NSW GOVERNMENT | Transport for NSW

Pendle Hill Station Easy Access Upgrade

Review of Environmental Factors

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Contents

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Abbreviations

AHIMS	Aboriginal Heritage Information Management System
BCA	Building Code of Australia
CCP	Commuter Car Park
CEMP	Construction Environmental Management Plan
CPTED	Crime Prevention Through Environmental Design
CTMP	Construction Traffic Management Plan
DDA	*Disability Discrimination Act 1992* (Commonwealth)
DPE	NSW Department of Planning and Environment
DSI	Detailed Site Investigation (Phase II Contamination Investigation)
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)
ESD	Ecologically Sustainable Development (refer to Definitions)
FM Act	*Fisheries Management Act 1994*
Heritage Act	*Heritage Act 1977*
Infrastructure SEPP	*State Environmental Planning Policy (Infrastructure) 2007*
LEP	Local Environmental Plan
LGA	Local Government Area
LoS	Level of Service
MWL	Main West Line
NES	National Environmental Significance
Noxious Weeds Act	*Noxious Weeds Act 1993*
NPW Act	*National Parks and Wildlife Act 1974*
PA system	Public Address System
POEO Act	*Protection of the Environment Operations Act 1997*
OEH	Office of the Environment and Heritage
RailCorp	former Rail Corporation of NSW (now Sydney Trains)
RAP	Remediation Action Plan
REF	Review of Environmental Factors
RMS	Roads and Maritime Services (formerly Roads and Traffic Authority)
SEPP	State Environmental Planning Policy
TPD	Transport Projects Division (TfNSW)
TfNSW	Transport for NSW
TCP	Traffic Control Plan
TSC Act	*Threatened Species Conservation Act 1995*
TVM	Ticket Vending Machine

Definitions

Asset owner From 1 July 2013, Sydney Trains and NSW Trains replaced RailCorp as operators and maintainers of the relevant rail networks although RailCorp remains the land owner entity for rail corridor land and infrastructure. The new organisations have been created to service the different needs of Sydney and intercity/regional customers.

Assets Standards 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 currently performed by RailCorp will be exercised by ASA.

Ecologically Sustainable Development 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 (refer to Section 4.2.2).

Opal card The integrated ticketing smartcard being introduced by TfNSW.
The Opal card provides smartcard access for travel on the public transport network in Sydney, the Blue Mountains, Central Coast, Hunter, Illawarra and Southern Highlands.

The smartcard is similar in size to a credit card and allows payment for travel on ferries, trains, buses and light rail, instead of buying a paper ticket.

Customers using the Opal card tap on at a card reader at the start of their trip and tap off at the end. The electronic ticketing system automatically calculates the fare and deducts it from the value stored on the Opal card.

Sydney Trains Sydney Trains is a rail operator created to service the different needs of Sydney. Sydney Trains is tasked with delivering metropolitan rail customers a better service.

the Proposal The construction and operation of the Pendle Hill Station Easy Access Project.

Executive summary

Transport for NSW (TfNSW) is the proponent for the Pendle Hill Easy Access Upgrade Project (the Proposal). TfNSW is the government agency responsible for the delivery of major transport infrastructure projects in NSW.

The Proposal is part of the Transport Access Program which is a NSW Government initiative to deliver 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 Proposal is designed to improve pedestrian access to and from the station, increase Pendle Hill Stations ability to cope with the predicted future patronage demands, improve pedestrian flow, passenger information services and wayfinding between transport modes.

The Proposal provides:

- installation of four new lifts:
  - one at each station entrance
  - one to Platform 1/2
  - one to Platform 3/4
- a new station concourse featuring
  - a family accessible toilet
  - amenities for Sydney Trains staff
- new platform stairs and canopies
- new street entry stairs and canopies
- partial demolition of the station footbridge spanning the rail corridor
- total demolition and removal of the pedestrian ramps connected to the existing footbridge.

Supporting these major features of the Proposal are a number of interchange and accessibility upgrade works that would improve access and convenience between modes

Construction is anticipated to commence in mid 2015 and would take up to two years to complete.

Need for the Proposal

Improving transport customer experience is the focus of the NSW Government. Transport interchanges, train station and commuter car parks are the important gateways to the transport system and as such play a critical role in shaping the customers experience and perception of public transport. TfNSW identified the need for improved access at Pendle Hill Station was identified through this process.

The *NSW Long Term Transport Master Plan* (TfNSW, 2012b) is a comprehensive plan for all modes of transport across NSW. The plan provides a clear direction for transport over the next 20 years, while building on current commitments. The *Long Term Transport Master Plan*

complements and builds on the visions and goals established in *NSW 2021* and this Proposal would support growth and improvements in the safe and efficient management of transport in the Sydney region.

Scoping studies were undertaken to identify needs at Pendle Hill Station and interchange. As a result, options to provide improved access to the Station were developed, leading to the identification of a preferred option (which is the subject of this REF and the Proposal).

The Proposal was selected as the preferred design as it provided:

- *Disability Discrimination Act 1992* (DDA) compliant access and accessible pathways between the new station entrance and platforms via new lifts and stairs to the new station concourse and platforms
- positive heritage outcomes through the retention of the platform buildings and partial retention of the existing footbridge and platform stairs
- additional canopy coverage on both platforms
- improved arrival experience with pedestrian crossings in close proximity to the new station entrances which is complemented by the realignment of the footpaths
- better connection to the NightRide bus stops and bicycle storage facilities by bringing them closer to the new station entrance
- accessible parking spaces in close proximity to the new station entrances and lifts
- a net increase of commuter parking spaces
- separated taxi and bus movements on Joyce Street by relocating the taxi rank
- formal kiss and ride area on Joyce Street and Wentworth Avenue.

Statutory considerations

The EP&A Act provides for the environmental impact assessment of development in NSW. 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 the EP&A Act.

State Environmental Planning Policy (Infrastructure) 2007 (the Infrastructure SEPP) is the primary environmental planning instrument relevant to the proposed development. 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.

As TfNSW is a public authority and the proposed activity falls within the definition of Rail Infrastructure Facilities as defined in Clause 78 of the Infrastructure SEPP, the Proposal is permissible without development consent. The environmental impacts of the Proposal are therefore assessed by TfNSW 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.

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. Liaison with both Holroyd and Parramatta councils would be maintained throughout the development of the Proposal.

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

- direct notification to the local community
- 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 approximately two weeks. Further information about these specific activities are included in Section 5 of this document.

During this period, the REF would also be available for viewing at the Wentworthville Library, Constitution Hill Library, Holroyd City Council Customer Service Centre, Transport for NSW (TfNSW) Community Information Centre, and via download from TfNSW's website. Furthermore, an information line (1800 664 490) would be available for the public to make enquires about the Proposal.

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.

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 during construction have the potential to occur should the Proposal proceed:

- temporary noise and vibration impacts
- minor temporary delays on the adjacent road network
- temporary changes to access arrangements including pedestrian diversions
- tree removal and visual impacts.

Upon completion of the construction of the Proposal, there would be improved access for the disabled, ageing and parents with prams. The Proposal, through provision of two lifts and a pedestrian overbridge, as well as one additional accessible parking space, would improve access to public transport for the general community within Pendle Hill. Improved facilities and access to the Pendle Hill Railway Station would service the community and encourage public transport use.

Figure 1: Planning approval and consultation process for the Proposal

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 Proposal has also been designed in accordance with the Transport for NSW's Sustainable Design Guidelines and has taken into account the principles of ecologically sustainable development (ESD). Initiatives would be considered further during the detailed design, construction and operational phases of the Proposal.

Should the Proposal proceed, the likely impacts would be appropriately managed in accordance with the mitigation measures outlined in this REF. Based on the assessment of environmental impacts contained in this REF, TfNSW has concluded that the Proposal is not likely to have a significant impact on the environment including threatened species, populations, endangered ecological communities and their habitats. Accordingly, an environmental impact statement is not required for the Proposal, nor is the approval of the Minister for Planning.

1 Introduction

Transport for NSW (TfNSW) was established in 2011 as the lead agency for integrated delivery of public transport services across all modes of transport in NSW. TfNSW is the proponent for the Pendle Hill Station Easy Access Upgrade (the Proposal).

The Proposal is designed to improve pedestrian access to and from the station, increase Pendle Hill Station's ability to cope with the predicted future patronage demands, and improve pedestrian flow, passenger information services and wayfinding between transport modes.

The Proposal would include the construction of a new concourse with new platform and street entry stairs, canopies, lifts, and public amenities. The new concourse would include a booking office, a family accessible toilet and amenities for Sydney Trains staff. The existing ramps and part of the existing footbridge would be demolished, leaving the existing platform stairs and section of footbridge between the platform 1/2 and 3/4. Minor refurbishments would be undertaken to the platform buildings. Adjustments to utilities would also be undertaken to facilitate the construction of the Proposal.

In addition, a number of interchange and accessibility upgrades works would improve access and convenience would be undertaken on both Wentworth Avenue, and Joyce Street and Pendle Way. These upgrades include the relocation of existing accessible car parking spaces, additional commuter parking, kiss and ride areas, new bus stop and shelter, bike racks and taxi stand.

Construction would likely commence in mid 2015 and it is anticipated that it would take up to two years to complete.

Details of the full scope of works are provided in Section 3.2.

1.1 Location of the Proposal

Pendle Hill Station is approximately 28 kilometres west of the Sydney CBD and is located on the boundary of two local government areas (LGA), divided by the rail line. The southern part of the rail corridor and land to the south of the station is located within the City of Holroyd. The northern part of the rail corridor and land to the north being part of the City of Parramatta. The rail corridor is bounded by Wentworth Avenue to the north with Joyce Street and Pendle Way to the south.

Pendle Hill Station serves the established and growing suburb of Pendle Hill (Figure 2 and 3) and is serviced by the North Shore, Northern and Western Line providing train services between Emu Plains or Richmond and Berowra via Central, and the Cumberland Line providing train services between Blacktown and Campbelltown.

Land use surrounding Pendle Hill Station comprises a mixture of commercial, industrial and residential zones. A light industrial area lies to the north of the station precinct, with several petrol stations and the Pendle Inn located along Wentworth Avenue. North east of the station, the area is typified with low density residential dwellings. The commercial area to the south of the station precinct contains a shopping centre with over 50 specialty stores. Surrounding the commercial area is a mix of low and high density residential areas.

Pendle Hill is the 72nd busiest station on the Sydney Trains network, with an average weekday patronage of approximately 6,720 trips (2011) and a projected growth in patronage to 9,840 by the year 2036 (AECOM, 2013).

Figure 2: Regional context

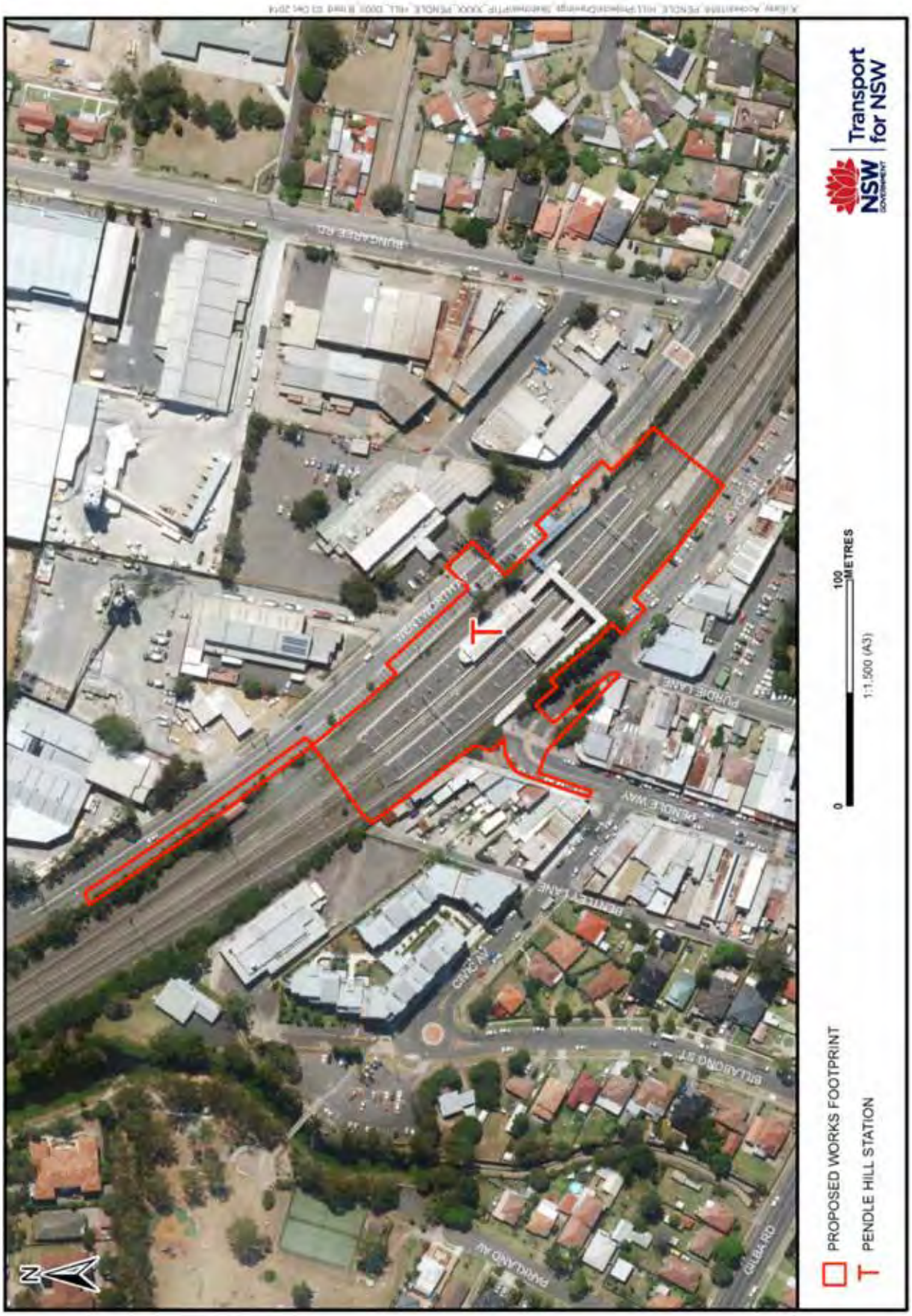

Figure 3: Approximate works footprint

1.2 Existing infrastructure and land uses

Pendle Hill Station consists of two island platforms with four tracks, providing services on the Western Line and Cumberland Line. Platforms 1 and 2 provide services to Berowra via Central and to Campbelltown via Parramatta. Platforms 3 and 4 provide services to Blacktown, Emu Plains and Richmond.

Access to the station platforms is provided by ramps at the Wentworth Avenue (northern side) and Joyce Street (southern side) entrances, linking to a footbridge over the tracks and stairs leading to the platforms. The walkway also facilitates cross-corridor movement from the retail precinct on the southern side of the rail corridor to light industrial and residential areas on the northern side. The ramps provided at both entrances are steep and there are currently no lifts provided for less mobile passengers.

Toilets and a staff operation area are located on Platforms 1 and 2, whilst ticket vending machines and real-time Passenger Information Displays are provided on both island platforms. A small kiosk is located on the footbridge above Platforms 1 and 2.

Current interchange facilities at Pendle Hill Station include bus stops servicing four routes (three regular services and two NightRide services), bicycle facilities, a taxi rank, kiss and ride areas and commuter (long-stay) car parking facilities. The station's interchange facilities are outlined in Table 1.

Table 1: Existing transport interchange arrangements

Transport	Details
Train	Pendle Hill Station is served by the T1 Western Line and the T5 Cumberland Line. Platforms 1 and 2 provide services to Berowra via Central and to Campbelltown via Parramatta. Platforms 3 and 4 provide services to Blacktown, Emu Plains and Richmond.
Bus	Pendle Hill Station is currently serviced by three bus routes operated by Hillsbus which runs along Joyce Street and Pendle Way, immediately to the south of the station. Route 705 and 711 operates from Blacktown to Parramatta, while route 708 operates from Constitution Hill to Parramatta (only one service is provided in each direction). In addition, two NightRide services are provided operating along Wentworth Avenue. The N70 route operates between Town Hall and Penrith, whilst the N71 operates between Town Hall and Richmond. One bus stop is provided for the Hillsbus 705, 711 and 708 routes in both directions, located on the southern side of Joyce Street. The provision of one bus stop requires buses to loop around Joyce Street, Pendle Way, Dunmore Street and Goodall Street. Shelter and seating is provided at the bus stop. Bus stops are provided for the NightRide services along Wentworth Avenue in both directions, however are located 80m east of the station entrance. No shelter is provided for the NightRide bus stops. In addition, school set-down and pick-up occurs at the Joyce Street bus stop.

Transport	Details
Commuter car parking	Two commuter car parking areas are provided, one on each side of the station. Approximately 58 long term car parking spaces are located along the northern side of Joyce Street, and 49 car parking spaces (including two accessible and two Sydney Trains parking bays) are provided along the southern side of Wentworth Avenue. Informal parking occurs past the marked parking bays, with cars parking informally in the unmarked parking area adjacent to Wentworth Avenue for an additional 200m. A number of parking restrictions are signposted along Joyce Street and Wentworth Avenue.
Taxi	A taxi zone with two spaces is provided on Joyce Street adjacent to the bus stop.
Bicycle facilities	Pendle Hill currently has limited formal cycle routes, however there are a small number of key roads which comprise of on-road facilities, including road markings identifying that a bicycle route exists. These key corridors include Ballandella Road, Wentworth Avenue and Binalong Road. Even though parts of these key corridors make provision for cyclists, there is presently no formal connectivity with Pendle Hill Station. A bicycle rack is provided at Pendle Hill Station on the pedestrian entry point to the station from Joyce Street, while a bicycle locker is located on Wentworth Avenue approximately 170 metres from the station entry. Other informal bicycle storage is evident at the station with many chained against fences, suggesting that additional or improved facilities are necessary.
Pedestrian access and movements	Pedestrian access to Pendle Hill Station is provided at the two entry points located on Wentworth Avenue (northern entrance) and Joyce Street (southern entrance). Both entrances are linked by ramps which lead to a footbridge, providing access to the platform level in the form of stairs. The footbridge is also used as a means to cross the rail corridor and provides connectivity between the industrial and residential areas north of the station, and the Pendle Hill town centre south of the station. Pedestrian crossing facilities are located on both Wentworth Avenue and Joyce Street in close proximity to the station entrances. Both pedestrian crossing facilities are in the form of a zebra crossing providing a safe crossing point to interchange facilities and the station. Footpaths are located along both sides of Wentworth Avenue, Pendle Way and Joyce Street, as well as all surrounding streets.
Kiss and ride	Pendle Hill Station currently provides one signposted kiss and ride area on the southern side of Wentworth Avenue, between the pedestrian crossing and the commuter car parking spaces. There is currently no formal kiss and ride area on the southern side of the station along Joyce Street, however an informal kiss and ride area is located along the eastbound carriageway at the no stopping zones in front of the station entrance.

1.3 Purpose of this Review of Environmental Factors

This REF has been prepared by TfNSW to assess the potential impacts of the construction and operation of the Proposal. For the purposes of these works, TfNSW is the proponent and the determining authority under Part 5 of the 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 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 significantly impact a matter of national environmental significance (NES) or Commonwealth land and the need to make a referral to the Commonwealth Department of the Environment (DoE) for any necessary approvals under the EPBC Act.

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 (TAP) and the specific objectives of the Proposal and why the preferred option has been chosen.

2.1 Strategic justification

Improving transport customer experience is the focus of the NSW Government's transport initiatives. Transport interchanges and railway 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 proposed Pendle Hill Station Easy Access 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 *2012–17 Disability Action Plan* (TfNSW, 2012f) was developed by Transport for NSW 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 achieve equitable access to stations for all patrons, 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.

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

The *Long Term Transport Master Plan* (TfNSW, 2012b) complements and builds on the visions and goals established in *NSW 2021* and this Proposal would support growth and improvements in the safe and efficient management of transport in the Sydney region.

Further details of the application of NSW Government policies and strategies are discussed in Section 4.3 of this REF.

2.1.1 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 where it is needed most. The program aims to provide:

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

2.1.2 Objectives of the Proposal

The objectives of the Proposal are to:

- improve accessibility in accordance with the *Disability Discrimination Act 1992* (DDA), Building Code of Australia (BCA) requirements
- upgrade station and interchange facilities and equipment to current Sydney Trains design standards
- promote interchange with other modes of transport
- minimise pedestrian conflict points, queuing and crowding points
- maximise perceptions of safety and security
- improve customer experience and amenity
- accommodate growth in patronage and changing travel patterns
- improve integration with surrounding precinct
- minimise construction impacts to passengers and station operations
- minimise the cost of ownership and maintenance.

2.2 Options considered

A scoping assessment of the Proposal was undertaken in 2011 to identify key constraints and needs at Pendle Hill Station. This process included investigations, consultation, options development, options assessment, and refinement in order to establish a preferred option.

Three upgrade options were initially developed to address access issues and deficiencies. Each option provided equitable access to the station concourse and platforms and improved interchange between modes. A number of upgrade elements are common to all options, but the three options vary in the amount and cost of works, and have the following distinguishing features:

- Option 1 retains the existing footbridge, ramps and platform stairs, with the provision of four new lifts at the station (one to each platform and one to each street entrance)
- Option 2 has four new lifts as per Option 1, but also includes the provision of stairs from the station entries to the existing footbridge.
- Option 3 comprises the demolition of the existing footbridge, platform stairs and ramps providing a new concourse, new platform stairs and station entry stairs and lifts, station operations area and facilities.

Following further consultation Option 3 was modified to form Option 3B.

- Option 3B includes the same design features as Option 3 with the key difference being the location of the station operations area.

2.2.1 Option 1

This option proposes the retention of the existing footbridge, platform stairs and ramps, with the addition of lifts to both platforms and both entries at Joyce Street and Wentworth Avenue. The existing booking office would be retained with a new family accessible toilet provided in the existing buildings on platforms 1 and 2. The existing structure would be upgraded with anti-throw screens, new handrails, new roof sheeting, lighting and stair treads replacements. The existing retail kiosk would be demolished and replaced with a new facility on the Joyce Street side of the concourse. Table 2 outlines the advantages and disadvantages associated with this option.

Table 2: Advantages and disadvantages of Option 1

Advantages	Disadvantages
• Existing platform buildings retained • Existing footbridge, stairs and ramps are retained • Lifts on Joyce and Wentworth Streets are close to parking • New stair to Joyce Street side • Low heritage impact	• Lift on Joyce Street is a considerable distance from the Pendle Hill town centre • Retail kiosk over Platform 1/2 would need to be removed • Existing footbridge does not comply with current Sydney Trains standard in terms of track clearance, throw screens, handrails and construction • Ramps do not comply with current Sydney Trains standard • Significant cost for refurbishment of existing structures

2.2.2 Option 2

This option proposes the retention of the existing footbridge and platform stairs with the addition of lifts to both platforms and lifts and stairs at both entries at Joyce Street and Wentworth Avenue. The existing booking office would be retained with a new family accessible toilet and staff toilet in the existing platform 1/2 building. The existing structure would be upgraded with anti-throw screens, new handrails, new roof sheeting, lighting and stair tread replacement. The existing retail kiosk would be demolished and replaced with a new facility on the Joyce Street side of the concourse. Table 3 outlines the advantages and disadvantages associated with this option.

Table 3: Advantages and disadvantages of Option 2

Advantages	Disadvantages
• Existing platform buildings retained • Existing bridge and stairs are retained • No significant temporary works are required • Lifts on Joyce and Wentworth Streets are close to parking • Second stair to Joyce Street side • Opportunity for new open forecourt to the Joyce Street entry • Low heritage impact	• Lift on Joyce Street is a considerable distance from the Pendle Hill town centre • Retail kiosk over Platform 1/2 would need to be removed • Footbridge does not comply with current Sydney Trains Standard in terms of track clearance, throw screens, handrails and construction • Significant cost for refurbishment of existing structures

2.2.3 Option 3

This option proposes the demolition of the existing footbridge, platform stairs and ramps with the provision of a new concourse, platform stairs and entry stairs to Wentworth Avenue and Joyce Street and new lifts servicing the platforms and street entries. Option 3 also provides a new station operations area in the proposed concourse and requires the partial demolition of the existing platform 1/2 building. The existing retail kiosk would also be demolished and replaced with a larger retail facility in the new concourse. Table 4 outlines the advantages and disadvantages associated with this option.

Table 4: Advantages and disadvantages of Option 3

Advantages	Disadvantages
• New Joyce Street entry close to Pendle Hill town centre • New station operations area at bridge level • Opportunity for a fully accessible compliant design • Improved overall station function and operation • Equitable access to all facilities	• Adverse heritage impact associated with partial demolition of Platform 1/2 building, footbridge and ramps • Cost of refurbishment of Platform 1/2 building • Pendle Way requires realignment

2.2.4 Option 3B

This option is a modification of Option 3, with the relocation of the station operation area from the middle of the concourse to the Joyce Street side of the station.

This option proposes the demolition of the existing footbridge, platform stairs and ramps with the provision of a new concourse, platform stairs and entry stairs to Wentworth Avenue and Joyce Street and new lifts servicing the platforms and street entries. Option 3B also provides a new station operations area on the Joyce Street side of the concourse and requires the partial demolition of the existing platform 1/2 building. The existing retail kiosk would also be demolished.

The following items were also identified and incorporated into the Option 3B station upgrade design layout

- provision of a communications and electrical room as an extension of the station operation area (located adjacent to Joyce Street)
- reconfiguration of stairs on Joyce Street away from adjacent commercial properties
- relocation of high voltage aerial lines due to an alignment conflict with the proposed station including;
  - Sydney Trains 11kV line on Joyce Street
  - Endeavour Energy 11kV and low voltage line on Wentworth Avenue

Table 5 outlines the advantages and disadvantages associated with this option.

Table 5: Advantages and disadvantages of Option 3B

Advantages	Disadvantages
• New Joyce Street entry close to Pendle Hill town centre • Proposed station operations area is at Joyce Street, making maintenance easier • Reduced construction cost with station operations area location • Opportunity for full accessibility compliant design • Improved overall station function and operation • Equitable access to all facilities	• Adverse heritage impact associated with partial demolition of Platform 1/2 building, footbridge and ramps • Pendle Way and Joyce Street require realignment

2.2.5 Option 4

TfNSW have investigated the feasibility of retaining the existing platform buildings as well as retaining the middle section of the existing footbridge between island platforms. Option 4 further develops on Option 3B to address potential heritage and sustainability impacts.

Option 4 requires the concourse to be constructed on an angle resulting in the platform stairs being set back sufficiently from the Platform 1/2 station building thereforeby avoiding the need for partial demolition.

The Option also proposes that a portion of the existing footbridge structure be retained between Platform 1/2 and Platform 3/4, along with the platform stairs. The access ramps and kiosk would be the only elements to be demolished.

Table 6 outlines the advantages and disadvantages associated with this option.

Table 6: Advantages and disadvantages of Option 4

Advantages	Disadvantages
• New Joyce Street entry close to Pendle Hill town centre • Proposed station operations area is at Joyce Street, making maintenance easier • Reduced construction cost with station operations area location • Opportunity for fully compliant design • Improved overall station function and operation • Equitable access to all facilities • Improved heritage outcome on Option 3 and 3B as a result of retaining existing platform building and partial retention of existing footbridge • Improved sustainability component as a result of reduced resource consumption / waste generation due to optimum retention of existing features	• Pendle Way and Joyce Street require realignment

2.2.6 The do-nothing option

The 'do nothing' option was not considered a feasible alternative as it is inconsistent with NSW Government objectives, would not improved station accessibility for mobility impaired patrons, help encourage the use of public transport and would not meet the immediate needs of the community. The NSW Government has identified the need for improvements to Pendle Hill Station as a priority under the Transport Access Program.

2.3 Selection of the preferred option

Option 4 is the preferred option for the Proposal. This option was preferred as it is cost-effective and meets the objectives of the NSW Government's Transport Access Program.

Option 1 and 2 do not meet RailCorp and DDA requirements in terms of track clearance, throw screens, handrails and construction. In addition, the existing stairs and ramps do not comply with RailCorp or DDA standards. Upgrading the existing structure would have a significant cost and would still result in significant non compliances.

Option 3 and 3B included several benefits in relation to the provision of a new concourse but required the partial demolition of platform buildings and total demolition of the existing footbridge and ramps.

Option 4 includes many of the benefits of Option 3 & 3B but provides improved heritage outcomes with the retention of platform buildings and partial retention of the existing footbridge.

The do-nothing option does not meet any of the objectives of the proposal.

2.4 Justification for the preferred option

The Proposal provides:

- DDA compliant access and accessible pathways between the station entrance and platforms by providing new lifts and stairs to the new station concourse and platforms
- positive heritage outcomes through the retention of the station building on Platform1/2 and partial retention of the footbridge and platform stairs
- additional canopy coverage on both platforms
- improved arrival experience with pedestrian crossings in close proximity to the new station entrances which is complemented by the realignment of the kerb edge
- better connection to the NightRide bus stops and bicycle storage facilities by providing them closer to the new station entrance
- accessible parking spaces in close proximity to the new station entrances and lifts
- provision of a net increase in commuter parking spaces
- separated taxi and bus movements on Joyce Street by relocating the taxi rank
- formal kiss and ride area on Joyce Street and Wentworth Avenue.

3 Description of the Proposal

Chapter 3 describes the Proposal and summarises key design parameters, construction method, and associated infrastructure and activities.

3.1 The Proposal

The Proposal is designed to improve pedestrian access to and from the station, increase Pendle Hill Station's ability to cope with the predicted future patronage demands, and improve pedestrian flow, passenger information services and wayfinding between transport modes.

The proposal provides:

- four new lifts:
  - one at each station entrance
  - one to Platform 1/2
  - one to Platform 3/4
- a new station concourse featuring
  - a booking office
  - a family accessible toilet
  - amenities for staff
- new platform stairs and canopies
- new street entry stairs and canopies
- demolition of the existing ramps and partial demolition of the existing footbridge.

Supporting these major features of the preferred concept design are a number of interchange and accessibility upgrade works that would improve access, convenience, and interchange between modes

Construction of the Proposal is anticipated to commence in mid 2015 and take up to two years to complete.

The design of the proposed works is described in more detail below.

Figure 4 shows the general arrangement of the Proposal. This design is indicative only and subject to further detailed design.

3.1.1 Design features

The proposed works have been grouped into five main elements:

- concourse, lifts, stairs, canopies and associated works
- station interchange, streetscape works and facilities
- platform works, ticketing facilities, rail systems
- utility works
- demolition works.

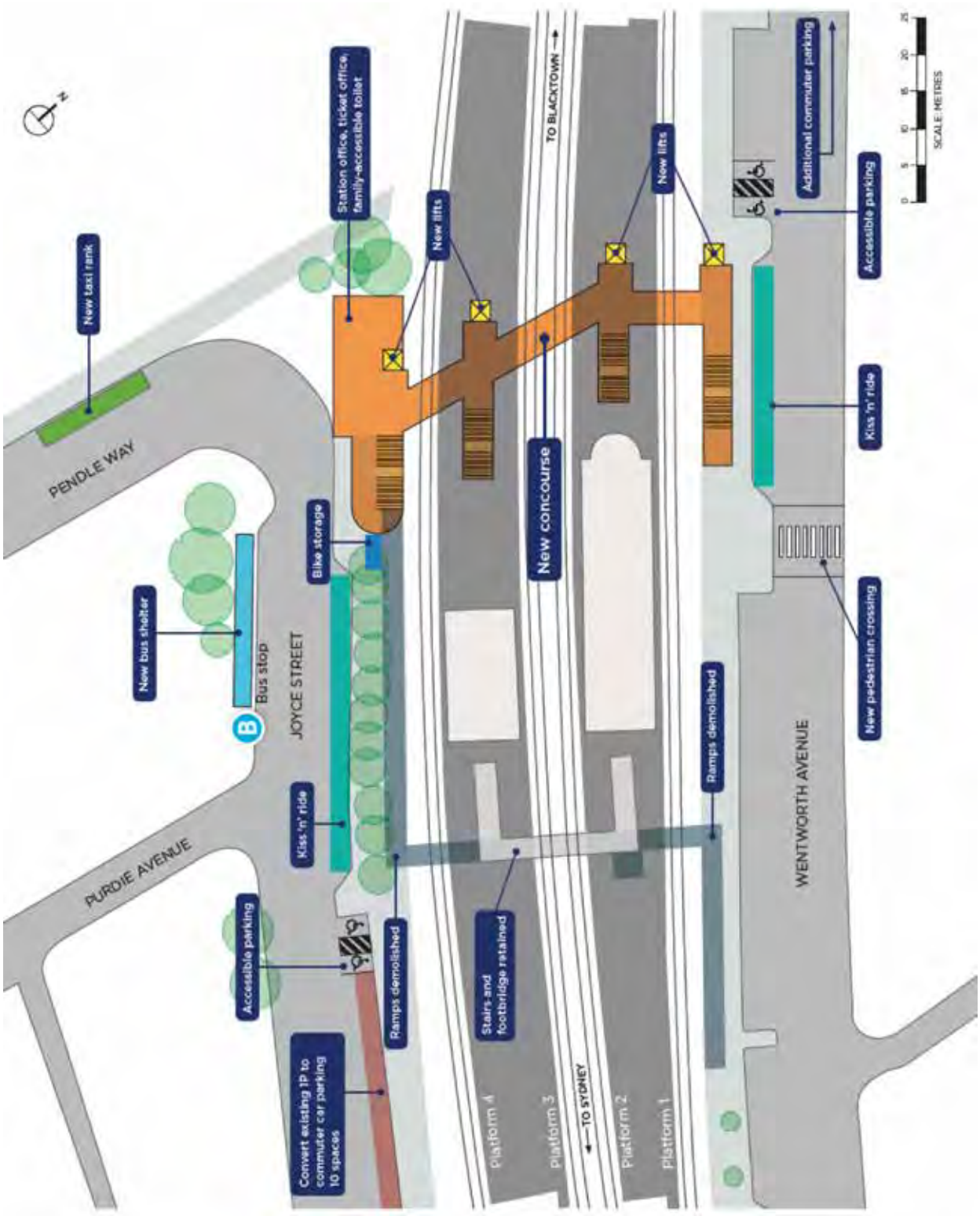

Figure 4: The Proposal (design is indicative and is subject to detailed design)

Concourse, lifts, stairs, canopies and associated works include:

- construct a new station concourse, station operations area and footbridge including enclosed accessible walkways, and associated canopies and support structures
- construct a new station operations area at Joyce Street to include a booking office, station operation facilities area, and a family accessible toilet
- provide new station access incorporating lift and stair access to both Wentworth Avenue and Joyce Street entrances, with associated landings and support structures, and canopies to stairs
- provide new lifts and stair access to both island platforms, with associated landings and support structures, and canopies to stairs
- provide a dedicated switch room and relocation of the communications equipment room to below the new station operation area accessible from the Joyce Street entry
- provide train impact protection to new structures adjacent to the tracks
- provide passenger information systems and ticketing facilities in the new concourse.

Station interchange, streetscape works and facilities include:

- modify the existing Joyce Street entry, including temporary access during construction
- reconfigure sections of Joyce Street including:
  - relocate the existing accessible parking to the western end of the car parking on Joyce Street, providing a minimum of two accessible car park spaces
  - potential remove existing 1P parking restrictions to provide 10 additional commuter parking spaces
  - relocate the existing taxi stand to Pendle Way, and provide a new stand and shelter
  - extend the existing bus stop and provide shelter and seating
  - provide a new kiss and ride area including a shelter
  - new kerb lines and road adjustments (including asphalting, line marking, pedestrian crossing and drainage as required)
  - footpath adjustments and extensions as required
  - street and public lighting as required
  - new bike racks and shelters
- reconfigure sections of Wentworth Avenue including:
  - relocate the existing accessible parking to the eastern end of the car parking on Wentworth Avenue, providing a minimum of two accessible car park spaces
  - provide an additional 10 commuter car parking spaces at the eastern end of the existing car parking spaces
  - provide an additional 28 commuter parking spaces at the western end of the existing car parking spaces
  - relocate the existing pedestrian crossing to closer to the new station entrance, and construct as a raised pedestrian crossing
  - provide a new kiss and ride area incorporating NightRide bus stop at the new station entrance

  - new kerb lines and road adjustments (including asphalting and line marking)
  - footpath adjustments and extensions as required
  - all associated temporary works including pedestrian and traffic management
- upgrade existing and provide new drainage, landscaping including tree removal, and fencing
- provide new access pathways between the station entrances, accessible parking, and kiss and ride areas
- wayfinding and station identification signage.

Platform works, ticketing facilities and rail systems works include:

- upgrade seating areas on platforms with weather protection including canopies and wind barriers
- refresh and reconfigure station buildings including the existing male and female toilets, waiting rooms and storage rooms
- convert the existing ticket office to a dedicated storage area
- platform regrading as required.

Utility works include:

- relocate, upgrade or replace existing utilities (including containments) to accommodate new and upgraded infrastructure and rail systems
- upgrade existing electrical infrastructure as required
- modify and adjust the existing 1500V overhead wire (OHW) and overhead wire structures (OHWS) as required to accommodate the installation of new structures and the modifications to the existing footbridge

Demolition works include:

- partially demolish the existing footbridge, retaining the footbridge between platforms 1/2 and 3/4, platform stairs and canopy structures including the canopy interface with the existing station buildings
- demolish the existing ramps, canopies, footings and associated structures
- demolish the existing retail kiosk and associated support structures and footings
- modify, where required, the existing roof sheeting and roof drainage system to make good the areas impacted by the adjacent demolition
- install balustrade and handrails to the exposed/unprotected areas of the retained footbridge in a manner sympathetic to the existing structure
- carry out additional work necessary to maintain the existing lighting to the undisturbed section of footbridge and stairs including but not limited to the re-routing of containment and cabling
- new wayfinding to the footbridge and stairs.

The photomontages in Figures 5 to 10 illustrate the Proposal.

Figure 5: Existing view of Pendle Hill Station from Pendle Way

Figure 6: Artists impression of the Proposal from Pendle Way

Figure 7: Existing view of Pendle Hill Station from Wentworth Avenue

Figure 8: Artists impression of the Proposal from Wentworth Avenue

Figure 9: Existing view of Pendle Hill Station from Joyce Street

Figure 10: Artists impression of the Proposal from Joyce Street

3.1.2 Engineering constraints

There are a number of constraints which have influenced development of the design of the proposed upgrade. These constraints include accessibility constraints, available space, property access requirements, heritage items, utilities, operational and stakeholder requirements. These are further outlined below.

Accessibility constraints

Many existing features of Pendle Hill Station are currently not DDA or BCA compliant, including:

- the gradient of the existing pedestrian ramps are not suitable for wheelchair access.
- the clearance of the footbridge to rail tracks beneath
- the footbridge and stairs handrails
- the width of the existing stairs, footbridge and intermediate stair landings
- no family accessible toilet provided
- no anti-throw screens installed on stairs and footbridge
- no accessible ticket window and accessible car park
- the height of the platform compared to train doors

Space constraints

The placement and integrity of existing structures needed to be considered during the development of the design. These structures included the island platform, canopies and pedestrian overbridge, presence of overhead cables along both street boundaries, and commercial.

Heritage

The station is listed as a heritage item on the Sydney Trains section 170 Heritage Register and the *Holroyd Local Environmental Plan 2013* (LEP).

Hazardous substances

Given the age of the station and its buildings, there is the potential for asbestos and lead paint to be encountered during construction.

Utilities

A number of utilities are located in the vicinity of the proposed works including water, telecommunications, electricity, rail, utilities and gas.

3.1.3 Design standards

The Proposal has been designed having regard to the following:

- Sydney Trains Design Standards
- Transport for NSW Sustainable Design Guidelines
- Disability Standards for Accessible Public Transport (2002) (issued under the Commonwealth Disability Discrimination Act 1992)
- relevant Australian Standards, including AS2890.1
- Crime Prevention Through Environmental Design (CPTED) principles
- Building Code of Australia

- Transport for NSW Guidelines for development of transport interchange facilities
- Assets Standards Authority standards.

3.1.4 Sustainability in design

The design of the Proposal has been undertaken in accordance with the project targets identified in TfNSW's Environmental Management System (EMS) and the *Sustainable Design Guidelines for Rail* (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.

The Guidelines also specify a minimum level of compliance within each category: 100 percent of applicable Compulsory initiatives, and 50 percent of the applicable Discretionary points are to be adopted on the project.

These sustainable design initiatives would be considered further during detailed design.

3.2 Construction activities

3.2.1 Work methodology

Construction of the Proposal is anticipated to commence in mid 2015 and take up to two years to complete.

To minimise impacts on commuters and the local community, it is proposed that the construction program be staged. The work methodology would be developed further, in consultation with the construction contractor, TfNSW and Council. The staging, as outlined in Table 7, is based on the current design and is subject to change during the detailed design stages.

The Proposal would need to be constructed within railway operating constraints and the track possession schedule. Some works would be required during weekend track possessions and during night periods to minimise impacts to commuters and local traffic. The concourse and platforms would remain accessible by commuters at all times during the normal train operations, and either closed or controlled during the relevant possession works.

Table 7 provides an indicative outline of the preliminary construction methodology based on the current concept design.

Table 7: Construction staging and works

Activity
Site establishment, temporary works and enabling works • establishment of site compound (erect hoarding, site offices, amenities and plant / material storage areas etc) • installation of environmental controls • site clearing and removal of vegetation and light poles for a temporary access ramp • services location • partial demolition of the existing southern ramp to connect to temporary access ramp • excavation and construction of temporary access ramp to existing station overbridge
Undergrounding of high voltage cabling and utilities works • undergrounding of high voltage cables on Wentworth Avenue and Joyce Street • connection with existing network • testing and commissioning • relocation of other services as outlined in Section 3.2.8
Excavation works • excavation and foundations for new concourse supports, lift wells and stairs on platforms and station entrances
Structural works • power and communications services to new structures • construction of new lift shafts and lift installation • construction of new station entrances, communications equipment room and switch room • construction of new suspended concourse, station operation area, footbridge and platform stairs • fitout of stations operation area, communications equipment room, switch rooms and concourse overbridge. • install canopies on concourse
Demolition of existing footbridge, platform stairs and ramps • demolition and removal of the existing footbridge and retail kiosk retaining the middle portion of the footbridge between platforms 1/2 and 3/4 • modifications to make good the retained section of the existing footbridge including: – retention of the existing platform stairs and canopy structures – installation of balustrade and handrails to the exposed and unprotected areas of the footbridge as a result of the demolition works in a manner sympathetic to the existing structure • new wayfinding to the footbridge and stairs • overhead wire adjustments

Activity
Station interchange and station building works • construction of car park, kiss and ride areas, accessible car parking spaces and footpaths • installation of bicycle racks • construction of a new bus shelter on Joyce Street • construction of a new taxi rank on Pendle Way • refreshed, reconfigured station buildings including the existing male and female toilets, waiting rooms and storage rooms
Testing and commissioning

3.2.2 Plant and equipment

A list of plant and equipment that would likely be used in the construction of the Proposal is provided below:

- truck & dogs
- piling rig
- concrete truck / agitator
- generators
- grinder
- bobcat / sweeper
- jack hammer
- asphalting equipment
- hi-rail dumper
- welder
- air compressor
- concrete pump
- concrete saw
- water truck
- mobile cranes
- concrete vibrator
- air compressor
- front end loader
- impact driver
- road and concrete saw
- compactor
- smooth drum roller
- paving machine
- line marking plant
- hand tools
- elevated work platform
- small vehicles.
- excavators with hammer attachment
- masonry hammer drill

3.2.3 Working hours

The standard construction hours would be as follows:

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

The Proposal is capable of being staged to be constructed within railway operating constraints and a track possession schedule. The majority of works are able to be undertaken in non-possession times using appropriate means of safe working to protect the live network. Therefore the majority of works would be conducted during standard working hours between 7am and 6pm Monday to Friday, and 8am to 1pm on Saturdays.

However, some works outside of standard hours would be required during evening, night periods and weekends during track possessions, and for key activities (including partial closures of on-street parking in Joyce Street and Wentworth Avenue) to minimise impacts to commuters and pedestrians. It is estimated that a total of eight possession periods would be required for the Proposal.

Where out of hours works are required, approval from TfNSW would be required and the affected community would be advised as outlined in the TfNSW's *Construction Noise Strategy* (TfNSW, 2012), and as per the Pendle Hill *Environmental Noise and Vibration Impact Assessment* (SLR, 2014).

3.2.4 Earthworks

Excavations and earthworks would be minor. There would be some excavations required along Joyce Street and Wentworth Avenue associated with trenching activities and landscaping. Excavation would also be required in preparation for the installation of the lifts at the station entrances and on the platforms.

Excavated material would be reused on site where possible or disposed of in accordance with relevant legislative requirements.

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 *TfNSW Sustainable Design Guidelines*. 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 access arrangements during construction of the Proposal are discussed in detail in Section 6.1 of this REF. A detailed construction methodology and associated management plan would be developed as part of the detailed design phase.

The potential traffic and access impacts expected during the construction of the Proposal include:

- temporary impacts to pedestrian access along Joyce Street, Pendle Way and Wentworth Avenue as a result of short-term diversions during works
- temporary parking displacement
- potential for temporary road closures.

Measures which would be employed to mitigate or minimise these potential impacts are further discussed in Section 6.1.

3.2.7 Ancillary facilities

During construction, the following facilities are likely to be required:

- construction compound including site office and amenities
- plant and equipment storage area
- stockpile areas.

These facilities would likely be located within an existing lay down area to the north west of Wentworthville Station, about 1.5 kilometres east of Pendle Hill Station. However, this is subject to detailed design and finalisation of the construction methodology. This location has been assessed as part of the Wentworthville Station Easy Access Upgrade Project REF (TfNSW, 2014).

In addition to this, small quantities of materials would be temporarily stored at Pendle Hill Station within the project footprint. Should facilities be required to be placed outside of the project footprint or the Wentworthville Station existing lay down area, an additional assessment would be undertaken.

It is unlikely that there would be excavation or tree removal to establish ancillary facilities, in addition to that required for the Proposal.

3.2.8 Public utility adjustments

A utility investigation, including Dial Before You Dig (DBYD) enquiries, has been undertaken during preliminary design stages, but in some areas was inconclusive. Further investigation may be required, although the Proposal is designed to minimise the relocation of services.

The following utilities occur within the Proposal area:

- Endeavour Energy
- Telstra and Optus – telecommunications
- Sydney Water Corporation – water and sewerage
- Jemena – gas
- Holroyd and Parramatta City Councils – stormwater
- Sydney Trains – CCTV, signalling and electrical.

The appropriate utility providers would be consulted during the detailed design phase.

It is likely some additional services may require relocation. Such relocation is unlikely to occur outside of the work footprint assessed in this REF. In the event that works would be required outside of this footprint, further assessment would be undertaken.

3.3 Property acquisition

The majority of the proposed works are within the RailCorp land ownership corridor and access to these areas would be via standing license arrangements for construction activities between TfNSW and RailCorp.

Portion of the works would be located on Holroyd City Council and Parramatta City Council roads adjoining the RailCorp land ownership corridor on either side of the station on Wentworth Avenue, Joyce Street and Pendle Way.

TfNSW would access the adjoining road areas for temporarily for construction purposes including both verge and traffic areas utilising its Public Authority status under Schedule 2 of the *Roads Act 1993* relating to Section 138.

Small portions of road on both sides of the station would be required permanently to site lift and stairway infrastructure and this land is expected to be acquired by agreement from the respective road authority utilising the powers in the Land Acquisition and Roads Act. These matters will be dealt with in direct discussion with the relevant councils.

4 Statutory considerations

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

4.1 Commonwealth legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act requires Commonwealth assessment and approval for a Proposal that has a significant impact on matters of National Environmental Significance (NES) or impacts on Commonwealth land.

These matters are considered in full in Appendix 2.

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 State 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. Having regard to these provisions, TfNSW has determined that no significant environmental impact is likely, and as a consequence an environmental impact statement is not required, nor is the approval of the Minister for Planning.

Clause 228 of the *Environmental Planning and Assessment Regulation 2000* (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 this REF provides an environmental impact assessment of the Proposal in accordance with clause 228. Appendix 1 specifically responds to the factors for consideration under clause 228.

4.2.2 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) outlined in Section 6(2) of the NSW *Protection of the Environment Administration Act 1991* and Schedule 2 of the EP&A Regulation.

The principles of ESD are:

- **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 Pendle Hill Station Easy Access Upgrade. Section 3.1.4 summarises how ESD would further be incorporated during the detailed design development of the Proposal. Section 6.12 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 and operation of the proposal.

4.2.3 Other NSW legislation and regulations

Table 8 provides a list of other relevant legislation applicable to the Proposal.

Table 8: Other relevant legislation applicable to the Proposal

Legislation	Requirements for the Proposal
Heritage Act 1977 (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 170A: *Heritage management by government instrumentalities*, where items listed on a government agency Heritage and Conservation Register are to be impacted. Pendle Hill Railway Station Group is listed on the RailCorp Section 170 register. No heritage approvals are required under the Act, but a government instrumentality must give the Heritage Council not less than 14 days written notice before the government instrumentality demolishes (or partially demolishes), or ceases to occupy any item under its Section 170. Transport agencies are responsible for conserving heritage places under their stewardship, as well as provide equitable access under the *Commonwealth Disability Discrimination Act 1992* (DDA) and relevant transport standards. The Proposal aims to ensure equitable access outcomes are achieved in a way that conserves heritage values and minimises impacts on heritage significance.
National Parks and Wildlife Act 1974 (NSW)	Sections 86, 87 and 90 require consent from the Office of Environment and Heritage (OEH) for the destruction or damage of Aboriginal objects. The Proposal is unlikely to disturb any Aboriginal objects.

Legislation	Requirements for the Proposal
Threatened Species Conservation Act 1995 (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).
Fisheries Management Act 1994 (NSW)	Adequate stormwater quality measures would prevent any adverse impacts on any natural watercourse. The Proposal would not affect any listed threatened species, marine vegetation or involve dredging or dam works.
Contaminated Land Management Act 1997 (NSW)	The site has not been declared under the CLM Act as being significantly contaminated.
Protection of the Environment Operations Act 1997 (PoEO Act) (NSW)	The proposed works are not included as a scheduled activity under the PoEO Act. Therefore an environment protection licence under this Act is not required. Part 5 provides a Duty to notify the EPA in the event of a pollution incident occurring.
Water Management Act 2000 (NSW)	The Proposal would not involve any marked increase in water consumption, water management works, drainage or flood works, controlled activities or aquifer interference.
Waste Avoidance and Resource Recovery Act 2001 (NSW)	TfNSW would carry out the construction of the Proposal in accordance with the objects of this Act. A Waste Management Plan would be prepared and implemented during construction.
Native Title Act 1993 (Commonwealth)	The proposed site is unlikely to be affected by any native title holders or claim.
Disability Discrimination Act 1992 (DDA) (Commonwealth); *Disability Services Act 1993 (NSW);* *Disability Standards for Accessible Public Transport 2002 (DSFAPT) (Commonwealth)*	The objects of the DDA are to eliminate, as far as possible, discrimination against persons on the grounds of disability, including in the provision of services. The proposal would promote the objectives of TfNSW's Disability Action Plan 2012-2017 which aims to eliminate, as far as practicable, direct and indirect discrimination in the provision of transport services to NSW residents and visitors. The Plan requires all new and refurbished transport infrastructure to meet customer focussed design standards and comply with DDA requirements.
Noxious Weeds Act (NSW)	Noxious weeds identified as occurring on site are discussed in Section 6.7.
Crown Lands Act (NSW)	The site does not comprise Crown Land.
Sydney Water Act 1994 (NSW)	The Proposal does not involve discharge of wastewater

4.3 NSW Government policies and strategies

In addition to statutory requirements, several NSW Government policies and strategies are relevant to the Proposal. Table 9 summarises the NSW Government policies and strategies applicable to the Proposal.

Table 9: Relevant NSW Government policies/strategies

Policy/Strategy	Commitment	Comment
Metropolitan Plan for Sydney 2036	The *Draft Metropolitan Strategy for Sydney 2031* (Department of Planning & Infrastructure, 2013) is currently being finalised along with updated subregional delivery plans.	The new delivery plan for the Sydney south region is likely to have revised housing and employment targets, although with similar increasing growth trends over the coming decades.
Rebuilding NSW State Infrastructure Strategy 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 massive investment in rail infrastructure, and aligns with the reservation of $8.9 billion for urban public transport to support Sydney's population, that is expected to reach almost 6 billion by 2031.
NSW 2021	*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. On 21 December 2012, the Government released the South Western (and Western Sydney and Blue Mountains) Regional Action Plans. These Plans outline the immediate actions the Government will take to address the priorities identified by the community.	The proposal is consistent with the NSW Government's commitment to: • grow patronage on public transport, and • improve customer experience with transport services. Goal 14 – Increase opportunities for people with a disability, by improving transport access and Goal 20 – build liveable centres. The Proposal contributes to Goal 7 – Reduce travel times. The Proposal also supports active transport by contributing to the development of cycle facilities as part of an integrated local network.

Policy/Strategy	Commitment	Comment
NSW Transport Master Plan	The *NSW Long Term Transport Master Plan* (December 2012) identifies a planned and coordinated set of actions to address transport challenges. It will guide the NSW Government's transport funding priorities over the next 20 years. The Long Term Master Plan will 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 key themes in the Master Plan: • Improving customers' journey experience • Making better use of existing assets • Providing accessible transport to help address social exclusion.

4.4 State Environmental Planning Policies

4.4.1 State Environmental Planning Policy (Infrastructure) 2007

The *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) is the key environmental planning instrument which determines the permissibility of the Proposal.

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 'associated public transport facilities for railway stations' which includes 'car parks intended to be used by commuters' in accordance with Clause 5.

Consequently, development consent is not required from Holroyd or Parramatta Councils. However the environmental impacts of the Proposal have been assessed under the provisions of Part 5 of the EP&A Act.

In addition, Part 2 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils prior to the commencement of certain types of development. Section 5.1 of this REF discusses the consultation undertaken with Council during the development of the Proposal.

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. However, none of these SEPPs apply to the Proposal.

4.5 Local Environmental Plans and strategies

4.5.1 Holroyd Local Environmental Plan 2013

The southern part of Pendle Hill Station falls within the Holroyd LGA and is covered by the *Holroyd Local Environmental Plan 2013* (HLEP). The HLEP 2013 provides the statutory framework for all planning within the area and also contains provisions to conserve local heritage and protect sensitive land. The operation of the Infrastructure SEPP means that the HELP does not apply to the proposal.

Under the HLEP 2013 the rail related infrastructure of Pendle Hill Station is zoned SP2 – Infrastructure. Pendle Hill town centre to the south is zoned B2 Local Centre and surrounded by land zoned R4 High Density Residential and R2 Low Density Residential.

Refer to Figure 11 below for the zoning of Pendle Hill Station precinct under the HLEP 2013.

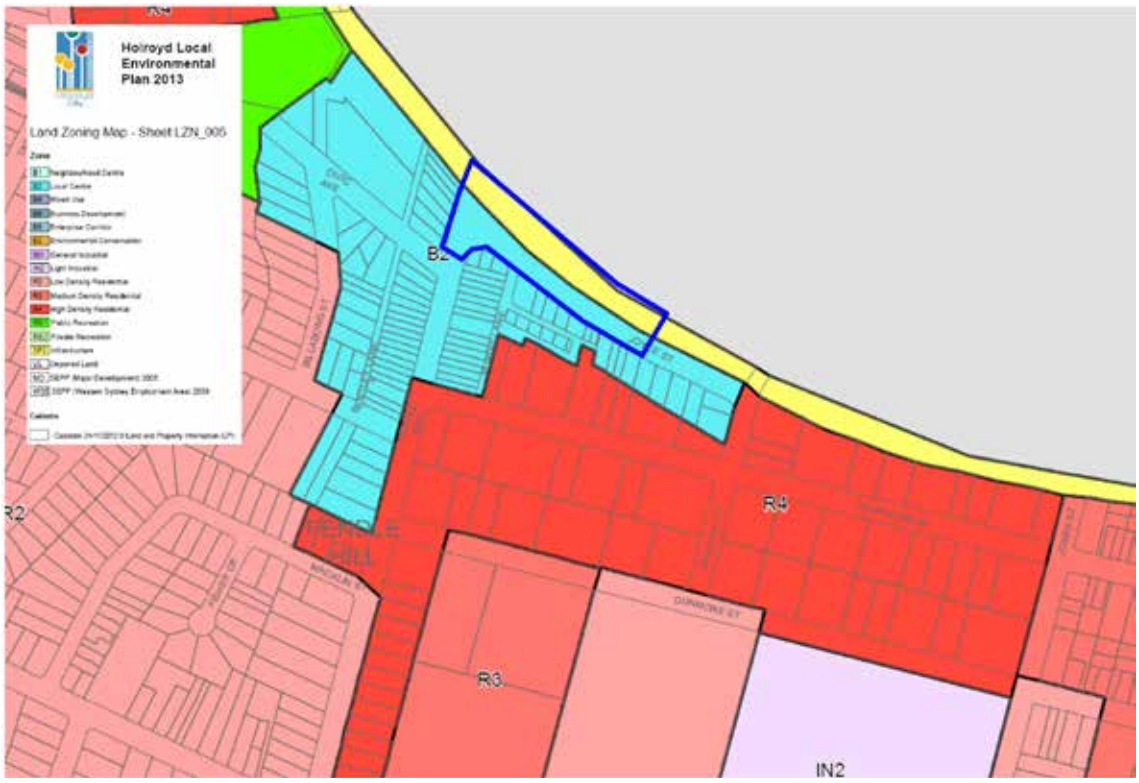

Figure 11: Holroyd LEP 2013 zoning map. Approximate footprint of the proposal is identified in blue.

Table 10 summarises the relevant aspects of the HLEP 2013 applicable to the proposal.

Table 10: Relevant provisions of the HELP 2013

Description	Comment
Zoning	Land within the works footprint (refer Figure 11) is zoned as SP2 Railway Infrastructure and B2 Local Centre.
Zone objectives and development control	Majority of the works would be undertaken with land zoned as SP2 Railway. The works would be in line with the objectives of this zone in that they would improve amenity for commuters and promote the use of public transport. Works would also meet the objectives of surrounding zones, specifically with reference to the following objectives: • To maximise public transport patronage and encourage walking and cycling. • To enhance the viability, vitality and amenity of local centres.
Consent requirements	Development for the purposes of rail infrastructure is permissible with consent under the provisions of the zoning table. However as the provisions of the Infrastructure SEPP prevail over the HELP 2013, development consent is not required (refer to Section 4.2.3).
Restrictions applying to heritage items	Clause 5.10 of the HLEP 2013 provides for the protection of items, places, and archaeological sites which have been identified in HLEP 2013 as having heritage significance.
Development in the vicinity of the heritage items	Pendle Hill Railway Station Group is listed as a heritage item on the HELP 2013. Heritage issues are further assessed in section 6.5

4.5.2 Parramatta Local Environmental Plan 2011

The northern part of Pendle Hill Station falls within the Parramatta LGA and is subject to the *Parramatta Local Environmental Plan 2011* (PLEP 2011). The PLEP 2011 provides the statutory framework for all planning within the area and also contains provisions to conserve local heritage and protect sensitive land. The operation of the Infrastructure SEPP means that the HELP does not apply to the proposal.

Under PLEP 2011 the rail related infrastructure of Pendle Hill Station is zoned SP2 Infrastructure. The area immediately north of the station is land zoned as B2 Local Centre and IN1 General Industrial.

Refer to Figure 12 below for the zoning of the Pendle Hill Station Precinct under PLEP 2011.

Figure 12: Parramatta LEP 2011 zoning map. Approximate footprint of the proposal is identified in blue.

Table 11 summarises the relevant aspects of the PLEP 2011 applicable to the proposal.

Table 11: Relevant PELP 2011 aspects applicable to the proposal

Description	Comment
Zoning	Land within the works footprint (refer Figure 12) is zoned as SP2 Railway Infrastructure, B2 Local Centre and IN1 General Industrial.
Zone objectives and development control	Majority of the works would be undertaken with land zoned as SP2 Railway. The works would be in line with the objectives of this zone in that they would improve amenity for commuters and promote the use of public transport. Works would also meet the objectives of surrounding zones, specifically with reference to the following objectives: • To maximise public transport patronage and encourage walking and cycling. • To enhance the viability, vitality and amenity of local centres.
Consent requirements	Development for the purposes of rail infrastructure is permissible with consent under the provisions of the zoning table. However as the provisions of the Infrastructure SEPP prevail over the PLEP 2011, development consent is not required (refer to Section 4.2.3).

Description	Comment
Restrictions applying to heritage items	Clause 5.10 of the PLEP 2011 provides for the protection of items, places, and archaeological sites which have been identified as having heritage significance.
Development in the vicinity of the heritage items	There are no heritage items listed on PLEP 2011 within proximity 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. Consultation requirement

Table 12 provides details of consultation requirements under the Infrastructure SEPP. Where consultation is required, notification has allowed for a 21 day response period, with all responses being considered in design. Refer to Section 5.6 below for a summary of response received during this notification period.

Table 12: Infrastructure SEPP consultation requirements

Consultation with Councils – development with impacts on council related infrastructure and services	Relevance to the Proposal
Where works would: • substantially impact on storm water management services • 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 would involve minor, temporary impact on council-owned footpaths and roads. Access would be maintained throughout most of the works. Consultation with Holroyd and Parramatta Council has been undertaken and would continue throughout the Proposal.
Consultation with Councils – development with impacts on local heritage	**Relevance to the Proposal**
Where railway station works: • substantially impact on local heritage item (if not also a State heritage item) • substantially impact on a heritage conservation area.	The proposal would involve upgrades to Pendle Hill Railway Station which is heritage listed under the HLEP 2013. Consultation with Holroyd Council has been undertaken with regards to the Proposal.
Consultation with Councils – development with impacts on flood liable land	**Relevance to the Proposal**
Where railway station works: • impact on land that is susceptible to flooding – reference would be made to 'Floodplain Development Manual: the management of flood liable land'.	The proposed site is not susceptible to flooding. Accordingly, consultation with Council is not required in regard to this aspect. Refer to Section 6.9.

Consultation with public authorities other than Councils	Relevance to the Proposal
Where development is undertaken adjacent to land reserved under the *National Parks and Wildlife Act 1974*, OEH and other agencies specified by the Infrastructure SEPP where relevant. Although not a specific Infrastructure SEPP requirement, other agencies TfNSW may consult would include: • Roads and Maritime Services (RMS) • TfNSW • OEH	Does not apply to the Proposal.

5.2 Consultation strategy

TfNSW's overall approach to stakeholder engagement is built on a philosophy of 'no surprises'. Ensuring the community and key stakeholders are fully informed and given the opportunity 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
- 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
- ensure a comprehensive and transparent approach.

5.3 Consultation tools and activities

The consultation strategy adopts a range of information sources to communicate the Proposal, including:

- public display of the REF
- distribution of flyers about the Proposal notifying of the REF display period via letterbox drops up to a radius of approximately 500 metres from the station
- distribution of notification flyers at Pendle Hill Station to the local community and commuters

- 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
- direct consultation with Councils, Sydney Trains and other non-community stakeholders
- advertisement of the REF public display on posters installed at the station.

5.4 Public display period

The REF (this document) would be on public display for two weeks. The display period of the REF will be advertised in the week that the public display commences and flyers distributed on the first day of public display.

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

- Wentworthville Library
  2 Lane Street Wentworthville, NSW, 2150
- Constitution Hill Library
  20 Hollis Street, Constitution Hill, NSW, 2145
- Holroyd City Council Customer Service Centre
  16 Memorial Avenue, Merrylands, NSW 2160
- Transport for NSW
  Community Information Centre
  388 George Street
  Sydney NSW 2000.

The REF will also be available on the TfNSW website: www.transport.nsw.gov.au/projects. Information on the Proposal will be available through the Project Infoline (1800 684 490) or by email (projects@transport.nsw.gov.au).

During this time, feedback is invited. Following consideration of feedback received during the public display period, TfNSW will determine whether to proceed with the Proposal.

5.5 Aboriginal community involvement

An Aboriginal Heritage Inventory Management System (AHIMS) search was undertaken for Pendle Hill Station and surrounding lands within a one kilometre radius. The search did not identify any Aboriginal sites recorded in or near the subject location, and no Aboriginal places have been declared in or near the subject location. Therefore it was not considered necessary to undertake specific Aboriginal consultation.

5.6 Stakeholder consultation

Meetings and workshops would be held with key stakeholders during the detailed design process. These may include but not be limited to:

- Holroyd City Council
- Parramatta City Council
- Sydney Trains
- RMS.

Meetings with both Holroyd and Parramatta City councils were held on 18 September 2013 during the concept development stage of the Proposal. The purpose of these meetings was to provide a briefing on the Proposal and to provide the Councils with an opportunity to provide feedback.

The following issues were raised by the councils:

- There is an existing pedestrian safety issue on Wentworth Avenue. Pedestrians walking from their informally parked cars west of the formal car parking spaces walk along the Wentworth Avenue carriageway, rather than crossing and using the footpath on the other side of the road.
- The pedestrian crossing on Wentworth Avenue should be raised.
- Any parking changes in the Holroyd LGA, such as removing the 1P restriction, should be reported to the Holroyd Traffic Committee for approval.

Following this, a subsequent meeting was held with Holroyd City Council on 7 November 2014 to further discuss the progression of the concept design. The key points of the discussion are outlined below:

- curb alignment in Joyce Street.
- the replacement of 1P parking with commuter parking
- council land encroachment for the construction of the Proposal

These issues would be taken into consideration during the detailed design process with an effort to minimise these impacts where possible. Ongoing consultation would be undertaken with Holroyd City Council and Holroyd Traffic Committee throughout this process.

In addition, the councils were encouraged to formally submit feedback about the design and construction of the Proposal during the public display period. Any additional feedback would be further considered and discussed with Council where practicable, to incorporate into the design.

5.7 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.

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.

During construction 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 throughout the construction phase would be undertaken in accordance with a community liaison plan (CLP) to be developed prior to the commencement of construction. See Figure 13 for the consultation process.

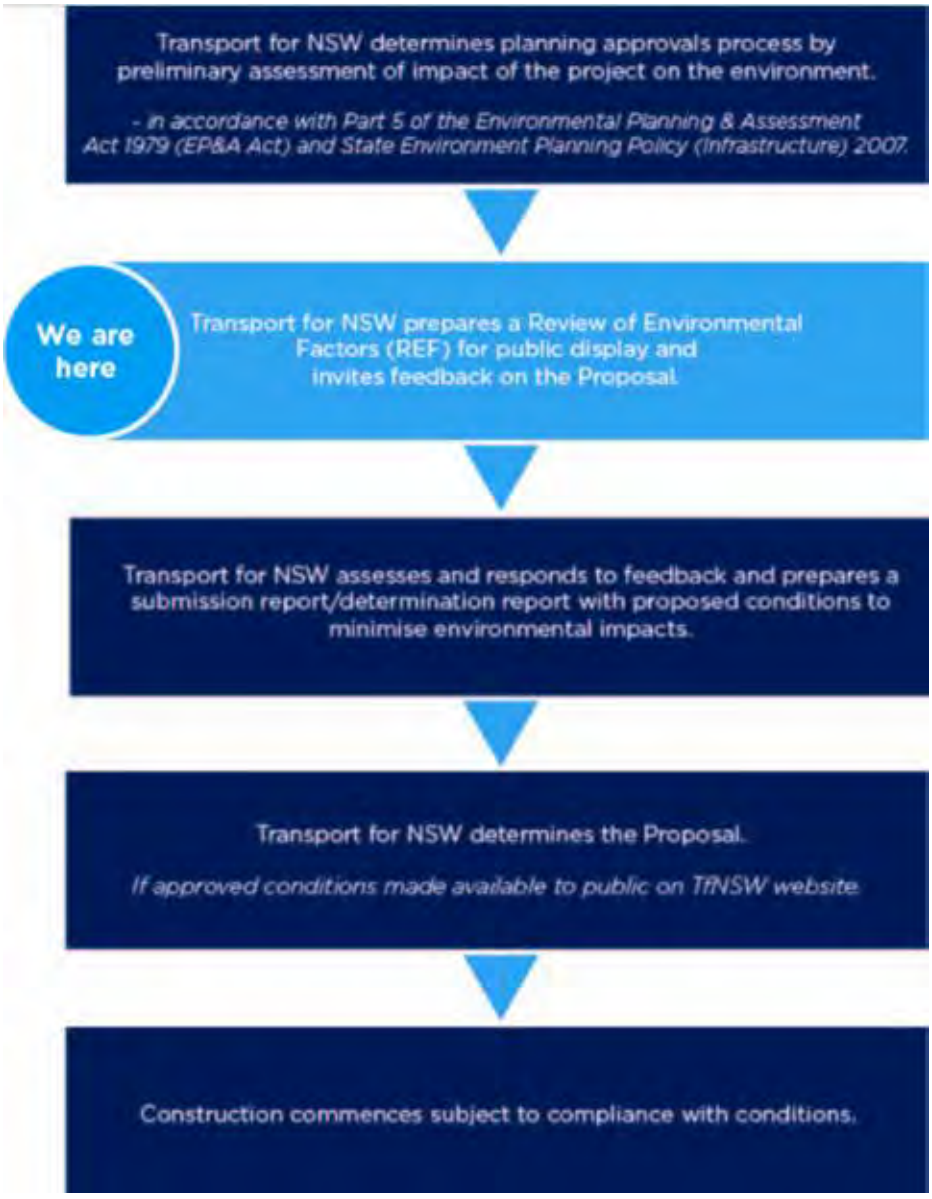

Figure 13: Ongoing consultation process for the Proposal

6 Environmental impact assessment

Chapter 6 of the REF provides a detailed description of the likely environmental impacts associated with the construction and operation of the Proposal. For each likely 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 1.

6.1 Traffic and transport

A Traffic, Transport and Access Impact Assessment (TTAIA) for the Proposal was undertaken by GTA Consultants Pty Ltd in November 2014. The results of the TTAIA are summarised below.

6.1.1 Existing environment

Road network and traffic

Joyce Street is located on the southern side of Pendle Hill Station and is a two lane single carriageway with approximately 3.5m lane widths. Joyce Street runs parallel to the rail corridor and is generally aligned in an east-west direction. Joyce Street accommodates a pedestrian crossing, taxi rank, bus zone and a combination of 1P and unrestricted parking along its length.

Pendle Way is also located on the southern side of Pendle Hill Station, is a two lane single carriageway perpendicular to the rail corridor and is generally aligned in a north-south direction. Pendle Way accommodates small pedestrian plazas on both sides of the street at the intersection with Joyce Street and commercial properties along its length. Pendle Way contains mainly 1P parking along both sides with a single accessible parking space near Civic Avenue.

Wentworth Avenue is located on the northern side of Pendle Hill Station and is a two lane single carriageway running parallel to the rail corridor and is generally aligned in an east-west direction. Wentworth Avenue accommodates a pedestrian crossing providing access to the station.

The AM peak period for Joyce Street/Pendle Way occurred between 7:00am and 8:00am with 555 traffic movements during that period of which 21% were associated with set-down/pickup activities. The AM peak period for Wentworth Avenue was between 7:15am and 8:15am with approximately 1,186 traffic movements of which 6% were associated with set-down/pick-up activities.

The PM peak periods on both Joyce Street/Pendle Way and Wentworth Avenue are much more spread out with approximately half the AM peak period movements. Approximately 2-3% of vehicle movements were associated with set-down/pick-up activities.

Existing parking availability

Four car parks facilitate commuter parking in the vicinity of Pendle Hill Station.
A commuter car park is provided off Purdie Lane and another car park near Civic Park, located approximately 250m south of the station, was also observed to be utilised by commuters.

Off-street perpendicular car parking is also available on Joyce Street and Wentworth Avenue. Additionally, ample on-street parallel and perpendicular car parking with 1P and 2P restrictions as well as unrestricted parking is available on both the northern and southern sides of the station.

Pendle Hill Station is served by a total of 504 car parking spaces, with 286 being supplied on the southern side and 218 on the northern side. Of the 286 spaces on the southern side, only 137 spaces were unrestricted whereas all spaces on northern side were unrestricted.

Total parking demand during peak periods on the southern side of the station was assessed as between 68% and 79% however the demand for unrestricted parking during peak periods was much higher at between 92% and 97%. Parking demand on the northern side was observed to be between 83 and 85%

The results indicate that there is a significant parking demand for unrestricted spaces with peak demand reaching an average of 95% and 84% on the southern and northern sides of the station respectively.

Bus operations

Bus stops are provided within a short walking distance from Pendle Hill Station, including on Joyce Street (south of the station) and Bungaree Road to the north. The buses are operated by Hillsbus and provide services linking Blacktown with Parramatta (route 705, 711), and Constitution Hill with Parramatta (route 708). In addition, school set-down/ pick-up occurs at the Joyce Street bus stop, with the majority of activity observed between 8.15am and 8.30am

The bus frequencies are detailed in Table 13.

Table 13: Bus service frequency at Pendle Hill Station

Route	Frequency
705	20 services per day
708	2 services per day
711	35 services per day
Total	**57 service per day**

Buses replace trains during weekend possession periods. These buses pick up and drop off along Joyce Street.

Pedestrian access

The station's overhead footbridge extends between Joyce Street on the southern side of the station and Wentworth Avenue on the northern side. It provides an important public pedestrian connection over the railway line, including for non-rail passengers, as it is aligned with the retail destinations on the southern side of the station.

The key pedestrian desire lines for the station are via established footpaths. These include along both sides of Wentworth Avenue, Joyce Street and Pendle Way and throughout the town centre to the south.

The pedestrian crossing on Wentworth Avenue accommodates the majority of the pedestrian movements to/ from the north, with a 2-3m wide footpath connecting the crossing with the northern station access. Similarly, a marked pedestrian crossing on the bend of Joyce Street and Pendle Way connects the southern station access with footpaths provided on both sides of Joyce Street and Pendle Way. Pedestrian movements along the western side of Pendle Way were observed to be the heaviest, mostly due activity associated with the commuter car park further to the west.

Access to the station platforms is via a combination of ramps and stairs, and does not comply with DDA requirements.

Cycleways and bicycle access

Bicycle facilities at the station include bicycle racks at the southern station access with capacity for five bicycles. At the time of the site visit, bicycle parking was underutilised with one or two bicycle racks occupied. Four bicycle lockers are located on Wentworth Avenue 175m east of the 90º commuter parking. These lockers are not conveniently located and do not have high usage rates. Of the four available, only one is currently in use

Kiss and ride and taxi facilities

A formal kiss and ride facility has been provided on the northern side of the station along Wentworth Avenue with capacity for 3 cars. No formal kiss and ride facility is provided on the southern side of the station however such activity does occur, particularly during the AM peak period in the no parking and 1P areas on either side of the marked pedestrian crossing.

A formal taxi rank with capacity for approximately 2 vehicles is also located adjacent to the bus zone on the southern side.

6.1.2. Potential impacts

Construction impacts

Construction vehicles

The surrounding road network is well established and would provide direct access to and from the site. Figures 14 and 15 have been prepared to illustrate the likely access routes for each side of the railway line.

It is anticipated that the primary site compound would be located at Wentworthville Railway Station (east of Pendle Hill) due to the site constraints with a lack of available space. Therefore vehicle routes between the two stations have been specified.

Additional worksites would be required at specific locations on both sides of Pendle Hill Station to cater for temporary works. The layout for the site compound would ensure access by the largest design vehicle, while it is likely that on-street Works Zones would be required to accommodate vehicle movements to the specific worksites. Prior approval for any Works Zone would be required from Council.

Traffic impacts

Traffic generated by the construction includes construction worker light vehicles (including utility vans), as well as heavy vehicles for periodic delivery and removal of materials, including conduits, utility poles, and extraction of spoil material. Vehicle types and sizes would vary depending on the required use, but include medium and large rigid vehicles and articulated vehicles for import of bulk materials or spoil removal, as well as concrete trucks. The amount of fill material or spoil would be minor as the site is for the most part level and paved.

The traffic generated by construction at the site is unknown at this stage, however given the size of the proposed works, construction traffic generation is expected to minor and have a negligible impact on existing traffic conditions. The interaction between the work site and street frontages (including traffic and pedestrians) would be managed by qualified personnel to ensure safety for all users at all times.

Some works, including the delivery of large structures such as lifts and the existing overbridge, have the potential to require temporary partial road closures. These would likely occur outside of peak periods, during weekend possessions and may require Road Occupancy Licences from the applicable Roads Authority. During partial road closures, it is anticipated that Stop/Slow traffic control or similar would be required to manage traffic at this location.

Parking impacts

Given that parking is in high demand in the local area, construction workers would be encouraged to use the frequently available public transport for travel to and from the site.

It is anticipated that the localised construction activities, specifically implementation of Works Zone may have a temporary impact on the commuter parking provision, with a degree of parking loss expected along the northern and southern station frontages.

It is desirable that works on either side of the station be staggered to reduce the impact to commuter parking. Should construction activity necessitate a larger impact on parking provision, advance signage informing users of such activity is recommended. This would allow for communication of the works while allowing users to make an informed decision of alternate parking locations, or change mode choice altogether.

Pedestrian access and other impacts

During the station interchange works, pedestrian access would at times be temporarily restricted along the footpath of Joyce Street, Pendle Way and Wentworth Avenue. Construction works in the vicinity of any pedestrian and cyclist desire lines would be managed and controlled at all times to ensure that there is no impact to public safety.

At times during construction, particularly during possession periods, access to the stations overhead footbridge would be restricted resulting in a loss of direct access between the northern and southern station precincts. During these periods, diversion signage would direct pedestrian traffic to an alternate rail crossings.

Construction activities would not typically present significant impacts on the surrounding area and users. This includes rail operations, bus operations and general traffic. Construction works in the vicinity of any pedestrian and cyclist desire lines would need to be managed and controlled at all times to ensure that there is no impact to public safety.

Negligible impact on access to surrounding properties is expected during construction.

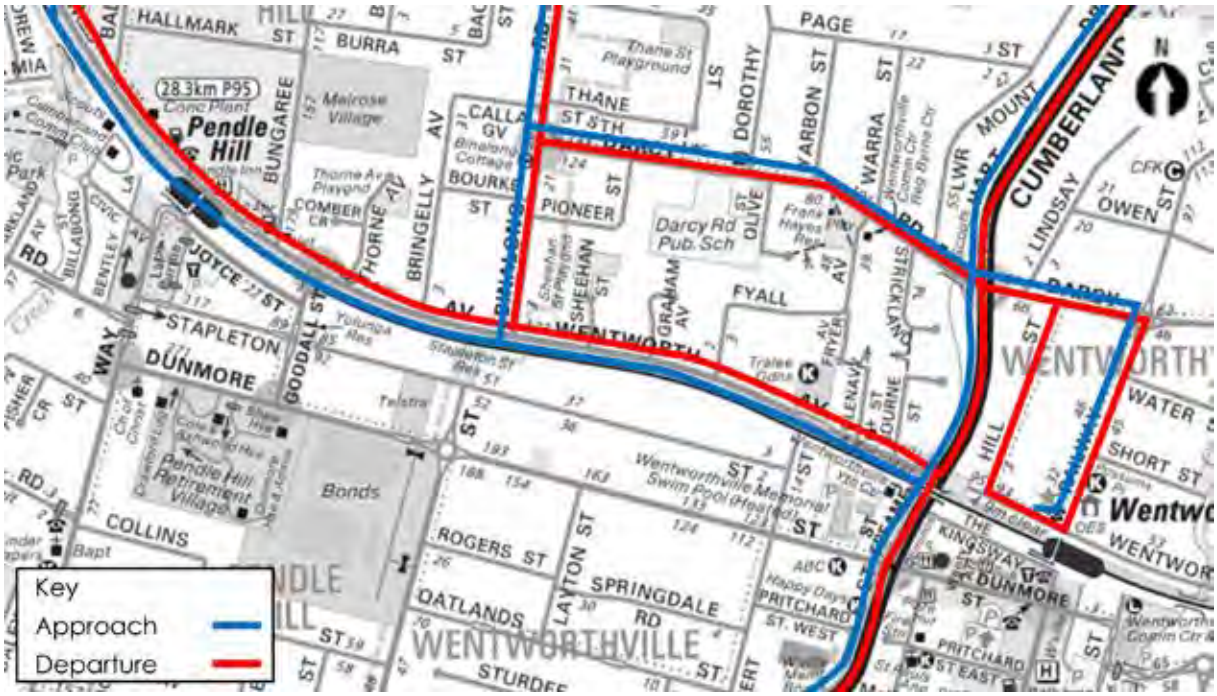

Figure 14: Construction vehicle routes (northern station precinct) (GTA, 2014)

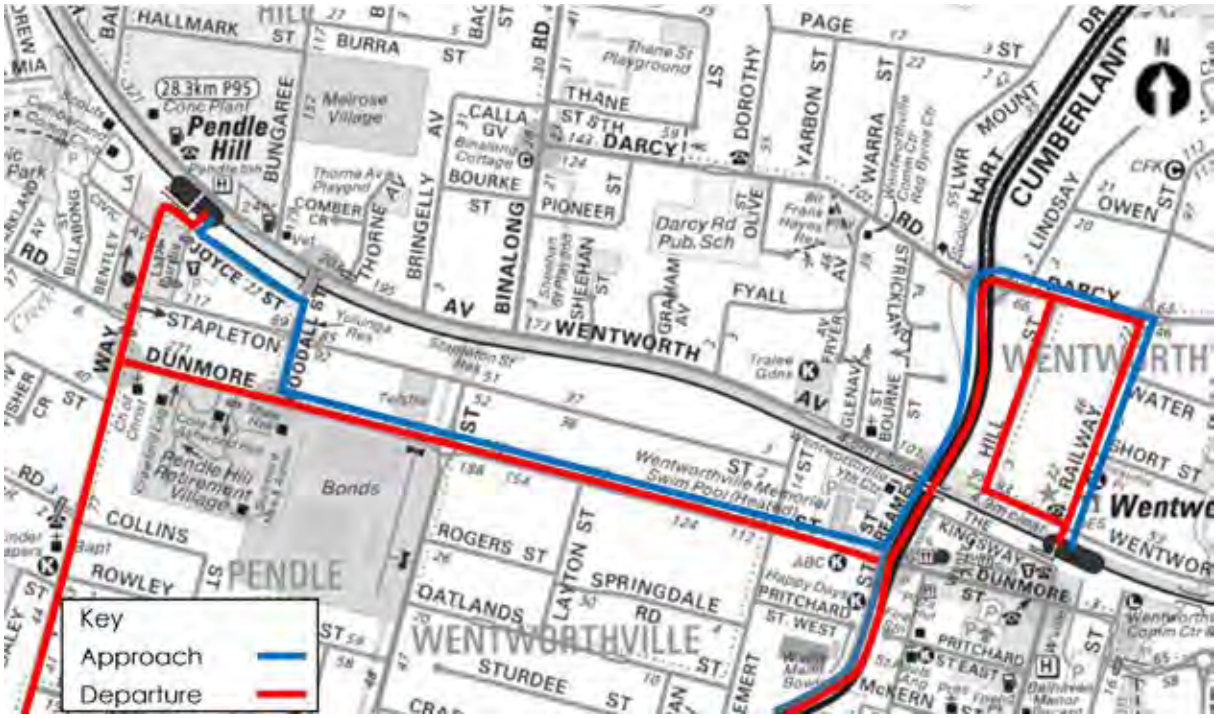

Figure 15: Construction vehicle routes (southern station precinct) (GTA, 2014)

Operational phase

Pedestrians

The proposed pedestrian facilities, including the new footbridge and a raised pedestrian crossing in Wentworth Avenue, would offer considerable pedestrian benefits, particularly in improving the user experience by providing new and improved facilities with greater capacity.

Relocation of the pedestrian footbridge to the western end of Pendle Hill Station would provide a more direct route for the majority of pedestrians, particularly for those approaching from the south. In addition, the proposed access arrangements would cater for an increase in parking demand west of the station, noting that car parking supply is expected to increase in this area.

The relocation of the accessible parking spaces would improve accessibility, particularly on the northern side where accessible spaces would be located in close proximity to the lift, stairs and entry forecourt area. The accessible spaces on the southern side would be located approximately 70-80m from the station access. Although this is not an optimal separation, there is a suitable pedestrian path which could adequately accommodate an accessible path of travel. In addition, this location could allow for an increased disabled parking provision.

It is considered that the upgraded access points at Pendle Hill Station would be adequate to accommodate the expected growth in passenger demand. Overall, the access footpaths would be expected to operate well with minimal (if any) queuing or delay at any time or location.

In addition, maintaining the existing pedestrian bridge between platforms would enable efficient and safe pedestrian activity, particularly for passengers who need to transfer between trains on opposing platforms.

Based on the above, the proposed pedestrian improvements would result in coherent, direct and safe connections and the overall user efficiency and connectivity for the station would be enhanced.

Station facilities

The proposal includes a combination of bicycle racks and bicycle lockers, which would be adequate to cater for the current and future demands. It is anticipated that the relocation of the lockers to the northern and southern station access points is likely to increase awareness of such facilities, potentially with an associated increase in the cycling mode share.

The proposal includes provision of formalised kiss and ride facilities, including relocation and expansion of the existing kiss and ride on the northern side, with capacity for up to five vehicles and a new kiss and ride facility on the southern side, with capacity for six vehicles. The kiss and ride facilities would be located in close proximity to the realigned station access points, to ensure direct access is provided.

The proposed relocation of taxi facilities from Joyce Street to Pendle Way would not be expected to have any adverse impacts. Its proposed location on a key pedestrian desire line could improve utilisation while also improving pedestrian accessibility to the station

Public transport

The proposed station upgrade would not have any significant impacts on bus or rail operations. It would likely bring about positive impacts in terms of contributing towards making public transport more accessible to the community.

The extension of the existing bus stop on the southern side of Joyce Street ensures adequate capacity for bus services. In addition, the proposed bus shelter new seats would improve amenity and the overall user experience, encouraging the use of local bus feeder services to access the station.

Traffic generation and parking demand

Given that the Proposal provides a higher level of station accessibility and usability at Pendle Hill Station, the improved commuter experience and upgraded facilities are likely to attract greater commuter use. As a result, traffic activity is anticipated to marginally increase, with a negligible impact on the surrounding road network.

The proposed parking arrangements along Wentworth Avenue include removal of existing parking spaces at the station entry to accommodate the proposed kiss and ride facility. This would be offset with the provision of approximately 10, 90 degree angled commuter parking spaces east of the station. It is also proposed to provide up to 28, 45 degree angled parking spaces west of the station, where informal commuter activity is occurring under existing arrangements. This combines to merely formalise parking and would result in a negligible increase in parking supply in the northern precinct.

The proposed parking arrangements would potentially result in the loss of approximately 12 restricted parking spaces along the northern side of Joyce Street to accommodate the following:

- approximately 10 commuter parking spaces
- two accessible parking spaces (including one relocated).

The restricted parking appears to be moderately utilised and with its conversion to commuter car park would result in any such demand being redistributed amongst the other restricted parking areas. The parking demand surveys, albeit during the morning and afternoon periods show that there is adequate capacity to accommodate this change.

Property access

The proposed station upgrade is not expected to have any impact on existing access to properties in the vicinity of the site.

6.1.3. Mitigation measures

The following mitigation measures are proposed to manage traffic, transport and access impacts:

- Prior to the commencement of works, a Construction Traffic Management Plan (CTMP) would be prepared and provided to Council for information. Specifically the TMP would discuss:
  - traffic management
  - locations of access to and from the local road network
  - pedestrian management – including wayfinding signage, traffic controllers and fencing
  - routes and turning movements of heavy vehicles
  - loading/delivery zones including queuing
  - parking (construction worker and commuter)
  - an Emergency Response Plan

- a Road Safety Audit would be undertaken during detailed design and design amendments made as required
- heavy vehicles would be restricted to specified routes, with the aim of minimising impacts on local roads. Where feasible, route markers would be installed for heavy vehicles along designated routes
- the impacts of construction traffic on the local road network and the impacts on intersection operation would be minimised by undertaking construction vehicle traffic movements outside of peak road traffic periods and outside of school peak periods
- the queuing and idling of construction vehicles in residential streets would be minimised through staging of deliveries where practicable
- where required, communication would be provided to the community and local residents to inform them of impacts to vehicle movements and anticipated effects on the local road network relating to site works
- access to all private properties and businesses adjacent to the works would be maintained during construction, unless otherwise agreed by relevant property owners
- signage would be erected to warn vehicles of construction activities and heavy vehicle movements
- should road closures be required, signage would clearly delineate alternative access, and that nearby businesses would operate as normal
- pedestrian access to and from the Station would be maintained at all times during construction (except during rail possessions)
- Traffic Control Plans would be prepared in accordance with applicable RMS guidelines
- road occupancy licences for temporary closure of roads would be obtained, where required
- limit off-site construction vehicle parking to designated areas. Areas of temporary on-street parking during peak construction events would be identified in the traffic management plans to minimise the impact on surrounding properties and businesses
- an emergency response plan would be developed for construction traffic incidents.
- during project inductions, all heavy vehicle drivers would be provided with the emergency response plan for construction traffic incidents.

6.2 Urban design, landscape and visual amenity

A Visual Impact Assessment was undertaken by Green Bean Design for the Proposal (Green Bean Design, 2014). The findings of this assessment are summarised in this section.

6.2.1 Existing environment

The general urban landscape character surrounding Pendle Hill Station is typical of both residential suburban settings and that of a main line rail corridor with mixed development within a local commercial centre. Residential areas to the north of Pendle Hill Station extend along Wentworth Avenue to the east of Bungaree Road and are defined by a mix of single storey detached dwellings with front and rear gardens. Dwellings are set back from street frontages with tree planting along nature strips. Land to the west of Bungaree Road comprises a combination of commercial, including an auto mechanic and the Pendle Inn, and light industrial properties.

The urban landscape character south of the rail corridor is defined by the Pendle Hill town centre with a range of shops and services extending along Pendle Way and Joyce Street. There is a constant level of vehicular and pedestrian activity throughout the local commercial area and a visual diversity of colour, line and form associated with buildings and signage.

The existing station is comprised of a number of key visual elements:

- east and west bound rail lines (main and suburban), electrical conductors and steel gantries
- four platforms located on two islands
- footbridge with walkway ramp and step access with railings
- station buildings, ticket office and passenger shelters/amenities
- utility poles and wires
- on street 90 degree car parking (to Joyce Street and Wentworth Avenue)
- various security and safety fencing
- directional and informative signage.

The station precinct and adjoining road corridors contain mature native and exotic tree planting which provides some degree of screening within proximity to, and beyond the station. Tree planting continues along local residential street nature strips and throughout residential garden areas.

Temporary receivers include road traffic, pedestrians and train customers. Other permanent receivers include:

- residential dwellings to the south on Civic Avenue, Stapleton Street and to the north on Bungaree Road
- commercial properties to the south on Pendle Way and Joyce Street
- industrial and commercial properties including the Pendle Inn to the north on Wentworth Avenue and Bungaree Road.

6.2.2 Potential impacts

Construction phase

Whilst construction activities would tend to be more visible than the operational stage of the proposal, the construction activities would be temporary and transient in nature. Views toward construction activities would be partially restricted by existing tree cover surrounding the station precinct. New elements typically introduced into the visual environment would include:

- temporary fencing and hoardings
- road barriers and signage
- scaffolding
- pedestrian fencing
- temporary site office and amenities.

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

The Proposal would also involve the use of a construction compound located in an existing lay down area west of Wentworthville Station. Construction visual impacts resulting from the use of this compound have been assessed in the Wentworthville Station Easy Access Upgrade REF (TfNSW, 2014).

Operational phase

Urban landscape effects

Visual Absorption Capability (VAC) is a classification system used to describe the relative ability of the urban landscape to accept modifications and alterations without the loss of character or deterioration of visual amenity. VAC relates to the physical characteristics of the urban landscape that are often inherent and quite static in the long term. In essence the VAC indicates the ability of an urban landscape setting to 'hide' development.

The VAC of an urban landscape is largely determined by inherent physical factors which include:

- the degree of visual penetration (view distance without obstruction) through surrounding buildings and tree cover
- the complexity of the urban landscape through bulk, scale, form and line.

Urban landscapes with a low visual penetration will have higher visual absorption capability values. Complex urban landscapes which include a mix of scale, form and line (together with some degree of vegetative screening) will also have high visual absorption capability values. The VAC of the urban landscape surrounding the Pendle Hill Station and the area of proposed works exhibits a relatively high VAC.

The Proposal and its associated infrastructure would have an overall low (and predominantly beneficial) impact upon the urban landscape character of the station precinct and surrounding environment. The bulk and scale of constructed elements would be partially visually contained by existing mature tree planting within and beyond the station precinct as well as existing development within the Pendle Hill local town centre and industrial development to the north. The Proposal design aims to incorporate various architectural and engineered outcomes that visually minimise bulk and scale of constructed elements through modulation and articulation of structures. Detailed design of the facade would aim to further minimise the bulk of the structure and incorporate transparent materials to maximise natural light into the building, and ensure that non-reflective materials are used for facades and finishes.

Building form and height also responds to both existing constructed elements within and adjacent to the station precinct including existing station buildings. Mature tree planting along the north and south portion of the rail corridor provides a backdrop to views of the proposal which would be visible below tree canopies. The proposal is unlikely to form any significant skyline view from surrounding receiver locations.

The proposal results in a seamless integration to the existing station precinct and, as an upgrade to existing transport facilities, retains the station's existing function and purpose in its relation to surrounding land use. The proposal integrates a high level of urban design and presents a rational approach to pedestrian and vehicular movement within the station precinct and connectivity to adjoining areas.

The proposal is considered to result in an overall beneficial visual outcome where contemporary design, modern materials and sympathetic colours to the existing station precinct would combine to create a legible and high visual amenity asset within the surrounding urban landscape.

Viewshed and potential impacts to receivers

The viewshed is defined as the area of land surrounding and beyond the Proposal area which could be potentially affected by the proposal. The viewshed is illustrated in Figure 16.

The visual significance of the Proposal on surrounding view locations would result primarily from a combination of the potential visibility of the Proposal and the characteristics of the landscape of the surrounding area. The potential degree of visibility and resultant visual significance is then partly determined by a combination of factors including:

- distance between view location and various elements within the proposal
- duration of view from receiver locations toward various constructed elements
- predicted impact of the proposal on existing visual amenity
- nature of predicted visual impacts
- visual sensitivity of locations from which views toward the proposal exist.

An assessment of significance was undertaken of the visual impact from 16 different receiver locations, with regard to above criteria, to determine an overall level of significance at each location. The level of visual significance is classified as high, moderate, low or negligible. The results of the assessment are displayed in the Visual Significance Matrix reproduced at Table 14. The location of the receivers included in the assessment is shown in Figure 17.

The majority of receiver locations, including private residential dwellings, road corridors and public spaces beyond the station precinct, have been determined to have an overall negligible to low visual significance with regard to the proposal and its associated infrastructure. The negligible to low visual significance largely results from the screening effect of existing tree planting alongside the rail corridor and the distribution of commercial development within the Pendle Hill town centre.

The proposed upgrade works are considered to have an overall beneficial impact for commercial properties as well as views from road corridors, where works would enhance and create a positive outcome for existing views.

Other impacts

Some proposal infrastructure would require lighting installation for operational, safety, security and maintenance purposes. Night lighting would include building and pole mounted directional spot lighting and pole mounted pedestrian lighting. The proposal would avoid broad area or floodlighting where possible. The majority of infrastructure 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. Lighting installations would avoid light spill to adjoining road corridors and residential areas.

The location of proposed works in relation to the offset distance to public domain, road corridors and residential areas, would result in the majority of shadows cast by the proposal infrastructure being contained within the station precinct boundary. Some overshadowing would extend along the south boundary of the station precinct and across the Pendle Way and Joyce Street intersection, but is unlikely to extend to commercial properties on the west side of Pendle Way.

Figure 16: Proposal viewshed (Green Bean Design, 2014)

Figure 17: Receiver locations for Visual Impact Assessment (Green Bean Design, 2014)

Table 14: Visual Significance Matrix (GBD, 2014)

Receiver viewpoint (Figure 17)	View direction and distance to proposal	Description	Distance	Duration	Predicted impacts	Nature of impacts	Magnitude	Sensitivity	Significance
R1 Residential dwellings & vet practice	West to north west – around 200 metres	Indirect views toward the Pendle Hill Station and the proposed works from residential dwellings north of Wentworth Avenue are partially blocked by tree planting to the south of the Wentworth Avenue road corridor.	Long	Long term	Neutral	Irreversible	Negligible	High	Negligible
R2 Residential dwellings	West – around 200 metres	Views toward the Pendle Hill Station and the proposed works from residential dwellings to the east of Bungaree Road are blocked by industrial buildings to the west of Bungaree Road.	Long	Long term	Neutral	Irreversible	Negligible	High	Negligible
R3 Industrial areas and Pendle Inn	South to south west – between 50 and 200 metres	Views extend across Wentworth Avenue toward the Pendle Hill Station and proposed works from industrial development and the Pendle Inn buildings. View opportunities are limited from within and adjoining industrial buildings.	Medium	Long term	Beneficial	Irreversible	Low	Medium	Low

Receiver viewpoint (Figure 17)	View direction and distance to proposal	Description	Distance	Duration	Predicted impacts	Nature of impacts	Magnitude	Sensitivity	Significance
R4 Commercial properties	North to north west – between 50 and 150 metres	Views toward the Pendle Hill Station and proposed works are direct from the east and central portions of commercial property frontage along the south side of Joyce Street. Views from the west end of Joyce Street toward the station are partially screened by tree planting alongside the station boundary.	Medium	Long term	Beneficial	Irreversible	Low	Medium	Low
R5 Residential dwellings & units	North to north west – around 150 metres	Views toward the Pendle Hill Station and the proposed works are partially screened by tree planting and commercial properties to the north of the residential units. Potential and partial views from upper storey units toward the station.	Long	Long term	Neutral	Irreversible	Low	High	Low
R6 Commercial property	East to north east – between 50 and 100 metres	Direct ground and first floor views toward the Pendle Hill Station will extend toward the west portion of the station precinct including proposed operations building.	Long	Long term	Neutral	Irreversible	Low	Medium	Negligible

Receiver viewpoint (Figure 17)	View direction and distance to proposal	Description	Distance	Duration	Predicted impacts	Nature of impacts	Magnitude	Sensitivity	Significance
R7 Commercial property	North – between 50 and 200 metres	Indirect views toward the Pendle Hill Station and proposed works are partially screened by tree planting adjoining the north portion of commercial property. The majority of commercial properties have frontage toward Pendle Way.	Medium	Long term	Neutral	Irreversible	Low	Medium	Negligible
R8 Commercial property	North east – between 50 and 200 metres	Indirect views toward the Pendle Hill Station and proposed works are partially screened by adjoining commercial development. The majority of commercial properties have frontage toward Pendle Way.	Long	Long term	Neutral	Irreversible	Low	Medium	Negligible
R9 Residential dwellings	North east – around 150 metres	Views toward the Pendle Hill Station and proposed works from residential dwellings to the south of Civic Avenue are blocked by commercial property and multi storey residential unit development to the north of Civic Avenue	Long	Long term	Neutral	Irreversible	Negligible	High	Negligible

Receiver viewpoint (Figure 17)	View direction and distance to proposal	Description	Distance	Duration	Predicted impacts	Nature of impacts	Magnitude	Sensitivity	Significance
R10 Residential dwellings & units	East – between 100 and 150 metres	Views toward the Pendle Hill Station and the proposed works from multi storey residential units north of Civic Avenue are partially screened by commercial property to the west of Pendle Way. A small number of upper storey windows are visible from the station footbridge.	Long	Long term	Neutral	Irreversible	Low	High	Low
R11 Commercial property	South east – around 150 metres	Views toward the Pendle Hill Station and the proposed works will be largely screened by commercial property to the west of Pendle Way and partial screening by tree planting alongside the rail corridor.	Long	Long term	Neutral	Irreversible	Low	Medium	Negligible
R12 Pendle Way road corridor	North– between 50 and 200 metres	Views toward the Pendle Hill Station and the proposed works are framed and restricted by commercial properties either side of the road. The south station precinct including proposed booking office and office building will terminate the view from the road corridor.	Short	Short term	Neutral	Irreversible	Low	Low	Low

Receiver viewpoint (Figure 17)	View direction and distance to proposal	Description	Distance	Duration	Predicted impacts	Nature of impacts	Magnitude	Sensitivity	Significance
R13 Purdie Lane	North– between 50 and 100 metres	Views toward the Pendle Hill Station and the proposed works from Purdie Lane are blocked by commercial property between Purdie Lane and Pendle Way. Direct views north along the Purdie Lane corridor are terminated to the north of Joyce Street by mature tree planting alongside the station precinct.	Short	Short term	Neutral	Irreversible	Negligible	Low	Negligible
R14 Joyce Street	North west – within 50 and in excess of 200 metres	Indirect lateral views toward the Pendle Hill Station and proposed works from Joyce Street extend across the rail corridor toward the station precinct, platforms and buildings.	Short	Short term	Neutral	Irreversible	Low	Low	Low
R15 Bungaree Road	West – between 100 and 150 metres	Views toward the Pendle Hill Station and proposed works are blocked by industrial development to the west of Bungaree Road.	Medium	Short term	Neutral	Irreversible	Low	Low	Negligible
R16 Wentworth Avenue	North– between 50 and 100 metres	Indirect lateral views toward the Pendle Hill Station and proposed works from Wentworth Avenue extend across the rail corridor toward the station precinct, platforms and buildings. Screening is provided by tree planting along a section of Wentworth Avenue south of the Bungaree Road intersection.	Short	Short term	Neutral	Irreversible	Low	Low	Low

6.2.3 Mitigation measures

The following mitigation measures are proposed to manage impacts to visual amenity:

- minimise light spill from the rail corridor into adjacent visually sensitive properties 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
- temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
- work/site compounds would be screened, with shade cloth (or similar material) (where necessary) to minimise visual impacts key viewing locations
- all lighting would be designed and installed in accordance with the requirements of standards relevant to *AS 4282-1997 Control of the Obtrusive Effects of Outdoor Lighting*
- detailed design of the facade would aim to minimise the bulk of the structure and incorporate transparent materials to maximise natural light into the building, and ensure that non-reflective materials are used for facades and finishes
- unnecessary loss or damage to vegetation partially affected or unaffected by the Proposal would be avoided by protecting trees prior to construction and/or trimming vegetation where possible to avoid total removal
- rehabilitation planting would be undertaken as early as possible to replace vegetation that provided screening to adjacent residential properties and sensitive visual receivers
- specifically designed lighting equipment would be used to minimise the upward spread of light near to and above the horizontal. Care would be taken when selecting luminaries to ensure that appropriate units are chosen and that their location will reduce spill light and glare to a minimum
- graffiti would be removed in accordance with TfNSW's standard requirements
- any areas of 'blank' wall would be softened by appropriate plantings and/or artwork to meet visual amenity and sustainability guidelines
- a landscape plan would be prepared for the proposed new elements. It would aim to provide some integration between the new structure and the existing vegetation and assist with providing a buffer from views from the west.

6.3 Noise and Vibration

An Environmental Noise and Vibration Impact Assessment has been undertaken by SLR Consulting Australia (SLR) for the Proposal (SLR, 2014). The findings of the assessment are summarised in this section.

6.3.1 Existing environment

Sources of noise in the vicinity of the Proposal are typical of a suburban centre affected by road and rail traffic. Existing sources of vibration in the immediate area would most likely be attributable to trains passing through the station. Sensitive receivers within close proximity to the Proposal include:

- residential receivers to the south east on Billabong Street and Bentley Lane, to the south on Stapleton Street and to the west on Wentworth Avenue and Bungaree Road
- commercial properties west and south of the Proposal on Bentley Lane, Pendle Way, Purdie Lane and Joyce Street, and to the north on Wentworth Avenue. The Pendle Inn is located to the north, opposite Pendle Hill Station.

Two nearby receivers were selected as locations to undertake noise monitoring as they were considered representative of the range of potentially highest impacted receivers. Accessibility and potential acoustic influences were also considered when selecting these locations.

SLR conducted operator-attended measurements on 3 November 2014, and continuous unattended noise monitoring for a period of a week in late October / early November 2014 at a residential dwelling (10 Billabong Street) and at the Pendle Inn (Figure 19). The noise measurements taken at this location were considered representative of the background noise level for neighbouring receivers and these levels have been used to inform the construction noise assessment.

As per the procedures outlined in the *Interim Construction Noise Guideline* (ICNG) (Department of Environment and Climate Change, 2009), background noise monitoring results were used to establish a Rating Background Level (RBL), which is then used for noise assessment purposes (Table 15). The existing average noise level (L_{Aeq}) represents the average noise level over the monitoring period. The background noise level (L_{A90}) represents the noise level exceeded for 90 percent of the monitoring period and is also referred to as the RBL.

A total of six indicative receivers were then included in the noise assessment to make a conservative prediction of potential noise impacts, utilising background monitoring data to set Proposal specific noise criteria (PSNC). Receivers are listed in Table 16 and in Figure 18.

Table 15: Summary of existing ambient noise levels (SLR, 2014)

Location	Period	Measurement parameter (dBA)	
		Rating Background Level (L_{A90})	Equivalent Continuous Level (L_{Aeq})
M1	Daytime	40	55
	Evening	39	53
	Night time	35	51
M2	Daytime	46	59
	Evening	40	56
	Night time	37	52

Note: Daytime: 7am to 6pm, Evening 6pm to 10pm and Night time 10pm to 7am

Table 16: Representative noise receivers (SLR, 2014)

Receiver	Address	Description
R1	2–12 Bentley Lane	Residential apartments, three storey
R2	158 Bentley Lane	Commercial, two storey
R3	9 Joyce Street	Commercial, single storey
R4	115–117 Stapleton Street	Residential apartments, three storey
R5	223 Wentworth Avenue	Pendle Inn, two storey
R6	213 Wentworth Avenue	Residential, single storey

Figure 18: Potential receivers within vicinity of the Proposal (SLR, 2014)

6.3.2 Associated policies and guidelines

Construction phase noise

Proposal specific noise criteria (PSNC) have been developed for receivers as per the procedures in the ICNG.

The ICNG prescribes levels for certain receiver types such as commercial premises and a method for establishing noise management levels for residential receivers (RBL + 10 dBA for standard construction hours; and RBL + 5dBA for out of hours). The 'highly noise affected' levels for residential receivers is 75 dBA. Sleep disturbance noise goals have also been established for residential receivers which are 50 dBA (R1 and R4) and 52 dBA (R5 and R6). The PSNC for the Proposal are outlined in Table 17.

Table 17: Proposal Specific Noise Criteria for the Proposal (SLR, 2014)

Receiver	Standard construction hours (LAeq, 15 min)	Out of hours (LAeq, 15 min)		
		Daytime	Evening	Night time
R1 – residential	50 dBA	45 dBA	44 dBA	39 dBA
R2 – commercial	70 dBA		N/A	
R3 – commercial	70 dBA		N/A	
R4 – residential	50 dBA	45 dBA	44 dBA	39 dBA
R5 – commercial/ hotel*	60 dBA external 50 dBA internal	60 dBA	60 dBA	45 dBA
R6 – residential	56 dBA	51 dBA	45 dBA	42 dBA

* Design noise level specified in AS 2107 for Bars and Lounges

Construction phase vibration

Human response

Assessing Vibration: A Technical Guideline (Department of Environment and Conservation, 2006) presents preferred and maximum vibration values for use in assessing human responses to vibration. The guideline provides acceptable values for intermittent vibration in terms of vibration dose values (VDV). The method for calculating VDV is presented in Section 4.5.1 of the Environmental Noise and Vibration Impact Assessment (SLR, 2014).

The acceptable VDV are presented in Table 18.

Table 18: Acceptable vibration dose values for intermittent vibration (SLR, 2014)

Location	Daytime		Night-time	
	Preferred value	Maximum value	Preferred value	Maximum value
Residences	0.20 mm/s$^{1.75}$	0.40 mm/s$^{1.75}$	0.13 mm/s$^{1.75}$	0.26 mm/s$^{1.75}$

Human perception

The human perception intermittent vibration dose levels at residences for the Proposal are set out in British Standard BS 6472-1998 *Evaluation of human exposure to vibration in buildings (1-80Hz)*, and presented in Table 19.

Table 19: Human perception values for intermittent vibration (SLR, 2014)

Location	Vibration dose values (mm/s$^{1.75}$)		
	Low probability of adverse comment	Adverse comment possible	Adverse comment probable
Residential building, day (7am to 11pm)	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential building, night (11pm to 7am)	0.13	0.26	0.51

Building response

British Standard BS 7385: Part 2-1993 *Evaluation and measurement for vibration in buildings Part 2* provides criteria against which the likelihood of building damage from ground vibration can be assessed. The conservative 'minimal risk of cosmetic damage' criterion has been adopted for the Proposal and is shown in Table 20.

Table 20: Transient vibration guide values – minimal risk of cosmetic damage (SLR, 2014)

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures – industrial or heavy commercial buildings	25mm/s at 4 Hz and above	
Unreinforced or light frames structures – residential or light commercial buildings	7.5 mm/s at 4 Hz, increasing to 10 mm/s at 15 Hz	10 mm/s at 15 Hz increasing to 25 mm/s at 40 Hz and above

6.3.3 Potential impacts

Construction phase noise

In order to quantify the noise emissions from the proposed construction works, spreadsheet noise calculations have been undertaken to predict the $L_{Aeq(15minute)}$ noise levels at the nearest sensitive receivers. The calculations include the source noise levels of the anticipated equipment, the location of the nearest sensitive receivers, the number of plant items likely to be operating at any given time and the distance between the equipment and the receivers.

In practice, noise levels will depend on the number of plant items and equipment operating at any one time and their precise location relative to the receiver of interest. Noise levels will vary due to the movement of plant and equipment about the worksites and the concurrent operation of plant. In some cases, reductions in noise levels will occur when plant are located in cuttings or behind embankments, buildings or other items of equipment.

A summary of predicted noise levels for the envisaged plant and equipment during various stages of the Proposal for standard construction hours at each of the six receivers is provided in Appendix 3.

From the assessment, it is likely that there would be exceedances of the daytime PSNC at all receivers at various stages of the Proposal for works undertaken during standard construction hours, however noise levels would be less than the ICNG 'highly affected' criteria of 75 dBA at residential receiver locations for a worst case scenario. Residential receivers close to the railway on the western side (around R1) are likely to be most affected with exceedances of around 20 dBA above the PSNC for the noisiest activities. The worst exceedance for a residential receiver (23 dBA) is predicted to occur at Bentley Lane (R1) during the relocation works for the taxi rank.

The Proposal would also involve the use of a construction compound located in an existing laydown area west of Wentworthville Station. Construction noise resulting from the use of this compound has been assessed in the Wentworthville Station Easy Access Upgrade REF (TfNSW, 2014).

In relation to construction traffic noise, the construction movements associated with the Proposal are considered to be an insignificant additional contribution to the ambient noise environment.

Any impacts associated with these works would be temporary and do not represent a permanent impact on the community and surrounding environment.

In order to minimise the potential noise and vibration impacts upon nearby sensitive receivers, most construction works are proposed to be undertaken during standard daytime construction periods (7am to 6pm Monday to Friday and 8.00 am to 1.00 pm on Saturdays).

However, some works outside of standard hours would be required during evening, night periods and weekends during track possessions, and for key activities (including partial closures of on-street parking in Joyce Street and Wentworth Avenue) to minimise impacts to commuters and pedestrians. Any out of hours works (OOHW) would be subject to a separate assessment on a case-by-case basis and would require approval by TfNSW and appropriate community notification. It is estimated that a total of eight possession periods would be required for the Proposal.

Some noise from construction sites is inevitable, such that the ICNG focuses on minimising construction noise impacts, rather than only on achieving numeric noise levels. These results and noted exceedances identify that best-practice construction noise management and control techniques would be required to reduce noise levels as far as practicable. To minimise impacts additional noise control, mitigation and management measures are also warranted. These would be implemented in conjunction with a community and stakeholder consultation and notification processes.

TfNSW has developed its own best-practice techniques for managing construction noise and vibration, and implementing feasible and reasonable mitigation measures. These are documented in the TfNSW Construction Noise Strategy which also identifies the thresholds by which impacts can be qualified and the level of mitigation and management required for each stage of works. These thresholds also identify the level of community consultation required. The mitigation and management measures provided by TfNSW are consistent with the intent and recommendations of the INCG developed for managing construction noise and vibration, and implementing feasible and reasonable mitigation measures.

In accordance with the requirements of the ICNG and the TfNSW Construction Noise Strategy suitable mitigation measures, which can be practically implemented on site, are provided in Section 6.3.4. Construction noise levels would be reduced and impacts minimised with the successful implementation of these recommendations. Impacts may not be reduced to negligible levels for all receptors during all construction activities;

however the recommendations are designed to ensure that any residual impacts are minimised as far as is practically achievable.

Construction phase vibration

The proposed activities either contain plant items that are not significantly vibration intensive or the separation distance from the nearest receivers is sufficient to mitigate the potential impact ts.

As a guide, safe working distances for typical items of vibration intensive plant are listed in Table 21. The safe working distances are quoted for both cosmetic damage (refer British Standard BS 7385) and human comfort (refer British Standard BS 6472). The safe working distances must be complied with at all times, unless otherwise approved by the relevant authority.

Table 21: Recommended safe working distances for vibration intensive plant

Plant Item	Rating/description	Safe working distance	
		Cosmetic damage (BS 7385)	Human response (EPA Vibration Guideline)
Vibratory roller	< 50 kN (Typically 1–2 tonnes)	5 m	15 m to 20 m
	< 100 kN (Typically 2–4 tonnes)	6 m	20 m
	< 200 kN (Typically 4–6 tonnes)	12 m	40 m
	< 300 kN (Typically 7–13 tonnes)	15 m	100 m
	> 300 kN (Typically 13–18 tonnes)	20 m	100 m
	> 300 kN (> 18 tonnes)	25 m	100 m
Small hydraulic hammer	(300 kg – 5 to 12t excavator)	2 m	7 m
Medium hydraulic hammer	(900 kg – 12 to 18t excavator)	7 m	23 m
Large hydraulic hammer	(1600 kg – 18 to 34t excavator)	22 m	73 m
Vibratory pile driver	Sheet piles	2 m to 20 m	20 m
Pile boring	≤ 800 mm	2 m (nominal)	N/A
Jackhammer	Hand held	1 m (nominal)	Avoid contact with structure

Cosmetic damage assessment

The separation distance(s) between the proposed works and the nearest receivers would typically be sufficient to ensure that the nearby buildings are unlikely to fall within the safe working distances with regard to cosmetic damage for most of the proposed construction equipment.

Pendle Hill Station is identified as being of heritage significance. At this stage in the proposal, the construction vibration assessment of these heritage buildings is considered in the same manner as other buildings along the proposal area in close vicinity to the works (i.e. judicious selection of plant and equipment would be necessary for vibration intensive activities) due to the potential for vibration impacts from construction works.

It is recommended that during the later stages of the design process, building surveys of sensitive structures within this property are carried out in order to assess the potential for increased susceptibility to building damage from vibration. Should these buildings be considered more susceptible to vibration, reduced vibration criteria levels may be applicable and subsequently adopted during the selection process for suitable equipment to be used in the vicinity of these buildings.

Human comfort vibration assessment

In relation to human comfort (response), the safe working distances in Table 21 relate to continuous vibration and apply to residential receivers. For most construction activities, vibration emissions are intermittent in nature and for this reason, higher vibration levels, occurring over shorter periods are permitted, as discussed in BS 6472-1.

Construction vibration levels at the nearest residential receivers are unlikely to be perceptible during the works. The separation distance from the nearest residential receivers is sufficient to mitigate the potential impacts, and as such have not been considered further in this assessment.

No exceedances of the human comfort vibration levels are therefore anticipated for these works.

Operational phase

Operational activities at Pendle Hill Station are not proposed to significantly change 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 four lifts, lighting and electrical and communications equipment including security cameras. Mechanical plant required for operation of the lift would be identified during detailed design would be selected in order to achieve the acceptable noise levels identified in the *NSW Industrial Noise Policy* (EPA. 2000) and would be free from annoying sound characteristics such as tonality, low frequency, impulsive and intermittent noise.

6.3.4 Mitigation measures

The following mitigation measures are proposed to manage noise and vibration impacts:

- 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, 2012a) and the Noise and Vibration Impact Assessment for the Pendle Hill Station Accessibility Upgrade (SLR, 2014). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.
- Works would 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. An Out of Hours Work approval would need to be obtained from TfNSW for any works outside normal work hours.

- Works would be carried out in accordance with the requirements of the *TfNSW Construction Noise Strategy* (TfNSW, 2012a), ICNG and the Noise and Vibration Impact Assessment for the Pendle Hill Station Accessibility Upgrade (SLR, 2014).
- During detailed design, building surveys of sensitive structures within the heritage listed station would be carried out in order to assess the potential for increased susceptibility to building damage from vibration. Should any buildings be considered more susceptible to vibration, reduced vibration criteria levels may be applicable and subsequently adopted during the selection process for suitable equipment to be used in the vicinity of these buildings.
- To reduce the construction noise impact from human activities, reasonable and feasible noise mitigation options should be considered, including:
  - 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
  - using only the equipment necessary for the upgrade works at any one time
  - 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 possible
  - 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 on site. No dropping of materials from height where practicable, throwing of metal items and slamming of doors.
- To reduce the construction noise and vibration impacts from mechanical activities, reasonable and feasible noise mitigation options should be considered, including:
  - maximising the offset distance between noisy plant and adjacent sensitive receivers
  - 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-"beeper" reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms for all plant and vehicles regularly used on site (greater than one day)
  - 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.

- 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.
- Where the $L_{Aeq(15minute)}$ construction noise levels are predicted to exceed 75 dBA, respite periods would be considered in accordance with the ICNG.

6.4 Indigenous Heritage

A search of OEH's AHIMS Web Services (Aboriginal Heritage Information Management System) was undertaken on 24 September 2014. This search indicated that no Aboriginal sites are recorded in or near the Proposal, and no Aboriginal places have been declared in or near the Proposal.

The Proposal is located in an area that has been highly modified for a range of uses. The site has low archaeological potential and therefore it is considered unlikely that any Indigenous heritage items would be located in the vicinity of the proposal, due to the past history of disturbance.

6.4.1 Potential impacts

Construction phase

As no known Indigenous heritage items are located in the vicinity of the proposal and the potential for unknown items is low, the proposal is considered unlikely to affect Indigenous heritage during construction.

Operational phase

As no known Indigenous heritage items are located in the vicinity of the proposal works and the potential for unknown items is low, the proposal is unlikely to affect Indigenous heritage during operation.

6.4.2 Mitigation measures

The following mitigation measures are proposed to manage impacts to indigenous heritage:

- all construction staff would receive basic training in the recognition of Aboriginal 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.
- if indigenous objects are located during works, all works must stop in the vicinity of the find, and the NSW Office of Environment and Heritage, LALC and an archaeologist would be notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained before works recommence.

6.5 Non-indigenous Heritage

A Statement of Heritage Impacts (SoHI) was prepared by Artefact in November 2014 to assess the potential heritage impacts associated with the Proposal. The following is a summary of the results of the investigation.

6.5.1 Existing environment

A search of heritage registers for heritage items located within proximity to the Proposal was undertaken and indicated that Pendle Hill Railway Station Group is heritage listed on the Sydney Trains section 170 register (Database no. 4800257) and HELP 2013 (LEP no. 96).

No other heritage items were identified.

Pendle Hill Station

The Pendle Hill Station was completed in 1943 following the quadruplication of the Main Western Line (MWL) through this area in 1942. Prior to this, the area was occupied by a 1924 Pendle Hill Station which consisted of two concrete platforms, two waiting sheds, a booking office water closet and hut. The 1924 station was directly associated with George A Bond, founder of the Bonds clothing brand. Bond had requested a platform near his Wentworthville Spinning Mills for Bonds employees. The 1924 Pendle Hill Station was demolished to make way for the existing Pendle Hill Station and no aspects of this station remain.

Pendle Hill Station currently comprises of two brick faced island platforms. Each platform consists of a concrete deck with top surfaces of the platforms covered in asphalt. Platform resurfacing took place in 2010. The platforms are occupied by modern timber bench seating, aluminium palisade fencing, signage and lighting.

The station building on platform 1/2 is designed in the Inter War Stripped Functionalist style. It is considerably larger than the station building on platform 3/4. The building has a faced brick exterior façade and low pitched gable roof. Each end of the building has brick parapets with courses of recessed heeler bricks capped by a course of bullnosed brick. The western end of the building is defined by a curved masonry bay with a single door. The roof is clad with Colorbond which extends out as an awning on all four sides of the building. The awnings on the eastern side of the station, where the ticket window and machine is located, are supported by two rectangular brick columns with curved corners. Steel framed windows are located around the building, each with three horizontal hopper panels. These are placed at regular intervals along each platform elevation.

The internal configuration of the building has a linear floor layout consisting of a series of rooms of various sizes. The easternmost room is currently a Booking Office and staff area at the easternmost (formerly a booking/parcels office). Rooms to the west (in order) are a general waiting room, ladies room and bathrooms, men's bathrooms and a store room. Doors to each room are secured by metal grill gates, while windows are covered in security mesh. The description for the listing states that the entire original fit out was removed in 1997. The booking office contains an older style cast iron safe. The safe is fixed to a concrete base. The booking office on Platform 3/4 contains an older style built-in timber counter.

Like the Station Building on Platform 1/2, the station building on platform 3/4 is designed in the Inter War Stripped Functionalist style. It is approximately half the size of the Platform 1/2 building and was constructed with a face brick façade and a low pitched gable roof with Colorbond awnings. The building has parapets at each end with courses of recessed heeler bricks capped by a course of bullnosed bricks. Each parapet has an Art Deco style projecting vertical masonry fin constructed with dual toned heeler bricks. Each parapet is centrally located and steps down from the fin. The awning over the eastern side of the building, where two ticket windows were once located, is supported by two rectangular brick columns with curved corners. The former ticket windows are now blocked. Early timber doors are extant. Standard steel framed windows are located at regular intervals around the building and contain vertically proportioned horizontal

hopper panels. A contemporary canopy connects the station building from the underside of the original Colorbond awning to the stairs and footbridge. The internal fit out to the building was removed in 1997.

The footbridge was completed in 1944 and consists of a steel beam structure with a concrete deck and RSJ steel supports. Two sets of stairs lead off the footbridge down to each platform while ramps extend down to street level at the Joyce Street and Wentworth Avenue entrances to the station. The footbridge and associated stairs and ramps are covered with Colorbond awnings. Painted steel balustrades run along either side of the footbridge and stairwell. Flooring within the footbridge consists of blue rubber tiles.

A small kiosk is located opposite the stairs leading toward Platform 1/2. The kiosk sits on a cantilevered concrete slab and is supported by steel trestles. Originally, the kiosk was timber clad with a skillion roof. Today the kiosk consists of metal cladding, has a gable roof and is currently not in use.

6.5.2 Potential impacts

Archaeological potential

The site inspection revealed that the rail corridor appears to have been cut down and levelled to the north of the Joyce Street car park (south of the study area). In addition, further disturbance appears to have taken place to the north of the rail corridor, where Wentworth Street is located. This area is associated with a car park and it appears as though the natural landform has been cut down to accommodate this item.

The location of the proposed new station operations area is currently occupied by a garden bed containing mature trees and plantings. The area around the garden bed consists of a paved pedestrian footpath sitting slightly below the level of the rail corridor. It is likely that this area underwent substantial levelling and disturbance during the development of this portion of Joyce Street.

The study area has undergone high levels of disturbance since the establishment of the MWL, addition of the 1924 Pendle Hill Station, quadruplication of the MWL in 1943 and subsequent establishment of the 1943 Pendle Hill Station.

In addition, there is no available information suggesting that the study area was associated with structures prior to the construction of the MWL in 1883.

Therefore, it is unlikely archaeological remains of the former 1924 Pendle Hill Station, including remains of platforms, structures, tracks and other associated infrastructure will exist within the area of the proposed works.

Impact on Pendle Hill Station

The Proposal would involve modifications to the heritage listed Pendle Hill Station. Key elements of these works that have the potential to impact on the heritage value of Pendle Hill Station include:

- the addition of a new station operations area, communications equipment room and footbridge, lifts and stairs
- partial demolition of the existing 1943 footbridge
- upgrades to existing station buildings
- upgrades to Joyce Street and Wentworth Avenue.

Table 22 assesses the extent of the impact to Pendle Hill Station of each of these elements.

Table 22: Impact of the Proposal on heritage items

Proposed work	Visual Impact	Impact to fabric	Archaeological impacts	Listing
Addition of a new station operations area, communications equipment room and footbridge, lifts and stairs.	Major	Moderate	None	HLEP 2013 Sydney Trains s170
Partial demolition of the existing 1943 footbridge	Moderate	Moderate	None	HLEP 2013 Sydney Trains s170
Upgrades to existing station buildings	Minor	Minor	None	HLEP 2013 Sydney Trains s170
Upgrades to Joyce Street and Wentworth Avenue	Minor	Minor	None	n/a

The proposal would involve the removal of the two existing ramps leading to the footbridge between Wentworth Avenue and Joyce Street. These ramps are associated with the original 1943 station and their removal would have a detrimental impact on the heritage significance through the removal of an element of the original fabric associated with the station precinct as well as impacting views and vistas to and from the study area.

The existing ramps and footbridge are non-compliant with the *Disability Discrimination Act 1992* and the ongoing use of the existing footbridge and ramps would not meet the objectives of the Proposal. The Proposal attempts to mitigate this loss through the retention of the portion of the original footbridge between platforms 1/2 and 3/4 and the platform stairs. This is considered to be a moderate impact to the heritage fabric of the station.

The new concourse and associated infrastructure including, lifts, stairs and canopies would have an adverse impact on the original built landscape of the station precinct as well as views and vistas towards the study area. The location of the Proposal would result in views east from the existing station buildings being compromised. These items would detract from the original context and historical characteristics of the station.

The design of the Proposal should aim to be as sympathetic as possible to the existing character of the study area in order to minimise visual impacts. The Pendle Hill Station is designed in the Inter-War Period Stripped Functionalist style, and additional items should echo these architectural philosophies by incorporating minimalist designs and similar colour schemes to those associated with the precinct today. For example, the use of unobtrusive, modern, light materials, such as glass panelling and slim frame elements would reduce the bulk of the Proposal, reducing the visual impact of the additional items.

Works to the existing station buildings would be confined to areas that have been modified in the recent past and are not considered to consist of original fabric associated with the 1943 structures. Works to the exterior of the buildings would have minor impacts to the heritage fabric of the station.

Works to Joyce Street and Wentworth Avenue would have little to no impact on the heritage significance of the Proposal site.

The Proposal would retain the original 1943 station buildings, 1943 platforms, 1942 rail corridor alignment and the stairs and footbridge between Platforms 1/2 and 3/4. Therefore major elements associated with the heritage significance of the item would remain part of the station precinct. In addition, the proposal would allow for increased public access to the station and its heritage listed buildings.

6.5.3 Mitigation measures

The following mitigation measures are proposed to manage impacts to non-indigenous heritage:

- The detailed design of the Proposal would aim to be as sympathetic as possible to the existing character of the study area in order to minimise visual impacts. Pendle Hill Station is designed in the Inter-War Period Stripped Functionalist style, and additional items should echo these architectural philosophies by incorporating minimalist designs, curved corner details and horizontal lines, and respond to the existing colour schemes and material palette to those associated with the precinct today. For example, the use of unobtrusive, modern, light materials, such as glass panelling and slim frame elements would reduce the bulk of the Proposal, reducing the visual impact of the additional items
- Opportunities to retain and/or create visual gaps in views between old and new fabric (e.g. new awnings and canopies) would be investigated during detailed design
- Detailed design will include identification of existing heritage features within the existing platform buildings for conservation, and internal alterations are to be guided by the advice of the heritage architect
- During detailed design, a heritage interpretation strategy would be developed which provides information on the heritage of the area. This would include heritage interpretive signage in relation to the removed ramps. Interpretive signage would be positioned in an area regularly used by Pendle Hill Station commuters and placed in a logical context associated with the location of the ramps and the station precinct. For example, signage could be located near the existing station buildings, facing the footbridge, or within the portion of the footbridge proposed to be retained.
- Archival recording of the ramps and their relationship to the surrounding station precinct would be undertaken in accordance with Heritage Division Guidelines prior to the proposed works commencing to mitigate impacts to the heritage significance of the study area.
- A suitably qualified and experienced heritage architect will be engaged to provide input to, and review of the detailed design of the Proposal.
- In the event that any unanticipated archaeological deposits are identified within the project site during construction, work likely to impact on the deposit would cease immediately and a suitably qualified heritage consultant would be contacted and directed by TfNSW. 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.
- A heritage induction would be provided to workers before construction begins, informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction.
- Non-indigenous heritage items would be identified on the construction contractor's environmental constraints maps.

6.6 Socio-economic impacts

6.6.1 Existing environment

Pendle Hill is a suburb within both the Holroyd and Parramatta local government areas in the West Central Subregion (WCS) and is located approximately 30 kilometres west of the Sydney CBD. The *West Central Subregional Strategy* describes the Pendle Hill precinct as containing a mix of new Employment Lands releases, with some older stock industrial developments. The prevailing uses are mixture of urban services and light manufacturing. These include automotive repairs and building material suppliers. There is also a concrete batching plant within the precinct. The precinct is well established and economically viable.

The West Central Subregional contains the second largest CBD in Sydney, Parramatta, as well as Sydney Olympic Park which boasts sporting and major event facilities of a world class standard. The subregion is considered to have a strong specialisation in key industries such as manufacturing, wholesaling, transport, storage, construction trade services, motor vehicle retailing and servicing. With the development of corporate centres, such as Parramatta, there is also significant growth in the number of managers, administrators and professionals is experiencing considerable growth. It is anticipated that by 2031, the number of jobs in the subregion will have increased by 61,000 jobs (20%) of which 27,000 are expected to be within the Parramatta LGA and 1,000 in the Holroyd LGA.

The Proposal is situated within Pendle Hill town centre which is characterised as a commercial centre containing a large supermarket, discount stores, grocery shops, speciality shops, real-estate agent, bank, and several cafes, fishmarkets and butchers.

6.6.2 Potential impacts

Construction phase

The Proposal has the potential to impact commercial and residential uses within the vicinity of the works through:

- noise and vibration impacts
- minor delays on the adjacent road network
- temporary displacement of parking should road closure be required
- changes to access arrangements including pedestrian diversions.

Construction activities would predominantly be confined to within the site and the adjoining roadway. Residents, businesses, Council and Sydney Trains would be notified of the works and where practicable consulted with regards to staging and timing, road closures and any required detours.

Construction could potentially require at times the temporary closure of Joyce Street, Pendle Way and Wentworth Avenue. While this would be undertaken outside of peak retail trading periods, this would result in access constraints and the temporary displacement of parking. This could have the potential to impact upon nearby businesses.

Targeted consultation with nearby business would be undertaken throughout the duration of works. Signage would be provided with suitable notification to alert commuters and customers that access would be maintained and trading would be as normal.

No temporary acquisitions would be required for the construction stage of the Proposal.

Mitigation measures have been identified in Table 27 to minimise the potential for such impacts to occur.

Operational phase

The proposed parking arrangements would result in the potential loss of approximately 12 restricted parking spaces along the northern side of Joyce Street to accommodate the following:

- approximately 10 commuter parking spaces
- two accessible parking spaces (including one relocated).

The restricted parking appears to be moderately utilised and with its conversion to commuter car park would result in any such demand being redistributed amongst the other restricted parking areas. The parking demand surveys, albeit during the morning and afternoon periods show that there is adequate capacity to accommodate this change.

The longer term social and economic impacts of the proposal would be positive for both residents and businesses of Pendle Hill, and particularly for commuters who frequent Pendle Hill Railway Station.

There would be an improvement in the accessibility of Pendle Hill Station for commuters as well as an improvement in safety and access for pedestrians. It is likely that such initiatives would help to encourage more people to use public transport.

As a result, it is expected that the Proposal would have a potential positive impact on nearby businesses.

No property acquisition would be required as a result of the Proposal.

6.6.3 Mitigation measures

Refer to Sections 6.1, 6.2 and 6.3 for discussion on the potential traffic, transport, visual and noise impacts arising from construction of the Proposal. Section 7.2 identifies a number of environmental safeguards to minimise these potential impacts.

- the proposed sustainability criteria for the project would encourage the contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal
- the community liaison plan (refer to Section 5) would identify all potential stakeholders and the methods for consultation with these groups during construction
- the community would be kept informed of construction progress, activities and impacts in accordance with a community liaison plan to be developed by the contractor prior to construction
- 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

A Flora and Fauna Assessment for the proposed area was undertaken by Biosis Pty Ltd in November 2014. The following is a summary of the results of the investigations.

6.7.1 Existing environment

Flora

Narrow strips of vegetation are present, located mostly along both sides of the fence lines on either side of the rail corridor. These areas were found to mostly comprise planted vegetation or environmental weeds south of the rail corridor. North of the rail

corridor, inside the RailCorp fence and west of the existing ramp, an area containing several indigenous native plants and trees is likely to be a small remnant of the natural vegetation of the local area. All areas were highly influenced by edge effects, particularly environmental weeds.

Northern side of rail corridor

To the east of the existing ramp along the footpath, some relatively recent paving and landscaping has been carried out comprising a row of small-leaved Lillypillies (*Syzygium sp.*) about 4 m in height and some
Mat-rushes (*Lomandra sp*). Narrow bands of vegetation are present within the RailCorp fence. Under the ramp, a row of dead Grevilleas (probably Grevillea "Robyn Gordon") and some Purple Lantana (*Lantana montevidensis*) is present.

To the west of the ramp and within the RailCorp fence, there are two large Forest Red Gum trees (*Eucalyptus tereticornis*) about 14 m in height and 40 cm diameter at breast height (DBH) that have had their northern branches lopped due the present of powerlines as well as several smaller saplings. At ground level there are low dead stumps of other large trees. This area includes a mix of Australian and exotic plant species such as African Olive (*Olea europaea subsp. Cuspidate*), Narrow-leaved Cotton Bush (*Gomphocarpus fruticosus*), Fleabane (*Conyza sp.*), Paddy's Lucerne (*Sida rhombifolia*) and Cobblers Pegs (*Bidens pilosa*).

West of the Forest Red Gums the vegetation comprises entirely exotic grasses and environmental weeds, including Spear Thistle (*Cirsium vulgare*), Lambs Tongues (*Plantago lanceolata*), Cobblers Pegs, Fleabane, Black Nightshade (*Solanum nigrescens*) and Flatweed (*Hypochoeris radicata*).

Southern side of rail corridor

No vegetation is present inside the RailCorp fence west of the base of the ramp but Ivy (*Hedera sp.*) is growing on the fence. In a derelict garden area at the end of Pendle Way, two large Pepper Trees (*Shinus ariera*) and Murrayas (*Murraya paniculata*) with Mat-rushes (*Lomandra sp.*) present at ground level.

Adjacent to the ramp and outside the RailCorp fence, a row of Bottlebrushes (*Callistemon sp.*) around 4 m in height are present along with a small Camphor Laurel (*Cinnamomum camphora*). Further east and adjacent to the ramp, a row of three large planted She-oaks (*Casuarina equisetifolia*) around 12 m in height and 30–40 cm DBH. Several large branches have been lopped due to the presence of overhead power lines. East of the She-oaks, a row of nine large Tallowwood (*Eucalyptus microcorys*) trees have been planted and now reach to about 10 m in height and 30-40 cm DBH. These have also been lopped due to the overhead power lines. A few small shrubs are present under the Tallowwoods comprising a Bottlebrush, a small Camphor Laurel and a Large-leaved Privet (*Ligustrum lucidum*). Two smaller She-oaks around 3 m in height are also present here.

Inside the rail fence a few scattered garden plants and environmental weeds are present such as; Large-leaved Privet, Oleander, a small Long-leaved Wattle (*Acacia longissima*), Paddy's Lucerne, Narrow-leaved Cotton Bush, Paspalum (*Paspalum dilatatum*).

Fauna and fauna habitat

A few large, mature trees with some fauna habitat value are present within the study area. These comprise the two large Forest Red Gums on the north side of the rail corridor and the large Tallowwoods on the south side, which may provide nectar resources, However the periodic lopping of all these trees, due to the close proximity of power lines, will over time disfigure the trees. The ramps, steps and concourses do not contain suitable cracks or holes that could be used by fauna species such as micro-bats or native birds.

A Noisy Miner (*Manorina melanocephala*) was the only fauna species observed within the study area. However, a nest was identified under the roof of the existing concourse. This is expected to be from a Common Myna (*Acridotheres tristis*) or Common Starling (*Sturnus vulgaris*).

Endangered Ecological Communities

Sixteen Threatened Ecological Communities have been recorded or are predicted to occur within 5 km of the study area. However, based on regional vegetation mapping of the Cumberland Plain (NPWS, 2002), remnants of four identifiable native vegetation communities comprising three TEC have been mapped near the study area:

- Shale Plains Woodland (Cumberland Plain Woodland, Critically Endangered Ecological Community, TSC Act and EPBC Act).
- Shale Hills Woodland (Cumberland Plain Woodland, Critically Endangered Ecological Community, TSC Act and EPBC Act).
- Alluvial Woodland (River-flat Eucalypt Forest of the NSW North Coast, Sydney Basin and South-east Corner Bioregions, Endangered Ecological Community, TSC Act).
- Shale-Sandstone Transition Forest – High Sandstone influence (Shale-Sandstone Transition Forest, Endangered Ecological Community, TSC Act).

The long history of urbanisation in the Pendle Hill area means that intact remnants of these native vegetation communities are considered scarce and therefore listed as Threatened Ecological Communities under NSW and/or Commonwealth legislation. No native vegetation communities are mapped as present within the Pendle Hill Railway Station study area.

During site investigation, four flora species were detected within proximity to each other, all of which are considered to be elements of one or more Endangered Ecological Communities as listed on the TSC and EPBC Acts.

The two large Forest Red Gum trees and three smaller Forest Red Gum saplings were identified on the northern side of the rail corridor, within the RailCorp fence and to the west of the ramp. The Forest Red Gum comprises part of the Cumberland Plain Woodland, River-flat Eucalypt Forest and Shale-Sandstone Transition Forest Endangered Ecological Communities. It is possible that these trees may be a remnant of one of those vegetation communities in the local area.

Within the same area, a large Blackthorn Bush (Bursaria spinosa), Hickory Wattle (*Acacia implexa*) and some False Sarsaparilla (*Hardenbergia violacea*) plants were also identified each of which forms part of an Endangered Ecolgoical Community. Hickory Wattle comprises part of the local Cumberland Plain Woodland and Shale-Sandstone Transition Forest. The Blackthorn and the False Sarsaparilla are both listed species of all the Cumberland Plain Woodland, River-flat Eucalypt Forest and Shale-Sandstone Transition Forest.

Threatened Species

No threatened species were identified during the Pendle Hill Station site assessment. A summary of threatened fauna species identified in a desktop assessment with a medium or higher likelihood of occurring in the study area is provided in Table 23.

Table 23: Threatened species

Species Name	Legislation	Section of the study area providing habitat
Grey-headed Flying-fox	EPBC Act, TSC Act	The Grey-headed Flying fox May forage on Forest Red Gums and Tallowwoods during flowering period. The Proposal is considered unlikely to alter any foraging habitat.
Eastern Bentwing Bat	TSC Act	The Eastern Bentwing Bat May forage while flying over the site. The Proposal is considered unlikely to alter any foraging or roosting habitat
East Coast Freetail Bat	TSC Act	The East Coast Freetail Bat May forage while flying over the site.
Little Lorikeet	TSC Act	The Little Lorikeet may forage on Forest Red Gums and Tallowwoods during flowering period. The Proposal is considered unlikely to alter any foraging habitat.

Noxious Weeds

Four weed species listed as noxious on the *Noxious Weeds Act* within the Holroyd and Parramatta Local Government Areas were identified within the site including; Green Cestrum, Asparagus Fern, Lantana and Large-leaved Privet. These species should be managed in accordance with the NW Act.

6.7.2 Potential impacts

Flora

The Proposal would result in the removal of 3 trees (refer to Table 24) with the potential to remove another 12 depending on the detailed design (refer to Table 25). These trees appear to have been planted for landscape purposes and therefore do not constitute a particular native vegetation community. Figure 20 illustrates the location of the trees outlined in Table 24 and 25.

Table 24: Trees to be removed as part of the Proposal

Tree number (Figure 20)	Quantity	Species	Common name	Height	Offset required if removed (per tree)	Note
3	2	*Shinus ariera*	Pepper Tree	5m	4	To be removed
4	1	*Ulmus parvifolia*	Chinese Elm	4m	4	To be removed

Table 25: Trees potentially requiring removal as part of the Proposal (pending detailed design)

Tree number (Figure 20)	Quantity	Species	Common name	Height	Offset required if removed (per tree)	Note
1	3	*Casuarina equisetifolia*	She-oaks	12 m	4	Potential removal
2	9	*Eucalyptus microcorys*	Tallowwoods	10 m	4	Potential removal

The only locally endemic native vegetation within the study area comprises the group of Forest Red Gums and other plants located in a narrow corridor west of the ramp on the north side of the rail corridor and separated from the proposed works by the existing RailCorp boundary fence. As a result this vegetation would not be impacted by the Proposal.

There is no potential habitat for any of the 16 threatened flora species known or predicted to occur within 5 km of the study area and the absence of these species was confirmed from the site inspection, as such there will be no impact on threatened flora species.

Vegetation offsets

TfNSW prepared a *Vegetation Offset Guide* (TfNSW, 2012e) to assist in meeting the biodiversity sustainability target and to provide a framework for a consistent approach to offset impacts to vegetation on applicable TfNSW projects. The following ratios for the provision of replacement trees were applied:

- eight trees for every tree with a DBH greater than 60cm
- four planted trees for every tree with a DBH of 15cm–60cm
- two trees for every tree with a DBH less than 15cm.

A minimum of 12 trees would need to be planted to compensate for the removal of three trees. An additional four trees would need to be planted per tree removed should any of the She-oaks or Tallowwoods require removal.

The Vegetation Offset Guide would be applied to the Proposal during detailed development of the landscape plan to identify any potential to offset within the bounds of the site. Additional offset vegetation planting would be planted at an alternative site in consultation with Council.

Noxious weeds

Due consideration would be given to the presence of the noxious weeds within the disturbance footprint including the appropriate disposal of noxious weed material cleared as a result of the Proposal, taking precautions to ensure that the proposed works do not result in their spread into new habitats.

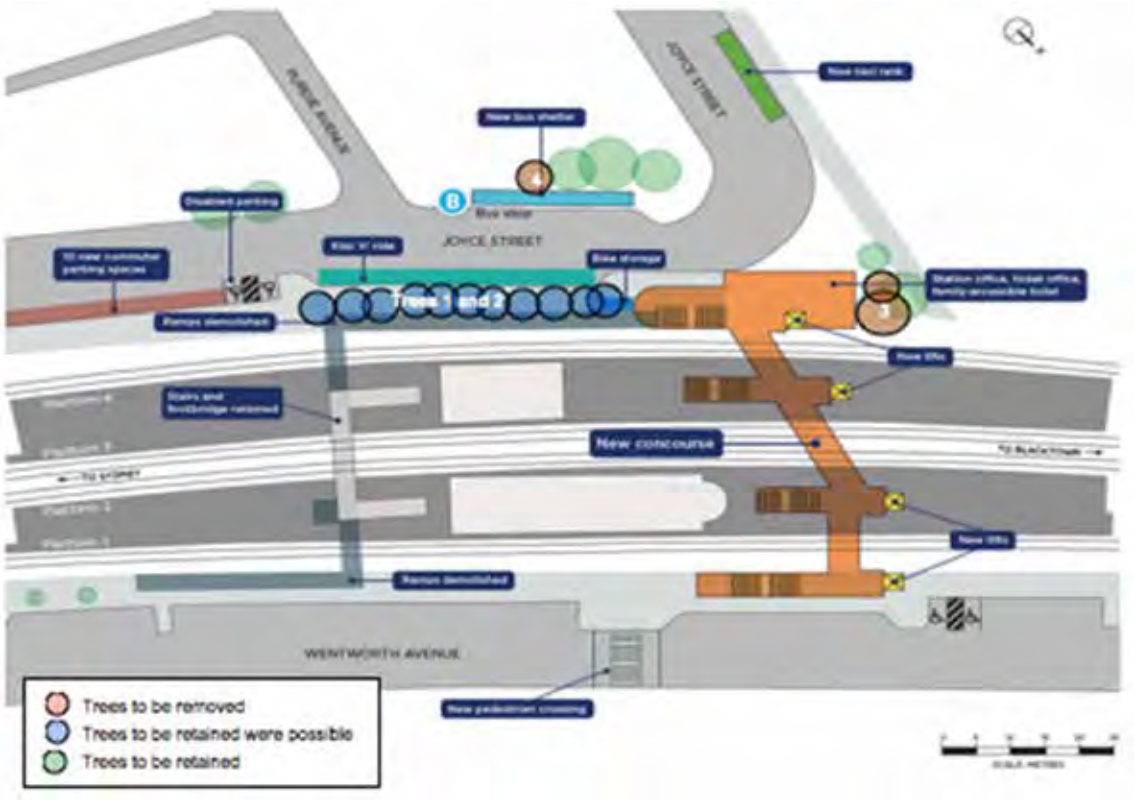

Figure 19: Vegetation impacts as a result of the Proposal

Fauna and fauna habitat

Due to the limited habitat available and lack of connectivity to other areas of habitat, overall diversity is expected to be low. The threatened Grey-headed Flying-fox and Little Lorikeet may visit the study area periodically to forage on the Forest Red Gums and Tallowwoods when flowering and some threatened micro-bat species may forage while flying over the study area as identified in Table 23. The proposal would have the potential to require the removal of the row of Tallowwoods adjacent to the existing ramp on the south side of the rail corridor. These losses are considered to result in a minor impact and as such do not require a formal impact assessment.

Built structures including buildings, stairs, ramps and concourses are present. These were found to provide little habitat for birds, micro-bats or other native fauna.

Two Koala feed tree species, as listed under SEPP No. 44, occur within the study area. Two large trees and several saplings of Forest Red Gum occur inside the RailCorp fence on the north side of the rail corridor and a row of nine large Tallowwoods occurs adjacent to the existing ramp on the south side of the rail corridor. The Tallowwoods are planted native trees, but not indigenous to the Sydney area. These trees may potentially be required to be removed for the Pendle Hill Station Easy Access Upgrade project (pending detailed design), however since the vegetated area to be cleared is far less than one hectare in area, SEPP 44 does not apply in this case.

6.7.3 Mitigation measures

The following mitigation measures are proposed to manage impacts to biodiversity:

- trees to be removed would be clearly demarcated on site prior to construction, to avoid unnecessary vegetation removal. Trees to be retained, particularly the Forest Red Gums, would be protected through exclusion fencing or Tree Protection Zones (TPZs) in accordance with Australian Standard AS4970-2009
- if roots are encountered during works near the Forest Red Gums, a qualified arborist will be engaged to advise on the best way to minimise risks to the long-term survival of the trees
- there would be no pedestrian or vehicular access to TPZs. No building activities should take place within the TPZ, including storage or stockpiling. Runoff from the site would not be allowed to enter the tree protection zones. Toolbox talks would inform workers of these zones and the restrictions applied
- in the event of any tree to be retained becoming damaged during construction, an arborist would be informed immediately to inspect and provide advice on remedial action where possible
- weed control measures would be developed and implemented by the CEMP to manage the 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
- vehicles and other equipment to be used on site would be cleaned to minimise seeds and plant material entering the site to prevent the introduction of further exotic plant species
- mulching and watering is required until plants are established
- disturbance of vegetation would be limited to the minimum amount necessary for the Proposal
- offsets and/ or landscaping would be undertaken in accordance with TfNSW Vegetation Offset Guidelines. Detailed design would see the landscape plan include provision of as much native vegetation within the Proposal as is feasible. Remaining vegetation to be offset would be undertaken in consultation with Council
- all workers would be provided with an environmental induction prior to commencing work on-site. This induction would include information on the protection measures to be implemented to protect vegetation and penalties for breaches
- should onsite works determine the removal or trimming of any additional trees, TfNSW Tree Removal Application Form would need to be completed and submitted to TfNSW for approval
- strategies to manage the light pollution including appropriate selection of luminaries to manage light spill through strategic positioning will be adopted during detailed design
- landscaping designs should aim to maintain and improve the current biodiversity values present by enhancing fauna habitat through establishment of dense native shrubs and grasses to provide resources for small native birds as well as the planting of winter flowering Eucalyptus trees

6.8 Contamination, Landform, Geology and Soils

Contamination and Geotechnical investigations for the proposed area were undertaken by AECOM in July 2014. The following is a summary of the results of the investigations.

6.8.1 Existing environment

Soils and geology

The Penrith 1:100,000 Geological Series Sheet (Chapman & Murphy, 1989) indicates that the site is underlain by Ashfield Shale of the Wianamatta Group, which comprises dark-grey to black claystone and fine sandstone siltstone laminite.

Investigations identified the ground condition to comprise fill material overlying stiff to hard residual silty clays, with siltstone encountered at a depth of 2.4 metres below ground surface level on the platforms and 1.5 metres below ground surface level for the new structures adjacent to Pendle Hill Station on Joyce St and Wentworth Ave.

The site is not located in an Acid Sulfate Soil (ASS) risk area as mapped by the Department of Land and Water Conservation (1997).

Though asbestos was not encountered in the boreholes, it may still be present beneath the platform as asbestos was commonly used as building material in the past within the rail environment.

Landform

The site is located within a gently undulating topography, with the site itself located on a slope grading towards the west.

The nearest water body is Pendle Creek located around 200 metres north west of the Pendle Hill Station. Pendle Hill Creek is a tributary of Toongabbie Creek which drains into Parramatta River.

Contamination

The Geotechnical Investigation and desktop contamination review did not identify any obvious soil contamination issues or potential soil contamination sources at the site. Odours or obvious fragments of potential asbestos containing materials (ACM) were not encountered in the boreholes.

The fill soils contained various inclusions that may be indicative of potential contamination. Fill materials in some locations were noted to contain slag fragments and white gravels of possibly lime or chalk material.

Concentrations of volatile organic compounds in natural material sub-soils ranged between 0 and 0.3 ppm. There were no odours or staining observed in natural materials at the locations sampled.

6.8.2 Potential impacts

The Proposal would require some excavation work for the construction of the lifts pits. It is estimated that the excavation would be approximately 4m x 4m area and would extend to a depth of approximately two metres below surface level.

The excavated spoil may require removal off site where it cannot be reused. As indicated by the targeted soil contamination assessment by AECOM (2014), it is likely that the spoil would be classified as General Solid Waste as there were no significant contaminants found however could be classified as Restricted Solid Waste or Hazardous Waste if significant contamination was identified during excavation.

There were no exceedances of the selected soil assessment criteria for human health in any of the samples analysed however heavy metals were detected above the laboratory limit of reporting. Overall the soils on the site are not considered to pose a significant health risk to current and future occupants of the site or construction workers during the proposed redevelopment of the site for the Proposal.

During construction works, there is also the potential for soil to become contaminated through incidental chemical or fuel spills and leaks from construction plant and equipment.

There is the potential for erosion and sedimentation impacts as a result of water moving into and across the construction site during construction works. These potential impacts would be mitigated by the measures proposed below.

6.8.3 Mitigation measures

The following mitigation measures are proposed to manage impacts as a result of soils and contamination:

- prior to commencement of works, erosion and sediment control plans would be prepared and implemented in accordance with Managing Urban Stormwater: Soils and Construction (the Blue Book) (Landcom/Department of Housing 2004). The erosion and sediment control plans would be established prior to the commencement of construction and be updated and managed throughout as relevant to the activities during the construction phase.
- erosion and sediment control measures would be established prior to any clearing and grubbing and site establishment activities
- erosion and sediment control measures would be 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
- in the event of an 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
- an appropriate Unexpected Finds Protocol, incorporating asbestos and other potential contaminants, would be included in the Construction Environment Management Plan. This would include procedures for handling asbestos contaminated materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal would be undertaken in accordance with WorkCover requirements
- 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
- construction plant, vehicles and equipment would be refuelled off-site, or in a designated refuelling area
- vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of
fuel/oil leaks
- the existing Sydney Trains and Council drainage systems would remain operational throughout the construction of the project
- emergency spill kits would be kept on-site at all times. All staff would be made aware of the location of the spill kit and be trained in its use.

6.9 Hydrology and water quality

6.9.1 Existing environment

The nearest water body is Pendle Creek located around 200 metres north west of the Pendle Hill Station. Pendle Hill Creek is a tributary of Toongabbie Creek which drains into Parramatta River. The railway station is situated within a gently undulating topography sloping towards the west.

Surface runoff within the vicinity of the Proposal is managed by Holroyd Council (south of the rail corridor) and Parramatta Council (north of the rail corridor) stormwater drainage system that consists mainly of at-grade stormwater pits, connected to an underground pipe network.

One hundred year ARI storm event flood maps have been sourced from both councils as shown in Figure 20. The maps indicate there is no flooding immediately adjacent to the current station on either Joyce Street (to the immediate south) or Wentworth Avenue (immediate north).

It should be noted flooding does occur on either side of the railway line, extending northward from the western end of the station platforms to Mia Mia Street and Burrabogee Road. There is also flooding between Joyce and Stapleton Street (parallel to and south of Joyce Drive) extending westward past Goodall Street and southward down Pendle Way to Macklin Street.

Figure 20: 100 year ARI map (Holroyd – left, Parramatta – right)

Groundwater was not encountered during the borehole investigation. However this does not necessarily indicate the absence of groundwater as the speed of drilling may not have allowed sufficient time for accumulation of groundwater in the borehole. Groundwater may also vary due to seasonal or other influences.

6.9.2 Potential impacts

Without appropriate safeguards, pollutants (fuel, chemicals or wastewater from accidental spills, and sediment from excavations and stockpiles) could potentially reach nearby stormwater drains. A range of mitigation measures to reduce the incidence of water quality impacts are proposed below and in Section 7.

The Proposal is unlikely to impact upon the hydrology of the surrounding area. The detailed design would take stormwater management into consideration. The new design does not result in a significant increase in impervious areas. As such, the Proposal is unlikely to significantly impact upon Council's drainage infrastructure.

Stormwater and drainage systems would be designed in accordance with the relevant Sydney Trains, Sydney Water and Council standards and requirements.

Activities which would disturb soil during construction work (such as tree removal, excavation for footings, realignment of kerbing and commuter carparking on Joyce Street and Wentworth Avenue) have the potential to impact upon local water quality as a result of erosion and run off sedimentation. There is also potential to contaminate local water quality as a result of incidental spills, particularly during periods of rainfall. Mitigation measures have been provided below to minimise the potential for these impacts.

6.9.3 Mitigation measures

- Erosion and sediment control plans would be prepared and implemented in accordance with *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom/Department of Housing 2004). The erosion and sediment control plans would be established prior to the commencement of construction and be updated and managed throughout as relevant to the activities during the construction phase.
- Erosion and sediment control measures would be 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.
- Adequate water quality and hazardous material procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implanted during the construction of the Project.
- The refuelling of plant and maintenance of machinery would be undertaken within impervious bunding on a hardstand area.

6.10 Air Quality

6.10.1 Existing environment

Based on a review of the existing land uses surrounding the proposal, the existing air quality is considered to be characteristic of an urban environment, with particular industrial influences.

OEH undertakes air quality monitoring across NSW. The site is located within the Sydney north-west monitoring region with air quality monitored at four fixed sites. Prospect is the closest monitoring site to the Proposal. A search of the daily regional air quality index for the Sydney East region for the month of August, 2014 showed that the region generally experienced 'Good' air quality values with some outlying values of 'Poor' and 'Hazardous' (Table 26).

Table 26: Daily air quality results for Sydney East region in August 2014

Air Quality	Very Good	Good	Fair	Poor	Very Poor	Hazardous
Number of days in August 2014	0	28	0	1	0	2

A search of the National Pollutant Inventory database (NPI) 2012/13 data within Pendle Hill (postcode 2145) indicate that there are three nearby facilities which have reported pollution all located within the Girraween Industrial Precinct:

- DuPont Girraween – Total volatile organic compounds, ethanol, methanol
- Industrial Galvanizers Girraween – Zinc compounds, PAHs, sulphur dioxide, total VOCs, Carbon monoxide
- Redox Pty Ltd – Total VOCs, acetic acid, nitric acid, sulfuric acid

Other sources of localised air pollution within proximity of Pendle Hill Railway Station Precinct would be car/truck exhaust fumes.

Potentially affected receptors within the vicinity of the site include the following:

- Users of the adjacent commercial and recreational areas
- Local residents
- Pedestrians and commuters within the Pendle Hill Railway Station Precinct/

6.10.2 Potential impacts

During construction, air quality impacts would be associated with the generation of dust and emissions from stationary and moving on-site machinery and associated vehicular traffic. Anticipated sources of dust and dust generating activities include:

- dust generated from the loading and transfer of material from trucks
- minor excavation and preparation of the columns and footing
- general construction works
- emissions associated with the combustion of diesel fuel and petrol from construction plant and equipment.

Dust produced from excavation works would be minor as excavation would be required only for trenching activities, landscaping and the lift pits.

The operation of plant, machinery and trucks may also lead to increases in exhaust emissions in the study area; however these impacts would be minor and short term. The minor, short-term air quality impacts would be minimised with the implementation of the mitigation measures identified below.

The project aims to improve amenity and access at Pendle Hill Station which would support an increase of patronage of the rail system which could result in a relative reduction of commuter vehicle movements on local roads. The Proposal, therefore, would have the potential to reduce vehicle emissions in the long term which would have some beneficial effect on local and regional air quality.

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, 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

The following mitigation measures are proposed to manage impacts on air quality:

- methods for reduction of emissions would be incorporated into project inductions, training and pre-start talks
- vehicle and machinery movements during construction would be restricted to designated areas and
  sealed/compacted surfaces where practicable
- visual monitoring of dust would be undertaken, where visible levels of dust are high, onsite activities would be reviewed, with additional control measures and/or varied site operations implemented if required
- stockpiles would be covered when not in use
- dust would be visually monitored and where necessary the following measures implemented:
  - apply water (or alternate measures) to exposed surfaces that are causing dust generation. Surfaces may include unpaved roads, stockpiles, hardstand areas and other exposed surfaces (for example recently graded areas)
  - appropriately cover loads on trucks transporting material to and from the construction site. Securely fix tailgates of road transport trucks prior to loading and immediately after unloading
- prevent where possible, or remove, mud and dirt being tracked onto sealed road surfaces
- plant and machinery would be regularly checked and maintained in a proper and efficient condition.

6.11 Cumulative impacts

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.

A review of the major project register, maintained by NSW Department of Planning and Infrastructure in September 2014 has identified that there are no other major developments located within the vicinity of the Proposal and/or would be under concurrent construction.

Transport for NSW is proposing to upgrade station facilities at Wentworthville Station, located about 1.5 kilometres to the east of Pendle Hill Station. The Proposal would at times coincide with works being undertaken at Wentworthville Station and would both share the same construction compound located in an existing lay down area within the rail corridor adjacent to the west of Wentworthville Station. However there is unlikely to be any direct impact to the Proposal site as a result of these works.

During construction the works would be coordinated with any other construction activities in the area with Council, Sydney Trains and any other developers identified to minimise cumulative construction impacts such as traffic and noise.

Traffic associated with the construction works is not anticipated to have a significant impact on the surrounding road network. Operational traffic and transport impacts would have minimal impact on the performance of the surrounding road network.

Based on this assessment it is anticipated that the cumulative impacts would be minor provided that consultation with relevant stakeholders and mitigation measures in Section 7 are implemented.

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 take into consideration any planned or existing developments that could result in cumulative impacts to the surrounding receivers. Consultation with the relevant stakeholders would be ongoing and would address any potential cumulative impacts.

6.12 Climate change and sustainability

6.12.1 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.

Due to the small scale of the Proposal and the short term temporary nature of the 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 27.

It is anticipated that, once operational, the Proposal would result in an increase in use of public transport and a decrease in use of private motor vehicles by commuters to travel to and from Artarmon town centre. This shift in transport usage would reduce the amount of fuel consumed by private motor vehicles and would result in a relative reduction in associated greenhouse gas emissions in the local area.

6.12.2 Climate change

The dynamic nature of our climate system indicates a need to focus attention on how to adapt to changes in the climate and understand the limitations of adaptation. The effects of climate change 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.

6.12.3 Sustainability

The design of the Proposal has been based on the principles of sustainability. The detailed design would adopt sustainability initiatives in accordance with the *Sustainable Design Guidelines* (Version 3.0) (TfNSW, 2013a) and the TfNSW EMS.

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 construction environmental management plan (CEMP) for the construction phase of the Proposal would be prepared in accordance with the requirements of the Transport Projects Division's Environmental Management System (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 but not be limited to the following management plans:

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

7.2 Mitigation measures

Mitigation measures for the Proposal are listed below in Table 27 below. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6, should the Proposal proceed.

Table 27: Proposed mitigation measures

No.	Mitigation measures
General	
1	An Environmental Design Constraints Map will be developed during detailed design and implemented during construction.
2	An Environmental Controls Map (ECM) will be developed prior to commencement of construction in accordance with TfNSW's draft guide to preparing ECMs. The ECM will be implemented for the duration of construction.
3	An appropriately qualified and experienced site based environment manager will be appointed prior to the commencement of construction.
4	A project risk assessment including environmental aspects and impacts will be undertaken prior to the commencement of construction.
5	Weekly inspections to monitor environmental compliance and performance will be undertaken during construction.

No.	Mitigation measures
6	Prior to the commencement of construction, all contractors will be inducted on the key project environmental risks, mitigation measures and conditions of approval.
Traffic and site access	
7	Prior to the commencement of works, a Construction Traffic Management Plan (CTMP) would be prepared and provided to Council for information. Specifically the TMP would discuss: • traffic management • locations of access to and from the local road network • pedestrian management – including wayfinding signage, traffic controllers and fencing • routes and turning movements of heavy vehicles • loading/delivery zones including queuing • parking (construction worker and commuter) • an Emergency Response Plan
8	a Road Safety Audit would be undertaken during detailed design and design amendments made as required
9	heavy vehicles would be restricted to specified routes, with the aim of minimising impacts on local roads. Where feasible, route markers would be installed for heavy vehicles along designated routes.
10	the impacts of construction traffic on the local road network and the impacts on intersection operation would be minimised by undertaking construction vehicle traffic movements outside of peak road traffic periods and outside of school peak periods
11	the queuing and idling of construction vehicles in residential streets would be minimised through staging of deliveries where practicable
12	where required, communication would be provided to the community and local residents to inform them of impacts to vehicle movements and anticipated effects on the local road network relating to site works
13	access to all private properties and businesses adjacent to the works would be maintained during construction, unless otherwise agreed by relevant property owners
14	signage would be erected to warn vehicles of construction activities and heavy vehicle movements
15	should road closures be required, signage would clearly delineate alternative access, and that nearby businesses would operate as normal
16	pedestrian access to and from the Station would be maintained at all times during construction (except during rail possessions)
17	Traffic Controls Plans would be prepared in accordance with applicable RMS guidelines
18	road occupancy licences for temporary closure of roads would be obtained, where required

No.	Mitigation measures
19	limit off-site construction vehicle parking to designated areas. Areas of temporary on-street parking during peak construction events would be identified in the traffic management plans to minimise the impact on surrounding properties and businesses
20	an emergency response plan would be developed for construction traffic incidents
21	during project inductions, all heavy vehicle drivers would be provided with the emergency response plan for construction traffic incidents.
Landscape and visual amenity	
22	minimise light spill from the rail corridor into adjacent visually sensitive properties 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
23	temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
24	work/site compounds would be screened, with shade cloth (or similar material) (where necessary) to minimise visual impacts key viewing locations
25	all lighting would be designed and installed in accordance with the requirements of standards relevant to *AS 4282-1997Control of the Obtrusive Effects of Outdoor Lighting*
26	detailed design of the facade would aim to minimise the bulk of the structure and incorporate transparent materials to maximise natural light into the building, and that non-reflective materials are used for facades and finishes
27	unnecessary loss or damage to vegetation partially affected or unaffected by the Proposal would be avoided by protecting trees prior to construction and/or trimming vegetation where possible to avoid total removal
28	rehabilitation planting would be undertaken as early as possible to replace vegetation that provided screening to adjacent residential properties and sensitive visual receivers
29	specifically designed lighting equipment would be used to minimise the upward spread of light near to and above the horizontal. Care would be taken when selecting luminaries to ensure that appropriate units are chosen and that their location will reduce spill light and glare to a minimum
30	graffiti would be removed in accordance with TfNSW's standard requirements
31	any areas of 'blank' wall would be softened by appropriate plantings and/or artwork to meet visual amenity and sustainability guidelines
32	a landscape plan would be prepared for the proposed new elements. It would aim to provide some integration between the new structure and the existing vegetation and assist with providing a buffer from views from the west.
Noise and vibration	
33	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, 2012a) and the Noise and Vibration Impact Assessment for the Pendle Hill Station Accessibility Upgrade (SLR, 2014). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.

No.	Mitigation measures
34	Works would 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. An Out of Hours Work approval would need to be obtained from TfNSW for any works outside normal work hours.
35	Works would be carried out in accordance with the requirements of the *TfNSW Construction Noise Strategy* (TfNSW, 2012a), ICNG and the Noise and Vibration Impact Assessment for the Pendle Hill Station Accessibility Upgrade (SLR, 2014).
36	During detailed design, building surveys of sensitive structures within the heritage listed station would be carried out in order to assess the potential for increased susceptibility to building damage from vibration. Should any buildings be considered more susceptible to vibration, reduced vibration criteria levels may be applicable and subsequently adopted during the selection process for suitable equipment to be used in the vicinity of these buildings.
37	To reduce the construction noise impact from human activities, reasonable and feasible noise mitigation options should be considered, including: • 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 • using only the equipment necessary for the upgrade works at any one time • 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 possible • 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 on site. No dropping of materials from height where practicable, throwing of metal items and slamming of doors.
38	To reduce the construction noise and vibration impacts from mechanical activities, reasonable and feasible noise mitigation options should be considered, including: • maximising the offset distance between noisy plant and adjacent sensitive receivers • 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-"beeper" reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms for all plant and vehicles regularly used on site (greater than one day) • 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.

No.	Mitigation measures
39	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
40	Where the $L_{Aeq\ (15minute)}$ construction noise levels are predicted to exceed 75 dBA
Indigenous heritage	
41	all construction staff would receive basic training in the recognition of Aboriginal 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.
42	if indigenous objects are located during works, all works must stop in the vicinity of the find, and the NSW Office of Environment and Heritage, LALC and an archaeologist would be notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained before works recommence.
Non-indigenous heritage	
43	The detailed design of the Proposal would aim to be as sympathetic as possible to the existing character of the study area in order to minimise visual impacts. Pendle Hill Station is designed in the Inter-War Period Stripped Functionalist style, and additional items should echo these architectural philosophies by incorporating minimalist designs, curved corner details and horizontal lines, and respond to the existing colour schemes and material palette to those associated with the precinct today. For example, the use of unobtrusive, modern, light materials, such as glass panelling and slim frame elements would reduce the bulk of the Proposal, reducing the visual impact of the additional items
44	Opportunities to retain and/or create visual gaps in views between old and new fabric (e.g. new awnings and canopies) would be investigated during detailed design
45	Detailed design will include identification of existing heritage features within the existing platform buildings for conservation, and internal alterations are to be guided by the advice of the heritage architect
46	During detailed design, a heritage interpretation strategy would be developed which provides information on the heritage of the area. This would include heritage interpretive signage in relation to the removed ramps. Interpretive signage would be positioned in an area regularly used by Pendle Hill Station commuters and placed in a logical context associated with the location of the ramps and the station precinct. For example, signage could be located near the existing station buildings, facing the footbridge, or within the portion of the footbridge proposed to be retained.
47	Archival recording of the ramps and their relationship to the surrounding station precinct would be undertaken in accordance with Heritage Division Guidelines prior to the proposed works commencing to mitigate impacts to the heritage significance of the study area
48	A suitably qualified and experienced heritage advisor will be engaged to provide input to, and review of the detailed design of the Proposal

No.	Mitigation measures
49	In the event that any unanticipated archaeological deposits are identified within the project site during construction, work likely to impact on the deposit would cease immediately and a suitably qualified heritage consultant would be contacted and directed by TfNSW. 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.
50	A heritage induction would be provided to workers before construction begins, informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction.
51	Non-indigenous heritage items would be identified on the construction contractor's environmental constraints maps.
Socio-economic	
52	the proposed sustainability criteria for the project would encourage the contractor to purchase goods and services locally
53	the community liaison plan (refer to Section 5) would identify all potential stakeholders and the methods for consultation with these groups during construction
54	the community would be kept informed of construction progress
55	contact details for a 24-hour construction response line
Biodiversity	
56	trees to be removed would be clearly demarcated on site prior to construction, to avoid unnecessary vegetation removal. Trees to be retained, particularly the Forest Red Gums, would be protected through exclusion fencing or Tree Protection Zones (TPZs) in accordance with Australian Standard AS4970-2009
57	if roots are encountered during works near the Forest Red Gums, a qualified arborist will be engaged to advise on the best way to minimise risks to the long-term survival of the trees.
58	there would be no pedestrian or vehicular access to TPZs. No building activities should take place within the TPZ, including storage or stockpiling. Runoff from the site would not be allowed to enter the tree protection zones. Toolbox talks would inform workers of these zones and the restrictions applied
59	in the event of any tree to be retained becoming damaged during construction, an arborist would be informed immediately to inspect and provide advice on remedial action where possible
60	weed control measures would be developed and implemented by the CEMP to manage the 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*
61	vehicles and other equipment to be used on site would be cleaned to minimise seeds and plant material entering the site to prevent the introduction of further exotic plant species
62	mulching and watering is required until plants are established

No.	Mitigation measures
63	disturbance of vegetation would be limited to the minimum amount necessary for the Proposal
64	offsets and/ or landscaping would be undertaken in accordance with TfNSW Vegetation Offset Guidelines. Detailed design would see the landscape plan include provision of as much native vegetation within the Proposal as is feasible. Remaining vegetation to be offset would be undertaken in consultation with Council
65	all workers would be provided with an environmental induction prior to commencing work on-site. This induction would include information on the protection measures to be implemented to protect vegetation and penalties for breaches
66	should onsite works determine the removal or trimming of any additional trees, TfNSW Tree Removal Application Form would need to be completed and submitted to TfNSW for approval
67	strategies to manage the light pollution including appropriate selection of luminaries to manage light spill through strategic positioning will be adopted during detailed design
68	landscaping designs should aim to maintain and improve the current biodiversity values present by enhancing fauna habitat through establishment of dense native shrubs and grasses to provide resources for small native birds as well as the planting of winter flowering Eucalyptus trees
Contamination, Landform, Geology and Soils	
69	prior to commencement of works, erosion and sediment control plans would be prepared and implemented in accordance with *Managing Urban Stormwater: Soils and Construction* (the Blue Book) (Landcom/Department of Housing 2004). The erosion and sediment control plans would be established prior to the commencement of construction and be updated and managed throughout as relevant to the activities during the construction phase.
70	erosion and sediment control measures would be established prior to any clearing and grubbing and site establishment activities
71	erosion and sediment control measures would be regularly inspected (particularly following rainfall events) to ensure their ongoing functionality
72	erosion and sediment control measures would be left in place until the works are complete and areas are stabilised
73	in the event of an 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
74	an appropriate Unexpected Finds Protocol, incorporating asbestos and other potential contaminants, would be included in the Construction Environment Management Plan. This would include procedures for handling asbestos contaminated materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal would be undertaken in accordance with WorkCover requirements
75	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 measures
76	construction plant, vehicles and equipment would be refuelled off-site, or in a designated refuelling area
77	vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks
78	the existing Sydney Trains and Council drainage systems would remain operational throughout the construction of the project
79	emergency spill kits would be kept on-site at all times. All staff would be made aware of the location of the spill kit and be trained in its use.
Hydrology and water quality	
80	Erosion and sediment control plans would be prepared and implemented in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom/Department of Housing 2004). The erosion and sediment control plans would be established prior to the commencement of construction and be updated and managed throughout as relevant to the activities during the construction phase.
81	Erosion and sediment control measures would be regularly inspected (particularly following rainfall events) to ensure their ongoing functionality.
82	Erosion and sediment control measures would be left in place until the works are complete and areas are stabilised.
83	Adequate water quality and hazardous material procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implanted during the construction of the Project.
84	The refuelling of plant and maintenance of machinery would be undertaken within impervious bunding on a hardstand area.
Air quality	
85	methods for reduction of emissions would be incorporated into project inductions, training and pre-start talks
86	vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable
87	visual monitoring of dust would be undertaken, where visible levels of dust are high, onsite activities would be reviewed, with additional control measures and/or varied site operations implemented if required
88	stockpiles would be covered when not in use
89	dust would be visually monitored and where necessary the following measures implemented: • apply water (or alternate measures) to exposed surfaces that are causing dust generation. Surfaces may include unpaved roads, stockpiles, hardstand areas and other exposed surfaces (for example recently graded areas) • appropriately cover loads on trucks transporting material to and from the construction site. Securely fix tailgates of road transport trucks prior to loading and immediately after unloading

No.	Mitigation measures
90	prevent where possible, or remove, mud and dirt being tracked onto sealed road surfaces
91	plant and machinery would be regularly checked and maintained in a proper and efficient condition.
Cumulative impacts	
92	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.
Community engagement	
93	Notification and other communication tools would be distributed to keep the community informed of construction progress, activities and impacts. This would especially outline the need to undertake out of hours works and the process for the community to provide feedback in relation to the works.
Sustainability	
94	The detailed design would adopt sustainability initiatives in accordance with the Sustainable Design Guidelines for Rail (Version 3.0) (TfNSW, 2013a) and the TfNSW EMS.

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:

- DDA compliant access to the station and the platforms
- positive heritage outcomes through the retention of the station building
- additional canopy coverage on both platforms, particularly on Platform 3/4
- improved arrival experience with pedestrian crossings in close proximity to the new station entrances which is complemented by the realignment of the kerb edge
- better connection to the NightRide bus stops and bicycle storage facilities by providing them closer to the new station entrance
- accessible parking spaces in close proximity to the new station entrances and lifts
- a net increase of commuter parking spaces
- separated taxi and bus movements on Joyce Street by relocating the taxi rank
- formal kiss and ride area on Joyce Street and Wentworth Avenue.

The key likely impacts of the Proposal are as follows:

- heritage impacts to Pendle Hill Station
- temporary construction impacts as a result of construction noise, disruption to local traffic and visual impacts
- removal of trees on the site
- visual impacts in operation as a result of modifications.

This REF has considered and assessed these impacts in accordance with clause 228 of the EP&A Regulations and the requirements of the EPBC Act (refer to Chapter 7, and Appendices 1 and 2). Should the project proceed, these impacts would be effectively managed the proposed Pendle Hill Station Easy Access Upgrade CEMP, mitigation measures (refer to Chapter 8) and the conditions of approval. As a result, the Proposal is unlikely to have a significant impact on the environment, threatened species, populations, endangered communities or their habitats. Accordingly an EIS is not required, nor is the approval of the Minister for Planning.

The proposal has also take into account the principles of ESD (refer to Section 5.6). These would be considered further during the detailed design, construction and operational phases of the proposal. This would ensure the proposal is delivered to maximise benefits to the community, and minimises any adverse impacts on the environment.

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Appendix 1 – Consideration of Clause 228 factors

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
Any environmental impact on a community? Some short-term impacts during construction would be anticipated, particularly in relation to noise, traffic and access and visual amenity. Mitigation measures outlined in Section 7 would be implemented to manage and minimise any adverse impacts.	minor
Any transformation of a locality? The Proposal is unlikely to have any transformation of the locality surrounding the Station.	nil
Any environmental impact on the ecosystem of the locality? The Proposal is unlikely to impact the local ecosystem as discussed in Section 6.	nil
Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? Some short-term impacts during construction would be anticipated, particularly in relation to noise, traffic and access and visual amenity. During operation the Proposal would have positive impacts to the community through providing improved access to Pendle Hill Station.	minor
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 has been designed to be as sympathetic to its heritage values and character as possible within the constraints imposed by the required policies, codes, standards and constructability constraints. The platform buildings and portion of the station footbridge is retained.	nil
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	minor
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
Any long-term effects on the environment? The Proposal is unlikely to have any long-term effects on the environment.	nil

Factor	Impacts
Any degradation of the quality of the environment? The Proposal is unlikely to have any degradation on the quality of the environment.	nil
Any risk to the safety of the environment? Construction of the Proposal would be managed in accordance with a CEMP to reduce any risks to the environment.	nil
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
Any pollution of the environment? The Proposal is unlikely to cause any pollution to the environment.	nil
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 in accordance with the EPA Waste Classification Guidelines (April, 2008). Mitigation measures would be implemented to ensure waste is reduced, reused or recycled where practicable.	nil
Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? The Proposal is unlikely to have increased demands on limited resources.	nil
Any cumulative environmental effect with other existing or likely future activities? Cumulative effects of the Proposal are described in Section 6. Where feasible, environmental management measures would be coordinated to reduce cumulative construction impacts. The Proposal is unlikely to have any significant long term impacts.	nil
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 2 – 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 SEWPAC.

Factor	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 if international significance in the vicinity 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 ecological 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
Any impact on a Commonwealth marine area? The works are not in the vicinity of a Commonwealth marine area.	nil
Does the Proposal involve a nuclear action (including uranium mining)? The Proposal does not involve a nuclear action.	nil
Additionally, any impact (direct or indirect) on Commonwealth land? The Proposal would not be undertaken on or near to any Commonwealth land.	nil

Appendix 3 – Results of noise modelling

Construction noise predictions – standard construction hours (SLR, 2014)

Area	Scenario	Receiver	Noise Level – LAeq(15minute) (dBA)			
			Worst-case Predicted	RBL	Daytime PSNC	Exceedance
1	Existing Joyce St accessible Parking relocated and provide an additional space	R1	67	40	50	17
		R2	70	n/a	70	-
		R3	82	n/a	70	12
		R4	72	40	50	22
		R5	69	n/a	60	9
		R6	66	46	56	10
2	Existing Wentworth Avenue accessible parking relocated	R1	72	40	50	22
		R2	76	n/a	70	6
		R3	69	n/a	70	-
		R4	64	40	50	14
		R5	75	n/a	60	15
		R6	63	46	56	7
4	Existing pedestrian crossing relocated and raised	R1	69	40	50	19
		R2	73	n/a	70	3
		R3	71	n/a	70	1
		R4	66	40	50	16
		R5	82	n/a	60	22
		R6	65	46	56	9
5	Relocated taxi rank	R1	73	40	50	23
		R2	76	n/a	70	6
		R3	76	n/a	70	6
		R4	69	40	50	19
		R5	68	n/a	60	8
		R6	63	46	56	7
6	Extended bus stop with upgrade shelter and seating facilities	R1	71	40	50	21
		R2	75	n/a	70	5
		R3	82	n/a	70	12
		R4	70	40	50	20
		R5	70	n/a	60	10
		R6	64	46	56	8

Area	Scenario	Receiver	Noise Level – LAeq(15minute) (dBA)			
			Worst-case Predicted	RBL	Daytime PSNC	Exceedance
7	Relocated Wentworth Avenue night ride and bus stop (co-locate with kiss and ride) on southern side of Wentworht Avenue	R1	72	40	50	22
		R2	76	n/a	70	6
		R3	70	n/a	70	-
		R4	65	40	50	15
		R5	77	n/a	60	17
		R6	63	46	56	7
8	Proposed additional 90 degree commuter parking for approx. 10 parking spaces	R1	66	40	50	16
		R2	68	n/a	70	-
		R3	72	n/a	70	2
		R4	68	40	50	18
		R5	72	n/a	60	12
		R6	68	46	56	12
9	Extended commuter parking along Wentworth Avenue with 28 parking spaces (45 degrees)	R1	71	40	50	21
		R2	70	n/a	70	-
		R3	65	n/a	70	-
		R4	62	40	50	12
		R5	68	n/a	60	8
		R6	60	46	56	4
10	Proposed kiss and ride	R1	71	40	50	21
		R2	75	n/a	70	5
		R3	71	n/a	70	-
		R4	65	40	50	15
		R5	79	n/a	60	19
		R6	64	46	56	8
11	Proposed bike / storage	R1	63	40	50	13
		R2	67	n/a	70	-
		R3	61	n/a	70	-
		R4	56	40	50	6
		R5	67	n/a	60	7
		R6	54	46	56	-
12	Provide way finding signage	R1	47	40	50	-
		R2	51	n/a	70	-
		R3	48	n/a	70	-
		R4	42	40	50	-
		R5	55	n/a	60	-
		R6	41	46	56	-

Area	Scenario	Receiver	Noise Level – LAeq(15minute) (dBA)			
			Worst-case Predicted	RBL	Daytime PSNC	Exceedance
14	Platform resurface to achieve 1:40 grading as required	R1	67	40	50	17
		R2	72	n/a	70	2
		R3	73	n/a	70	3
		R4	65	40	50	15
		R5	71	n/a	60	11
		R6	62	46	56	6
15	Existing footbridge upgrade/ refurbish in accordance with the contract	R1	68	40	50	18
		R2	72	n/a	70	2
		R3	77	n/a	70	7
		R4	69	40	50	19
		R5	73	n/a	60	13
		R6	66	46	56	10
16	Existing station building upgrade/refurbish in accordance with the contract. For Stores – make good floor, walls and ceiling, removed joinery & fit out. For Toilets – make good floor, walls and ceiling, repair joinery and fit new seating as required.Generally – adjust doors, thresholds and adjacent ground level refurbish	R1	62	40	50	12
		R2	67	n/a	70	-
		R3	67	n/a	70	-
		R4	59	40	50	9
		R5	67	n/a	60	7
		R6	57	46	56	-
17	Remove 1p restriction to provide additional 10 (90 degree) commuter parking spaces	R1	61	40	50	11
		R2	64	n/a	70	-
		R3	73	n/a	70	3
		R4	67	40	50	17
		R5	64	n/a	60	4
		R6	62	46	56	6
18	Upgrade seating facilities with proposed wind barriers as required	R1	61	40	50	11
		R2	67	n/a	70	-
		R3	66	n/a	70	-
		R4	58	40	50	8
		R5	65	n/a	60	5
		R6	55	46	56	-

Area	Scenario	Receiver	Noise Level – LAeq(15minute) (dBA)			
			Worst-case Predicted	RBL	Daytime PSNC	Exceedance
19	Relocate overhead wiring structure as required	R1	70	40	50	20
		R2	77	n/a	70	7
		R3	66	n/a	70	-
		R4	60	40	50	10
		R5	68	n/a	60	8
		R6	58	46	56	2
23	construction of a new suspended concourse, station operations area and footbridge including enclosed accessible walkways connecting lifts on either side of the station	R1	67	40	50	17
		R2	71	n/a	70	-
		R3	76	n/a	70	6
		R4	68	40	50	18
		R5	72	n/a	60	12
		R6	66	46	56	10
24	provision of new canopies to the concourse, footbridge, stairs, lifts and platforms. New canopies are to marry into the existing platform canopy structures to be maintained on platform 1/2 and 3/4.	R1	71	40	50	21
		R2	71	n/a	70	1
		R3	66	n/a	70	-
		R4	62	40	50	12
		R5	69	n/a	60	9
		R6	60	46	56	4
25	provision of a dedicated electrical/switch room below the new Station Operation Area accessible from the Joyce Street entry.	R1	71	40	50	21
		R2	71	n/a	70	1
		R3	66	n/a	70	-
		R4	62	40	50	12
		R5	69	n/a	60	9
		R6	60	46	56	4
26	provision of a dedicated Communications Equipment Rom (CER) and Station Operation Area (SOA) accessible from Joyce Street including the relocation and/or upgrading of communication equipment as required. The new CER is required to house the communication racks and equipment required for (but not limited to) CCTV, PA, SPI Ticketing and station LAN services.	R1	71	40	50	21
		R2	71	n/a	70	1
		R3	66	n/a	70	-
		R4	62	40	50	12
		R5	69	n/a	60	9
		R6	60	46	56	4

Area	Scenario	Receiver	Noise Level – LAeq(15minute) (dBA)			
			Worst-case Predicted	RBL	Daytime PSNC	Exceedance
27	a new Station Operations Area (SOA) at concourse level to include (as a minimum) a booking office, count room, station manager area, staff meal room, staff locker room, staff toilet, and a minimum of one (1) family accessible toilet.	R1	71	40	50	21
		R2	71	n/a	70	1
		R3	66	n/a	70	-
		R4	62	40	50	12
		R5	69	n/a	60	9
		R6	60	46	56	4
28	modifications and adjustments to the existing 1500V over head wire (OHW) and over head wire structures (OHWS) as may be required to accommodate the installation of new structures and the partial demolition of the existing footbridge	R1	63	40	50	13
		R2	67	n/a	70	-
		R3	73	n/a	70	3
		R4	64	40	50	14
		R5	68	n/a	60	8
		R6	61	46	56	5
29	demolition and removal of the existing footbridge, ramps, canopies, retail kiosk, footings and associated structures except the middle portion of footbridge and its supports spanning between platforms 1/2 and 3/4 as identified in the Works Brief Drawings	R1	66	40	50	16
		R2	69	n/a	70	-
		R3	75	n/a	70	5
		R4	67	40	50	17
		R5	71	n/a	60	11
		R6	64	46	56	8
31	train impact protection to new structures adjacent to the tracks as required and dependent on the Contractor's design.	R1	68	40	50	18
		R2	76	n/a	70	6
		R3	67	n/a	70	-
		R4	61	40	50	11
		R5	68	n/a	60	8
		R6	58	46	56	2
33	All temporary works.	R1	56	40	50	6
		R2	62	n/a	70	-
		R3	62	n/a	70	-
		R4	54	40	50	4
		R5	60	n/a	60	-
		R6	51	46	56	-

Area	Scenario	Receiver	Noise Level – LAeq(15minute) (dBA)			
			Worst-case Predicted	RBL	Daytime PSNC	Exceedance
34	Construction Compound	R1	69	40	50	19
		R2	74	n/a	70	4
		R3	75	n/a	70	5
		R4	66	40	50	16
		R5	73	n/a	60	13
		R6	63	46	56	7
35	potential Undergrounding of overhead electrical wires (to both sides of rail corridor)	R1	68	40	50	18
		R2	74	n/a	70	4
		R3	74	n/a	70	4
		R4	66	40	50	16
		R5	72	n/a	60	12
		R6	63	46	56	7

Note: Recommended standard hours for construction are between the hours of 7.00 am and 6.00 pm Monday to Friday and Saturday 8am to 1pm. No work Sundays or public holidays.

Note: Bold indicates highly noise affected as per the ICNG