Transport for NSW

Turrella Station Upgrade

Review of Environmental Factors

Transport Access Program

Artist's impression of the Turrella Station upgrade subject to detailed design.

November 2021

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Review of Environmental Factors

Transport Access Program
Ref–6635595

Contents

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Document reviewers:	Malinda Facey, Rosemary Snowdon, Natalie Moore, Shane Brady, Peter Langford, Tracey Leotta, Justin Perrott

Figures

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Abbreviations

Term	Meaning
AHIMS	Aboriginal Heritage Information Management System
CCTV	Closed Circuit TV
CEMP	Construction Environmental Management Plan
CLM Act	*Contaminated Land Management Act 1997* (NSW)
CNVS	*Construction Noise and Vibration Strategy*
CTMP	Construction Traffic Management Plan
DDA	*Disability Discrimination Act 1992* (Commonwealth)
DPIE	NSW Department of Planning, Industry and Environment
DSAPT	*Disability Standards for Accessible Public Transport (2002)*
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EPL	Environment Protection Licence
Heritage Act	*Heritage Act 1977* (NSW)
Hz	Hertz
ICNG	*Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2000).
Infrastructure SEPP	*State Environmental Planning Policy (Infrastructure) 2007* (NSW)
IS	Infrastructure Sustainability
IS Council	Infrastructure Sustainability Council of Australia
LEP	Local Environmental Plan
LGA	Local Government Area
LVIA	Landscape and Visual Impact Assessment
LVIA Guideline	*Guideline for Landscape Character and Visual Impact Assessment*
NCA	Noise Catchment Area
NES	National Environmental Significance
NML	Noise Management Level

Term	Meaning
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
OEH	Formerly NSW Office of the Environment and Heritage
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
RBL	Rating Background Level
REF	Review of Environmental Factors (this document)
Roads Act	*Roads Act 1993* (NSW)
SEPP	State Environmental Planning Policy
SoHI	Statement of Heritage Impact
TAHE	Transport Asset Holding Entity
TfNSW	Transport for NSW
UDLP	Urban Design and Landscaping Plan
VDV	Vibration Dose Value
Vibration Guideline	*Assessing Vibration: A technical guideline* (DEC, 2006)
WARR Act	*Waste Avoidance and Resource Recovery Act 2001* (NSW)

Definitions

Term	Meaning
Average Recurrence Interval	The likelihood of occurrence, expressed in terms of the long-term average number of years, between flood events as large as or larger than the design flood event. For example, floods with a discharge as large as or larger than the 100-year ARI flood will occur on average once every 100-years.
Asset Management Branch	The Asset Management Branch (formerly Asset Standards Authority - ASA) is a part of Transport for NSW, and responsible for engineering governance, assurance of design safety, and ensuring the integrity of transport and infrastructure assets. Within the rail environment, Design Authority functions formerly performed by ASA are now exercised by the Asset Management Branch.
Concept design	The concept design is the preliminary design presented in this REF, which would be refined by the Contractor (should the Proposal proceed) to a design suitable for construction (subject to Transport for NSW acceptance).
Detailed design	Detailed design broadly refers to the process that the Contractor undertakes (should the Proposal proceed) to refine the concept design to a design suitable for construction (subject to Transport for NSW acceptance).
Disability Standards for Accessible Public Transport	The Commonwealth *Disability Standards for Accessible Public Transport 2002* ("Transport Standards") (as amended) are a set of legally enforceable standards, authorised under the Commonwealth *Disability Discrimination Act 1992* (DDA) for the purpose of removing discrimination 'as far as possible' against people with disabilities. The Transport Standards cover premises, infrastructure and conveyances, and apply to public transport operators and premises providers.
Ecologically Sustainable Development (ESD)	As defined by clause 7(4) Schedule 2 of the EP&A Regulation. Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends are maintained, and the total quality of life, now and in the future, can be increased.
Feasible	A work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements.
Interchange	Transport interchange refers to the area/s where passengers transit between vehicles or between transport modes. It includes the pedestrian pathways and cycle facilities in and around an interchange.
Noise sensitive receiver	In addition to residential dwellings, noise sensitive receivers include, but are not limited to, hotels, entertainment venues, pre-schools and day care facilities, educational institutions (e.g. schools, TAFE colleges), health care facilities (e.g. nursing homes, hospitals), recording studios and places of worship/religious facilities (e.g. churches).
NSW Trains	From 1 July 2013, NSW Trains became the new rail provider of services for regional rail customers.
Opal card	The integrated ticketing smartcard being introduced by Transport for NSW.
Out of hours work (OOHW)	Defined as work *outside* of standard construction hours (i.e. outside of 7am to 6pm Monday to Friday or 8am to 1pm Saturday).

Term	Meaning
Proponent	A person or body proposing to carry out an activity under Division 5.1 of the EP&A Act - in this instance, Transport for NSW.
Rail possession / shutdown	Shutdown is the term used by railway building/maintenance contractors to indicate that they have taken possession of the track (usually a block of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.
Reasonable	Selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure.
Sensitive receivers	Land uses which are sensitive to potential noise, air and visual impacts, such as residential dwellings, schools and hospitals.
Sydney Trains	From 1 July 2013, Sydney Trains replaced CityRail as the provider of metropolitan train services for Sydney.
Tactiles	Tactile tiles or Tactile Ground Surface Indicators (TGSIs) are textured ground surface indicators to assist pedestrians who are blind or visually impaired. They are found on many footpaths, stairs and train station platforms.
Proposal	The construction and operation of the Turrella Station Upgrade.

Executive summary

Overview

The NSW Government is improving accessibility at Turrella Station. This project is being delivered as part of the Transport Access Program, a NSW Government Initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure.

As part of this program, the Turrella Station Upgrade (Proposal) aims to provide a station precinct that is accessible to people with disability, limited mobility, parents/carers with prams, and customers with luggage.

The Proposal would include the following key features:

- a new lift providing access from the Reede Street overbridge to the station platforms
- a new station entrance from the Reede Street overbridge. The new station entrance would include:
    - demolition of the existing station access stairs and the section of the eastern platform canopy
    - construction of a new station entrance landing area
    - construction of new stairs between the proposed landing and the station platforms
- internal modifications to the existing station building including:
    - provision of a new unisex ambulant toilet in the location of the existing female toilets
    - provision of a new unisex family accessible toilet in the location of the existing male toilets
- modifications to kerb and line markings to accommodate the expansion of the kiss and ride bay along Turrella Street
- upgrades along the footpath located on the northern side of Turrella Street to provide an accessible and safe path of travel to the new station entrance including installation of traffic barriers
- localised platform regrading and the installation of new tactiles along the platforms
- provision of three new bike hoops accommodating up to six bicycles located on Henderson Street
- ancillary work including improvements to station lighting and CCTV to improve safety and security, electrical upgrades for the new infrastructure (new padmount substation located on Henderson Street), landscaping and adjustments to wayfinding signage.

Transport for New South Wales (Transport for NSW) is the government agency responsible for the delivery of major transport infrastructure projects in NSW and is the proponent for the Proposal.

This Review of Environmental Factors (REF) has been prepared to assess all matters affecting or likely to affect the environment by reason of the construction and operation of the Proposal under the provisions of Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Subject to approval, construction is expected to commence in 2022 and take approximately 18 months to complete. A detailed description of the Proposal is provided in Chapter 3 of this REF.

An overview of the Proposal is shown in Figure ES.1-1.

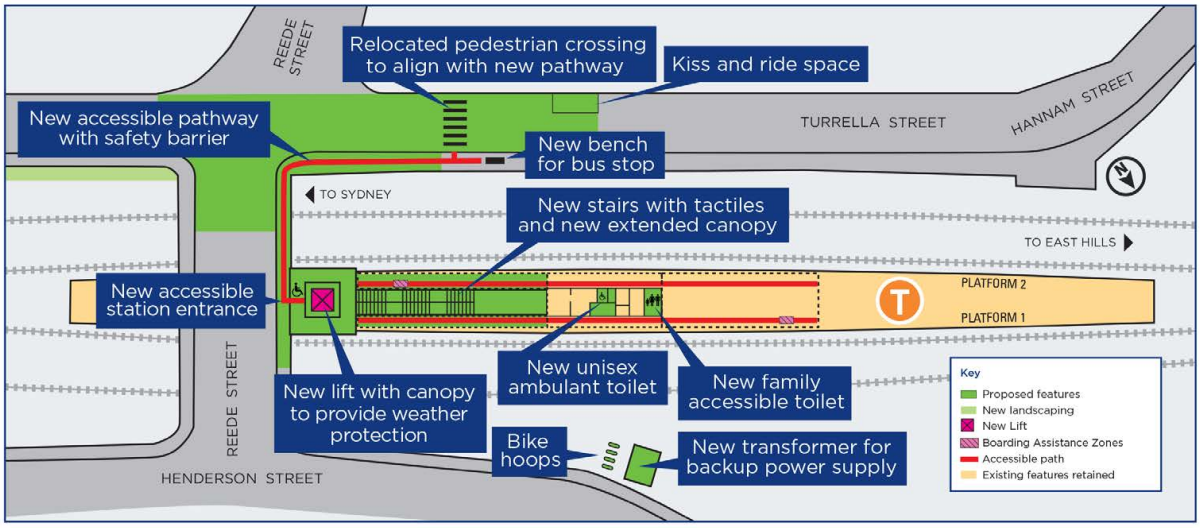

Figure ES.1-1 Proposed Turrella Station Upgrade (subject to change during detailed design)

Need for the Proposal

The Proposal would ensure that Turrella Station would meet legislative requirements under the *Disability Discrimination Act 1992* (DDA) and the *Disability Standards for Accessible Public Transport 2002* (DSAPT).

The Proposal is designed to drive a stronger customer experience outcome, to deliver improved travel to and between modes, encourage greater public transport use and better integrate interchanges with the role and function of town centres. The Proposal would also assist in responding to forecasted growth in the region and as such would support growth in commercial and residential development.

Chapter 2 of this REF further describes the need for the proposal and outlines the options considered in developing the design.

Community and stakeholder consultation

Community consultation activities for the Proposal would be undertaken during the public display period of this REF with the public invited to submit feedback to help Transport for NSW understand what is important to customers and the community. The REF would be displayed for a period of two weeks. Further information about these specific consultation activities is included in Section Community and stakeholder consultation5 of this REF.

During the display period a Project Infoline (1800 684 490) and email address (projects@transport.nsw.gov.au) would also be available for members of the public to make enquiries.

In accordance with the requirements of the *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP), consultation is required with local councils and/or public authorities in certain circumstances, including where council managed infrastructure is affected. Consultation has been undertaken with Sydney Trains, Sydney Trains Engineering and System Integrity Division (Sydney Trains ESI), Transport for NSW Asset Management Branch (AMB) and Bayside Council during the development of design options and the preferred option. Consultation with these stakeholders will continue through the detailed design and construction of the Proposal.

Feedback can be sent to:

- projects@transport.nsw.gov.au
- Transport Access Program – Turrella Station Upgrade

  Director Environment and Sustainability (Rail Development and Delivery)

  Transport for NSW

  PO Box K659

  Haymarket NSW 1240

Or submitted:

- via https://www.transport.nsw.gov.au/projects/current-projects/turrella-station-upgrade

Transport for NSW 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 ES.1-2 shows the planning approval and consultation process for the Proposal.

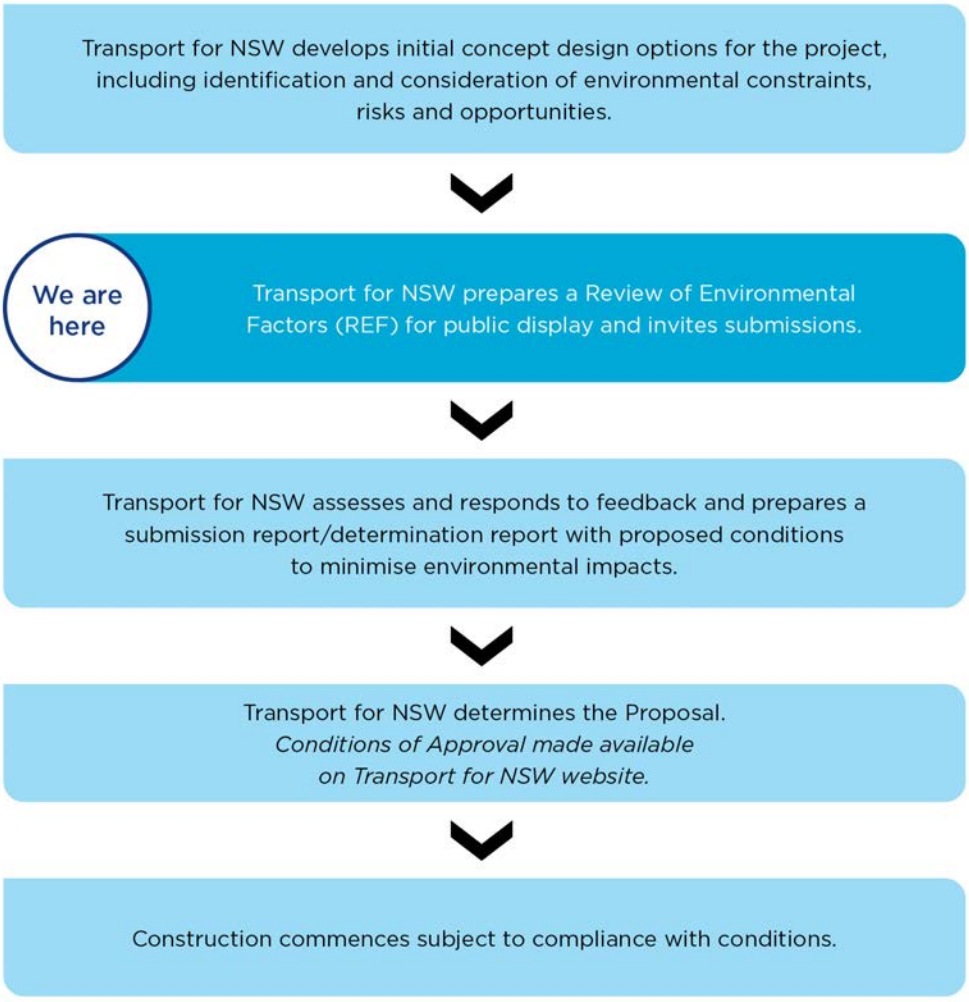

Figure ES.1-2 Planning approval and consultation process for the Proposal

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 Proposal would provide the following benefits:

- upgrading and providing a station that is accessible to people with a disability, limited mobility, parents with prams and people with luggage
- improving customer safety at the station with the provision of a new lift, DDA compliant stairs, CCTV and upgrades to pathways on Turrella Street leading to the station
- improve accessibility and interchange facilities at the station by expanding the kiss and ride bay along Turrella Street
- improving customer amenities by providing a family accessible toilet and a unisex ambulant toilet
- improve customer experience by upgrading customer information and communication systems, adjusting wayfinding signage and landscaping work.

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

- temporary impacts on local traffic movements and road network associated with construction traffic and temporary road closures
- temporary noise and vibration impacts associated with construction activities
- minor disruption to bus customers and pedestrians during construction to facilitate construction work and road closures
- potential sediment mobilisation, dust generation and erosion risk during construction
- introduction of new elements, such as the station entrance, lift, canopy, ramp and traffic barriers to the visual environment.

Further information regarding these impacts is provided in Chapter 6 of the REF. A photomontage of the Proposal to demonstrate its indicative design is illustrated in Figure ES.1-3.

Conclusion

This REF has been prepared having regard to sections 5.5 and 5.7 of the EP&A Act, and clause 228 of the EP&A Regulation, to ensure that Transport for NSW takes into account, to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The detailed design of the Proposal would also be designed in accordance with the Infrastructure Sustainability Council of Australia (IS Council) Infrastructure Sustainability (IS) Rating Tool (v 1.2) taking into account the principles of ecologically sustainable development (ESD).

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

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

Figure ES.1-3 Photomontage of the Proposal (subject to detailed design)

1 Introduction

Transport for NSW is responsible for strategy, planning, policy, procurement, regulation, funding allocation and other non-service delivery functions for all modes of transport in NSW including road, rail, ferry, light rail, point to point, cycling and walking. Transport for NSW is the proponent for the Turrella Station Upgrade (Proposal).

1.1 Overview of the Proposal

1.1.1 The need for the Proposal

The NSW Government is committed to facilitating and encouraging use of public transport, such as trains, by upgrading stations to make them more accessible, and improving interchanges around stations with other modes of transport such as buses, bicycles and cars. The Transport Access Program is an initiative targeted at achieving compliance with the DSAPT Regulations across the network. Turrella Station has been identified for an accessibility upgrade as it currently does not meet key requirements of the *Disability Standards for Accessible Public transport 2002* (DSAPT) or the *Commonwealth Disability Discrimination Act 1992* (DDA). It also does not allow for equitable access to the station platforms. Turrella Station includes one island platform, with stairs from the Reede Street overbridge providing the only point of access.

The following accessibility issues have been addressed in the Proposal:

- access to Turrella Station is restricted to one set of stairs
- the existing paths on Turrella Street and Reede Street providing access to the station are not compliant with current DSAPT standards
- the stairs facilitating access to the station platforms are not DSAPT compliant
- there is no family accessible toilet or ambulant toilet on the platforms.

The Proposal would ensure the station continues to provide a high level of customer experience and comfort providing equitable access and improved amenities for all existing and future users. The improvements would in-turn assist in supporting the growth of public transport use and delivering improved travel to and between modes.

1.1.2 Key features of the Proposal

The key features of the Proposal are summarised as follows:

- a new lift providing access from the Reede Street overbridge to the station platforms
- a new station entrance from the Reede Street overbridge:
    - demolition of the existing station access stairs and the section of the eastern platform canopy in order to accommodate the new stairs, lift, landing and canopy
    - construction of a new station entrance landing area
    - construction of new stairs between the proposed landing and the station platforms
- internal modifications to the existing station building including:
    - provision of a new unisex ambulant toilet in the location of the existing female toilets
    - provision of a new family accessible toilet in the location of the existing male toilets
- modifications to kerb and line markings to accommodate the expansion of the kiss and ride bay along Turrella Street

- upgrades to the footpath located on Reede Street and Turrella Street to provide an accessible and safe path of travel to the new station entrance, including installation of traffic barriers
- localised platform regrading and the installation of new tactiles along the platforms
- provision of three new bike hoops accommodating up to six bicycles located on Henderson Street
- ancillary work including improvements to station lighting and CCTV to improve safety and security, electrical upgrades for the new infrastructure (new padmount substation located on Henderson Street), landscaping and adjustments to wayfinding signage.

Subject to planning approval, construction is expected to commence in early 2022 and take approximately 18 months to complete.

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

1.2 Location of the Proposal

The Proposal would involve upgrade work to Turrella Station, approximately 10 kilometres west of Sydney's Central Business District (CBD). The regional context of the Proposal is shown in Figure 1-1.

The Proposal resides in the suburb of Turrella and the Bayside Local Government Area (LGA), to which the *Bayside Local Environmental Plan 2021* (Bayside LEP) applies. Turrella Station is surrounded by a combination of urban land uses including various medium and high-density housing to the south, and mixed development, commercial and public recreation to the north.

Turrella Station is serviced by the T8 Airport and South Line and is bounded by Hannam and Turrella Street to the south, Reede Street to the east and Henderson Street to the north. The majority of the Proposal would be undertaken within the rail corridor, with some work being proposed along Turrella and Reede Streets.

Legend

- Proposal Area
- Turrella Suburb Boundary
- Railway Station
- Railway Line
- Primary/ArterialRoad
- Motorway
- Watercourses

FIGURE 1-1

Regional Context

Image Source: ESRI Basemap Data source: NSW DFSI (2021)

1.3 Existing infrastructure and land uses

Turrella Station is a single island consisting of two platforms (Platforms 1 and 2) with two canopies and an existing station building. A site locality plan for Turrella Station is shown in Figure 1-2.

The station building is a single-storey, brick building consisting of a booking/parcel's office (also the Station Master's room), storeroom and female and male toilets. The building dates back from circa 1931 and is listed as being of local heritage significance (refer to Section 6.5 for further detail).

1.3.1 Station access

Access to Turrella Station is provided via a single set of stairs accessed from the Reede Street overbridge. The stairs are the only point of access to the station platform. Refer to Figure 1-2 and Figure 1-5.

1.3.2 Interchange facilities

Public transport and other interchange facilities surrounding the station include:

- existing bus stop located south of the station along Turrella Street servicing the 473 Rockdale to Campsie
- parallel parking along the length of Henderson Street
- existing bicycle route along Hannam Street, Turrella Street, Reede Street overbridge and continuing west off Henderson Street connecting to the path across Wolli Creek
- a bicycle locker accommodating up to four bicycles located west of the station on the northern side of Turrella Street
- a designated kiss and ride bay accommodating one vehicle on the southern side of Turrella Street opposite the station
- there are no commuter car parks or taxi ranks in proximity of the station.

1.3.3 Surrounding land use

Land use surrounding Turrella Station can be divided by the rail corridor. North of the corridor along Henderson Street, land use is designated as light industrial inclusive of small-scale industrial businesses housed in warehouses and sheds, alongside the M5 East Water Treatment Plant and bus depot at the far eastern end of Henderson Street. At the other end of Henderson Street is a community pathway leading to the Turrella Reserve which follows the course of Wolli Creek.

The local area to the south of the station typically consists of residential high-rise apartment buildings and detached housing in high density and low density residential zones.

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Legend

- Proposal Area
- Proposed Work Areas
- Laydown Area
- Construction Compound
- Watercourses
- Railway Line

Image Source: Nearmap (May 2021) Data source: NSW DFSI (2020)

FIGURE 1-2

Site Locality Map

Figure 1-3 Photo showing the current Turrella Station entrance from the Reede Street overbridge

Figure 1-4 Photo showing Turrella Station platform and building, viewed from the south east from the rail corridor

Figure 1-5 Photo showing the Reede Street overbridge and entry stairs to Turrella Station from the rail corridor

1.4 Purpose of this Review of Environmental Factors

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 5.5 of the EP&A Act, and to identify mitigation measures to reduce the likely impacts of the Proposal. This REF has been prepared in accordance with clause 228 of the *Environment Planning and Assessment Regulation 2000* (EP&A Regulation).

This assessment has also considered the relevant provisions of other relevant environmental legislation, including the *Biodiversity Conservation Act 2016*, *Fisheries Management Act 1994* (FM Act) and the *Roads Act 1993* (Roads Act).

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

2 Need for the Proposal

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

2.1 Strategic justification

Improving transport customer experience is the focus of the NSW Government's transport initiatives. Transport interchanges and train stations are 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 Turrella Station Upgrade, the subject of this REF, is 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. Table 2-1 provides an overview of NSW Government policies and strategies relevant to the Proposal.

Table 2-1 Key NSW Government policies and strategies applicable to the Proposal

Policy / strategy	Overview	How the Proposal aligns
Future Transport Strategy 2056 (TfNSW, 2018a)	*Future Transport 2056* is an update of NSW's *Long Term Transport Master Plan*. It is a suite of strategies and plans for transport to provide an integrated vision for the state. *Future Transport 2056* identifies 12 customer outcomes to guide transport investment in Greater Sydney. These outcomes include transport providing convenient access, supporting attractive places and providing 30-minute access for customers to their nearest centre by public transport.	The Proposal transforms the existing rail network into a physically more accessible network, supporting the vision of the *Future Transport Strategy 2056*. The installation of a lift provides greater access to and from Turrella Station and the T8 line - Airport enabling customers with mobility difficulties more choices, connections and opportunities. Providing greater access, the Proposal also supports the state wide outcomes outlined in strategy: • encouraging active travel (walking and cycling) and using public transport • a fully accessible network that enables barrier-free travel for all.
Disability Inclusion Action Plan (2018-2022) (TfNSW, 2017a)	The *Disability Inclusion Action Plan 2018-2022* was developed by Transport for NSW in consultation with the Accessible Transport Advisory Committee, which consists of representatives from peak disability and ageing organisations within NSW. The Disability Plan identifies the challenges, the achievements to date, the considerable undertaking that is required to finish the job and provides a solid and practical	The Transport Access Program was identified in the *Disability Inclusion Action Plan 2018-2022* as a key action to ensure transport networks in Sydney are accessible for all potential users. The Proposal has been designed in consideration of the key actions outlined in the plan. Guided by the plan's principals, the Proposal provides the opportunity for local communities specifically Turrella to become a more liveable community for people with a disability, by

Policy / strategy	Overview	How the Proposal aligns
	foundation for future progress over the next five years.	providing equitable access to Turrella Station.
A Metropolis of Three Cities - Greater Sydney Region Plan (Greater Sydney Commission, 2018a)	The *Greater Sydney Region Plan* is the NSW Government's 40-year land use plan for Sydney. It establishes a vision for a metropolis of three cities – the Eastern Harbour City, Central River City and Western Parkland City. The vision aims to meet the needs of a growing and changing population. One of the main directions of the plan is liveability. It recognises that by designing and or optimising existing infrastructure can develop a well-connected city by improving the accessibility of the community.	The Proposal ensures greater access to Turrella Station which helps support Objective 6 (Services and Infrastructure) of the *A Metropolis of Three Cities - Greater Sydney Region Plan.* The installation of a lift and upgrades to the current access points leading to Turrella Station ensures equitable access for all customers at Turrella Station and the destinations the train provides connections to. The Proposal will support and improve the liveability of the Turrella community, enhancing the existing use of Turrella Station.
Eastern District Plan (Greater Sydney Commission, 2018b)	The *Eastern City District Plan* is a 20-year plan guiding regional and local planning to help implement the *Greater Sydney Regional Plan* and achieve the 40-year vision for Greater Sydney. Due to the evolving nature of Greater Sydney the plan identifies services and social infrastructure to meet peoples changing needs as one of their planning priorities. The plan highlights the importance for inclusion and accessibility for public transport due to the rapidly ageing population and substantial number of residents with a disability within the district.	The Proposal supports one of the main goals outlined in the *Eastern City District Plan* focusing on accessibility and inclusion of public transport. The Proposal would allow equitable access to Turrella Station whereas existing access is restricted and excludes wheelchair accessibility. The Proposal would also allow parents with prams and people with limited mobility greater access to the station and the community.
Building Momentum – State Infrastructure Strategy 2018-2038 (Infrastructure NSW, 2018)	The *State Infrastructure Strategy 2018-2038* makes recommendations for each of NSW's key infrastructure sectors including transport. The strategy aims to boost productivity, increase global competitiveness and improve the quality of people's lives. The strategy seeks to ensure that the transport system creates opportunities for people and businesses to access the services and support they need.	The Proposal supports investment in existing rail infrastructure, allowing Turrella Station to be accessed by all potential users.

Policy / strategy	Overview	How the Proposal aligns
NSW: Premier Priorities *(NSW Government, 2019)* *https://www.nsw.gov.au/improving-nsw/premiers-priorities/*	In June 2019, 14 new Premier's Priorities were announced that would allow the Government to measure and deliver in areas where NSW can do better. The key policy priorities, include the following: • a strong economy • highest quality education • well-connected communities with quality local environments • putting customer at the centre of everything we do breaking the cycle of disadvantage.	The Proposal aligns with the Premiere's Priorities, as it focuses on delivering well-connected communities with quality local environments and placing the customer's needs at the centre. The Proposal provides an investment in accessible infrastructure to support access to Turrella Station, giving customers additional options to access the public transport network within the Turrella community.
Bayside 2030, Community Strategic Plan 2018-2030 *(Bayside Council 2018)*	The *Bayside 2030 Strategic Pla*n sets the council direction to 2030. The plan utilises four unique themes to achieve their vision. The themes revolve around vibrancy, connectivity, sustainability and prosperity.	The *Bayside 2030, Community Strategic Plan* works towards the community being a 30-minute city, providing reliable and accessible public transport to the city. The Proposal assists in enabling Turrella to become more vibrant and prosperous by providing equitable access to the station and improving and modernising station facilities.
Bayside Local Strategic Planning Statement *(Bayside Council, 2020)*	The *Bayside Local Strategic Planning Statement* provides a vision and priorities for land use for the Bayside LGA to 2036 The statement is distinguished by its four themes of Collaboration, Liveability, Productivity and Sustainability. These themes are used to help guide planning to meet the needs of Bayside Council's diverse and growing population.	To accommodate a growing and diverse population the Proposal improves and ensures equitable access to Turrella Station thus aligning with the *Bayside Local Strategic Planning Statement*.

2.2 Objectives of the Transport Access Program

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

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

2.3 Objectives of the Proposal

The specific objectives of the Turrella Station Upgrade are to:

- provide a station that is accessible to people with a disability, less mobility and parents/carers with prams and customers with luggage
- improve customer experience (weather protection, upgrading toilet facilities, better interchange facilities and visual appearance)
- minimise pedestrian conflict and crowding points
- improve integration with surrounding precinct
- improve customer safety (CCTV, lighting, stair and handrail upgrades)
- improve wayfinding in and around the station
- respond to the heritage values of the site
- improve customer amenity
- maintain/create cross corridor access/pedestrian links to Turrella.

2.4 Design development

The existing station layout does not meet the requirements of the DDA or the DSAPT. Current access to Turrella Station is restricted to a set of stairs connecting the Reede Street overbridge to the platform, limiting access and useability of the station.

Pedestrian access leading to the station does not comply with DSAPT standards. Pathways on Turrella Street and Reede Street leading to the station entry are steep and form a non-compliant path of travel while extensive services (e.g. overhead wires and light poles) narrow and obstruct footpaths surrounding the station.

A series of design options were developed to ensure access was provided to the station platforms, kiss and ride bay and bus stop on Turrella Street. Each design underwent a multi-criteria analysis and optioneering process to ensure compliance with the requirements of DDA and DSAPT. The concept design also considered the heritage value of Turrella Station, customer experience and visual amenity of the surrounding area.

2.5 Alternative options considered

All design options were required to respect the existing heritage building whilst tying in with the more contemporary surroundings. The preliminary options investigated providing additional DDA access to Wolli Creek Reserve from Henderson Street, as well as relocating the primary access point away from the Reede Street overbridge. Figure 2-1 shows a selection of preliminary options considered.

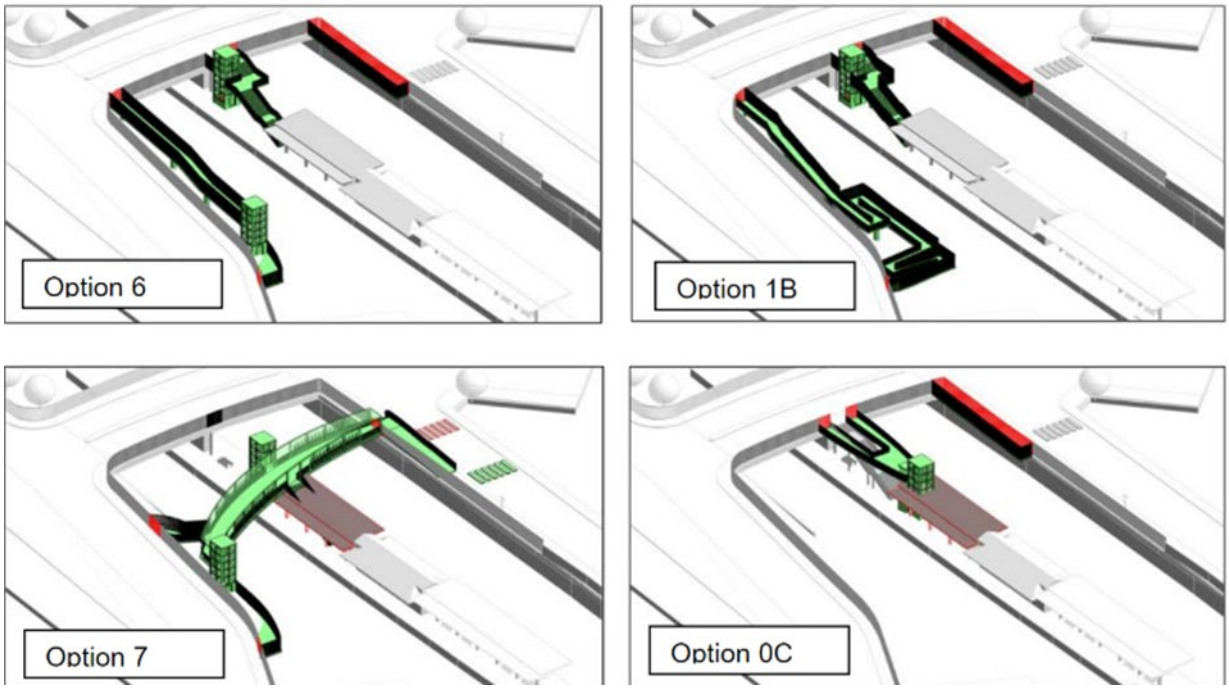


Figure 2-1 Preliminary options for Turrella Station Entrance

2.5.1 The 'do-nothing' option

Under a 'do-nothing' option, existing access to the platform would remain the same and there would be no changes to the way the station and the interchange currently operates.

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

The 'do nothing' option was not considered a feasible alternative as it is inconsistent with NSW Government objectives and would not help encourage the use of public transport and would not meet the needs of Turrella and surrounding community. Station upgrades are necessary to adhere to current DSAPT requirements.

2.5.2 Assessment of identified options

The design options were assessed utilising multi-criteria analysis and an optioneering approach that included consideration of factors such as customer experience, accessibility, safety, heritage value, engineering constraints, modal integration and cost to select a preferred option.

During the first round of optioneering multiple options were explored, with three providing an additional point of access to the industrial area on Henderson Street. Option 0C was chosen as it would utilise the existing station access point (via the Reede Street overbridge) and would have a lower visual impact to the heritage listed station building. An option to provide an additional point of access to the station from Henderson Street was not progressed as it would require the relocation of signal infrastructure and other critical utilities on Henderson Street and all transport mode transfer points are located on Turrella Street. The most feasible option for the Proposal was to provide a DDA compliant ramp to overcome the existing accessibility issue on the Reede Street overbridge corner with Turrella Street leading to the bus stop.

Following another round of optioneering and multi-criteria analysis, two main station entrance concept designs (Option 0C and Option 0D) were analysed, with each of the options shown in closer detail in Figure 2-2.

Option 0C retained the existing stairs, with a two-sided overbridge extending west from Reede Street overbridge to connect to a lift located midway between the station building and the Reede Street overbridge.

Option 0D proposed the new lift would be constructed directly off the overbridge, with a lift landing on all sides of the new lift, and stair access from the west side of the lift landing. A canopy would also be constructed over the stairs.

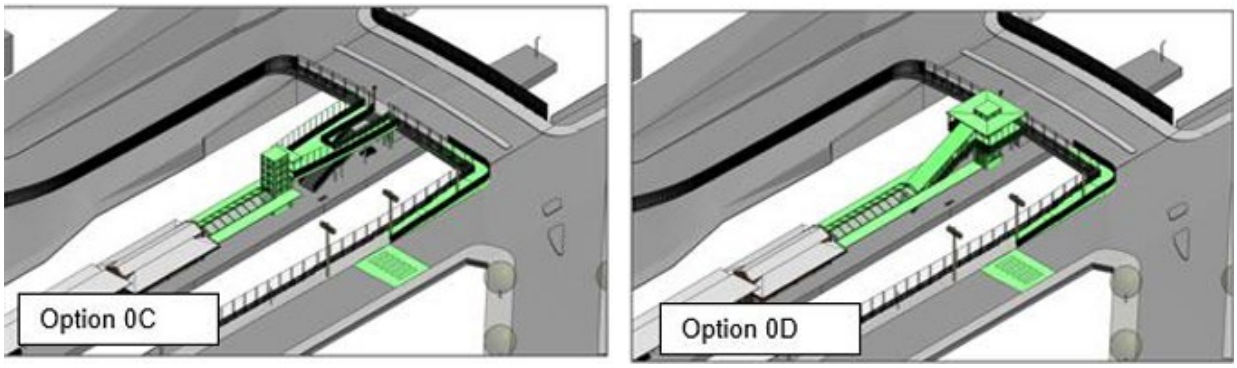


Figure 2-2 Option 0C and Option 0D Concept Designs

2.6 Justification for the preferred option

Option 0D was determined to be the preferred option for the station entrance based on the analysis undertaken. Option 0D presented the following advantages over Option 0C:

- reduced visual impact to the heritage station building
- improved pedestrian flows
- similar design approach to the nearby Bexley North Station providing continuity along the rail line
- DSAPT compliant stairs
- better weather protection.

3 Proposal description

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

3.1 The Proposal

The Proposal involves upgrades to Turrella Station as part of the Transport Access Program which would improve accessibility and amenities for customers.

The Proposal would include the following key elements:

- a new lift providing access from the Reede Street overbridge to the station platforms
- a new station entrance from the Reede Street overbridge. The new station entrance would include:
    - demolition of the existing station access stair and the section of the eastern platform canopy
    - construction of a new station entrance landing area
    - construction of new stairs between the proposed landing and the station platforms
- internal modifications to the existing station building including:
    - provision of a new unisex ambulant toilet in the location of the existing female toilets
    - provision of a new family accessible toilet in the location of the existing male toilets
- modifications to kerb and line markings to accommodate the expansion of the kiss and ride bay along Turrella Street
- relocation of the pedestrian crossing on Turrella Street approximately 10 metres west to allow easier access from the kiss and ride bay
- upgrades along the footpath located on Reede Street and Turrella Street to provide an accessible and safe path of travel to the new station entrance including installation of traffic barriers
- localised regrading and the installation of new tactiles along the platforms
- provision of three new bike hoops accommodating up to six bicycles located on Henderson Street
- ancillary work including improvements to station lighting and CCTV to improve safety and security, electrical upgrades for the new infrastructure (new padmount substation located on Henderson Street), landscaping and adjustments to wayfinding signage.

Figure 3-1 shows the general layout of key elements for the Proposal.

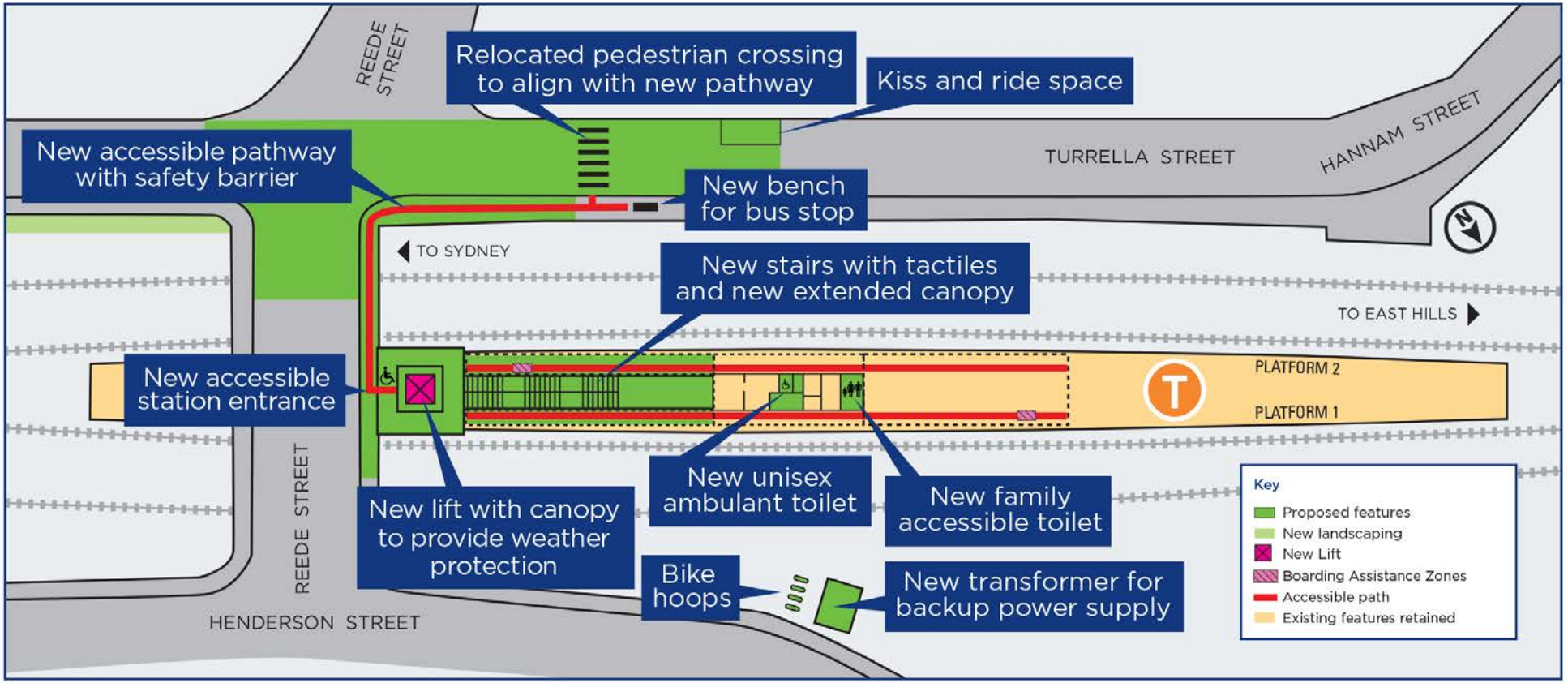


Figure 3-1 Key features of the Proposal

(Indicative only, subject to detailed design)

3.2 Scope of work

3.2.1 Station upgrade

Details of the proposed work to take place at the station to improve accessibility and customer experience are provided below:

- upgrades to the existing footpath between Reede Street, Turrella Street and the station entrance on the Reede Street overbridge
- demolition of the existing stairs connecting the station platforms to Reede Street and replace with new stairs
- installation of a new lift and associated lift landing between Reede Street and the station platforms
- demolition of the existing platform canopy and replace with a new canopy extending from the lift to the existing station building.

To maintain existing pedestrian access to the station during construction of the new station entry, temporary stairs would be constructed to continue to provide access to the station platforms. The design and staging of the temporary access would be determined during detailed design phase of the Proposal.

3.2.2 Station building modifications

Details of the proposed work to take place within the station building to improve accessibility and customer experience are provided below:

- refurbishment of existing male toilets located within the station building to create a new family accessible toilet. This work would include the demolition of existing toilets, installation of fittings, finishes, services connections, bathroom fixtures (including toilets, sinks, and a changing table), plumbing and widening of the existing brick opening to allow for a new compliant door
- designation of a new single staff toilet to be located in the existing female toilets
- construction of a new unisex ambulant toilet at the location of the existing female toilets. This would include the demolition of existing internal fittings and installation of new fittings, fixtures, finishes, and services connections
- relocation of the communications room to the existing cleaning room
- relocation of the cleaning room to the existing men's toilets. This would include the removal of existing internal partitions, fixtures and fittings and the installation of service connections, fixtures and fittings.

3.2.3 Interchange facilities

Details of the proposed work to take place around the station to improve accessibility and customer experience are provided below:

- relocation of the road centreline along Turrella Street to provide more space for the proposed expansion of the kiss and ride bay
- modifications to the median strip on Reede Street and provision of new road line markings to allow vehicles to turn left onto Reede Street from Turrella Street more safely and reduce the likelihood of a vehicle mounting the kerb
- relocation of the pedestrian crossing on Turrella Street approximately 10 metres west to allow easier access from the kiss and ride bay

- provision of three new bike hoops located along Henderson Street
- provision of a new bench for the bus stop located along Turrella Street adjacent to the relocated pedestrian crossing
- construction of a new ramp and path located near the corner of Turrella Street and Reede Street including the installation of new compliant handrails and traffic barriers.

3.2.4 Ancillary work

Details of the proposed ancillary work required to take place at and around the station to facilitate accessibility upgrades are provided below:

- relocation of services including lighting and communications systems (e.g. CCTV), stormwater drainage, retaining walls, and overhead wiring
- improvements to station power supply which includes the installation of a padmount substation, and earthing/bonding provisions (specific power requirements to be determined during detailed design)
- improvements to station security and communication systems, including CCTV modifications, public address system upgrades, modification to station passenger information systems and new hearing induction loops within the station platforms
- new ticketing facilities including additional opal card readers
- new wayfinding signage in relation to the new lifts and parking spaces
- regrading and resurfacing of the station platforms to provide compliant paths of travel between the lift, boarding assistance zones, accessible toilets and other facilities on the platforms
- lighting upgrades
- relocation of station furniture and rubbish bins
- landscaping along Turrella Street
- provision of a new bench seat and wheelchair waiting space at the bus waiting area on Turrella Street
- temporary site compounds for storage of materials and equipment
- temporary work (where required) during construction in order to maintain existing pedestrian ‘level of service’ and access to the station
- relocation and preservation of existing underground services including sewer, telecommunications, water, power and gas.

3.2.5 Materials and finishes

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

Availability and constructability are also important criteria to ensure that materials are readily available and the structure can be built with ease and efficiently. Materials are also selected for their application based on their suitability for meeting design requirements. Materials selection would also consider sustainability aspects, including consideration of supply chain and sourcing materials locally where possible, prioritising the use of reused and recycled materials where practicable, and investigating use of materials that have environmental labels.

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

- lower lift shafts –concrete
- upper lift shafts – steel frame with glass infill panels
- station entrance and lift landing – concrete base with mesh anti-throw screens, green glazed subway tiles and roof
- platform stairs – concrete with stainless steel/metal handrails, throw screens and canopy, steel balustrading where required, stainless steel handrails
- platform canopy – steel frame and glazed glass awning with a solid steel roof over the platform edges and translucent roof in the centre of the platform.

The design would be submitted to Transport for NSW's Design Review Panel at various stages for comment before being accepted by Transport for NSW. An Urban Design Plan (UDP) and/or Public Domain Plan would also be prepared by the Contractor, prior to finalisation of detailed design for endorsement by Transport for NSW.

3.3 Design development

3.3.1 Engineering constraints

There are a number of constraints which have influenced the design development of the Proposal these include:

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

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

Heritage: Turrella Station is listed on the Transport Asset Holding Entity's (TAHE) Section 170 Heritage and Conservation Register. The station has local historical, aesthetic, social, research and technical, rarity and representative significance.

Turrella Railway Station is as an example of a small Inter-War period suburban railway building demonstrating design and construction techniques of the inter-war period. It provides insight into NSW Railway's experimentation with styles of architecture and adaptation to Depression period economic conditions.

Utilities: A Dial Before You Dig (DBYD) search has identified a number of utilities in the vicinity of the proposed work including:

- Sydney Water Main and sewer
- Jemena medium pressure gas main
- Telstra and Optus communication cables
- services in the platforms including electrical and communications
- stormwater services
- rail systems including signalling infrastructure and cabling, communications optic fibre, and overhead wiring.

Public access: pedestrian access to the station would be maintained during the construction process.

Construction access: construction access would require traffic control in the adjacent streets and use of a large mobile crane would be required to lift construction materials and equipment to the Station from these roadways. Proposed isolation padmount substation location is constrained by maintaining distance from nearby underground 33kV conduit.

3.3.2 Design standards

The Proposal would be designed having regard to the following:

- Disability Standards for Accessible Public Transport 2002 (issued under the DDA)
- Building Code of Australia
- relevant Australian Standards
- Transport for NSW Asset Management Branch standards
- Sydney Trains standards
- Infrastructure Sustainability Council (IS Council) Infrastructure Sustainability Rating Scheme (V1.2)
- Guidelines for the Development of Public Transport Interchange Facilities (Ministry of Transport, 2008)
- Crime Prevention Through Environmental Design principles
- other Transport for NSW policies and guidelines
- council standards, codes and guidelines where relevant.

3.3.3 Sustainability in design

Transport for NSW is committed to minimising the impact on the natural environment and supports the IS Council's Infrastructure Sustainability (IS) rating tool. The IS rating tool was developed and is administered by IS Council. It is an independently verified and nationally recognised rating system for evaluating sustainability across design, construction and operation of infrastructure.

The Turrella Station Upgrade is one of a number of projects within the Transport Access Program that is using version 1.2 of the IS rating tool and targeting an 'Excellent' rating. The rating scheme provides an independent and consistent methodology for the application and evaluation of sustainability outcomes in infrastructure projects.

The development of the concept design for the Proposal has been undertaken in accordance with the project targets identified in the program wide TAP 3 Sustainability Strategy.

The Sustainability Strategy sets targets across the following key issues:

- climate change adaption and resilience
- renewable energy
- waste
- materials
- supply chain management
- community connection
- social procurement and workforce.

Key design elements and strategies developed during concept design will be used to further develop the design and construction.

3.4 Construction activities

3.4.1 Work methodology

Subject to approval, construction is expected to commence in early 2022 and take approximately 18 months to complete. The construction methodology would be further developed during the detailed design of the Proposal by the nominated Contractor in consultation with Transport for NSW.

The proposed construction activities for the Proposal are identified in Table 3-1. This staging is indicative and is based on the current concept design and may change once the detailed design methodology is finalised. The staging is also dependent on the Contractor's preferred methodology, program and sequencing of work.

Table 3-1 Indicative construction staging for key activities

Stage	Activities
Site establishment and enabling work	• establish site compounds (i.e. fencing, site offices, amenities and plant/material storage areas) • establish temporary facilities as required (temporary toilets, temporary construction lights etc.) • erect site hoarding as required • service location and relocation • confirmation of locations of existing underground utilities • relocate utilities as required • establish protection zones around utilities not required to be relocated
Lift installation, stairs, and canopy construction	• prepare sites and position cranes and piling rigs for lifts • temporary earthworks and dismantling of fencing and barriers to allow piling rigs to reach desired locations • excavation of lift pit and lift landing footings (including temporary shoring if required) • piling works for lift and lift landing • waterproof (as required) • install reinforcement, formwork and concrete to form the lift pit and footings • erect glass and steel shaft structure • install structural supports for lift landing • install lift landing • install lift, including fit-out • remove existing stairs from Reede Street to the station platforms • carry out piling work and establish footings for the new stairs • install the new stairs • construct street level walk-out to lift with fit-out around lift including new canopy and anti-throw screens. • piling work for canopy footings • concrete pour • erect steel framework and roof

Stage	Activities
Turrella Street and Reede Street modifications	• demolition/excavation of existing non-compliant footpath • construction of ramp and regrading of footpath area to tie into existing footpath on Reede Street and Turrella Street • installation of traffic barriers • partial removal of medium strip on Reede Street • adjustment of line markings and pedestrian crossing on Turrella Street
Station building work	• reconfiguration of existing male and female toilets into family accessible toilet, ambulant toilet, staff toilet and cleaning room
Demobilisation, testing and commissioning	• installation of ancillary features • removal of hoardings • site demobilisation • testing electrical, communications and signalling components • commissioning of new lifts

3.4.2 Plant and equipment

The plant and equipment likely to be used during construction includes:

- hand tools
- all terrain forklift
- street sweeper
- 12 tonne crane truck
- hi-rail crane truck
- hi-rail flat bed vehicle
- water cart
- demolition saw
- generator (5kVA – 25 kVA)
- petrol pressure washer
- solar/generator powered light towers for night works
- vacuum truck
- bore rigs
- 10 tonne smooth drum roller
- rivet buster
- oxy-acetylene burner
- piling rigs (bore)
- hi-rail piling rig (25 tonne)
- jackhammer
- air compressor
- 4 tonne excavator
- 2.5 tonne excavator
- 1.5 tonne excavator
- articulated dump truck
- 250 tonne crane

3.4.3 Working hours

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

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

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

Out of hours work is required in some cases to minimise disruptions to customers, pedestrians, motorists and nearby sensitive receivers; and to ensure the safety of railway

workers and operational assets. It is estimated that approximately four rail possessions would be required to facilitate the following:

- construction and installation of new stairs
- service relocation work
- electrical work
- piling works for lifts
- lift installation
- work on the station including regrading, construction of canopies and work involving service routes.

Out of hours work may also be scheduled outside rail possession periods. Approval from Transport for NSW would be required for any out of hours work and the affected community would be notified as outlined in Transport for NSW's *Construction Noise and Vibration Strategy* (CNVS) (TfNSW, 2019a) (refer to Section 6.3 for further details).

3.4.4 Extended Working Hours during COVID-19

The Minister for Planning and Public Spaces has made a number of Orders under Section 10.17 of the EP&A Act in response to the COVID-19 pandemic. This includes the *Environmental Planning and Assessment (COVID-19 Development – Infrastructure Construction Work Days No. 2) Order 2020* (the 'Order'), which commenced on 24 December 2020, and is applicable to construction activities for projects which have been subject to an assessment under Division 5.1, or approval under Division 5.2 of the EP&A Act. The Order extends the standard construction hours to allow infrastructure construction work on Saturday, Sunday and Public holidays (7am to 6pm), without the need for any approval (excluding high noise generating works such as rock breaking or pile driving and the like).

These extended working hours were due to expire on 25 March 2021. However, on Wednesday 24 March 2021, the NSW Government introduced the COVID-*19 Legislation Amendment (Emergency Measures) Bill 2020*, which was subsequently passed by parliament, and came into effect on 25 March 2021. A section of the Bill enabled the extension of the extended working hours until 31 March 2022.

Whilst no further assessment of the environmental impacts is required for these extended working hours, in the event that Transport for NSW would seek to utilise the extended working hours permitted by the Order, advance notification would be provided to the community.

3.4.5 Earthworks

Excavations and earthworks would generally be required for the following:

- lift shaft pit excavation
- regrading and resealing of Platforms 1 and 2
- excavation for power supply upgrade work
- excavation for construction of the kiss and ride bay located along Turrella Street
- footpath regrading on Turrella Street
- partial removal of median strip on Reede Street

Excavated material would be reused onsite where possible or disposed of in accordance with relevant legislative and sustainability requirements.

Specific locations for spoil placement would be agreed with Transport for NSW and the Contractor during the delivery phase.

It is estimated that approximately 280 cubic metres of spoil would be generated by the Proposal.

3.4.6 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 IS Council Infrastructure Sustainability Rating Scheme (v1.2). Materials would be sourced from local suppliers where practicable. Reuse of existing materials and sourcing recycled materials would be undertaken where practicable. Investigation of materials that have environmental labels (such as an Environmental Product Declaration) would also be considered as part of the detailed design and procurement processes.

3.4.7 Traffic access and vehicle movements

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

- temporary increase in walking distance for rail customers on the station platforms during construction work due to placement of construction hoarding and work sites
- bus stop on the northern side of Turrella Street west of Reede Street may be temporarily closed during construction requiring customers to use the bus stop on Loftus Street, approximately 200 metres away
- minor disruptions to pedestrian/cyclist movements in and around the station and minor increase in traffic on the local road network during temporary road closures.

3.4.8 Ancillary facilities

A total of five laydown areas and one temporary construction compound would be required for the Proposal to accommodate a site office, amenities, laydown and storage area for materials. It has been proposed the temporary construction compound would be positioned within the rail corridor opposite 29 Henderson Street.

In addition, four laydown areas would be located east of the Reede Street overbridge. Three of which are located within the rail corridor while one is positioned on a vacant area of land located at 27 Henderson Street (owned by TAHE).

The fifth laydown area would be located approximately 900 metres west of the Reede Street overbridge positioned within the rail corridor. Proposed compound and laydown areas are shown in Figure 1-2.

Impacts associated with utilising these areas have been considered in the environmental impact assessment including requirements for rehabilitation.

3.4.9 Public utility adjustments

The Proposal has been designed to avoid relocation of services where feasible, however further investigation may be required. It is likely some services may require relocation, including electrical services on Henderson Street and a light pole that provides an existing Optus underground to above ground connection on Turrella Street. Other relocations are unlikely to occur outside of the footprint of the work assessed in this REF. In the event that work would be required outside of this footprint, further assessment would be undertaken. The appropriate utility providers would be consulted during the detailed design phase.

3.5 Property acquisition

Transport for NSW does not propose to acquire any property as part of the Proposal.

3.6 Operation and maintenance

The future operation and maintenance of the Turrella Station and interchange is subject to further discussions with Sydney Trains, Transport for NSW and Bayside Council. Structures constructed under this Proposal would be maintained by Sydney Trains. It is expected that an adjacent garden/landscape area between rail corridor boundary fence and Turrella Street would be vested to and maintained by Bayside Council.

4 Statutory considerations

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

4.1 Commonwealth legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

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

As the Proposal would not or is not likely to have a significant impact on any matters of NES or on Commonwealth land, a referral to the Commonwealth Minister for the Environment is not required.

4.1.2 Other Commonwealth legislation

Other Commonwealth legislation applicable to the Proposal is discussed in Table 4-1.

Table 4-1 Other Commonwealth legislation applicable to the Proposal

Applicable legislation	Considerations
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	There is an obligation on a person who discovers anything which he or she has reasonable grounds to suspect are Aboriginal remains to report that discovery to the Minister, giving particulars of the remains and their location. The Proposal does not include any previously identified Aboriginal sites and/or places (refer Section 6.5); however, considerations for unexpected finds further detailed in mitigation measures and applies to this Act.
DDA	This Act aims to eliminate as far as possible, discrimination against persons on the ground of disability in areas including access to premises and the provision of facilities, services and land. The Proposal would be designed having regard to the requirements of this Act. The key objective of the Proposal is to improve the accessibility of Turrella Station which is consistent with the objectives of this Act.
Native Title Act 1983	This Act aims to provide for the recognition and protection of Native Title, how Native Title land is used and establishes a mechanism for determining claims to Native Title. There are no pending or approved Native Title claims over the Proposal area.

4.2 NSW legislation and regulations

4.2.1 Transport Administration Act 1988

The *Transport Administration Act 1988* establishes Transport for NSW as a public authority who is to exercise its functions in a manner that promotes certain common objectives, including to promote the delivery of transport services in an environmentally sustainable manner.

This REF has been prepared having regard to, among other things, the specific objectives of Transport for NSW under the *Transport Administration Act 1988*, including:

2A Objects of Act

…

a) to provide an efficient and accountable framework for the governance of the delivery of transport services,

b) to promote the integration of the transport system,

c) to enable effective planning and delivery of transport infrastructure and services,

d) to facilitate the mobilisation and prioritisation of key resources across the transport sector,

e) to co-ordinate the activities of those engaged in the delivery of transport services,

f) to maintain independent regulatory arrangements for securing the safety of transport services.

2B Common objectives and service delivery priorities of public transport agencies

…

(a) ***Environmental sustainability***

To promote the delivery of transport services in an environmentally sustainable manner.

(b) ***Social benefits***

To contribute to the delivery of social benefits for customers, including greater inclusiveness, accessibility and quality of life.

4.2.2 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 Division 5.1 of the EP&A Act. Division 5.1 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as Transport for NSW, which do not require development consent under Part 4 of the Act.

In accordance with section 5.5 of the EP&A Act, Transport for NSW, as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the Proposal.

Clause 228 of the EP&A Regulation defines the factors which must be considered when determining if an activity assessed under Division 5.1 of the EP&A Act has or is likely to have a significant impact on the environment. Chapter 6 of the REF provides an environmental impact assessment of the Proposal in accordance with clause 228 and Appendix B specifically responds to the factors for consideration under clause 228.

4.2.3 Other NSW legislation and regulations

Table 4-2 provides a list of other relevant legislation applicable to the Proposal.

Table 4-2 Other legislation applicable to the Proposal

Applicable legislation	Considerations
Biodiversity Conservation Act 2016 (NSW)	The Proposal area 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 Section 6.7).
Biosecurity Act 2015 (NSW)	Clause 22 requires any person who deals with a biosecurity matter has a duty to ensure that in so far as is reasonably practicable, the potential biosecurity risk is prevented, eliminated or minimised. Appropriate management methods would be implemented during construction if declared noxious weeds in the Bayside LGA are identified (refer to Section 6.7).
Contaminated Land Management Act 1997 (CLM Act) (NSW)	Section 60 of the CLM Act imposes a duty on landowners to notify the Department of Planning, Industry and Environment (DPIE), and potentially investigate and remediate land if contamination is above EPA guideline levels. The site has not been declared under the CLM Act as being significantly contaminated (refer Section 6.8).
Crown Lands Act 1987 (NSW)	The Proposal does not involve work on any Crown land.
DDA	The Proposal would be designed having regard to the requirements of this Act.
Heritage Act 1977 (Heritage Act) (NSW)	The following sections of the Heritage Act contain requirements for impacts to heritage listed items or exposure of relics: • Sections 57 and 60 (approval) where items listed on the State Heritage Register are to be impacted • Sections 139 and 140 (permit) where relics are likely to be exposed • Section 170 where items listed on a government agency Heritage and Conservation Register are to be impacted. The Turrella Railway Station is listed on the Transport Asset Holding Entity's Section 170 Heritage and Conservation Register (Item 4801898). The Proposal has been assessed as having a minor adverse impact on the station group with impacts attributed to changes to visual presentation and configuration of station. More detail is shown in the heritage assessment summarised in Section 6.5. The heritage assessment also concluded that the archaeological potential within the study area is low. However, if unexpected archaeological items are discovered during the construction of the Proposal, all works would cease and appropriate advice sought, in accordance with Transport for NSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2019b). Formal notification is to be provided by the asset owner to the Heritage Council regarding the demolition of structures associated with the Turrella Station Group at least 14 days prior to the demolition of these structures in accordance with section 170A(1)(c) of the Heritage Act.

Applicable legislation	Considerations
	No items of State heritage significance were identified near the Proposal, and therefore an approval under Section 60 of the Heritage Act would not be required.
National Parks and Wildlife Act 1974 (NPW Act) (NSW)	Sections 86, 87 and 90 of the NPW Act require consent from NSW Environment, Energy and Science (formerly NSW Office of the Environment and Heritage (OEH)) for the destruction or damage of Aboriginal objects. The Proposal is unlikely to disturb any Aboriginal objects (refer Section 6.4). However, if unexpected archaeological items or items of Aboriginal heritage significance are discovered during the construction of the Proposal, all work would cease and appropriate advice sought. In addition, the Turrella Reserve is located 240 metres north-west of the Proposal. The Proposal is not anticipated to result in any adverse impacts to this park and would not involve impacts to land reserved for, or adjacent to, land reserved under the NPW Act.
Protection of the Environment Operations Act 1997 (PoEO Act) (NSW)	The Proposal does not involve a 'scheduled activity' under Schedule 1 of the PoEO Act. Accordingly, an Environment Protection Licence (EPL) is not required for the Proposal. However, in accordance with Part 5.7 of the PoEO Act, Transport for NSW would notify the EPA of any pollution incidents that occur onsite. This would be managed in the Construction Environmental Management Plan (CEMP) to be prepared and implemented by the Contractor.
Roads Act	Section 138 of the Roads Act requires consent from the relevant road authority for the carrying out of work in, on or over a public road. However, clause 5(1) in Schedule 2 of the Roads Act states that public authorities do not require consent for work on unclassified roads. The roads surrounding the Proposal are local roads, managed and maintained by Bayside Council (refer to Section 6.1). The Proposal would involve work to the median strip on Reede Street, the footpath along Turrella Street and Reede Street as well as excavation works for a kiss and ride bay on Turrella Street. Reede Street and Turrella Street are local roads maintained by local council. Road Occupancy Licence/s (ROL) would be obtained from the relevant roads authority for road work and any temporary road closures where required. Traffic impacts of the Proposal are discussed further in Section 6.1.
Sydney Water Act 1994 (NSW)	The Proposal would not involve discharge of wastewater to the sewer.
Waste Avoidance and Resource Recovery Act 2001 (WARR Act) (NSW)	Transport for NSW would carry out the Proposal having regard to the requirements of the WARR Act. A site-specific Waste Management Plan would be prepared.
Water Management Act 2000 (NSW)	The Proposal would not involve any water use (from a natural source e.g. aquifer, river – only from the network), water management work, drainage or flood work, controlled activities or aquifer interference.

4.2.4 State Environmental Planning Policies

State Environmental Planning Policy (Infrastructure) 2007

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

Division 15, Clause 79 of the Infrastructure SEPP allows for certain types of development to be carried out by or on behalf of a public authority without consent on any land (i.e. assessable under Division 5.1 of the EP&A Act). Specifically, Clause 79(1) of the Infrastructure SEPP states that:

> *'Development for the purpose of a railway or rail infrastructure facilities may be carried out by or on behalf of a public authority without consent on any land.'*

Clause 78 defines 'rail infrastructure facilities' as including elements such as:

> *(a) 'railway tracks, associated track structures, cuttings, drainage systems, fences, tunnels, ventilation shafts, emergency accessways, overbridges, embankments, level crossings and roads, pedestrian and cycleway facilities.'*
>
> *(d) 'railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms'*
>
> *(e) public amenities for commuters*
>
> *(f) associated public transport facilities for railway stations…'*

Consequently, development consent is not required for the Proposal, which is classified as a rail infrastructure facility, however the environmental impacts of the Proposal have been assessed under the provisions of Division 5.1 of the EP&A Act.

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

The Infrastructure SEPP prevails over all other environmental planning instruments except where there is an inconsistency with *State Environmental Planning Policy (State Significant Precincts) 2005* or certain provisions of *State Environmental Planning Policy (Coastal Management) 2018*. The Proposal does not require consideration under these SEPPs and therefore do not require further consideration as part of this REF.

State Environmental Planning Policy 55 – Remediation of Land

State Environmental Planning Policy No.55 — Remediation of Land (SEPP 55) provides a State-wide approach to the remediation of contaminated land for the purpose of minimising the risk of harm to the health of humans and the environment. While consent for the Proposal is not required, the provisions of SEPP 55 have still been considered in the preparation of this REF.

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

Impacts of contaminated lands and potential remediation are in Section 6.8.

State Environmental Planning Policy 19 – Bushland in Urban Areas

This instrument requires public authorities to not disturb bushland referred to in clause 6(2) unless it has first considered the aims of this instrument.

The Bayside LGA is a LGA that this instrument applies to. The Proposal area is not located within bushland and is not located adjacent to any bushland areas with the exception of the temporary laydown area located off Henderson Street. In this instance an exclusion zone would be created to prevent accidental damage.

The REF has considered the general aim of this instrument through an assessment of biodiversity matters relevant to the Proposal.

State Environmental Planning Policy (Coastal Management) 2018

The Coastal Management SEPP seeks to balance social, economic and environmental interests by promoting a coordinated approach to coastal management. It defines the four coastal management areas in the *Coastal Management Act* through detailed mapping and specifies assessment criteria that are tailored for each coastal management area. Councils and other consent authorities must apply these criteria when assessing proposals for development that fall within one or more of the mapped areas.

The Proposal area is located within a coastal environment area under the Coastal Management SEPP. The provisions of the Infrastructure SEPP prevail over the Coastal Management SEPP except in areas identified as coastal wetlands, littoral rainforests, and where coastal protection works are to be undertaken. As the Proposal is not within an area identified as a coastal wetland or littoral rainforest, and coastal protection works are not being undertaken, the provisions of the Coastal Management SEPP do not apply to this Proposal.

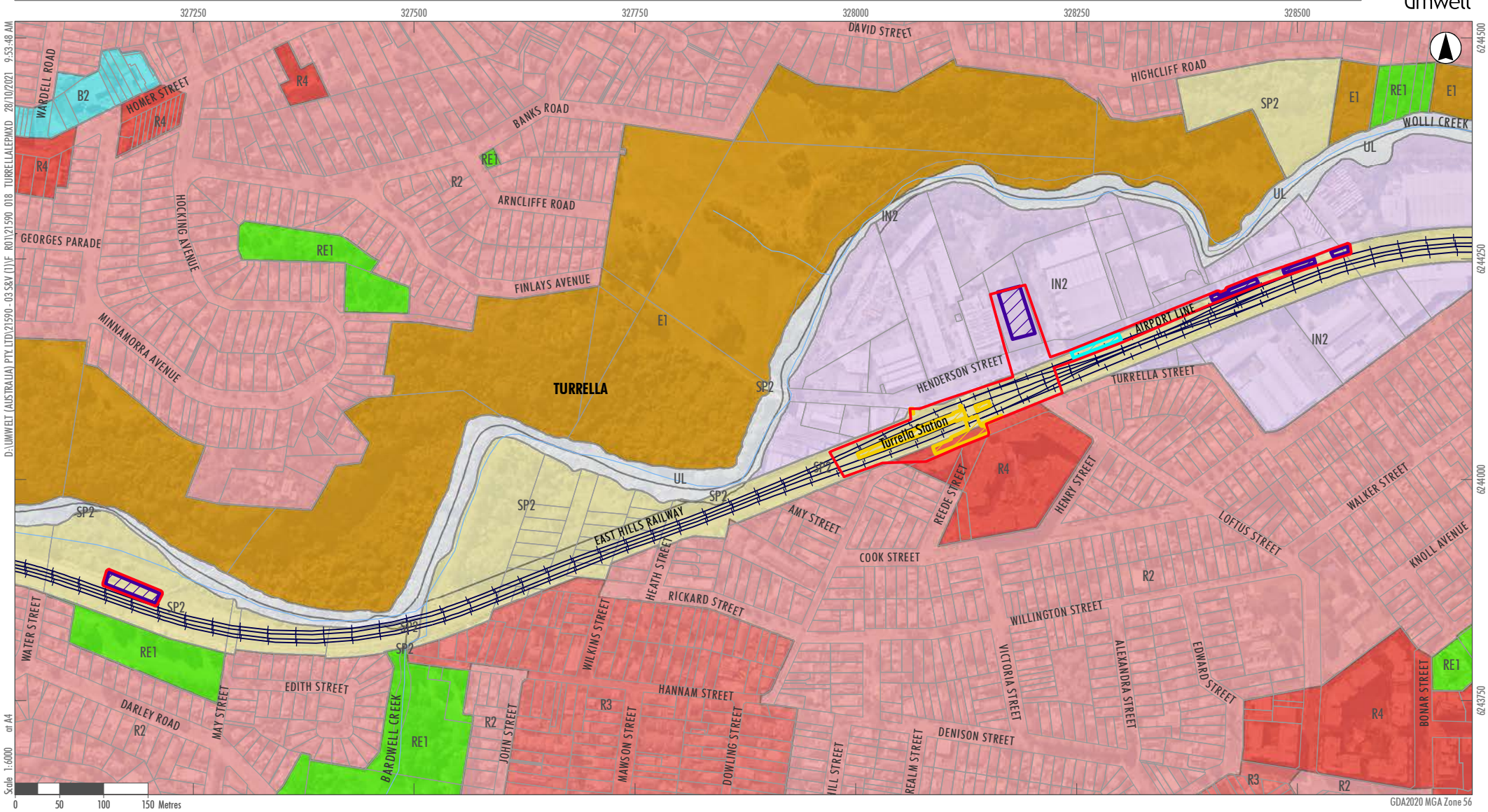
4.2.5 Bayside Local Environmental Plan 2021

The Proposal is located within the Bayside LGA. The Infrastructure SEPP prevails over all other environmental planning instruments (such as LEPs) except where there is an inconsistency with State Environmental Planning Policy (State Significant Precincts) 2005 or certain provisions of State Environmental Planning Policy (Coastal Management) 2018. During the preparation of this REF, the provisions of *Bayside Local Environmental Plan 2021* were considered (refer Table 4-3).

Table 4-3 Relevant provisions of the Bayside LEP

Provision description	Relevance to the Proposal
Clause 2.3 - Zone objectives and Land Use Table	Under the Bayside LEP 2021, the Proposal is located in areas zoned as: • SP2 Infrastructure (Railway) for the proposed works associated with the station platform and building, the new entrance on Reede Street and footpath regrading on Turrella Street. • R4 High Density Residential for the proposed works associated with the new kiss and ride bay, footpath regarding and ramp construction on Turrella Street. The objectives of the applicable land zones are as follows: • SP2 Infrastructure (Railway) – to provide for infrastructure and related uses and to prevent development that is not compatible with or that may detract from the provision of infrastructure • R4 High Density Residential: To provide for the housing needs of the community within a high density residential environment and to provide a variety of housing types within a high density residential environment while also enabling other land uses that provide facilities or services to meet the day to day needs of residents. The Proposal is consistent with the objectives of zone SP2 Infrastructure (Railway) as it provides the addition of new infrastructure to the station that would enhance operations whilst not causing any adverse impact to the surrounding locality. The Proposal would allow equitable access to Turrella Station meeting the day to day needs of residents and encouraging a growing community. This is generally consistent with objectives outlined within the R4 high density residential zone
Clause 5.10 – Heritage Conservation	Clause 5.10 of the Bayside LEP 2021 aims to conserve the environmental heritage of the local area, the heritage significance of heritage items and heritage conservation areas, archaeological sites and Aboriginal objects and places. Turrella Station is not listed as a heritage item of local significance nor is it located within a conservation area identified within the Bayside LEP 2021. A discussion of potential impacts to local heritage and the requirements for consent are provided in Section 6.4.
Clause 5.12 – Infrastructure development and use of existing buildings of the Crown	Clause 5.12 of the Bayside LEP does not restrict or prohibit the carrying out of any development, by or on behalf of a public authority, which is permitted to be carried out with or without development consent. The Proposal would be undertaken by a public authority and is permitted without development consent.
Clause 6.1 – Acid Sulfate Soils	Clause 6.1 of the Bayside LEP aims to ensure that development does not disturb, expose or drain acid sulfate soils and cause environmental damage. Turrella Station is located within an area mapped as Class 5, meaning acid sulfate soils are not expected to be found. Further detail is provided in Section 6.8.

Provision description	Relevance to the Proposal
Clause 6.2 - Earthworks	Clause 6.2 of the Bayside LEP 2021 aims to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land. Potential impacts due to earthworks are discussed in Section 6.8.
Clause 5.21– Flood planning	Clause 5.21 of the Bayside LEP 2021 aims to minimise the flood risk to life and property and flood impacts on the environment. The Proposal site and surrounding areas is designated as flood planning areas under Bayside LEP. Consideration of the potential flood risk mitigation measures to manage flood risk for the Proposal are outlined in Section 6.9.
Clause 6.4 – Biodiversity protection	Clause 6.4 of the Bayside LEP 2021 aims to maintain and enhance native fauna, flora and ecological processes and encourage the recovery of native fauna and flora and their habitats. Potential impacts on biodiversity are provided in Section 6.7.
Clause 6.5 – Riparian land, watercourses and artificial waterbodies	Clause 6.5 of the Bayside LEP 2211 aims to protect and maintain water quality, the stability of the bed and banks and ecological processes within waterways and riparian lands. Potential impacts on water quality are outlined in Section 6.9.



Legend

- Proposal Area
- Proposed Work Area
- Laydown Area
- Construction Compound
- Watercourses
- Railway Line

Zoning

- B2 Local Centre
- E1 National Parks and Nature Reserves
- IN2 Light Industrial
- R2 Low Density Residential
- R3 Medium Density Residential
- R4 High Density Residential
- RE1 Public Recreation
- SP2 Infrastructure
- UL Unzoned Land

Image Source: Nearmap (May 2021) Data source: NSW DFSI (2020)

FIGURE 4-1

Bayside LEP Zoning Map

4.3 Ecologically sustainable development

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

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

The principles of ESD have been adopted by Transport for NSW throughout the development and assessment of the Turrella Station Upgrade. Section 3.3 summarises how ESD would be incorporated in the design development of the Proposal. Section 6.13 includes an assessment of the Proposal on climate change and sustainability, and Section 7.2 lists mitigation measures to ensure ESD principles are incorporated during the construction phase of the Proposal.

5 Community and stakeholder consultation

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

5.1 Stakeholder consultation during concept design

Key stakeholders for the Turrella Station Upgrade, comprising Transport for NSW, Sydney Trains and Bayside Council, were engaged during the development of the Proposal to provide insights into the station's deficiencies and future development and growth plans, and to also participate in the development and assessment of the station improvement options.

Workshops and meetings undertaken during the development of the concept design included:

- options assessment workshops with relevant Transport for NSW and Sydney Trains representatives
- briefing meeting with Bayside Council
- security risk assessment workshop
- climate change risk assessment workshop
- safety in design workshop
- sustainability workshop

5.2 Consultation requirements under the Infrastructure SEPP

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

Table 5-1 provides details of consultation requirements under the Infrastructure SEPP for the Proposal.

Table 5-1 Infrastructure SEPP consultation requirements

Clause	Clause particulars	Relevance to the Proposal
Clause 13 | Consultation with Councils – development with impacts on council related infrastructure and services	Consultation is required where the Proposal would result in: • substantial impact on stormwater management services • generating traffic that would place a local road system under strain • involve connection to or impact on a council owned sewerage system • involve connection to and substantial use of council owned water supply • significantly disrupt pedestrian or vehicle movement • involve significant excavation to a road surface or footpath for which Council has responsibility.	The Proposal includes work that would: • require connections or impacts the stormwater system • disrupt pedestrian and vehicle movements • impact on road pavements under Council's care and control • impact on Council-operated footpaths. Consultation with Bayside Council has been undertaken and would continue throughout the detailed design and construction phases.
Clause 14 | Consultation with Councils – development with impacts on local heritage	Where railway station work: • substantially impact on local heritage item (if not also a State heritage item) • substantially impact on a heritage conservation area.	There is no proposed impact to local heritage/heritage conservation area. Accordingly, consultation with Council is not required. Further detail of impacts of the Proposal on the Turrella Railway Station Group refer to Section 6.5.
Clause 15 | Consultation with Councils – development with impacts on flood liable land	Where railway station work: • impact on land that is susceptible to flooding – reference would be made to *Floodplain Development Manual: the management of flood liable land.*	The Proposal is located on land that is identified by the Bayside Council to be susceptible to flooding. Accordingly, consultation with Bayside Council is required. Consultation will be undertaken as part of the planning approvals process during public display. Impacts of flooding on the Proposal is further discussed in Section 6.9.
Clause 15A Consultation with Councils – development with impacts on certain land within the coastal zone	Where railway station work would: • impact on land within a coastal vulnerability area and is inconsistent with certified coastal management program that applies to that land	There is no proposed impact to land located within the coastal zone. Accordingly, consultation with Council is not required.

Clause	Clause particulars	Relevance to the Proposal
Clause 15AA Consultation with State Emergency Service – development with impacts on flood liable land	Where railway station work would: • impact on flood liable land - written notice must be given (together with a scope of work) to the State Emergency Services and taken into consideration any response to the notice received from the State Emergency Service within 21 days after the notice is given.	The Proposal is located on land that is designated as a flood planning area under the Bayside LEP. The Proposal Area is susceptible to flooding under a probable maximum flood event. Consultation would be undertaken with the State Emergency Services in accordance with clause 15AA.
Clause 16 | Consultation with public authorities other than Councils	For *specified development* which includes consultation with the DPIE for development that is undertaken adjacent to land reserved under the NPW Act and other agencies specified by the Infrastructure SEPP where relevant. Although not a specific Infrastructure SEPP requirement, other agencies Transport for NSW may consult with could include: • Sydney Trains • NSW Train Link • OEH	As identified in Table 4-1, Turrella Reserve is located approximately 240 metres north-west of the Proposal. The Proposal is not anticipated to result in any adverse impacts to the reserve and would not involve impacts to land reserved for, or adjacent to land reserved under, the NPW Act. Therefore, consultation with DPIE under Clause 16 is not required. Consultation with Sydney Trains has occurred throughout the optioneering and concept design process and would continue during detailed design of the Proposal.

5.3 Consultation strategy

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

The objectives of the consultation strategy are to:

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

5.4 Public display

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

- installation of information signage at the station with QR codes taking customers to the project webpage
- public display of the REF on the project webpage including customer feedback form
- distribution of a project notification at the station, and to local community and rail customers, outlining the Proposal and inviting feedback
- targeted social media posts linking to the project webpage
- NSW Government Have Your Say website linking to the project webpage
- consultation with Bayside Council, Sydney Trains, and key stakeholders
- community information session (if permitted)
- media release.

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

The REF would also be available on the Transport for NSW website[1]. Information on the Proposal would be available through the Project Infoline (1800 684 490) or by email[2].

Feedback can be sent to:

- projects@transport.nsw.gov.au
- Transport Access Program – Turrella Station Upgrade

  Director Environment and Sustainability (Rail Development and Delivery)

  Transport for NSW

  PO Box K659

  Haymarket NSW 1240

Or submitted:

- via https://www.transport.nsw.gov.au/projects/current-projects/turrella-station-upgrade

Following consideration of feedback received during the public display period, Transport for NSW would determine whether to proceed with the Proposal and what conditions would be imposed on the project should it be determined to proceed.

[1] http://www.transport.nsw.gov.au/projects-tap
[2] projects@transport.nsw.gov.au

5.5 Aboriginal community involvement

An Aboriginal Heritage Information Management System (AHIMS) search was undertaken for the area covered by the Proposal (the area around Turrella Station) plus a 200 metres radius, on 10 September 2021. The search did not identify any Aboriginal sites or places.

The extensive landscape modification that has occurred across the Proposal area suggests that intact evidence of Aboriginal land use is unlikely to occur within the boundaries of the Proposal area. Similarly, the high level of disturbance would suggest that the archaeological potential of the area is low. Therefore, it was not considered necessary to undertake specific Aboriginal consultation.

5.6 Ongoing consultation

At the conclusion of the public display period for this REF, Transport for NSW would acknowledge receipt of feedback from each respondent. The issues raised by the respondents would be considered by Transport for NSW before determining whether to proceed with the Proposal (refer Figure ES.1-2).

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

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

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 B.

6.1 Traffic and transport

A Traffic, Transport and Access Impact Assessment was undertaken by Turnbull Engineering in September 2021 to support this Proposal (Turnbull Engineering, 2021). The following sections assess the potential impacts to road and rail users during the construction and operation stages of the Proposal and provide mitigation measures to reduce these impacts.

6.1.1 Existing environment

Site context

Turrella Station is located in the suburb of Turrella bordered by the suburbs of Bardwell Park, Earlwood, Wolli Creek and Bardwell Valley. The station services the T8 Airport and South Line and is bounded by Turrella Street between Hannam Street and Reede Street on the south side of the rail line and Henderson Street to the north of the rail line. Access to the station is provided by the Reede Street overbridge connecting Turrella Street and Henderson Street.

Road network

Turrella Station is surrounded by local roads including Turrella Street, Henderson Street, Reede Street and Hannam Street. These roads have a sign posted speed limit of 50km/hr. and are characterised by a single traffic lane in each direction. Turrella Station is only accessible via stairs located on the Reede Street overbridge which spans over the rail corridor.

Car parking

There is no formal commuter car parking provided at Turrella Station however there are 74 unrestricted on-street parking spaces located on local roads in close proximity to the station.

Public transport

Rail

Turrella Station services the T8 Airport and South Line. Platform 1 serves inbound train services towards Central Station and the City Circle via the Airport and Platform 2 services outbound train services towards Macarthur Station.

Bus

One bus route currently operates in the vicinity of Turrella Station:

- bus route 473 – Rockdale to Campsie, operated by Transit Systems.

Bus stops close to the station are located on Turrella Street and Loftus Street. Both bus stops do not provide seating nor shelter for customers.

Active Transport

Pedestrian network

Paved footpaths are provided on both sides of Turrella Street, Reede Street and Henderson Street.

A marked pedestrian crossing is located on Turrella Street west of Reede Street, providing a safe crossing point for customers of the station and connecting the station to the kiss-and-ride zone on the southern side of Turrella Street.

Cycle network

The cycle network in the vicinity of Turrella Station is limited. The network consists of marked on-road cycle routes on Turrella Street, Hannam Street, Reede Street and Henderson Street with a bicycle locker accommodating up to four bicycles located approximately 60 metres west of Turrella Station on the northern side of Turrella Street. No other bicycle parking facilities are located within proximity to Turrella Station.

Kiss and ride

A kiss and ride bay accommodating one vehicle is located on the southern side of Turrella Street between Hannam Street and Reede Street.

6.1.2 Potential impacts

a) Construction phase

Traffic

The majority of construction vehicles generated by the Proposal are expected to be light vehicles (including utilities) for construction workers with heavy vehicles reserved for the delivery and removal of materials, plant and equipment. The traffic generated by the construction work is not expected to exceed 20 light vehicles and three heavy vehicles per day during the peak construction period. A marginal increase in vehicles is expected during rail shutdowns.

Temporary full or partial closure of sections of Turrella Street, Reede Street and Henderson Street would be required to facilitate works such as crane lifts, structure deliveries, modifications to aerials, concrete pours and earthworks. Appropriate detour routes and/or other traffic management arrangements would be implemented when these roads are temporarily closed. Temporary road closures would result in a minor increase in travel time for vehicles travelling on a detour route.

Furthermore, given that the Reede Street overbridge provides the only vehicle access to properties on Henderson Street, north-south connectivity between Turrella Street and Henderson Street via the Reede Street overbridge would be maintained throughout construction, with appropriate arrangements to be determined during construction planning.

All roadwork would be undertaken on a progressive basis whilst ensuring minimal space and time is required to undertake particular phases of work. Traffic changes would be consulted with Bayside Council prior to construction.

Overall, road network impacts are anticipated to be minor given the availability of alternative roads that provide similar connectivity, and the temporary short-term nature of the closures.

Haulage routes

Potential haulage routes that could be used by construction vehicles travelling to and from the construction compound and the laydown areas are shown in Figure 6-1.

It is recommended that construction vehicles travel via Forest Road, Wollongong Road, Bonar Street, Thompson Street and Turrella Street to access the construction compound. Loftus Street and Kelsey Street have also been nominated as a potential shorter alternative route which should be limited to use outside of the school zone hours to minimise road network and safety impacts when the school zone is in operation on Loftus Street.

The proposed haulage routes are subject to overhead hazard assessments, swept path analysis and the largest vehicle that the construction compound and laydown areas can accommodate. The final construction haulage routes would be determined by the nominated construction contractor during detailed design of the Proposal.

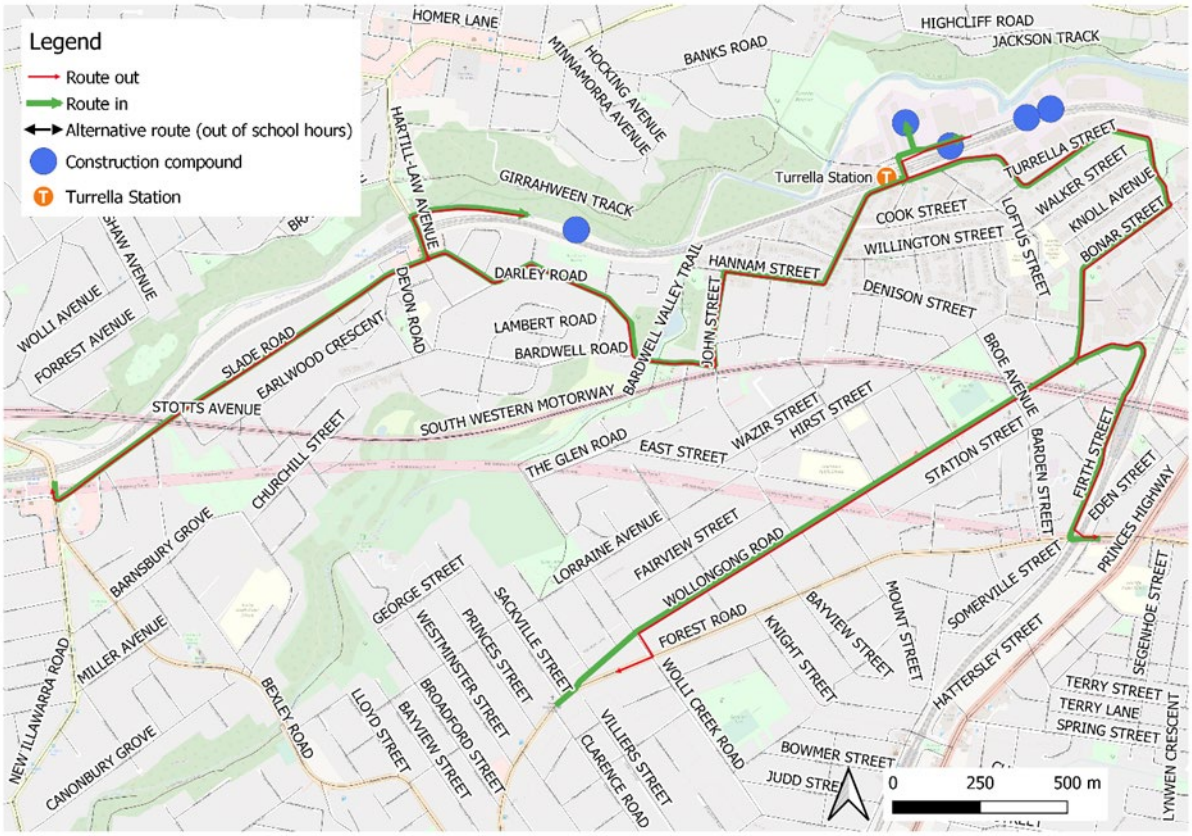


Figure 6-1 Potential haulage routes

Emergency vehicle access

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

Parking

Approximately three parking spaces would be temporarily removed on the southern side of Turrella Street between Hannam Street and Reede Street during construction works. This removal is required to enable the installation of the new corner ramp on Reede Street, relocation of the pedestrian crossing, modifications to line marking and the kiss-and-ride zone. Additional parking spaces may also be temporarily removed on Turrella Street and Henderson Road to facilitate works such as crane lifts, structure deliveries, modification to aerials, concrete pours, earthworks and to accommodate construction vehicle access at the proposed construction compound. Due to the low number of parking spaces that may be removed and the availability of alternative on-street parking spaces nearby, impacts to parking are anticipated to be minor.

Public transport

Bus

The bus stop on the northern side of Turrella Street west of Reede Street may be temporarily relocated during construction, if required the bus stop would be temporarily moved to a location in close proximity to its current location. This would result in a minor increase of walking distance for customers. Signage would be in place and communicated to bus customers in advance of any changes. This impact would be considered minor.

All bus route and stop changes would be assessed by the Transport for NSW Customer Journey Planning team and made in consultation with the relevant bus operator prior to implementation.

Active transport

Pedestrians

Access to and from Turrella Station would be maintained throughout construction via the installation of temporary stairs from the Reede Street overbridge, except during scheduled rail shutdowns when no trains would be running. The existing crossing would be retained until the new crossing has been completed. The removal of the existing crossing would be undertaken during a rail shutdown and traffic control would be provided.

Temporary closure of footpaths on roads surrounding the Proposal may be required during construction. If required, footpaths on the other side of the road would remain open, maintaining connectivity. Temporary full or partial closure of Turrella Street between Reede Street and Hannam Street may result in the closure of the pedestrian crossing and would require pedestrians to cross the road at an alternative location. This closure would be undertaken during a scheduled rail shutdown and traffic control would be provided to allow pedestrians to safely cross Turrella Street.

The presence of construction work on the platforms would reduce the amount of space available and temporarily impact pedestrian movements along the platform. This has the potential to result in a higher level of congestion arising from restricted access to certain areas of the platforms such as near the lift construction area.

Impacts on the pedestrian network are anticipated to be minor due to pedestrian connectivity being maintained throughout construction and the lower traffic volumes expected on Turrella Street when the street is closed during construction. Although traffic volumes associated with heavy vehicles and construction workers would increase, increases are expected to be within typical fluctuations of daily traffic movements and therefore not result in an increased road safety risk during construction.

Temporary signage would be provided to direct pedestrians along detour routes and along the platforms.

Cyclists

On-road cycle routes on Henderson Street, Reede Street and Turrella Street would be affected during temporary full or partial closure of these roads. This would result in cyclists being required to travel via alternative roads including Cook Street, Reede Street or Loftus Street. It is not expected that cyclists and the bicycle locker would be significantly affected, as impacts would be temporary given the temporary nature of the road closures and low number of construction vehicles.

Kiss and ride

Temporary closure of the kiss and ride zone on the southern side of Turrella Street may be required during construction. Impacts would be considered minor given that only one space would be temporarily unavailable, and alternate parking spaces are provided along Turrella Street.

Property access

Property access would be maintained and unaffected by construction work where possible, however temporary obstruction of accesses may be required during activities such as the loading and unloading of oversize materials and plant. Should this be necessary all affected properties would be notified well in advance of disruptions.

b) Operational phase

Road network

The Proposal would assist in making transport infrastructure more accessible to rail customers and in providing an improved transition between transport modes, which would likely increase patronage at Turrella Station. This could lead to a marginal increase in traffic on roads near the station however it is anticipated to have a negligible impact on the surrounding road network.

Parking

The Proposal would remove three on-street parking spaces on the southern side of Turrella Street due to the realignment of the road centreline and reconfiguration of the kiss-and-ride bay. Due to the low number of permanently removed parking spaces and availability of unrestricted on-street parking surrounding the station, parking impacts are anticipated to be minor.

Public transport

No impacts to the existing bus network and train services are expected during operation of the Proposal. It is noted a bench seat would be installed at the bus stop on the northern side of Turrella Street, which would improve customer experience.

Active transport

Pedestrian network

The Proposal would enhance pedestrian accessibility given the inclusion of facilities such as a new lift and new canopies for weather protection. Additionally, the proposed modification to the existing footpath along the northern side of Turrella Street with a new DSAPT compliant ramp, extended guard rails and a widened footpath along the western side of Reede Street would improve pedestrian safety.

Cycle network

No operational impacts are expected to affect the cycle network in proximity of Turrella Station as a result of the Proposal. The Proposal would provide three bike hoops accommodating up to six bicycles located adjacent to 12 Henderson Street.

Kiss and ride

Kiss and Ride facilities at the station would be improved through the modification of the existing single kiss and ride bay on the southern side of Turrella Street to provide a kiss and ride bay with capacity for two vehicles. Connectivity between the kiss and ride bays and the station would also improve due to the relocated pedestrian crossing.

Property access

No changes to private property access would be required as part of the operation of the Proposal.

6.1.3 Mitigation measures

The following general management and mitigation measures are recommended to minimise the potential traffic and transport impacts during construction of the Proposal:

- prior to the commencement of construction, a Construction Traffic Management Plan (CTMP) would be prepared as part of the CEMP and in accordance with relevant guidelines. The CTMP would outline how construction of the Proposal would avoid, mitigate and manage risks involving construction activities to users of the traffic and transport network and local residents. The CTMP would include, at a minimum, procedures for:
    - ensuring adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised
    - maximising safety and accessibility for pedestrians and cyclists
    - ensuring adequate sight lines to allow for safe entry and exit from the site
    - ensuring access to railway stations, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made)
    - managing impacts and changes to on and off street parking and requirements for any temporary replacement provision
    - identifying parking locations for construction workers away from stations and busy residential areas and details of how this will be monitored for compliance
    - identifying routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses
    - managing relocation of kiss and ride, taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired
    - managing traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the CTMP.

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

- communication would be provided to the community and local residents to inform them of changes to parking, pedestrian access and/or traffic conditions including vehicle movements and anticipated effects on the local road network relating to site work.
- Road Occupancy Licences (ROLs) for temporary road closures would be obtained, where required
- investigation into alternative parking arrangements would be carried out in consultation with Bayside Council prior to the commencement of construction to mitigate the loss of parking during construction
- construction workers would be encouraged to carpool or use other forms of transport to travel to and from the construction compound, to minimise parking impacts on commuters, residents and the general public
- adequate information would be provided to affected bus customers and operators due to the potential bus stop closure on Turrella Street including advanced notification and appropriate signage to an alternative bus stop
- a drive-through assessment or swept path analysis would be carried out to ensure that sufficient manoeuvring space is provided for the largest design vehicle along the proposed haulage routes
- traffic Guidance Schemes (TGSs) would be developed for construction works that require lane closures such as on Turrella Street, Reede Street or Henderson Street. TGS implementation would ensure adequate warning and guidance is provided to road users, minimising road related traffic impacts
- access between Turrella Station and the transport network would be maintained during typical construction periods outside of rail shutdown periods
- directional signage and/or linemarking would be used to direct and guide drivers, cyclists and pedestrians past the construction compound and on the surrounding road network
- use of Loftus Street and Kelsey Street as part of an alternative haulage route would be limited to hours outside of the operation of the school zone
- additional investigation into the proposed local roads used by construction routes given the load limits that currently exist would be carried out in consultation with Transport for NSW and Bayside Council
- before and after dilapidation surveys of roads used by construction vehicles between the construction compounds and the arterial road network would be carried out by the construction contractor
- access between Turrella Street and Henderson Street via Reede Street would be maintained during construction, with appropriate arrangements to be determined by the construction contractor during construction planning
- Bayside Council would be consulted about non-compliant swept paths on Reede Street and Turrella Street, with approval of the final design to be obtained prior to the commencement of construction.

Refer to Table 7-1 for a full list of proposed mitigation measures.

6.2 Urban design, landscape and visual amenity

A Landscape and Visual Impact Assessment (LVIA) was undertaken for the Proposal (Envisage, 2021). The assessment included a desktop review, site visit (26 August 2021), landscape character assessment, visual impact assessment and preparation of photomontages. The photomontages provide an indication of what the Proposal would look like from key viewpoints upon completion.

The method for the LVIA was developed with reference to Transport for NSW's *Guideline for Landscape Character and Visual Impact Assessment, Environmental Impact Assessment Practice Note EIA-N04, 2020* (the LVIA Guideline).

Two assessments are presented in the LVIA Guideline to improve design outcomes:

- Landscape character assessment - the assessment of impact on the aggregate of an area's built, natural and cultural character or sense of place – which helps determine the overall impact of a project on an area's character and sense of place.
- Visual impact assessment - the assessment of impact on views - which helps define the day to day visual effects of a project on people's views.

The method used to measure impact is based on the combination of sensitivity of the existing area or view to change, and magnitude of the Proposal on that area or view. These terms are defined in the LVIA Guideline as:

- sensitivity: refer to the qualities of an area, the number and type of receivers and how sensitive the existing character of the setting is to the proposed nature of change
- magnitude: refer to the physical scale of a project, how distant it is and the contrast it presents to the existing condition.

The combination of sensitivity and magnitude provide the rating of the landscape character impact for a project, or visual impact for individual viewpoint (refer Table 6-1).

Table 6-1 Landscape character and visual impact rating matrix (impact levels in italics)

		Magnitude (of change)			
		High	Moderate	Low	Negligible
Sensitivity (to change)	High	*High*	*High-Moderate*	*Moderate*	*Negligible*
	Moderate	*High-Moderate*	*Moderate*	*Moderate-low*	*Negligible*
	Low	*Moderate*	*Moderate-low*	*Low*	*Negligible*
	Negligible	*Negligible*	*Negligible*	*Negligible*	*Negligible*

6.2.1 Existing environment

Landscape character

There are many elements that contribute to the landscape character of the Proposal area including land use, vegetation and landform.

The landscape along Turrella Street and Reede Street intersection is dominated by apartment buildings with light industrial complexes located along the length of Henderson Street. The lack of vegetation except for a few immature trees located along the eastern side of Turrella Street demonstrates a highly urbanised environment.

Turrella station is located within a cutting, between Turrella Street and Henderson Street. Access to the station is provided via stairs located from the Reede Street overbridge.

Henderson Street slopes up to Reede Street overbridge, as does Turrella Street, at a gentler grade. Due to its location within the rail corridor cutting the station building is not a dominant element in the landscape with views to the station buildings being limited.

Visual context

Turrella Station has a limited area of visibility, being only visible from the nearest urban area to a maximum of about 250 metres. The extent of visibility includes the residential area and associated apartment buildings south of the station, the light industrial area to the north and public spaces and roads close to the station.

Four public and private viewpoint have been identified within the viewshed as potentially sensitive to visual change. Those viewpoint and their sensitivity to change are identified in Table 6-2.

Table 6-2 Viewpoints

Visual receptor	Description	Sensitivity to change
VP1: General store (Figure 6-2)	This viewpoint represents views available from near the general store and café which are the only close shops to the station and a community focus.	The sensitivity of this viewpoint is rated as moderate as: • this is a public viewpoint which is a focus of community activity, however, it is within a highly urban area near Turrella Station, with the railway line and the overbridge structure/throw screens already dominating this view.
VP2: Henderson Street (Figure 6-3)	This viewpoint represents views available from the western end of Henderson Street, which is part of the public thoroughfare that connects through to Turrella Reserve and other residential areas to the south-west.	The sensitivity of this viewpoint is rated as low as: • the public thoroughfare is positioned within the industrial area on the northern side of the station • the existing station occupies a large proportion of the existing view • the dominant feature of the view is high-rise apartments in the background with station fencing and part of the station platform shelter visible in the middle ground • the view includes overhead utilities, posts and bins and is not scenic.
VP3: Turrella Street (Figure 6-4)	This viewpoint represents views available from the western end of Turrella Street, representing public street views and private residential views near street level.	The sensitivity of this viewpoint is rated as low as: • both the public views from Turrella Street, and the private views from the street level (from detached houses plus nearby lower levels of the apartment buildings in this vicinity) are within a highly urban area • railway and road infrastructure associated with this area near Turrella Station already dominate this view, including the railway line, station, station stairs and fencing/throw screens.

Visual receptor	Description	Sensitivity to change
VP4: Apartments (Figure 6-5)	This viewpoint represents views from the apartment buildings at the corner of Reede and Turrella Streets, east of Turrella Station.	The sensitivity of this viewpoint is rated as low as: • views would vary, with some apartments at higher levels having wide views over the railway and to residential and more distant areas to the west • railway and road infrastructure dominate the view, and include the railway line, station, station stairs and fencing/throw screens.

The locations of each viewpoint and area of visibility of the station are shown on Figure 6-6.

Figure 6-2 VP1 – Existing view

Figure 6-3 VP2 – Existing view

Figure 6-4 VP3 – Existing view

Figure 6-5 VP4 – Existing view

Figure 6-6 Approximate visibility and main viewpoints

6.2.2 Potential impacts

a) Construction phase

Landscape character

Due to the highly urban nature of the area surrounding Turrella Station, and the absence of any landscape or cultural elements of note (apart from the station buildings), the landscape character has a low sensitivity to the type and scale of the proposed visual change.

During construction, the Proposal would have a temporary, moderate magnitude of change on landscape character as:

- construction activities would affect a relatively large proportion of the station, particularly close to the Reede Street overbridge, and contrast somewhat with surrounding scale and character through the appearance of construction machinery, fencing and periodic use of tall, moving cranes
- the nominated construction compound would be located within the rail corridor opposite 29 Henderson Street. Four smaller laydown areas would also be within the rail corridor along Henderson Street and be relatively compatible with the surrounding industrial zone and railway infrastructure.

Visual impact

Visual impacts during construction of the Proposal are detailed below in Table 6-3.

Table 6-3 Visual impacts during construction

Visual receptor	Magnitude of change	Overall impact level
VP1: General store	The magnitude of change during the temporary construction period is rated as moderate as: • views of construction activities such as the lift and landing would be visible within 50 metres. Machinery such as cranes would also be seen at times, although work on the station platform would not be visible • the proposed compound and laydown areas would not be visible • there may be some nightwork during which lights would be in operation, however, lights would be directed toward the work.	**Moderate**
VP2: Henderson Street	The magnitude of change during the temporary construction period is rated as low as: • views of construction activities would be within 50 metres and construction of the lift and landing to the overbridge would be visible. Some machinery such as cranes would also be seen at times, with partial views also of construction at the level of the station platform • the main construction compound and laydown areas on the northern side of the railway would be visible and contain machinery and stored materials at times • there may be some nightwork during which lights would be in operation, however, lights would be directed toward the work.	**Low**
VP3: Turrella Street	The magnitude of change during the temporary construction period is rated as low as: • views of construction activities would be within 50 metres and construction of the lift and landing to the overbridge would be visible. Some machinery such as cranes would also be seen at times, with partial views also of construction at the level of the station platform • the main construction compound and laydown areas on the northern side of the railway would be visible and contain machinery and stored materials at times • there may be some nightwork during which lights would be in operation, however, lights would be directed toward the work.	**Low**

Visual receptor	Magnitude of change	Overall impact level
VP4: Apartments	The magnitude of change during the temporary construction period is rated as low as: • views of some of the construction activities would be within 50 metres, with clearer views possible from some higher apartments. Some machinery such as cranes would also be seen at times, with views also of construction at the level of the station platform and overbridge. Yet all changes would be seen where existing railway infrastructure is already visible • The main construction compound and laydown areas located along Henderson Street within the rail corridor would also be obstructed due to being on other side of railway line • there may be some nightwork during which lights would be in operation, however, lights would be directed toward the work.	**Low**

b) Operational phase

Landscape character

During operation, the Proposal would have a low magnitude of change as:

- the new station entry and lift shaft would increase the height of built elements near Turrella Station (about 4.7 metres higher than the current road surface of the overbridge), however the changes would generally be compatible in form and scale with the existing urban surroundings, which includes tall apartment buildings on Turrella Street and Reede Street
- removal of the existing aged stairs and construction of a new entry would provide a more contemporary look to the station
- other upgrades such as the proposed landscaping along Turrella Street and a new seat at the bus stop on Turrella Street would improve the visual environment and general amenity for users.

Visual impact

Visual impacts during the operational phase of the Proposal are detailed below in Table 6-4. Photomontages showing changes to views at VP1, VP2 and VP3 are shown in Figure 6-7, Figure 6-8 and Figure 6-9 respectively.

Table 6-4 Visual impacts during operation

Visual receptor	Magnitude of change	Overall impact level
VP1: General store	The magnitude of change at operation is rated as low as: • the new station entry and lift shaft would increase the height of built elements in the view (about 4.7 metres higher than the road surface of the overbridge), however would be generally compatible in form and scale with the existing surroundings • construction of a new entry would provide a more contemporary and universally accessible access to the station seen from this viewpoint	**Moderate – low**

Visual receptor	Magnitude of change	Overall impact level
	• the extent of fencing along Turrella Street would increase, adding visual clutter and have an adverse visual impact • the proposed landscaping along Turrella Street (to the right of this viewpoint) and a new seat at the bus stop on Turrella Street would improve the visual environment and general amenity.	
VP2: Henderson Street	The magnitude of change at operation is rated as low as: • the view to the high-rise would remain dominant and no parts of the Proposal would breach the skyline • the new station entry and lift shaft would increase the height of built elements in the middle ground of the view (about 4.7 metres higher than the current road surface of the overbridge), however would be generally compatible in form and scale with the existing surroundings and seen against the apartment buildings to the east • all changes would be seen within the context of the surrounding industrial zone, and railway infrastructure.	**Low**
VP3: Turrella Street	The magnitude of change at operation is rated as low as: • the new station entry and lift shaft would increase the height of built elements in the view (about 4.7 metres higher than the current road surface of the overbridge), however, would generally be compatible in form and scale with the existing surroundings • other changes along Turrella Street including increasing the extent of fencing would add additional clutter • planned re-painting of the existing acoustic wall (just to west of photograph) would improve its presentation.	**Low**
VP4: Apartments	The magnitude of change at operation is rated as low as: • the new station entry and lift shaft would increase the height of built elements in the view (about 4.7 metres higher than road surface of overbridge), however would generally be compatible in form and scale with the existing surroundings • other changes along Turrella Street including increasing the extent of fencing would add additional clutter • other upgrades such as the proposed landscaping along Turrella Street and re-painting of the existing acoustic wall would improve the visual environment.	**Low**

Figure 6-7 Photomontage showing the proposed changes to the existing view of Turrella Station from VP1, subject to detailed design

Figure 6-8 Photomontage showing the proposed changes to the existing view of Turrella Station from VP2, subject to detailed design

Figure 6-9 Photomontage showing the proposed changes to the existing view of Turrella Station from VP3, subject to detailed design

6.2.3 Mitigation measures

The following mitigation measures are proposed to manage the potential visual impacts of the Proposal:

- an Urban Design and Landscaping Plan (UDLP) for the Project shall be prepared and submitted to Transport for NSW for endorsement by the Precincts and Urban Design Team. The UDLP is to address the fundamental design principles as outlined in *'Around the Tracks''– urban design for heavy and light rail'* (TfNSW, Interim 2016) At a minimum, the UDLP shall:

    a) demonstrate a robust understanding of the Project site through a comprehensive site analysis to inform the design direction, demonstrate connectivity with street networks, transport modes, active transport options, and pedestrian distances

    b) identify opportunities and challenges

    c) establish site-specific principles to guide and test design options

    d) demonstrate how the preferred design option responds to the design principles established in Around the Tracks, including consideration of Crime Prevention through Environmental Design Principles.

    The UDLP is to include the Public Domain Plan for the chosen option and shall provide analysis of the:

    1. landscape design approach including design of pedestrian and bicycle pathways, street furniture, interchange facilities, new planting and opportunities for public art
    2. materials schedule including materials and finishes for proposed built works, colour schemes, paving and lighting types for public domain, fencing and landscaping

3. an Artist's Impression or Photomontage to communicate the proposed changes to the precinct.

The following design guidelines are available to assist and inform the UDLP for the Project:

- *TAP Urban Design Plan Guidelines* (TfNSW, Draft 2018)
- *Commuter Car Parks Urban Design Guidelines* (TfNSW, Interim 2017)
- *Managing Heritage Issues in Rail Projects Guidelines* (TfNSW, Interim 2016)
- *Creativity Guidelines for Transport Systems* (TfNSW, Interim 2016)
- *Water Sensitive Urban Design Guideline SD-106* (TfNSW, 2017).

The UDLP shall be:

1. prepared in consultation with councils and relevant stakeholders
2. prepared by a registered architect and/or landscape architect
3. prepared to inform/support the concept design and submitted to Transport for NSW for review at this design milestone finalised and submitted to Transport for NSW at the completion of design documentation

- all permanent lighting would be designed and installed in accordance with the requirements of standards relevant to *AS 1158 Road Lighting and AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting*
- the detailed design of the Proposal would comply with Crime Prevention Through Environmental Design principles
- worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations
- temporary hoardings, barriers, traffic management and signage would be removed when no longer required
- during construction, graffiti would be removed in accordance with Transport for NSW's Standard Requirements
- lift canopy structure – options should be explored to reduce the size of the horizontal beam supporting the lift canopy. This would help to minimise the dominance of the lift structure in views to and from the station
- the detailed design of the enclosed stairway should explore options for high transparency materials to allow better views to the station building as well as to lighten the appearance of the structure against the other proposed modifications to the east end of the station
- investigate removing the existing white fencing along Turrella Street and instead attach a handrail to the security fencing/throw screens if a handrail is required, removing the need for two different types of fencing
- alternatively, investigate using fencing similar to the black palisade security fence on northern side (Henderson Street)
- investigate whether a new fence is necessary along the roadside of the overbridge and along the roadside of Turrella Street, and if a simpler handrail could be substituted and/or fencing used in a more targeted way
- consider using dark coloured fencing as it is generally less visible and easier to see through, thus receding better into the background
- include several moderate sized street trees along the eastern section of Turrella Street (possibly of the same species as on the opposite side of the street). Trees would improve

the aesthetics and add important shade, reducing heat island effects recognised as being prevalent in urban areas

- the selected colour for the acoustic walls along Turrella Street should consider the overall design of the Proposal.

Refer to Table 7-1 for a full list of proposed mitigation measures.

6.3 Noise and vibration

This section provides a summary of the *Noise and Vibration Impact Statement – Turrella Station* prepared by Umwelt (2021a). It is noted noise monitoring fieldwork as part of this assessment could not be undertaken due to NSW Government Health Orders therefore typical background noise levels representative of 'urban residential' receivers were adopted for this assessment.

6.3.1 Existing environment

Background noise levels

The background and ambient noise levels that were adopted for the Proposal area was determined by reviewing the developments and zoning within the vicinity of the Proposal area. Noise management levels (NML) were adopted from Table 2.3 of the NSW EPA *Noise Policy for Industry* (EPA, 2017), representative to that of the 'Urban residential' LEP zoned land-use receiver categories.

'Urban residential' receiver category is an area with an acoustical environment that has any combination of being dominated by 'urban hum' (the aggregate sound of many unidentifiable, mostly road/rail traffic and/or industrial related sound sources).

The rated background levels (RBL) that have been adopted for receivers in proximity to the Proposal area include:

- daytime 45 dB(A)
- evening 40 dB(A) and
- night period RBL of 35 dB(A).

Receivers

Receivers potentially sensitive to sound and vibration in response to the Proposal were identified and have been grouped into noise catchment areas as shown in Figure 6-10.

Legend

- Proposal Area
- Proposed Work Areas
- Laydown Area
- Construction Compound
- Noise Catchment Areas (NCA)
- Watercourses
- Railway Line

FIGURE 6-10

Noise Catchment Area Map

Image Source: Nearmap (May 2021) Data source: NSW DFSI (2020)

Modelled receiver numbers, type and address details are shown in Table 6-5.

Table 6-5 Modelled noise catchment area receiver identification, type and address details

Noise catchment area (NCA)	Receiver type	Address	Approximate separation distance[1] (m)
NCA01	Residential receivers / industrial premises	Industrial premises south of the rail corridor, north of Turrella Street, 139, 143, 145 Turrella Street, Turrella.	81
NCA02	Residential receivers / commercial (offices, retail outlets) receivers	Premises bound by Turrella Street, Loftus Street, Cook Street and Hamman Street, Turrella. Including, The London Coffee Co., Shop 1, 10 Reede Street, and BMK Mart, Shop 2, 10 Reede Street, Turrella.	39
NCA03	Residential receivers	Premises south of the rail corridor, NW and N of Hannam Street, Turrella. Includes Wilkins Street, Rickard Street and Heath Street, Turrella.	92
NCA04	Residential receivers / active recreational area	Premises south of the rail corridor and north of Darley Road and Slade Road, Bardwell Park. Includes Powys Avenue, Water Street, May Street and Edith Street, Bardwell Park.	178
NCA05	Residential receivers	Premises bound by the rail corridor and south of Minnamorra Avenue, Earlwood.	230
NCA06	Residential receivers	Residences northwest of the Proposal in Earlwood, between Finlays Avenue and David Street, Earlwood. Includes Banks Road, Pembrew Crescent and Wavell Parade.	328
NCA07	Residential receivers / active recreational Areas	Residences northwest of the Proposal in Earlwood, between Finlays Avenue and David Street, Earlwood. Includes Banks Road, Pembrew Crescent and Wavell Parade, as well as the recreational areas of Wolli Creek Regional Park and Turrella Reserve.	279
NCA08	Industrial premises	Industrial premises bound by the rail corridor, south of Henderson Street and east of Wolli Creek	64
NCA09	Industrial premises	Industrial premises north of Henderson Street, south of Wolli Creek. Includes 5, 7, 9, 11, 13, 15, 17 and 23 Henderson Street, Turrella.	25
NCA10	Industrial premises	Industrial premises adjacent to the construction compounds, north of Henderson Street, south of Wolli Creek. Includes 29, 41-47, 57-67 and 75 Henderson Street, Turrella.	18

Note 1. Approximate separation distance to the centre of the station or the nearest distance to the compound/laydown areas.

Assessment criteria

Railway station upgrades are a construction project covered by the CNVS (TfNSW, 2018). The CNVS outlines the methodology to be taken to assess, mitigate and manage construction noise and vibration from Transport for NSW Infrastructure and Place Division projects.

Guidance and principal requirements regarding the management of noise and vibration from construction in NSW are contained in the:

- *Interim Construction Noise Guideline* (ICNG) (Department of Environment and Climate Change, 2009)
- Assessing Vibration: A technical guideline (vibration guideline) (DEC, 2006).

Construction hours

Time periods are defined in the CNVS for different types of construction activities and for standard construction hours (including the delivery of plant and equipment) and out-of-hours works (OOHW) as shown in Table 6-6. OOHW Periods 1 and 2 are included in the period described by the ICNG as 'outside the recommended standard hours'.

Table 6-6 Construction hours as defined in CNVS

Time period	Construction hours	Monday–Friday	Saturday	Sunday/Public Holiday
Day	Standard construction hours	7am – 6pm	8am – 1pm	No work
Evening	OOHW Period 1	6pm – 10pm	7am – 8am and 1pm – 10pm	8am – 6pm
Night	OOHW Period 2	10pm – 7am	10pm – 8am	6pm – 7am
Construction activities with special audible characteristics (high noise impact, impulsive or tonal noise emissions	8am – 5pm[1]	9am – 1pm[1]	No work	

Note 1. Works may be carried out in continuous blocks not exceeding three hours each with a minimum respite from those activities and works of not less than one hour between each block, unless otherwise approved by Transport for NSW.

Noise assessment criteria

The applicable criteria for construction noise impacts are given in the ICNG. Table 6-7 presents the ICNG construction NML for representative receivers surrounding the Proposal area in accordance with the respective construction times shown in Table 6-6. The assessment levels are intended to guide the need for, and the selection of, feasible and reasonable work practices to minimise construction noise impacts.

Table 6-7 NML for residential and non residential receivers as defined in the CNVS

Land use	Construction time	NML $L_{Aeq, 15\ minute}$
Residential	Recommended standard hours	RBL + 10 dB(A)
	Outside recommended standard hours	RBL + 5 dB(A)
Classrooms at schools and other educational institutions	Applicable when property is in use	Internal noise level[1] 45 dB(A)
Hospital wards and operating theatres	Applicable when property is in use	Internal noise level 45 dB(A)
Places of worship	Applicable when property is in use	Internal noise level 45 dB(A)
Community centres	Applicable when property is in use	Depends on the intended use of the centre. Refer to the recommended 'maximum' internal levels in AS2107 for specific uses[2]. Internal noise level 40 dB(A)
Industrial premises	Applicable when property is in use	External[3,4] L_{Aeq} (15 minute) 75 dB(A)
Offices, retail outlets	Applicable when property is in use	External[4] L_{Aeq} (15 minute) 70 dB(A)
Other businesses that may be very sensitive to noise, where the noise level is project specific: childcare centres	Applicable when property is in use	Internal L_{Aeq}[5] (15 minute) ≤ 40 dB(A) External L_{Aeq}[6] (15 minute) ≤ 55 dB(A)
Active recreation areas	Applicable when property is in use	External L_{Aeq} (15 minute) 65 dB(A)
Passive recreation areas	Applicable when property is in use	External L_{Aeq} (15 minute) 60 dB(A)
Rough sleepers	Outside recommended standard hours	Project Notifications, Specific Notifications and consideration of well-being.

Note 1. Applies at the centre of the room in use, most exposed to the construction noise, and can include both airborne and ground-borne noise

Note 2. Community Centres generally provide community spaces for life-long learning, social and cultural activities and typically contain a multi-use hall. The assumed conservatively representative design use from AS2107 was for assembly halls and conference rooms within Educational Buildings, resulting in a recommended 'maximum' internal noise level of L_{Aeq} (15 minute) 40 dBA.

Note 3. The external noise levels should be assessed at the most-affected occupied point of the premises.

Note 4. The external noise levels should be assessed at the most-affected occupied point of the premises.

Note 5. From the Association of Australian Acoustical Consultants (AAAC) Guideline for Child Care Centre Acoustic Assessment (the GCCCAA), September 2010, any location within the outdoor play or activity area of the Centre during the hours when the Centre is operating.

Note 6. Any location within the indoor play or sleeping areas of the Centre during the hours when the Centre is operating (the GCCCAA)

Where a quantitative noise assessment is to be undertaken, the construction airborne noise objectives are based on the ICNG. The NML for the different receivers and different time periods based on the adopted RBLs are summarised in Table 6-8.

Table 6-8 Proposed construction noise management levels, dB(A)

Land use	Time period	RBL	Noise affected NML1 $L_{Aeq, 15\ minute}$	Highly noise affected NML $L_{Aeq, 15\ minute}$	Sleep disturbance level (L_{Amax})
All residential receivers	Recommended standard hours[2]	45	55 (45+10)	75	Not applicable[3]
	Outside recommended standard hours (Saturday 1pm - 10pm)	45	50 (45+5)	Not applicable[4]	Not applicable
	Outside recommended standard hours (evening)	40	45 (40+5)	Not applicable	Not applicable
	Outside recommended standard hours (night time)	35	40 (35+5)	Not applicable	65 dB(A)[5] LAmax
Sensitive land uses (other than residences)	Applicable when property is in use	Not applicable	Refer to Table 6-7 above	Not applicable	Not applicable

Note 1. Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 metres above ground level. If the property boundary is more than 30 metres from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 metres of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Note 2. Recommended standard hours: Monday to Friday 7am – 6pm; Saturday 8am – 1pm.

Note 3. Sleep disturbance only applicable during OOHW2 (Night) period

Note 4. Noise assessment levels for Highly Noise Affected are not defined outside of standard hours

Note 5. On an hourly basis between 10pm - 7 am, determine the number and distribution of L_{Amax} noise levels greater than 65 dBA where L_{Amax}- L_{Aeq} exceeds 15 dB. Where increasing as a result of the project, take account of maximum noise levels when prioritising, selecting and designing noise control measures.

Sleep disturbance

The ICNG recommends that where construction works are planned to extend over two or more consecutive nights, the Project should consider maximum noise levels and the extent and frequency of the maximum noise level events exceeding the RBL. The potential for both sleep disturbance and awakenings should be considered in the assessment and is assessed by comparison of the predicted noise levels against the screening levels.

The NSW EPA's sleep disturbance screening level for industrial noise is based on the $L_{AF1,1minute}$ level (equivalent to the L_{Amax}) of a noise event which should not exceed the ambient L_{A90} noise level by more than 15 dB.

Where sleep disturbance criteria exceedance for more than two consecutive nights cannot be avoided due to reasonable and feasible justification, the delivery partner must consult with the community and consider further mitigation such as duration reduction or alternative accommodation.

Construction vibration – buildings

Criteria for potential damage to structures are given in:

- Australian Standard AS 2187: Part 2-2006 Explosives - Storage and Use - Part 2: Use of Explosives (AS2187)
- British Standard *BS 7385 Part 2-1993 Evaluation and measurement for vibration in buildings – Part 2* (BS7385)
- German Institute for Standardisation *DIN 4150-3:1999-02 Structural vibration – Effects of vibration on structures* (DIN4150) also has criteria of particular reference for heritage structures

Criteria for vibration effects on building structures recommended in the CNVS are given in BS7385. The criteria in BS7385 are given in terms of peak component (x-, y- or z-axes separately) vibration velocity values from transient (impulsive) vibration events. The criteria for continuous vibration are recommended to be 50% lower than for impulsive vibration. The vibration criteria for the protection of structures and buildings from cosmetic damage (e.g. hairline cracks in drywalls, etc.) are given in Table 6-9.

Table 6-9 Vibration criteria for minimal risk of cosmetic damage to structures (peak vibration velocity (ppv) mm/s)

Type of structure	Peak component particle velocity (mm/s)		
	4 Hz - 15 Hz	15 Hz - 40 Hz	40 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50 [transient (impulsive) vibration] 25 (continuous vibration)		
Un-reinforced or light framed structures	15 increasing to 20 [transient (impulsive) vibration]	20 increasing to 50 [transient (impulsive) vibration]	50 [transient (impulsive) vibration]
Residential or light commercial type buildings	7.5 increasing to 10 (continuous vibration)	10 increasing to 25 (continuous vibration)	25 (continuous vibration)

Assessment guidelines for vibration damage to heritage-protected structures are commonly referenced from the DIN4150. This standard differentiates between short-term and long-term vibration, where short-term vibration is caused by sources such as drop-hammers, impact piling, etc. All other sources of vibration are considered to be long-term.

The DIN4150 guideline value for heritage-protected structures for long-term vibration is 2.5 mm/s peak particle velocity (PPV) in the horizontal plane at all frequencies. This guideline value is primarily intended for older, sensitive, above-ground structures (typically buildings).

Construction vibration – human perception

Criteria for potential human perception of vibration are given in the vibration guideline. The criteria in the vibration guideline are given for continuous vibration, impulsive vibration and for intermittent vibration. For continuous and impulsive vibration, the criteria are given in terms of root-mean-square (rms) vibration acceleration (m/s^2) in the frequency range 1 - 80 Hertz (Hz). For intermittent vibration, the criteria are given in terms of vibration dose value (VDV), which is a parameter used for assessing the combined magnitude and the total duration of vibration impacts.

The criteria given in the vibration guideline for continuous or impulsive vibration relevant to the receivers in the area are given in Table 6-10. The frequency weightings are given in Appendix B3 of the vibration guideline.

Table 6-10 Criteria for continuous and impulsive vibration for human comfort (weighted vibration acceleration m/s^2 at 1 to 80 Hz)

Location	Assessment period[1]	Preferred values		Maximum values	
		z-axis[2]	x- and y-axes[2]	z-axis	x- and y-axes
Continuous vibration					
Residences	Day	0.010	0.0071	0.020	0.014
	Night	0.007	0.005	0.014	0.010
Offices, schools, educational institutions, or places of worship	Day or Night	0.020	0.014	0.040	0.028
Impulsive vibration					
Residences	Day	0.30	0.21	0.60	0.42
	Night	0.10	0.071	0.20	0.14
Offices, schools, educational institutions, or places of worship	Day or Night	0.64	0.46	1.28	0.92

Note 1. Day time period is 7am - 10pm. Night time period is 10pm - 7am.

Note 2. Typically the x-direction is the horizontal radial direction oriented directly between the source and receiver, the y-direction is the horizontal tangential direction, and the z-direction is the orthogonally vertical direction.

The criteria for intermittent vibration given in the vibration guideline for the relevant receivers in the area proximate to the site are shown in Table 6-11. The VDV is calculated using the frequency-weighted rms acceleration as described in the vibration guideline.

Table 6-11 Vibration criteria for intermittent vibration (VDV m/s$^{1.75}$)

Location	Day time period[1]	Night time period[1]		
	Preferred value	Maximum value	Preferred value	Maximum value
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions or places of worship	0.40	0.80	0.40	0.80

Note 1. Day time period is 7am - 10pm. Night time period is 10pm - 7am

Construction traffic noise

Noise from construction traffic is assessed against the road traffic noise criteria:

- *NSW Road Noise Policy* (Department of Environment, Climate Change and Water, 2011)
- Environmental Noise Management Manual (Roads and Traffic Authority, 2001)
- *Noise Criteria Guideline* (Roads and Maritime, 2015)

6.3.2 Potential impacts

a) Construction phase

Predicted noise levels

A range of predicted LAeq,15minute noise levels has been assessed for the different construction scenarios undertaken within standard construction hours and OOHW. Scenarios include:

- scenario 1 - Site establishment and enabling work
- scenario 2 - Lift installation, stairs, and canopy construction
- scenario 3 - Turrella Street and Reede Street modifications
- scenario 4 - Station building work
- scenario 5 - Demobilisation, testing and commissioning
- scenario 6 - Five construction compounds within the rail corridor

Standard hours

Construction noise levels are anticipated to exceed the NML at both residential and non-residential receivers during standard working hours at a range of receiver locations as shown in Table 6-12 and Table 6-13.

Table 6-12 Predicted construction noise levels for residential receivers during standard working hours

Receiver/ NCA	NML	Approximate distance from Proposal (m)	Predicted noise levels, L_{eq} dB(A) per construction scenarios					
			1	2	3	4	5	6
NCA01	55	81	**45-69**	**49-71**	**46-70**	**41-64**	29-55	**47-67**
NCA02	55	39	**45-84**	**47-84**	**46-84**	**40-78**	**29-73**	**36-65**
NCA03	55	92	**57-76**	**58-76**	**57-76**	**49-66**	**41-56**	36-51
NCA04	55	178	43-52	44-54	43-52	37-46	29-35	**55-61**
NCA05	55	230	41-52	42-55	42-53	37-47	28-38	46-48
NCA06	55	328	**43-60**	**46-61**	**43-61**	38-54	30-45	27-46
NCA07	55	279	**54-61**	**55-62**	**55-61**	49-55	39-47	36-54

Note 1. bold predicted noise levels represent potential noise criteria exceedances at respective receiver locations.

Note 2. noise receivers that are expected to be highly noise affected are highlighted

Table 6-13 Predicted construction noise levels for non residential receivers during standard working hours

Receiver / NCA	NML	Approximate distance from Proposal (m)	Predicted noise levels, L_{eq} dB(A) per construction scenarios					
			1	2	3	4	5	6
NCA08	75	64	**66-81**	**66-81**	**66-81**	59-74	50-66	45-51
NCA09	75	25	**66-80**	**71-82**	**67-82**	62-71	52-67	45-60
NCA10	75	18	**55-78**	**56-80**	**55-79**	**49-76**	39-70	**45-77**

Note 1. bold predicted noise levels represent potential noise criteria exceedances at respective receiver locations.

Note 2. noise receivers that are expected to be highly noise affect are highlighted

Most exceedances are attributed to scenario 1, 2 and 3 which consist of the main construction activities of the Proposal. Residential receivers located along Turrella Street (NCA01, NCA02 and NCA03) and non-residential receivers located north of Henderson Street are most affected (NCA10). Accordingly the implementation of standard and additional mitigation measures would be triggered.

It is noted that most of the exceedances are expected to be the result of the worst case scenario over a 15 minute period. Construction work is expected to be undertaken periodically therefore noise exceedances would not occur throughout the full duration of the Proposal. It is predicted noise levels would be much lower during construction due to activities being short term and staged intermittently.

Out of hours work

Construction noise levels are anticipated to exceed the NML at residential receivers during outside standard working hours at a range of different locations as shown in Table 6-14.

Table 6-14 Predicted construction noise levels for residential receivers outside standard working hours

Receiver / NCA	NML		Approximate distance from Proposal (m)	Predicted noise levels, L_{eq} dB(A) per construction scenarios					
	OOHW1	OOHW2		1	2	3	4	5	6
NCA01	45	55	81	**45-69**	**49-71**	**46-70**	**41-64**	**29-55**	**47-67**
NCA02	45	55	39	**45-84**	**47-84**	**46-84**	**40-78**	**29-73**	**36-65**
NCA03	45	55	92	**57-76**	**58-76**	**57-76**	**49-66**	**41-56**	36-51
NCA04	45	55	178	43-52	44-54	43-52	37-46	29-35	**55-61**
NCA05	45	55	230	41-52	42-55	42-53	37-47	28-38	46-48
NCA06	45	55	328	**43-60**	**46-61**	**43-61**	38-54	30-45	27-46
NCA07	45	55	279	**54-61**	**55-62**	**55-61**	49-55	39-47	36-54

Note 1. bold predicted noise levels represent potential noise criteria exceedances at respective receiver locations.

Note 2. noise receivers that are expected to be highly noise affect are highlighted

Residential receivers along Turrella Street are expected to be the most affected with receivers NCA1 and NCA2 potentially affected by all construction scenarios. As such the appropriate standard and additional mitigation measures would be implemented.

As mentioned in the section above most exceedances are expected to be the result of the worst case scenario over a 15 minute period. Construction work is expected to be undertaken periodically therefore noise exceedances would not occur throughout the full duration of the Proposal. It is predicted noise levels would be much lower during construction due to activities being short term and staged intermittently.

Sleep disturbance assessment

The predicted sleep disturbance noise levels have been presented in Table 6-15 show construction scenarios for all stages of construction undertaking night works. Predicted noise levels show all scenarios have the potential to exceed sleep disturbance criteria at every assessed noise catchment area.

If sleep criterion is expected to be exceeded for two consecutive nights and cannot be avoided due to reasonable and feasible justification, the community would be consulted, and mitigation measures would be implemented.

Table 6-15 Sleep disturbance assessment

Receiver/NCA	Night period RBL, LA90 dB(A)	Sleep disturbance criteria, $L_{A1,1minute}$	Predicted noise level, $L_{A1,1minute}$, dB(A) per construction scenarios		
			1	2	3
NCA01 116 Turrella Street, Turrella	35	50	69	71	70
NCA02 128-132 Turrella Street, Turrella	35	50	84	84	84
NCA03 1 Hannam Street, Turrella	35	50	76	76	76
NCA04 18 Edith Street, Bardwell Park	35	50	52	52	52
NCA05 5 March Place Earlwood	35	50	52	53	53
NCA06 7A David Street, Earlwood	35	50	62	65	55
NCA07 47A Highcliff Road, Earlwood	35	50	61	62	61

Vibration

Some construction scenarios would require vibration intensive equipment to undertake the proposed work that may affect the nearest sensitive receiver. Minimum working distances for vibration intensive plant have been outlined to comply with human comfort and cosmetic damage vibration limits and are shown in Table 6-16.

Table 6-16 Minimum working distances of vibration intensive equipment

Plant item	Rating/description	Minimum working distance (m)	
		Cosmetic damage (residential building)	Human response
Small hydraulic hammer	(300 kg - 5 to 12t excavator)	2	7
Pile boring	≤ 800 mm	2 (nominal)	N/A
Jackhammer	Handheld	1 (nominal)	Avoid contact with structure

If working distances of vibration intensive equipment is maintained, there would be no expected impact to human response or cosmetic damage however if vibration intensive works are required within the minimum working distances, mitigation measures as outlined in Section 6.3.3 (including site specific vibration monitoring or vibration trials) would be implemented to ensure no impact to relevant structures.

Construction traffic noise impacts

It is expected construction-related traffic movements would be minimal during the day/night-time periods and the traffic noise impacts associated with the construction activities would also be minor and insignificant.

To minimise the construction traffic noise levels and reduce the risk of negative impacts occurring, construction traffic management would be considered as part of a Noise and Vibration Management Plan.

b) Operational phase

The Proposal would not increase noise and/or vibration emissions associated with operational aspects of the station or existing rail network. The Proposal would introduce new infrastructure and assets (e.g. lifts, stairs etc) but these items are not anticipated to generate significant noise and/or vibration emissions. The Proposal would increase accessibility and hence the potential mobility and scale of station usage but any emissions from these sources (e.g. passenger access and usage of the station) are insignificant when compared to the existing ambient environment. Furthermore, the Proposal would not increase the number of train pass-by events (the dominant existing operational noise emission source) that occur daily on the existing rail network. Accordingly, there is no anticipated change in operational noise and/or vibration impacts associated with the Proposal.

6.3.3 Mitigation measures

The following mitigation measures are proposed to manage the potential noise and vibration impacts of the Proposal

- all recommended additional mitigation measures for affected receivers in accordance with the *Noise and Vibration Impact Statement* (Umwelt, 2021c) are to be applied
- prior to commencement of work, a CNVMP would be prepared and implemented in accordance with the requirements of the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009), CNVS (TfNSW, 2019a) and the Noise and Vibration Impact Assessment for the Proposal (Umwelt, 2021c). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable
- the CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which would be considered, include:
    - regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise
    - avoiding any unnecessary noise when carrying out manual operations and when operating plant
    - ensuring spoil is placed and not dropped into awaiting trucks
    - avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where practicable
    - switching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloaded
    - avoiding deliveries at night/evenings wherever practicable
    - no idling of delivery trucks

    - keeping truck drivers informed of designated vehicle routes, parking locations and acceptable delivery hours for the site
    - minimising talking loudly; no swearing or unnecessary shouting, or loud stereos/radios onsite; no dropping of materials from height where practicable, no throwing of metal items and slamming of doors
- the CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which would be considered, include:
    - maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances
    - using the most suitable equipment necessary for the construction work at any one time
    - directing noise-emitting plant away from sensitive receivers
    - regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc
    - using non-tonal reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms for all plant used regularly onsite (greater than one day), and for any out of hours work
    - use of quieter and less vibration emitting construction methods where feasible and reasonable
- work would generally be carried out during standard construction hours (i.e. 7.00 am to 6.00 pm Monday to Friday; 8.00 am to 1.00 pm Saturdays). Any work outside these hours may be undertaken if approved by Transport for NSW or authorised under the Environmental Planning and Assessment (COVID-19 Development – Infrastructure Construction Work Days No. 2) Order 2020 (whilst the Order is in effect), and the community is notified prior to this work commencing. An Out of Hours Work application form would need to be prepared by the Contractor and submitted to the Transport for NSW Senior Environment and Sustainability Officer for any work outside normal hours
- as per the CNVS (TfNSW, 2019a), construction activities with special audible characteristics (high noise impact, intensive vibration, impulsive or tonal noise emissions) would be limited to standard hours, starting no earlier than 8am; and to continuous blocks not exceeding three hours each with a minimum respite from those activities and work of not less than one hour between each block, unless otherwise approved by Transport for NSW
- work would be conducted behind temporary hoardings/screens wherever practicable. The installation of construction hoarding would take into consideration the location of residential receivers to ensure that ‘line of sight’ is broken, where feasible
- to avoid structural impacts as a result of vibration or direct contact with structures, the proposed work would be undertaken in accordance with the safe work distances outlined in the Noise and Vibration Assessment (Umwelt, 2021a) and attended vibration monitoring or vibration trials would be undertaken where these distances are required to be challenged
- vibration resulting from construction and received at any structure outside of the project would be managed in accordance with:
    - for structural damage vibration –British Standard BS 7385-2:1993 Evaluation and measurement for vibration in buildings Part 2 and German Standard DIN 4150: Part 3 – 1999: Structural Vibration in Buildings: Effects on Structures

    - for human exposure to vibration the acceptable vibration - values set out in the *Environmental Noise Management Assessing Vibration: A Technical Guideline* (Department of Environment and Conservation, 2006) which includes British Standard BS 6472-2:1992 *Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)*

- property conditions surveys would be completed prior to any vibratory work including jack hammering and compaction for all buildings/structures/roads with a plan distance of 50 metres from the work and all heritage listed buildings and other sensitive structures within 150 metres of the work (unless otherwise determined following additional assessment they are not likely to be adversely affected)
- alternative accommodation options may be offered to residents living in close proximity to construction works that are likely to experience highly intrusive noise levels
- out of hours work during evening and night periods would be restricted so that receivers are impacted for no more than three consecutive evenings and no more than two consecutive nights in the same noise catchment area in any one week, except where there is a Duration Respite. A minimum respite period of four evenings/five nights shall be implemented between periods of evening and/or night works
- notification within a minimum of seven days prior to the start of works would be provided to local residents and local businesses in particular sensitive receivers to advise of upcoming works and potential disruptions
- verification monitoring of noise and/or vibration levels during construction would be undertaken in the form of routine checks of noise levels or following reasonable complaints, conducted at the affected receiver(s) or a nominated representative location
- respite offers should be considered where there are high noise and vibration generating activities near receivers
- where respite periods are considered counterproductive in reducing impact and where it can be strongly justified on a project-by-project basis, the number of evenings and/or nights worked may be increased through duration reduction so that the project can be completed more quickly.

Refer to Table 7-1 for a list of proposed mitigation measures.

6.4 Aboriginal heritage

A desktop assessment was undertaken for the Proposal with consideration of the requirements identified in the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (OEH, 2010).

6.4.1 Existing environment

It is acknowledged the Proposal takes place on the land of the Bidjigal clan of the Eora people. An AHIMS search (as identified in Section 5.5) with a buffer of 200 metres was undertaken on 10 September 2021 for the Proposal. The search identified no Aboriginal sites or places recorded or declared in or near the Proposal area (OEH, 2021).

The Proposal and the surrounding area are highly modified, with exception of Wolli Creek and Turrella Reserve which are both located northwest 240 metres and 700 metres from the station respectively. Wolli Creek and Turrella Reserve are the closest points that may be identified as an area with an increased potential for Aboriginal objects. However, these areas are located some distance away from the proposed works. The high level of disturbance that has occurred due to development of the rail corridor suggests that the presence of culturally sensitive buried items is unlikely within the boundaries of the Proposal area.

6.4.2 Potential impacts

a) Construction phase

Construction of the Proposal would involve some excavation and other ground disturbing activities for the following activities:

- the foundation and pit for the new lift shaft would require excavation into existing platforms, rock, soils
- construction of new stairs
- provision of upgraded pathways, kiss and ride bay and ramp located along Turrella Street would require excavation into existing pathways and roadway
- partial removal of median strip on Reede Street.

As no known Aboriginal heritage items are located in or near the vicinity of works, and due to the Proposal area being heavily modified, the potential for Aboriginal items to be encountered is considered unlikely. Therefore, the Proposal is unlikely to impact Aboriginal heritage during construction.

b) Operational phase

The Proposal does not pose risks to Aboriginal heritage during the operational phase.

6.4.3 Mitigation measures

The following mitigation measures are proposed with respect to potential Aboriginal heritage impacts:

- all construction staff would undergo an induction in the recognition of Aboriginal cultural heritage material. This training would include information such as the importance of Aboriginal cultural heritage material and places to the Aboriginal community, as well as the legal implications of removal, disturbance and damage to any Aboriginal cultural heritage material and sites
- if unforeseen unidentified Aboriginal objects are uncovered during construction, the procedures contained in the Transport for NSW *Unexpected Heritage Finds Guideline* (TfNSW, 2019b) would be followed and works nearby the find would cease immediately. The Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Sustainability Officer so they can assist in co-ordinating the next steps which are likely to involve consultation with an Aboriginal consultant, Heritage NSW and the Local Aboriginal Land Council
- if human remains are found, work would cease, the site secured and the NSW Police and Heritage NSW notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to works recommencing at the location.

6.5 Non-Aboriginal heritage

This section provides a summary of the Statement of Heritage Impact (SoHI) prepared by Umwelt (2021b). The SoHI was prepared in order to provide an understanding of the impact of the Proposal to heritage items within the Proposal area, namely the Turrella Railway Station Group.

6.5.1 Existing environment

Historical context

Turrella Station was opened in 1931 in coordination with the East Hills Railway line. All station buildings on the East Hills line were built to the same general design and plan. The station building at Turrella was a four-bay rectangular dark face brick building.

The East Hills line from Turrella to Panania is the only line in Sydney that has retained almost all station buildings from the original construction phase (1927-1931), noting that some of the station buildings have been altered over time. The only exception to this is the former station building at East Hills Station which was demolished in 1987.

When first built, Turrella Railway Station had one of the smaller brick station buildings along the line, and a (since demolished) separate booking office near the station entry point.

However, the booking office was removed from the base of the stairs in 1980 and the stairway was further altered in 2001 during the widening of the overbridge for quadruplication of the line. This included major modifications to the stairway, replacing all of the structure except for the steel trestle and outside stringers.at the west end. The upper section of the stair and the connecting landing to the overbridge were also replaced with a new reinforced concrete slab landing and concrete pillar support.

In 2003 a gabled awning with a corrugated steel roof was attached to the east end of the station building, outside of the ticket window. The station building roof was also reclad in 2008, replacing the original corrugated fibro-asbestos sheet roofing with corrugated steel.

The existing butterfly canopies to the east and west side of the station building were added in 2012. Other modifications to the station, such as upgrades to services, installation of furniture, rubbish bins and communications and security equipment, have occurred over time, as with the other stations on the East Hills Line.

Listed heritage items

The Turrella Railway Station Group is currently listed on the TAHE Section 170 Register (SHI No.4801890). A summary of this item is provided below

Turrella Railway Station Group

Turrella Railway Station Group is listed on the TAHE Section 170 Heritage and Conservation Register (#4801890) and assessed as having local significance.

The following Statement of Significance for *Turrella Railway Station Group* has been reproduced from the TAHE Heritage and Conservation Register, as provided in the online State Heritage Inventory database (OEH, 2021b):

> *Turrella Railway Station has historical significance as a major public work completed as an unemployment relief project during the Great Depression, and as a major transport hub for the suburb of Turrella since 1931. Turrella Railway Station platform building is of aesthetic significance as an austere 1930s railway building with simple Art Deco detailing and fine brick workmanship that is evocative of the effects of the Depression on building programs for large organisations such as the NSW railways. Turrella Railway Station is representative of the cohesive collection of 10 East Hills line railway stations from Turrella to East Hills.*

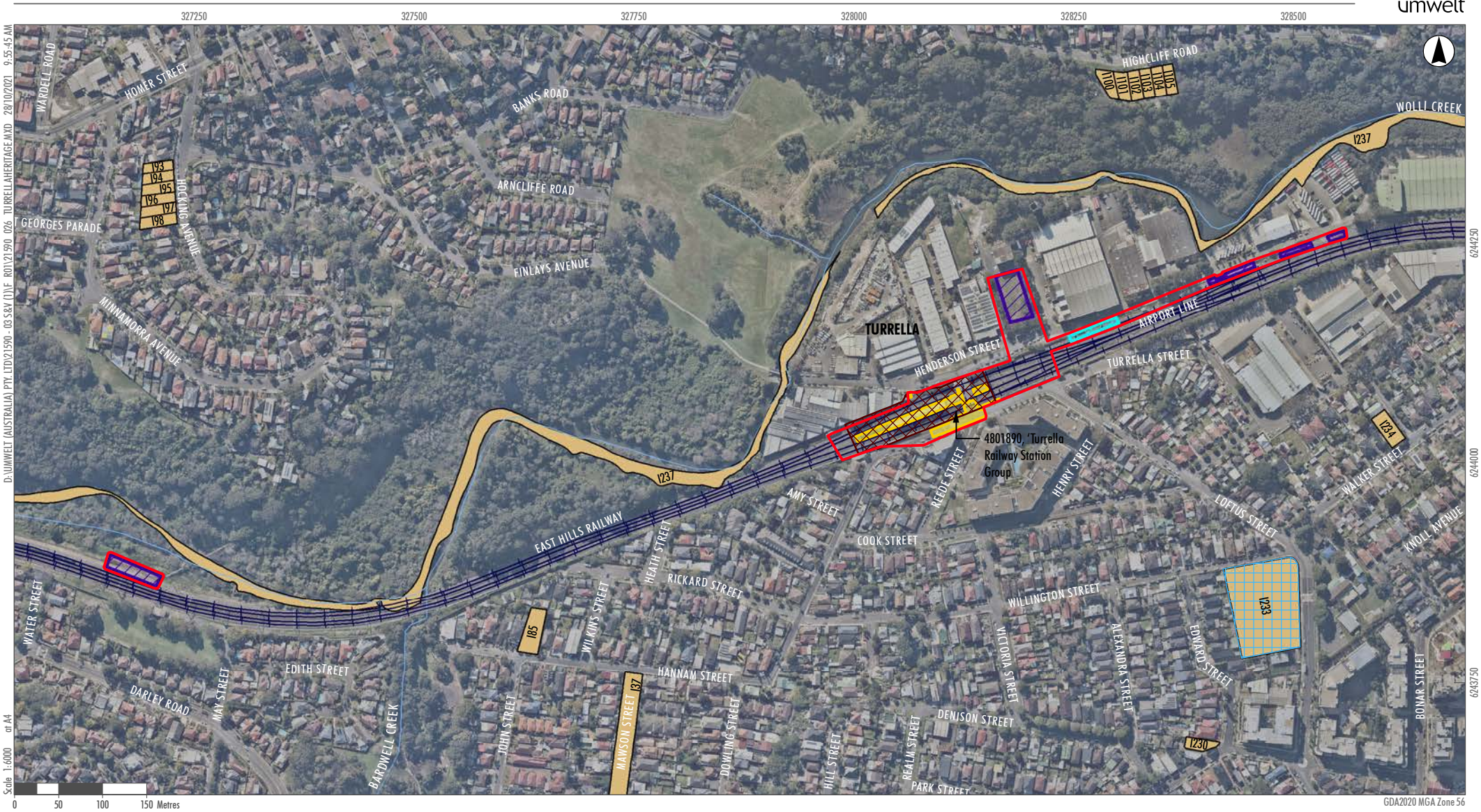
Further information regarding the Turrella Railway Station Group heritage item is provided in section 4 of the SoHI.

Other listed heritage items within the vicinity of the Proposal

Three additional heritage items of local significance have been identified on the Bayside LEP as being within the vicinity of the Proposal. These are:

- ‘Wolli Creek Valley’ (Item IDI237) - located 90 metres northwest of the Proposal area.
- ‘Cairnsfoot Special School’ (Item IDI233) - located 330 metres southeast of the Proposal area.
- ‘Victorian House’ (Item IDI387) - located 370 metres southeast of the Proposal area.

The locations of these heritage items in relation to the Proposal area are shown in Figure 6-11.



Legend

- Proposal Area
- Proposed Work Areas
- Laydown Area
- Construction Compound
- State Heritage Register Curtlidge
- LEP Heritage Item - General
- TAHE S170 Curtilage
- Watercourses
- Railway Line

FIGURE 6-11

Heritage Context of Proposal Area

Image Source: Nearmap (May 2021) Data source: NSW DFSI (2020), Bayside LEP (2021)

General

Assessment of significance of existing heritage environment

The Turrella Railway Station Group is listed on the TAHE S170 register for its historical, aesthetic, research potential and representative heritage values. Table 6-17 contains the significance assessment prepared as part of TAHE S170 heritage and conservation register entry for Turrella Railway Station Group on the NSW State Heritage Inventory.

Table 6-17 TAHE Section 170 Heritage Significance Assessment

Criterion	Application of Criteria
Criterion A – Historical Significance	*Turrella Railway Station is of historical significance as part of the East Hills line, a major Depression period public work undertaken under the controversial Premiership of Jack Lang and through its relationship to the development of the suburb of Turrella and the broader East Hills region. The austere design of the station building is reflective of the completion of the East Hills line as a Depression period unemployment relief works project.*
Criterion B – Associative Significance	No associative significance was identified as part of the listing on the TAHE S170 heritage register.
Criterion C – Aesthetic or Technical Significance	Turrella Railway Station is of aesthetic significance as an example of a small Inter-War period suburban railway building. Although the station has been modified through the installation of modern canopies, services and furniture, the station building remains generally consistent with other East Hills line railway station buildings in design and style. *The building externally retains its original design elements, and is very austere in style, with Inter-War Art Deco style touches (for example brick strapwork detail to parapets) and is competently executed, exhibiting fine workmanship in its brickwork. The building is noted for its use of monochromatic brickwork, stepped parapets, irregular fenestration and engaged piers.* Although the placement of the modern canopies has reduced the visibility and therefore legibility of these significant design elements, it still retains a level of significance under this criterion.
Criterion D – Social Significance	*The place has the potential to contribute to the local community's sense of place and can provide a connection to the local community's past.*
Criterion E – Research Potential	*Turrella Station is of research significance for its ability to demonstrate design and construction techniques of the Inter-War period. The building provides insights into NSW Railway's experimentation with styles of architecture and adaptation to Depression period economic conditions.*
Criterion F – Rarity	*The Turrella Station building is not rare, as it is part of a cohesive group of 10 similar to identical Inter-War suburban station buildings completed in 1931 between Turrella and East Hills.*
Criterion G – Representativeness	Turrella Railway Station is a good, representative example of an East Hills line railway station, with the platform and station building generally intact. However the modern canopies introduced to the station in 2012 obscure views of the station building and demonstrates the effects of the economic Depression of 1929-1930s on railway station construction. Although modified with modern canopies installed, the Station is one of the least modified along the East Hills Line, with accessibility upgrades and other modifications having been made to the majority of other stations along the line as Transport for NSW improve accessibility to stations across the network. Turrella Railway Station is representative of the cohesive collection of East Hills line railway stations from Turrella to East Hills.

Significance gradings

Elements of the Turrella Station Railway Group were graded utilising the Heritage Council of NSW grading criteria. Each element was reviewed to identify the level of significance the feature contributed the Railway group. The gradings are provided below in descending order from greatest to lowest (intrusive) contribution to the item's heritage significance:

- exceptional
- high
- moderate
- little
- neutral
- intrusive

Elements of the Turrella Railway Station Group have been graded as follows:

- **exceptional:** island platform: form, layout, brick coping (excluding modern asphalt surface)
- **high:** station building - form, fabric and design elements (excluding modern fit out)
- **moderate:** nil
- **little:** stairs from Reede Street overbridge, station lights
- **neutral:** Reede Street overbridge, station building (modern internal fit-out), Platform surface and furniture including seats and rubbish bins
- **intrusive:** platform canopies

Potential archaeological features

The Proposal area has a low potential retaining any historical archaeological remains due to earlier phases of land use and the positioning of the station in such a large land cutting. The construction of the East Hills Railway line would have resulted in complete removal of any historical archaeological remains associated with early use.

6.5.2 Potential impacts

a) Construction phase

Station upgrades

Footpath

Upgrade works to the footpath between Reede Street, Turrella Street and the station entrance would not result in any physical impacts to the Turrella Railway Station Group.

Stairs

The existing stairs vernacular in its design is of little heritage significance due to being modified over time. The impact from the construction and replacement of the stairs is expected to be minor.

Lift and landing

The new lift and landing located at the eastern end of Turrella Station would introduce a relatively large new structural element to the station group. This work would require demolition of a small section of the platform for the installation of the lift. This is located near the centre of the platform away from the brick facing and coping and would remove the non-original platform surface and fill from the platform. The proposed scope of works would not result in physical impacts to fabric of significance.

Platform canopy

The proposed works would remove the existing canopy, an intrusive element to the station group, with the replacement canopy designed to provide better, though still partially obstructed, views of the station building. The existing canopy is not physically connected to the station building; therefore the removal of the canopy would not require interaction with significant elements of the station building and would not have an adverse physical impact.

Station building modifications

Male toilets

The existing male toilets would be modified to a new family accessible toilet. The proposed works would include the removal of original partitions and urinal, originating from the 1930s when the building was constructed.

Installation of new service connections and plumbing would also require penetrations to the original structure of the building, with any associated ventilation works requiring removal of sections of the original ceiling. The removal of the original fit out within the male toilets would have a moderate adverse physical impact. Penetrations to the original finishes to the walls and ceilings would result in a minor adverse physical impact.

The Proposal would completely remove evidence of this component of the station building's original design, both through the removal of the original fit out and reconfiguration of the space. This would result in a major adverse impact. Penetrations to the original finishes to the walls and ceilings would result in a minor adverse physical impact.

In addition, widening of the existing opening in the brick wall would also be undertaken which would include the removal of original brickwork. This would have a minor adverse physical impact.

Overall, the proposed refurbishment works of the male toilet would have a moderate adverse impact to the Turrella Railway Station Group.

The relocation of the cleaner's room to the east half of the male toilet would require the re-configuration of walls and openings within the station building. Reconfiguration of the west bay of the station building, where the male toilets are located, would have a moderate adverse impact as it would be a small departure from the standard building design used for all stations along the East Hills line, and result in a change in use of the westernmost bay. New penetrations within this space have the potential to result in a minor to moderate adverse physical impact, depending on the size and location required, and extent of intervention to original fabric required. The proposed relocation of the cleaning room has the potential to result in a moderate adverse impact on the Turrella Railway Station Group.

Female toilets

Demolition of the existing internal partitions would remove original elements of the station group. This would have a moderate adverse physical impact.

Installation of new fittings, fixtures and services would require new penetrations and fixings to the station building walls and ceilings. This would be into areas of original fabric such as the walls and ceilings. This would have a minor to moderate impact, depending on the size and location of penetrations required.

Overall, refurbishment works to the female toilet to form a unisex ambulant toilet would have a moderate adverse impact to the Turrella Railway Station Group.

Other building modifications

Other building modifications including the removal of the kitchenette and relocation of the communications room to the existing cleaner's room. Removal of the kitchenette and other modern fittings from the communications room would not result in an adverse visual or physical impact as this constitutes non-original and non-significant fabric.

Relocation of the communications equipment to the existing cleaner's room would require installation of new service connections, fixtures which would likely consist of new penetrations to original walls, floors or ceilings. This would have the potential to result in a minor to moderate adverse physical impact.

Overall, these other building modifications have the potential to have a minor adverse impact on the Turrella Railway Station Group.

Ancillary works

Relocation of services

Relocation of services within the Turrella Railway Station Group has the potential for localised impacts on significant fabric of the station group. New services installed within existing cable routes or where installation does not remove significant fabric or add penetrations or fixings to significant fabric, would not result in adverse impact. However, where new penetrations to the station building or platform face are required, this would have a minor to moderate adverse physical impact, depending on the extent of works required. Introduction of new cable routes to the exterior walls of the station building platform face or rock cuttings may result in a minor adverse visual impact and should be avoided.

Power supply upgrades

The construction of the substation would not require impacts to the significant elements of the station.

Wayfinding signage

New wayfinding signage would be located in the public domain and separate from the significant elements of the station. No works would be required to significant fabric of the station group.

Regrading and resurfacing of the station platforms

The platform surface has been extensively altered since the construction of the station and is not considered a significant part of the platform. Resurfacing and regrading of the platform would not result in an adverse physical heritage impact on the Turrella Railway Station Group.

Relocation of station furniture and rubbish bins

Relocation of these items along the platform is unlikely to require intervention into the significant elements of the station group. This would not have an adverse physical impact.

Temporary construction compound and laydown areas

The construction compound and laydown areas for storage would be temporary. Any visual impacts associated with this would be temporary, with the works being fully reversible. The proposed construction compound and laydown areas would be located unobtrusively to minimise temporary visual impacts.

The temporary construction compound and laydown areas would result in negligible temporary impacts, which would be reversible upon completion of the Proposal.

Relocation and protection of existing underground services

The relocation of services using non-destructive search methods would not result in any adverse physical or visual impacts as no physical works are required.

Protection works would occur to the services, only if required. Any services exposed for this work would be re-buried (or similar) with associated surfaces made good, to match existing surrounding surfaces. This would not result in any visual impacts and would result in a negligible degree of physical impact.

This would not result in adverse impact on the Turrella Railway Station Group.

Interchange facilities

Construction work associated with upgrades to interchange facilities would not have an adverse physical impact on the Turrella Railway Station Group.

Archaeological impacts

The earthworks (ground disturbing works) outlined in the Proposal are unlikely to impact on historical archaeological remains or 'relics' due to the Proposal area not possessing the potential to retain historical archaeological remains. This is due to earlier phases of land use within the area, the construction of the East Hills line would have resulted in complete removal of any historical archaeological remains associated with early land use.

b) Operational phase

Station upgrades

Footpath

Upgrade works to the footpath between Reede Street, Turrella Street and the station entrance would not result in any ongoing visual impacts to the Turrella Railway Station Group.

Stairs

The overall design is relatively similar to the existing staircase, with the major proposed change being the introduction of the canopy.

As the existing stair does not form part of any significant views or vistas to or from the station (rather, it presents as a utilitarian and expected element within the immediate context of the station) modifications to its appearance would not significantly alter the overall presentation of the station, which has already been modified by contemporary changes (particularly those undertaken in 2001 and 2012).

The design seeks to improve on the existing visual impacts with the west end of the proposed canopy to the stairs open, allowing views through the canopy to the upper parapet wall of the station building.

Overall, the proposed new staircase and associated canopy do represent a visual change within the context of the station, but given the already compromised visual presentation of the station and its component elements**,** the visual impacts of this change are assessed to be minor.

Lift and landing

The new lift and landing at the east end of the station would introduce a relatively large new structural element to the station group. The structure would be located to the east end of the station and away from the station building, resulting in an appropriate degree of visual and physical separation. The new lift and landing (with canopy) would be located in proximity to large scale elements, such as the Overbridge and stair, rather than in proximity to smaller scale elements such as the station building.

The newly proposed works would result in a relatively limited degree of additional visual impact, noting that views to the eastern elevation of the station building are already compromised and currently are not particularly contributory to the heritage significance of the station group.

Overall, the proposed new lift and associated landing to the Reede Street Overbridge would have a minor adverse impact on the Turrella Railway Station Group

Platform canopy

The proposed works would remove an intrusive element to the station group, with the replacement canopy designed so as to provide better, albeit still partially obstructed, views of Interwar Art Deco detailing to the eastern elevation of the station building. The proposed canopy would have a minor adverse visual impact and overall minor impact on the Turrella Railway Station Group.

Station building modifications

Male toilets

The proposed refurbishment works of the male toilets would have a moderate adverse impact to the Turrella Railway Station Group. This is associated with the reconfiguration of the space and removal of the original elements with the space. It should be noted that these works would be confined to the male toilets and would not impact on the presentation and aesthetic significance of the station group as a whole.

Works associated with the relocation of the cleaning room to the existing male toilet would generally not be visible to the public and would not impact on the significant views of the station building, nor detract from the overall contribution of the building to the significance of the Turrella Railway Station Group.

Female toilets

Works associated with the creation of a new unisex ambulant toilet in the existing female toilets would not comprise the overall contribution of the station building to the aesthetic significance of the Turrella Railway Station Group.

Other building modifications

Removal of the kitchenette and other modern fittings from the communications room would not result in an adverse visual impact as this constitutes non-original and non-significant fabric.

The relocation of the communications room to the cleaner’s room would generally not be visible to the public and would not impact on the significant views of the station building, nor detract from the overall contribution of the building to the significance of the Turrella Railway Station Group.

Ancillary works

Relocation of services

Introduction of new cable routes to the exterior walls of the station building platform face or rock cuttings may result in a minor adverse visual impact and should be avoided.

Detailed design should confirm the extent to which services are required for relocation to determine the level of impact to the Turrella Railway Station Group.

Power supply upgrades

The new substation would be a new rectangular structure, approximately 1.5m high by 2m wide by 2.5m long on a concrete pad footing. This would sit at eye level from the station platform, due to the embankment at the Henderson Street Entrance. Construction of the substation in the proposed location would obscure some views of the station building from the north; some views would remain, albeit at smaller scale. This would have a minor adverse visual impact upon the Turrella Railway Station Group.

Wayfinding signage

Signage would be of small scale and would introduce minor additional elements to the station along with updates to the present wayfinding signage. This would have a negligible visual impact. New and updated signage would be cohesive in presentation and materiality.

Regrading and resurfacing of the station platforms

The proposed regrading to the platform would not result in an adverse visual heritage impact on the Turrella Railway Station Group

Relocation of station furniture and rubbish bins

No adverse heritage impact would result from relocation of existing furniture or rubbish bins.

Interchange facilities

The proposed upgrades to the public domain including ramp and footpath are anticipated to have a negligible to minor impact on the Turrella Railway Station Group. This should be confirmed following completion of the detailed design.

6.5.3 Mitigation measures

The following mitigation measures are proposed to manage the potential non-aboriginal heritage impacts of the Proposal:

- options would be explored to retain a representative example of the original partitions in one of the station toilets. This would be done in consultation with the Transport for NSW heritage team and heritage consultant to find a sensitive design approach that also meets the Building Code Australia and proposal requirements
- the final design for the toilets and any works to original fabric would be prepared in consultation with a heritage consultant and Transport for NSW. This would include endorsement from Transport for NSW heritage team on the 75% complete design (Critical Design Review) to ensure all opportunities to minimise heritage impacts have been considered and incorporated into the design where appropriate
- the glazing to the toilet windows would have the paint removed with other options investigated to reinstate visibility to the original glazing panes, noting that privacy screening measures will likely be required
- the design and finishes of new station elements, including the new toilets would respond to the Inter-War architecture and design of the station

- an appropriate materials and colour palette would be selected for the new elements included in the Proposal. This would be done in consultation with Sydney Trains standard colour schemes for Inter-War railway stations
- opportunities to repaint the station elements in accordance with the Sydney Trains standard colour schemes for Inter-War railway stations would be explored within the Proposal scope. This provides an opportunity to mitigate some of the impacts of the Proposal on the Turrella Railway Station Group
- opportunities would be explored to reinstate removed original fabric where possible. This includes the use of sympathetic new elements or replicate the details such as doors and windows as specified in the original designs
- the Inter-War Art-Deco detailing on the original building would be emphasised or highlighted in the proposed new works. This could include lighting placed to spotlight significant elements or use of similar detailing or patterns in the new work which reflect the original architectural style of the station building
- lift canopy structure – options would be explored to reduce the size of the horizontal beam supporting the lift canopy. This would help to minimise the dominance of the lift structure in views to and from the station
- enclosed stairway – the detailed design would explore options for high transparency materials to the enclosed canopy to allow better views to the station building as well as to lighten the appearance of the structure against the other proposed modifications to the east end of the station
- power supply upgrades – screening of the proposed padmount substation would be considered to reduce the impact on the views to and from the station building. This could include the use of interpretive devices or public art to improve the setting of the north side of the station, near Henderson Street entrance
- upgrades to any services should seek to use existing cable routes or penetrations through significant elements of the station group. This should be undertaken in accordance with the Sydney Trains Heritage Technical Note: Installation of New Electrical and Data Services at Heritage Sites
- details of the temporary enabling works should be confirmed and reviewed to ensure no additional impacts may result from the required works. This should include reviewed visual and physical impacts
- preparation of a heritage interpretation plan in accordance with Sydney Trains Interpretation Guideline. This should be implemented as part of the detailed design and construction documentation for the Proposal
- all project team members, including contractors, would be provided with a heritage induction as part of the general site induction package. This would identify why the Turrella Station Group is significant, their obligations under the Heritage Act and environmental management process relating to unexpected finds, design revisions identified during construction and protection methods to be used during construction to prevent accidental damage during construction works
- significant elements of the station group would be adequately protected during the works. This could include physical barriers, exclusion zones or other methods as appropriate to ensure accidental damage does not occur during the works
- regrading of the platform would be completed so that no significant or original features along the platform are impacted. This includes the boot scrapers and the light poles, which are contributory elements to the station group
- in accordance with Section 170a of the Heritage Act, Sydney Trains should provide notification of the work to Heritage Division 14 days prior to the commencement of the work

- adequate drainage and ventilation to the station building would be maintained when regrading the platform. This includes ensuring any vents to the lower section of walls are free from debris at the end of the regrading works, and that asphalt or other materials are not built up directly against the station building
- a Photographic archival recording should be prepared for Turrella Station prior to the commencement of works, including any temporary works or site investigations. This should capture the areas of the station affected by the Proposal
- in the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in Transport for NSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2019b) would be followed, and work within the vicinity of the find would cease immediately. The Contractor would immediately notify the Transport for NSW Project Manager and the Transport for NSW Senior Environment and Sustainability Officer so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and Heritage NSW. Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to work recommencing at the location
- a suitably qualified heritage architect would be engaged from the detailed design phase through to construction to ensure compliance with the relevant heritage approvals, and to further minimise the impact of the Proposal through the use of appropriate form, proportion and materials
- on completion of work, an update would be prepared for the Section 170 Heritage and Conservation Register, with required details
- section 170 of the Heritage Act and the State Agency Heritage Management Guidelines require a state agency to notify Heritage NSW of the demolition of a heritage asset, or substation portion of that asset. The Proposal includes the demolition of a significant original element, being the removal of the stairs to the station platform and the demolition of the original fitout in the male toilet. Therefore, Heritage NSW would be notified of the proposed works to Turrella Railway Station Group.

Refer to Table 7-1 for a full list of proposed mitigation measures.

6.6 Socio-economic impacts

6.6.1 Existing environment

The Turrella Station services the T8 Airport and South Line and is situated within the Bayside LGA. The Proposal would primarily occur within land designated as SLP2 (Rail) with minor works occurring along Turrella Street.

Potential sensitive receivers that have the potential to be influenced by the Proposal include:

- local residents predominantly those adjacent to the Proposal (the residential apartments on Turrella Street)
- local businesses along Henderson Street
- commuters including train passengers using Turrella Station

A review of the 2016 Australian Bureau of Statistics Census data revealed Turrella has a population of 2,511 people with a median age of 29 years. Of this population, around 1,331 were employed, with the train being identified as the second most common method of travel to work (around 36 percent of employed people aged over 15 years) (ABS, 2016).

The *Bayside 2030, Community Strategic Plan* and the *Bayside Local Strategic Planning Statement* identifies public transport to be an important factor into creating a more prosperous, vibrant and connected community. The goals and themes set out by these plans focus on

enabling Turrella to become more accessible, sustainable and able to continue to support a growing and diverse community. Key priorities of the *Bayside Local Strategic Planning Statement* is to have a city that is supported by infrastructure, and for that infrastructure to meet the needs of the Bayside Community. This includes increasing accessibility to stations, allowing everyone to be able to take advantage of public transport. The Proposal broadens the useability of Turrella Station, supporting existing infrastructure by modernising and addressing its existing issues with accessibility.

6.6.2 Potential impacts

a) Construction phase

The construction of the Proposal has the potential to temporarily impact customers, cyclists, parking, pedestrians, residents, businesses, and the kiss and ride bay as a result of:

- temporary disruption to existing station facilities and amenities (e.g. platforms, toilets and seating)
- temporary impacts to local traffic movements due to an increase in truck movements in the area, delivering site materials, plant and equipment
- temporary changes in pedestrian access to station via Reede Street overbridge
- construction noise, dust and visual impacts.

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

Construction work would be managed to ensure pedestrian and cyclist access is provided across the rail corridor located on the Reede Street overbridge. In the event where construction works may disrupt existing pedestrian facilities appropriate signage and or traffic controllers would be utilised and positioned to notify pedestrians of the temporary arrangements.

No direct impacts to social infrastructure are anticipated as work would be predominantly carried out within the rail corridor.

b) Operational phase

The Proposal overall would result in many socio-economic benefits for the Turrella community including:

- equitable access for all customers at Turrella Station through the implementation of upgraded footpaths, lift installation, new stairs and canopy all compliant with key DDA and DSAPT requirements
- upgraded and modernised amenities and facilities including a new unisex ambulant toilet and family accessible toilet, new platform weather protection and wayfinding signage
- greater connectivity, increased use of public transport to and from Turrella Station.

6.6.3 Mitigation measures

The following mitigation measures are proposed to manage the potential socio-economic impacts of the Proposal:

- sustainability criteria for the Proposal would be established to encourage the Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal
- feedback through the submissions process would be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where practicable
- a Community Liaison Management Plan would be prepared prior to construction to identify all potential stakeholders and the best practice methods for consultation with these groups during construction. The Plan would also encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where practicable
- contact details for a 24-hour construction response line (1800 775 465), Project Infoline (1800 684 490) and email address (projects@transport.nsw.gov.au) would be provided for ongoing stakeholder contact throughout the construction phase
- the community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Plan to be developed prior to construction.

Refer to Table 7-1 for a list of proposed mitigation measures.

6.7 Biodiversity

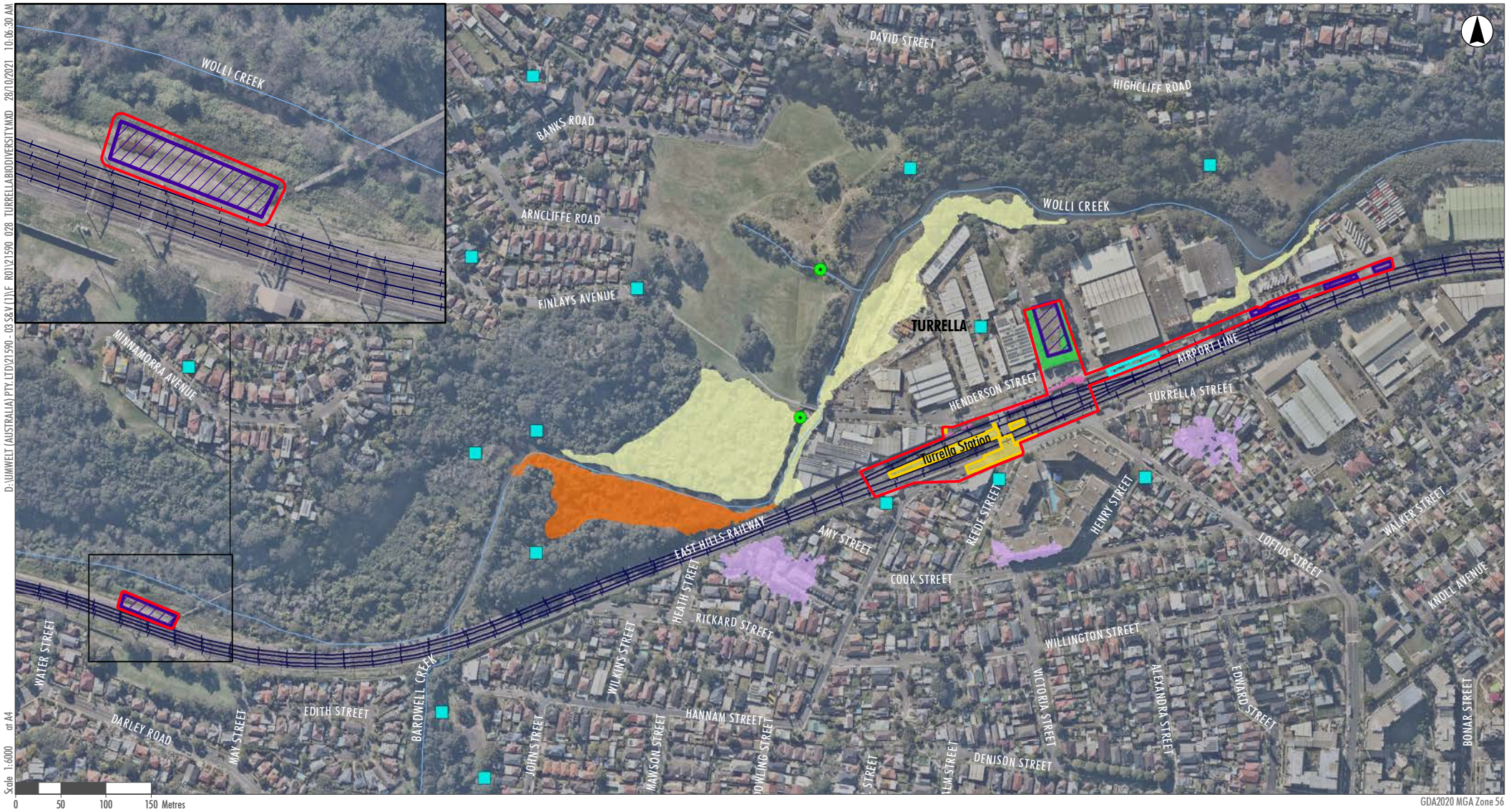
This section provides a summary of the Ecological Impact Assessment prepared by Umwelt (2021b) to assess the potential construction and operational impacts of the Proposal. The methodologies used to undertake these assessments are provided in the Ecological Impact Assessment. It is noted a site visit could not be undertaken due to NSW Government Health Orders.

6.7.1 Existing environment

The Proposal area is located within an urban area which has been heavily modified over time. Due to the long history of rail and use of the site, vegetation within the project boundaries is limited and scarce.

Vegetation communities

One native vegetation community has been identified to occur within the Proposal area, within the laydown area at 27 Henderson St, and has been precautionarily mapped as ‘native vegetation’ as seen in Figure 6-12. Aerial imagery also suggest exotic vegetation may have once occurred between the railway tracks and southern retaining wall, however Google Street View with images dating from October 2020 suggests it has been removed.



Legend

- Proposal Area
- Proposed Work Areas
- Laydown Area
- Construction Compound
- Native Vegetation
- Weeds and Exotics
- Watercourses
- Railway Line

SydneyMetroArea_v3_2016_E_4489

- PCT 1808 - (Swamp Oak Floodplain Forest TEC)
- Urban_E/N: Urban Exotic/Native
- Weed_Ex: Weeds and Exotics

Bionet Atlas Fauna Threatened Species Records

- Dusky Woodswallow
- Grey-headed Flying-fox

FIGURE 6-12

Biodiversity identified within proximity of Proposal

Image Source: Nearmap (May 2021) Data source: NSW DFSI (2020), Bionet Atlas (2021), © State Government of NSW and Department of Planning, Industry and Environment 2016

Flora

Six threatened flora species have been recorded within 10 kilometres of the Proposal. Each of these species was assessed as having a low likelihood of occurrence within the Proposal area due to the likely absence of potential habitat or being highly fragmented and surrounded by residential and commercial development making it highly unlikely it would support the occurrence of threatened flora.

Fauna

No threatened fauna habitat was identified with the potential for threatened species to utilise within the Proposal area. Threatened microbat species may utilise cracks in concrete and small openings in buildings as roosting sites, although they are unlikely to utilise these spaces due to the excessive noise created by traffic and trains passing through Turrella Station.

Nearby forest and wetlands associated with Wolli Creek and Wolli Creek Regional Park may provide suitable habitat for threatened fauna including bird and bat species that may fly over the Proposal area including the Grey Headed Flying Fox. The nearest Grey-headed Flying Fox camp is located within four-hundred metres of the study to the west in Wolli Creek Regional Park seen in Figure 6-12. It is unlikely that any threatened species would utilise any habitat located within the Proposal area.

Migratory species

The Proposal area does not provide habitat for any migratory species. Wolli Creek Regional Park contains a creek and forest that may constitute suitable habitat for migratory bird species which is located 1.2 kilometres from the Proposal. These bird species may utilise the airspace above the study area as they migrate up and down the coast, stopping to rest or forage at Wolli Creek Regional Park.

6.7.2 Potential impacts

a) Construction phase

Direct impacts

Vegetation communities

The proposed works are not expected to have a direct impact or require clearing of any native vegetation. Access to the compound located in the north-east of the Proposal area (within the rail corridor) would be via an existing gateway with storage of all materials occurring in existing cleared areas. Access to other laydown areas within the rail corridor would also not require the clearance of any native vegetation.

The laydown area located on 27 Henderson Street would not require the removal of any native vegetation as access is provided via an existing driveway and storage of all materials would occur in an existing cleared area.

The Proposal would not require the removal of any vegetation.

Flora

The Proposal area does not contain suitable habitat for any threatened flora species known or predicted to occur within 10 kilometres of the study area. No threatened flora species have been previously recorded within the study area. As such, no threatened flora species are expected to be directly impacted by construction.

Fauna

No potential habitat for threatened fauna species has been assessed as occurring within the study area. The proposed works are unlikely to impact any resident fauna, but birds/bats that may utilise the airspace above the study area may be deterred e.g. construction noise.

Indirect impacts

There is the potential for light, noise and vibrations to have an indirect impact on biodiversity. This could have an impact on the health and behaviour of fauna in Wolli Creek Regional Park, or any bird and bat species that may fly over the study area while foraging. Given these impacts are already generated by traffic and frequently passing trains, it is unlikely the proposed construction activities would result in additional impacts on biodiversity.

b) Operational phase

The operation of the Proposal is not anticipated to result in any further impacts to biodiversity.

6.7.3 Mitigation measures

The following mitigation measures are proposed to manage the potential biodiversity impacts of the Proposal:

- the vegetation surrounding the laydown area located north-east off Henderson Street would be inspected by a suitably qualified ecologist to rule out the occurrence of any threatened species or ecological communities
- an exclusion zone would be setup surrounding the native vegetation adjacent the compound in the north-east of the study area. The exclusion zone would be marked and delineated with fluorescent flagging tape
- all workers would be provided with an environmental induction prior to commencing work onsite. This induction would include information on the protection measures to be implemented to protect vegetation, penalties for breaches and locations of areas of sensitivity
- construction of the Proposal must be undertaken in accordance with Transport for NSW's *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2019c) and Transport for NSW's *Fauna Management Guideline* (TfNSW, 2019d)
- disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal
- in the event of any tree to be retained becoming damaged during construction, the Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Senior Environment and Sustainability Officer to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible
- all construction workers should be briefed on the location of the native vegetation exclusion zone prior to the beginning of works
- should the detailed design or onsite work determine the need to remove or trim any trees, which have not been identified in the REF, the Contractor would be required to complete Transport for NSW's Tree Removal Application Form and submit it to Transport for NSW for approval
- for new landscaping work, mulching and watering would be undertaken until plants are established

- weed control measures, consistent with Transport for NSW's *Weed Management and Disposal Guideline* (TfNSW, 2019e), would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the project. This would include the management and disposal of weeds in accordance with the *Biosecurity Act 2015*.

Refer to Table 7-1 for a list of proposed mitigation measures.

6.8 Contamination, landform, geology and soils

6.8.1 Existing environment

Landform, geology and soils

The topography of Turrella is characterised by undulating to rolling low hills. According to the soil landscapes of central and eastern (standard 1:100,000) map provided by DPIE describes geology of the Proposal area primarily consisting of Hawkesbury Sandstone, which is a medium to coarse-grained quartz sandstone.

Acid sulfate soils

A review of the DPIE's Acid Sulfate Soils dataset indicated that the Proposal area is located within an area mapped as Class 5, meaning Acid Sulfate Soils are not expected to be found. The laydown area located on Henderson Street and adjoining north of the project boundary is mapped as Class 3 Acid Sulfate Soils (likely to be found one metre below ground), however there is no earth work disturbance of the soils proposed in this area. Therefore, there is a low probability of Acid Sulfate Soils occurrence.

Contamination

Given the historical use of the station as a rail corridor, there is potential for contaminants to be present within the soils underlying the station. Historic activities associated with rail corridors that have the potential to result in contamination include the introduction of fill materials including ash, fuel or oil spills and accidental leaks or spills from maintenance and operational activities. Given the age of the building, there is also potential for asbestos materials and lead paint to be encountered.

A search of the public register of notices issued by the NSW EPA under the CLM Act was undertaken on 14 September 2021. One site was recorded within Turrella being declared as 'Significantly Contaminated Land' located 750 metres away from the Proposal area. There were no sites in the vicinity of Turrella Station identified as contaminated to an extent that warrants regulation.

6.8.2 Potential impacts

a) Construction phase

If appropriate mitigation strategies and safeguards are not implemented accidental fuel or chemical spills from construction activities/stockpiling may enter stormwater drains and flow into nearby waterways.

There is also potential for works undertaken inside the station building to disturb asbestos material or other hazardous substances e.g. lead paint if not appropriately managed could pose a health risk to construction workers and customers.

Excavation activities could lead to erosion and sedimentation impacting local waterways. Groundwater would also need to be considered, as excavation areas may need to be locally dewatered to remove groundwater seepage or rainfall runoff. Incorrect dewatering may pose risks to nearby waterways in particular Wolli Creek.

There is also a potential of contamination of soil through accidental fuel or chemical spills from construction plant and equipment.

b) Operational phase

The operation of the Proposal is not expected to generate any further impacts to contamination, landform, geology and soils than what is already existing.

6.8.3 Mitigation measures

The following mitigation measures are proposed to manage the potential soil and contamination impacts of the Proposal:

- prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the 'Blue Book' *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of works and maintained throughout construction
- erosion and sediment control measures would be established prior to any clearing, grubbing and site establishment activities and would be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. Erosion and sediment control measures would be maintained and left in place until the work is complete and areas are stabilised
- vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment would also be refuelled offsite, or in a designated refuelling area
- all fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and Transport for NSW's *Chemical Storage and Spill Response Guidelines* (TfNSW, 2019f)
- adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the Transport for NSW *Chemical Storage and Spill Response Guidelines* (TfNSW, 2019f) during the construction phase. All staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill
- an appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with WorkCover requirements
- in the event of a pollution incident, works would cease in the immediate vicinity and the Construction Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Sustainability Officer. The EPA would be notified by Transport for NSW if required, in accordance with Part 5.7 of the POEO Act.

Refer to Table 7-1 for a list of proposed mitigation measures.

6.9 Hydrology and water quality

6.9.1 Existing environment

Surface water

The Proposal is located within 100 metres south of Wolli Creek which is a major tributary of the Cooks River Catchment. The creek is tidal dominated with water quality being characterised by urban development.

The Proposal area is located on land mapped as flood affected land under the Bayside LEP. Turrella Station is only expected to flood following a probable maximum flood event as highlighted within the Bayside LEP. As mentioned in the Bardwell Creek Flood Study Review 2019 the noise barriers located along the northern and southern side of the East Hills rail line acts as a flood barrier in the event of increase water levels, mitigating flooding of the station.

Groundwater

A search of NSW OEH data in August 2021 found four groundwater bores within 500 metres of the station however no water was present.

a) Construction phase

The Proposal is unlikely to have a significant impact on the hydrology of the area or disturb any nearby watercourses. However, without appropriate safeguards and mitigation strategies in place, pollutants (fuels, accidental spills or chemicals) could enter stormwater drains and flow into nearby waterways. Erosion and sedimentation resulting from construction activities also has the potential to impact local waterways.

During excavation work (notably for the lift shaft), groundwater might be present. Dewatering activities may need to be undertaken and water discharged appropriately should groundwater be encountered or if rainwater is captured onsite during excavation work.

Construction activities have the potential to be impacted by flood events, including delays due to site inundation or rain and potential damage to machinery and equipment.

b) Operational phase

The Proposal is unlikely to have any impacts on the hydrology of the Proposal area or surrounding area, with any potential impacts considered negligible.

Regrading of the access footpaths, platforms, installation of the walkway, ramp and canopy will all effect the surface water flow regime of the station, however the level of impact is expected to be minor. Modifications to the surface water flows would likely be within the capacity of the stormwater network and as such, impacts would be minimal. The current design has considered the potential impacts of flooding on the operation of the Proposal. Detailed design would consider stormwater management around new and existing structures to ensure the design meets potential flood risk requirements for operational activities and equipment.

6.9.2 Mitigation measures

A site-specific Erosion and Sediment Control Plan would be prepared in accordance with the ‘Blue Book’ *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004) and implemented for the Proposal to manage the potential impacts on the hydrology and water quality. Additional mitigation measures include:

- adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines

and the Transport for NSW Chemical Storage and Spill Response Guidelines (TfNSW, 2019f) during the construction phase. All staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill

- existing drainage systems would remain operational throughout the construction phase
- should groundwater be encountered during excavation work, groundwater would be managed in accordance with the requirements of the *Waste Classification Guidelines* (EPA, 2014) and Transport for NSW's *Water Discharge and Reuse Guideline* (TfNSW, 2019g)
- all fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and Transport for NSW's *Chemical Storage and Spill Response Guidelines* (TfNSW, 2019f)
- vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment would also be refuelled offsite, or in a designated refuelling area
- in the event of a pollution incident, work would cease in the immediate vicinity and the Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Senior Environment and Sustainability Officer. The EPA would be notified by Transport for NSW if required, in accordance with Part 5.7 of the POEO Act.

Refer to Table 7-1 for a list of proposed mitigation measures.

6.10 Air quality

6.10.1 Existing environment

The WestConnex and Transurban M5 East tunnel ambient monitoring network provide the most representative air quality monitoring results for the region surrounding the project. The monitoring sites include locations at Arncliffe, Bexley, Bardwell Valley, Undercliffe, Turrella and Earlwood.

The closest monitoring site is located at Thompson Street, Turrella 500 metres away from the Proposal area. The station records carbon dioxide (CO), nitrogen dioxide (NO_2), Nitrogen oxide (NO_x) and PM_{10}. No exceedances were reported between 09 August 2020 and 09 August 2021, indicating good air quality for the locality.

6.10.2 Potential impacts

a) Construction phase

Throughout construction air quality impacts may result from dust particles generated by the construction works. Some activities with the potential to produce dust include excavation for the new lift, stockpiling activities and loading and transfer of material from trucks.

Emissions of carbon monoxide, sulphur dioxide, particulate matter (PM_{10}), nitrous oxides, volatile organic compounds, and polycyclic aromatic hydrocarbons from the combustion of diesel fuel and petrol due to the construction plant and equipment may also contribute to the impacts on air quality.

Provided the Proposal does not entail any significant land disturbance, dust would likely have a minimal impact to air quality. Impacts from the increase of emissions due to construction traffic, plant and equipment are predicted to be minimal and temporary.

b) Operational phase

Overall impacts to air quality during the operation of the Proposal would be negligible due to the land use remaining the same.

6.10.3 Mitigation measures

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

- air quality management and monitoring for the Proposal would be undertaken in accordance with Transport for NSW *Air Quality Management Guideline* (TfNSW, 2019h)
- methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks
- plant and machinery would be regularly checked and maintained in a proper and efficient condition. Plant and machinery would be switched off when not in use, and not left idling
- vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable
- to minimise the generation of dust from construction activities, the following measures would be implemented:
    - apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces)
    - cover stockpiles when not in use
    - appropriately cover loads on trucks transporting material to and from the construction site and securely fix tailgates of road transport trucks prior to loading and immediately after unloading
    - prevent mud and dirt being tracked onto sealed road surfaces.

Refer to Table 7-1 for a list of proposed mitigation measures.

6.11 Waste

During construction of the Proposal, the following waste materials would be generated:

- asphalt and concrete
- surplus building materials
- excavated spoil
- building material wastes (including metals, timbers, plastics, packaging, fencing etc.)
- electrical wiring and conduit waste (from electrical connections)
- hazardous chemical wastes (e.g. fuels)
- green waste (including weeds)
- demolition waste from the stairs, canopy, footpath works, overbridge modifications, platform pavement, preparations to upgrade the existing toilet facilities and non-compliant tactiles.

Waste management would be undertaken in accordance with the WARR Act. A Waste Management Plan would be prepared to identify all potential waste streams associated with the work and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities along with other onsite management practices such as keeping the area tidy and free of rubbish.

The handling, storage, transport and disposal of asbestos and hazardous waste (including any lead waste) would be in accordance with the requirements of relevant EPA and Safe Work NSW guidelines. Waste management targets in consideration of the Infrastructure Sustainability Rating Scheme – Version 1.2 (ISCA, 2018) would be developed for the Proposal and would include reuse and recycling.

6.12 Sustainability

The design of the Proposal would be based on the principles of sustainability, including aiming for an excellent rating as a program under the Infrastructure Sustainability Council (IS Council) Infrastructure Sustainability Rating Tool Version 1.2 and the Transport for NSW Environmental Management System (EMS). These guidelines require a number of mandatory and discretionary initiatives to be applied. Refer to Section 3.3.3 for more information regarding the application of these guidelines.

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

6.13 Climate change

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

Climate change could lead to an increase in the intensity of rainfall events, whereby the rainfall expected to occur in a 100-year average recurrence interval flood event would occur more frequently. Such changes in weather in the region are unlikely to impact on the operation of the Proposal with respect to issues such as increased flooding. Though the Proposal is located on flood affected land as mentioned in section 6.9 operations would only be impacted by a PMF event.

Climate change could lead to an increase in frequency and severity in bushfires. The Proposal is not situated on land mapped as bush fire prone but would be designed with appropriate fire protection measures.

The detailed design would consider the impacts of climate change on the Proposal through:

- undertaking a hydrological assessment to ensure that the proposed infrastructure would not increase the potential flooding within the Proposal site
- selecting materials for durability in extreme conditions that minimise heat retention
- incorporating fire resistant/retarding materials wherever practicable
- incorporating engineering and design features to ensure structures are constructed to minimise direct impacts from severe storms and strong winds.

6.14 Greenhouse gas emissions

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

The detailed design process would undertake a compliant carbon foot printing exercise in accordance with Transport for NSW's Carbon Estimate and Reporting Tool Manual (TfNSW, 2019i) or other approved modelling tools. The carbon footprint would to be used to inform decision making in design and construction. Greenhouse gas emissions would also be assessed in accordance with IS Council IS Rating Tool V1.2.

Due to the small scale of the Proposal and the short-term temporary nature of the individual construction work, 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 7-1.

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

6.15 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. Multiple projects undertaken at a similar time/similar location may also lead to construction fatigue, particularly around noise, traffic and air quality impacts, if not appropriately managed.

A search of the Department of Planning and Environment's Major Projects Register, Sydney and Regional Planning Panel Development and Planning Register, and Bayside Council Development Application Register in September 2021 identified no major developments or projects proposed in the vicinity of Turrella.

During construction, work would be coordinated with any other construction activities in the area as required. Consultation and liaison would occur with Bayside Council, TAHE/Sydney Trains, and any other developers identified, to minimise cumulative construction impacts such as traffic and noise.

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

Based on this assessment, it is anticipated that the cumulative impacts would be minor/negligible, provided that consultation with relevant stakeholders and mitigation measures in Chapter 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 be developed and implemented as appropriate.

7 Environmental management

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

7.1 Environmental management plans

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

The CEMP would 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 7-1. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6 should the Proposal proceed.

Table 7-1 Proposed mitigation measures

No.	Mitigation measure
	General
1.	A CEMP would be prepared by the Contractor in accordance with the relevant requirements of *Environmental Management Plan Guideline – Guideline for Infrastructure Projects,* NSW Department of Planning, Industry and Environment, 2020) for approval by Transport for NSW, prior to the commencement of construction and following any revisions made throughout construction.
2.	A project risk assessment including environmental aspects and impacts would be undertaken by the Contractor prior to the commencement of construction and documented as part of the CEMP.
3.	An Environmental Controls Map (ECM) would be developed by the Contractor in accordance with Transport for NSW's *Guide to Environmental Controls Map* (TfNSW, 2019j) for approval by Transport for NSW, prior to the commencement of construction and following any revisions made throughout construction.
4.	Prior to the commencement of construction, all contractors would be inducted on the key project environmental risks, procedures, mitigation measures and conditions of approval.
5.	Site inspections to monitor environmental compliance and performance would be undertaken during construction at appropriate intervals.
6.	Service relocation would be undertaken in consultation with the relevant authority. Contractors would mark existing services on the ECM to avoid direct impacts during construction.

No.	Mitigation measure
7.	Any modifications to the Proposal, if approved, would be subject to further assessment and approval by Transport for NSW. This assessment would need to demonstrate that any environmental impacts resulting from the modifications have been minimised.
	Traffic and site access
8.	Prior to the commencement of construction, a CTMP would be prepared as part of the CEMP and in accordance with relevant guidelines. The CTMP would outline how construction of the Proposal would avoid, mitigate and manage risks involving construction activities, users of the traffic and transport network and local residents. The CTMP would include at a minimum: • ensuring adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised • maximising safety and accessibility for pedestrians and cyclists • ensuring adequate sight lines to allow for safe entry and exit from the site • ensuring access to railway stations, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made) • managing impacts and changes to on and off street parking and requirements for any temporary replacement provision • identifying parking locations for construction workers away from stations and busy residential areas and details of how this will be monitored for compliance • identifying routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses • managing relocation of kiss and ride, taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired • managing traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the CTMP. Consultation with the relevant roads authorities would be undertaken during preparation of the CTMP. The performance of all project traffic arrangements must be monitored during construction.
9.	Communication would be provided to the community and local residents to inform them of changes to parking, pedestrian access and/or traffic conditions including vehicle movements and anticipated effects on the local road network relating to site work.
10.	Road Occupancy Licences (ROLs) for temporary road closures would be obtained, where required.
11.	Investigation into alternative parking arrangements would be carried out in consultation with Bayside Council prior to the commencement of construction to mitigate the loss of parking during construction.
12.	Construction workers would be encouraged to carpool or use other forms of transport to travel to and from the construction compound, to minimise parking impacts on commuters, residents and the general public.
13.	Adequate information would be provided to affected bus customers and operators due to the potential bus stop closure on Turrella Street including advanced notification and appropriate signage to an alternative bus stop.

No.	Mitigation measure
14.	A drive-through assessment or swept path analysis would be carried out to ensure that sufficient manoeuvring space is provided for the largest design vehicle along the proposed haulage routes.
15.	Traffic Guidance Schemes (TGSs) would be developed for construction works that require lane closures such as on Turrella Street, Reede Street or Henderson Street. TGS implementation would ensure adequate warning and guidance is provided to road users, minimising road related traffic impacts.
16.	Access between Turrella Station and the transport network would be maintained during typical construction periods outside of rail shutdown periods.
17.	Directional signage and/or linemarking would be used to direct and guide drivers, cyclists and pedestrians past the construction compound and on the surrounding road network.
18.	Use of Loftus Street and Kelsey Street as part of an alternative haulage route would be limited to hours outside of the operation of the school zone.
19.	Additional investigation into the proposed local roads used by construction routes given the load limits that currently exist would be carried out in consultation with Transport for NSW and Bayside Council.
20.	Before and after dilapidation surveys of roads used by construction vehicles between the construction compounds and the arterial road network would be carried out by the construction contractor.
21.	Access between Turrella Street and Henderson Street via Reede Street would be maintained during construction, with appropriate arrangements to be determined by the construction contractor during construction planning.
22.	Bayside Council would be consulted about non-compliant swept paths on Reede Street and Turrella Street, with approval of the final design to be obtained prior to the commencement of construction.
	Urban design, landscape and visual amenity
23.	An UDLP for the Project shall be prepared and submitted to Transport for NSW for endorsement by the Precincts and Urban Design Team. The UDLP is to address the fundamental design principles as outlined in '*Around the Tracks' – urban design for heavy and light rail* (TfNSW, Interim 2016). At a minimum, the UDLP shall: a. demonstrate a robust understanding of the Project site through a comprehensive site analysis to inform the design direction, demonstrate connectivity with street networks, transport modes, active transport options, and pedestrian distances b. identify opportunities and challenges c. establish site-specific principles to guide and test design options d. demonstrate how the preferred design option responds to the design principles established in *Around the Tracks*, including consideration of Crime Prevention through Environmental Design Principles. The UDLP is to include the Public Domain Plan for the chosen option and shall provide analysis of the: 1. landscape design approach including design of pedestrian and bicycle pathways, street furniture, interchange facilities, new planting and opportunities for public art 2. materials schedule including materials and finishes for proposed built works, colour schemes, paving and lighting types for public domain, fencing and landscaping

No.	Mitigation measure
	3. an Artist's Impression or Photomontage to communicate the proposed changes to the precinct. The following design guidelines are available to assist and inform the UDLP for the Project: • *TAP Urban Design Plan Guidelines* (TfNSW, Draft 2018) • *Commuter Car Parks Urban Design Guidelines* (TfNSW, Interim 2017) • *Managing Heritage Issues in Rail Projects Guidelines* (TfNSW, Interim 2016) • *Creativity Guidelines for Transport Systems* (TfNSW, Interim 2016) • *Water Sensitive Urban Design Guideline SD-106* (TfNSW, 2017). The UDLP shall be: 1. prepared in consultation with councils and relevant stakeholders 2. prepared by a registered architect and/or landscape architect 3. prepared to inform/support the concept design and submitted to Transport for NSW for review at this design milestone finalised and submitted to Transport for NSW at the completion of design documentation.
24.	All permanent lighting would be designed and installed in accordance with the requirements of standards relevant to *AS 1158 Road Lighting* and *AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting.*
25.	The detailed design of the Proposal would comply with Crime Prevention Through Environmental Design principles.
26.	Worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.
27.	Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
28.	During construction, graffiti would be removed in accordance with Transport for NSW's Standard Requirements.
29.	Lift canopy structure – options should be explored to reduce the size of the horizontal beam supporting the lift canopy. This would help to minimise the dominance of the lift structure in views to and from the station.
30.	The detailed design of the enclosed stairway should explore options for high transparency materials to allow better views to the station building as well as to lighten the appearance of the structure against the other proposed modifications to the east end of the station.
31.	Investigate removing the existing white fencing along Turrella Street and instead attach a handrail to the security fencing/throw screens if a handrail is required, removing the need for two different types of fencing.
32.	Alternatively, investigate using fencing similar to the black palisade security fence on northern side (Henderson Street).
33.	Investigate whether a new fence is necessary along the roadside of the overbridge and along the roadside of Turrella Street, and if a simpler handrail could be substituted and/or fencing used in a more targeted way.
34.	Consider using dark coloured fencing as it is generally less visible and easier to see through, thus receding better into the background.

No.	Mitigation measure
35.	Include several moderate sized street trees along the eastern section of Turrella Street (possibly of the same species as on the opposite side of the street). Trees would improve the aesthetics and add important shade, reducing heat island effects recognised as being prevalent in urban areas.
36.	The selected colour for the acoustic walls along Turrella Street should consider the overall design of the Proposal.
	Noise and vibration
37.	All recommended additional mitigation measures for affected receivers in accordance with the Noise and Vibration Impact Statement (Umwelt, 2021c) are to be applied.
38.	Prior to commencement of work, a CNVMP would be prepared and implemented in accordance with the requirements of the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009), CNVS (TfNSW, 2019a and the Noise and Vibration Impact Assessment for the Proposal (Umwelt, 2021c). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.
39.	The CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which would be considered, include: • regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise • avoiding any unnecessary noise when carrying out manual operations and when operating plant • ensuring spoil is placed and not dropped into awaiting trucks • avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where practicable • switching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloaded • avoiding deliveries at night/evenings wherever practicable • no idling of delivery trucks • keeping truck drivers informed of designated vehicle routes, parking locations and acceptable delivery hours for the site • minimising talking loudly; no swearing or unnecessary shouting, or loud stereos/radios onsite; no dropping of materials from height where practicable, no throwing of metal items and slamming of doors.
40.	The CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which would be considered, include: • maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances • using the most suitable equipment necessary for the construction work at any one time • directing noise-emitting plant away from sensitive receivers • regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc • using non-tonal reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms for all plant used regularly onsite (greater than one day), and for any out of hours work

No.	Mitigation measure
	• use of quieter and less vibration emitting construction methods where feasible and reasonable.
41.	Work would generally be carried out during standard construction hours (i.e. 7.00 am to 6.00 pm Monday to Friday; 8.00 am to 1.00 pm Saturdays). Any work outside these hours may be undertaken if approved by Transport for NSW or authorised under the *Environmental Planning and Assessment (COVID-19 Development – Infrastructure Construction Work Days No. 2) Order 2020* (whilst the Order is in effect), and the community is notified prior to these work commencing. An Out of Hours Work application form would need to be prepared by the Contractor and submitted to the Transport for NSW Environment and Sustainability Officer for any work outside normal hours.
42.	As per the CNVS (TfNSW, 2019c, construction activities with special audible characteristics (high noise impact, intensive vibration, impulsive or tonal noise emissions) would be limited to standard hours, starting no earlier than 8am; and to continuous blocks not exceeding three hours each with a minimum respite from those activities and work of not less than one hour between each block, unless otherwise approved by Transport for NSW.
43.	Work would be conducted behind temporary hoardings/screens wherever practicable. The installation of construction hoarding would take into consideration the location of residential receivers to ensure that 'line of sight' is broken, where feasible.
44.	To avoid structural impacts as a result of vibration or direct contact with structures, the proposed work would be undertaken in accordance with the safe work distances outlined in the Noise and Vibration Assessment (specialist name, year) and attended vibration monitoring or vibration trials would be undertaken where these distances are required to be challenged.
45.	Vibration resulting from construction and received at any structure outside of the project would be managed in accordance with: • for structural damage vibration –British Standard BS 7385-2:1993 Evaluation and measurement for vibration in buildings Part 2 and German Standard DIN 4150: Part 3 – 1999: Structural Vibration in Buildings: Effects on Structures • For human exposure to vibration the acceptable vibration - values set out in the *Environmental Noise Management Assessing Vibration: A Technical Guideline* (Department of Environment and Conservation, 2006) which includes British Standard BS 6472-2:1992 *Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz).*
46.	Property conditions surveys would be completed prior to any vibratory work including jack hammering and compaction for all buildings/structures/roads with a plan distance of 50 metres from the work and all heritage listed buildings and other sensitive structures within 150 metres of the work (unless otherwise determined following additional assessment they are not likely to be adversely affected).
47.	Property conditions surveys would be completed prior to any vibratory work including jack hammering and compaction for all buildings/structures/roads with a plan distance of 50 metres from the work and all heritage listed buildings and other sensitive structures within 150 metres of the work (unless otherwise determined following additional assessment they are not likely to be adversely affected).
48.	Alternative accommodation options may be offered to residents living in close proximity to construction works that are likely to experience highly intrusive noise levels.
49.	Out of hours work during evening and night periods will be restricted so that receivers are impacted for no more than three consecutive evenings and no more than two consecutive nights in the same noise catchment area in any one week, except where there is a Duration

No.	Mitigation measure
	Respite. A minimum respite period of four evenings/five nights shall be implemented between periods of evening and/or night works.
50.	Notification within a minimum of seven days prior to the start of works would be provided to local residents and local businesses in particular sensitive receivers to advise of upcoming works and potential disruptions.
51.	Verification monitoring of noise and/or vibration levels during construction would be undertaken in the form of routine checks of noise levels or following reasonable complaints, conducted at the affected receiver(s) or a nominated representative location.
52.	Respite offers should be considered made where there are high noise and vibration generating activities near receivers.
53.	Where respite periods are considered counterproductive in reducing impact and where it can be strongly justified on a project-by-project basis, the number of evenings and/or nights worked may be increased through duration reduction so that the project can be completed more quickly.
	Aboriginal heritage
54.	All construction staff would undergo an induction in the recognition of Aboriginal cultural heritage material. This training would include information such as the importance of Aboriginal cultural heritage material and places to the Aboriginal community, as well as the legal implications of removal, disturbance and damage to any Aboriginal cultural heritage material and sites.
55.	If unforeseen Aboriginal objects are uncovered during construction, the procedures contained in Transport for NSW's *Unexpected Heritage Finds Guideline* (TfNSWb, 2019) would be followed, and work within the vicinity of the find would cease immediately. The Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Sustainability Officer so they can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, Heritage NSW and the Local Aboriginal Land Council.
56.	If human remains are found, work would cease, the site secured and the NSW Police and Heritage NSW notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to work recommencing at the location.
	Non-Aboriginal heritage
57.	Options would be explored to retain a representative example of the original partitions in one of the station toilets. This would be done in consultation with the Transport for NSW heritage team and heritage consultant to find a sensitive design approach that also meets the Building Code Australia and proposal requirement.
58.	The final design for the toilets and any works to original fabric would be prepared in consultation with a heritage consultant and Transport for NSW. This would include endorsement from Transport for NSW heritage team on the 75% complete design (Critical Design Review) to ensure all opportunities to minimise heritage impacts have been considered and incorporated into the design where appropriate.
59.	The glazing to the toilet windows would have the paint removed with other options investigated to reinstate visibility to the original glazing panes, noting that privacy screening measures will likely be required.

No.	Mitigation measure
60.	The design and finishes of new station elements, including the new toilets would respond to the Inter-War architecture and design of the station.
61.	An appropriate materials and colour palette would be selected for the new elements included in the Proposal. This would be done in consultation with Sydney Trains standard colour schemes for Inter-War railway stations.
62.	Opportunities to repaint the station elements in accordance with the Sydney Trains standard colour schemes for Inter-War railway stations would be explored within the Proposal scope. This provides an opportunity to mitigate some of the impacts of the Proposal on the Turrella Railway Station Group.
63.	Opportunities would be explored to reinstate removed original fabric where possible. This includes the use of sympathetic new elements or replicate the details such as doors and windows as specified in the original designs.
64.	The Inter-War Art-Deco detailing on the original building would be emphasised or highlighted in the proposed new works. This could include lighting placed to spotlight significant elements or use of similar detailing or patterns in the new work which reflect the original architectural style of the station building.
65.	Lift canopy structure – options would be explored to reduce the size of the horizontal beam supporting the lift canopy. This would help to minimise the dominance of the lift structure in views to and from the station.
66.	Enclosed stairway – the detailed design would explore options for high transparency materials to the enclosed canopy to allow better views to the station building as well as to lighten the appearance of the structure against the other proposed modifications to the east end of the station.
67.	Power supply upgrades – screening of the proposed padmount substation would be considered to reduce the impact on the views to and from the station building. This could include the use of interpretive devices or public art to improve the setting of the north side of the station, near Henderson Street entrance.
68.	Upgrades to any services should seek to use existing cable routes or penetrations through significant elements of the station group. This should be undertaken in accordance with the Sydney Trains Heritage Technical Note: Installation of New Electrical and Data Services at Heritage Sites.
69.	Details of the temporary enabling works should be confirmed and reviewed to ensure no additional impacts may result from the required works. This should include reviewed visual and physical impacts.
70.	Preparation of a heritage interpretation plan in accordance with Sydney Trains Interpretation Guideline. This should be implemented as part of the detailed design and construction documentation for the Proposal.
71.	All project team members, including contractors, would be provided with a heritage induction as part of the general site induction package. This would identify why the Turrella Station Group is significant, their obligations under the Heritage Act and environmental management process relating to unexpected finds, design revisions identified during construction and protection methods to be used during construction to prevent accidental damage during construction works.
72.	Significant elements of the station group would be adequately protected during the works. This could include physical barriers, exclusion zones or other methods as appropriate to ensure accidental damage does not occur during the works.

No.	Mitigation measure
73.	Regrading of the platform would be completed so that no significant or original features along the platform are impacted. This includes the boot scrapers and the light poles, which are contributory elements to the station group.
74.	In accordance with Section 170a of the Heritage Act, Sydney Trains should provide notification of the work to Heritage Division 14 days prior to the commencement of the work.
75.	Adequate drainage and ventilation to the station building would be maintained when regrading the platform. This includes ensuring any vents to the lower section of walls are free from debris at the end of the regrading works, and that asphalt or other materials are not built up directly against the station building.
76.	A Photographic archival recording should be prepared for Turrella Station prior to the commencement of works, including any temporary works or site investigations. This should capture the areas of the station affected by the Proposal.
77.	In the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in Transport for NSW's Unexpected Heritage Finds Guideline (TfNSW, 2019b) would be followed, and work within the vicinity of the find would cease immediately. The Contractor would immediately notify the Transport for NSW Project Manager and the Transport for NSW Senior Environment and Sustainability Officer so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and Heritage NSW. Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to work recommencing at the location.
78.	A suitably qualified heritage architect would be engaged from the detailed design phase through to construction to ensure compliance with the relevant heritage approvals, and to further minimise the impact of the Proposal through the use of appropriate form, proportion and materials.
79.	On completion of work, an update would be prepared for the Section 170 Heritage and Conservation Register, with required details.
80.	Section 170 of the Heritage Act and the State Agency Heritage Management Guidelines require a state agency to notify Heritage NSW of the demolition of a heritage asset, or substation portion of that asset. The Proposal includes the demolition of a significant original element, being the removal of the stairs to the station platform and the demolition of the original fitout in the male toilet. Therefore, Heritage NSW would be notified of the proposed works to Turrella Railway Station Group.
	Socio-economic
81.	Sustainability criteria for the Proposal would be established to encourage the Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.
82.	Feedback through the submissions process would be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where practicable.
83.	A Community Liaison Management Plan would be prepared prior to construction to identify all potential stakeholders and best practice methods for consultation with these groups during construction. The plan would also encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where practicable.
84.	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.

No.	Mitigation measure
85.	The community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Management Plan to be developed prior to construction.
	Biodiversity
86.	The vegetation surrounding the compound located north-east off Henderson Street would be inspected to rule out the occurrence of any threatened species or ecological communities
87.	An exclusion zone would be setup surrounding the native vegetation adjacent the compound in the north-east of the study area. The exclusion zone would be marked and delineated with fluorescent flagging tape.
88.	All workers would be provided with an environmental induction prior to commencing work onsite. This induction would include information on the protection measures to be implemented to protect vegetation, penalties for breaches and locations of areas of sensitivity.
89.	Construction of the Proposal must be undertaken in accordance with Transport for NSW's *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2019c) and Transport for NSW's *Fauna Management Guideline* (TfNSW, 2019d).
90.	Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal.
91.	In the event of any tree to be retained becoming damaged during construction, the Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Senior Environment and Sustainability Officer to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.
92.	All construction workers should be briefed on the location of the native vegetation exclusion zone prior to the beginning of works.
93.	Should the detailed design or onsite work determine the need to remove or trim any additional trees, which have not been identified in the REF, the Contractor would be required to complete Transport for NSW's Tree Removal Application Form and submit it to Transport for NSW for approval.
94.	For new landscaping work, mulching and watering would be undertaken until plants are established.
95.	Weed control measures, consistent with Transport for NSW's *Weed Management and Disposal Guideline* (TfNSW, 2019e), would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the project. This would include the management and disposal of weeds in accordance with the *Biosecurity Act 2015*.
	Soils and water
96.	Prior to commencement of work, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the 'Blue Book' *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of work and maintained throughout construction.
97.	Erosion and sediment control measures would be established prior to any clearing, grubbing and site establishment activities and would be maintained and regularly inspected

No.	Mitigation measure
	(particularly following rainfall events) to ensure their ongoing functionality. Erosion and sediment control measures would be maintained and left in place until the work is complete and areas are stabilised.
98.	Vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment would also be refuelled offsite, or in a designated refuelling area.
99.	All fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and Transport for NSW *Chemical Storage and Spill Response Guidelines* (TfNSW, 2019f).
100.	Adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the Transport for NSW *Chemical Storage and Spill Response Guidelines* (TfNSW, 2019f) during the construction phase. All staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill.
101.	In the event of a pollution incident, work would cease in the immediate vicinity and the Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Senior Environment and Sustainability Officer. The EPA would be notified by Transport for NSW if required, in accordance with Part 5.7 of the POEO Act.
102.	The existing drainage systems would remain operational throughout the construction phase.
103.	Should groundwater be encountered during excavation work, groundwater would be managed in accordance with the requirements of the *Waste Classification Guidelines* (EPA, 2014) and Transport for NSW *Water Discharge and Reuse Guideline* (TfNSW, 2019g).
	Air quality
104.	Air quality management and monitoring for the Proposal would be undertaken in accordance with Transport for NSW's *Air Quality Management Guideline* (TfNSW, 2019h).
105.	Methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks.
106.	Plant and machinery would be regularly checked and maintained in a proper and efficient condition. Plant and machinery would be switched off when not in use, and not left idling.
107.	Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.
108.	To minimise the generation of dust from construction activities, the following measures would be implemented: • apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces) • cover stockpiles when not in use • appropriately cover loads on trucks transporting material to and from the construction site and securely fix tailgates of road transport trucks prior to loading and immediately after unloading • prevent mud and dirt being tracked onto sealed road surfaces.

No.	Mitigation measure
	Waste and contamination
109.	The CEMP (or separate Waste Management Plan, if necessary) must address waste management and would at a minimum: • identify all potential waste streams associated with the work and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities • detail other onsite management practices such as keeping areas free of rubbish • specify controls and containment procedures for hazardous waste and asbestos waste • outline the reporting regime for collating construction waste data.
110.	An appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with WorkCover requirements.
111.	All excavated spoil suitable for reuse would be reused on site and distributed as agreed with Transport for NSW and the Contractor. The reuse of excavated material would be further reviewed and confirmed during construction.
112.	All spoil to be removed from site would be tested to confirm the presence of any contamination. Any contaminated spoil would be disposed of at an appropriately licensed facility.
113.	All spoil and waste must be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying waste (*EPA, 2014) prior to disposal.
114.	Any concrete washout would be established and maintained in accordance with Transport for NSW's *Concrete Washout Guideline* – draft (TfNSW, 2019k) with details included in the CEMP and location marked on the ECM.
	Sustainability, climate change and greenhouse gases
115.	Detailed design and construction of the Proposal is to be undertaken in accordance with the IS Council Infrastructure Sustainability Rating Scheme (v1.2).
116.	The detailed design process would undertake a compliant carbon foot printing exercise in accordance with Transport for NSW's *Carbon Estimate and Reporting Tool Manual* (TfNSW, 2019i) or other approved modelling tools. The carbon footprint would to be used to inform decision making in design and construction.
117.	The detailed design process would undertake a climate change impact assessment with reference to the Climate Change Impacts and Risk Management: A Guide for Business and Government (Department of the Environment and Heritage, 2006) and the ISCA Guidelines for Climate Change Adaptation (AGIC, 2011) to determine the hazards/risks associated with future climatic conditions. Issues including protecting customers and electrical equipment from wind and rain during storm events, size of guttering, cross flow ventilation, reflective surfaces etc. would be considered in the design.
	Cumulative impacts
118.	The potential cumulative impacts associated with the Proposal would be further considered as the design develops and as further information regarding the location and timing of potential developments is released. Environmental management measures would be developed in the CEMP and implemented as appropriate.

8 Conclusion

This REF has been prepared in accordance with the provisions of Section 5.5 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:

- upgrading and providing a station that is accessible to people with a disability, limited mobility, parents with prams and people with luggage
- improving customer safety at the station with the provision of a new lift, DSAPT compliant stairs, CCTV and upgrades to pathways on Turrella Street leading to the station
- improve accessibility and interchange facilities at the station by expanding the kiss and ride bay along Turrella Street
- improving customer amenities by providing a family accessible toilet and a unisex ambulant toilet
- improve customer experience by upgrading customer information and communication systems, adjusting wayfinding signage and landscaping work.

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

- temporary impacts on local traffic movements and road networks associated with construction traffic and temporary road closures.
- temporary noise and vibration impacts associated with construction activities
- minor disruption to bus customers and pedestrians during construction to facilitate construction works and road closures
- introduction of new elements, such as the station entrance, lift, canopy, ramp and traffic barriers to the visual environment
- potential sediment mobilisation, dust generation and erosion risk during construction.

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

The Proposal would also take into account the principles of ESD and sustainability (refer to Section 3.3.3 and Section 4.3). These would be considered during the detailed design, construction and operational phases of the Proposal. This would ensure the Proposal is delivered to maximum benefit to the community, is cost effective and minimises any adverse impacts on the environment.

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Appendix A Consideration of matters of National Environmental Significance

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

Matters of NES	Impacts
Any impact on a World Heritage property? There are no World Heritage properties within a ten-kilometre radius of the site.	Nil
Any impact on a National Heritage place? There are no National Heritage places within a ten-kilometre radius of the site.	Nil
Any impact on a wetland of international importance? No wetlands of international importance are located within a ten-kilometre radius of the site.	Nil
Any impact on a listed threatened species or communities? Based on available habitat and the potential impacts of the Proposal, it is highly unlikely that any threatened species or communities would be impacted.	Nil
Any impacts on listed migratory species? No listed migratory species are likely to utilise the habitat within the study area, only the airspace above the Proposal area	Nil
Does the Proposal involve a nuclear action (including uranium mining)? The Proposal does not involve a nuclear action.	Nil
Any impact on a Commonwealth marine area? The Proposal would not impact on a Commonwealth marine area.	Nil
Does the Proposal involve development of coal seam gas and/or large coal mine that has the potential to impact on water resources? The Proposal is not related to coal seam gas or mining.	Nil
Additionally, any impact (direct or indirect) on Commonwealth land? The Proposal would not impact on Commonwealth land.	Nil

Appendix B Consideration of clause 228

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

Factor	Impacts
(a) Any environmental impact on a community? There are some potential temporary impacts associated with the construction phase of the Proposal including noise, traffic and access. Mitigation measures mentioned in Table 7.1 would be implemented to reduce and manage adverse impacts.	Minor
(b) Any transformation of a locality? The Proposal would introduce new visual elements into the landscape e.g. Lift, station entrance and canopy. The new elements would be consistent with existing station elements.	Minor
(c) Any environmental impact on the ecosystem of the locality? Minimal impacts would be expected due to the Proposal area being heavily modified and absent of vegetation. Mitigation strategies are outlined in Table 7.1 to manage and mitigate adverse impacts.	Minor
(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? There would be some temporary short-term impacts associated with the construction of the Proposal. Mitigation measures are outlined in Table 7.1 would effectively minimise potential adverse impacts. The Proposal would allow the locality to grow and gain value due to improving the accessible of Turrella Station.	Minor
(e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations? Turrella Station is listed on the TAHE Section 170 Heritage and Conservation Register. The heritage listing applies to the station platform and building. Heritage values will be preserved where possible, refer to Section 6.9 for detail.	Minor
(f) Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974*)? Based on available habitat and the potential impacts of the Proposal, it is highly unlikely that any threatened fauna will be impacted.	Nil
(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? The Proposal would not have any impact on endangering any species.	Nil
(h) Any long-term effects on the environment? There would be no long-term effects on the environment as a result of the Proposal	Nil

Factor	Impacts
(i) Any degradation of the quality of the environment? It is expected there would be no degradation of the environment due to the Proposal.	Nil
(j) Any risk to the safety of the environment? Risk to safety of the environment would be managed and minimised as outlined by the mitigation measures outlined Table 7.1.	Nil
(k) Any reduction in the range of beneficial uses of the environment? It is anticipated there would be no reduction of range in beneficial uses of the environment due to the Proposal.	Nil
(l) Any pollution of the environment? There is a low probability the Proposal would cause any pollution tot eh environment. Mitigation measures mentioned in Table 7.1 would minimise potential adverse impacts.	Nil
(m) Any environmental problems associated with the disposal of waste? There would be an unlikely chance environmental problems would be associated with disposal of waste. Mitigation strategies are outlined in Table 7.1 would mitigate and manage adverse impacts.	Nil
(n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? The Proposal may increase the demand of car parking spaces due to the station being more accessible impacting surrounding streets.	Minor
(o) Any cumulative environmental effect with other existing or likely future activities? Construction works would be coordinated with any other construction activities occurring within proximity of the Proposal, through consultation with Bayside Council, Sydney Trains/TAHE and any other developers to reduce the likelihood of cumulative impacts.	Nil
(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? The Proposal would not impact on coastal processes and is not subject to coastal hazards. The Proposal is not predicted to be affected by sea level rise or bushfire.	Nil