would include the installation of lighting for operational, safety, security and maintenance purposes. Night lighting would include building and pole mounted directional spot lighting and pole mounted pedestrian lighting. The majority of infrastructure areas associated with the Proposal would be unlikely to require additional lighting, or lighting that would result in a direct line of sight from surrounding view locations. Light installations would be installed in accordance with the *Australian Standard 4282:1997 Controlling the Obtrusive Effects of Outdoor Lighting*, and avoid light spill to adjoining road corridors and residential areas.

Table 6 Visual impact assessment

Receiver viewpoint	Description of existing view	Receiver sensitivity	Description of visual impact	Magnitude of visual impact	Visual impact rating
R1	Pedestrian and motorist views are directed along the road corridor; however, elevated and indirect views from the bridge extend along the rail corridor towards the station. Views towards the station are contained by built development either side of the rail corridor, including retaining walls, fences and buildings. Distant views extend towards high rise residential development which forms the sky line view to the north of the station.	Low	The Proposal would form a visible element within the surrounding landscape but is unlikely to constitute a marked effect on existing views. The Proposal would complement the scale, landform and pattern of the surrounding landscape and would not create a noticeable deterioration in the existing view.	Low	Low
R2	Ground level and upper storey views extend towards and across the rail corridor. Views towards the station are restricted to units with a northerly aspect. Existing mature tree plantings provide screening and filtered views towards the station.	Low	The Proposal would result in no discernible deterioration in the existing view.	Negligible	Negligible
R3	Street level views towards the station from the Cambridge Street road corridor are contained and screened by buildings to the north of Cambridge Street.	Negligible	The Proposal would result in no discernible deterioration in the existing view.	Negligible	Negligible
R4	Ground level views (from single storey buildings) extend towards and across the Cambridge Street road corridor. Views towards the station are restricted by property fencing, screen plantings and other surrounding buildings. Existing mature tree plantings within the rail corridor provide screening and filtered views towards the station.	Low	The Proposal may form a visible element within the surrounding landscape but is unlikely to constitute a marked effect on existing views. The Proposal would complement the scale, landform and pattern of the surrounding landscape and would not create a noticeable deterioration in the existing view.	Low	Low

Receiver viewpoint	Description of existing view	Receiver sensitivity	Description of visual impact	Magnitude of visual impact	Visual impact rating
R5	Ground level and upper storey views extend towards and across the rail corridor. Views towards the station are restricted to units with a northerly or westerly aspect. Some existing mature tree plantings within the rail corridor provide screening and filtered views towards the station.	Moderate	The Proposal would form a visible element within the surrounding landscape but is unlikely to constitute a marked effect on existing views. The Proposal would complement the scale, landform and pattern of the surrounding landscape and would not create a noticeable deterioration in the existing view.	Low	Moderate-Low
R6	Ground level views (from single storey buildings) extend towards and across the Wigram Street corridor. Views west towards the station are partially restricted by property fencing, screen plantings and other surrounding buildings. Existing mature tree plantings within the rail corridor provide screening and filtered views towards the station.	Moderate	The Proposal would form a visible element within the surrounding landscape but is unlikely to constitute a marked effect on existing views. The Proposal would complement the scale, landform and pattern of the surrounding landscape and would not create a noticeable deterioration in the existing view.	Low	Moderate-Low
R7	Ground level and upper storey views extend towards and across the rail corridor. Views towards the station are restricted to units with a northerly or westerly aspect. Some existing mature tree plantings within the rail corridor provide screening and filtered views towards the station.	Low	The Proposal would form a visible element within the surrounding landscape but is unlikely to constitute a marked effect on existing views. The Proposal would complement the scale, landform and pattern of the surrounding landscape and would not create a noticeable deterioration in the existing view.	Low	Low
R8	Street level views towards the station from commercial buildings along the Marion Street corridor are partially contained and screened by buildings to the south.	Negligible	The Proposal would result in no discernible deterioration in the existing view.	Negligible	Negligible

Receiver viewpoint	Description of existing view	Receiver sensitivity	Description of visual impact	Magnitude of visual impact	Visual impact rating
R9	Street level views from the Station Street East corridor extend across the rail corridor and towards multi storey residential and commercial buildings. Views towards the station are partially contained and screened by tree plantings and fencing along the rail corridor boundary.	Negligible	The Proposal would result in no discernible deterioration in the existing view.	Negligible	Negligible
R10	Street level and upper storey views from commercial properties are directed west across the Station Street East road corridor and the rail corridor towards multi storey residential and commercial development. Street level and upper storey views south towards the station are screened by commercial development to the south of Marion Street. Ground level and upper storey views towards the station are screened by multi storey residential and commercial buildings to the south of Marion Street.	Negligible	The Proposal would result in no discernible deterioration in the existing view.	Negligible	Negligible
R11	Ground level and upper storey views towards the station are screened by multi storey residential and commercial buildings to the south of Marion Street.	Negligible	The Proposal would result in no discernible deterioration in the existing view.	Negligible	Negligible
R12	Street level views towards the station are screened by multi storey residential and commercial buildings to the south of Marion Street.	Negligible	The Proposal would result in no discernible deterioration in the existing view.	Negligible	Negligible
R13	Ground level and upper storey views from the building extend east across the rail corridor and the north portion of the station platforms. Views towards the station buildings are screened by multi storey residential to the south.	Negligible	The Proposal would result in no discernible deterioration in the existing view.	Negligible	Negligible

Receiver viewpoint	Description of existing view	Receiver sensitivity	Description of visual impact	Magnitude of visual impact	Visual impact rating
R14	Ground level and upper storey views towards the station are screened by multi storey residential buildings to the south.	Negligible	The Proposal would result in no discernible deterioration in the existing view.	Negligible	Negligible
R15	Ground level and upper storey views extend towards and across the rail corridor. Views towards the station are restricted to units with an easterly aspect. Some limited existing mature tree plantings provide screening and filtered views towards the station.	Moderate	The Proposal would form a visible element within the surrounding landscape but is unlikely to constitute a marked effect on existing views. The Proposal would complement the scale, landform and pattern of the surrounding landscape and would not create a noticeable deterioration in the existing view.	Low	Moderate-Low
R16	Views extend towards and across the rail corridor and are partially restricted to vantage points with an easterly aspect. Existing mature tree plantings adjoining commercial buildings provide screening and filtered views towards the station.	Low	The Proposal would form a visible element within the surrounding landscape but is unlikely to constitute a marked effect on existing views. The Proposal would complement the scale, landform and pattern of the surrounding landscape and would not create a noticeable deterioration in the existing view.	Low	Low
R17	Ground level and upper storey views extend towards and across the rail corridor. Views towards the station are partially restricted to units or vantage points with an easterly aspect. Existing mature tree plantings adjoining the residential buildings provide filtered views towards the station from ground and upper level views.	Moderate	The Proposal would form a visible element within the surrounding landscape but is unlikely to constitute a marked effect on existing views. The Proposal would complement the scale, landform and pattern of the surrounding landscape and would not create a noticeable deterioration in the existing view.	Low	Moderate-Low

Receiver viewpoint	Description of existing view	Receiver sensitivity	Description of visual impact	Magnitude of visual impact	Visual impact rating
R18	Ground level and upper storey views extend towards and across the rail corridor. Views towards the station are partially restricted to vantage points with a north-easterly aspect. Existing tree plantings on building frontage provide screening and filtered views towards the station from ground and upper levels.	Low	The Proposal would form a visible element within the surrounding landscape but is unlikely to constitute a marked effect on existing views. The Proposal would complement the scale, landform and pattern of the surrounding landscape and would not create a noticeable deterioration in the existing view.	Low	Low
R19	Street level views towards the station from the Raymond Street road corridor are largely contained and screened by buildings to the north of Raymond Street.	Negligible	The Proposal would result in no discernible deterioration in the existing view.	Negligible	Negligible
R20	Street level views extend north along the road corridor and towards the station concourse. Street level views are contained by built development to the west of the station, although views towards buildings are softened by tree plantings along and within property boundaries. Distant views from the street extend north towards high rise development on the skyline. Street level views to the east of the road corridor are partially screened and filtered by fencing alongside the rail corridor, but extend above and beyond the rail corridor towards residential buildings along Cambridge Road and Wigram Street. The skyline to the east is also defined by mature tree plantings both within and beyond the rail corridor.	Moderate	The Proposal would form a visible element within the surrounding landscape but is unlikely to constitute a marked effect on existing views. The Proposal would complement the scale, landform and pattern of the surrounding landscape and would not create a noticeable deterioration in the existing view.	Low	Moderate-Low

Receiver viewpoint	Description of existing view	Receiver sensitivity	Description of visual impact	Magnitude of visual impact	Visual impact rating
R21	Street level views extend south along the road corridor and towards the station concourse. Street level views are contained by multi storey commercial and residential development to the west of the station, although views towards buildings are softened by tree planting along and within property boundaries. Street level views to the east of the road corridor are partially screened and filtered by fencing alongside the rail corridor, but extend above and beyond the rail corridor towards residential buildings along Wigram Street. The skyline to the east is also defined by mature tree plantings both within and beyond the rail corridor.	Moderate	The Proposal would form a visible element within the surrounding landscape but is unlikely to constitute a marked effect on existing views. The Proposal would complement the scale, landform and pattern of the surrounding landscape and would not create a noticeable deterioration in the existing view.	Low	Moderate-Low

6.2.3 Mitigation measures

Measures to mitigate visual impacts during construction would be included in a CEMP for the Proposal and would include measures such as minimising light spill during night works, screening of compounds and minimising tree removal. Refer to Table 18 for a list of proposed mitigation measures.

Detailed design of the Proposal would be undertaken with reference to the recommendations included in the Visual Impact Assessment (GBD, 2015) which is included in the list of proposed mitigation measures in Table 18.

In order to minimise the visual impact of the Proposal, the following mitigation measures would be considered further during detail design:

- incorporate contemporary light/transparent design, with modern materials and colours that are sympathetic to the existing station precinct
- consideration and refinement in selection and location for replacement tree plantings which may provide partial screening or backdrop setting for constructed elements
- a review of materials and colour finishes for selected components including potential gabion walls to the underside of ramps
- further refinement to the design of the platform canopies to minimise bulk and visual impacts
- further refinement in the design of the lift structures to minimise the bulk and height of the structures
- additional tree planting would be considered at the detailed design stage to compensate for proposed tree removal to accommodate the Proposal, including the eastern boundary of the rail corridor either side of the upgraded pedestrian entry.

6.3 Noise and vibration

This section provides a summary of the Noise and Vibration Impact Assessment undertaken by AECOM (2015c).

The assessment included:

- identifying sensitive noise receivers
- undertaking unattended day and night-time background noise monitoring
- establishing the noise and vibration assessment criteria
- establishing construction vibration criteria
- modelling of construction noise for the most intensive construction activities for each stage. The modelling assessed the likely plant that would be used for each construction activity and associated sound power levels to calculate the predicted noise level at each receiver location
- assessing the potential construction noise and vibration impacts by comparing the predictions with the criteria.

As operational noise levels are expected to be minimal, no quantitative modelling of potential operational noise impacts was undertaken.

6.3.1 Existing environment

Noise sensitive receivers

The following two noise catchment areas (NCAs) were identified for the Proposal (refer to Figure 12):

- NCA 1 (east of the station) - comprises single-storey and multi-storey residential receivers; a small cluster of commercial receivers on Station Street East; and a church and school to the south-east of the station. The acoustic environment is characterised by road traffic on local roads and on the M4 Western Motorway, train operations on the Main Western Line and natural sounds. NCA 1 is considered to be suburban as it is characterised by local traffic flows with some limited commercial areas.
- NCA2 (west of the station) - comprises single-storey and multi-storey residential receivers; commercial receivers to the west of the station; and a school to the north-west of the station. The acoustic environment is characterised by road traffic on local roads, on arterial roads including Church Street/Great Western Highway and on the M4 Western Motorway, rail traffic on the Main Western Line and natural sounds. NCA 2 is considered to be urban as it is characterised by relatively high traffic flows and commercial areas.

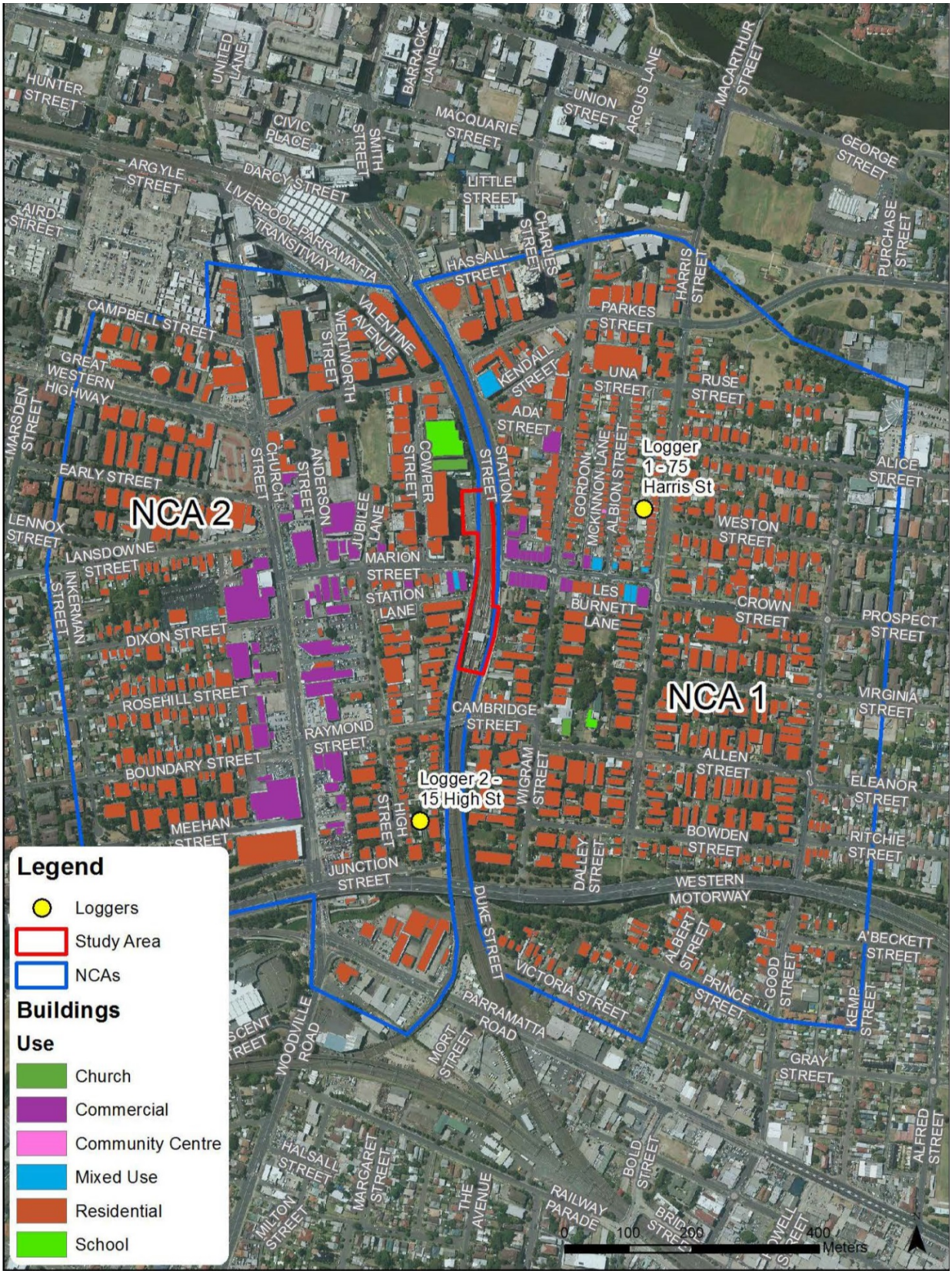


Figure 12 Noise catchment areas and sensitive receivers (AECOM, 2015c)

The nearest sensitive receivers within proximity to the Proposal include:

- residential receivers located along Station Street West and Wigram Street
- commercial properties on Marion Street
- Alphacrucis College
- Nan Tien Temple
- St Oliver's Primary School
- St Oliver's Plunkett Catholic Church
- Harris Park Community Centre.

Seventeen residential receiver locations were selected to represent the worst affected residential receivers of similar background noise levels. These are shown in Figure 13.

Background noise levels

Attended and unattended background noise monitoring was undertaken at two representative receiver locations (one from each NCA) (refer to Figure 12). Unattended monitoring was undertaken for a period of one week between June and July 2015.

Background noise monitoring data was then used to establish the background noise levels for the day, evening and night time periods (refer Table 7).

Table 7 Existing background and ambient noise levels

Location/NCA	Period[1]	Rating background level (L_{A90})[2]	Ambient noise level (L_{Aeq})[3]
75 Harris Street – NCA 1	Daytime	41 dBA	54 dBA
	Evening	43 dBA	52 dBA
	Night time	39 dBA	47 dBA
15 High Street – NCA 2	Daytime	48 dBA	61 dBA
	Evening	49 dBA	56 dBA
	Night time	44dBA	54 dBA

Notes:

1. Daytime period refers to 7am to 6pm (or 8am to 6pm Sundays and public holidays)
   Evening period refers to 6pm to 10pm
   Night time refers to10pm to 7am (or 10pm to 8am Sundays and public holidays)
2. The rating background level (RBL) (L_{A90}) represents the noise level exceeded for 90 per cent of the monitoring period.
3. The ambient noise level represents the average noise level over the monitoring period.

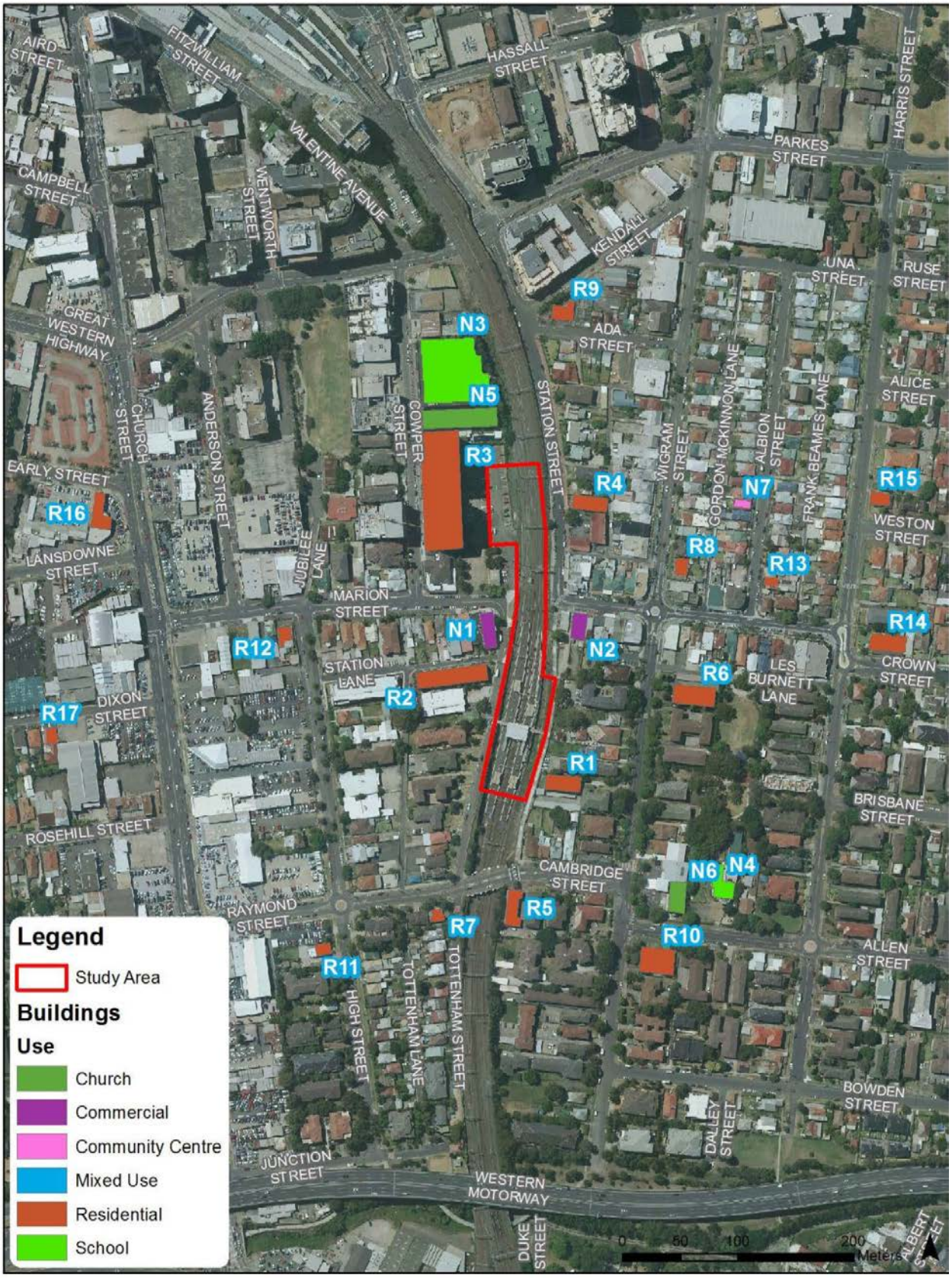


Figure 13 Representative receiver locations (AECOM, 2015c)

Construction noise management levels

The ICNG provides a framework to consider the impacts of construction noise on residences and other sensitive land uses by presenting assessment approaches that are tailored to the scale of construction projects.

The ICNG recommended standard hours for construction are defined as:

- Monday to Friday: 7am to 6pm
- Saturday: 8am to 1pm
- no work on Sundays or public holidays.

Noise management levels for residential receivers for recommended standard hours are defined by the ICNG as follows:

- The 'noise affected level' represents the point above which there may be some community reaction to noise and is calculated based on the rating background level (RBL) + 10 dBA.
- The 'highly noise affected level' represents the point above which there may be strong community reaction to noise and is prescribed as 75 dBA.

The noise management levels for residential receivers outside recommended construction hours are calculated based on the RBL + 5 dBA.

The ICNG also prescribes noise management levels for other non-residential receivers such as commercial, schools and places of worship.

Where works exceed the noise management levels, all reasonable and feasible measures (such as equipment selection and location, construction scheduling and respite periods) should be implemented to reduce noise levels as far as practicable.

The construction noise management levels developed for the Proposal for residential and non-residential sensitive receivers are listed in Table 8 and Table 9 respectively.

Table 8 Construction noise management levels – residential receivers

NCA	Period	Standard hours NML[1] ($L_{Aeq, 15\ min}$)	Highly noise affected NML ($L_{Aeq, 15\ min}$)	Out of hours NML ($L_{Aeq, 15\ min}$)
NCA 1	Daytime	51 dBA	75 dBA	46 dBA
	Evening	N/A	N/A	48 dBA
	Night time	N/A	N/A	44 dBA
NCA 2	Daytime	58 dBA	75 dBA	53 dBA
	Evening	N/A	N/A	54 dBA
	Night time	N/A	N/A	49 dBA

Note:
1. Noise management level.

Table 9 Construction noise management levels – non-residential receivers

Receiver type	NML- when in use ($L_{Aeq, 15\ min}$)
Classrooms at schools/other education institutions, places of worship, medical centres/hospitals, and community centres	55 dBA[1]
Commercial premises (including office, retail outlets)	70 dBA

Note:
1. Management levels are based on a 45 dBA internal noise management level and a 10 dB reduction through an open window.

Sleep disturbance criteria

Sleep disturbance noise criteria established at the nearest residential receivers based on the *NSW Road Noise Policy* (Department of Environment, Climate Change and Water, 2011) are presented in Table 10.

Table 10 Sleep disturbance criteria

NCA	Background noise level $L_{(A90),\ dB(A)}$	Screening level $L_{A1\ (1\ minute),\ dB(A)}$	Awakening reaction $L_{A1\ (1\ minute),\ dB(A)}$
1	39	54	60 to 65
2	44	59	60 to 65

Traffic noise criteria

For traffic noise, the criterion applied on public roads generated during the construction phase of a project is an increase in existing road traffic noise of no more than 2 dBA.

Construction vibration criteria

When assessing vibration there are two categories of vibration criteria, one related to the impact of vibration on building structures, and one relating to human comfort.

Human comfort

Assessing Vibration: A Technical Guideline (Department of Environment and Conservation, 2006) provides vibration criteria for human comfort. For intermittent vibration (like that which could result from construction machinery) the criteria is based on a concept of a vibration 'dose'. Table 11 lists the preferred and maximum levels for human comfort.

Table 11 Human comfort intermittent vibration limits (British Standard BS 6472-1992)

Receiver type	Period	Preferred value $m/s^{1.75}$	Maximum value $m/s^{1.75}$
Residential	Day[1]	0.2	0.4
	Night[2]	0.13	0.26
Offices, schools, educational institutions and places of worship	When in use	0.4	0.8

Note:
1. Daytime period is defined as 7am – 10pm under BS 6472-1992
2. Night period is defined as 10pm – 7am under BS 6472-1992

Structural damage to buildings

The German Standard *DIN 4150 1999-02 Standard Structural Vibration – Effects of vibration on structures* provides guidelines for vibration levels for building structures.

Table 12 Guideline values for short-term vibration on structures (DIN 4150)

Type of structure	At foundation frequency of			Plane of floor at uppermost storey
	1 Hz to 10 Hz[1] mm/s	10 Hz to 50 Hz[1] mm/s	50 Hz to 100 Hz[1] mm/s	All frequencies[2] mm/s
Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20-40	40-50	40
Dwellings and buildings of similar design and/or use	5	5-15	15-20	15
Structures that because of their particular sensitivity to vibration, do not correspond to those listed in lines 1 or 2 and have intrinsic value (such as heritage buildings)	3	3-8	8-10	8

Operational noise criteria

The *Industrial Noise Policy* provides guidance in relation to acceptable noise limits for industrial noise emissions, which includes, but is not limited to, noise emissions from mechanical plant.

The assessment procedure in the *Industrial Noise Policy* (EPA, 2000) has two components:

- controlling intrusive noise impacts in the short-term for residences
- maintaining noise level amenity for residences and other land uses.

The project specific noise levels established for the operation of the Proposal are summarised in Table 13 and are based on the lower of the intrusive and amenity criteria.

Table 13 Environmental noise emission criteria, $L_{(Aeq)}$, dB(A)

NCA	Period	Intrusive criteria	Amenity criteria	Project specific noise levels
NCA 1	Day	46	55	46
	Evening	46	45	45
	Night	44	40	40
NCA 2	Day	53	60	53
	Evening	53	50	50
	Night	49	45	45
School	N/A	N/A	45[1]	45

NCA	Period	Intrusive criteria	Amenity criteria	Project specific noise levels
Place of worship	N/A	N/A	60[1]	50
Commercial premises	N/A	N/A	65[1]	65

Note:
1. External noise level assuming windows remain closed.

6.3.2 Potential impacts

Construction noise

Table 14 lists the modelled construction noise levels for the receiver locations based on potentially noisy construction activities from Section 3.2.1.

The results of the modelling indicate that the noise generated by construction is predicted to exceed the 'noise affected' noise management levels at most residential receivers (R1, R2, R3, R4, R5, R6, R7, R8 and R9) during most construction stages. The noise affected noise management levels may also be exceeded at Alphacrucis College and Nan Tien Temple.

R1 is predicted to exceed the 'highly affected' noise management level during stages 2 and 5 (vegetation removal and finalisation works).

The exceedences shown in Table 14 would be mitigated by implementing the standard noise mitigation measures provided by the *Construction Noise Strategy* (TfNSW, 2012c) where feasible and reasonable (refer to Section 6.4.3). The exceedances would be short-term and temporary, and limited to the duration of the construction period.

Table 14 Predicted construction noise levels during each activity – standard hours (dBA)

Receiver ID	Receiver address	NML	1A[1]	1B[2]	2A[3]	3A[4]	3B[5]	4A[6]	5[7]
R1	27 Station Street West	*58*	**74**	**75**	**72**	**72**	**68**	**72**	**78**
R2	8 Cowper Street	*58*	**70**	**59**	56	56	52	56	**74**
R3	22 Station Street East	*51*	**69**	**58**	**55**	**55**	51	**55**	**73**
R4	40 Wigram Street	*51*	**62**	**56**	**53**	**53**	50	**53**	**66**
R5	8 Cambridge Street	*51*	**57**	**62**	**59**	**59**	**55**	**59**	**61**
R6	Les Burnett Lane	*51*	**52**	**61**	**58**	**58**	**55**	**58**	**56**
R7	20 Tottenham Street	*58*	52	**60**	57	57	53	57	56
R8	59 Wigram Street	*51*	**53**	**53**	50	50	46	50	**57**
R9	5 Ada Street	*51*	51	51	48	48	44	48	**55**
R10	25-27 Wigram Street	*51*	42	45	42	42	39	42	46
R11	11 Marion Street	*58*	47	45	42	42	39	42	51
R12	34 High Street	*58*	45	54	51	51	47	51	49
R13	4 Albion Street	*51*	45	50	47	47	44	47	49

Receiver ID	Receiver address	NML	1A[1]	1B[2]	2A[3]	3A[4]	3B[5]	4A[6]	5[7]
R14	55 Harris Street	*51*	44	51	48	48	44	48	48
R15	65 Harris Street	*51*	42	49	46	46	43	46	46
R16	65 Church Street	*58*	39	43	40	40	37	40	43
R17	31 Dixon Street	*58*	40	43	40	40	37	40	43
N1	45-43 Marion Street (commercial)	*70*	**76**	70	67	67	63	67	**80**
N2	53 B Marion Street (commercial)	*70*	69	66	63	63	59	63	**73**
N3	Alphacrucis College	*55*	**56**	49	46	46	43	46	**60**
N4	St Oliver's Primary School	*55*	40	45	42	42	39	42	44
N5	Nan Tien Temple	*55*	**65**	**56**	53	53	49	53	**69**
N6	St Oliver Plunkett's Catholic Church	*55*	42	44	41	41	38	41	46
N7	Harris Park Community Centre	*55*	49	54	51	51	48	51	53

Notes:

1. 1A – Establishment of site compound (erect fencing, tree protection zones, site offices, amenities and plant/material storage areas etc.)
2. 1B – Removal of trees and vegetation
3. 2A – Lift, footbridge and platform upgrade
4. 3A – Reconfiguration of station building
5. 3B – Upgrade of station building
6. 4A – Interchange works (construction of accessible ramps on both sides of the station)
7. 5 – Finalisation
8. Items in **BOLD BLACK** indicate predicted noise impact at this receiver during this work stage is above NML. Items in **BOLD RED** indicate a 'highly affected' residential receiver with level of 75 dB(A) or greater.

Out of hours works and sleep disturbance

Out of hours works would be required during possessions that typically extend 24-hours a day over a weekend. Approximately six possessions would occur during the construction period as described in Section 3.2.3.

Table 15 lists the modelled construction noise levels for the receiver locations based on potentially noisy construction activities that are likely to occur outside standard construction hours (refer to Section 3.2.3). The modelling has indicated that there would be exceedances of the out of hours noise management levels at residential receivers in both NCAs. Residential receivers on Station Street West are likely to be the worst affected during out of hours works.

However it is important to note that such out of hours works would only comprise a number of weekends or evening/night time periods over the 18 month construction period and are required for safety, constructability and traffic reasons. Most works would be undertaken during standard hours.

Any out of hours works would be assessed in more detail and subject to further approval by TfNSW along with appropriate community notification and mitigation measures in place, in accordance with TfNSW's *Construction Noise Strategy* (TfNSW, 2012c).

Table 15 Predicted construction noise levels – out of hours (dBA)

Receiver ID	Receiver address	Day and evening NML	Day and evening			Night NML	Night	
			1A[1]	2A[2]	3B[3]		2A[2]	3B[3]
R1	27 Station Street West	*53*	**74**	**72**	**68**	*49*	**72**	**68**
R2	8 Cowper Street	*53*	**70**	56	52	*49*	56	52
R3	22 Station Street East	*46*	**69**	**55**	51	*44*	**55**	51
R4	40 Wigram Street	*46*	**62**	**55**	51	*44*	**53**	50
R5	8 Cambridge Street	*46*	**57**	**59**	**55**	*44*	**59**	**55**
R6	Les Burnett Lane	*46*	**52**	**58**	**55**	*44*	**58**	**55**
R7	20 Tottenham Street	*53*	52	57	53	*49*	57	53
R8	59 Wigram Street	*46*	53	50	46	*44*	50	46
R9	5 Ada Street	*46*	51	48	44	*44*	48	44
R10	25-27 Wigram Street	*46*	42	42	39	*44*	42	49
R11	11 Marion Street	*53*	47	42	39	*49*	42	39
R12	34 High Street	*53*	45	**51**	**47**	*49*	**51**	**47**
R13	4 Albion Street	*46*	45	**47**	44	*44*	**47**	44
R14	55 Harris Street	*46*	44	48	44	*44*	48	44
R15	65 Harris Street	*46*	42	46	43	*44*	46	43
R16	65 Church Street	*53*	39	40	37	*49*	40	37
R17	31 Dixon Street	*53*	40	40	37	*49*	40	37

Receiver ID	Receiver address	Day and evening NML	Day and evening			Night NML	Night	
			1A[1]	2A[2]	3B[3]		2A[2]	3B[3]
N1	45-43 Marion Street (commercial)	*70*	**76**	67	63	-	67	63
N2	53 B Marion Street (commercial)	*70*	69	63	59	-	63	59
N3	Alphacrucis College	*55*	**56**	46	43	-	46	43
N4	St Oliver's Primary School	*55*	40	42	39	-	42	39
N5	Nan Tien Temple	*55*	**65**	53	49	-	53	49
N6	St Oliver Plunkett's Catholic Church	*55*	42	41	38	-	41	38
N7	Harris Park Community Centre	*55*	49	51	48	-	51	48

Notes:
1. 1A – Site compound establishment
2. 2A – Lift, footbridge and platform upgrade
3. 3B – Refresh of station building
4. Items in **BOLD BLACK** indicate predicted noise impact at this receiver during this work stage is above NML.

Traffic noise

As noted in Section 3.2.6 the project would generally result in a small increase in vehicles (approximately three movements per day and 16 movements per day during possessions and peak periods), which is a minor increase compared with existing traffic levels on surrounding roads. Therefore, it is considered that the project would not result in any exceedance of the road traffic noise criteria.

Construction vibration

The German Standard *DIN 4150 1999-02 Standard Structural Vibration – Effects of vibration on structures* provides guidelines for vibration levels for building structures. As described in Table 12, the Standard recommends a maximum allowable vibration velocity of 5 mm/s for dwellings and a maximum allowable vibration velocity of 3 mm/s for heritage structures.

The Noise and Vibration Impact Assessment provided safe working buffer distances for jackhammers, vibratory rollers and plate compactors which would be used during construction based on the *Construction Noise Strategy* (TfNSW, 2012c). These are provided in Table 16.

Table 16 Recommended safe working distances of vibration intensive equipment

Plant	Rating/ description	Safe distance for cosmetic damage (residential) m	Safe distance for cosmetic damage (heritage) m	Safe distance for human response m
Jack hammer	Hand held	1 m (nominal)	10 m	Avoid contact with structure
Vibratory roller	<50 kN (Typically 1-2 tonnes)	5 m	60 m	15-20 m
	<100 kN (Typically 2-4 tonnes)	6 m	80 m	20 m
	<200 kN (Typically 4-6 tonnes)	12 m	**X**[1]	40 m
	<300 kN (Typically 7-13 tonnes)	15 m	**X**[1]	100 m
	>300 kN (Typically 13-18 tonnes)	20 m	**X**[1]	100 m
	>300 kN (>18 tonnes)	25 m	**X**[1]	100 m
Plate compactor	5 horsepower	1 m (nominal)	10 m	10 m

Note:
1. High risk to impact to heritage buildings within approximate 100 metre radius.

If the safe working distances outlined in Table 16 are complied with no adverse impact from the vibration intensive works are likely in terms of human response or cosmetic damage.

As discussed in Section 6.5, a number of locally listed heritage items are situated within the vicinity of the site. Site-specific safe working distances would be established on-site prior to the vibration generating works commencing. Vibration intensive work should not proceed within the safe working distances unless a permanent vibration monitoring system is installed approximately one metre from the building footprint, to warn operators in real time (e.g. flashing lights, SMS, or audible alarm systems) when vibration levels are approaching the maximum vibration criteria. In addition, condition surveys of heritage buildings would be undertaken in order to assess potential for increased susceptibility to building damage from vibration.

Where reasonable and feasible, smaller equipment must be considered for works around heritage structures where those works are required within the safe working distances prescribed in Table 16.

Operation

Operational activities at Harris Park Station are not proposed to significantly change and as a result the existing noise and vibration levels are unlikely to change.

Plant expected to be associated with the operation of the Proposal would include three lifts, lighting and electrical equipment including security cameras. Mechanical plant required for the operation of the lifts would be identified during detailed design and would be selected in order to achieve the acceptable noise levels identified in the *NSW Industrial Noise Policy* (EPA, 2000) and summarised in Table 13. New plant would be free from annoying sound characteristics such as tonality, low frequency, impulsive and intermittent noise.

There would be no vibration impacts associated with the operation of the Proposal.

6.3.3 Mitigation measures

Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the *Construction Noise Strategy* (TfNSW, 2012c) and the Noise and Vibration Impact Assessment (AECOM, 2015c).

The CNVMP would be the key management document that would prescribe specific mitigation measures to minimise construction noise and vibration. The measures would focus on contractor inductions, the efficient operation of plant and equipment, along with prescribing safe working distances for vibration intensive equipment and detailing procedures for noise and vibration monitoring, and for obtaining TfNSW approval for out of hours works. The CVNMP would also detail requirements for managing potential vibration impacts to heritage items through monitoring and nominating safe working distances.

The CNVMP would also be supported by the Community Liaison Plan to be prepared for the Proposal, which would detail community notification requirements which can range from letter box drops, phone calls to offers of alternative accommodation depending on the level of impact.

Refer to Table 18 for a list of proposed mitigation measures.

6.4 Indigenous heritage

This section provides a summary of the Aboriginal Heritage Due Diligence Assessment prepared by Umwelt (2015) for the Proposal in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (OEH, 2010).

The assessment included a desktop analysis including review of existing databases, past reports, historical maps and aerial imagery.

6.4.1 Existing environment

The Harris Park area forms part of a landscape that was used by the Barramattagal, the Toongagal and the Bidjigal people for many thousands of years prior to European contact.

An extensive search of the Aboriginal Heritage Information System (AHIMS) database was undertaken by Umwelt on 15 May 2015 for a 500 metre radius of the proposal site and a revised basic search was conducted by TfNSW on 5 January 2016 for a 200 metre radius of the proposal site.

The desktop search identified no previously registered AHIMS sites within 200 metres of the study area. The nearest AHIMS site was identified more than 300 metres from the study area.

The Proposal is located within an area that has been heavily modified. The clear and observable disturbance to the area as a result of previous construction and use of the railway would have resulted in the removal of or significant disturbance to the natural soil profile.

The study area is located about 420 metres south of the modified channel of Clay Cliff Creek and one kilometre south east of the Parramatta River. No landscape features likely to indicate the presence of Aboriginal objects were identified in the study area. Therefore the proposal site has been assessed as having low Aboriginal archaeological potential (Umwelt, 2015). In accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (OEH, 2010), no further Aboriginal heritage investigations are required.

6.4.2 Potential impacts

Construction

Construction of the Proposal would involve earthworks and other ground disturbance activities which have the potential to impact Indigenous sites, if present.

The due diligence assessment determined that there are no known Indigenous sites or areas where Indigenous objects are likely to occur. As such, there is a low risk/low likelihood that the Proposal would result in harm to Indigenous items.

Operation

The Proposal would not result in impacts to Indigenous heritage during operation.

6.4.3 Mitigation measures

If unforseen Indigenous objects are uncovered during development, work would cease in the vicinity of the find and the TfNSW Project Manager and TfNSW Environment and Planning Manager are to be notified immediately to assist in co-ordinating next steps which are likely to involve consultation with an archaeologist, OEH and the Local Aboriginal Land Councils. If human remains are found, work would cease, the site secured and the NSW Police and OEH notified.

Refer to Table 18 for a list of proposed mitigation measures.

6.5 Non-Indigenous heritage

A search of the following historic heritage registers was undertaken for the study area and surrounds:

- National Heritage List
- Commonwealth Heritage List
- Register of the National Estate (non-statutory archive)
- NSW State Heritage Register
- Holroyd LEP
- Parramatta LEP and Parramatta City Centre LEP.

A desktop review of existing parish maps, aerial photography and other historical records was undertaken by Umwelt to assess the archaeological potential of the proposal site (Umwelt, 2015).

6.5.1 Existing environment

Database results

The desktop search identified no items listed on the Commonwealth, National or State Heritage Register within the study area or immediate surrounds. A number of locally listed heritage items were identified within proximity to the proposal site.

Heritage listed items within 50 metres of the proposal site are listed in Table 17 and shown in Figure 14.

Table 17 Heritage items/areas in the vicinity of the proposal site

Heritage item	Address	Heritage listing	Reference number	Approximate distance from the proposal site
Parramatta Station to Parramatta Road Railway Line (Archaeological Site)/Parramatta Archaeological Management Unit 3098	Station Street East	RailCorp's S170 Heritage and Conservation Register	4804407 (SHI)	Site is within the curtilage of the S170 listed item
Harris Park West Conservation Area		Parramatta LEP 2011		20 m north-east
Single storey residence	48 Wigram Street	Parramatta LEP 2011	I303 (LEP)	Immediately east
Single Storey residence	5 Cambridge Street	Parramatta LEP 2011	I266 (LEP)	20 m south-east
Single Storey residence	3 Cambridge Street	Parramatta LEP 2011	I265 (LEP)	30 m south-east
Single Storey residence	1 Cambridge Street	Parramatta LEP 2011	I264 (LEP)	40 m south-east

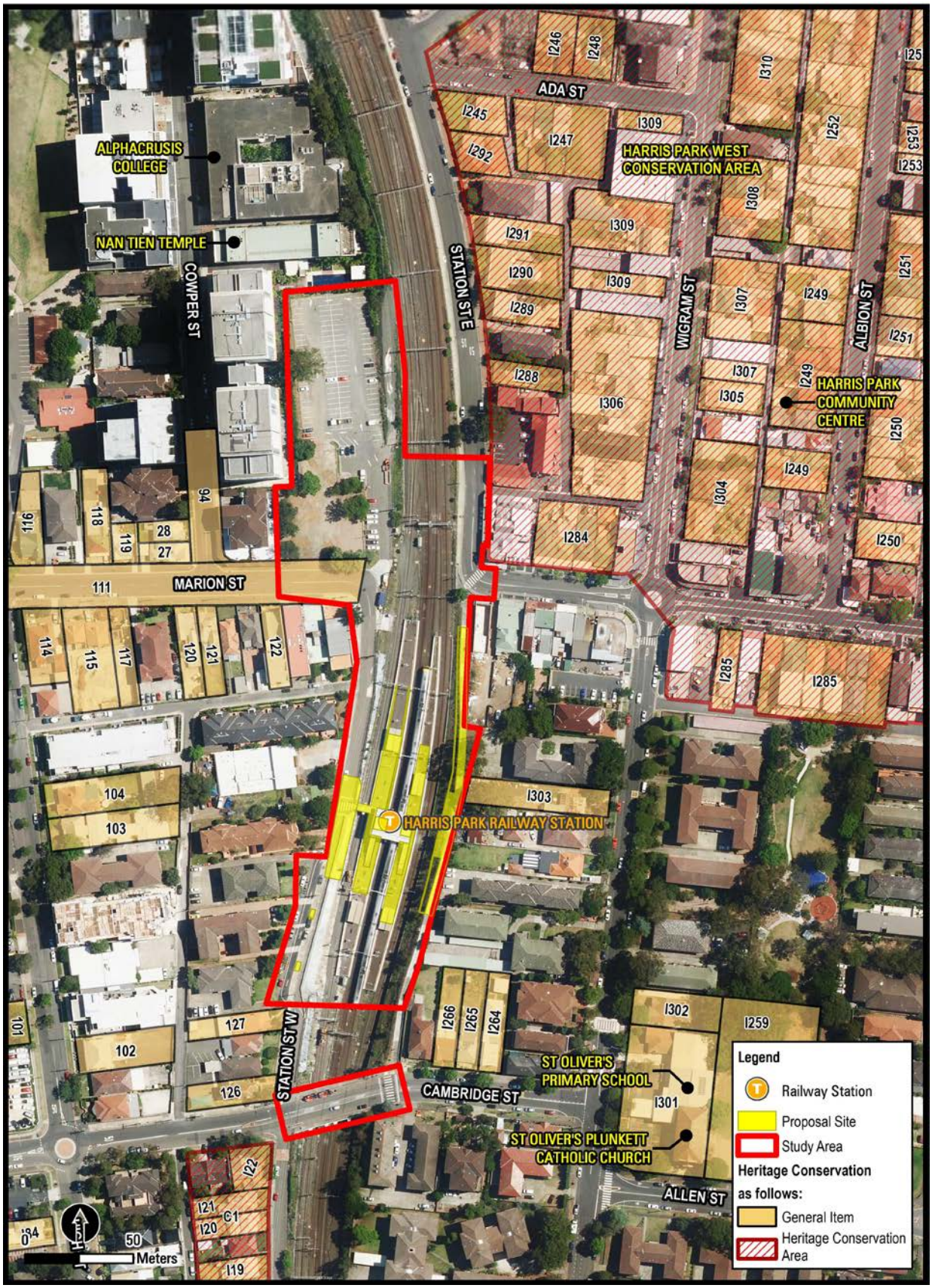


Figure 14 Heritage listed items within the vicinity of the proposal site

Historical background

Large estates were created in the area from the 1790s as government and military officers received generous grants and bought up smaller ones given to ex-convicts or soldiers. The State heritage-listed Experiment Farm, the earliest land grant made in the Parramatta area, is situated approximately 600 metres to the east of the proposal site.

Harris Park Railway Station opened in the late 1880s following the opening of the Granville to Blacktown section of the Main Western Line, through Harris Park, in 1860.

This rail link to the emerging industrial areas of Granville and Clyde led to a network of workers' cottages quickly developing around the station and by 1900 the suburb also contained more substantial homes and middle-class residents. Harris Park remained largely residential and a renewed subdivision in the 1920s took up most of the area's available land (Umwelt, 2015).

Archaeological potential

The Proposal is situated within the curtilage of the Parramatta Station to Parramatta Road Railway Line Archaeological site which is listed on RailCorp's S170 Heritage and Conservation Register and the Parramatta Historical Archaeological Landscape Management Study (PHALMS) Parramatta Archaeological Management Unit (AMU) 3098.

PHALMS identifies sites in the Parramatta area where archaeological remains may be present. While PHALMS has no legal status, it is a planning tool that provides Parramatta City Council and OEH with an overview of areas that require consideration of archaeological issues.

Parramatta AMU 3098 covers an extensive area between Parramatta Station to Parramatta Road and includes Harris Park Station. The area was used historically for agricultural purposes prior to the construction of the railway. The potential archaeological resources within this area may include open deposits, scatters and ecological samples related to the early agricultural use of this area.

The AMU is listed as having little archaeological potential and of local archaeological significance (OEH, 2001). Based on the State Heritage Inventory listing description, the archaeological resources of this AMU are likely to have been subject to minor disturbance, with major disturbance in some areas.

The preliminary archaeological assessment indicated that the construction of the railway station is likely to have removed all evidence associated with the early agricultural and pastoral use of the area (Umwelt, 2015). Furthermore, any evidence associated with the agricultural activities (ecological samples etc) prior to the development of the railway is likely to be patchy and it is impossible to specify what such remains may entail and where they would be located within the area.

The preliminary archaeological review concluded that there is no known potential historical archaeological resource in the Proposal site and that it is highly unlikely to expose intact archaeological relics. Accordingly, no further archaeological assessment is required.

6.5.2 Potential impacts

Construction

Built heritage

The nearest heritage listed item is a single storey residence (48 Wigram Street) which is listed on the Parramatta LEP 2011 (Item I303). The Proposal would not impact on the heritage fabric of the item.

Indirect impacts on heritage listed buildings within the vicinity of the Proposal such as vibration impacts could occur during vibration intensive activities. Such impacts would be mitigated with the implementation of mitigation measures provided in Table 18. Vibration impacts and safe working distances are discussed further in Section 6.3.

Archaeological heritage

Despite the S170 archaeological heritage listing, the assessment concluded that there is a low risk of encountering archaeological items/deposits in the proposal site and that construction is unlikely to expose historical archaeological relics.

Mitigation measures provided in Table 18 would be implemented in the unlikely event that any potential archaeological items are discovered during works.

Operation

The operation of the Proposal does not present any risks to non-Indigenous heritage.

6.5.3 Mitigation measures

Potential impacts to non-Indigenous heritage would be managed through the implementation of the CEMP prepared by the Contractor that would map and protect nearby non-Indigenous heritage items and prescribe management measures to ensure these items are not affected.

Any unexpected archaeological deposits would be managed in accordance with relevant legislation and stop-work procedures to be prepared by the Contractor. Further archaeological work and/or consents would be obtained for archaeological deposits prior to works recommencing at the location, where required.

Refer to Table 18 for a list of proposed mitigation measures.

6.6 Socio-economic impacts

6.6.1 Existing environment

Land use surrounding Harris Park Station is comprised of a mixture of commercial and residential zones. The areas to the west and east of the station are characterised by a mixture of high, medium and low density residential dwellings.

The Harris Park town centre with various small scale retail, business and community services is located approximately 90 metres north-east of the proposal site. The Auto Alley (Church Street) corridor, which has been subject to strategic planning investigations for the development of medium to high density residential and commercial uses, is situated approximately 300 metres west of the proposal site.

The closest residential properties are immediately adjacent to the station on Station West Street and Station Street East (within 10 metres).

Other educational and religious facilities in the broader area include:

- St Oliver's Primary School and Catholic Church which are situated approximately 100 metres east of the proposal site
- Alphacrucis College which is situated approximately 200 metres north-west of the proposal site (approximately 50 metres north-west of the study area)
- Nan Tien Temple which is situated approximately 190 metres north-west of the proposal site (approximately 40 metres north-west of the study area).

6.6.2 Potential impacts

Construction

The construction of the Proposal has the potential to temporarily impact customers, pedestrians, residents, motorists, businesses and other receivers as a result of:

- temporary loss of time-restricted parking on nearby streets and in the Council car park (if the location is selected for the construction compound)
- increase in truck movements delivering site materials, plant and equipment
- construction noise, dust and visual impacts.

Access for emergency services would be maintained at all times and it is not anticipated that access to residential properties would be significantly affected during construction of the Proposal.

Refer to Sections 6.1, 6.2 and 6.3 for discussion on the potential traffic, access, visual and noise impacts arising from construction of the Proposal and the proposed management strategies.

Operation

Overall, the Proposal would provide positive socio-economic benefits to Harris Park and the Parramatta City LGA, including:

- improved accessibility for customers at Harris Park Station providing an accessible route to station platforms through the provision of upgraded footpaths and lifts
- improved customer amenity and facilities at the station including a family accessible toilet, and canopies over the pedestrian bridge, stairs, platforms for weather protection along with new tactiles and wayfinding signage
- improved transport interchange facilities including new formalised kiss and ride areas, taxi waiting areas and additional bicycle facilities on both sides of the station
- potential increased use of public transport to and from Harris Park
- additional lighting and CCTV would provide positive CPTED outcomes for the area.

6.6.3 Mitigation measures

Table 18 provides a number of environmental safeguards to minimise these potential impacts with a particular focus on keeping the community informed and includes the following:

- sustainability criteria for the Proposal would be established to encourage construction personnel to purchase goods and services locally helping to ensure the local community benefits from the construction of the Proposal
- a Community Liaison Plan (to be developed by the Contractor prior to construction) would identify all potential stakeholders and the best-practice methods for consultation with these groups during construction. The Plan would also encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where possible
- the community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Plan

- contact details for a 24-hour construction response line, Project Infoline and email address would be provided for ongoing stakeholder contact throughout the construction phase.

6.7 Biodiversity

This section provides a summary of the Ecological Impact Assessment prepared by Jacobs (2015) which included a desktop assessment, literature review and site inspection of the study area.

6.7.1 Existing environment

Threatened species and communities

The results of the database searches identified the following threatened biota previously recorded or predicted to occur in the locality of the Proposal (up to five kilometre radius):

- 16 threatened flora species and two endangered plant populations listed under the TSC Act/EPBC Act
- 56 threatened fauna species listed under the TSC Act, FM Act and/or EPBC Act
- 27 migratory species listed under the EPBC Act.

No threatened flora, fauna or migratory species were identified during the survey. The study area does not contain any native remnant vegetation communities; threatened or endangered ecological communities. While fauna habitats are generally considered to be of poor quality, the desktop review identified that the Grey-headed Flying-fox (*Pteropus poliocephalus)* was considered to have a high likelihood to occur in the study area with the presence of suitable foraging habitat. Further assessment for this species has been considered in Section 6.7.2.

Flora

The study area is situated within a highly modified urban environment. Vegetation is dominated by landscape plantings and opportunistic vegetation that have established in the disturbed areas within and adjacent to the rail corridor. No native remnant vegetation communities are present in the study area or immediate surrounds. No threatened ecological communities occur within or immediately surrounding the study area.

The plantings are a mixture of species commonly planted as street trees and landscape plantings in the Sydney region including *Eucalyptus moluccana* (Coastal Grey Box), *Eucalyptus microcorys* (Tallowwood), *Corymbia citriodora* (Lemon-scented Gum), *Lophostemon confertus* (Brush Box), *Jacaranda mimosifolia* (Jacaranda), *Cinnamomum camphora* (Camphor laurel), *Callistemon sp.* (Bottle Brush), *Ligustrum lucidum* (Large-leaf privet), *Pinus pinaster* (Pine), *Grevillea robusta* (Silky Oak), *Populus deltoides* (Poplar), and Casuarina spp.(She Oaks). Vegetation within the rail corridor is dominated by exotic species and plantings of *Corymbia citriodora* (which is not native to the Sydney region) which have previously been trimmed and have subsequently re-sprouted.

Understorey vegetation consists primarily of exotic vegetation and small tree species including *Acacia saligna* (Golden Wreath Wattle), and *Cinnamomum camphora* (Camphor Laurel). The ground layer is dominated by grasses and herbaceous weeds including *Stenotaphrum secundatum* (Buffalo Grass), *Pennisetum clandestinum* (Kikuyu), *Sida rhombifolia* (Paddy's Lucerne), *Bidens pilosa* (Cobbler's Pegs), *Conyza bonariensis* (Fleabane), *Asparagus aethiopicus* (Asparagus Fern), and *Lactuca serriola* (Prickly Lettuce) with some native ground covers including *Dianella caerulea* (Blue Flax-lily), and *Lomandra longifolia* (Spiny-headed Mat-rush). Exotic vines including *Araujia sericifera* (Moth Vine), *Anredera cordifolia* (Madeira Vine), and *Ipomoea indica* (Morning Glory) are common.

A total of 105 trees were recorded in the study area during the field survey. These trees range from mature eucalypts to smaller shrubs and trees re-sprouting from previous trimming works within the rail corridor. The most significant trees are located along in and adjacent to the Harris Park car park. These trees are large and contribute considerably to the local character of the area and provide important visual amenity.

The location of each tree within the survey area is outlined in Figure 15.

An assessment of each tree including suggested Tree Protection Zones according to the *AS 4970-2009 for the Protection of Trees on Development Sites* is provided in Appendix C of the Ecological Impact Assessment (Jacobs, 2015).

The following noxious weeds classified as Control Class 4 – locally controlled weeds were identified in the study area:

- *Asparagus aethiopicus* (Asparagus fern)
- *Lantana camara* (Lantana)
- *Ligustrum lucidum* (Broad-leaved privet).

Fauna habitat

Fauna habitat within the study area is generally of low quality and lacks important features such as hollow bearing trees, dense litter layer, and abundant woody debris. No significant fauna habitat was identified within the study area.

Figure 15 Location of trees within study area (Jacobs, 2015)

6.7.2 Potential impacts

Construction

Direct impacts

Direct biodiversity impacts of the Proposal are predicted to be minimal due to the disturbed nature of vegetation in the study area and the nature of the construction methods. Vegetation and habitat clearing would be minimal and no impacts to remnant native vegetation or high quality fauna habitat are predicted. Direct trauma to native fauna is expected to be minimal as no high quality habitats would be removed.

Vegetation removal would be required on the eastern side of the station for construction of the lift, stairs and upgraded path (refer to Figure 15). The vegetation that may be impacted consists of:

- approximately 46 *Corymbia citriodora* (Lemon-scented Gum) trees (re-growth from previous trimming) which have a diameter breast height (DBH) of 0.1 metres (refer to Figure 15, trees 41 – 53, trees 56 - 57 and trees 65 – 97)
- one *Acacia podalyriifolia* (Queensland Silver Wattle) shrub which has a DBH of 0.05 metres (refer to Figure 15, tree 55)
- one *Acacia parramattensis* (Parramatta Wattle) shrub which has a DBH of 0.1 metres (refer to Figure 15, tree 54).

This vegetation consists of planted species which are not endemic or native to the locality and accordingly the ecological impact associated with the removal of these species has been assessed as being of low magnitude. Replacement landscaping would be provided along the upgraded path on the eastern side of proposal site (refer to Figure 4).

The extent of vegetation clearing has been assessed as a worst case basis. The final extent would be determined during detailed design and construction planning stages and would be minimised as far as practicable.

Indirect impacts

Noise, dust, light and contaminant pollution during construction is predicted to be minimal. The mitigation measures outlined in Table 18 would ensure that these indirect impacts would be minimised.

Proliferation of weed species may occur as a result of the works. Without appropriate management strategies, construction activities have the potential to disperse weeds including species listed as noxious under the *Noxious Weeds Act 1993*. Construction activities also have the potential to import new weed species into the study area.

The most likely causes of weed dispersal and importation associated with the works include earthworks, movement of soil, and attachment of seed (and other propagules) to vehicles and machinery. There is also the chance of the introduction and spread of *Phytophthora cinnamomi* (Root Rot) from machinery which could detrimentally affect the vegetation along the rail corridor. The mitigation measures outlined in Section 6.7.3 and Table 18 would ensure that weed and pathogen importation and spread is minimised.

Threatened species and communities

Assessments of significance were undertaken for the Grey-headed Flying-fox in accordance with section 5A of the EP&A Act (seven part test) and the significant impact criteria for EPBC Act matters of NES (DotE, 2013).

The assessments concluded that the Proposal is unlikely to result in a significant impact to the species. While minor vegetation removal would be required, the proposed works would not

result in the removal of any high quality habitat or breeding habitat for the species. The Grey-headed Flying-fox would be able to persist in the study area after the works have been completed. The habitat would remain in a similar state after the proposed works have been completed.

Operation

Operational activities at Harris Park Station are not proposed to significantly change and as a result there would be no increased risk to biodiversity.

6.7.3 Mitigation measures

Tree Protection Zones (TPZ) would be established prior to construction commencing as per the recommendations in the Ecological Impact Assessment (Jacobs, 2015) to protect trees to be retained during construction. An arborist would inspect trees at the completion of excavation works, and again at the completion of all works to ascertain the percentage loss of structural root zone of trees in close proximity to the works and advise on the health of tree and any remedial actions required.

TfNSW has prepared a *Vegetation Offset Guide* (TfNSW, 2013d) to provide a framework for a consistent approach to offset impacts to vegetation on applicable TfNSW projects and allows for appropriate offsets to be applied for one tree or a group of trees that do not form part of a vegetation community, regardless of whether they are native or not.

As trees have been identified for removal, the Ecological Impact Assessment has recommended that a minimum of 94 trees must be planted to meet TfNSW's offset ratios. Any additional trees that are found to require removal during construction would also need to be offset. Such measures and procedures for tree assessment and removal would be included and implemented as part of the CEMP for the Proposal. This would also include checking trees for active nests, prior to their removal.

The CEMP would be developed in accordance with the recommendations of the Ecological Impact Assessment (Jacobs, 2015) and would include a range of other weed control measures, tree protection, and erosion and sedimentation control measures. Refer to Table 18 for a list of proposed mitigation measures.

6.8 Contamination, landform, geology and soils

Geotechnical and contamination investigations were undertaken as part of the development of the concept design (AECOM, 2015d, 2015e and 2015f). The findings of these investigations are summarised in this section.

6.8.1 Existing environment

Geology and soils

Harris Park Station is located within a rail cutting, with the highest point being at Cambridge Street. The western cutting is around five metres high at the pedestrian overbridge and is supported by a vertical concrete panel retaining wall and a crib wall. The retaining wall was constructed after the collapse of the previous wall in 2013.

The *Sydney 1:100 000 Geological Series Map* (Herbert, 1983) indicates that Harris Park Railway Station is underlain by Ashfield Shale of the Wianamatta Group. This comprises primarily dark grey to black claystone, siltstone, and fine sandstone-siltstone laminate.

Reference to the *Sydney 1:100,000 Soil Landscape Series Sheet* (Chapman and Murphy, 1989) indicates that the proposal site is underlain by the Glenorie Soil Landscape. This is described as an erosional soil landscape, occupying rolling low hills on Wianamatta Group

Shales. The landscape comprises predominantly shallow to moderately deep soils, around 100 centimetres thick. Limitations associated with the soil landscape include high soil erosion hazard, localised impermeable highly plastic subsoil and moderate reactivity.

The geotechnical investigations indicated that the soil profile at the top of the rail cutting on the western and eastern sides of the station generally consist of a concrete surface, underlying fill material to a depth of 0.9 metres and silty clays over weathered shales. The ground profile within the station platforms (proposed lift locations) generally consist of asphaltic surface underlain by fill material to a depth of one metre over weather shales.

Acid sulphate soils

A review of the Australian Soil Resource Information System (ASRIS) National Acid Sulphate Soil database indicated that there is an extremely low potential for acid sulphate soils to occur within the study area.

Salinity

The Western Sydney salinity map (Department of Infrastructure, Planning and Natural Resources, 2002) indicates that there is a moderate salinity potential within the study area.

Contamination

A review of the NSW EPA's Contaminated Land Record and the PoEO public register identifies that Harris Park Station is not listed as a contaminated site, nor has the site been subject to regulation under the *Contaminated Land Management Act 1997*.

The preliminary contamination assessment did not identify any asbestos fibres (or asbestos containing materials) or exceedances for the commercial/industrial land-use in any of the samples analysed. The preliminary waste classification indicated that spoil would meet the requirements of general solid waste (AECOM, 2015).

As the proposal site is located primarily within the rail corridor it may be subject to localised contamination as a result of the construction and operation of the rail line.

6.8.2 Potential impacts

Construction

The Proposal would require excavation work for the installation for the foundations and footings for the lift shaft pits, stairs, and canopies. Other trenching or excavation may be required for footpath and road works, relocation of services, drainage works, retaining walls and tree removal. There would also be earthworks required to build up existing levels.

Soil disturbance

Excavation and other earthworks such as trenching and stockpiling activities, if not adequately managed, could result in the following impacts:

- erosion of exposed soil and stockpiled materials
- dust generation from excavation and vehicle movements over exposed soil
- an increase in sediment loads entering the stormwater system and/or local runoff.

These impacts are considered to be low-moderate due to the site terrain. However, it is expected that erosion and stability risks could be adequately managed through the implementation of standard measures as outlined in the 'Blue Book' *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004) and other erosion protection measures for the existing cutting if required.

Contamination

Excavation has the potential to expose contaminants, which if not appropriately managed, can present a health risk to construction workers and the community. Contaminants would also pose an environmental risk if they were to enter nearby waterways through the stormwater infrastructure. As there is potential for onsite contamination, chemical testing and visual characterisation would be undertaken to confirm the composition and nature of excavated material. Where spoil is classified as unsuitable for reuse it would be transferred to an appropriately licensed offsite facility.

There is also potential for activities to result in the contamination of soil through accidental fuel or chemical spills from construction plant and equipment.

Operation

There would be no operational risks to geology and soils as a result of the Proposal.

6.8.3 Mitigation measures

As part of the CEMP, a site-specific erosion and sediment controls plan/s would be prepared and implemented in accordance with the 'Blue Book' - *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004). The Erosion and Sediment Control Plan would be established prior to the commencement of construction and be updated and managed throughout as relevant to the activities during the construction phase.

An environmental risk assessment is to be undertaken prior to construction and must include a section on contamination as per the TfNSW Standard Requirements. Measures to mitigate potential impacts from any contaminated soil/materials during construction would be developed and implemented through an unexpected contamination finds procedure and Waste Management Plan as part of the CEMP. All waste would be managed in accordance with relevant legislation.

Refer to Table 18 for a list of proposed mitigation measures.

6.9 Hydrology and water quality

6.9.1 Existing environment

Surface water

The proposal site is located within the Clay Cliff Creek catchment. Clay Cliff Creek, which is situated about 500 metres north of the proposal site, is a concrete stormwater channel which flows in an east to west direction to the Parramatta River.

Surface runoff within the vicinity of the Proposal is managed by Parramatta City Council's stormwater drainage system that consists mainly of stormwater pits (at street level), connected to an underground pipe network which then discharges via the Clay Cliff stormwater channel to the southern bank of the Parramatta River.

The quality of surface water runoff in the vicinity of the proposal site would be impacted by the existing land uses, including the operation of local roads and the rail corridor.

Groundwater

A search of the Department of Primary Industries - Office of Water Groundwater Map identified one groundwater monitoring bore within a 500 metres of the proposal site. However, no water bearing zone was identified in the bore.

Groundwater was not encountered during the geotechnical investigation which included boreholes to a maximum depth of 8.36 metres (AECOM, 2015d). However, groundwater levels

may change over time due to seasonal or other influences such as high rainfall events which may result in significantly higher groundwater levels or in surface water sheeting over the exposed shale cut slopes (AECOM, 2015c).

Flooding

A review of the Parramatta City Council Flood Map for the Harris Park area indicates that Harris Park Station and streets adjacent to the station, including Station Street, Marion Street, and Cambridge Street, are not within the 100 year or probable maximum flood (PMF) extents. The nearest area affected by the 100 year flood is approximately 300 metres north-west of the station.

6.9.2 Potential impacts

Construction

Without appropriate safeguards, pollutants (fuel, chemicals or wastewater from accidental spills, and sediment from excavations and stockpiles) could potentially reach nearby stormwater drains and flow into nearby waterways.

Activities which would disturb soil during construction work have the potential to impact upon local water quality as a result of erosion and run off sedimentation.

Operation

The Proposal is unlikely to impact upon the hydrology of the proposal site or the surrounding area. The detailed design would take stormwater management into consideration and while the new design does require some drainage modifications, such works would be designed and undertaken in accordance with the relevant Sydney Trains, Sydney Water and Council standards and requirements.

6.9.3 Mitigation measures

As noted in Section 6.8.3, an Erosion and Sediment Control Plan would be prepared and implemented for the Proposal to manage risks to water quality. Other mitigation measures that would be required for construction include regular vehicle and equipment maintenance along with spill kits and spill response procedures. Any dewatering would be undertaken in accordance with TfNSW's *Water Discharge and Reuse Guideline* (TfNSW, 2015a).

Refer to Table 18 for a list of proposed mitigation measures.

6.10 Air quality

6.10.1 Existing environment

Based on the existing land uses surrounding the proposal site, the existing air quality is considered to be characteristic of an urban environment. Sensitive receivers in the vicinity of the Proposal include staff and customers at Harris Park Station and residential and commercial properties around the station.

A search of the National Pollutant Inventory undertaken on 3 December 2015 for the 2013 to 2014 reporting period identified 36 air polluting substances from 13 sources in the Parramatta LGA. The closest source was identified at 1 Unwin Street, Rosehill about 1.4 kilometres from the proposal site.

Other contributors to air quality within the study area would include emissions from motor vehicles on the surrounding road network, and the diesel trains on the adjoining rail corridor.

6.10.2 Potential impacts

Construction

The main air quality impacts that have the potential to occur during construction would be temporary impacts associated with dust particles and emissions of carbon monoxide, sulphur dioxide, particulate matter (PM_{10}), nitrous oxides, volatile organic compounds, and polycyclic aromatic hydrocarbons associated with the combustion of diesel fuel and petrol from construction plant and equipment.

Anticipated sources of dust and dust-generating activities include:

- excavation for the foundations and footings of the lift shaft pits, stairs and canopies
- other trenching or excavation for footpath and road works, relocation of services, drainage works, retaining walls and tree removal
- stockpiling activities
- loading and transfer of material from trucks
- other general construction activities.

The Proposal would have a minimal impact on air quality as it would not involve extensive excavation or other land disturbance with the potential to generate significant quantities of dust.

The operation of plant, machinery and trucks may also lead to increases in exhaust emissions in the local area however these impacts would be minor and short-term.

The implementation of standard air quality management controls (listed in Table 18) would minimise the potential for air quality impacts.

Operation

Overall impacts of air quality during the operation of the Proposal are considered minimal as the Proposal would not result in a significant change in land use. Also, as the Proposal would increase access to public transport, the use of public transport would be anticipated to increase and subsequently aim to reduce the amount of private vehicle related emissions in the long-term.

6.10.3 Mitigation measures

Table 18 provides a list of mitigation measures that are proposed to manage air quality issues during construction. They are aimed around maintaining and operating plant and equipment efficiently and implementing measures for dust suppression including watering, covered loads and appropriate management of tracked dirt/mud on vehicles. Such measures would be included in the CEMP to be prepared for the Proposal.

6.11 Waste

6.11.1 Construction waste

Construction of the Proposal would generate the following waste:

- surplus building materials
- asphalt and concrete
- earthworks spoil
- various building material wastes (including metals, timbers, plastics, concrete, carpeting etc.)
- general waste, including food and other wastes generated by construction workers.

6.11.2 Operational waste

The Proposal would not result in changes to operational waste.

6.11.3 Mitigation measures

Careful planning of construction activities would ensure that the volume of surplus materials is minimised.

Waste management would be undertaken in accordance with the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act). A Waste Management Plan would be prepared that would identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities along with other onsite management practices such as keeping areas free of rubbish.

The application of the *NSW Sustainable Design Guidelines – Version 3.0* (TfNSW, 2013a) would also result in waste management targets to be developed for the Proposal and would include reuse and recycling.

6.12 Cumulative impacts

6.12.1 Existing or potential projects

Cumulative impacts occur when two or more projects are carried out concurrently and in close proximity to one another. The impacts may be caused by both construction and operational activities and can result in a greater impact to the surrounding area than would be expected if each project was undertaken in isolation.

This section describes the cumulative impacts and benefits likely to arise from the combination of the construction and operation of the proposal with other projects being carried out in the area.

Based on a search of the major projects register maintained by the Department of Planning and Infrastructure, Sydney East Joint Regional Planning Panel Development and Planning Register, Parramatta City Council's and Holroyd City Council's Development Application Registers, the following projects within the vicinity of the proposal site may be constructed at the same time as the proposal:

- M4 Widening (Church Street to Homebush Bay Drive)
- Mixed commercial and residential complex within Auto Alley.

The M4 widening project is currently underway and involves widening of the M4 between Church Street and Homebush Bay Drive approximately 300 metres south of the Proposal.

In October 2014, a development application was lodged by Boyded Industries proposing Gateway South, a $600 million mixed commercial and residential complex in the Auto Alley area. The proposal involves the construction of two 10 storey commercial towers and a 31 storey mixed use tower. This includes 779 residential units and 40,000 square metres of commercial space, new public domain works and a new park for community use. The future renewal of Auto Alley could potentially increase station entries and exits from the western side of Harris Park Station as well as rail patronage.

No other major development proposals have been identified in the vicinity of the proposal site. Other developments likely to occur within the locality would be small scale projects such as residential dwellings in adjacent residential areas.

6.12.2 Potential impacts

Potential cumulative impacts may occur as a result of construction activities occurring simultaneously with the projects listed above. Potential impacts would include:

- increased traffic travelling through the study area and the surrounding road network and associated delays for road users
- construction noise and vibration
- reduced visual amenity.

Cumulative impacts would be minimised and managed through the application of environmental safeguards and management measures as summarised in Table 18.

Developments proposed within proximity to the proposal site would also increase construction vehicles on local roads and construction noise. The construction period for local developments is unknown.

6.12.3 Mitigation measures

Consultation with relevant stakeholders would be undertaken during construction planning to ensure that potential cumulative impacts are minimised. Any additional mitigation measures from consultation would be included in the Traffic Management Plan and Noise and Vibration Management Plan.

The potential cumulative impacts associated with the Proposal would be further considered as the design develops and as further information regarding the location and timing of potential developments is released. Environmental management measures would be developed and implemented as appropriate.

During construction, the works would be co-ordinated with any other construction activities in the area. Consultation and liaison would occur with Parramatta City Council, Holroyd City Council, RailCorp/Sydney Trains, and any other developers identified to minimise cumulative construction impacts such as traffic and noise.

6.13 Climate change and sustainability

6.13.1 Greenhouse gas emissions

An increase in greenhouse gas emissions, primarily carbon dioxide, would be expected during construction of the Proposal due to exhaust emissions from construction machinery and vehicles transporting materials and personnel to and from site.

The detailed design process would undertake an AS 14064-2 (Greenhouse Gases - project level) compliant carbon footprinting exercise in accordance with TfNSW's *Greenhouse Gas Inventory Guide for Construction Projects* (TfNSW, 2013e). The carbon footprint would be used to inform decision making in design and construction.

Due to the small scale of the Proposal and the short-term temporary nature of the individual construction works, it is considered that greenhouse gas emissions resulting from the construction of the Proposal would be minimal. Furthermore, greenhouse gas emissions generated during construction would be kept to a minimum through the implementation of the standard mitigation measures detailed in Table 18.

It is anticipated that, once operational, the Proposal may result in an increase in use of public transport and a relative decrease in use of private motor vehicles by commuters to travel to and from Harris Park. A modal shift in transport usage may reduce the amount of fuel consumed by private motor vehicles with a corresponding relative reduction in associated greenhouse gas emissions in the local area.

6.13.2 Climate change

The dynamic nature of our climate system indicates a need to focus attention on how to adapt to the changes in climate and understand the limitation of adaptation. The effects of climate on the Sydney region can be assessed in terms of weather changes, storm intensity, flooding and increased risk of fire.

Climate change could lead to an increase in the intensity of rainfall events, whereby the rainfall expected to occur in a 100-year average recurrence interval flood event would occur more frequently. Such changes in weather in the region are unlikely to impact on the operation of the Proposal (for more information on flooding refer to Section 6.9).

Climate change could lead to an increase in the frequency and severity of bushfires. No bushfire maps were available for the area at the time of this assessment; however, the Proposal would be designed with appropriate fire protection measures.

6.13.3 Sustainability

The design of the Proposal would be based on the principles of sustainability, including the incorporation of the *NSW Sustainable Design Guidelines – Version 3.0* (TfNSW, 2013a) and the TfNSW *Environmental Management System* (EMS). These guidelines require a number of mandatory and discretionary initiatives to be applied. Refer to Section 3.1.4 for more information regarding the application of these guidelines.

Further positive impacts in relation to climate change and sustainability associated with the Proposal include encouraging a reduction in private vehicle use and increasing the accessibility of public transport services.

7 Environmental management

This chapter of the REF identifies how the environmental impacts of the Proposal would be managed through environmental management plans and mitigation measures. Section 7.2 lists the proposed mitigation measures for the Proposal to minimise the impacts of the Proposal identified in Chapter 6.

7.1 Environmental management plans

A CEMP for the construction phase of the Proposal would be prepared in accordance with the requirements of TfNSW's EMS. The CEMP would provide a centralised mechanism through which all potential environmental impacts relevant to the Proposal would be managed, and outline a framework of procedures and controls for managing environmental impacts during construction.

The CEMP would include at a minimum the following management plans:

- Construction Traffic Management Plan
- Construction Noise and Vibration Management Plan
- Erosion and Sediment Control Plan
- Waste Management Plan.

The CEMP would incorporate as a minimum all environmental mitigation measures identified below in Section 7.2, any conditions from licences or approvals required by legislation, and a process for demonstrating compliance with such mitigation measures and any conditions of approval.

7.2 Mitigation measures

Mitigation measures for the Proposal are listed below in Table 18. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6 should the Proposal proceed.

Table 18 Proposed mitigation measures

No.	Mitigation measure
	General
1.	An Environmental Controls Map (ECM) would be developed by the Contractor in accordance with TfNSW's *Guide to Environmental Controls Map* (TfNSW, 2015c) for approval by TfNSW, prior to the commencement of construction for implementation for the duration of construction.
2.	A project risk assessment including environmental aspects and impacts would be undertaken by the Contractor prior to the commencement of construction and documented as part of the CEMP.
3.	Site inspections to monitor environmental compliance and performance would be undertaken during construction at appropriate intervals.
4.	Prior to the commencement of construction, all contractors would be inducted on the key project environmental risks, procedures, mitigation measures and conditions of approval.

No.	Mitigation measure
5.	Service relocation would be undertaken in consultation with the relevant authority. Contractors would mark existing services on the ECM to avoid direct impacts during construction.
	Traffic and site access
6.	Prior to the commencement of construction, a Construction Traffic Management Plan (CTMP) would be prepared as part of the CEMP and would include at 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 (unless affected property owners have been consulted and appropriate alternative arrangements made) • 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 • routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses • details for relocating kiss and ride, including appropriate signage to direct patrons. Particular provisions should also be considered for the accessibility impaired • measures to manage traffic flows around the area affected by the Project, 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. Consultation with the relevant roads authorities would be undertaken during preparation of the CTMP. The performance of all project traffic arrangements must be monitored during construction.
7.	Communication would be provided to the community and local residents to inform them of impacts to vehicle and pedestrian movements, detours and anticipated effects on the local road network relating to site works.
8.	Access to all private properties and businesses adjacent to the works would be maintained during construction, unless otherwise agreed by relevant property owners.
9.	Road Occupancy Licences for temporary road closures would be obtained, where required.
10.	The queuing and idling of construction vehicles in residential streets would be minimised through staging of deliveries where practicable.
11.	Should road closures be required, signage would be erected to clearly delineate alternative access and that nearby businesses would operate as normal.
12.	Pedestrian access to and from the station would be maintained at all times during construction where practicable.
13.	The performance of all project traffic arrangements would be monitored during construction.
14.	Workers would be encouraged to access the proposal site via public transport.

No.	Mitigation measure
15.	Site access and work scheduling arrangements would be finalised in consultation with affected property owners.
16.	Deliveries and road works would be scheduled to avoid peak times (such as construction of shared zone at night and generally limiting works in the road carriageway as much as practicable).
17.	Impacts on time-restricted parking are to be minimised by staging road works where practicable.
	Urban design, landscape and visual amenity
18.	The detailed design of the Proposal would be undertaken with reference to the recommendations in the Visual Impact Assessment (GBD, 2015) including: • consideration and refinement in selection and location for replacement tree plantings which may provide partial screening or backdrop setting for constructed elements • a review of materials and colour finishes for selected components including potential gabion walls to the underside of ramps • further refinement to the design of the platform canopies to minimise bulk and visual impacts • further refinement of the lift structures to minimise the bulk and height of the structures.
19.	An Urban Design and Landscaping Plan (UDLP) would be prepared by the Contractor and submitted to TfNSW for approval, prior to finalisation of the detailed design. The UDLP, at a minimum, would address the following: • the appropriateness of the proposed design with respect to the existing surrounding landscape, built form, behaviours and use-patterns • materials, finishes, colour schemes and maintenance procedures including graffiti control for new walls, barriers and fences • location and design of pedestrian and bicycle pathways, street furniture including taxi facilities, bicycle storage (where relevant), telephones and lighting equipment • landscape treatments and street tree planting to integrate with surrounding streetscape • total water management principles to be integrated into the design where considered appropriate • design measures included to meet the *NSW Sustainable Design Guidelines - Version 3.0.*
20.	Finishes and materials for new elements would be complementary to the existing locality and landscape and reflective surfaces would be minimised with a preferred use of muted colours.
21.	All permanent lighting would be designed and installed in accordance with the requirements of standards relevant to *AS 1158 Road Lighting* and *AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting.*
22.	The detailed design of the Proposal would comply with Crime Prevention Through Environmental Design principles.
23.	The design is to be presented to the TfNSW Design and Sustainability Panel for acceptance prior to the finalisation of design.
24.	Worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.

No.	Mitigation measure
25.	Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
26.	During construction, graffiti would be removed in accordance with TfNSW's Standard Requirements.
27.	Light spill from the rail corridor into adjacent visually sensitive properties would be minimised by directing construction lighting into the construction areas and ensuring the site is not over-lit. This includes the sensitive placement and specification of lighting to minimise any potential increase in light pollution.
	Noise and vibration
28.	Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the *Interim Construction Noise Guideline* (DECC, 2009), *Construction Noise Strategy* (TfNSW, 2012c) and the Noise and Vibration Impact Assessment for the Proposal (AECOM, 2015c year). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.
29.	The CNVMP would outline measures to reduce the construction noise impact from human activities. Reasonable and feasible noise mitigation options which would be considered, include: • regularly training workers and contractors (such as at toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise • avoiding any unnecessary noise when carrying out manual operations and when operating plant • ensuring spoil is placed and not dropped into awaiting trucks • avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where possible • switching off any equipment not in use for extended periods e.g. heavy vehicles engines should be switched off whilst being unloaded • avoiding deliveries at night/evenings wherever practicable • no idling of delivery trucks • keeping truck drivers informed of designated vehicle routes, parking locations and acceptable delivery hours for the site • minimising talking loudly; no swearing or unnecessary shouting, or loud stereos/radios onsite; no dropping of materials from height where practicable, no throwing of metal items or slamming of doors.

No.	Mitigation measure
30.	The CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which should be considered, include: • maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances • using the most suitable equipment necessary for the construction works at any one time • directing noise-emitting plant away from sensitive receivers • regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc. • using non-tonal reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms for all plant used regularly onsite (greater than one day), and for any out of hours works • fitting mufflers/silencers to pneumatic tools (e.g. breakers) and use residential-grade mufflers on plant use of quieter and less vibration emitting construction methods where feasible and reasonable.
31.	Works would generally be carried out during normal work hours (i.e. 7am to 6pm Monday to Friday; 8am to 1pm Saturdays). Works outside these hours may be undertaken if approved by TfNSW and the community notified prior to the works commencing. An Out of Hours Work application form would need to be prepared by the Contractor and submitted to the TfNSW Environment and Planning Manager for any works outside normal hours.
32.	Where the $L_{Aeq\ (15minute)}$ construction noise levels are predicted to exceed 75 dBA at nearby affected sensitive receivers, respite periods would be observed, where practicable and in accordance with TfNSW"s *Construction Noise Strategy* (TfNSW, 2012c). This would include restricting the hours that very noisy activities can occur.
33.	Affected pre-schools, schools, universities and other identified sensitive receivers will be consulted in relation to noise mitigation measures to identify any noise sensitive periods, e.g. exam periods. As much as reasonably possible noise intensive construction works in the vicinity of affected educational buildings are to be minimised
34.	Work would be conducted behind temporary hoardings/screens wherever practicable. The installation of construction hoarding should take into consideration the location of residential receivers to ensure that 'line of sight' is broken, where feasible.
35.	To avoid structural impacts as a result of vibration or direct contact with structures, the proposed works would be undertaken in accordance with the safe work distances outlined in the Noise and Vibration Assessment (AECOM, 2015c) and attended vibration monitoring or vibration trials would be undertaken where these distances are required to be challenged.
36.	A dilapidation survey would be carried out for the heritage listed buildings closest to works prior to their commencement to confirm their structural integrity and whether further vibration assessment and additional mitigation measures are required.
37.	Vibration resulting from construction and received at any structure outside of the project would be managed in accordance with the *German Standard DIN 4150: Part 3 – 1999 Structural Vibration in Buildings: Effects on Structures and Environmental Noise Management Assessing Vibration: A Technical Guideline* (Department of Environment and Conservation, 2006).

No.	Mitigation measure
38.	For vibration intensive activities that occur within the safe working distances, as presented in Table 16, management methods to mitigate vibration should include, but not be limited, to the following: • Equipment selection and maintenance - the use of less vibration intensive methods of construction or equipment should be considered where possible to reduce the potential for cosmetic damage. All equipment should be maintained and operated in an efficient manner, in accordance with manufacturer's specifications, to reduce the potential for adverse vibration impacts. • Works scheduling and respite periods - works scheduling can often be adopted to effectively manage construction vibration impacts and in particular to limit potential impacts. Wherever possible, vibration intensive works should be limited to the least sensitive times of the day. Respite periods should be negotiated with the community for construction activities expected to generate high levels of vibration. • Supplementary vibration monitoring - If vibration intensive equipment is to be used within the safe working distances for cosmetic damage, attended vibration measurements are undertaken when work commences (or a vibration intensive activity commences), to determine site specific safe working distances. • Vibration intensive work should not proceed within the safe working distances unless a permanent vibration monitoring system is installed approximately a metre from the building footprint, to warn operators (via flashing light, audible alarm, SMS etc.) when vibration levels are approaching the peak particle velocity objective. It is also advisable to carry out dilapidation surveys of sensitive historical structures before construction works begins. • For work scheduled to occur near a building, within the safe working distance for human response but outside the safe working distance for cosmetic damage, it is considered that the additional measures highlighted would be sufficient to mitigate the vibration impact at nearby residential receivers. Therefore vibration monitoring would not be required at these properties.
	Indigenous heritage
39.	All construction staff would undergo an induction in the recognition of Indigenous cultural heritage material. This training would include information such as the importance of Indigenous cultural heritage material and places to both the Indigenous and non-Indigenous community, as well as the legal implications of removal, disturbance and damage to any Indigenous cultural heritage material and sites.
40.	If unforseen Indigenous objects are uncovered during construction, the procedures contained in TfNSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2015a) would be followed, and work would cease in the vicinity of the find. The Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager so they can assist in coordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, the OEH and the Local Aboriginal Land Council. If human remains are found, work should cease, the site secured and the NSW Police and the OEH notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained before works recommence.
	Non-Indigenous heritage
41.	A heritage induction would be provided to workers prior to construction, informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction.

No.	Mitigation measure
42.	In the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in TfNSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2015a) would be followed, and works within the vicinity of the deposit would cease immediately. The Contractor would immediately notify the TfNSW Project Manager and the TfNSW Environment and Planning Manager so they can assist in coordinating the next steps which are likely to involve consultation with an archaeologist and OEH. Where it is required further, archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to works recommencing at the location.
43.	Heritage listed items within the vicinity of the Proposal and proposed mitigation measures to protect the items during construction are to be identified on the ECM.
44.	As Harris Park Station is listed as an archaeological site on RailCorp's Heritage and Conservation Register, Sydney Trains Heritage would be notified of the proposed works.
45.	If excavation works are proposed within any of the proposed compound locations, further archaeological assessment would need to be undertaken by an appropriately qualified archaeologist.
	Socio-economic
46.	Sustainability criteria for the Proposal would be established to encourage the Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.
47.	Feedback through the submissions process would be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where possible.
48.	A Community Liaison Plan would be prepared prior to construction to identify all potential stakeholders and best practice methods for consultation with these groups during construction. The plan would also encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where possible.
49.	Contact details for a 24-hour construction response line, Project Infoline and email address would be provided for ongoing stakeholder contact throughout the construction phase.
50.	The community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Plan to be developed prior to construction.
	Biodiversity
51.	Construction of the Proposal must be undertaken in accordance with TfNSW's *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2015d) and TfNSW's *Fauna Management Guideline* (TfNSW, 2015e).
52.	All workers would be provided with an environmental induction prior to commencing work onsite. This induction would include information on the protection measures to be implemented to protect vegetation, penalties for breaches and locations of areas of sensitivity.
53.	Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees nominated to be removed in the Ecological Impact Assessment (Jacobs, 2015) would be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal. Trees to be retained would be protected through temporary protection measures discussed below.

No.	Mitigation measure
54.	Tree Protection Zones (TPZs) would be established around trees to be retained, as nominated in the Ecological Impact (Jacobs, 2015). Tree protection would be undertaken in line with *AS 4970-2009 Protection of Trees on Development Sites* and would include exclusion fencing of TPZs.
55.	In the event of any tree to be retained becoming damaged during construction, the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.
56.	Should the detailed design or onsite works determine the need to remove or trim any additional trees, which have not been identified in the REF, the Contractor would be required to complete TfNSW's Tree Removal Application Form and submit it to TfNSW for approval.
57.	For new landscaping works, mulching and watering would be undertaken until plants are established and for a minimum 12 month period.
58.	Weed control measures, consistent with TfNSW's *Weed Management and Disposal Guideline* (TfNSW, 2015f), would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the project. This would include the management and disposal in accordance with the *Noxious Weeds Act 1993.*
59.	Vehicles and other equipment would be used onsite would be cleaned to minimise seeds and plant material entering the site to prevent the introduction of further exotic plant species.
60.	Mulching and watering would be undertaken until plants are established.
61.	Offsets and/or landscaping would be undertaken in accordance with TfNSW's *Vegetation Offset Guide* (TfNSW, 2013d) and in consultation with Parramatta City Council.
	Soils and water
62.	Prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the 'Blue Book' *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004). The Erosion and Sediment Control Plan would be implemented prior to and throughout construction and be updated and managed throughout as relevant to the activities during the construction phase.
63.	Erosion and sediment control measures would be established prior to any clearing, grubbing and site establishment activities and would be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. Erosion and sediment control measures would be left in place until the works are complete and areas are stabilised.
64.	Vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment would also be refuelled offsite, or in a designated refuelling area.
65.	All fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards and EPA Guidelines.

No.	Mitigation measure
66.	Adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the TfNSW *Chemical Storage and Spill Response Guidelines* (TfNSW, 2015g) during the construction phase. All staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill.
67.	In the event of a pollution incident, works would cease in the immediate vicinity and the EPA would be notified by TfNSW if required, in accordance with Part 5.7 of the PoEO Act.
68.	The existing drainage systems would remain operational throughout the construction phase.
69.	Should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the *Waste Classification Guidelines* (EPA, 2014) and TfNSW's *Water Discharge and Reuse Guideline* (TfNSW, 2015b).
	Air quality
70.	Air quality management and monitoring for the Proposal would be undertaken in accordance with TfNSW's *Air Quality Management Guideline* (TfNSW, 2015h).
71.	Methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks.
72.	Plant and machinery would be regularly checked and maintained in a proper and efficient condition.
73.	Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.
74.	To minimise the generation of dust from construction activities, the following mitigation measures would be implemented: • apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hard stand areas and other exposed surfaces • cover stockpiles when not in use • appropriately cover loads on trucks transporting material to and from the construction site and securely fix tailgates of road transport trucks prior to loading and immediately after unloading • prevent or remove mud and dirt from being tracked onto sealed road surfaces.
	Waste and contamination
75.	The CEMP (or separate Waste Management Plan, if necessary) must address waste management and should at a minimum: • identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities • detail other onsite management practices such as keeping areas free of rubbish • outline the reporting regime for collating construction waste data.
76.	An appropriate Unexpected Finds Protocol, incorporating asbestos containing materials and other potential contaminants, would be included in the CEMP. This would include procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal would be undertaken in accordance with WorkCover requirements.

No.	Mitigation measure
77.	All spoil to be removed from site would be tested to confirm presence of any contamination. Any contaminated spoil would be disposed of at an appropriately licensed facility.
78.	All spoil and waste must be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying waste (*EPA 2014) prior to disposal.
79.	Any concrete washout should be established and maintained in accordance with TfNSW's *Concrete Washout Guideline* – draft (TfNSW, 2015i) with details included in the CEMP and location marked on the ECM.
	Climate change and sustainability
80.	The detailed design process would undertake an AS 14064-2 (Greenhouse Gases - project level) compliant carbon footprinting exercise in accordance with TfNSW's Greenhouse Gas Inventory Guide for Construction Projects (TfNSW, 2013e). The carbon footprint would to be used to inform decision making in design and construction.
81.	Detailed design of the Proposal would be undertaken in accordance with the *NSW Sustainable Design Guidelines – Version 3.0* (TfNSW, 2013a) with a view to obtaining a Silver rating or better.
82.	The detailed design process would undertake a climate change impact assessment with reference to the *Climate Change Impacts and Risk Management: A Guide for Business and Government* (Department of the Environment and Heritage, 2006) and the *ISCA Guidelines for Climate Change Adaptation* (AGIC, 2011) to determine the hazards/risks associated with future climatic conditions. Issues including protecting customers and electrical equipment from wind and rain during storm events, size of guttering, cross flow ventilation, reflective surfaces etc. would be considered in the design.
	Cumulative impacts
83.	The potential cumulative impacts associated with the Proposal would be further considered as the design develops and as further information regarding the location and timing of potential developments is released. Environmental management measures would be developed in the CEMP, and implemented as appropriate.

8 Conclusion

This REF has been prepared in accordance with the provisions of section 111 of the EP&A Act, taking into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The Proposal would provide the following benefits:

- improved accessibility for customers at Harris Park Station providing an accessible route to station platforms through the provision of lifts
- improved customer amenity and facilities at the station including a family accessible toilet, and canopies over the pedestrian bridge, stairs, platforms along with new tactiles and wayfinding signage
- improved transport interchange facilities including new formalised kiss and ride areas, taxi zones and sheltered bicycle facilities on both sides of the station
- potential increased use of public transport to and from Harris Park.

The likely key impacts of the Proposal are as follows:

- temporary changes to vehicle and pedestrian movements to and around the station during construction
- temporary noise and vibration impacts during construction
- removal of trees/vegetation that would require planting offsets
- introduction of new elements such as the new canopies, lifts, and stairs into the visual environment.

This REF has considered and assessed these impacts in accordance with clause 228 of the EP&A Regulation and the requirements of the EPBC Act (refer to Chapter 6, Appendix A and Appendix B). Based on the assessment contained in this REF, it is considered that the Proposal is not likely to have a significant impact upon the environment or any threatened species, populations or communities. Accordingly an EIS is not required, nor is the approval of the Minister for Planning.

The Proposal would also take into account the principles of ESD (refer to Section 3.1.4). These would be considered during the detailed design, construction and operational phases of the Proposal. This would ensure the Proposal is delivered to maximum benefit to the community, is cost effective and minimises any adverse impacts on the environment.

References

AECOM, 2015a, *Harris Park Station Precinct Accessibility Upgrade – Concept Plan Project*, Sydney

AECOM, 2015b, *Harris Park Easy Access Upgrade Transport and Traffic Impact Assessment*, Sydney

AECOM, 2015c, *Harris Park Station Easy Access Upgrade Noise and Vibration Assessment*, Sydney

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Appendix A Consideration of matters of National Environmental Significance

The table below demonstrates TfNSW's consideration of the matters of NES under the EPBC Act to be considered in order to determine whether the Proposal should be referred to Commonwealth Department of the Environment.

Matters of NES	Impacts
Any impact on a World Heritage property? There are no World Heritage properties in the vicinity of the Proposal.	Nil
Any impact on a National Heritage place? There are no National Heritage places in the vicinity of the Proposal.	Nil
Any impact on a wetland of international importance? There are no wetlands of international importance within 10 kilometres of the Proposal.	Nil
Any impact on a listed threatened species or communities? It is unlikely that the development of the Proposal would significantly affect any listed species or communities.	Nil
Any impacts on listed migratory species? It is unlikely that the development of the Proposal would significantly affect any listed migratory species.	Nil
Does the Proposal involve a nuclear action (including uranium mining)? The Proposal does not involve a nuclear action.	Nil
Any impact on a Commonwealth marine area? There are no Commonwealth marine areas in the vicinity of the Proposal.	Nil
Does the Proposal involve development of coal seam gas and/or large coal mine that has the potential to impact on water resources? The Proposal is for a transport facility and is not related to coal seam gas or mining.	Nil
Additionally, any impact (direct or indirect) on Commonwealth land? The Proposal would not be undertaken on or near any Commonwealth land.	Nil

Appendix B Consideration of clause 228

The table below demonstrates TfNSW's consideration of the specific factors of clause 228 of the EP&A Regulation in determining whether the Proposal would have a significant impact on the environment.

Factor	Impacts
(a) Any environmental impact on a community? There would be some temporary impacts to the community during construction, particularly in relation to noise, traffic and access and visual amenity. Mitigation measures outlined in Table 18 would be implemented to manage and minimise adverse impacts.	Minor
(b) Any transformation of a locality? While some tree removal is required within the rail corridor along the eastern side of the station, efforts would be made to minimise the area of trees to be removed so to maintain the visual character of the area (refer to Section 6.7 for more detail). The Proposal would have a positive contribution to the locality by creating accessible entrances to the station and station platforms.	Minor
(c) Any environmental impact on the ecosystem of the locality? The Proposal would require minor vegetation removal. However, given the Proposal's location within an urbanised environment and the low habitat value of the trees to be removed, impacts to biodiversity and ecosystems are expected to be negligible.	Nil
(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? There would be some temporary impacts during construction particularly in relation to noise, traffic and access and visual amenity. Minor vegetation removal would be required from the eastern side of the station. However, the number of trees to be removed has been minimised as far as possible.	Minor
(e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations? The Proposal would have a positive contribution to the locality by creating a new, open and accessible entrance to the station and also facilitating public access across the railway. A desktop archaeological assessment has been undertaken which determined that there is a low risk of encountering archaeological items/deposits and that the Proposal is unlikely to expose historical archaeological relics.	Minor
(f) Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974*)? The Proposal is unlikely to have any impact on the habitat of protected fauna.	Nil

Factor	Impacts
(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? The Proposal is unlikely to have any impact on endangering any species of animal, plant or other form of life, whether living on land, in water or in the air.	Nil
(h) Any long-term effects on the environment? The Proposal is unlikely to have any long-term effects on the environment.	Nil
(i) Any degradation of the quality of the environment? The Proposal is unlikely to have any degradation on the quality of the environment.	Nil
(j) Any risk to the safety of the environment? The Proposal is unlikely to cause any pollution or safety risks to the environment provided the recommended mitigation measures are implemented.	Nil
(k) Any reduction in the range of beneficial uses of the environment? The Proposal is unlikely to have any reduction in the range of beneficial uses of the environment.	Nil
(l) Any pollution of the environment? The Proposal is unlikely to cause any pollution or to the environment provided the recommended mitigation measures are implemented.	Nil
(m) Any environmental problems associated with the disposal of waste? The Proposal is unlikely to cause any environmental problems associated with the disposal of waste. All waste would be managed and disposed of with a site-specific Waste Management Plan. Mitigation measures would be implemented to ensure waste is reduced, reused or recycled where practicable.	Nil
(n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? The Proposal is to unlikely increase demands on resources that are or are likely to become in short supply.	Nil
(o) Any cumulative environmental effect with other existing or likely future activities? Cumulative effects of the Proposal are described in Section 6.12. Where feasible, environmental management measures would be co-ordinated to reduce any cumulative construction impacts. The Proposal is unlikely to have any significant adverse long-term impacts.	Nil
(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? The Proposal would not affect or be affected by any coastal processes or hazards.	Nil

Appendix C Sustainable Design Guidelines checklist

Compulsory initiatives

Initiative	Theme	Description	Design (D) or Construct (C) interface	Under consideration
C.1 Carbon footprint	Energy and greenhouse	Undertake AS14064-2 (greenhouse gases – project level) compliant carbon footprinting exercise for all projects with a capital investment value over $10 million in accordance with TfNSW's *Greenhouse Gas Inventory Guide for Construction Projects*. The carbon footprint is to be used to inform decision-making in design and construction. Use standard carbon coefficient values for construction material and fuel usage. Monitor and report the carbon footprint every six months during construction.	DC	Yes
C.2 Building orientation and form	Energy and greenhouse	Optimise the building orientation and form to allow for maximum daylight levels (though avoiding overheating).	D	Yes
C.3 Five star appliances	Energy and greenhouse	Purchase plug-in equipment with at least five star Minimum Energy Performance Standards (MEPS) rating (fridges, air conditioners, etc.) or an Energy Star accreditation (IT equipment).	DC	Yes
C.4 Insulation	Energy and greenhouse	Insulate covered and indoor areas. Techniques include adequate thermal mass, and insulating walls and ceilings. Also ensure that all opening are sealed.	D	Yes
C.5 Renewable Energy	Energy and greenhouse	Purchase at least 25 per cent of site-based electricity energy needs from Green Power or renewable sources during construction of the asset.	C	Yes
C.6 Climate change impact assessment	Climate resilience	Perform a climate change impact assessment for each project worth over $10 million using current scientific predictions (i.e. Intergovernmental Panel on Climate Change (IPCC), Commonwealth Scientific and Industrial Research Organisation (CSIRO) etc.) to determine the hazards/risks associated with future climatic conditions. Refer to *Climate Change Impacts and Risk Management: A Guide for Business and Government* and the *AGIC Guidelines for Climate Change Adaptation* for guidance.	D	Yes

Initiative	Theme	Description	Design (D) or Construct (C) interface	Under consideration
C.7 Design for climate change	Climate resilience	All projects with a capital investment value over $10 million to design out extreme, high and medium risks as identified in the climate change impact assessment where practicable.	D	Yes
C.8 Whole of life costing	Materials and waste	Use whole of life costing methodologies (such as Life-Cycle Cost Analysis (LCCA) Method) in line with ISO 15686-5 to inform decision-making on significant issues pertaining to project scope options (such as route selection) and material/technology selection (for example steel versus concrete bridge). Significant issues can be determined using qualitative criteria such as likely scale of environmental impact.	DC	Yes
C.9 Reduce waste to landfill	Materials and waste	Ensure at least 95 per cent of construction and demolition waste (by weight) is diverted from landfill, and either recycled or reused, for all projects with a capital investment value over $10 million.	DC	Yes
C.11 Reduce cement	Materials and waste	Reduce the absolute quantity of Portland cement by at least 30 per cent, as an average across all concrete mixes, by substituting it with supplementary cementitious materials (such as a fly ash, ground granulated blast furnace slag or alkali activated cements) subject to meeting strength and durability requirements.	DC	Yes
C.12 Biodiversity offsetting	Biodiversity and heritage	For non-significant impacts (inside or outside the rail corridor) offsetting is to be in accordance with the TfNSW *Vegetation Offset Guide* as applicable.	DC	Yes
C.13 Heritage conservation and enhancement	Biodiversity and heritage	100 per cent of significant heritage items are identified during project development and design and are protected or beneficially reused where practical. This will require consultation with all relevant Indigenous Heritage groups (where applicable).	DC	Yes
C.14 Heritage interpretation	Biodiversity and heritage	Achieve interpretation of all applicable heritage or historic items through development and implementation of a heritage interpretation strategy (such as incorporate interpretive signage at the station, which provides information on the heritage of the area).	DC	Yes

Initiative	Theme	Description	Design (D) or Construct (C) interface	Under consideration
C.15 Water balance study	Water	Undertake a water balance study for the operational phase (including groundwater where applicable). The study will estimate ongoing water needs, and identify and assess opportunities for on-site capture and reuse, including non-potable water sources as appropriate.	D	Yes
C.16 Water efficient fittings	Water	Ensure onsite amenities using potable water comply with the following criteria: Toilets to be WELS (max 4.5/3 L/min) dual flush toilets; Urinals to be waterless; All taps to be WELS (max 7.5 L/min); (see Green Star Office v3). Any other water fixtures should achieve at least a five star WELS rating.	DC	Yes
C.17 Water efficient controls	Water	Specify sensors, timers or spring loaded devices for taps where possible to reduce water loss from taps that are left running.	D	Yes
C.18 Monitor and record construction water	Water	Projects that have capital value greater than $10 million are to monitor and record water consumption at the site office, all outlets available to the construction site and other water uses such as from non -potable sources.	C	Yes
C.19 Incorporate Water Sensitive Urban Design (WSUD)	Water	Retain hydrology features (including streams, ponds etc.) and incorporate with surface water treatment systems (such as retention basins). This can also be used to treat runoff from hard surfaces before going to stormwater to assist with flood prone areas. Wetland species should be planted in drainage areas to trap gross pollutants where appropriate. Refer to *Australian Runoff Quality – A Guide to Water Sensitive Urban Design*.	DC	Yes
C.20 Noise management	Pollution control	Project to comply with TfNSW *Construction Noise Strategy* and related conditions of approval.	DC	Yes
C.21 Community involvement in planning	Community benefit	Actively engage with stakeholders including the community during planning.	D	Yes
C.22 Planning framework	Community benefit	Plan and design projects to take into considerations existing planning strategies in consultation with relevant authorities.	D	Yes

Initiative	Theme	Description	Design (D) or Construct (C) interface	Under consideration
C.23 Crime Prevention Through Environmental Design (CPTED)	Community benefit	Incorporate CPTED principles during design. This may include natural observation and use of CCTV. Natural observation is achieved through fence, landscape, streetscape and open space design in public or staff supervised areas. This is achieved by minimising narrow corridors, hidden corners and through the use of lighting.	D	Yes

Discretionary initiatives

Initiative	Theme	Description	Design (D) or Construct (C) interface	Under consideration
1.15 Light coloured finishes	Energy and greenhouse	Use light coloured finishes on floors, walls and ceilings of offices, stations and platforms to help reflect ambient light. Within car parks, consider glare and safety issues that may arise.	D	Yes
1.44 Vertical transport	Energy and greenhouse	Install energy efficient vertical transport systems (such as ramps; variable speed drive escalators that enable a slow-mode, so that they oscillate at lower speeds when not in use and increase in speed when users step into the foot panel at the entry to the escalator. Install and variable voltage variable frequency (VVVF) control gear for lifts.	D	Yes
1.51 Photovoltaic panels	Energy and greenhouse	Integrate photovoltaic panels into structures. For an above ground station, on -site renewable energy technologies supply sufficient quantities so that the station's energy supply to be low carbon as defined in Appendix B. For a below ground station, on-site renewable energy technologies should be maximised. For car parks, renewable energy generation should supply 100 per cent of lighting and ventilation demand (unless restricted by wind and shadowing). For a maintenance facility, renewable energy generation should supply 100 per cent of sites lighting, small power and ventilation demands.	D	Yes
2.8 Protection from extreme weather (sun, rain, wind)	Climate resilience	Consider design measures for protecting customers and electrical equipment from wind and rain during storm events.	D	Yes
2.9 Protect sensitive assets	Climate resilience	Protect sensitive assets (such as lifts) from the effects of extreme climate and weather.	D	Yes

Initiative	Theme	Description	Design (D) or Construct (C) interface	Under consideration
3.1 Sustainable procurement	Materials and waste	Develop a sustainable procurement strategy to be implemented during construction. The strategy must include at a minimum (i) a commitment to sustainable procurement in a relevant policy and/or plan, (ii) sustainability questions and requirements in tender documentation, (iii) a process for evaluating tenderers based on sustainability criteria including percentage tender evaluation weighting on sustainability and iv) sustainability requirements in subcontracts. Project teams should be able to demonstrate that the strategy has influenced procurement decision-making and outcomes.	DC	Yes
3.3 Environmentally responsible suppliers	Materials and waste	Use materials certified under recognised environmental certification systems (such as EcoSpecifier, Good Environmental Choice, ECO-Buy, Water Efficiency Labelling Scheme (WELS), Energy Star, Forest Stewardship Council (FSC), Low Carbon Australia Carbon Neutral Certified).	DC	Yes
3.17 Low VOC paints and finishes	Materials and waste	Specify low volatile organic compound (VOC) paints and finishes. Refer to *Green Star – Office Interiors v1.1* available online.	DC	Yes
3.29 Segregation of waste	Materials and waste	Enable waste segregation in the design process by including space for the collection and segregation of waste with appropriate marking (such as signage) and controls (such as lockable lids), located away from sensitive receptors (such as water courses). During construction, use facilities and procedures that maximise on-site separation of waste to maximise reuse/recycling.	DC	Yes
3.35 Modular construction	Materials and waste	Use modular and replaceable finishing elements (such as tunnel lining).	D	Yes
3.36 Prefabrication	Materials and waste	Use prefabricated building and civil components (for bridges, walls (retaining, deflection, noise), culverts, platforms, level crossings and tunnel lining etc.) to reduce construction waste material usage, pollution risks and travel.	DC	Yes
4.2 Ecological value opportunities	Biodiversity and heritage	Maximise ecological values through landscape species choice, and planting density and configuration. Make sure that appropriate weed management strategies are undertaken to avoid migration or contamination on and offsite.	DC	Yes

Initiative	Theme	Description	Design (D) or Construct (C) interface	Under consideration
4.8 Green roofs and walls	Biodiversity and heritage	Install green roof and/or green walls, maximising the extent of native vegetation.	D	Yes
5.1 Rain water	Water	Store rain from roofs or shade structures in water tanks. Connect water tanks to a new or existing non-potable water reticulation system. Connect sub-meter to all outflow pipes from tanks.	D	Yes
5.10 Planting	Water	Select plant species that require minimal or no irrigation after establishment.	DC	Yes
7.17 Legibility through public art	Community benefit	Assist orientation in the station through the use of public art (such as floor scape art).	D	Yes
7.19 Kiss and ride	Community benefit	Provide for kiss and ride at the station.	D	Yes
7.20 Taxi stand and/or bus stop	Community benefit	Provide shelter for nearby taxi stands.	D	Yes
7.28 Bicycle lockers and/ or racks	Community benefit	Provide sheltered bicycle lock ups and/or lockers in or near entrance to the station. Allow for at least five per cent of staff use at maintenance facilities. See Section 3.9.3.1 of the *ASA Station Design Standard Requirements* for further information on bicycle parking requirements at stations.	D	Yes
7.33 Safe pedestrian movement	Community benefit	Make sure that safe movement is promoted for pedestrians and cyclists by minimising vehicle crossings of paths, providing clear signage, and providing freedom from obstacles such as poles, trees etc.	D	Yes
7.38 Reduce vandalism	Community benefit	Minimise risks from vandalism during design, such as designing pedestrian bridges and walkways with a high degree of surveillance or railings, restrict window openings and limit to a maximum 80 millimetre opening.	D	Yes
7.39 Reduce graffiti	Community benefit	Minimise graffiti risks such as through treatment of fencing and other surfaces with anti-graffiti paint or coatings, vegetation cover to deter graffiti or providing designated walls for graffiti.	D	Yes
7.50 Shading	Community benefit	Provide shade through vegetation or structures over platform, concourse, car parks and pedestrian pathway areas and work/lunch areas.	D	Yes

Initiative	Theme	Description	Design (D) or Construct (C) interface	Under consideration
7.51 Asset vegetation	Community benefit	Provide vegetation to reduce heat islanding and increase visual attraction.	DC	Yes
7.52 Heat islands	Community benefit	Use light coloured materials on roofs and pavements to both shade from and reflect sunlight, in order to decrease heat islanding.	DC	Yes