



Transport Access Program

Towradgi Station Upgrade

Review of Environmental Factors



Artist's impression of the proposed Towradgi Station Upgrade, subject to detailed design



Towradgi Station Upgrade – Review of Environmental Factors

**Transport Access Program
Ref – 6452099**

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Document control

Status:	Final
Date of issue:	July 2020
Version:	0.3
Document Author	Eleanor Parry Chris Jack
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Abbreviations

Term	Meaning
AHIMS	Aboriginal Heritage Information Management System
AS	Australian Standard
ASA	Asset Standards Authority (refer to Definitions)
ASS	Acid Sulfate Soils
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
BS	British Standard
CBD	Central Business District
CEMP	Construction Environmental Management Plan
CCTV	Closed circuit TV
CLM Act	<i>Contaminated Land Management Act 1997 (NSW)</i>
CNVMP	Construction Noise and Vibration Management Plan
CTMP	Construction Traffic Management Plan
DBH	Diameter Breast Height
DDA	<i>Disability Discrimination Act 1992 (Cwlth)</i>
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DPIE	NSW Department of Planning, Industry and Environment
DSAPT	<i>Disability Standards for Accessible Public Transport (2002)</i>
ECM	Environmental Controls Map
EES	Environment, energy and science group in the Department of Planning, Industry and Environment (formerly Office of Environment and Heritage)
EMS	Environmental Management System
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000 (NSW)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)</i>
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development (refer to Definitions)

Term	Meaning
FM Act	<i>Fisheries Management Act 1994 (NSW)</i>
Heritage Act	<i>Heritage Act 1977 (NSW)</i>
ICNG	<i>Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009).</i>
Infrastructure SEPP	<i>State Environmental Planning Policy (Infrastructure) 2007 (NSW)</i>
IS rating	Infrastructure Sustainability rating under ISCA rating tool (v 1.2)
ISCA	Infrastructure Sustainability Council of Australia
LEP	Local Environmental Plan
LGA	Local Government Area
MCA	Multi-criteria analysis
NES	National Environmental Significance (refers to matters of National Environmental Significance under the EPBC Act)
NPW Act	<i>National Parks and Wildlife Act 1974 (NSW)</i>
NSW	New South Wales
OEH	Formerly NSW Office of the Environment and Heritage
PDP	Public Domain Plan
PoEO Act	<i>Protection of the Environment Operations Act 1997 (NSW)</i>
REF	Review of Environmental Factors (this document)
Roads Act	<i>Roads Act 1993 (NSW)</i>
Roads and Maritime	NSW Roads and Maritime Services
SEPP	State Environmental Planning Policy
SREP	Sydney Regional Environmental Plan
Transport for NSW	Transport for NSW
TPZ	Tree Protection Zone
UDP	Urban Design Plan
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001 (NSW)</i>
WM Act	<i>Water Management Act 2000 (NSW)</i>

Definitions

Term	Meaning
Asset Standards Authority	The ASA is an independent body within Transport for NSW, responsible for engineering governance, assurance of design safety, and ensuring the integrity of transport and infrastructure assets.
Concept design	The concept design is the preliminary design presented in this REF, which would be refined by the Construction Contractor (should the Proposal proceed) to a design suitable for construction (subject to Transport for NSW acceptance).
Determining Authority	A Minister or public authority on whose behalf an activity is to be carried out or public authority whose approval is required to carry out an activity (under the EP&A Act).
Disability Standards for Accessible Public Transport	The Commonwealth <i>Disability Standards for Accessible Public Transport 2002</i> (as amended) are a set of legally enforceable standards, authorised under the Commonwealth <i>Disability Discrimination Act 1992</i> (DDA) for the purpose of removing discrimination 'as far as possible' against people with disabilities. The Standards cover premises, infrastructure and conveyances, and apply to public transport operators and premises providers.
Ecologically Sustainable Development	As defined by clause 7(4) Schedule 2 of the EP&A Regulation. Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends are maintained, and the total quality of life, now and in the future, can be increased.
Feasible	A work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements.
Interchange	Transport interchange refers to the area/s where passengers transit between vehicles or between transport modes. It includes the pedestrian pathways and cycle facilities in and around an interchange.
Out of hours work	Defined as work <i>outside</i> standard construction hours (i.e. outside of 7am to 6pm Monday to Friday, 8am to 1pm Saturday and no work on Sundays/public holidays).
Proponent	A person or body proposing to carry out an activity under Division 5.1 of the EP&A Act.
Rail shutdown	Rail shutdown is the term used by railway building/maintenance personnel to indicate that they have taken possession of the track (usually a section 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.
The Proposal	The construction and operation of the Towradgi Station Upgrade.

Term	Meaning
Vegetation Offset Guide (Transport for NSW, 2019a)	<p>The Transport for NSW guide that applies where there is vegetation clearing proposed, and where the impact of the proposed clearing is not deemed 'significant' for the purposes of section 5.5 of the EP&A Act.</p> <p>The Guide provides for planting of a minimum of eight trees for each large tree with a diameter at breast height (DBH) of more than 60 cm, four trees where the DBH is 15-60 cm, or two trees where DBH is less than 15 cm.</p>

Executive summary

Overview

Transport for New South Wales (NSW) is proposing to undertake the Towradgi Station Upgrade to improve accessibility at this location. Transport for NSW is the government agency responsible for the delivery of major transport infrastructure projects in NSW and is the proponent for the Towradgi Station Upgrade (the 'Proposal').

The Proposal forms 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.

The Proposal would aim to provide a station precinct that is accessible to those with a disability, limited mobility, parents/carers with prams, and customers with luggage.

The Proposal would provide:

- a new footbridge over the rail corridor connecting the platforms of the station including two lifts and two sets of stairs
- new footpaths to connect Towradgi Road and Weber Crescent to the station and the new footbridge
- modification of the existing station building layout for the provision of a new family accessible toilet
- two accessible parking spaces and a kiss and ride zone on Weber Crescent
- new platform shelters and minor regrading and widening of the station platforms
- a new SSER building.

This Review of Environmental Factors (REF) has been prepared to assess the environmental impacts associated with the construction and operation of the Proposal under the provisions of Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Subject to approval, construction is expected to commence in mid-2021 and take around 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 1 Proposed Towradgi Station Upgrade (indicative only, subject to detailed design) below.

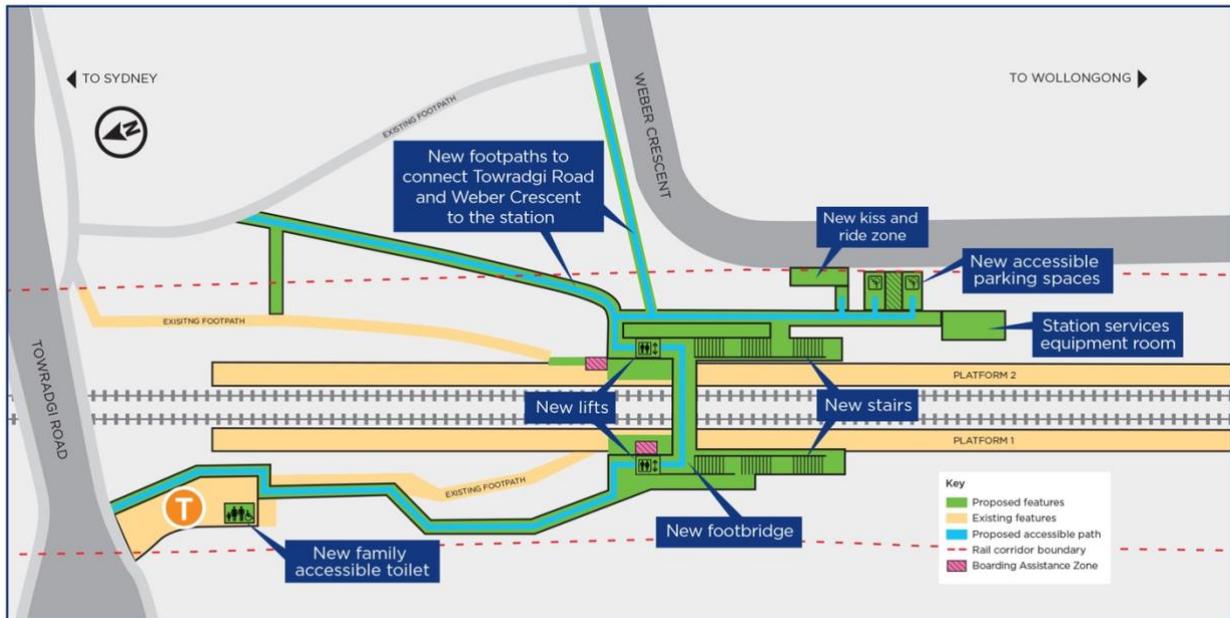


Figure 1 Proposed Towradgi Station Upgrade (indicative only, subject to detailed design)

Need for the Proposal

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

The Proposal has been 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 proposed 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 activities is included in Section 5 of this REF.

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

In accordance with the requirements of the Statement 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 with Wollongong Council is required under the Infrastructure SEPP and would continue through the detailed design and construction of the Proposal.

Feedback can be sent to:

- projects@transport.nsw.gov.au

Or submitted:

- Directly in the feedback box on the project webpage
<https://www.transport.nsw.gov.au/projects/current-projects/towradgi-station-upgrade>

Under normal circumstances Transport for NSW would hold community information sessions at the station. We regret that due to the COVID-19 social distancing measures, we can't. We are still available by phone and email to respond to your questions, and look forward to hearing from you that way.

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 2 shows the planning approval and consultation process for the Proposal.

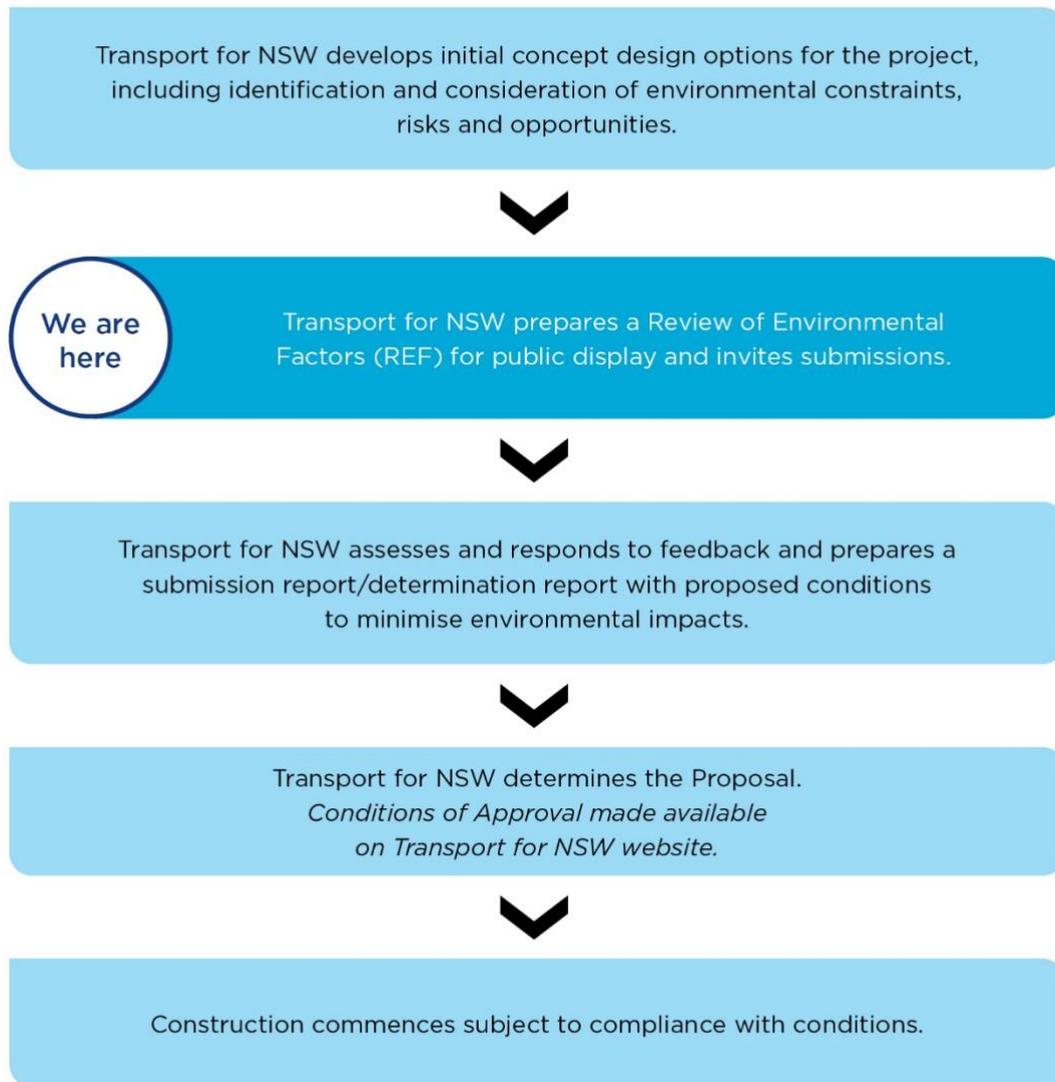


Figure 2 Planning approval and consultation process for the Proposal

Environmental impact assessment

The Proposal would provide longer term benefits to the local community through improved accessibility to the station and improved station facilities.

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

- temporary visual, noise and vibration impacts during construction
- temporary traffic and pedestrian impacts during construction
- loss of trees which would be offset in accordance with the Vegetation Offset Guide (Transport for NSW, 2019a)
- introduction of new visual elements such as lifts and a footbridge to the environment.

Further information regarding these impacts and mitigation measures are provided in Chapter 6 and Chapter 7 of the REF.

Conclusion

This REF has been prepared having regard to sections 5.5 to 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 (ISCA) Infrastructure Sustainability Rating Scheme (v1.2) 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 3 Visual representation of the Proposal (subject to change during 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 Towradgi Station Upgrade (the 'Proposal').

1.1 Overview of the Proposal

1.1.1 Need for the Proposal

The Towradgi Station Upgrade, the subject of this REF, forms part of the Transport Access Program. This Program is an initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure.

Towradgi Station has been identified for an accessibility upgrade as it does not currently meet key requirements of the *Disability Standards for Accessible Public Transport 2002* (DSAPT) or the Commonwealth *Disability Discrimination Act 1992* (DDA). The non-compliant pathways and car parking do not facilitate access for people with reduced mobility, parents or carers with prams, or customers with luggage.

The Proposal would provide safe and equitable access to the platforms and car parking near the station. The Proposal would improve accessibility of the station in line with the requirements of the DDA and the DSAPT. The upgrades would provide an improved customer experience for existing and future users of the station.

The needs and objectives of the Proposal are further discussed in Chapter 2 of this REF.

1.2 The Proposal

The key features of the Proposal are summarised as follows:

- construction of a new footbridge over the rail corridor connecting the platforms of Towradgi Station including two lifts and two sets of stairs
- construction of new footpaths to connect Towradgi Road and Weber Crescent to the station and the new footbridge
- replacement of the existing toilet within the station building with a new family accessible toilet, provision of two accessible parking spaces and a kiss and ride zone on Weber Crescent
- removal of existing platform shelters and the provision of new platform shelters
- minor regrading and widening of the station platforms
- construction of a new Station Systems Equipment Room (SSER) building.

Subject to planning approval, construction is expected to commence in mid-2021 and take around 18 months to complete.

A detailed description of the Proposal is provided in Chapter 3 of this Review of Environmental Factors (REF). An overview of the key features of the Proposal is also provided in Figure 1.

1.3 Location

The Proposal is located in the suburb of Towradgi in the Wollongong City Council Local Government Area (LGA). Towradgi is about five kilometres north of Wollongong and about 60

kilometres south west of the Sydney Central Business District (CBD). The location of the Proposal in the regional context is shown in Figure 4.

Towradgi Station is serviced by the SCO-South Coast Line. Platform 1 provides services to Sydney CBD and connections to metropolitan services and Platform 2 provides train services southbound towards Port Kembla.



Figure 4 Regional context (base map source: SixMaps, NSW Spatial Services)

1.4 Surrounding land uses

Towradgi Station is located 100 metres east of Memorial Drive and one kilometre west of Towradgi Beach in an area which is generally characterised by low density residential uses. The station is located on Towradgi Road which has a few isolated retail properties. Towradgi Public school is located 200 metres south of Towradgi Station, adjacent to the rail corridor.

The station is bounded by Weber Park, which is a small public park directly east and residential properties directly west. The Proposal includes upgrades to Towradgi Station on land owned by RailCorp and managed by Sydney Trains within the rail corridor with some work also proposed to the footpaths within Weber park that are under control of Wollongong City Council. The Proposal site and surrounding land uses are shown in Figure 5.



Figure 5 Proposal site locality (Base map source: NearMap 2020)

1.5 Existing infrastructure

1.5.1 Platforms

Towradgi Station consists of two platforms located on either side of the existing rail tracks as shown in Figure 6. Platform 1 is located on the western side and services trains travelling towards Sydney. Platform 2 is located on the eastern side and services trains travelling towards Wollongong.

Each platform is narrow and has a shelter with seating (see Figure 7 and Figure 8). Mature trees are located along the boundary of the rail corridor.



Figure 6 View of Towradgi Station looking south from Towradgi Road overbridge



Figure 7 Platform shelter on western side of station



Figure 8 Platform shelter on eastern side of station

1.5.2 Station entrances

Access to the station is via Towradgi Road to the north and Weber Park on the eastern side of the station. The Platform 1 entrance is on Towradgi Road to the north and the entrance to Platform 2 is located in the north western corner of Weber Park off Towradgi Road. The footpaths from the station entrances slope down towards the station platforms.

The station building is located on the western side of the station at the entrance to Platform 1 (see Figure 9). The station building contains a unisex toilet, ticketing office and a storeroom.



Figure 9 Station building on western entrance to station near Towradgi Road

1.5.3 Parking and intermodal facilities

The following intermodal facilities are located near Towradgi Station:

- informal kiss and ride located on Towradgi Road and Weber Crescent near the station
- the nearest bus stop is located 300 metres east on Murrarar Road
- a bike rack adjacent to station building on the western side.

No formal commuter car parking is provided in the vicinity of Towradgi Station. Untimed on-street parking is available in the surrounding streets.

1.6 Purpose of this Review of Environmental Factors

This REF has been prepared by pitt&sherry on behalf of Transport for NSW to assess the potential impacts of the Towradgi Station Upgrade. For the purposes of this work, Transport for NSW is the proponent and the determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of this REF is to describe the Proposal, to assess the likely impacts of the Proposal having regard to the provisions of section 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 *Environmental Planning and Assessment Regulation 2000* (the EP&A Regulation).

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

Having regard to the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), this REF considers the potential for the Proposal to have a significant impact on matters of National Environmental Significance (NES) or Commonwealth land, and the need to make a referral to the Commonwealth Department of 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 and options considered

Chapter 2 discusses the need and strategic justification for the Proposal, with consideration of the objectives of the Transport Access Program as well as the specific objectives of the Proposal. This chapter also provides a summary of the options that have been considered during development of the Proposal and a justification for the preferred option.

2.1 Strategic justification

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

The Towradgi Station Upgrade, the subject of this REF, forms part of the Transport Access Program which is an initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure. The Proposal would improve accessibility of the station in line with the requirements of the *Disability Discrimination Act 1992* (DDA) (Commonwealth) and the *Disability Standards for Accessible Public Transport 2002* (DSAPT).

In 2019, the NSW Government announced a series of State Priorities intended to guide the ongoing actions of the NSW Government across the State, and guide resource allocation and investment in conjunction with the NSW Budget (NSW Government 2019). These priorities range across a number of issues including infrastructure, the environment, education, health, wellbeing and safety in addition to Government services. They government's key policy priorities are:

- 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 particularly supports the priority of creating well-connected communities. The Proposal assists in meeting the priority by improving accessibility to public transport and encouraging greater use of public transport.

The NSW Government has developed *Future Transport Strategy 2056* (Transport for NSW 2018a). This plan provides a comprehensive strategy for all modes of transport across NSW over the next 40 years, while also delivering on current commitments.

Data forecasts indicate that there would be a growth in patronage at Towradgi Station. The Proposal accommodates the forecast Sydney Trains patronage growth (an increase of 13 per cent to 2036) and changing travel patterns.

The *Disability Inclusion Action Plan 2018-2022* (Transport for NSW, 2017b) was developed by Transport for NSW in parallel with the development of *Future Transport Strategy 2056*. The plan builds on the objectives of *Future Transport Strategy 2056* in relation to accessibility to transport. The Transport Access Program has been identified in this plan as a key action of ensuring transport networks in Sydney are accessible for all potential users.

Public transport is viewed as critical to urban productivity, expanding employment opportunities by connecting people to jobs, reducing congestion, and supporting delivery of urban renewal.

Table 1 provides an overview of NSW Government policies and strategies relevant to the Proposal.

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

Policy / Strategy	Overview	How the Proposal aligns
<p>Future Transport Strategy 2056 (Transport for NSW, 2018a)</p>	<p>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.</p> <p>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 and the provision of accessible transport services.</p>	<p>The Proposal would deliver on the customer focus and accessible services outcomes. The Proposal would assist in meeting the following State-wide outcomes detailed in Future Transport 2056:</p> <ul style="list-style-type: none"> • encouraging active travel (walking and cycling) and using public transport • a fully accessible network that enables barrier-free travel for all • public and active travel lower environmental impacts reducing Green House Gas (GHG) emissions and congestion.
<p>Building Momentum – State Infrastructure Strategy 2018-2038 (Infrastructure NSW, 2018)</p>	<p>The State Infrastructure Strategy 2018-2038 makes recommendations for each of NSW's key infrastructure sectors including transport.</p> <p>The strategy sets out the Government's priorities for the next 20 years, and combined with the Future Transport Strategy 2056, the Greater Sydney Region Plan and the Regional Development Framework, brings together infrastructure investment and land-use planning for our cities and regions.</p>	<p>The Proposal particularly supports Direction 6 of the Plan, which is to create 'a well-connected city' by ensuring services and infrastructure meet communities' changing needs. The Proposal would be consistent with this direction by providing improved accessibility to Towradgi Station.</p>
<p>Disability Inclusion Action Plan 2018-2022 (Transport for NSW, 2017a)</p>	<p>The Disability Inclusion Action Plan 2018-2022 was developed by Transport for NSW in parallel with the development of Future Transport 2056. The Plan builds on the objectives of Future Transport 2056 in relation to accessibility to transport.</p>	<p>The Proposal has been developed with consideration of the objectives outlined in this Plan and seeks to improve and provide equitable access to public transport facilities. The Transport Access Program, of which the Proposal forms part is identified in the plan as a key action of ensuring the transport networks in Sydney are accessible for all potential users.</p>

Policy / Strategy	Overview	How the Proposal aligns
<p>Illawarra Shoalhaven Regional Plan 2015 (Department of Planning and Environment, 2015)</p>	<p>The Illawarra Shoalhaven Regional Plan 2015 provides the strategic planning and decision-making framework to guide sustainable growth in the region for the next 20 years beyond 2015. The vision is for a sustainable future and a resilient community, capable of adapting to changing economic, social and environmental circumstances.</p>	<p>Goal 3 of the Plan is for a region with communities that are strong, healthy and well-connected, which includes improving public transport service levels. The Proposal would support this goal by improving the accessibility of the Towradgi Station.</p>
<p>Wollongong 2028 Community Strategic Plan (Wollongong Council, 2018)</p>	<p>The Wollongong 2028 Community Strategic Plan is a long term plan which provides direction for the delivery of key projects and services which will help meet the need. The overarching community vision is to protect the natural environment and be leaders in building an educated, creative and connected community.</p>	<p>One of the goals of the plan is to provide sustainable, affordable and accessible transport. The Proposal supports this goal by providing accessibility upgrades to Towradgi Station. Another key goal to be a healthy community in a liveable city, which would be supported by providing an accessible infrastructure developed with consideration for safety and security.</p>

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. The program provides:

- stations that are accessible to people with disabilities, are less mobile, 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 transport modes for all customers
- safety improvements including extra lighting, CCTV, help points, fences and security measures for car parks and interchanges, including stations, bus stops and wharves
- signage improvements so customers can easily use public transport and transfer between modes at interchanges.

2.3 Objectives of the Proposal

The objectives of the Proposal have been prepared with consideration of the overarching objectives of the Transport Access Program:

- a station that is accessible to those with a disability, limited mobility, carers/parents with prams and customers with luggage
- buildings and facilities for all modes that meet the needs of a growing population

- interchanges that support an integrated network and allow seamless transfers between all modes for all customers.

2.4 Options considered

Transport for NSW commissioned the development of a scoping design for the Towradgi Station Upgrade that would improve accessibility in and around the station and meet key architectural, engineering and urban design objectives (SMEC, 2018).

To develop a preferred option for the station upgrade that addresses the Proposal objectives, a multi criteria analysis was undertaken. Two options were developed and considered by key stakeholders to address access issues and deficiencies:

- Option 1: A new footbridge with lift and stair access south of the existing platform shelters. Upgraded footpaths to connect the new footbridge to Towradgi Road on both the eastern and western side of the station. A new kiss and ride zone and accessible parking spaces on Weber Crescent.
- Option 2: A new footbridge with lift and stair access positioned closer to the existing road overbridge to the northern end of the station platform. Regrading of existing pathways on the western side of the station and new footpath on the eastern side to connect to the new footbridge to Towradgi Road and a new kiss and ride zone and accessible parking spaces on Weber Crescent.

The two options were assessed with consideration of factors such as customer experience, accessibility, engineering constraints, modal integration and cost. Stakeholders including representatives from Transport for NSW and Sydney Trains were consulted regarding the various options in order to determine the final configurations.

Both options were considered to be equally beneficial for the provision of upgrade facilities such as staff amenities, passenger services and other systems (e.g. electrical and communication systems). However, differences between the options included impacts to the local community during construction and operation. An identified constraint for Option 2 was constructability and access limitation for large cranes particularly with large native trees present along the eastern boundary of the station. Option 2 would likely require removal of a higher number of trees. Improved access from Weber Crescent and the proposed accessible car parks was identified in Option 1.

2.4.1 The 'do-nothing' option

Under a 'do-nothing' option, existing access to Towradgi Station would remain the same and there would be no changes to the way it 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, would not assist in encouraging the use of public transport, and would not meet the immediate needs of the Towradgi community.

2.5 Justification for the preferred option

Option 1 was identified as the preferred option due to:

- better customer experience including shorter more direct travel from the proposed accessible parking spaces and kiss and ride zone
- better integration with Weber Crescent and existing footpaths from Towradgi road

- lower security risks due to shorter connections to open public areas with passive surveillance
- better constructability and reduced construction environmental impacts.

3 Proposal description

Chapter 3 describes the Proposal and summarises key design parameters and construction methodology. The description of the Proposal is based on the scoping design and is subject to detailed design.

3.1 Scope of work

The Proposal involves an upgrade of Towradgi Station as part of the Transport Access Program which would improve accessibility and amenities for customers. The Proposal would include the following key elements:

- construction of a new footbridge over the rail corridor connecting the platforms of the station including two lifts and two sets of stairs
- construction of new footpaths to connect Towradgi Road and Weber Crescent to the station and the new footbridge
- replacement of the existing toilet within the station building with a new family accessible toilet
- provision of two accessible parking spaces and a kiss and ride zone on Weber Crescent
- removal of existing platform shelters and the provision of new platform shelters
- minor regrading and widening of the station platforms
- construction of a new SSER building.

The general layout of the proposed work is shown in Figure 10 General layout of the proposed work (indicative only, subject to detailed design) and indicative elevations of the footbridge, lifts and stairs are shown in Figure 11 Indicative elevations of the proposed footbridge, lifts and stairs (indicative only, subject to detailed design).

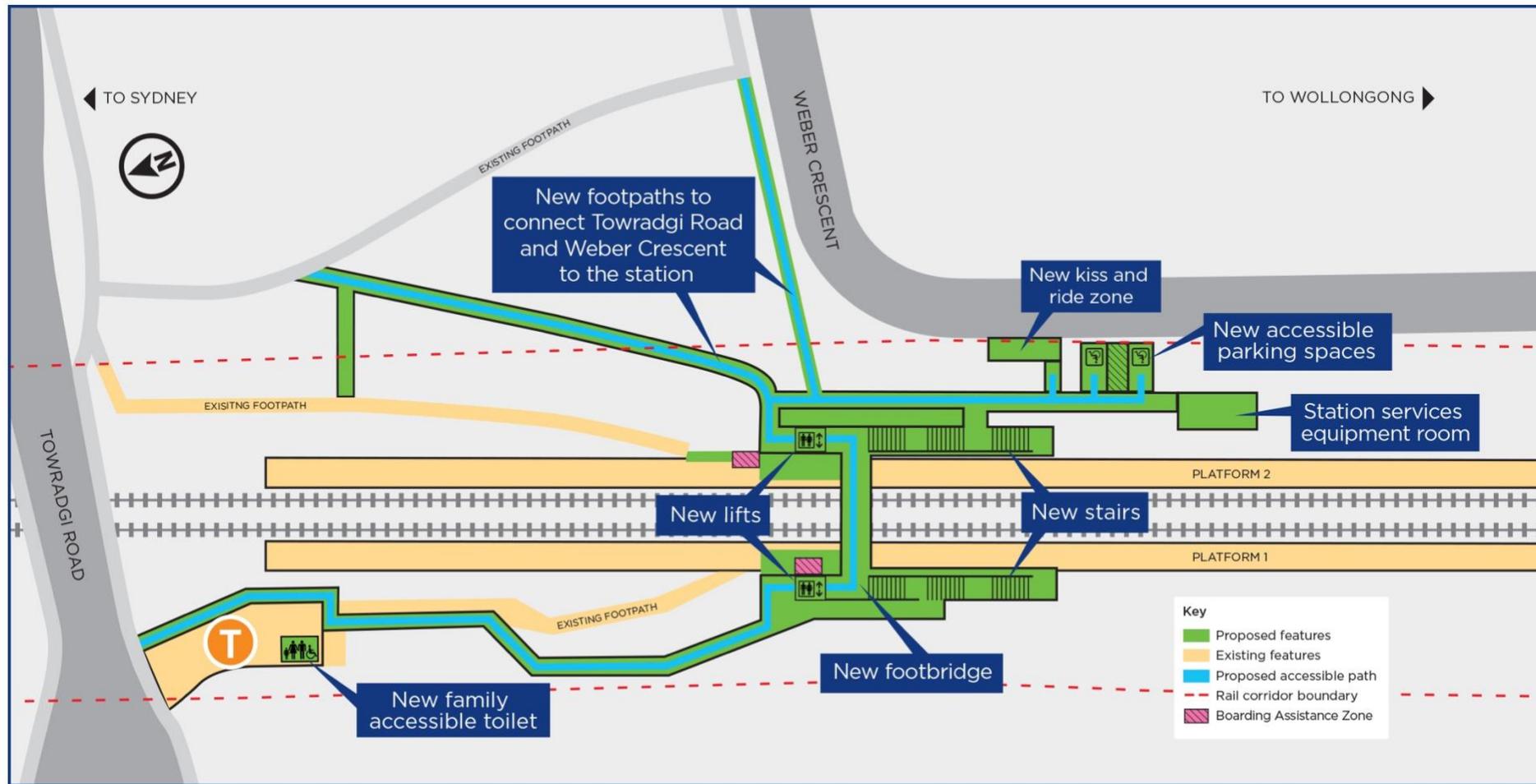


Figure 10 General layout of the proposed work (indicative only, subject to detailed design)



Figure 11 Indicative elevations of the proposed footbridge, lifts and stairs (indicative only, subject to detailed design)

3.1.1 New footbridge

A key component of the Proposal is the construction of a new footbridge over the rail corridor south of the existing platform shelters. The footbridge would provide an accessible connection to the two platforms and the surrounding pedestrian network. The key components of the footbridge include:

- two new lifts with three stops, at platform level, road/pedestrian level and footbridge level
- two stairways located on the western and eastern side of the footbridge
- lift landings with canopies for weather protection at the waiting areas
- installation of handrails and safety screens where required.

3.1.2 Interchange facilities

The improved interchange facilities at the station include:

- provision of two accessible parking spaces with a shared zone on Weber Crescent
- provision of a kiss and ride zone on Weber Crescent
- construction of new footpaths to connect to existing footpaths, new accessible parking spaces and kiss and ride to the new footbridge on the eastern side of the station
- construction of a new footpath to connect Towradgi Road to the new footbridge on the western side of the station.

3.1.3 Platform and building work

A number of adjustments to the interchange areas around the station are proposed to complement the upgrades to the station, improve accessibility and the customer experience. Modifications and improvements to the station include:

- upgrading of the existing toilet within the station building to accommodate one unisex family accessible toilet
- regrading of the station entry from Towradgi Road to the station building
- demolition of existing shelters on each platform and construction of new shelters on each platform which integrate with the new footbridge structure
- regrading and widening of sections of each platform
- relocation of the boarding assistance zones (BAZ) on each platform to align with the new footbridge
- construction of a SSER adjacent to Weber Crescent
- upgrading of existing power and electrical systems
- replacement and adjustments to existing fencing and safety screens
- ancillary work including adjustments to lighting, handrails, drainage work, landscaping, wayfinding signage, improvements to station communications systems including closed circuit TV (CCTV) cameras, hearing loops, emergency help points and installation of tactile ground surface indicators (TGSIs).

3.1.4 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. Consideration has also been given to life cycle impacts which are calculated by assessing the environmental impacts of materials from the point of extraction, through to transportation, use, operation and end of life.

Availability and constructability are also important criteria to ensure that materials can be readily sourced, and the structure can be built with ease and efficiently. Materials would be selected for their application based on their suitability for meeting the design requirements of the Proposal.

Different materials are proposed for each architectural element for the construction of the upgraded or new facilities. Subject to detailed design, the Proposal would include the following:

- lift shafts –precast concrete with anti-graffiti coating, aluminium louvres, prefinished metal roof sheeting, aluminium window frames and glass
- pedestrian footbridge – insitu and precast concrete structural deck, steel framing and infill panels for the safety screens and stainless steel handrails
- lift landing canopies – structural steel framing and prefinished metal roof sheeting.

The design would be submitted to Transport for NSW's Design Review Panel and Sydney Trains for design advice before being accepted by Transport for NSW. An Urban Design Plan (UDP) including a Public Domain Plan (PDP) would also be prepared by the Construction Contractor prior to finalisation of detailed design for endorsement by Transport for NSW. Indicative photomontages of the Proposal were prepared as shown in Figure 12 Artist's impression of the Proposal, perspective from the northern end of Platform 1 (subject to detailed design).



Figure 12 Artist's impression of the Proposal, perspective from the northern end of Platform 1 (subject to detailed design).

3.2 Design development

3.2.1 Engineering and environmental constraints

There are a number of constraints which have influenced the design development of the Proposal.

Existing structures: the accessibility, placement and integrity of existing structures has been considered during the development of the design – these structures include the existing platforms, platform shelters, station building, footpaths, Towradgi Road overbridge, overhead wiring and associated support structures, seating, light poles, on-street car parking.

Sydney Trains' requirements: modification of 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. Existing access points to the rail corridor and associated infrastructure would be maintained.

Vegetation: the Proposal has been designed to minimise impact to multiple mature and semi-mature trees located around the eastern and western side of the station's platforms.

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

- Endeavour Energy – Electricity
- Jemena Gas South – Gas and Petroleum
- NBN – Communications
- Transport for NSW – Electricity
- Telstra – Communications.

Construction access: Platform 1 would be accessed via a gate at the end of Ocean Street and Platform 2 would be accessed via Weber Crescent. The site compound would be located off Weber Crescent as outlined in Section 3.3.7.

Public access: Pedestrian access to the station and across the rail corridor via Towradgi Road would be maintained during construction.

3.2.2 Design standards

The Proposal would be designed having regard to the following design standards:

- *Disability Standards for Accessible Public Transport 2002* (issued under the Commonwealth *Disability Discrimination Act 1992*)
- National Construction Code
- relevant Australian Standards
- Asset Standards Authority standards
- Infrastructure Sustainability Council of Australia (ISCA) Infrastructure Sustainability Rating Scheme (v1.2)
- *Transport for NSW Urban Design Guidelines*
- *Guidelines for the Development of Public Transport Interchange Facilities* (Ministry of Transport, 2008).
- Crime Prevention Through Environmental Design (CPTED) principles
- other Transport for NSW policies and guidelines

- relevant council standards.

3.2.3 Sustainability in design

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

The Towradgi 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 scoping 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 adaptation and resilience
- Renewable energy
- Waste
- Materials
- Supply chain management
- Community connection
- Social procurement and workforce.

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

3.3 Construction activities

3.3.1 Work methodology

Subject to approval, construction is expected to commence in mid-2021 and take around 18 months to complete. The construction methodology would be further developed during the detailed design of the Proposal by the nominated Construction Contractor in consultation with Transport for NSW.

The construction activities for the Proposal are identified in Table 2. This staging is indicative and is based on the current concept design and may change once the detailed design methodology is finalised.

Table 2 Indicative construction staging for key activities

Stage	Activities
Site establishment and enabling work	<ul style="list-style-type: none"> • establish construction site area including compound and associated utilities (i.e. erect fencing, tree protection zones, site offices, amenities and plant/material storage area) • establish temporary construction site access points from both sides of the station • install safety barriers and hoarding around the nominated work zones • install sedimentation and erosion control measures as required • relocate station services which are to be impacted by the work • installation of power where required • remove and trim identified vegetation to allow for construction of new lift and entrances.
Platform 2 footbridge work (eastern side of station)	<ul style="list-style-type: none"> • isolate services as required and protection of overhead powerlines • construct piling/crane pad near Weber Crescent • construct footbridge piles and lift piles • construct foundations for stair supports • excavate lift pit • construct lift pit and shaft on Platform 2 • construct stairs • construct elevated lift landings for mid and upper level on Platform 2 side • install screens and handrails • install new lift systems including new services such as lighting, and CCTV.
Platform 1 footbridge work (western side of station)	<ul style="list-style-type: none"> • isolate services as required and protection of overhead powerlines • construct piling/crane pad near Platform 1 • construct footbridge piles and lift piles • construct foundations for stair supports • excavate lift pit • construct lift pit and shaft on Platform 1 • construct stairs • construct elevated lift landings for mid and upper level on Platform 1 side • install screens and handrails • install new lift systems including new services such as lighting, and CCTV.
Footbridge structure	<ul style="list-style-type: none"> • isolation and protection of overhead powerlines • erect new footbridge superstructure • install protection and safety screens.

Stage	Activities
Station upgrade work	<ul style="list-style-type: none"> demolish Platform 1 and 2 shelter structures construct foundation for shelter structures locally widen and regrade platforms install new fencing at shelter locations install new platform shelters modification to station building to provide a family accessible toilet construct new SSER.
Interchange work	<ul style="list-style-type: none"> construct new accessible car parking spaces and kiss and ride zone in Weber Crescent construct new footpaths to connect into existing footpaths and to the new footbridge on the eastern side of the station construct a new footpath to connect the new accessible car spaces and kiss and ride to the new footbridge construct a new footpath to connect to the new footbridge on the western side of the station regrade footpaths between Towradgi Road and station building.
Finalisation	<ul style="list-style-type: none"> install wayfinding signage and lighting reinstate impacted ground re-vegetate all disturbed areas and complete landscaping.
Testing and commissioning	<ul style="list-style-type: none"> test and commission power supply, lifts, lighting, new/modifications station services, communication and security systems.

3.3.2 Plant and equipment

An indicative list of plant and equipment that would be required is provided below. Additional equipment likely to be used would be identified during detailed design by the Construction Contractor.

- | | | |
|---|---|---|
| <ul style="list-style-type: none"> trucks jackhammer chainsaw piling rig rock breaker crane excavator bobcat demolition saw concrete pump concrete truck | <ul style="list-style-type: none"> lighting tower coring machine water cart suction trucks rail mounted elevated work platform forklift vibrating roller/compaction plate road rail excavator | <ul style="list-style-type: none"> hand tools skip trucks hammer drills torque wrenches and impact wrenches grinders and bar benders |
|---|---|---|

3.3.3 Working hours

Most of the 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

Work outside of standard hours may be required occasionally at night, on weekends and during scheduled Sydney Trains rail shutdowns. These are scheduled line closures that would occur regardless of the Proposal when part of the rail network is temporarily closed for maintenance 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 shutdowns would be utilised to facilitate the following:

- construction of lift shafts
- installation of footbridge structure
- platform work including demolition of shelters, construction of new platform shelters and platform widening and regrading.

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

The Minister for Planning and Public Spaces has recently 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) Order 2020 (the ‘Order’), which applies to construction activities for projects which have been subject to a completed 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 (7.00am to 6.00pm) for projects approved prior to the 9th April 2020 (when the Order commenced).

As such, Transport for NSW will consider its position with regard to extending standard construction hours consistent with the intention of the Order through the Determination process. In the event that Transport for NSW would seek to extend the standard construction hours, the potential environmental impacts of doing so would be further assessed as part of the Determination process.

3.3.4 Earthworks

Excavations and earthworks would generally be required for the following:

- lift shafts
- stairway foundations

- other minor civil work including pathways, footings and foundations for structures, drainage/stormwater work, and trenching activities for service adjustments and relocations and drainage upgrade work.

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

3.3.5 Source and quantity of materials

The source and quantity of materials would be determined during the detailed design phase of the Proposal and would consider the requirements of the ISCA Infrastructure Sustainability Rating Scheme (v1.2). Materials would be sourced from local suppliers where practicable. Reuse of existing and recycled materials would be undertaken where practicable.

3.3.6 Traffic access and vehicle movements

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

- temporary disruption to pedestrians, rail customers and cyclists including
 - impact to pedestrian and cyclist movements on both sides of the station due to the movement of construction material and plant, and traffic diversions
 - temporary changes to pedestrian access
 - increased vehicle movements
- temporary impacts to on-street parking on Weber Crescent
- temporary increase in traffic on Weber Crescent and Ocean Street.

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

3.3.7 Temporary construction compound

A temporary construction compound would be required to accommodate a site office, amenities, laydown and storage area for materials. Areas for construction site compounds are proposed on the east side of the station off Weber Crescent (refer to Figure 13). The area nominated for the compound is on land owned by Wollongong City Council. Construction zones would be established on both sides of the station.



Figure 13 Indicative locations of the site compounds and crane pads.

3.3.8 Service relocation and adjustments

Where possible, the Proposal has been designed to avoid relocation of services, however some relocation may be necessary and further investigation will be required. While it is likely some services may require relocation, such work is unlikely to occur outside the footprint of work assessed in this REF. In the event that work would be required outside the footprint, further assessment would be undertaken. The appropriate utility providers would be consulted during the detailed design phase.

3.4 Property acquisition

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

3.5 Operation and maintenance

The future operation and maintenance of the new station/interchange is subject to further discussions with Sydney Trains, Transport for NSW and Wollongong City Council. The infrastructure that is constructed as part of this Proposal would be maintained by Sydney Trains. It is expected that proposed footpaths would be maintained by Wollongong City 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 *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places - defined in the EPBC Act as 'matters of National Environmental Significance (NES)'. The EPBC Act requires the assessment of whether the Proposal is likely to significantly impact on matters of NES or Commonwealth land. These matters are considered in full in Appendix A.

As the Proposal would not 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

Table 3 Other Commonwealth legislation applicable to the Proposal

Applicable legislation	Considerations
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>	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.
<i>Disability Discrimination Act 1992</i>	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 accessibility of the station would be improved by providing lifts to the platforms and two accessible parking spaces.

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 matter 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*:

- to plan for a transport system that meets the needs and expectations of the public,
- to promote economic development and investment,
- to provide integration at the decision-making level across all public transport modes,
- to promote greater efficiency in the delivery of transport infrastructure projects,

(e) to promote the safe and reliable delivery of public transport and freight services.

4.2.2 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (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 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 *Environmental Planning and Assessment Regulation 2000* (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 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 provides a list of other relevant legislation applicable to the Proposal.

Table 4 Other NSW legislation applicable to the Proposal

Applicable legislation	Considerations
<i>Biodiversity Conservation Act 2016</i> (BC Act)	<p>The BC Act establishes a framework for assessing and protecting environmental and public interests.</p> <p>The Proposal site is unlikely to contain suitable habitat for any listed threatened species or community and the Proposal is unlikely to have a significant impact on any threatened species or community (refer Section 6.4).</p>
<i>Biosecurity Act 2015</i>	<p>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 Wollongong LGA are identified.</p>
<i>Coastal Management Act 2016</i>	<p>This Act provides for the protection of the coastal environment for the benefit of both present and future generations. It divides the coastal zone into four coastal management areas (coastal wetlands and littoral rainforests area; coastal vulnerability area; coastal environment area; and coastal use area).</p> <p>The Proposal site is partially located within land mapped 'coastal environmental area'. Refer to Sections 4.2.4 and 6.9.</p>
<i>Contaminated Land Management Act 1997</i> (CLM Act)	<p>Section 60 of the CLM Act imposes a duty on landowners to notify the EPA, and potentially investigate and remediate land if contamination is above EPA guideline levels.</p> <p>The Proposal site has not been notified under the CLM Act as being contaminated (refer to Section 6.8).</p>
<i>Heritage Act 1977</i> (Heritage Act)	<ul style="list-style-type: none"> • 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. <p>The Proposal is not located in close proximity to any heritage items listed on the State or section 170 register and is unlikely to impact a heritage item (refer to Section 6.4).</p>
<i>National Parks and Wildlife Act 1974</i> (NPW Act)	<p>Sections 86, 87 and 90 of the NPW Act require consent from Department of Planning, Industry and Environment (DPIE) for the destruction or damage of Aboriginal objects.</p> <p>Sections 151–153D of the Act specify the uses for which leases, licences or easements can be granted. Section 153 relates to approval for easements which can be granted by the Minister for or for the construction of pipelines, or for the erection of standards, posts, wires and appliances for the conveyance or transmission of electricity, or for any other purpose deemed necessary.</p> <p>The Proposal is unlikely to disturb any Aboriginal objects (refer Section 6.5). However, if unexpected archaeological items or items of Aboriginal heritage significance are discovered during construction of the Proposal, all work would cease, and appropriate advice sought.</p>

Applicable legislation	Considerations
<i>Protection of the Environment Operations Act 1997 (PoEO Act)</i>	<p>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.</p> <p>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 CEMP to be prepared and implemented by the Construction Contractor.</p>
<i>Roads Act 1993 (Roads Act)</i>	<p>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.</p> <p>The Proposal would not require work within or over a public road. Should work over Weber Crescent be required, Wollongong City Council would be consulted.</p>
<i>Sydney Water Act 1994</i>	The Proposal would not involve discharge of wastewater to the sewer.
<i>Waste Avoidance and Resource Recovery Act 2001 (WARR Act)</i>	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.
<i>Water Management Act 2000 (WM Act)</i>	<p>Approval under the WM Act is required for certain types of developments and activities that are carried out in or near a river, lake or estuary. Under section 91E of the WM Act, it is an offence to carry out a controlled activity in, on or under waterfront land unless a controlled activity approval has been issued.</p> <p>The Proposal would not involve any water use (directly from a natural source such as an aquifer, river), water management work, drainage or flood work, controlled activities or aquifer interference.</p>

4.2.4 Key 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.

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*.

Clause 79 in Division 15 of the Infrastructure SEPP permits the development of 'rail infrastructure facilities' on any land on behalf of a public authority without consent. The definition of 'rail infrastructure facilities' under Clause 78 includes:

- railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms.
- public amenities for commuters
- associated public transport facilities for railway stations.

The Proposal is classified as 'rail infrastructure facilities' and therefore does not require development consent. However, the environmental impacts of the Proposal have been assessed in accordance with Part 5, Division 5.1 of the EP&A Act.

Division 1 of the Infrastructure SEPP prescribes the consultation to be undertaken with the Local Council and the relevant public authorities with regards to certain 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*.

State Environmental Planning Policy (Coastal Management) 2018

The Coastal Management SEPP replaces SEPP 14 (Coastal Wetlands), SEPP 26 (Littoral Rainforests) and SEPP 71 (Coastal Protection), and seeks to balance social, economic and environmental interests by promoting a coordinated approach to coastal management.

The Coastal Management SEPP gives effect to the objectives of the *Coastal Management Act 2016* from a land use planning perspective, by specifying how development proposals are to be assessed if they fall within the coastal zone. It defines the four coastal management areas (coastal wetlands and littoral rainforests area; coastal vulnerability area; coastal environment area; and coastal use area) in the 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 site is partially located within land mapped 'Coastal Environmental Area' under Clause 13 of the Coastal Management SEPP. If the Proposal was located within an area mapped as Coastal Wetlands or Littoral Rainforest, the Coastal Management SEPP would require that the public authority obtain development consent from the relevant local council. Under the provision of the Infrastructure SEPP, the Proposal does not require development consent. Notwithstanding, the Proposal is not considered likely to have any adverse impacts on coastal environmental values (refer to Section 6.9).

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.

The potential for contaminated land and the potential impacts of the Proposal are assessed in Section 6.7 of this REF. It is unlikely that any large-scale remediation (Category 1) work would be required as part of the Proposal.

4.2.5 Wollongong Local Environmental Plan 2009

The Wollongong LEP is the governing plan for the Wollongong LGA, including Towradgi. Table 5 summarises the relevant aspects of the Wollongong LEP applicable to the Proposal. Figure 14 Wollongong LEP zoning map shows the land zoning of the Proposal site and the surrounding areas under the Wollongong LEP. While the Infrastructure SEPP prevails over Local Environmental Plans, the provisions of the Wollongong LEP have been considered with respect to the Proposal as detailed below.

Table 5 Relevant provisions of the Wollongong LEP

Provision description	Relevance to the Proposal
<p>Land Use Zones – Zone SP2 Infrastructure (railway) Zone RE1 Public Recreation</p>	<p>The Proposal site is located in land zoned SP2 Infrastructure (Railway) and RE1 Public Recreation. The objectives of the SP2 zone are:</p> <ul style="list-style-type: none"> • to provide for infrastructure and related uses • to prevent development that is not compatible with or that may detract from the provision of infrastructure. • to provide for key transport corridors. <p>The Proposal is consistent with the objectives of the SP2 zone as the work is to improve access to Towradgi Station.</p> <p>The objectives of the RE1 zone are:</p> <ul style="list-style-type: none"> • to enable land to be used for public open space or recreational purposes • to provide a range of recreational settings and activities and compatible land uses • to protect and enhance the natural environment for recreational purposes • to cater for the development of a wide range of uses and facilities within open spaces for the benefit of the community. <p>The Proposal involves establishing footpaths through the land zoned RE1, with the remaining work being within the rail corridor (Zoned SP2).</p>
<p>Clause 7.5 - Acid Sulfate Soils</p>	<p>The objective of this clause is to ensure that development does not disturb, expose or drain acid sulfate soils and cause environmental damage. The Proposal is located on land mapped as Class 5 Acid Sulfate Soils (ASS) which is land within 500 metres of Classes 1 to 4 . ASS are not typically found in Class 5 areas. As the Proposal is unlikely to lower the water table below one metre, it is unlikely to disturb ASS in adjacent areas.</p>
<p>Clause 7.6 - Earthworks</p>	<p>The applicable objective of this clause is to ensure that any earthworks will not have a detrimental impact on environmental functions and processes, neighbouring uses or heritage items and features surrounding land. The proposed earthworks as part of the Proposal would be unlikely to detrimentally impact environmental function or surrounding land uses.</p>

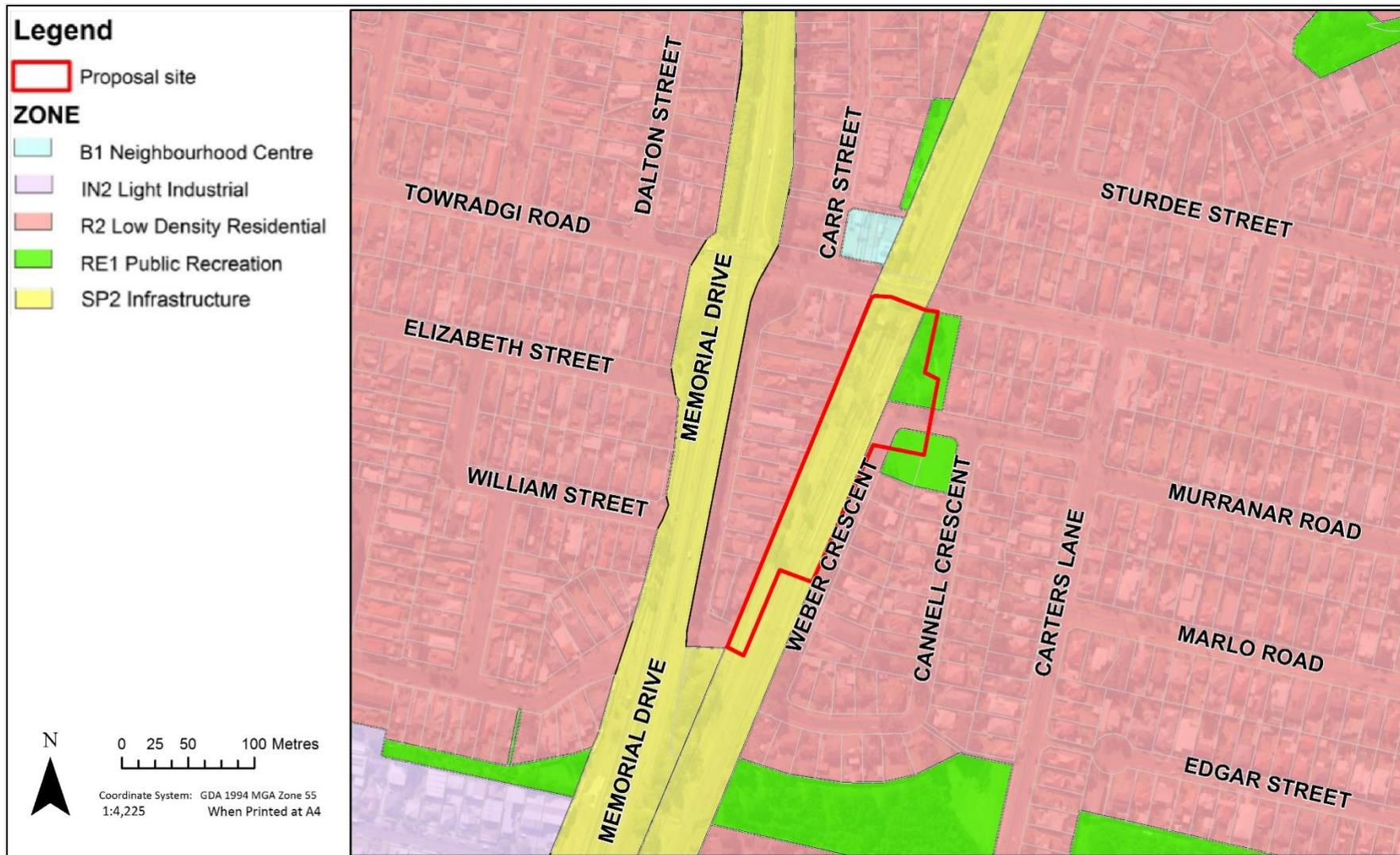


Figure 14 Wollongong LEP zoning map

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 Towradgi Station Upgrade. Section 4.3 summarises how ESD has been incorporated in the design development of the Proposal. Section 6.12 includes an assessment of the Proposal on 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 also 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 scoping design

Key stakeholders for Towradgi Station, comprising of Sydney Trains and Transport for NSW, were engaged during development of the concept design plan to provide insights into the scope of work for the Proposal, and to also participate in the development and assessment of the station improvement options.

5.1.1 Community consultation during coronavirus

In response to the evolving Coronavirus situation, Transport for NSW is following NSW Health advice and changing the way it approaches community consultation for important transport infrastructure projects.

It is important for the community to have their say on all transport infrastructure projects and while this isn't business as usual, Transport for NSW will ensure all appropriate community consultation is carried out.

This means consultation will be carried out in different ways, including via social media, to ensure the community can practice social distancing and limit the spread of Coronavirus.

Transport for NSW will continue to deliver projects across NSW, while ensuring the safety of all staff and the community.

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 13-16 of the Infrastructure SEPP require that public authorities undertake consultation with councils and other agencies, when proposing to carry out development without consent.

Table 6 provides details of consultation requirements under the Infrastructure SEPP for the Proposal.

Table 6 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	<p>Consultation is required where the Proposal would result in:</p> <ul style="list-style-type: none">substantial impact on stormwater management servicesgenerating traffic that would place a local road system under straininvolve connection to or impact on a council owned sewerage systeminvolve connection to and substantial use of council owned water supply	<p>The Proposal includes work that would:</p> <ul style="list-style-type: none">require connections or impacts upon the stormwater systemdisrupt pedestrian and vehicle movementsimpact on road pavements under Council's care and controlimpact on Council-operated footpaths.

Clause	Clause particulars	Relevance to the Proposal
	<ul style="list-style-type: none"> significantly disrupt pedestrian or vehicle movement involve significant excavation to a road surface or footpath for which Council has responsibility. 	<p>Consultation with Wollongong City Council has been undertaken and would continue throughout the detailed design and construction phases.</p>
<p>Clause 14 Consultation with Councils – development with impacts on local heritage</p>	<p>Where railway station works:</p> <ul style="list-style-type: none"> substantially impact on local heritage item (if not also a State heritage item) substantially impact on a heritage conservation area. 	<p>There is no proposed impact to local heritage items. Therefore, consultation with Council is not required. Refer to Section 6.6.</p>
<p>Clause 15 Consultation with Councils – development with impacts on flood liable land</p>	<p>Where railway station works:</p> <ul style="list-style-type: none"> impact on land that is susceptible to flooding – reference would be made to <i>Floodplain Development Manual</i>: the management of flood liable land. 	<p>The Proposal is not located on flood prone land. Accordingly, consultation with Council is not required in regard to this aspect.</p>
<p>Clause 15A Consultation with Councils – development with impacts on certain land within the coastal zone</p>	<p>Where railway station works:</p> <ul style="list-style-type: none"> impact on land within a coastal vulnerability area and is inconsistent with certified coastal management program that applies to that land. 	<p>The Proposal is located within a coastal vulnerability area mapped as Coastal Environmental Area. Consultation with Council is required in regard to this aspect. The Proposal is not inconsistent with Wollongong Coastal Management Plan (BMT WBM Pty Ltd, 2017).</p>
<p>Clause 15AA Consultation with State Emergency Service – development with impacts on flood liable land</p>	<p>Where railway station works:</p> <ul style="list-style-type: none"> impact on flood liable land – written notice must be given (together with a scope of works) to the State Emergency Service. Any response to the notice received from the State Emergency Service within 21 days after the notice is given must be taken into consideration. 	<p>The Proposal is not located on flood prone land. Accordingly, consultation with the State Emergency Service is not required in regard to this aspect.</p>
<p>Clause 16 Consultation with public authorities other than Councils</p>	<p>For <i>specified development</i> which includes consultation with the OEH for development that is undertaken adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i>, and other agencies specified by the Infrastructure SEPP where relevant. Although not a specific Infrastructure SEPP requirement, other agencies</p>	<p>The Proposal is not located adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i>. Accordingly, consultation with the Environment, Energy and Science (EES) Group in the DPIE on this matter is not required.</p>
<p>Clause 104 Consultation with relevant roads authority</p>	<p>For <i>traffic-generating development</i> specified in Column 1 of the Table to Schedule 3 that involves new premises of the relevant size or capacity, or an enlargement or extension of existing</p>	<p>The Proposal is not deemed a traffic-generating development. Accordingly, consultation with the relevant division of Transport for NSW is not required in</p>

Clause	Clause particulars	Relevance to the Proposal
	premises, being an alteration or addition of the relevant size or capacity – written notice of the intention to carry out the development must be given to the relevant roads authority in relation to the development. Any response to the notice that is received within 21 days after the notice is given must be taken into consideration.	regard to this aspect. Refer to Section 6.1.

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 is 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.

5.3.1 Public display

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

- distribution of a project newsletter at the station, and to local community and rail customers, outlining the Proposal and inviting feedback on the REF
- Installation of project information signage regarding the public display of the REF, detailing how customers can have their say
- advertisement of the REF public display in local media with a link to the Transport for NSW website that includes a summary of the Proposal, information on how to provide feedback and a feedback box to provide direct feedback to the project team
- Geo-targeted social media posts with click-through capability to the project webpage

- consultation with Wollongong City Council, Sydney Trains, NSW Trains and other non-community stakeholders.

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

The REF would be placed on public display on the [Transport for NSW website¹](#), and [NSW Government Have Your Say website²](#).

Further information on the Proposal may be requested by contacting the Project Infoline (1800 684 490) or by [email³](#).

During the display period feedback from the community is invited and can be submitted in the following ways:

- Mail: Towradgi Station Upgrade
Associate Director, Environmental Impact Assessment
Transport for NSW
Locked Bag 6501
St Leonards NSW 2065
- Email: projects@transport.nsw.gov.au
- Transport for NSW website: <https://www.transport.nsw.gov.au/projects/current-projects/towradgi-station-upgrade>

Following the 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.

5.4 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 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, Council and other key stakeholders informed of the process, identify any further issues as they arise, and develop additional mitigation measures to minimise the impacts of the Proposal. The interaction with the community would be undertaken in accordance with a Community Liaison Management Plan to be developed prior to the commencement of construction.

¹ [transport.nsw.gov.au/projects/current-projects/towradgi-station-upgrade](https://www.transport.nsw.gov.au/projects/current-projects/towradgi-station-upgrade)

² [nsw.gov.au/have-your-say](https://www.nsw.gov.au/have-your-say)

³ projects@transport.nsw.gov.au

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 Impact Assessment was completed for the Proposal by Bitzios Consulting in July 2020 with results summarised below.

6.1.1 Existing environment

Road network

Towradgi Road

Towradgi Road is a two-way, two-lane road that is part of an unclassified regional route. It is aligned in an east-west direction perpendicular to Towradgi Station and extends from Corrimal town centre at the Princes Highway to Towradgi Point on the coastline. The sign posted speed limit is 50 kilometres/hour. Short term and unrestricted parallel parking is available on both sides of the road east of the station, and a small short-term parking area is available in front of the neighbourhood centre across from the western side of the station. The railway overpass bridge is higher than the average level of the road, and the changes in elevation limit the sight distance for vehicles approaching the bridge.

Memorial Drive

Memorial Drive is a two-way, four-lane highway that forms part of State Road Highway 1. It is aligned in a north-south direction parallel to Towradgi Station on the western side and extends from the Princes Highway at Bulli to the Princes Motorway at Gwynneville. The sign posted speed limit is 80 kilometres/ hour north of the intersection at Towradgi Road and increases to 90 kilometres per hour south of the intersection.

Weber Crescent

Weber Crescent is a two-way unmarked local road that runs parallel to Towradgi Station on the eastern side and curves away from the station to run parallel to Towradgi Road. It is a no through road from Carters Lane and forms a loop with Carnell Crescent. There are no footpaths on the side of the road parallel to the station and there is no raised kerb on the station side of the road. The sign posted speed limit on Weber Crescent is 50 kilometres/ hour.

Ocean street

Ocean Street is a two-way unmarked local road that is aligned in a north-south direction to Towradgi Station on the western side. It is a no through road that is accessible from Towradgi Road, and access to the rail corridor is located at the southern end of the road.

Parking

No designated commuter car parking is located at Towradgi Station. On-street parking is available on the surrounding roads, including Towradgi Road and Weber Crescent. Parking on

Towradgi Road is generally short-stay due to parking restrictions, with unmarked parallel spaces only. Unrestricted parking is also available on the various side streets near the station. Typical parking demand is below capacity of the available on-street parking.

Public Transport

Towradgi Station

Towradgi Station is serviced by the South Coast Line. The South Coast Line has northbound services departing from Kiama, Port Kembla, Dapto and Wollongong, and southbound services departing from Central, Waterfall and Thirroul. The station is serviced by all stops services travelling between Port Kembla and Waterfall or Thirroul, where passengers need to change services to travel to Sydney.

Train services typically operate with 20 to 35 minute frequencies during peak morning and evening periods and 60 minute frequencies in off-peak periods. Journeys between Central Station and Towradgi Station during peak periods take approximately 90 to 100 minutes including a change of service.

Bus services

Public bus stops are located a distance away from the station, on Murrarar Road approximately 200m to the east, and the Princes Highway approximately 600m to the west. The buses that service the area are Routes 2, 3, 8, 90, 91, 92 and 93. Routes 3 and 8 depart from Murrarar Road and link to the suburbs surrounding Towradgi, and the routes departing from the Princes Highway link to Stanwell Park to the north and Wollongong to the south.

There are three school bus services that run along Towradgi Road and may stop at unmarked locations outside Towradgi Station. The bus stops in the vicinity of the station are shown in Figure 15.

Pedestrian infrastructure

Pedestrian access to the station platforms is provided by footpaths from Towradgi Road. The only pedestrian route crossing the rail line is via the footpath on Towradgi Road overbridge, as there is no station footbridge provided. The footpaths leading to the station platforms and the footpath across Towradgi Road overbridge are not suitable for accessible use due to DDA non-compliant steep grades in excess of 1:14.

There are footpaths on both sides of Towradgi Road, but the nearest crossings are at Memorial Drive and Carter Lane approximately 100 metres away from the station entrances. A footpath also leads through Weber Park east of the station on Weber Crescent. There are no footpaths on the north-south aligned section of Weber Crescent.

Cycling infrastructure

A bicycle rack with space for six bicycles is located in front of the station building near the entrance to Platform 1. Bicycle lockers are available in a park on the eastern side of the station with capacity for two bicycles.

The transport facilities currently available at Towradgi Station are shown in Figure 15.



Figure 15 Existing Transport Facilities (base map source: SixMaps, NSW Department of Finance and Services)

6.1.2 Potential impacts

Construction phase

Traffic

Construction access to Platform 1 would be via a gate at the end of Ocean Street, and Platform 2 would be accessed via a gate off Weber Crescent. The site compound would be located near Weber Crescent as outlined in Section 3.3.7. The construction of the Proposal would temporarily add extra vehicles to the local roads in the vicinity of the station. Vehicles that would access the Proposal site include heavy vehicles for material and equipment delivery and removal, light work vehicles for construction workers.

Construction traffic is not expected to exceed 20 light vehicles and 10 heavy vehicles per day during peak construction periods (including scheduled Sydney Trains rail shutdowns) and would be less when work is undertaken during standard construction hours. The timing of construction vehicles should be planned to reduce traffic impact, but it is unlikely that the Proposal will cause congestion issues.

Construction vehicles are able to access the site from Memorial Road via Towradgi Road. To access the proposed site compounds on Weber Crescent, vehicles would use Towradgi Road and Carters Lane. For longer vehicles to access Weber Crescent, a detour along Pioneer Road is required as the turn onto Carters Lane from Towradgi Road would be blocked by a pedestrian island as shown in Figure 16.

Ocean Street is the only road that could be used to access the western side of the rail corridor. Construction vehicles may have difficulty making the right turn into Ocean Street from Towradgi Road if the 'Keep Clear' zone at the intersection of the roads is blocked. Heavy vehicles approaching from Memorial Drive north would have to weave across a lane to turn from the right lane of Towradgi Road into Ocean Street, however there would likely be

sufficient gaps created by the signal phasing at the intersection of Memorial Drive and Towradgi Road to facilitate this movement. Measures to reduce the risk associated with these movements would be incorporated into the Construction Traffic Management Plan (CTMP).

Construction vehicle turnaround areas would be designed for both sides of the rail corridor to ensure forward entry and egress from the frontage roadways. Swept path analysis would be undertaken to ensure that construction vehicles can safely manoeuvre within the Proposal site and access the crane pads and site compounds. The paved turnaround area next to the Ocean Street access gate may be designated as the turnaround area for construction vehicles as expected traffic volumes would be low and vehicles would have sufficient sight lines across the turnaround area.

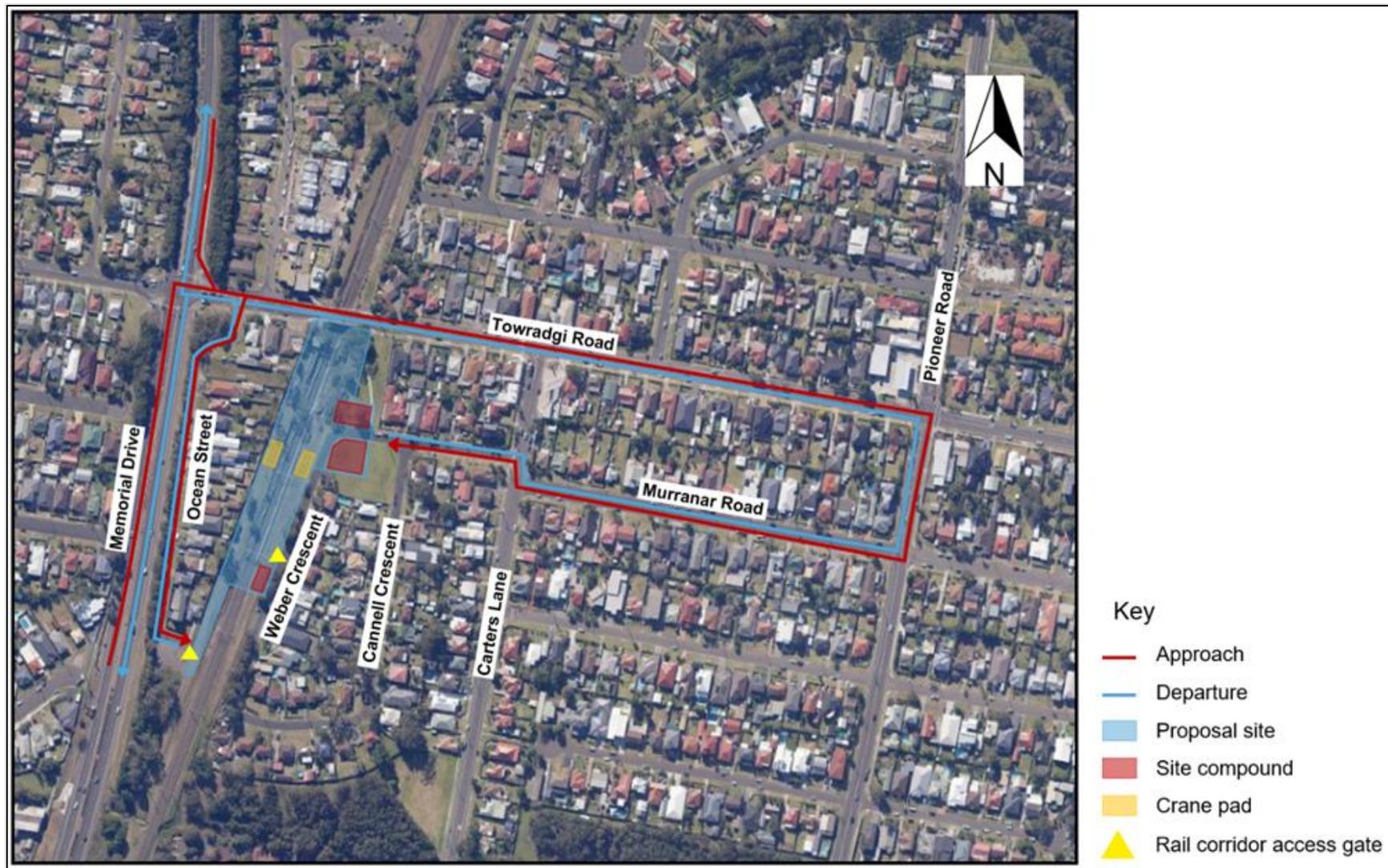


Figure 16 Proposed construction vehicle routes

Parking

The demand for parking in the area is low, so parking demand generated by construction work would be unlikely to result in a loss of parking for surrounding residents and commuters. Parking restrictions may be needed on Weber Crescent and Ocean Street near the Proposal site to allow heavy vehicles to safely access the site.

Pedestrians and cyclists

Pedestrian access to the station and across the rail corridor via Towradgi Road would be maintained during construction except during scheduled rail shutdowns. Access through the park on the eastern side of station would be maintained where practicable.

Public transport

It is not anticipated the construction work would impact on the public transport network. Bus routes and stops are not affected by the construction.

Operation phase

Public transport

It is unlikely that the Proposal would have any impacts on bus and rail operations. As the future patron demand suggests, the proposed station upgrade is unlikely to cause congestion issues on the South Coast Line.

The Proposal is also unlikely to have a substantive impact on the surrounding bus network because of the low expected growth in rail patronage. The addition of the new station entrance on Weber Crescent means that transfers to the Route 3/8 bus stops on Murrarar Road would be more convenient for passengers. A pedestrian crossing on Carter Lane may assist in providing safe access between the station and the bus stops.

Pedestrian and cyclist

The proposed station upgrades include a number of pedestrian facilities including a new entrance from Weber Crescent, footbridge stairs and lifts which would greatly improve accessibility and safety.

The new station entrance on Weber Crescent would provide easier access for pedestrians travelling towards the south east of the station and provide easier access to street parking in the vicinity. A new footpath has been proposed to connect the existing footpath on Weber Crescent to the station. This footpath would improve accessibility and connectivity to the surrounding areas to the east and south east areas of the station.

The provision of a footbridge with lifts and new DDA compliant footpaths would improve access for people with mobility issues and provide an alternative pedestrian railway crossing that is safer than the footpath on Towradgi Road overbridge.

No changes to the bicycle network or bicycle parking are proposed.

Traffic

The Proposal would result in a minor increase in the number of vehicles using Weber Crescent due to the availability of the kiss and ride facility, accessible parking and new station entrance. However, demand as a result of the Proposal would not increase congestion.

A formal kiss and ride area would be provided at the new Weber Crescent entrance, with space for at least one vehicle. This is likely to generate more traffic for the nearby streets, and given the location of the kiss and ride area, there may be increased U-turn activity on Weber Crescent as this would be the fastest way to gain access to the kiss and ride area. It is

possible to drive to the kiss and ride area without performing a U-turn, however this would involve a detour through Cannell Crescent.

Parking

The new station entrance off Weber Crescent along with the proposed kiss and ride and accessible parking spaces means that traffic and parking demand will increase on Weber Crescent and the surrounding roads. The Proposal may reduce the number of vehicles using Towradgi Road, as the parking on Weber Crescent will become closer to the station. This would likely have a minor impact on the smaller roads, and a negligible impact on the larger road network.

The current demand for parking on Weber Crescent is a fraction of the available capacity, but increases in demand may cause issues as there is no indication of where parking is permitted. Line marking and signage may be necessary to define where parking is restricted.

The proposed accessible parking spaces and kiss and ride parking space off Weber Crescent would be clearly marked and signposted.

6.1.3 Mitigation measures

Prior to the commencement of construction, a CTMP would be prepared as part of the CEMP and would include at a minimum:

- ensuring adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised
- maximising safety and accessibility for pedestrians and cyclists
- ensuring adequate sight lines to allow for safe entry and exit from the site
- ensuring access to railway stations, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made)
- managing impacts and changes to on and off-street parking and requirements for any temporary replacement provision
- parking locations for construction workers away from stations and busy residential areas and details of how this will be monitored for compliance
- routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses
- details for rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus operators. Particular provisions would also be considered for the accessibility impaired
- measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the CTMP.

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.

If additional permanent line marking and signage is required on Weber Crescent, consultation with Council would be undertaken during the detailed design phase.

Refer to Section 7.2 for a full list of proposed mitigation measures.

6.2 Landscape and visual amenity

A Landscape Character and Visual Impact Assessment was prepared for the Proposal to assess the landscape character and visual impact of the Proposal (Envisage Consulting, 2020). This includes landscape and visual effects of both construction and operational stages of the Proposal. The findings of the assessment are summarised below.

6.2.1 Existing environment

Towradgi Station is located in a relatively flat area and the rail corridor is positioned within a cutting. The key features around Towradgi Station are the Towradgi Road overbridge, low-density residential housing, the open grassed area of Weber Park, tall native trees and backdrop of the Illawarra Escarpment.

Character within the rail corridor is more 'infrastructure based' - station elements such as lighting, stanchions, fencing, small buildings and the steep-sided cutting, reflect the operation of the railway. The station also includes tall, mature trees which enhance local scenic quality.

The existing landscape character is rated as having low sensitivity, due to:

- the landscape setting of the station is typical of suburban development along this part of the south coast
- the scenic quality of the wider landscape setting is enhanced by the presence of the Illawarra Escarpment in the background
- the station and railway infrastructure are not visually appealing elements within the landscape, however, are generally well concealed within the cutting and do not overly detract from the residential suburban setting.
- the rail corridor includes tall, mature trees which contribute positively to local character.

Towradgi Station has a very small visual catchment due to its location within a cutting and the generally flat surrounding terrain. Buildings and vegetation along the rail corridor also screen views.

Views of the station are generally only possible from close proximity, approximately 100 metres from adjacent roads, residences and Weber Park. An approximate visual envelope and identified viewpoints are shown in Figure 17.



Figure 17 Viewpoints identified for Proposal site

6.2.2 Potential impacts

Construction phase

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

- moving construction equipment and machinery such as the crane would be a prominent feature
- fencing/hoarding, the temporary compound, construction vehicles, stockpiles would be prominent features
- the extent of the station landscape that would be affected by construction activities would be relatively large
- tall, mature trees would be removed, reducing local scenic quality.

Due to the low sensitivity of the landscape character, the overall impact is anticipated to be moderate to low. Residents on Ocean Street and Weber Crescent would have a temporary visual impact during the construction phase. The impacts from the construction phase would be temporary and minimised where possible.

Operation phase

Once completed, the main Proposal elements that would result in visible changes include:

- two lift shafts either side of the rail corridor - approximately eight metres above existing ground level on the western side, and approximately nine metres above existing ground level on the eastern side
- a 14 metre long footbridge between the two lift shafts . The deck of the footbridge would be approximately 2.5 metres below the top of the lift shaft
- stairs at either end of the footbridge connecting to each platform
- a new SSER building on Weber Crescent
- removal of vegetation within the rail corridor at the location of the proposed footbridge and in the vicinity of the station entry to Platform 1.
- pathways to connect Towradgi Road and Weber Crescent to the new footbridge the lift shafts
- removal of existing platform shelters and the provision of new platform shelters
- kiss and ride bay and two accessible parking spaces on Weber Crescent.

Upgrades to the station building are largely internal, and would not look significantly different when viewed from the outside. Regrading of the platform and the pavement around the station building would not result in a notable change in appearance.

The Proposal would have a low magnitude of change on the landscape character due to:

- result in loss of eight tall trees, increasing exposure of the rail corridor in the vicinity of the footbridge and near the southern end of platform 2
- include new, tall structures that would increase the visual presence of railway infrastructure within the scene
- the lift shafts would appear against a background of trees and not detract from the presence of the Illawarra Escarpment in the background.

Overall, Proposal elements would be compatible with the scale and character of the rail corridor, and railway infrastructure would still be confined to a relatively small proportion of the wider scene.

The nearest sensitive viewers are residents on Ocean Street and Weber Crescent who have private, potentially prolonged views of the Proposal. Less sensitive receivers are temporary users of Weber Park, Towradgi station and commercial premises. Each viewpoint identified in Figure 17 has been assessed and outlined in Table 7 below. Following construction, railway infrastructure would have greater visual presence, however, the additional features would be generally compatible with the scale and character of the rail corridor, would not affect distant views to the Illawarra Escarpment, or decrease local scenic quality. A photomontage of the Proposal as seen from viewpoint 2 is shown in Figure 18.

Table 7 View point impact assessment

Viewpoint	Description	Visual sensitivity	Magnitude of change	Visual impact of the Proposal	Overall impact
VP1 - Ocean Street residences (adjacent to the west)	View from residential properties along Ocean Street which back onto the rail corridor. The view of the rail corridor and railway infrastructure (such as stanchions, fencing and light poles), and the cutting, is not appealing. Most properties include screening vegetation which reduces the extent of rail corridor and infrastructure elements in view.	Low	Moderate	<ul style="list-style-type: none"> • new tall elements would be introduced. The western lift shaft would be approximately eight metres taller than existing ground level and potentially in the line-of-sight from upper storeys. • the loss of trees may result in reduced privacy for some residents and potentially expose some residences to views from the east • the Proposal would be in close proximity to backyard fences (approximately 10 metres away). • existing backyard vegetation would partially screen the Proposal (and there is potential for residents to further increase private landscape screening). 	Moderate-low
VP2- Weber Crescent residences (adjacent to the south)	View from residential properties located along Weber Crescent (parallel to the rail corridor) overlook the railway. Viewers are very close to the rail corridor and the Proposal site. The position of the station within the cutting reduces its prominence, however, taller elements (such as the mesh fence and overhead stanchions) are visible, and the view of the rail corridor is not appealing. Views are limited by existing vegetation.	Low	Moderate	<ul style="list-style-type: none"> • new elements (lift shafts, footbridge and stairs) would increase the visual presence of the railway. • the eastern lift would be approximately nine metres taller than existing ground level and approximately 45 metres from the closest private property • the proposed car spaces and SSER would be approximately 12-15 metres from the closest private property. • trees north of the eastern lift shaft would be taller than the new infrastructure and provide a backdrop and scale to the new elements. • over time, vegetation proposed around the SSER would screen it from view, and replacement planting within the corridor (to offset trees removed) may reduce views of the rail corridor (see Figure 18). 	Moderate-low

Viewpoint	Description	Visual sensitivity	Magnitude of change	Visual impact of the Proposal	Overall impact
VP3 – Towradgi Road (north)	The viewpoint includes pedestrians and other travellers using Towradgi Road, customers accessing Platform 1, and customers and operators of several two-storey commercial premises located along the northern side of Towradgi Road (approximately 25m from the pedestrian entrance to Platform 1). The viewpoint provides public views of the station entrance from close proximity.	Low	Low	<ul style="list-style-type: none"> footpath regrading and proposed new entry elements (signage, lighting) would improve the condition and appeal of the entrance. tall shrubs east of the entrance would remain in the background. 	Low
VP4 – Weber Crescent (east)	The viewpoint includes private views from Weber Crescent and from Cannell Crescent residences east of the Proposal site. The rail corridor lies between the viewer and the most scenic outlook from this viewpoint is the Illawarra Escarpment. However, the rail corridor is not prominent and not a significant component of the view. Most viewers do not have prolonged views of the rail corridor (with the exception of two residences adjacent to Weber Park).	Low	Low	<ul style="list-style-type: none"> the lift shafts, footbridge and stairs would be new, prominent elements at the end of Weber Crescent. The nearest lift shaft would be approximately 8 metres above the existing ground level. the new elements would have a backdrop of vegetation from residential backyards on the western side of the rail corridor; and would not affect views of the Illawarra Escarpment. the lift shafts would be shorter than the trees to the north (up to 15 metres high) and so the bulk of the Proposal would be consistent with the surrounding elements. 	Moderate-low
VP5 - Weber Park/Towradgi Road (north-east).	The viewpoint at the intersection of Weber Park and Towradgi Road includes pedestrians and road users accessing Towradgi Road, customers going to Towradgi Station, and visitors to Weber Park.	Low	Low	<ul style="list-style-type: none"> the Proposal would introduce new elements into the view, approximately 70 metres to the south. the height of the lift shafts would be lower than existing vegetation in the foreground to be retained and therefore would be partially screened. an additional path would be provided for park users. 	Low

Viewpoint	Description	Visual sensitivity	Magnitude of change	Visual impact of the Proposal	Overall impact
VP6 - Weber Crescent residences (south)	Further south along Weber Crescent are single detached dwellings parallel to, and opposite, the rail corridor. The viewpoint includes private views from front yards and upper storeys of some residences, and public views of Weber Crescent road users.	Low	Low	<ul style="list-style-type: none"> potential tree removal along the eastern boundary of the rail corridor would increase the extent of the rail corridor in view and increase views to residents along the western boundary of the rail corridor. 	Low



Figure 18 Photomontage of Proposal from Viewpoint 2 on Weber Crescent (subject to detailed design)

6.2.3 Mitigation measures

During Construction, the site compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations. Potential tree removal would be avoided where practicable by locating the proposed construction site compounds to avoid impacts to adjacent trees.

An Urban Design Plan would be prepared for the Proposal and submitted to Transport for NSW for endorsement. The Urban Design Plan is to address the fundamental design principles as outlined in the Transport for NSW Urban Design Guidelines, Transport for NSW, Interim 2016.

The following would be considered during detailed design of the Proposal to improve the visual outcomes:

- planting tall screening vegetation along the western boundary of the rail corridor in consultation with adjacent residential receivers
- increased density of plant numbers and width of planting area south and east of the proposed SSER and selection of quick growing, native plant species with good screening characteristics
- planting advanced size specimen plant species along Weber Crescent near the proposed car spaces to create a more attractive initial outcome for residents with close views of the Proposal site
- planting quick growing tree species with good screening characteristics to replace vegetation removed along rail corridor where necessary
- select colours for the proposed lift shafts and footbridge that respond to the background colour tones of the existing landscape to reduce the prominence of the new structures.

Refer to Section 7.2 for a full list of proposed mitigation measures.

6.3 Noise and vibration

A Noise and Vibration Impact Assessment (NVIA) report by Muller Acoustic Consulting was prepared in July 2020, with results summarised below.

6.3.1 Existing environment

The existing noise environment in the vicinity of Towradgi Station is typical of a suburban area with consistent road traffic on Memorial Drive and from the trains passing along the rail line and through the station.

Sensitive receivers

A range of noise receivers were identified within approximately 600 metres of the Proposal site. The sensitive receivers and land uses in Table 8 have been identified in close proximity to the Proposal site. A map identifying the position of the potentially affected receivers is provided in Figure 19.

Table 8 Noise receivers in proximity to the Proposal

Receivers	Distance from Proposal site
Residential receivers	<ul style="list-style-type: none"> • within approximately 10 to 600 metres in all directions
Medical facility	<ul style="list-style-type: none"> • Family General Practice – 45 metres north east on Towradgi Road
Commercial premises	<ul style="list-style-type: none"> • two premises within 30 to 45 metres north west on Towradgi Road • three premises 150 to 185 metres east on Towradgi Road
Places of worship	<ul style="list-style-type: none"> • Towradgi Congregational - 135 metres east • Corrimal Baptist Church - 600 metres north east
Educational institute	<ul style="list-style-type: none"> • Towradgi Public School 320 metres • Wollongong Flexible Learning Centre - 550 metres west
Active recreation areas	<ul style="list-style-type: none"> • Kemps Reserve - 315 metres south • Pop Errington Park - 385 metres west



Figure 19 Noise receivers around the Proposal site

Background noise levels

During preparation of the NVIA, social isolation requirements were in place as a result of the COVID-19 pandemic, which caused changes in typical work, commuter and traffic patterns. Due to these changes any results of noise monitoring taken at this time were determined to be unlikely to represent business as usual noise levels for the area.

Background noise monitoring was previously undertaken by GHD (2019) for the Fairy Meadow Station Upgrade Noise and Vibration Impact Assessment, about 1.3 kilometres south of the Proposal site. A review of the Fairy Meadow Station locality indicates that the noise environment is influenced by similar ambient noise sources, including road traffic along arterial (Memorial Drive), sub-arterial and local roads and rail sources. It is therefore considered that background noise monitoring in the Fairy Meadow Station locality is representative of background noise levels in the area surrounding the Proposal site.

The measured noise monitoring data were used to determine the Rating Background Level (RBL) during the day, evening and night-time periods in accordance with the Noise Policy for Industry (NPI) (EPA, 2017). The results of the unattended noise monitoring are presented in Table 9.

Table 9 Adopted RBLs for the Proposal

Background noise level	Day	Evening	Night
Rating Background Level, dB LA90	47	40	34
Ambient Level, dB LAeq	59	58	51

Note: Day - the period from 7.00am to 6.00pm Monday to Saturday or 8.00am to 6.00pm on Sundays and public holidays; Evening - the period from 6.00pm to 10.00pm; Night - the remaining periods.

6.3.2 Potential impacts

Construction noise

The assessment includes identification of potentially affected assessment locations, description of activities involved in the Proposal, derivation of the construction noise criteria for standard and Out of Hours (OOH) periods and quantification of potential noise impacts at receivers.

The assessment and management of noise from construction work is completed using the *NSW Interim Construction Noise Guideline (ICNG)* (Department of Environment and Climate Change, 2000). The ICNG is specifically aimed at managing noise from construction work regulated by Department of Planning, Industry and Environment (DPIE) and is used to assist in setting statutory conditions in licences or other regulatory instruments.

The ICNG provides a framework to consider the impacts of construction noise on residences and other sensitive land uses and the Noise Management Levels (NML) provide noise criteria for construction. The application of the ICNG criteria to residential receivers is outlined in Table 10.

Table 10 ICNG recommended NMLs

Provision description	NML ($L_{Aeq,15\text{ minutes}}$)	Application
<p>Recommended standard hours: Monday to Friday 7.00am to 6.00pm Saturday 8.00am to 1.00pm No work on Sunday or Public Holidays</p>	<p>Noise affected RBL + 10dBA</p>	<p>The noise affected level represents the point above which there may be some community reaction to noise.</p> <p>Where the predicted or measured $L_{Aeq,15\text{min}}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to minimise noise.</p> <p>The proponent should also inform all potentially impacted residents of the nature of work to be carried out, the expected noise levels and duration, as well as contact details.</p>
<p>Monday to Friday 7.00am to 6.00pm Saturday 8.00am to 1.00pm No work on Sunday or Public Holidays</p>	<p>Highly noise affected 75dBA</p>	<p>The highly noise affected level represents the point above which there may be strong community reaction to noise.</p> <p>Where noise is above this level, the proponent should consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level.</p> <p>If no quieter work method is feasible and reasonable, and the work proceeds, the proponent should communicate with the impacted residents by clearly explaining the duration and noise level of the work, and by describing any respite periods that would be provided.</p>
<p>Outside recommended standard hours</p>	<p>Noise affected RBL + 5dB</p>	<p>A strong justification would typically be required for work outside the recommended standard hours.</p> <p>The proponent should apply all feasible and reasonable work practices to meet the noise affected level.</p> <p>Where all feasible and reasonable practices have been applied and noise is more than 5dBA above the noise affected level, the proponent should negotiate with the community.</p>

NMLs for construction activities have been developed for receivers during standard construction hours and out of hours periods and are summarised in Table 11. OOH periods are divided into two categories:

- Period 1 (evening/low risk period):
 - Monday to Friday – 6.00pm to 10.00pm
 - Saturdays – 1.00pm to 6.00pm
 - Sundays and Public Holidays – 8.00am to 6.00pm
- Period 2 (night/medium to high risk period):
 - Monday to Friday – 10.00pm to 7.00am

- Saturdays, Sundays and Public Holidays – 6.00pm to 7.00am (8.00am on Sunday mornings and Public Holidays).

Table 11 NMLs at surrounding receivers

Location	Assessment period	RBL (dBA)	NML (dB LA _{eq15min})
Residential receivers	Day (Standard Hours)	47	57 (RBL+10dBA)
Residential receivers	Evening (OOH Period 1)	40	45 (RBL+5dBA)
Residential receivers	Night (OOH Period 2)	34	39 (RBL+5dBA)
Commercial Receivers	When in use	-	70 (external)
School classrooms	When in use	-	45 (internal)
Places of Worship	When in use	-	45 (internal)
Active recreation areas	When in use	-	65 (external)

A computer model was developed to predict and quantify project noise emissions to neighbouring receivers for typical construction activities and operations.

Work during OOH periods are expected during rail shutdowns to complete installation work for the footbridge and work on the station platform. Work during the rail shutdowns have been assessed for all modelled scenarios during the day, evening and night-time assessment periods. The rail shutdowns would be required to limit the effect on normal rail operations and to improve worker safety.

Noise emissions at residential receiver locations are predicted not to exceed the NMLs by more than 10dB for all construction activities during standard construction hours. Noise emissions are predicted to be above the OOH NMLs at the most affected receivers by more than 5dB for all stages of construction. The highest affected receivers are in the vicinity of the Proposal site on Towradgi Road, Weber Crescent, Ocean Street and Cannell Street. It is noted that construction noise levels would not exceed the highly noise affected NML of 75dBA at any residential receiver locations.

The construction noise emissions are predicted to meet the NMLs for all non-residential receiver types during construction.

Where construction noise levels are still predicted to exceed the NMLs after the application of the standard mitigation measures, additional mitigation measures (AMM) should be implemented where required. Construction noise management zones have been mapped to identify the receivers where residual noise levels after the application of standard mitigation measures are anticipated to exceed the NML by 5dB or more. The noise management zones for OOH period 1 (refer to Figure 20) and OOH period 2 (refer to Figure 21) have been predicted for pedestrian bridge construction work, which is considered to be the activity likely to impact the greatest number of receivers.



Figure 20 The noise management zones for the proposal during OOH period 1



Figure 21 The noise management zones for the Proposal during OOH period 2

Sleep disturbance

OOH construction activities occurring during the night time have the potential to generate noise emissions that may cause sleep disturbance at receivers in proximity to the construction work.

Noise modelling quantified the levels from maximum night time events from the near point of each construction activity to each assessed receiver. Modelling adopted a sound power level of 115dB L_{Amax} to represent emissions from transient sources such as metallic impacts from equipment.

Modelling identified that maximum emissions have the potential to exceed to maximum noise trigger level at the nearest assessed receivers on Towradgi Road, Ocean Street and Weber Crescent. Therefore, it is recommended that the Proposal proactively manages night time noise emissions and implement reasonable and feasible noise control strategies to minimise and where possible, eliminate the occurrence of sleep disturbance within the surrounding locality.

Construction road traffic

Noise and vibration impacts from construction road traffic associated with the Proposal are not anticipated due to the relatively low number of additional vehicles on the public road network. Nevertheless, construction vehicles travelling on local roads, including Ocean Street and Weber Crescent may result in increased levels of road traffic noise. Therefore, standard mitigation measures will be implemented.

Construction vibration

The assessment and management of noise from construction work is completed with reference to the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019). This strategy recommends safe working buffer distances for standard structure depending on the plant and equipment being used. As the nearest receivers to the location of the accessible parking space works, lift shafts and platforms are about 18 metres, 50 metres and 20 metres respectively, the use of medium or large hydraulic hammers, and vibratory rollers would be avoided, where possible.

Where construction is required within the safe working buffer distance alternative work methods are required, such as smaller equipment. If no alternative work method is feasible or reasonable, then compliance vibration monitoring should be undertaken where work is required within the safe working buffer distance.

Operation phase

The Proposal would not result in an increase in rail operations on the South Coast Line and therefore would not affect operational noise levels. The use of lifts at the station is not anticipated to increase the operational noise at the station. All other operational noise impacts from the station are not expected to increase noise levels past the operational noise criteria.

It is anticipated that station upgrades would include improvements to station communications systems would have a net beneficial effect, with noise levels at nearby residential receivers anticipated to be lower than present.

Therefore, it is expected that operational noise levels would be the same or lower than current levels.

6.3.3 Mitigation measures

Prior to commencement of work, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the INCG , *Construction Noise and Vibration Strategy* (Transport for NSW, 2019) and the Noise

and Vibration Impact Assessment for the Proposal (Muller Acoustic Consulting, 2020). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.

Refer to Section 7.2 for a full list of proposed mitigation measures.

Additional noise mitigation measures

Where construction noise levels are still predicted to exceed the NMLs after the application of the standard mitigation measures, further mitigation measures as outlined Table 12 should be implemented where reasonable.

Table 12 Proposed additional mitigation

Time period	Receiver Perception	dB above RBL	dB above NML	AMMs
Standard	Noticeable	5 – 10	0	--
	Clearly Audible	>10 – 20	<10	--
	Moderately Intrusive	>20 – 30	>10 – 20	PN, V
	Highly Intrusive	>30	>20	PN, V
	> 75dBA HNA	n/a	n/a	PN, V, SN
OOH Period 1	Noticeable	5 – 10	<5	
	Clearly Audible	>10 – 20	5 - 15	PN
	Moderately Intrusive	>20 – 30	>15 – 25	PN, V, SN, RO
	Highly Intrusive	>30	>25	PN, V, SN, RO, RP#, DR#
OOH Period 2	Noticeable	5 – 10	<5	PN
	Clearly Audible	>10 – 20	5 - 15	PN, V
	Moderately Intrusive	>20 – 30	>15 – 25	PN, V, SN, RO, RP, DR
	Highly Intrusive	>30	>25	PN, V, SN, AA, RP, DR

Notes: PN = Project Notification; SN = Specific Notification, individual briefings, or phone call; V = Verification monitoring; DR = Duration Reduction; RP = Respite Period; RO = Project specific Respite Offer; AA = Alternative Accommodation.

6.4 Biodiversity

6.4.1 Existing environment

Flora

Towradgi has multiple native mature and semi-mature trees located along the rail corridor within the Proposal site as shown in Figure 22. The surrounding area contains exotic maintained grass species. Three young native plantings are located directly south of the Station buildings as shown in Figure 23. The plantings are surrounded by weeds.



Figure 22 Native trees located behind the shelter on the Platform 1



Figure 23 Young native plantings south of the Station building

An Arboricultural Impact Assessment, which assessed the impacts to the trees within the Proposal site was completed by Eco Logical Australia based on a desktop review and inspections of the site conducted by arborists on 9 April and 17 June 2020.

During the site visits, 81 trees were identified within the Proposal site as show in Figure 24. These trees were assessed in accordance with the Institute of Australian Consulting Arborists (IACA) Significance of a Tree Assessment Rating System (IACA, 2010) using the following ratings:

- high - priority for retention - these trees are considered important and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by Australian Standard AS 4970–2009 Protection of trees on development sites.
- medium - consider for retention. These trees are moderately important for retention. Their removal should only be considered if adversely affected by the proposed work and all other alternatives have been considered and exhausted.
- low - consider for removal. These trees are not considered important for retention, nor require special work or design modification to be implemented for their retention.
- priority for removal: Tree not considered important for retention, nor requiring special work or design modification to be implemented for their retention.

The vegetation likely to be impacted is not mapped as a plant community type under the Illawarra Vegetation Mapping (Office of Environment and Heritage, 2016). Tree 12 (*Syzygium paniculatum*) identified in Figure 24 is an endangered species listed under the EPBC Act.



Figure 24 Trees identified within the Proposal site and their identified retention value

Fauna

A search using the EPBC Act protected matters search tool undertaken on the 18 March 2020 identified six listed Threatened Ecological Communities, 84 threatened species and 60 migratory species that may occur within 10 kilometres of the Proposal site. A search of NSW NPWS Wildlife Atlas database (Office of Environment and Heritage, 2020) identified endangered species within 10 kilometres of the Proposal site. Species listed under the BC Act and/or the EPBC Act likely to occur in the vicinity of the Proposal site include endangered birds species such as the Square-tailed Kite (*Lophoictinia isura*), the Swift Parrot (*Lathamus discolor*) and Powerful Owl (*Ninox strenua*) and bat species such as the Grey-headed Flying-fox (*Pteropus poliocephalus*).

No habitat features were identified by the arborist within the Proposal site. The area is considered to constitute marginal foraging habitat for a range of highly mobile fauna species including native birds that may utilise the site as part of a much larger foraging range. The Proposal site has relatively low habitat connectivity, but could be used as a stopping point for mobile fauna between the riparian corridors located over 200 metres north and south of the site.

6.4.2 Potential impacts

Construction phase

Trees may be impacted from the Proposal by physical damage to the structural root zone (SRZ) or above tree section from activities such as site grading, soil compaction, excavation, stock piling within tree protection zone (TPZ) as well as changes in site hydrology, changes in soil level and site contamination.

The potential impact to trees from the Proposal was assessed against the following ratings:

- high impact - the SRZ is directly affected or the proposed encroachment is greater than 20% of the TPZ. Trees may not remain viable if they are subject to high impact. These trees cannot be retained unless the Proposal is changed.
- medium impact: if the proposed encroachment is greater than 10% of the TPZ (but less than 20% of the TPZ) and outside of the SRZ, the project arborist may require detailed root investigation to demonstrate that the tree(s) would remain viable. These trees may be retained subject to further investigation and mitigation measures.
- low impact - if the proposed encroachment is less than 10% (total area) of the TPZ, and outside of the SRZ, detailed root investigations should not be required. These trees can be retained.
- no impact - no likely or foreseeable encroachment within the TPZ. These trees can be retained.

The impact to trees from the Proposal is shown in the Figure 25 Impacts to trees from the Proposal with the revised footpath alignment and site compound location. The Proposal was designed to minimise impact to vegetation where possible. The alignment of the proposed footpaths on the eastern side of the station was revised to avoid impacts to three trees and the proposed location of the southern site compound in the rail corridor has been adjusted to avoid medium or higher impact to TPZs of adjacent trees .

Arboricultural Impact Assessment - Revised Layout



Legend

Assessed Area

Proposed Works

Indicative Site compounds

Indicative Crane pads

Tree Protection Zone

No Impact: 0%

Low Impact: <10%

Medium Impact: <20%

High Impact: >20%

Revised Arboricultural Impact Assessment

● No Impact: 0%

● Low Impact: <10%

● Medium Impact: <20%

● High Impact: >20%

0 10 20 40

Metres

Datum/Projection:
GDA 1994 MGA Zone 56

nearmap.com

eco logical
AUSTRALIA
A TETRA TECH COMPANY

Prepared by: SC Date: 25/06/2020

Figure 25 Impacts to trees from the Proposal with the revised footpath alignment and site compound location

The total number of trees potentially subject to high impact from the Proposal would be nine trees. It is anticipated that most trees subject to high impact from the Proposal would be removed. However any site compound proposed to the north of Weber Crescent would be placed to avoid impact to the TPZ of tree 37 to ensure it is not removed. The removal of six trees (trees one to six) from the western side of the station and two trees (trees 28 and 29) from the eastern side of the station would likely be removed for the Proposal.

The Proposal site does not contain any threatened ecological communities or habitat for threatened flora. Tree 12 (*Syzygium paniculatum*), which is an endangered species listed under the EPBC Act would not be impacted by the Proposal. Removal of eight trees along with a small number of shrubs would have a minor impact on native flora and fauna within the locality.

Operation phase

The Proposal site is located within a modified urban environment and the operational phase of the Proposal would not involve any additional impacts on native flora and fauna beyond existing conditions. Landscaping is proposed around the SSER to be installed adjacent to Weber Crescent. The plant species selected for landscaping would be native and endemic to the area. Furthermore, opportunities to maintain or enhance the ecological value of the Proposal site would be investigated during detailed design.

6.4.3 Mitigation measures

Construction of the Proposal must be undertaken in accordance with *Transport for NSW's Vegetation Management (Protection and Removal) Guideline* (Transport for NSW, 2018b) and *Transport for NSW's Fauna Management Guideline* (Transport for NSW, 2018c). Impacts to the young native plantings would be avoided where possible.

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.

Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees nominated to be removed in the *Towradgi Station Arboricultural Impact Assessment* (Eco Logical, 2020) would be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal. Site compound locations would be further refined to avoid impacts to TPZs.

A project arborist would supervise work within TPZs and provide advice regarding tree protection and monitor compliance. Final inspection of trees would be undertaken by the project arborist after all major construction has ceased and following the removal of tree protection measures.

Offset for tree removal and landscaping would be undertaken in accordance with *Transport for NSW's Vegetation Offset Guide* (Transport for NSW, 2019a) and in consultation with the relevant council, and/or the owner of the land upon which the vegetation is to be planted. Should all trees identified be removed they would be offset as outlined in Table 13.

Table 13 Potential offset requirements

Size of tree (diameter at Breast Height)	Offset plantings per tree	Potential trees to be removed	Offsets plantings required
Large tree (DBH>60centimetres)	8 trees	2	16
Medium tree (DBH 15-60 centimetres)	4 trees	4	16

Size of tree (diameter at Breast Height)	Offset plantings per tree	Potential trees to be removed	Offsets plantings required
Small young tree (DBH<15 centimetres)	2 trees	2	4
Total		8	36

Weed control measures, consistent with the *Weed Management and Disposal Guideline* (Transport for NSW, 2015), 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 Section 7.2 for a full list of proposed mitigation measures.

6.5 Aboriginal heritage

6.5.1 Existing environment

The Proposal site is not located within a landscape feature likely to indicate the presence of Aboriginal objects in accordance to the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (Department of Environment, Climate Change and Water, 2010).

A search of Aboriginal heritage information management system (AHIMS) was undertaken on 14 April 2020. The AHIMS search with a 200 metre buffer did not identify any sites in proximity to the Proposal site and no Aboriginal places have been declared. Furthermore, the Proposal site is located in an area that has been highly modified. Previous construction of the rail corridor and station has resulted in significant disturbance to the Proposal site.

The Proposal site has low archaeological potential and it is considered unlikely that any Aboriginal heritage items would be located in the vicinity of the Proposal due to the history of disturbance.

6.5.2 Potential impacts

Construction phase

As there are no Aboriginal heritage items in close proximity to the Proposal site, the ground disturbance and other construction activities are unlikely to damage, displace or destroy an item of heritage value.

Operation phase

No impacts to Aboriginal heritage items in the vicinity of the Proposal are anticipated during operation of the Proposal.

6.5.3 Mitigation measures

If previously unidentified Aboriginal objects are uncovered during construction, in accordance with Transport for NSW's *Unexpected Heritage Finds Guideline* (Transport for NSW, 2019b), work would cease in the vicinity of the find and the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager would be notified immediately to assist in co-ordinating next steps which are likely to involve consultation with an archaeologist, DPIE and the Local Aboriginal Land Council/s. If human remains are found, work would cease, the site would be secured and the NSW Police and DPIE would be notified.

6.6 Non-Aboriginal heritage

6.6.1 Existing environment

A desktop assessment was undertaken to identify potential non-Aboriginal heritage items within the vicinity of the Proposal. The assessment included a review of the following online databases:

- National Heritage List
- NSW State Heritage Register
- Wollongong LEP.

The assessment did not identify any heritage items within the Proposal site. The heritage item identified closest to the Proposal site is a locally listed house at 459 Princes Highway, Fairy Meadow (reference number 6212) located over 500 metres to the west of the station.

6.6.2 Potential impacts

Construction phase

As there are no non-Aboriginal heritage items in close proximity to the Proposal site, the ground disturbance and other construction activities are unlikely to damage, displace or destroy an item of heritage value.

Operation phase

No impacts to non-Aboriginal heritage items in the vicinity of the Proposal are anticipated during operation of the Proposal.

6.6.3 Mitigation measures

In the event that any unexpected archaeological deposits are identified within the Proposal site during construction, work within the vicinity of the find would cease immediately and the procedures contained in Transport for NSW's *Unexpected Heritage Finds Guideline* (Transport for NSW, 2016a) would be followed.

Refer to Section 7.2 for a full list of proposed mitigation measures.

6.7 Socio-economic impacts

6.7.1 Existing environment

Towradgi is a coastal suburb located to the north of Wollongong CBD. Land uses within the suburb generally comprise of low density residential development and public recreation areas.

Towradgi Station is an ungated station and is accessed predominately by walking from the surrounding areas. The station is located on Towradgi Road which has a few isolated retail businesses. Towradgi Public school is located 450 metres south of Towradgi station adjacent to the rail corridor. Weber Park is located directly east of the station and residential properties are located immediately west.

A review of the 2016 Australian Bureau of Statistics (ABS) Census data was undertaken for the suburb of Towradgi. The suburb had a population of 3,127 people. There was an above average use of private vehicles in Towradgi when commuting to and from work. Approximately 75 per cent travel to work in a private vehicle and 6.5 percent of the population use public transport to get to work with a majority using the train (ABS, 2016).

Two key goals of the Wollongong City Council Community Strategic Plan, *Wollongong 2028*, are:

- to have a healthy community in a liveable city
- to have affordable and accessible transport.

Strategies to achieve these goals include ensuring public facilities in key locations and transport routes are clean, accessible and inviting to the community and developing community transport options for frail older people, people with disabilities and the transport disadvantaged are actively promoted and available.

The median age of people in Towradgi was 42 years in 2016 with people aged 65 years and over making up 20.2% of the population, which is a little above the national average. Within Wollongong, the percentage of people 65 years and older is expected to increase to 38%. *Wollongong City Council's Ageing Plan 2018-2022* sets out how the Council will make Wollongong a place where older residents are supported to remain involved, connected and valued within the community (Wollongong City Council, 2018). An objective of this plan is increasing accessibility and connectivity of transport options.

Council also developed a *Disability Inclusion Plan 2016-2020*, which identified increasing the number of accessible parking spaces, footpaths and toilets within the region as key actions.

6.7.2 Potential impacts

Construction phase

The Proposal has the potential to impact residents and businesses within the vicinity of the work through:

- temporary visual, noise and vibration impacts
- temporary changes to access arrangements around the station including pedestrian diversions
- temporary occupation of part of Weber Park
- minor delays on the adjacent road network
- increased truck movements delivering materials and equipment and transporting waste
- temporary loss of access to the toilet facilities.

A portion of Weber Park would be occupied during the construction phase however access through the park would be maintained.

The above impacts on the community are expected to be relatively short term in nature. These impacts would be further reduced as many of them would likely occur during rail shutdown periods when movements in the vicinity of the station would be lower as a result of the trains not operating.

Potential impacts relating to noise, vibration, traffic, access and visual amenity are considered in Sections 6.1, 6.2 and 6.3.

Operation phase

The Proposal would provide long-term benefits to the local community including:

- improved accessibility for station customers and pedestrians, particularly people with a disability, limited mobility, less mobile, parents/carers with prams and customers with luggage

- improved customer amenity and facilities, including a family accessible toilet
- improved access to transport interchange facilities through improved footpaths to meet DDA requirements
- improved safety for customers on the station platform, including upgrade of station systems including CCTV and emergency help points.

The Proposal would improve the overall accessibility of the station. The Proposal would support the objectives and actions of the Wollongong City Council's *Community Strategic Plan, Ageing Plan 2018-2022* and *Disability Inclusion Plan 2016-2020*.

6.7.3 Mitigation measures

A Community Liaison Management Plan (CLMP) 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.

The community would be kept informed of construction progress, activities and impacts in accordance with the CLMP.

Refer to Section 7.2 for a full list of proposed mitigation measures.

6.8 Contamination, geology and soils

6.8.1 Existing environment

Landform

The landform in the vicinity of Towradgi Station is generally flat with a gentle incline towards the east and the rail corridor is positioned within a cutting.

Soils and geology

The Towradgi Station Preliminary Geotechnical Assessment (SMEC, 2018) observed the general subsurface conditions appear to comprise a thin layer of soil material overlying moderately weathered sandstone.

The Wollongong (Sheet 9029) 1:50,000 series geological map indicates that the site is underlain by the Pheasants Nest Formation. The Pheasants Nest Formation is described as interbedded andesitic sandstone, coal, carbonaceous mudrock and mudrock (Stroud et al, 1985).

Under the Wollongong LEP, the Proposal site is mapped as Class 5 ASS, which is land within 500 metres of Classes 1 to 4 ASS. Class 5 areas have a low probability of ASS being present.

Contamination

The AS 4482.1-2005 - *Guide to the investigation and sampling of sites with potentially contaminated soil - Non-volatile and semi-volatile compounds* lists the chemicals used by specific industries. The Standard lists the following chemicals that are commonly associated with railway yards:

- hydrocarbons
- arsenic
- phenolics
- heavy metals

- nitrates and ammonia.

A review of the NSW EPA contaminated land register and the PoEO Act public register undertaken on 18 March 2020 indicates the Proposal site is not listed as a contaminated site, nor has the site been subject to any regulation under the *Contaminated Land Management Act 1997*.

The station may contain contaminated materials with the fabric of the existing buildings including such as asbestos, lead paint polychlorinated biphenyls in light fittings or synthetic mineral fibres.

6.8.2 Potential impacts

Construction phase

The Proposal would require excavation work for foundations and footings and pits for lift shafts. Other trenching, excavation or grading would be required for installing services, drainage work, new paving, and tree removal.

Potential risks associated with the proposed work may include:

- fuel or oil spills or leaks from plant, equipment or vehicles
- erosion and sediment runoff.

In the unlikely event, contamination is encountered on-site during construction, appropriate control measures would be implemented to manage the immediate risks. All other work that may impact on the contaminated area would cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in Unexpected Finds Protocol to be prepared for the Proposal and included in the CEMP.

In the absence of appropriate management measures, there is a risk that new contaminants may be introduced to the local environment during construction work, for example through fuels and oils used in construction equipment and plant. In order to minimise potential risks designated fuelling areas would be established and contractors would be informed of correct fuelling techniques and proper handling techniques for potential contaminating materials. Fuelling areas and chemical storage areas would be equipped with spill kits.

The construction activities have the potential to impact upon local water quality and drainage as a result of erosion through runoff and sedimentation downstream. Given the relatively flat terrain, there is relatively low risk of erosion through runoff. Regardless, erosion risks would be managed through the implementation of standard measures as outlined in the 'Blue Book' - *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004). The implementation of the Construction Environmental Management Plan (CEMP) and Erosion and Sediment Control Plan would ensure suitable erosion control measures are put in place and maintained correctly during construction.

The Proposal is mapped Class 5 which indicates there is a low probability of encountering ASS during construction. Furthermore the Proposal would not lower the water table below one metre and so unlikely to disturb ASS in adjacent areas.

Operation phase

The operation of the Proposal would have no material change to geology, soils, hazardous materials or contamination.

6.8.3 Mitigation measures

A CEMP would be developed which includes mitigation measures to manage erosion and sediment control. 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.

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.

An appropriate Unexpected Finds Protocol for contamination, considering asbestos containing materials and other potential contaminants, would be also included in the CEMP.

Refer to Section 7.2 for a full list of proposed mitigation measures.

6.9 Hydrology and water quality

6.9.1 Existing environment

Surface water

The Proposal site is located over the border of the Towradgi Creek sub-catchment and the Cabbage Tree Creek sub-catchment of the Wollongong Coast Basin.

The topography of the Proposal site is relatively flat. However, the station is located in a cutting. The nearest mapped waterway is an unnamed stormwater channel 120 metres to the south of the Proposal site. A stormwater channel which is a tributary of Towradgi Creek is located approximately 170 metres to the north of the Proposal site. The waterways and waterbodies in the vicinity of the Proposal site are shown in Figure 5.

Wollongong City Council stormwater drainage infrastructure exists in close proximity to the site. The drainage in the immediate area comprises the stormwater drains and pipes within the road network

Surface water in the vicinity of the Proposal site is managed by the Council stormwater drainage system consisting mainly of kerb and gutter connected to an underground pipe network. Surface water quality in the vicinity of the Proposal is considered to be consistent with a highly urbanised environment with many sources of pollution such as oils from adjacent road, rubbish and leaf litter.

The Proposal site is partially located within land mapped 'Coastal Environmental Area' under the Coastal Management SEPP. The *Wollongong Coastal Management Plan* prepared in accordance with the SEPP includes assessment of Towradgi (BMT WBM Pty Ltd, 2017). However, the Plan identifies Towradgi Beach and the surrounding properties in close proximity as the risk area and does not identify any actions for the properties and roads surrounding the Proposal site.

The Proposal site is not located in area mapped as flood prone land in the Towradgi Creek Flood Study (WMA Water, 2019) or under the Wollongong LEP.

Groundwater

A search of WaterNSW's real-time data website identified no existing groundwater bores in the vicinity of the Proposal. The nearest groundwater bore with water level information is located about 500 metres south west of the Proposal. The groundwater levels at this bore and surrounding bores is about three metres below the surface.

6.9.2 Potential impacts

Construction phase

Without appropriate safeguards, pollutants (fuel, chemicals or wastewater from accidental spills, and sediment from excavations and stockpiles) could potentially reach nearby stormwater drains and the streams near the site.

Activities which would disturb soil during construction work (such as tree removal, excavation for footings, and realignment of kerbing) have the potential to impact upon local water quality as a result of erosion and sedimentation. There is also potential to contaminate local water quality as a result of accidental spills or inadequate fuel and chemical storage practices. Any translocating contaminants would be expected to flow towards the nearby council stormwater drainage infrastructure.

Areas of excavation may need to be locally dewatered as a result of groundwater seepage or rainfall events and runoff. Incorrect dewatering may pose risks to nearby waterways where run-off travels from the site to these areas. Any dewatering activities would be undertaken in line with Transport for NSW's Water Discharge and Reuse Guideline (Transport for NSW, 2017f).

Operation phase

The Proposal is unlikely to substantially change the hydrology of the area surrounding the station. The existing stormwater system would continue to manage surface water around the station. The Proposal would result in an increase in hardstand areas due to the extension of footpaths, accessible parking spaces and the SSER. This increase has the potential to increase runoff, however the increase is considered to be negligible on flows around the station.

Further hydrological assessment would be undertaken during detailed design to ensure the Proposal would not be impacted by heavy rainfall events and would not worsen local flooding patterns.

6.9.3 Mitigation measures

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* (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.

Furthermore opportunities to improve water quality from stormwater runoff during operation, such as incorporating water sensitive urban design, would be investigated during detailed design.

Refer to Section 7.2 for a full list of proposed mitigation measures.

6.10 Air quality

6.10.1 Existing environment

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

DPIE undertakes air quality monitoring across NSW. The site is located within Illawarra monitoring region with air quality monitored at fixed sites. Kembla Grange is the closest monitoring site to the Proposal. A search of the daily regional air quality index for the Illawarra region on 30 March 2020 showed that the region experienced 'Very Good' air quality.

A search of the National Pollutant Inventory database 2018/19 data within the vicinity of Towradgi Station indicates that there are no nearby facilities that are monitored for air quality. The closest facility which has reported pollution is over two kilometres away and is Bellambi Sewage Treatment Plant (Department of Environment and Energy, 2019).

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

- users of the adjacent commercial and recreational areas
- local residents
- pedestrians and commuters within the local area.

6.10.2 Potential impacts

Construction phase

An increase in greenhouse gas emissions, primarily carbon dioxide, would be expected during construction of the Proposal. Much of this would be from embedded energy within materials, followed by plant/equipment use. The greatest opportunities for reducing greenhouse gas emissions associated with the Proposal are likely to be in the selection of materials.

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

Particulate emissions would be associated with a number of stationary and mobile sources as well as potential wind erosion of exposed soil.

Anticipated sources of dust and dust generating activities include:

- loading and transfer of materials from trucks
- stockpiling activities
- excavation and preparation of the lift pits, tree removal, drainage work and road work
- general construction work.

The Proposal would have a minimal impact on air quality as it would not involve extensive excavation or other land disturbance with the potential to generate significant quantities of dust. Appropriate measures would be established to manage dust emissions from demolition work.

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

The likely airborne dust load generated during a typical construction day would be small and therefore would be unlikely to result in reduced local air quality at the nearest potentially affected receptors, given the relatively small construction footprint, and with the implementation of proposed control measures.

Operation phase

The Proposal is not anticipated to significantly increase customer traffic to and from the station. However, over the long-term there is anticipated to be increase in patronage at Towradgi Station. Increase in patronage at the station is not anticipated to significantly impact air quality in the station area.

Overall impacts of air quality during the operation of the Proposal are considered minimal as the Proposal would not result in a significant change in land use.

6.10.3 Mitigation measures

Section 7.2 provides a list of mitigation measures that are proposed to manage air quality issues during construction. They are aimed around maintaining and operating plant and equipment efficiently and implementing measures for dust suppression including watering exposed soil surfaces, soil surfaces, covered loads and appropriate management of tracked dirt or mud on vehicles. Such measures would be included in the CEMP to be prepared for the Proposal.

6.11 Waste and resources

6.11.1 Potential impacts

Construction phase

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

- asphalt and concrete
- surplus building materials
- excavated spoil
- building materials wastes (including metals, timbers, plastics, packaging, fencing)
- electrical wiring and conduit waste (from electrical connections)
- hazardous chemical wastes
- green waste from vegetation removal
- demolition waste from existing bathrooms, station store and SSER
- general waste, including food scraps and other wastes generate by construction workers.

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

Waste management would be undertaken in accordance with the ISCA IS Rating Tool v1.2 would be developed for the Proposal and would include reuse and recycling.

Operation phase

The Proposal would not result in changes to operational waste management arrangements.

6.11.2 Mitigation measures

Refer to Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

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 ISCA 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 3.2.3 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 increase 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 change. The potential climate changes in the Illawarra region can be assessed in terms of weather changes, storm intensity, coastal inundation, heavy rainfall events and increased risk of fire.

A high-level climate risk assessment was undertaken for Towradgi Station (SMEC, 2018a), which identified the following key risks:

- extreme temperature events
- extreme rainfall events
- storms and strong winds
- bushfires.

The climate projections for the Illawarra region in 2030 include an increase maximum temperature of 0.7°Celsius, which is expected to rise to 1.9°Celsius by 2070. Projections also include an increase in number of hot days with a maximum temperature of over 35°C and increased annual rainfall (NARClIM). Measures to protect rail customers from heat exposure and stress including new shelters to provide shade have been incorporated into the Proposal

Although the station is not located on land identified as bushfire prone, bushfires that occur within, or bushfire warnings for, the Illawarra Escarpment area have the potential to cause delays, cancellations, and direct damage to assets.

Towradgi Station itself is not on flood prone land. Extreme rainfall events and floods have the potential to cause flooding or scouring of infrastructure, impacts to reliability of services, and/or reduced access and egress. Flooding of the South Coast Line would also impact services at Towradgi. Further hydrological assessment would be undertaken during detailed design to ensure the Proposal would not be impacted by flooding and would not worsen local flooding patterns.

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

- a hydrological assessment would be undertaken to ensure that the proposed infrastructure would not increase the potential flooding within the Proposal site
- selection of materials for durability in extreme conditions and that minimise heat retention
- incorporate fire resistant/retarding materials wherever practicable
- incorporate 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 the site.

The detailed design process would undertake a compliant carbon footprinting exercise in accordance with Transport for NSW's Carbon Estimate and Reporting Tool Manual (Transport

for NSW, 2017) or other approval modelling tools. The carbon footprint would be used to inform decision making in design and construction.

Due to the small scale of the Proposal and the short-term temporary nature of the individual construction work, it is considered that greenhouse gas emissions resulting from the construction would be kept to a minimum through the implementation of the standard mitigation measures detailed in Chapter 7.

It is anticipated that, once operational, the Proposal may result in an increase in use of Towradgi Station and a relative decrease in use of private motor vehicles by commuters to travel to and from Towradgi. 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 DPIE's Major Projects Register, Southern Joint Regional Planning Panel Development and Planning Register, and Wollongong City Council Development Application Register in April 2020 identified that no major development applications are listed in the vicinity of the Proposal for approval at this time.

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.

7.1 Environmental management plans

A CEMP for the construction phase of the Proposal would be prepared in accordance with the requirements of the Transport for NSW 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 but not be limited to the following key sub plans:

- Traffic Management Plan (TMP)
- Erosion and Sediment Control Plan
- Waste Management Plan.

The CEMP would also include at 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 in Table 14. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6 should the Proposal proceed.

Table 14 Proposed mitigation measures

No.	Mitigation measure
General	
1.	A Construction Environmental Management Plan (CEMP) would be prepared by the Construction Contractor in accordance with the relevant requirements of <i>Guideline for Preparation of Environmental Management Plans</i> , Department of Infrastructure, Planning and Natural Resources, 2004) 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 Construction 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 Construction Contractor in accordance with Transport for NSW's <i>Guide to Environmental Controls Map</i> (Transport for NSW, 2017b) 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.

No.	Mitigation measure
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.
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 transport	
8.	<p>Prior to the commencement of construction, a Construction Traffic Management Plan (CTMP) would be prepared as part of the CEMP and would include at a minimum:</p> <ul style="list-style-type: none"> • 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 and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made) • managing impacts and changes to on and off-street parking and requirements for any temporary replacement provision • parking locations for construction workers away from stations and busy residential areas and details of how this will be monitored for compliance • routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses and ensure safe practices • details for rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus operators. Particular provisions would also be considered for the accessibility impaired • measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the CTMP. <p>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.</p>
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 for temporary road closures would be obtained, where required.
11.	Swept path analysis would be undertaken to ensure that construction vehicles can safely manoeuvre within the site and access the locations of the crane pads and site compounds.
12.	If additional line marking and signage is required on Weber Crescent, consultation with Council would be undertaken during the detailed design phase.

No.	Mitigation measure
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Landscape and visual amenity	
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| 13. | <p>An Urban Design Plan is to be submitted to Transport for NSW and endorsed by Transport for NSW's Precincts and Urban Design team. The Urban Design Plan is to address the fundamental design principles as outlined in 'Around the Tracks' – urban design for heavy and light rail, Transport for NSW, Interim 2016. The Urban Design Plan shall:</p> <ul style="list-style-type: none">• Demonstrate a robust understanding of the site through a comprehensive site analysis to inform the design direction, demonstrate connectivity with street networks, transport modes, active transport options, and pedestrian distances• Identify opportunities and challenges• Establish site specific principles to guide and test design options• 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 Urban Design Plan is to include the Public Domain Plan for the chosen option and will provide analysis of the:• Landscape design approach including design of pedestrian and bicycle pathways, street furniture, interchange facilities, new planting and opportunities for public art• Materials Schedule including materials and finishes for proposed built works, colour schemes, paving and lighting types for public domain, fencing and landscaping• An Artist's Impression or Photomontage to communicate the proposed changes to the precinct <p>The following design guidelines are available to assist and inform the Urban Design Plan for the Proposal:</p> <ul style="list-style-type: none">• <i>TAP Urban Design Plan, Guidelines, Transport for NSW, Draft 2018</i>• <i>Commuter Car Parks, urban design guidelines, Transport for NSW, Interim 2017</i>• <i>Managing Heritage Issues in Rail Projects Guidelines, Transport for NSW, Interim 2016</i>• <i>Creativity Guidelines for Transport Systems, Transport for NSW, Interim 2016</i>• <i>Water Sensitive Urban Design Guidelines for Transport for NSW Projects, 2016</i> <p>Endorsement of the Urban Design Plan will demonstrate compliance with the Conditions of Approval in the REF Determination Report:</p> <p>The Urban Design Plan and Landscaping Plan shall be:</p> <ul style="list-style-type: none">• Prepared prior to concept design• Prepared in consultation with Local Council and relevant• Prepared by registered Architect and/or Landscape Architect. |
| 14. | <p>All permanent lighting would be designed and installed in accordance with the requirements of standards relevant to <i>AS 1158 Road Lighting</i> and <i>AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting</i>.</p> |
| 15. | <p>Worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.</p> |
| 16. | <p>Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.</p> |
| 17. | <p>During construction, graffiti would be removed in accordance with Transport for NSW's Standard Requirements.</p> |

No.	Mitigation measure
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| 18. | <p>The following would be considered during detailed design of the Proposal to improve the visual outcomes:</p> <ul style="list-style-type: none">• planting tall screening vegetation along the western boundary of the rail corridor in consultation with adjacent residential receivers• increased density of plant numbers and width of planting area south and east of the proposed SSER and select quick growing, native plant species with good screening characteristics• planting advanced size specimen plant species along Weber Crescent near the proposed car spaces to create a more attractive initial outcome for residents with close views of the Proposal site• planting quick growing tree species with good screening characteristics to replace vegetation removed along rail corridor where necessary• select colours for the proposed lift shafts and footbridge that respond to the background colour tones of the existing landscape to reduce the prominence of the new structures. |
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Noise and vibration

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| 19. | <p>Prior to commencement of work, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the <i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2009), <i>Construction Noise and Vibration Strategy</i> (Transport for NSW, 2019) and the Noise and Vibration Impact Assessment for the Proposal (Muller Acoustic Consulting, 2020). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.</p> |
| 20. | <p>The CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which would be considered, include:</p> <ul style="list-style-type: none">• 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 loud talking; 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. |
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No.	Mitigation measure
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| 21. | <p>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:</p> <ul style="list-style-type: none">• 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. |
| 22. | <p>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 and the community is notified prior to these works commencing. An Out of Hours Work application form would need to be prepared by the Construction Contractor and submitted to the Transport for NSW Environment and Planning Manager for any works outside normal hours.</p> |
| 23. | <p>Where the $L_{Aeq}(15\text{minute})$ construction noise levels are predicted to exceed 75 dBA and/or 30 dBA above the Rating Background Level at nearby affected sensitive receivers, respite periods would be observed, where practicable, and in accordance with Transport for NSW's <i>Construction Noise and Vibration Strategy</i> (Transport for NSW, 2019). This would include restricting the hours that very noisy activities can occur.</p> |
| 24. | <p>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.</p> |
| 25. | <p>Vibration (other than from blasting) resulting from construction and received at any structure outside of the Project would be limited to:</p> <ol style="list-style-type: none">a) for structural damage vibration –British Standard BS 7385-2:1993 <i>Evaluation and measurement for vibration in buildings Part 2</i>b) for human exposure to vibration – the acceptable vibration values set out in the <i>Environmental Noise Management Assessing Vibration: A Technical Guideline</i> (Department of Environment and Conservation, 2006) which includes British Standard BS 6472-2:1992 <i>Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)</i>. |
| 26. | <p>Property condition surveys would be completed prior to piling, excavation of bulk fill or any vibratory works including jack hammering and compaction for all buildings/structures/roads with a plan distance of 20 metres from the works and all sensitive structures within 50 metres of the works (unless otherwise determined following additional assessment they are not likely to be adversely affected). Vibration monitoring would be undertaken to confirm the minimum working distances at specific sites.</p> |

No.	Mitigation measure
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Aboriginal heritage

27. If unforeseen Aboriginal objects are uncovered during construction, the procedures contained in Transport for NSW's *Unexpected Heritage Finds Guideline* (Transport for NSW, 2016a) would be followed, and works within the vicinity of the find would cease immediately. The Construction Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager so they can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, the OEH and the Local Aboriginal Land Council. If human remains are found, work would cease, the site secured and the NSW Police and the OEH notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to works recommencing at the location.

Non-Aboriginal heritage

28. 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* (Transport for NSW, 2016a) would be followed, and works within the vicinity of the find would cease immediately. The Construction Contractor would immediately notify the Transport for NSW Project Manager and the Transport for NSW Environment and Planning Manager 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 works recommencing at the location.

Biodiversity

29. Construction of the Proposal must be undertaken in accordance with Transport for NSW's *Vegetation Management (Protection and Removal) Guideline* (Transport for NSW, 2018b) and Transport for NSW's *Fauna Management Guideline* (Transport for NSW, 2018c).
30. 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.
31. Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Site compounds and laydown areas would be located to avoid impacts on tree protection zones. The site compound proposed to the north of Weber Crescent would be placed to avoid impact to the TPZ of tree 37 to ensure it is not removed.
32. Trees/vegetation nominated to be removed in the Towradgi Station Arboricultural Impact Assessment (Eco Logical, 2020) would be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal. Trees to be retained would be protected through temporary protection measures discussed below.
33. Tree Protection Zones (TPZs) would be established around trees to be retained, as nominated in the Arboricultural Impact Assessment (Eco Logical, 2020). Tree protection would be undertaken in line with *AS 4970-2009 Protection of Trees on Development Sites* and would include exclusion fencing of TPZs.
34. In the event of any tree to be retained becoming damaged during construction, the Construction Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.

No.	Mitigation measure
35.	Should the detailed design or onsite works determine the need to remove or trim any additional trees, which have not been identified in the REF, the Construction Contractor would be required to complete Transport for NSW's Tree Removal Application Form and submit it to Transport for NSW for approval.
36.	Weed control measures, consistent with Transport for NSW's <i>Weed Management and Disposal Guideline</i> (Transport for NSW, 2015), 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 <i>Biosecurity Act 2015</i> .
37.	A project arborist would supervise works within TPZs and provide advice regarding tree protection and monitor compliance.
38.	Final inspection of trees would be undertaken by the project arborist after all major construction has ceased and following the removal of tree protection measures.
39.	Offset for tree removal and landscaping would be undertaken in accordance with Transport for NSW's <i>Vegetation Offset Guide</i> (Transport for NSW, 2019a) and in consultation with the relevant council, and/or the owner of the land upon which the vegetation is to be planted.
Socio-economic	
40.	Sustainability criteria for the Proposal would be established to encourage the Construction Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.
41.	Feedback through the submissions process would be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where practicable.
42.	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.
43.	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.
44.	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.
Soils and water	
45.	Prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the <i>'Blue Book' Managing Urban Stormwater: Soils and Construction</i> (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.
46.	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 works are complete and areas are stabilised.

No.	Mitigation measure
47.	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.
48.	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 <i>Chemical Storage and Spill Response Guidelines</i> (Transport for NSW, 2018d).
49.	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 <i>Chemical Storage and Spill Response Guidelines</i> (Transport for NSW, 2018d) 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.
50.	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 Planning Manager. The EPA would be notified by Transport for NSW if required, in accordance with Part 5.7 of the POEO Act.
51.	The existing drainage systems would remain operational throughout the construction phase.
52.	Should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the <i>Waste Classification Guidelines</i> (EPA, 2014) and Transport for NSW's <i>Water Discharge and Reuse Guideline</i> (Transport for NSW, 2017c).
53.	Opportunities to improve water quality from stormwater runoff during operation, such as incorporating water sensitive urban design, would be investigated during detailed design.
Air quality	
54.	Air quality management and monitoring for the Proposal would be undertaken in accordance with Transport for NSW's <i>Air Quality Management Guideline</i> (Transport for NSW, 2018e).
55.	Methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks.
56.	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.
57.	Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.
58.	<p>To minimise the generation of dust from construction activities, the following measures would be implemented:</p> <ul style="list-style-type: none"> • 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
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Waste and contamination

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| 59. | <p>A Waste Management Plan is to be prepared as part of the CEMP to address waste management and would at a minimum:</p> <ul style="list-style-type: none">• identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities• detail other onsite management practices such as keeping areas free of rubbish• specify controls and containment procedures for hazardous waste and asbestos waste• outline the reporting regime for collating construction waste data. |
| 60. | <p>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.</p> |
| 61. | <p>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.</p> |
| 62. | <p>All spoil and waste must be classified in accordance with the <i>Waste Classification Guidelines Part 1: Classifying waste</i> (EPA, 2014) prior to disposal.</p> |
| 63. | <p>Any concrete washout would be established and maintained in accordance with Transport for NSW's <i>Concrete Washout Guideline</i> – (Transport for NSW, 2018f) with details included in the CEMP and location marked on the ECM.</p> |

Sustainability, climate change and greenhouse gases

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| 64. | <p>Detailed design and construction of the Proposal is to be undertaken in accordance with the ISCA Infrastructure Sustainability Rating Scheme (v1.2)</p> |
| 65. | <p>The detailed design process would undertake a compliant carbon footprinting exercise in accordance with Transport for NSW's Carbon Estimate and Reporting Tool Manual (Transport for NSW, 2017) or other approved modelling tools. The carbon footprint would to be used to inform decision making in design and construction.</p> |

Cumulative

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| 66. | <p>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.</p> |
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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:

- improved accessibility for station customers and pedestrians, including people with a disability, less mobile and those with prams or luggage through the construction of two new lifts and a footbridge
- improved customer amenity and facilities, including a family accessible toilet
- upgraded interchange facilities including a kiss and ride zone, accessible parking spaces and footpaths connecting the station with surrounding streets
- improved access through improved paths to meet DDA requirements
- improved safety for customers on the station platform, including upgrade of station systems including CCTV, emergency help points.

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

- temporary visual, noise and vibration impacts during construction
- temporary traffic and pedestrian impacts during construction
- loss of trees which would be offset in accordance with the Vegetation Offset Guide (Transport for NSW, 2019a)
- introduction of new visual elements such as lifts and a footbridge to the environment.

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

The Proposal has also taken into account the principles of ESD and sustainability (refer to Section 4.3 and Section 6.12). These would be considered further 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 Agriculture, Water and the Environment.

Matters of NES	Impacts
<p>Any impact on a World Heritage property? There are no World Heritage properties within 1 kilometre of the Proposal.</p>	Nil
<p>Any impact on a National Heritage place? There are no National Heritage places within 1km of the Proposal</p>	Nil
<p>Any impact on a wetland of international importance? There are no wetlands of international importance within 1km of the Proposal.</p>	Nil
<p>Any impact on a listed threatened species or communities? It is unlikely that the development of the Proposal would significantly affect listed threatened species or communities (see section 6.4)</p>	Nil
<p>Any impacts on listed migratory species? It is unlikely that the development of the Proposal would significantly affect any listed migratory species.</p>	Nil
<p>Does the Proposal involve a nuclear action (including uranium mining)? The Proposal does not involve a nuclear action.</p>	Nil
<p>Any impact on a Commonwealth marine area? There are no Commonwealth marine areas in the vicinity of the Proposal.</p>	Nil
<p>Does the Proposal involve development of coal seam gas and/or large coal mine that has the potential to impact on water resources? The Proposal is for a transport facility and does not relate to coal seam gas or mining.</p>	Nil
<p>Additionally, any impact (direct or indirect) on Commonwealth land? The Proposal would not be undertaken on or near any Commonwealth land.</p>	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
<p>(a) Any environmental impact on a community?</p> <p>There would be some temporary impacts to the community during construction, particularly in relation to noise, traffic, access and visual amenity. Mitigation measures outlined in Section 6.7 would be implemented to manage and minimise adverse impacts.</p>	Minor
<p>(b) Any transformation of a locality?</p> <p>The Proposal would include the introduction of new visible elements in the landscape including a new footbridge, stairs, lift shafts and footpaths. The appearance of the new elements would be consistent with the existing station elements and are considered to be common features in urban areas.</p>	Minor
<p>(c) Any environmental impact on the ecosystem of the locality?</p> <p>The removal of six trees from the western side of the station and two tree from the eastern side of the station, along with a small number of shrubs would have a minor impact on native flora and fauna within the locality</p>	Minor
<p>(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</p> <p>During construction, temporary impacts would include noise, traffic, access and visual amenity.</p> <p>Operational impacts on the locality would either be negligible or would not impact on identified sensitive receivers. Operational visual impacts range from moderate to low.</p>	Minor
<p>(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?</p> <p>The Proposal creates equitable access to the station and the station platforms, having a positive contribution to the locality.</p> <p>The Proposal is not anticipated to have any adverse archaeological, architectural, cultural or social impacts on the locality .</p>	Negligible
<p>(f) Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?</p> <p>The Proposal would not have any impact on habitat of protected fauna.</p>	Nil
<p>(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</p> <p>The Proposal is unlikely to have any impact on endangering species of animal, plant or other form of like, whether living on land, in water or in air.</p>	Nil
<p>(h) Any long-term effects on the environment?</p> <p>The Proposal is unlikely to have any long-term effects on the environment.</p>	Nil

Factor	Impacts
<p>(i) Any degradation of the quality of the environment? The Proposal is unlikely to have any long-term effects on the environment.</p>	Nil
<p>(j) Any risk to the safety of the environment? Provided the recommended mitigation measures are implemented, the Proposal is unlikely to cause any pollution or safety risks to the environment. Specific management measures would be implemented to manage asbestos and other hazardous materials that may be encountered during construction.</p>	Minor
<p>(k) Any reduction in the range of beneficial uses of the environment? The Proposal is unlikely to have any reductions in the range of beneficial uses of the environment.</p>	Nil
<p>(l) Any pollution of the environment? The Proposal is unlikely to cause any pollution of the environment provided the recommended mitigation measures are implemented as outlined Chapter 7.</p>	Nil
<p>(m) Any environmental problems associated with the disposal of waste? The Proposal is unlikely to cause any environmental problems associated with the disposal of waste. Hazardous waste and special waste may be generated from the Proposal. Prior to construction, contamination investigations would be undertaken to confirm the presence of contaminated material, particularly asbestos. All waste would be managed and disposed of with a site-specific Waste Management Plan. Mitigation measures would be implemented to ensure waste is reduced, reused or recycled where practicable.</p>	Minor
<p>(n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? The Proposal is unlikely to increase demands on resources that are, or are likely to become, in short supply.</p>	Nil
<p>(o) Any cumulative environmental effect with other existing or likely future activities? Cumulative effects of the Proposal are described in Section 6.16. Where feasible, project activities and environmental management measures would be co-ordinated to reduce any cumulative construction impacts. The Proposal is unlikely to have any significant adverse long-term impacts.</p>	Nil
<p>(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? The Proposal is unlikely to impact on coastal processes and coastal hazards, including those under projected climate change conditions.</p>	Nil