



Como Station Upgrade Review of Environmental Factors

**Transport Access Program
Ref – 6236519**

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Abbreviations

Term	Meaning
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
APS	Access to Premises (Disability Standards)
ARI	Average Recurrence Interval
ASA	Asset Standards Authority (refer to Definitions)
ASS	Acid Sulfate Soils
BCA	Building Code of Australia
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
CBD	Central Business District
CCTV	Closed Circuit TV
CEMP	Construction Environmental Management Plan
CLM Act	<i>Contaminated Land Management Act 1997 (NSW)</i>
CNVMP	Construction Noise and Vibration Management Plan
CNVS	Construction Noise and Vibration Strategy
CPTED	Crime Prevention Through Environmental Design
DBH	Diameter at Breast Height
DBYD	Dial Before You Dig
D&C	Design & Construct
DDA	<i>Disability Discrimination Act 1992 (Cwlth)</i>
DoEE	Department of the Environment and Energy (Cwlth)
DP&E	NSW Department of Planning and Environment
DSAPT	<i>Disability Standards for Accessible Public Transport 2002</i>
DSI	Detailed Site Investigation (Phase II Contamination Investigation)
ECM	Environmental Controls Map
EMS	Environmental Management System
EPA	Environment Protection Authority

Term	Meaning
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>
EPI	Environmental Planning Instrument
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development (refer to Definitions)
ETS	Electronic Ticketing System
FM Act	<i>Fisheries Management Act 1994 (NSW)</i>
Heritage Act	<i>Heritage Act 1977 (NSW)</i>
HV	High Voltage
ICNG	<i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2000).
Infrastructure SEPP	<i>State Environmental Planning Policy (Infrastructure) 2007 (NSW)</i>
LCT	Landscape Character Type
LEP	Local Environmental Plan
LGA	Local Government Area
LoS	Level of Service
LV	Low Voltage
LVIA	Landscape and Visual Impact Assessment
NES	National Environmental Significance
Noxious Weeds Act	<i>Noxious Weeds Act 1993 (NSW)</i>
NPI	<i>Noise Policy for Industry</i> (EPA, 2017)
NPW Act	<i>National Parks and Wildlife Act 1974 (NSW)</i>
NSW	New South Wales
NVIA	Noise and Vibration Impact Assessment
OEH	NSW Office of the Environment and Heritage
OHWS	Overhead Wire Structure
OOHW	Out of hours works
PA system	Public Address system

Term	Meaning
PDP	Public Domain Plan
POEO Act	<i>Protection of the Environment Operations Act 1997 (NSW)</i>
RailCorp	(former) Rail Corporation of NSW
RAP	Remediation Action Plan
RBL	Rating Background Level
REF	Review of Environmental Factors (this document)
RNP	<i>Road Noise Policy (DECCW, 2011)</i>
Roads Act	<i>Roads Act 1993 (NSW)</i>
Roads and Maritime	NSW Roads and Maritime Services (formerly Roads and Traffic Authority)
SEPP	State Environmental Planning Policy
SHR	State Heritage Register
SoHI	Statement of Heritage Impact
TCP	Traffic Control Plan
TfNSW	Transport for NSW
TGSI	Tactile Ground Surface Indicators ('tactiles')
TMP	Traffic Management Plan
TPZ	Tree Protection Zone
TVM	Ticket Vending Machine
UDP	Urban Design Plan
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001 (NSW)</i>

Definitions

Term	Meaning
Average Recurrence Interval	The likelihood of occurrence, expressed in terms of the long-term average number of years, between flood events as large as or larger than the design flood event. For example, floods with a discharge as large as or larger than the 100-year ARI flood will occur on average once every 100-years.
Asset Standards Authority	The ASA is an independent body within TfNSW, responsible for engineering governance, assurance of design safety, and ensuring the integrity of transport and infrastructure assets. Design Authority functions formerly performed by RailCorp are now exercised by ASA.
Concept design	The concept design is the preliminary design presented in this REF, which would be refined by the Contractor (should the Proposal proceed) to a design suitable for construction (subject to TfNSW acceptance).
Design and Construct Contract	A method to deliver a project in which the design and construction services are contracted by a single entity known as the Contractor. The Contractor completes the project by refining the concept design presented in the REF and completing the detailed design so that it is suitable for construction (subject to TfNSW acceptance). The Contractor is therefore responsible for all work on the project, both design and construction.
Detailed design	Detailed design broadly refers to the process that the Contractor undertakes (should the Proposal proceed) to refine the concept design to a design suitable for construction (subject to TfNSW acceptance).
Disability Standards for Accessible Public Transport	The Commonwealth <i>Disability Standards for Accessible Public Transport 2002</i> ('Transport Standards') (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 Transport Standards cover premises, infrastructure and conveyances, and apply to public transport operators and premises providers.
Ecologically Sustainable Development	As defined by clause 7(4) Schedule 2 of the EP&A Regulation. Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends are maintained, and the total quality of life, now and in the future, can be increased.
Feasible	A work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements.
Interchange	Transport interchange refers to the area/s where passengers transit between vehicles or between transport modes. It includes the pedestrian pathways and cycle facilities in and around an interchange.
Noise sensitive receiver	In addition to residential dwellings, noise sensitive receivers include, but are not limited to, hotels, entertainment venues, pre-schools and day care facilities, educational institutions (e.g. schools, TAFE colleges), health care facilities (e.g. nursing homes, hospitals), recording studios and places of worship/religious facilities (e.g. churches).

Term	Meaning
NSW Trains	From 1 July 2013, NSW Trains became the new rail provider of services for regional rail customers.
Opal card	The integrated ticketing smartcard being introduced by TfNSW.
Out of hours works	Defined as works <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 - in this instance, TfNSW.
Rail possession	Possession is the term used by railway building/maintenance contractors to indicate that they have taken possession of the track (usually a block of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.
Reasonable	Selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure.
Sensitive receivers	Land uses which are sensitive to potential noise, air and visual impacts, such as residential dwellings, schools and hospitals.
Sydney Trains	From 1 July 2013, Sydney Trains replaced CityRail as the provider of metropolitan train services for Sydney.
Tactiles	Tactile tiles or Tactile Ground Surface Indicators (TGSIs) are textured ground surface indicators to assist pedestrians who are blind or visually impaired. They are found on many footpaths, stairs and train station platforms.
The Proposal	The construction and operation of the Como Station Upgrade.
Vegetation Offset Guide	The TfNSW guide that applies where there is vegetation clearing proposed, and where the impact of the proposed clearing is not deemed 'significant' for the purposes of section 5.5 of the EP&A Act. 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.

Executive summary

Overview

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

As part of this program, the Como Station Upgrade (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 aim to provide:

- a new lift and stairs at the commuter car park off Como Parade to connect to the existing underpass
- new lift from the underpass to provide access to the station platform
- relocation of three accessible spaces in the Como Parade car park
- new accessible pathways throughout the station precinct, especially along Railway Road
- formalisation of the kiss and ride area on Railway Road
- improved amenities such as a new ambulant toilet and family accessible toilet.

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

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 late 2019 and take around 15 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 below.

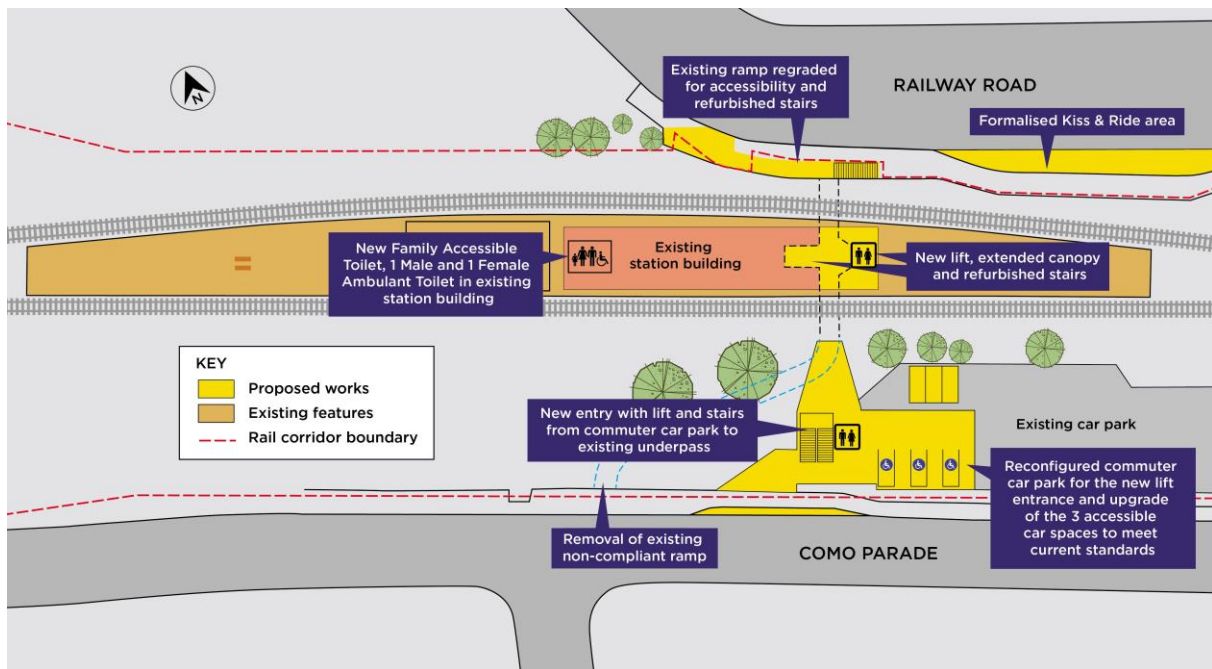


Figure 1 Proposed Como Station Upgrade (subject to change during detailed design)

Need for the Proposal

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

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

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

Community and stakeholder consultation

Community consultation activities for the Proposal would be undertaken in the lead up to and during the public display period of this REF and the community invited to submit feedback to assist TfNSW understand what is important to customers and the community. Further information about these specific activities is included in Section 4.5 of this REF.

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

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

Should the Proposal proceed to construction, the community would be kept informed throughout the duration of the construction period. Figure 2 shows the planning approval and consultation process for the Proposal.

Feedback can be sent to:

- projects@transport.nsw.gov.au
- Transport Access Program– Como
Transport for NSW
Locked Bag 6501
St Leonards NSW 2065

Or submitted:

- In person at a project community information session
- TfNSW website:

www.transport.nsw.gov.au/projects/current-projects/como-station-upgrade

Via NSW Government Have Your Say www.nsw.gov.au/improving-nsw/have-your-say/

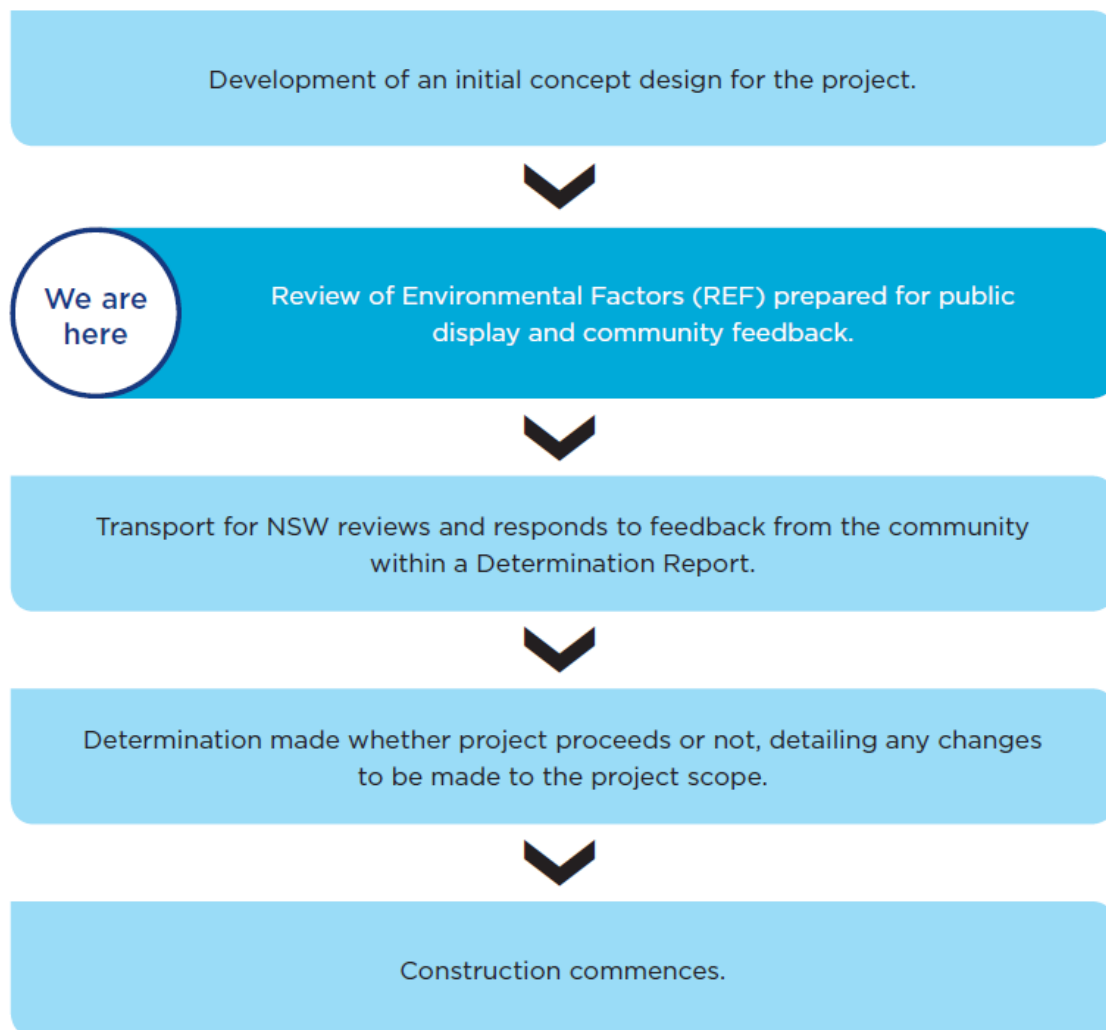


Figure 2 Planning approval and consultation process for the Proposal

Environmental impact assessment

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

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

- temporary noise and vibration impacts during construction
- temporary traffic impacts during construction
- temporary disruptions to station facilities and amenities during construction
- removal of vegetation and subsequent planting offsets
- visual impacts to sensitive receivers during operation including the introduction of new elements, such as lift shafts, into the visual environment.
- longer term benefits of the Proposal include improved accessibility to the station and improved station facilities.

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

Conclusion

This REF has been prepared having regard to sections 5.5 and 5.7 of the EP&A Act, and clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), to ensure that TfNSW takes into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

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 Photomontage of the Proposal (subject to detailed design)

1 Introduction

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

1.1 Overview of the Proposal

1.1.1 The need for the Proposal

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

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

Como Station has been identified for an accessibility upgrade as it does not currently meet key requirements of the *Disability Standards for Accessible Public Transport* (DSAPT) or the Commonwealth *Disability Discrimination Act 1992* (DDA).

The non-compliant access points, ramps and stairs to the Como Station underpass and platforms do not facilitate access for people with reduced mobility, parents/carers with prams or customers with luggage. There are no lift facilities and inadequate tactile surfacing to stairs, platforms and interchange facilities.

The Proposal would provide safe and equitable access to the platforms and to the pedestrian network surrounding the station. Customer facilities and amenity would also be improved. The improvements would provide an improved customer experience for existing and future users of the station.

The expected increase in patronage has been taken into consideration during the design development.

1.1.2 Key features of the Proposal

The key features of the Proposal are summarised as follows:

- incorporate a new paved area that connects a new lift lobby with the underpass on Como Parade
- installation of a new lift and stairs at the-commuter car park off Como Parade to connect to the existing underpass
- removal of the existing non-compliant pedestrian ramp off Como Parade and rehabilitation of the area
- installation of a new lift from the pedestrian underpass to the station platform
- relocation of the existing non-compliant DDA parking spaces within the commuter car park close to the new lift, with construction of the relocated spaces compliant to current standards
- extension of the existing access ramp on eastern side of the station (Railway Road) to provide DDA compliant pedestrian route to the underpass

- new handrails, installation of tactile ground surface indicators (TGSIs) and nosing to the existing stairs
- removal of vegetation and trees as minimally required to accommodate new infrastructure
- modification of the existing station building layout to allow for new amenities
- installation of a canopy on the platform between the station building and new lift structure
- housing of the digital communications equipment in a compliant enclosure within the existing station building
- upgrading of the existing toilets to accommodate one unisex Family Accessible toilet and Ambulant male & female toilets
- ancillary works including adjustments to lighting, Opal card readers, handrails, low voltage electrical upgrades, minor drainage works, landscaping, improvements to station communications systems including closed circuit TV (CCTV) cameras, hearing loops, wayfinding signage, emergency help points and installation of tactile ground surface indicators (TGSIs).

Subject to planning approval, construction is expected to commence in late 2019 and take around 15 months to complete.

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

1.2 Location of the Proposal

The Proposal is located in the suburb of Como in the Sutherland Shire Local Government Area (LGA) about 20 kilometres south-west of the Sydney Central Business District (CBD). The location of the Proposal in the regional context is shown in Figure 4.

Como Station is located in an area which is generally characterised by low and medium density residential uses. Three educational establishments (Como Public School, Como Pre-School Kindergarten and Como School of Arts (used as a community centre)) lie to the north-east of the station. Carina Bay is located further to the north-east and flows into Georges River.

Como Station is serviced by the T4 Eastern Suburbs and Illawarra Line. Platform 1 provides services northbound to Bondi Junction and Platform 2 provides services southbound to Cronulla and Waterfall.

The Proposal includes upgrades to Como Station on land owned by RailCorp and managed by Sydney Trains within the station precinct and commuter car park, with some works also proposed along the footpaths that are under control of Sutherland Shire Council.



Data Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community, 2015, 2012, 2011, 2010, 2009, 2008, 2007, 2006, 2005, 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995, 1994, 1993, 1992, 1991, 1990, 1989, 1988, 1987, 1986, 1985, 1984, 1983, 1982, 1981, 1980, 1979, 1978, 1977, 1976, 1975, 1974, 1973, 1972, 1971, 1970, 1969, 1968, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1959, 1958, 1957, 1956, 1955, 1954, 1953, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1943, 1942, 1941, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1922, 1921, 1920, 1919, 1918, 1917, 1916, 1915, 1914, 1913, 1912, 1911, 1910, 1909, 1908, 1907, 1906, 1905, 1904, 1903, 1902, 1901, 1900, 1899, 1898, 1897, 1896, 1895, 1894, 1893, 1892, 1891, 1890, 1889, 1888, 1887, 1886, 1885, 1884, 1883, 1882, 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Figure 4: Regional context

1.3 Existing infrastructure and land uses

Platforms

Como Station consists of an island platform with the westbound side of the station (Platform 1) providing services to Bondi Junction and the eastbound side (Platform 2) providing services to Cronulla and Waterfall.

The platforms are accessed via a pedestrian underpass located at the southern end of the platforms.

The station building is located in the centre of the platform and contains:

- a ticketing office and ticketing machines
- communications rooms
- a staff area including office, toilet and store room
- waiting areas
- male and female toilets.

The island platform contains a canopy to the north of the station building to provide weather protection (refer Figure 5).



Figure 5 Como Station platform looking south, showing Platform 1 and Platform 2

Station entrances

Station entrances are located on both sides of the station. The western entrance is via Como Parade (as described below and shown in Figure 6). The eastern entrance is accessed via a ramp and stairs off Railway Road.



Figure 6 Como Station eastern pedestrian access point looking south from Railway Road

Underpass

This underpass is located at the southern end of the platform. The underpass is connected to the platform via stairs and Opal card readers are located within the underpass next to the stairs (Figure 7). To the east of the station, the underpass connects to Railway Road via stairs and a ramp. To the west, the underpass is accessed from Como Parade via a steep pathway.



Figure 7 Como Station looking east, showing the underpass and Opal card readers

Intermodal facilities

The following intermodal facilities are located at Como Station:

- an informal drop off facilities located on both sides of the station at Railway Road to the east and Como Parade to the west
- a commuter car park at Como Parade
- a secure bike locker located within the commuter carpark at Como Parade.

Car parking

The commuter car park (Figure 8) is located on the western side of the station and can be accessed from Como Parade. It provides approximately 60 car parking spaces, three accessible parking spaces, one motorbike parking space and a secure bicycle locker. Untimed on-street parking on surrounding streets is also available on the western and eastern side of the station.



Figure 8 Como Station commuter car park, showing the three non-compliant accessible parking spaces and the motorbike parking space

1.3.1 Existing land uses

Land directly surrounding the station is occupied by low density residential houses. Low density residential dwellings along Novara Crescent back onto the railway line and dwellings to the west of the railway line are located on the opposite side of Como Parade to the station. A community hall and pre-school (Como Pre-School Kindergarten) are located about 100 metres to the north of the railway station. Como Public School is located on Tivoli Esplanade about 230 metres north east of the station and Como West Public School is located on Wolger Street about 600 metres west of the station. There are no commercial properties located within 200 metres of Como Station. Carina Bay Reserve and Carina Bay are about 200 metres east of Como Station. The key features of the study area are shown in Figure 9.



Figure 9 Key features of the study area

1.4 Purpose of this Review of Environmental Factors

This REF has been prepared by TfNSW to assess the potential impacts of the Como Station Upgrade. For the purposes of these works, TfNSW 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 *Environment Planning and Assessment Regulation 2000* (the EP&A Regulation).

This assessment has also considered the relevant provisions of other relevant environmental legislation, including the *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 Environment for any necessary approvals under the EPBC Act. Refer to Chapter 4 for more information on statutory considerations.

2 Need for the Proposal

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

2.1 Strategic justification

2.1.1 Overview

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

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

In September 2015, the NSW Government announced a series of State Priorities as part of *NSW: Making It Happen* (NSW Government, 2015). The State Priorities are 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: Making it Happen* focuses on 12 key 'priorities' to achieve the NSW Government's commitments. These priorities range across a number of issues including infrastructure, the environment, education, health, wellbeing and safety in addition to Government services.

One of the 12 priorities identified as part of *NSW: Making It Happen* relates to investment in building infrastructure. The ongoing development and investment in transport infrastructure is identified as part of the wider building infrastructure priority.

The Proposal assists in meeting the priority by improving accessibility to public transport and encouraging greater use of public transport.

TfNSW has also developed a *Future Transport Strategy 2056* (TfNSW, 2018a), an overarching strategy, supported by a suite of plans, for transport in NSW to the year 2056. *Future Transport 2056* ensures that NSW is prepared for rapid changes in technology and innovation to create and maintain a world class, safe, efficient and reliable transport system over the next 40 years.

The Proposal includes provision to accommodate the forecast Sydney Trains patronage growth (an increase of 15 per cent to 2036) and changing travel patterns.

The *Disability Action Plan 2018-2022* (TfNSW, 2017a) was developed by TfNSW, in consultation with the Accessible Transport Advisory Committee, which is made up of representatives from peak disability and ageing organisations within NSW. The Proposal has been developed in consideration of the objectives outlined in this Plan.

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

2.1.2 Objectives of the Transport Access Program

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

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

2.1.3 Objectives of the Proposal

The specific objectives of the Como Station Upgrade are to:

- provide a station that is accessible to those with a disability, are less mobile, parents/carers with prams and customers with luggage
- improve customer experience (weather protection, better interchange facilities and visual appearance)
- minimise pedestrian conflict and crowding points
- improve integration with surrounding precinct
- improve customer safety
- improve wayfinding in and around the station
- improve customer amenity
- signage improvements so customers can more easily use public transport and transfer between modes at interchanges.

2.2 Design development

The need for an upgrade was identified as the existing station layout does not meet the requirements of the *Commonwealth Disability Discrimination Act 1992* (DDA) or the *Disability Standards for Accessible Public Transport* (DSAPT). It does not allow for equitable access to the station platforms. The following issues were identified:

- access to the pedestrian entrances from Como Parade and Railway Road is via an underpass and stairs to an island platform. The existing ramps leading into the underpass on both sides of the station are not compliant with accessibility and building standards
- there is no existing accessible access (via lifts) to the platforms, sanitary facilities and waiting rooms on Platform 1 and 2
- the existing lighting is not compliant with existing standards
- Platform 1 does not meet all circulation and cross fall gradient requirements

- safety zone markings are non-compliant, and a proportion of the tactile indicators require replacement
- some of the non slip nosing on the stairways may not be compliant
- the handrails on stairways are not compliant with required standing for height, overruns and downturns at landings
- the station does not have family accessible toilet facilities
- stairways and ramps have tactile indicators; however tactiles to the platform landing of the platform stairway are not compliant as they do not extend across the full width of the path of travel/stairway
- the station does not have hearing augmentation
- the public telephone on Platform 1 is non-compliant
- the emergency help point at Platform 2 is obstructed by an existing service.

A Scoping Design Report was prepared in 2018 (Aurecon, 2018), consistent with the primary objectives of the Transport Access Program.

The detailed design of the project would be developed to confirm current deficiencies of the Como Station and opportunities for improving accessibility and customer experience with respect to the DDA Act or DSAPT requirements would be further explored.

2.3 Alternative options considered

2.3.1 The ‘do-nothing’ option

Under a ‘do-nothing’ option, existing access to the platform would remain non-compliant with DDA and DSAPT and there would be no changes to the way the station currently operates.

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

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

2.3.2 Identified options

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

- Option 1: the extension of the existing paved area to accommodate a new lift up to the car park level on the Como Parade side and construction of a new lift from the platform down to the underpass
- Option 2: the construction of a new overhead footbridge from the commuter car park on Como Parade to the platform. Two lifts would be provided, with the first providing access from the car park to the overhead footbridge, and the second between the footbridge, platform and underpass.

2.3.3 Assessment of identified options

The two options were assessed with consideration of factors such as customer experience, accessibility, engineering constraints, modal integration and cost.

Stakeholders including representatives from TfNSW and Sydney Trains were consulted regarding the various options in order to determine the final configurations.

All 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). Differences between the options included impacts to the local community during construction and operation and security concerns.

Option 1 was identified as the preferred option as it would make use of the existing station entry point. From a customer experience perspective, Option 1 provides the same entry point for all users requiring lift access. Option 1 would have minimal visual impact and would make use of the existing underpass. However, this option would likely require removal of additional vegetation compared to Option 2.

Option 2 would likely result in a lesser impact to existing vegetation immediately adjacent to the station. However the proposed footbridge would result in additional maintenance during operation, reduce the number of available spaces in the commuter car park and have greater visual impact. There would also be two separate entrances for the lift and stairs which would reduce ease of access and customer safety.

Additionally, Option 1 would result in the loss of less car parking spaces than Option 2 with the implementation of new infrastructure. Option 2 would result in temporary closure of the car park during construction.

2.4 Justification for the preferred option

As outlined in Section 2.3.3, Option 1 was confirmed as the preferred option as it provides the required accessibility requirements, has minimal visual impacts, and limited impact on the current facilities at Como Station.

3 Description of the Proposal

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

3.1 The Proposal

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

The Proposal would include the following key elements:

- incorporate a new paved area that connects a new lift lobby with the underpass on Como Parade
- installation of a new lift and stairs at the-commuter car park off Como Parade to connect to the existing underpass
- removal of the existing non-compliant pedestrian ramp off Como Parade and rehabilitation of the area
- installation of a new lift from the pedestrian underpass to the station platform
- relocation of the existing non-compliant DDA parking spaces within the commuter car park close to the new lift, with construction of the relocated spaces compliant to current standards
- extension of the existing access ramp on eastern side of the station (Railway Road) to provide DDA compliant pedestrian route to the underpass
- new handrails, installation of tactile ground surface indicators (TGSIs) and nosing to the existing stairs
- removal of vegetation and trees as minimally required to accommodate new infrastructure
- modification of the existing station building layout to allow for new amenities
- installation of a canopy on the platform between the station building and new lift structure
- housing of the digital communications equipment in a compliant enclosure within the existing station building
- upgrading of the existing toilets to accommodate one unisex Family Accessible toilet and Ambulant male & female toilets
- ancillary works including adjustments to lighting, Opal card readers, handrails, low voltage electrical upgrades, minor drainage works, landscaping, improvements to station communications systems including closed circuit TV (CCTV) cameras, hearing loops, wayfinding signage, emergency help points and installation of tactile ground surface indicators (TGSIs).

Subject to planning approval, construction is expected to commence in late 2019 and take around 15 months to complete.

Figure 10 shows the general layout of key elements for the Proposal.

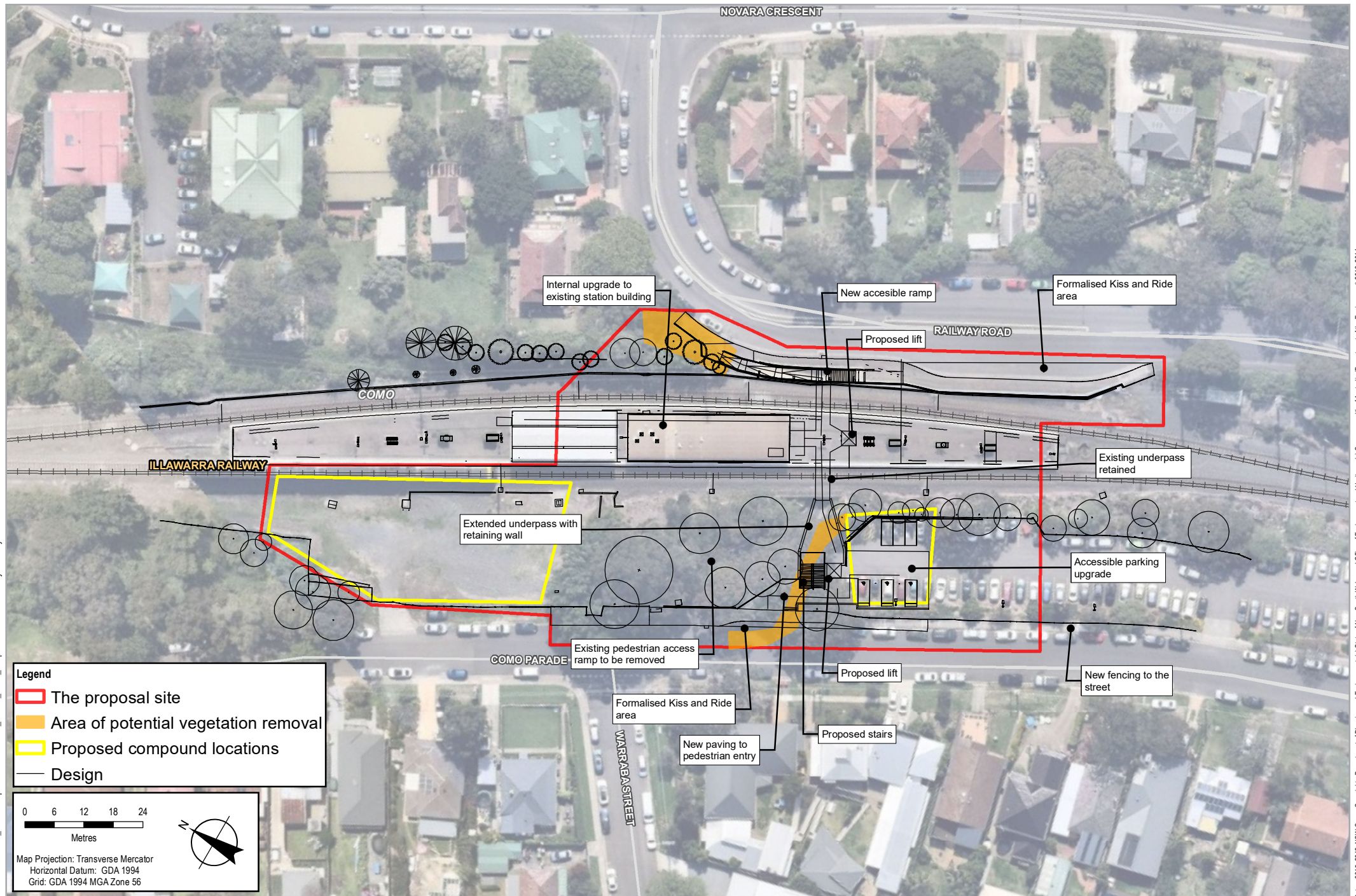


Figure 10 General layout of the key elements of the Proposal
(Indicative only, subject to detailed design)

3.1.1 Scope of works

Station upgrade

The Proposal would improve accessibility to the station through the installation of two new lifts. One lift would be from the existing underpass to platform level, with the other lift located within the commuter car park on Como Parade to provide access to the underpass.

New stairs would also be installed next to the lift at the commuter car park which would also provide access to the underpass. The existing pathway leading to the underpass would be extended west towards Como Parade. This would involve excavation through the existing rock face and removal of some vegetation. The existing ramp from Como Parade to the underpass would be closed and rehabilitated. A new DDA compliant pedestrian path of travel would be provided via a new lift from the existing commuter car park at Como Parade to the underpass (see below for further detail).

The ramp on the eastern (Railway Road) side of the station would be extended to provide a DDA compliant pedestrian route to the underpass. New handrails would also be added to the extended ramp. The ramp extension would involve some vegetation trimming and removal. There would also be some modification to station facilities including a new family accessible toilet and ambulant toilet within the existing station building on the platform. A compliant enclosure for the digital communications equipment would also be provided within the existing station building. Additional bench seating would be provided on the platform.

The proposed layout of the underpass extension is shown in Figure 11 and the proposed internal layout of the reconfigured station building is shown in Figure 12. Elevations showing the new lift structures are provided in Figure 13.

To facilitate the above upgrades, the following works would also be required:

- electrical upgrades including conversion of a section of 11kV aerial power line to underground cabling
- upgrading of low voltage systems to support new infrastructure (such as the lifts); and aboveground and underground cable containment works
- minor drainage works on both sides of the rail corridor
- adjustment of station ticketing facilities, including Opal card readers
- improvements to station systems including CCTV cameras, hearing loops, public address systems, emergency help points, and installation of TGSIs
- new/upgraded wayfinding and statutory/regulatory signage
- temporary site compounds for storage of materials and equipment
- boundary fencing
- temporary works (where required) during construction in order to maintain existing pedestrian 'level of service'.

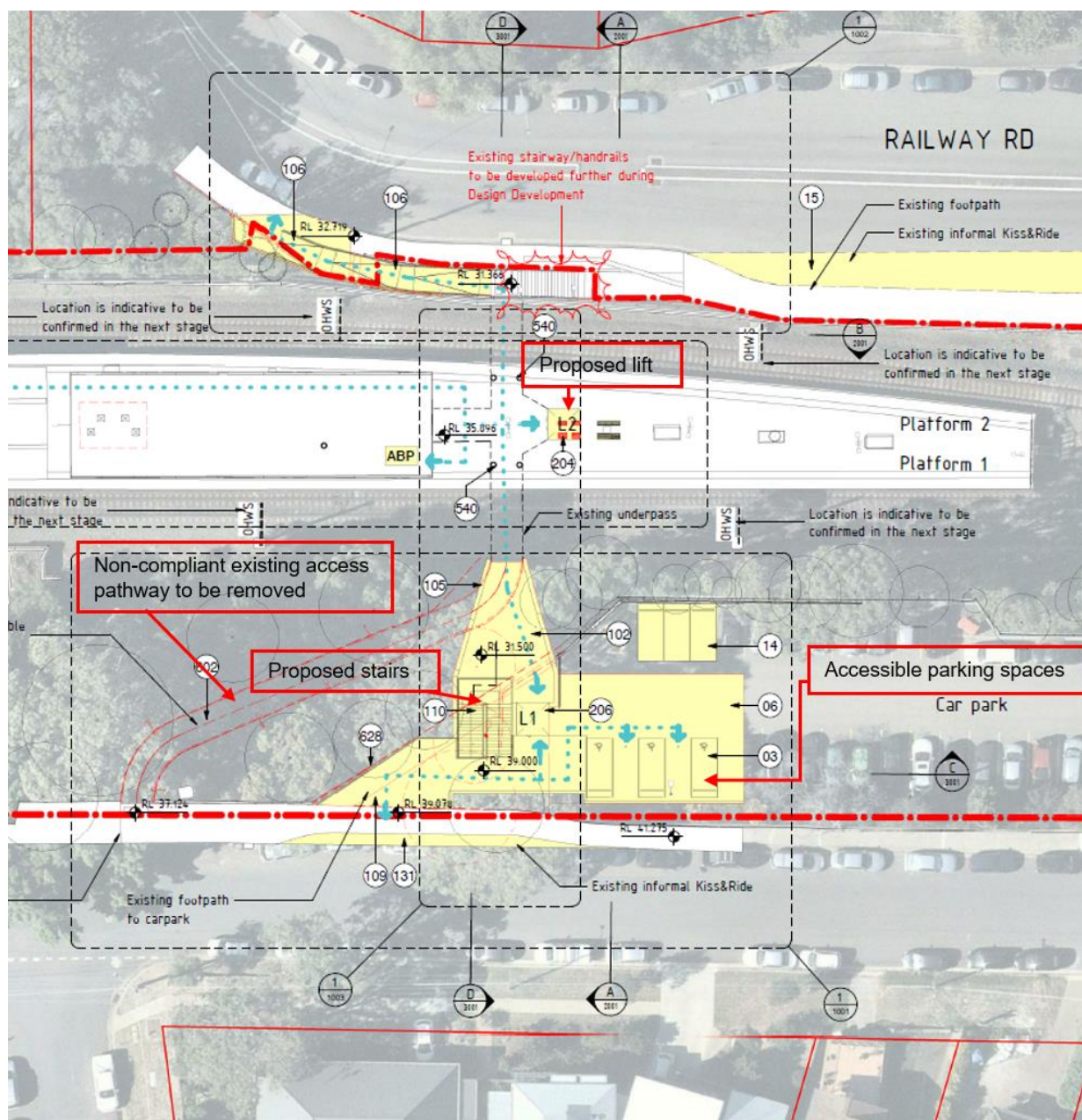


Figure 11 Proposed underpass pathway and Railway Road ramp upgrade (subject to detailed design)

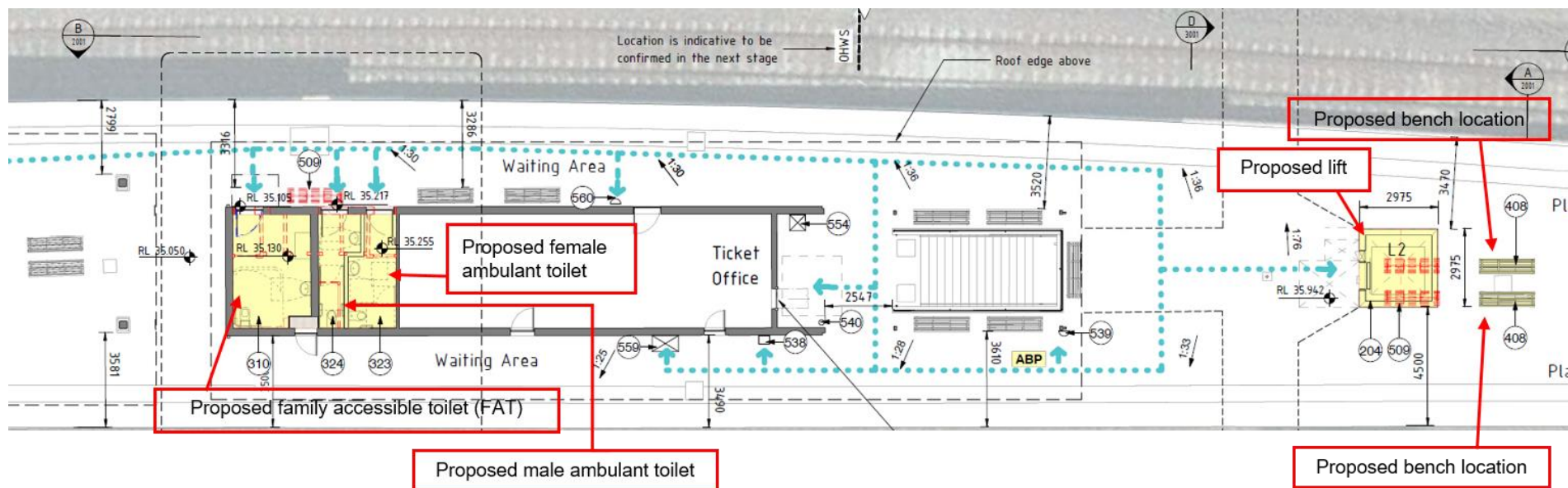


Figure 12 Proposed station building layout (subject to detailed design)

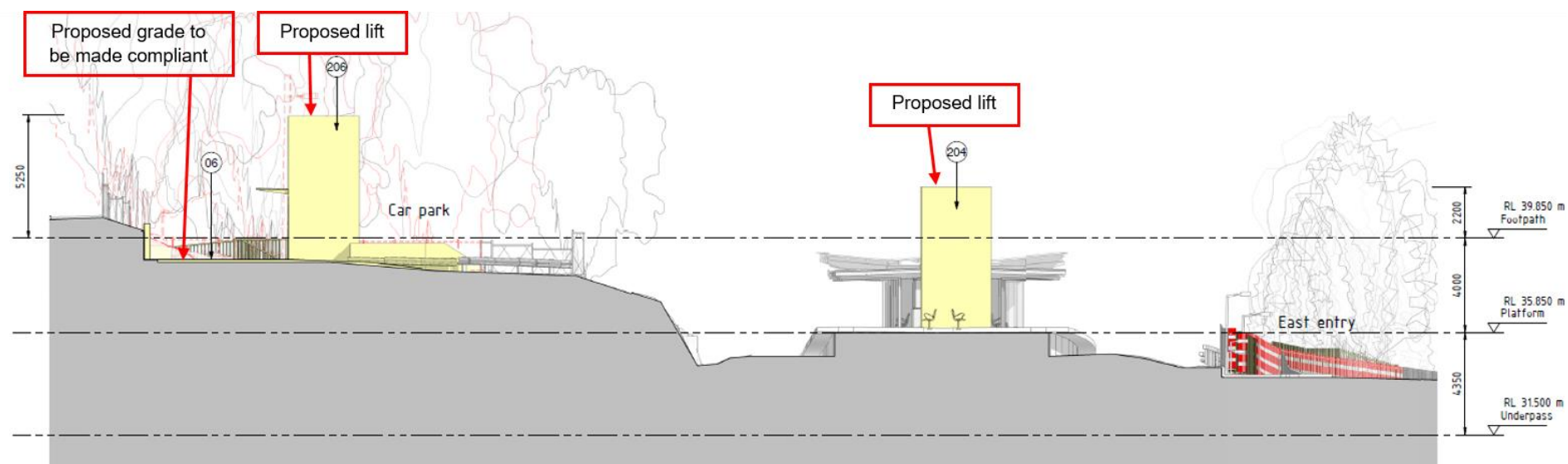


Figure 13 North elevation of proposed new lifts (subject to detailed design)

Interchange facilities

To complement the upgrades to the station, a number of adjustments to the interchange areas around the station are proposed to improve accessibility and the customer experience:

- adjustments to line-marking to formalise three new DDA compliant car parking spaces in the commuter car park on Como Parade, close to the lift and the station entry
- provision of a new DDA compliant pedestrian path of travel from the existing commuter car park at Como Parade
- formalisation of a kiss and ride facility adjacent to Railway Road
- adjustments to pedestrian infrastructure adjacent to Railway Road on the eastern side of the station to provide an accessible path to the station entry.

Materials and finishes

Materials and finishes for the Proposal have been selected based on the criteria of durability, maintenance efficiency, cost effectiveness, to minimise visual impacts, and urban design outcomes. Life cycle impacts have also been taken into account in the selection process through the consideration of the environmental impacts of materials from the point of extraction, transportation, operations and end of life.

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

Each of the upgraded or new facilities would be constructed from a range of different materials, with a different palette for each architectural element. Based in the existing design, the Proposal would include the following materials and finishes for the key elements:

- lift shafts – precast concrete with colour bond façade and glass for the upper sections
- platform canopy – steel frame and glass.

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

Indicative photomontages of the Proposal are shown in Figure 14 and Figure 15.



Figure 14 View looking north east from Como Parade



Figure 15 View looking north west from Railway Road

3.1.2 Engineering constraints

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

Existing structures: the placement and integrity of existing structures were considered during the development of the design – these structures included the station island platform, station buildings, and the underpass.

Continued operation of existing underpass: extension of the existing paved area is required to be undertaken in a way that allows existing facilities and access to the station to continue to operate during construction.

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

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

- Sydney Water recorded sewer and water assets located within the Proposal area
- a Jemena high pressure gas main is located across the railway line
- cross corridor NBN communications cabling travelling under the station
- a stormwater pit located west of commuter carpark owned by Sutherland shire.

3.1.3 Design standards

The Proposal would be designed having regard to the following:

- *Disability Standards for Accessible Public Transport 2002* (issued under the Commonwealth *Disability Discrimination Act 1992*)
- Building Code of Australia (BCA)
- relevant Australian Standards
- TfNSW Asset Standards Authority standards
- Sydney Trains standards
- Infrastructure Sustainability Rating Scheme - Version 1.2 (ISCA, 2018)
- *Guidelines for the Development of Public Transport Interchange Facilities* (Ministry of Transport, 2008).
- Crime Prevention Through Environmental Design (CPTED) principles
- other TfNSW policies and guidelines
- council standards where relevant.

3.1.4 Sustainability in design

TfNSW is committed to minimising the impact on the natural environment and utilising the infrastructure Sustainability Council of Australia's (ISCA) 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 Como Station Upgrade is one of a number of projects within the Transport Access Program that would be using version 1.2 of the IS rating tool, and targeting an 'Excellent' rating.

This requires the achievement of between 50 and 75 points out of a possible 100. 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 would be used to further develop the design and construction, thus facilitating achievement of the 'Excellent' target rating.

3.2 Construction activities

3.2.1 Work methodology

Subject to approval, construction is expected to commence in late 2019 and take around 15 months to complete. The construction methodology would be further developed during the Detailed design of the Proposal by the nominated Contractor in consultation with TfNSW.

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

Table 1 Indicative construction staging for key activities

Stage	Activities
Site establishment and enabling works	• Establish the work site area, including the construction compound, associated utilities, fencing, tree protection zones, site offices, amenities and plant/material storage area • partial closure of the commuter car park to facilitate works and storage • partial closure /diversion of pedestrian walkway on platforms • install hoarding around the proposed lift shafts location which extend to the edge of the underpass • remove vegetation to allow for new infrastructure • relocate station services which are to be impacted by the works • utilities connection and disconnection as required • establish traffic control measures.

Stage	Activities
Lift and stair installation	• excavation of lift pits (including temporary shoring if required) • piling works for new stairs and lifts • install lift structure including top landing, roof, louvres, lift equipment and fit-out • install new stairs including landing.
Platform works	• relocation of existing seating on the platform
Interchange works	• upgrade existing paved footpath along Railway Road and Como Parade. Construction would be staged to ensure that pedestrians would retain continued access to the station • demolish existing non-compliant sections of pedestrian paths • relocate high voltage transmission line to underground on the south east side of station • install new kerb ramps in car park and to kiss and ride.
Station building works	• reconfigure internal station building areas to allow for ambulant and family accessible toilet amenities and a communications room.
Finalisation	• install signage • undertake electrical and power supply upgrade works • replanting/landscaping, fencing adjustments and installation of bollards.
Testing and commissioning	• test and commission power supply, lifts, lighting, new/modifications to station services, ticketing systems, communication and security systems.
Demobilisation	• landscaping, tree replacement, removal of redundant materials.

3.2.2 Plant and equipment

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

- trucks
- jack hammer
- chainsaw
- piling rig
- franna/mobile cranes
- bobcat
- excavator
- demolition saw
- concrete pump
- concrete truck
- lighting tower
- coring machine
- water cart
- suction trucks
- rail mounted elevated work platform
- forklift
- vibrating roller/compaction plate
- road rail excavator
- hand tools
- skip trucks
- hammer drills
- torque wrenches and impact wrenches
- grinders and bar benders
- elevated work platform
- crane
- rock breaker

3.2.3 Working hours

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

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

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

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

- detailed site survey, services and/or geotechnical investigations within and around the rail corridor
- installation of hoardings
- excavation of underpass extension
- piling, excavation for lift pits and installation of lift shafts
- installation of new stair structures
- delivery of lift equipment
- electrical works.

Out of hours works may also be scheduled outside rail possession periods. Approval from TfNSW would be required for any out of hours work and the affected community would be

notified as outlined in TfNSW's *Construction Noise and Vibration Strategy* (TfNSW, 2018b) (refer to Section 6.3 for further details).

3.2.4 Earthworks

Excavations and earthworks would generally be required for the following:

- underpass pathway extension which would include some rock breaking
- services relocation including construction of a new combined services route and electrical cabling
- construction of the lift shafts and stairs
- extension of the pedestrian ramp on the eastern side (Railway Road)
- other minor civil works including footings and foundations for structures, drainage /stormwater works, and trenching activities for service adjustments and relocations and drainage upgrade works.

Excavated material would be reused onsite where possible or disposed of in accordance with relevant legislative requirements. It is estimated that about 300 cubic metres of earthworks would be required to accommodate the lift shafts, ramp construction and other ancillary works.

3.2.5 Source and quantity of materials

The source and quantity of materials required would be determined during the detailed design phase of the Proposal and would consider the requirements of the ISCA IS Rating Tool v1.2 (ISCA, 2017). Materials would be sourced from local suppliers where possible. Reuse of existing and recycled materials would be undertaken where practicable.

3.2.6 Traffic access and vehicle movements

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

- impacts to pedestrian, rail customers and cyclists
 - impact to pedestrian and bicycle rider movements on both sides of the station due to the movement of construction material, traffic diversions and the location of crane/s during construction
 - temporary pedestrian access
 - increased vehicle movements may reduce safety
- impacts to off-street parking in the commuter car park located off Como Parade
- impacts to on-street car parking locations.

3.2.7 Ancillary facilities

A temporary construction compound would be required to accommodate a site office, amenities, laydown and storage area for materials. Two areas for construction compounds have been proposed to the west of the station (refer Figure 10). One area is located within Railcorp land, within the railway corridor boundary and is currently vacant. The second site is located within the commuter car park to the south of the station entrance. Impacts associated with utilising this area have been considered in the environmental impact assessment including requirements for rehabilitation.

3.2.8 Public utility adjustments

The Proposal has been designed to avoid relocation of services where feasible, however further investigation may be required. It is likely some services may require relocation, but such works are unlikely to occur outside of the footprint of the works assessed in this REF. In the event that works would be required outside of this footprint, further assessment would be undertaken. The appropriate utility providers would be consulted during the detailed design phase.

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

3.3 Property acquisition

TfNSW does not propose to acquire any property as part of the Proposal.

3.4 Operation management and maintenance

The future operation and maintenance of the new station/interchange is subject to further discussions with Sydney Trains, TfNSW and Sutherland Shire Council. Structures constructed under this Proposal would be maintained by Sydney Trains. It is expected that adjacent footpaths would continue to be maintained by Sutherland Shire Council.

4 Statutory considerations

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

4.1 Commonwealth legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

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

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

4.2 NSW legislation and regulations

4.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act establishes the system of environmental planning and assessment in NSW. This Proposal is subject to the requirements of Division 5.1 of the EP&A Act which specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as TfNSW, which do not require development consent under Part 4 of the EP&A Act.

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

Clause 228 of the *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.

4.2.2 Other NSW legislation and regulations

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

Table 2 Other legislation applicable to the Proposal

Applicable legislation	Considerations
<i>Contaminated Land Management Act 1997</i> (CLM Act) (NSW)	Section 60 of the CLM Act imposes a duty on landowners to notify the Office of Environment and Heritage (OEH), and potentially investigate and remediate land if contamination is above EPA guideline levels. The site has not been declared under the CLM Act as being significantly contaminated (refer Section 6.8).
<i>Crown Lands Act 1987</i> (NSW)	The Proposal does not involve works on any Crown land.
<i>Disability Discrimination Act 1992</i> (DDA Act) (Cwlth)	The Proposal would be designed having regard to the requirements of this Act.
<i>Heritage Act 1977</i> (Heritage Act) (NSW)	As outlined in Section 6.5 the Proposal is not located within or adjacent to any heritage listed properties and therefore no approvals or notifications are required for the Proposal.
<i>National Parks and Wildlife Act 1974</i> (NPW Act) (NSW)	Sections 86, 87 and 90 of the NPW Act require consent from OEH for the destruction or damage of Indigenous objects. The Proposal is unlikely to disturb any Indigenous objects (refer Section 6.4). However, if unexpected archaeological items or items of Indigenous heritage significance are discovered during the construction of the Proposal, all works would cease and appropriate advice sought.
<i>Biosecurity Act 2015</i> (NSW)	Appropriate management methods would be implemented during construction if weeds declared noxious in the Sutherland Shire Council are encountered (refer Section 6.7).
<i>Protection of the Environment Operations Act 1997</i> (PoEO Act) (NSW)	The Proposal does not involve a 'scheduled activity' under Schedule 1 of the PoEO Act. Accordingly, an Environment Protection Licence (EPL) is not required for the Proposal. However, in accordance with Part 5.7 of the PoEO Act, TfNSW would notify the EPA of any pollution incidents that occur onsite. This would be managed in the Construction Environmental Management Plan (CEMP) to be prepared and implemented by the Construction Contractor.
<i>Roads Act 1993</i> (Roads Act) (NSW)	Section 138 of the Roads Act requires consent from the relevant road authority for the carrying out of work in, on or over a public road. However, clause 5(1) in Schedule 2 of the Roads Act states that public authorities do not require consent for works on unclassified roads. The Proposal would not result in any impacts on any classified roads and therefore consent is not required under Section 138 of the Roads Act.
<i>Sydney Water Act 1994</i> (NSW)	The Proposal would not involve discharge of wastewater to the sewer.
<i>Biodiversity Conservation Act 2016</i> (BC Act) (NSW)	The site does not contain suitable habitat for any listed threatened species or community and is unlikely to have a significant impact on any threatened species or community (refer Section 6.7).
<i>Waste Avoidance and Resource Recovery Act 2001</i> (WARR Act) (NSW)	TfNSW would carry out the Proposal having regard to the requirements of the WARR Act. A site-specific Waste Management Plan would be prepared.

Applicable legislation	Considerations
<i>Water Management Act 2000</i> (NSW)	The Proposal would not involve any water use (from a natural source e.g. aquifer, river – only from the network), water management works, drainage or flood works, controlled activities or aquifer interference.

4.3 State Environmental Planning Policies

4.3.1 State Environmental Planning Policy (Infrastructure) 2007

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

Clause 79 of the Infrastructure SEPP allows for the development of 'rail infrastructure facilities' by or on behalf of a public authority without consent on any land (i.e. assessable under Division 5.1 of the EP&A Act). Clause 78 defines 'rail infrastructure facilities' as including elements such as 'railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms', public amenities for commuters' and 'associated public transport facilities for railway stations'.

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

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

It is noted the Infrastructure SEPP prevails over all other environmental planning instruments except where *State Environmental Planning Policy (Major Development) 2005* and *State Environmental Planning Policy (Coastal Management) 2018* applies. The Proposal does not require consideration under these SEPPs and therefore do not require further consideration as part this REF.

4.3.2 State Environmental Planning Policy 55 – Remediation of Land

SEPP 55 provides a State-wide approach to the remediation of contaminated land for the purpose of minimising the risk of harm to the health of humans and the environment. While consent for the Proposal is not required, the provisions of SEPP 55 have still been considered in the preparation of this REF.

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

4.4 Local environmental planning instrument and development controls

The Proposal is located within the Sutherland Shire LGA. The provisions of the Infrastructure SEPP mean that Local Environmental Plans (LEPs), prepared by councils for an LGA, do not apply. However, during the preparation of this REF, the provisions of the *Sutherland Shire Local Environmental Plan 2015* were considered.

4.4.1 Sutherland Shire Local Environmental Plan 2015

The *Sutherland Shire Local Environmental Plan 2015* (Sutherland Shire LEP) is the governing environmental planning instrument for the Sutherland Shire LGA, including Como. Table 3 summarises the relevant aspects of the Sutherland Shire LEP applicable to the Proposal. Figure 16 shows the relevant section of the zoning map from the Sutherland Shire LEP, with the indicative location of the Proposal.

Table 3 Relevant provisions of the Sutherland Shire LEP

Provision description	Relevance to the Proposal
SP2 Infrastructure (Railway), R3 Medium Density Residential	The Proposal is located in land zoned SP2 Infrastructure (Railway) and R3 Medium Density Residential The land use objectives within the SP2 zone include: - to provide for infrastructure and related uses - to prevent development that is not compatible with or that may detract from the provision of infrastructure. The land use objectives within the R3 zone include: - to provide for the housing needs of the community within a medium density residential environment. - to provide a variety of housing types within a medium density residential environment. - to enable other land uses that provide facilities or services to meet the day to day needs of residents. - to encourage the supply of housing that meets the needs of the Sutherland Shire's population, particularly housing for older people and people with a disability. - to promote a high standard of urban design and residential amenity in a high quality landscape setting that is compatible with natural features. - to allow development that is of a scale and nature that provides an appropriate transition to adjoining land uses. The Proposal is consistent with the objectives of both zones as it would provide required infrastructure for the community in the form of works to improve access. All works are also located on rail land or land occupied by existing roads.
Clause 5.12 – Infrastructure development and use of existing buildings of the Crown	The LEP does not restrict or prohibit the carrying out of development by, or on behalf of a public authority, that is permitted with or without consent, or is exempt development under the Infrastructure SEPP.

4.5 NSW Government policies and strategies

Table 4 provides an overview of other NSW Government policies and strategies relevant to the Proposal.

Table 4 NSW Government policies and strategies applicable to the Proposal

Policy/Strategy	Commitment	Comment
<i>Future Transport Strategy 2056 (Transport for NSW 2018a)</i>	<i>Future Transport 2056</i> (Transport for NSW 2018a) is an overarching strategy that ensures transport in NSW is prepared for rapid changes in technology and innovation to create and maintain a world class, safe, efficient and reliable transport system over the next 40 years. <i>Future Transport 2056</i> ensures that we are prepared for rapid changes in technology and innovation to create and maintain a world class, safe, efficient and reliable transport system. The strategy is supported by a range of sub plans which are outlined in the below sections. The strategy has been developed to ensure land use and transport strategies are in line with one another through the strategy being developed in consultation with the Greater Sydney Commission, Infrastructure NSW, Department of Premier and Cabinet and Department of Planning and Environment.	The Proposal would assist in meeting the following State wide outcomes detailed in <i>Future Transport 2056</i>: • encouraging active travel (walking and cycling) and using public transport • a fully accessible network that enables barrier-free travel for all.
<i>Greater Sydney: Services and Infrastructure Plan (TfNSW, 2018c)</i>	The <i>Greater Sydney Services and Infrastructure Plan</i> builds on the strategic initiatives outlined in <i>Future Transport 2056</i> (discussed above). This plan provides a detailed look at the initiatives with the Greater Sydney area including identifying specific projects which have been identified as assisting in delivering <i>Future Transport 2056</i>.	The Transport Access Program, to which the Proposal forms part of is identified in the services and infrastructure plan as a key initiative with a commitment for the works to occur in the next 10 years.
<i>Disability Inclusion Action Plan 2018-2022 (TfNSW, 2017c)</i>	The <i>Disability Inclusion Action Plan</i> was developed as part of <i>Future Transport 2056</i>. The plan builds on the objectives regarding accessibility to transport as outlined in <i>Future Transport 2056</i>.	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.

Policy/Strategy	Commitment	Comment
Sydney's Walking Future - Connecting people and places (TfNSW, 2013a)	<i>Sydney's Walking Future</i> outlines the NSW government's efforts to: • promote walking for transport • connect people to places through safe walking networks around activity centres and public transport interchanges.	The Proposal would facilitate walking by removing physical barriers to accessible public transport and by providing accessible cross-corridor access, hence contributing a relative reduction in local trips via private cars.
Sydney's Cycling Future - Cycling for everyday transport (TfNSW, 2013b)	<i>Sydney's Cycling Future</i> outlines the NSW government's commitment to a safe and connected network of bicycle paths as an important part of Sydney's integrated transport system. The NSW government wants to make bike riding a convenient and enjoyable option by improving access to towns and centres, and investing in bicycle facilities at transport hubs.	The Proposal supports the government's Bike and Ride initiative that better integrates bicycle riding with other modes of transport, making it convenient to ride to transport hubs, park bicycles securely and transfer to public transport as part of longer transport journeys.
Building Momentum: State Infrastructure Strategy 2018-2038 (Infrastructure NSW, 2018)	The NSW government has devised a 20-year strategy to improve the current state of NSW's infrastructure. The <i>State Infrastructure Strategy</i> (Infrastructure NSW 2018) identifies policies and strategies for infrastructure needed to meet the demands of a growing population and economy.	The Proposal supports investment in rail infrastructure as identified in the strategy.
Greater Sydney Region Plan: A Metropolis of Three Cities Our Greater Sydney 2056: Southern District Plan – connecting communities (Greater Sydney Commission, 2018)	<i>A Metropolis of Three Cities</i> guides the future growth of Greater Sydney. The plan includes a number of objectives related to transport networks including: • provision of transport infrastructure to support future growth • optimising existing infrastructure where possible. • The Proposal is located within the Southern District as outlined in the plan. Further discussion of the Proposal in relation to the Southern District is outlined below.	The Proposal would assist in meeting these objectives as it would provide a more accessible rail network which would include the availability of the network to a wider range of commuters. It would also involve the upgrade of existing infrastructure (i.e. stations) to enable it to better serve growth without the need for new investment.

4.6 Ecologically sustainable development

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

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

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

5 Community and stakeholder consultation

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

5.1 Stakeholder consultation during concept design

Key stakeholders for Como Station, comprising of TfNSW and Sydney Trains were engaged in the 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.

Workshops and meetings undertaken during design development included:

- options assessment workshops with relevant TfNSW and Sydney Trains representatives
- constructability workshops.

5.2 Consultation requirements under the Infrastructure SEPP

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

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

Table 5 Infrastructure SEPP consultation requirements

Clause	Clause particulars	Relevance to the Proposal
Clause 13 Consultation with Councils – development with impacts on council related infrastructure and services	Consultation is required where the Proposal would result in: - substantial impact on stormwater management services - generating traffic that would place a local road system under strain - involve connection to or impact on a council owned sewerage system - involve connection to and substantial use of council owned water supply - significantly disrupt pedestrian or vehicle movement - involve significant excavation to a road surface or footpath for which Council has responsibility.	The Proposal includes works that would: - require connections or impacts the stormwater system - disrupt pedestrian and vehicle movements - impact on road pavements under Council's care and control - impact on Council-operated footpaths. Consultation with Sutherland Shire Council would continue throughout the detailed design and construction phases.
Clause 14 Consultation with Councils – development with impacts on local heritage	Where railway station works: - substantially impact on local heritage item (if not also a State heritage item) - substantially impact on a heritage conservation area.	There is no proposed impact to local heritage or a heritage conservation area. Accordingly, consultation with Council is not required. Refer to Section 6.5.
Clause 15 Consultation with Councils – development with impacts on flood liable land	Where railway station works: impact on land that is susceptible to flooding – reference would be made to <i>Floodplain Development Manual: the management of flood liable land</i>.	The Proposal is not located on land that is susceptible to flooding. Accordingly, consultation with Council is not required in regard to this aspect. Refer to Section 6.9.
Clause 15AA Consultation with State Emergency Service – development with impacts on flood liable land	Where development works: would be carried out on flood liable land – reference would be made to the <i>Floodplain Development Manual: the management of flood liable land</i>.	The Proposal is not located on land that is susceptible to flooding. Accordingly, consultation with the State Emergency Service is not required in regard to this aspect. Refer to Section 6.9.

Clause	Clause particulars	Relevance to the Proposal
Clause 16 Consultation with public authorities other than Councils	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 TfNSW may consult with could include: • Roads and Maritime • Sydney Trains • OEH.	The Proposal is not located adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i>. Accordingly, consultation with the OEH on this matter is not required.

5.3 Consultation strategy

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

The objectives of the consultation strategy are to:

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

5.4 Public display

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

- public display of the REF at locations listed below
- distribution of a project newsletter at the station, and to local community and rail customers, outlining the Proposal and inviting feedback on the REF
- advertisement of the REF public display in local newspapers with a link to the TfNSW website including a summary of the Proposal and information on how to provide feedback

- consultation with council/s, Sydney Trains, NSW Trains and other non-community stakeholders
- community information session on Tuesday 9 April 4 - 6pm at the station.
- door knock adjacent properties

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 placed on public display at the following locations:

- Sutherland Shire Council - 4-20 Eton Street, Sutherland
- Sutherland Library - 30-36 Belmont Street, Sutherland
- Transport for NSW Office - Level 5, Tower A, Zenith Centre, 821 Pacific Highway, Chatswood

The REF would also be available to download from the TfNSW website¹ and the NSW Government Have Your Say website². Information on the Proposal would be available through the Project Infoline (1800 684 490) or by email³. During this time feedback is invited. Following consideration of feedback received during the public display period, TfNSW would determine whether to proceed with the Proposal and what conditions would be imposed on the project should it be determined to proceed.

5.5 Ongoing consultation

At the conclusion of the public display period for this REF, TfNSW would acknowledge receipt of feedback from each respondent. The issues raised by the respondents would be considered by TfNSW before determining whether to proceed with the Proposal (refer to Section 1.1).

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

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

¹ <https://www.transport.nsw.gov.au/projects/current-projects/como-station-upgrade>

² www.yoursay.transport.nsw.gov.au/como

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

6.1.1 Existing environment

Road network

Como Parade

Como Parade is located west of Como Station and is oriented in a north-south direction. It functions as a local road and provides direct access to Como Station for pedestrians and the commuter car park area. This thoroughfare has one traffic lane in each direction and unrestricted parallel parking is provided on either side.

Como Parade contains the default residential speed limit of 50 km/h.

Warraba Street

Warraba Street is located west of Como Station and is oriented in an east-west direction. It functions as a local road providing connection between Como Station and the Como local shopping area and Como West Public School. This thoroughfare has one traffic lane in each direction and unrestricted parallel parking is provided on either side.

Warraba Street contains the default residential speed limit of 50 km/h.

Wolger Street

Wolger Street is located west of Como Station and is oriented in a north-south direction. It functions as a local road providing access to Como local shopping area and Como West Public School. This thoroughfare has one traffic lane in each direction and unrestricted parallel parking is provided on either side.

Wolger Street contains the default residential speed limit of 50 km/h with a 40 km/h School Zone in the proximity of Como West Public School.

Yamba Road

Yamba Road is located west of Como Station and is oriented in an east-west direction (south of Warraba Street). It functions as a local road providing an alternate connection between Como Station and the Como local shopping area and Como West Public School. This thoroughfare has one traffic lane in each direction and unrestricted parallel parking is provided on either side.

Yamba Road contains the default residential speed limit of 50 km/h.

Railway Road

Railway Road is located east of Como Station and is oriented in a north-south direction. It functions as a local road and passes over the railway line to link to Yamba Road. This

thoroughfare has one traffic lane in each direction and unrestricted parallel parking is provided on the eastern side and an informal kiss and ride facility on the western side, adjacent to Como Station. There is a No Stopping restriction on the railway overpass and a central median from Como Station to Novara Crescent.

Railway Road contains the default residential speed limit of 50 km/h.

Novara Crescent

Novara Crescent is located east of Como Station and is oriented in a north-south direction. It functions as a local collector road providing a link between Como and Jannali to the south. Novara Crescent has one traffic lane in each direction. There is unrestricted parking, however due to the narrow width (nominal 8 metres kerb to kerb), parking usually occurs informally mounting the kerb, south of Railway Road. North of Railway Road the road width widens (nominally 11 metres kerb to kerb) providing opportunity for unrestricted parallel kerbside parking.

Novara Crescent contains the default residential speed limit of 50 km/h with a 40 km/h School Zone north of Railway Road.



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Figure 17 Local road network surrounding Como Station

Car parking

A commuter car park is provided on the western side of Como Station with access from Como Parade. The car park consists of approximately 58 car spaces, 3 non-compliant accessible parking spaces and 1 motorcycle bay.

Additionally, unrestricted on street parking is available in the surrounding road network.

Public Transport

Rail

Como Station is serviced by the T4 Eastern Suburbs and Illawarra Line, providing connections to Sutherland, Cronulla, Waterfall and Sydney CBD and Sydney eastern suburbs.

Train services typically operate with 20 minute frequencies during peak morning and evening periods and 30 minute frequencies in off-peak periods.

The journey time between Como Station and Central Station is approximately 34 minutes.

Bus

The closest bus stop to Como Station is within Wolger Street at the intersection with Warraba Street (near the local shopping area and Como West Public School), about 500 metres west of the station. This stop is serviced by route 967 – Como West to Miranda via Oyster Bay and provides 14 services between 8:28 am to 7:23 pm Monday to Friday; 11 services between 7:50 am to 3:50 pm Saturday, with no services on Sunday.

Pedestrian infrastructure

There is an existing pedestrian underpass connecting Railway Road and Como Parade providing connection to Como Station. A footpath is provided on the eastern kerb of Como Parade providing connection between the commuter car park and the station. Footpaths are also provided on both sides of Railway Road between Como Parade and Novara Crescent.

A footpath is provided on the northern kerb of Warraba Street to provide a pedestrian link between Como Station and the local shopping area in Wolger Street.

There are no designated pedestrian crossing facilities within the road network adjoining Como Station.

Kiss and ride facilities

There is no formal kiss and ride facility within proximity of Como Station, however within Railway Road there is a No Parking restriction which is used as an informal kiss and ride. Additionally, on Como Parade a No Parking restriction (primarily for the use of the Australia Postbox) could also act as an informal kiss and ride facility given its proximity to the station entry/exit.

Taxi

There are no designated taxi zones in the vicinity of Como Station.

Cyclist infrastructure

The bicycle networks in the vicinity of Como Station are limited. An on-road path of moderate difficulty is provided along Novara Crescent connecting Jannali to the south and Georges River to the north.

Bicycle lockers are located at the southern end of the commuter car park.

6.1.2 Potential impacts

Construction phase

Traffic impacts

Access to the site would require the use of the local road network. To minimise impact, it is proposed that the primary access / egress route to the site compound would be via Linden Street Arterial Road network. This includes River Road from the south east and the Princess Highway from the east.

The proposed site compound is on the western side of Como Station with access from Como Parade. The proposed route shown in Figure 18 utilises local roads that have greater widths and minimises the requirement to cross the railway line. The access/egress route includes Leonay Street, Jannali Avenue, Mitchel Avenue, Soldiers Road, Wolger Street, Yamba Road and Como Parade.

Should access be required to the eastern side of Como Station (Railway Road), access can be via the same designated route noted above, with egress along the eastern side of the railway line via Novara Crescent, Railway Crescent, Toronto Parade and Waratah Street (if heading towards the west) or Acton Street (if heading to the west/north/south).

Note: Novara Crescent is nominally 8 metres wide (kerb to kerb) with potential on-street parking (in some locations kerb mounting parking occurs). The road network can be narrow and therefore two way truck movements would be avoided. The proposed access route eliminates two way construction vehicle movement in this area.

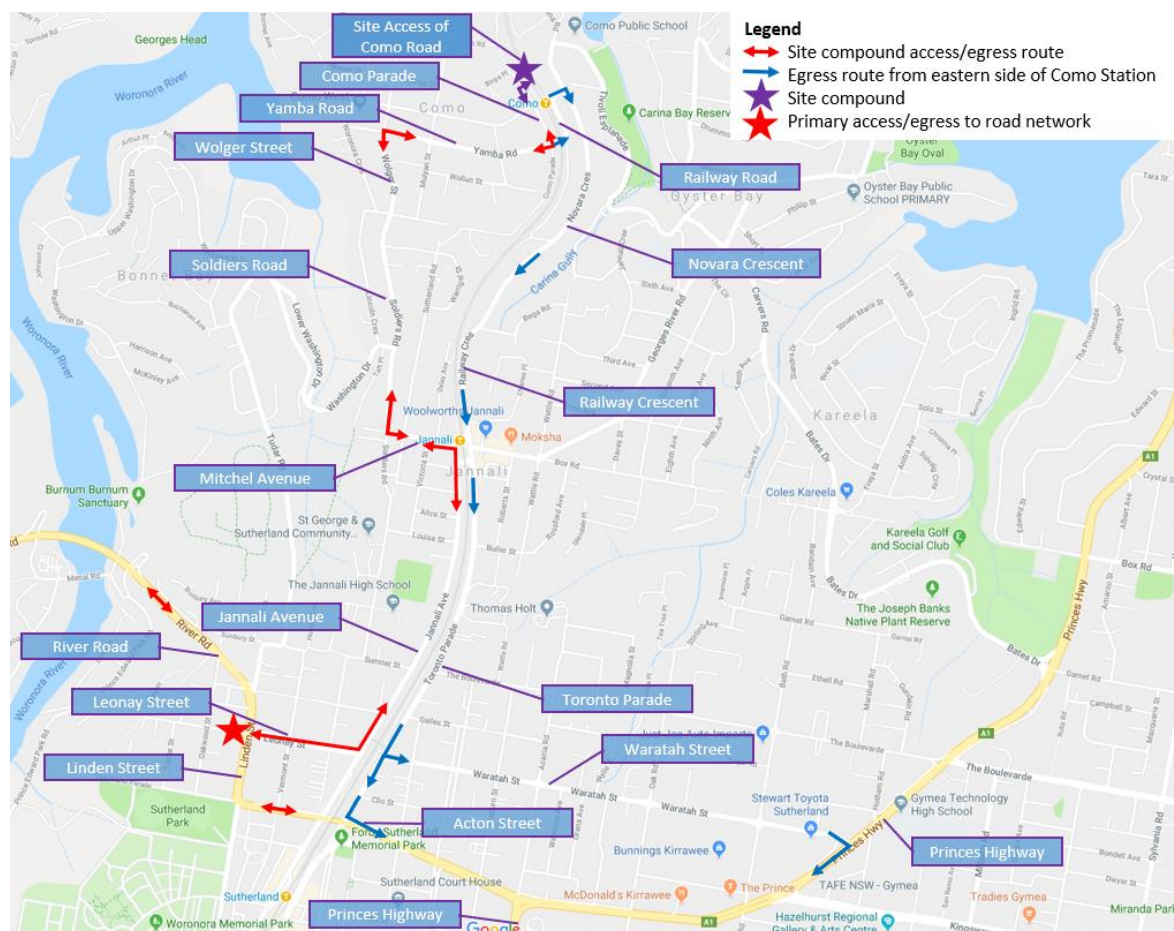


Figure 18 Construction vehicle access routes

Source: Google maps – modified by GHD

Parking

Heavy vehicles

The arrival of construction heavy vehicles would require coordination to minimise queuing of vehicles, notably during peak truck movement, such as concrete pour deliveries. Application for Work Zones, should it be required, would minimise the likelihood of impacts to traffic movement on the surrounding road network in areas of queuing.

Light vehicles

Construction light vehicles are expected to park on-street if required, with limited offsite parking available. It is recommended during day work to park outside a designated exclusion zone of approximately 400 metres. This recommendation would need to be addressed in greater detail in a Construction Traffic and Pedestrian Management Plan (TMP) for the proposed works.

Light construction vehicles are expected to park on the road network in proximity to Como Station during the construction period. It is recommended that workers are encouraged to use alternate transport options such as public transport to access the site.

Public transport

It is not anticipated the construction works would impact on the public transport network. There are no bus stops in the vicinity of the site and train services would not be affected during the works.

Pedestrian and cyclists

Access to the station is expected to be maintained at all times during the construction period except during scheduled rail track possessions, when pedestrian management may be implemented for use of the underpass. However, pedestrians and cyclists on Railway Road and Como Parade are anticipated to be affected by the proposed construction activities.

Potential interactions between construction traffic and pedestrians and bicycle riders include:

- impact to pedestrian and cyclist movements due to the movement of material, traffic diversions and the location of crane/s during construction.
- pedestrian access is likely to be impacted due to the construction of the new station accesses (ramps, stairs and lift) and footpath.
- increased vehicle movements may reduce safety.

Mitigation measures for ensuring that pedestrian and cyclist access and safety are not compromised would include traffic control near the pedestrian and bicycle access points on the eastern and western side of Como Station.

Kiss and ride

As part of the construction works, the informal kiss and ride facility located on Railway Road is to be formalised including associated signage. The informal kiss and ride facility is anticipated to remain operational throughout the works, with pedestrians being directed away from the station access ramp works area.

The 'no parking' area in Como Parade (potentially used as a kiss and ride facility) is located south of the footpath widening area. The contractor would be required to manage potential drop off and pick up activity in this area and ensure the works area is safe for the nearby pedestrian thoroughfare.

Operational phase

Traffic impacts

As no additional car parking is proposed, the proposed Como Station upgrade is expected to result in negligible traffic impacts in the vicinity of the station.

Parking

The existing three non-compliant accessible parking spaces within the commuter car park are proposed to be modified to provide DDA compliant spaces. It is anticipated that approximately three commuter car spaces will be removed due to the proposed changes (subject to detailed design development).

No other changes to off-street and or on-street car parking is proposed.

Pedestrian and cyclist impacts

Pedestrian access to Como Station would be improved by upgrading the existing ramp on Railway Road and installation of new stairs on Como Parade for improved access to the existing commuter car park. Whilst the existing non-compliant ramp from Como Parade would be removed, DDA compliant pedestrian access via the commuter car park would be provided via new lifts from the underpass to the station platform and commuter car park. This would improve the accessibility of the station for customers with disabilities, customers with less mobility, parents/carers with prams, and customers with luggage.

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

Taxi / kiss and ride impact

The informal kiss and ride facility at Railway Road would be formalised to increase safety. No taxi zone is proposed.

Bus impacts

No changes are proposed to the existing bus stop facilities or bus services at Como Station. The proposed pedestrian access improvements to the pedestrian paths would provide better accessibility to the station, improve interchange between different modes of transport and encourage public transport use.

6.1.3 Mitigation measures

A detailed TMP is required to be prepared prior to the commencement of works with site induction for construction personnel being undertaken to outline the requirements of the TMP. The aim of the TMP is to maintain the safety of all workers and road users within the vicinity site and outline mitigation measures of construction traffic impacts. The plan is to include such items as:

- vehicle approach routes
- traffic management
- workers transportation and on-site parking provisions
- pedestrian and bicycle rider management
- oversize vehicle permit requirements
- road hazards (including environmental, transportation infrastructure, emergency services and public facilities)

- methods of communicating traffic changes to the local community and visitors to the area
- recommended mitigation measures during construction.

The TMP would be developed in consultation with Sutherland Shire Council, Transport for NSW and Roads and Maritime.

Refer to Table 21 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.2 Urban design, landscape and visual amenity

A Landscape and Visual Impact Assessment (LVIA) was prepared for the Proposal to assess the landscape character and visual impact of the Proposal (GHD, 2019a). This includes landscape and visual effects of both construction and operational stages of the Proposal. The findings of the assessment are summarised in this section.

6.2.1 Existing environment

The study area for the LVIA has been defined as land within 500 metres of the Proposal site. Four landscape character types were identified within the study area, including low density residential on slope, community facilities, rail corridor and low lying flat recreation/conservation.

Key views and viewshed

Key views in the study area include distant water views towards the Georges River from the southern end of the station platforms and distant views across the valley (across Carina Bay Reserve) from the eastern and western ridge lines (predominantly achieved from private residential properties).

The viewshed, which forms the study area for the visual impact assessment, is defined as the area of land surrounding and beyond the Proposal site, which could be potentially affected by the Proposal.

An abundance of canopy vegetation is present which creates a visual buffer so that many views are short and mid-range. However, distant views of the abundant canopy vegetation create a pleasant green outlook.

Within the immediate vicinity of the station, views to the water can be seen from the southern end of the station, the southern end of the commuter car park, as well as an isolated location on the south-western side of Como Parade.

The presence of canopy trees and built form create a visual barrier to many views shown as areas of theoretical visibility. Therefore, the viewshed for the Proposal is largely confined to the streets immediately surrounding the station precinct, as well as isolated locations on the eastern ridgeline.

Landscape character types

Based on the assessment of natural and cultural influences shaping the study area the following Landscape Character Types (LCTs) have been defined:

The following LCTs have been identified for the study area:

- LCT1 Low density residential on slope
- LCT2 Community facilities
- LCT3 Rail corridor
- LCT4 Low lying flat recreation / conservation

The various LCTs are shown on Figure 19.

Sensitive visual receivers

Sensitive visual receivers within the Proposal viewshed include the following:

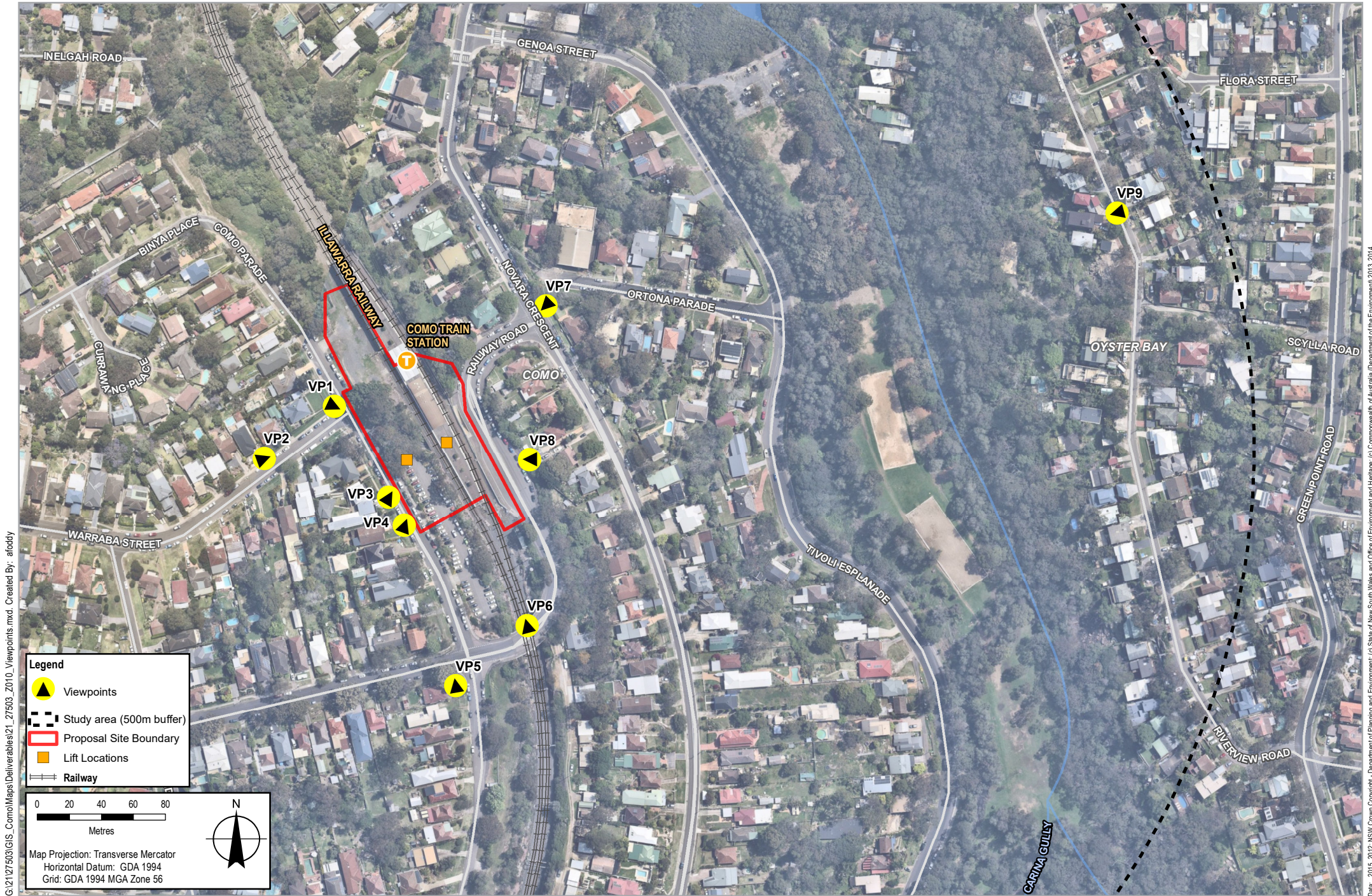
- residential properties on Como Parade in the immediate vicinity of the station precinct
- residential properties on Riverview Road
- commuters using Como Station, including platforms, commuter car park, and pedestrian underpass
- pedestrians and road users on Como Parade, Railway Road, Warraba Street, and Novara Crescent
- there is also the potential for a number of elevated residential properties on Como Parade south of Bulumin Street, which can be seen from the station platforms, to be considered as sensitive receivers.

Viewpoint locations

Viewpoints which represent views from the most sensitive visual receivers are provided in Figure 20 and Table 6.

Table 6 Viewpoint locations

Viewpoint	Location	Description
VP1	105 Como Parade	This view is representative of residents and pedestrians north of the station on the western side of Como Parade.
VP2	Warraba Street	This view is representative of residents and pedestrians on the northern side of Warraba Street
VP3	109-111 Como Parade	This view is representative of residents and pedestrians on the western side of Como Parade opposite the station
VP4	113 Como Parade	This view is representative of residents and pedestrians on the western side of Como Parade south of the station
VP5	Yamba Road	This view is representative of residents, pedestrians and road users at the Como Parade and Yamba Road intersection
VP6	Novara Crescent	This view is representative of pedestrians and road users at the Novara Crescent Railway Road intersection
VP7	Railway Road bridge	This view is representative of pedestrians and road users crossing the Railway Road bridge
VP8	Railway Road	This view represents residents on Railway Road
VP9	19 Riverview Road	This view represents residents on Riverview Road



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Figure 20: Viewpoint location plan

6.2.2 Potential impacts

Construction phase

Construction works would result in temporary landscape and visual impacts which may extend beyond the Proposal site. Landscape and visual impacts associated with construction activities are generally of greater magnitude than those associated with operation, however are temporary in nature.

Landscape and visual impacts during construction resulting from those activities outlined in Section 3.2 may include:

- the presence of a crane required for lift construction, proposed to be located within the commuter car park
- the presence of an excavator, crane truck, concrete truck, and concrete pump
- the presence of a piling rig (if required), mounted on tracks, with access through the maintenance gate on Como Parade
- temporary hoarding between the work being undertaken and the public domain, platform and concourse; this would include an area on the platform, and two separate areas to the northern end of the commuter car park
- presence of construction traffic and workers
- temporary parking areas
- importation and storage of construction equipment and plant
- materials stockpiling and the presence of incomplete structures
- construction activities to the pedestrian underpass, lifts, stairs, station entry zones on Como Parade and Railway Road, and within the station building
- activities associated with the removal of mature trees
- the presence of tree protection fencing to a number of existing trees to be retained
- replacement work to existing rail corridor fencing along the adjacent streetscapes.

Operational phase

Potential visual impacts relate to the introduction of new elements in the landscape. The key features of the Proposal are described in Section 3.1. Once constructed, the potential visual impacts of the Proposal would be mainly associated with:

- the upgraded station facilities, including the new lifts shafts
- vegetation removal
- new lighting
- associated landscaping.

Photomontages providing an indication of the appearance of the Proposal are included in Section 3 as in Figure 14 and Figure 15.

Landscape character impacts

Operational landscape impacts were assessed to be either negligible or no impact and the Proposal would result in a built form generally consistent with the existing landscape character of the study area.

Table 7 provides a summary of landscape character impacts for the Proposal at each LCT.

Table 7 Summary of landscape impacts

LCT	Description	Sensitivity to change	Magnitude of change	Overall Rating
LCT1	Low density residential on slope	Moderate	Negligible	Negligible
LCT2	Community facilities	N/A	N/A	No Impact
LCT3	Rail corridor	Low	Low	Low
LCT4	Low lying flat recreation/conservation	N/A	N/A	No Impact

Visual impacts

The significance of the potential visual impacts was determined by assessing the magnitude of potential impacts for each receiver in combination with the sensitivity of the receiver. A summary of the results of the visual impact assessment for those receivers with the potential to be impacted by the Proposal is provided in Table 8.

In summary, the Proposal would introduce constructed elements, including the proposed lift structure in the car park. While this new lift is a relatively isolated new built form element, it would be set back from the street and at a lower elevation than the street level within the context of tall canopy trees. Its scale and height would therefore integrate well into the existing context. The new lift proposed to the station platform is located adjacent to the existing station building of a similar scale, in front of a backdrop of canopy vegetation on a rocky slope. Additionally, the canopy vegetation is present to the eastern side of Railway Road as well as the elevated Railway Road bridge on the southern edge of the station precinct. These combine to visually mitigate the scale and height of the proposed new lift.

The Proposal is not expected to create a noticeable deterioration in the amenity of the existing view and surrounding built environment. The assessed significance of impacts for the receivers with the potential to be impacted by the Proposal ranged from negligible to high-moderate.

Viewpoint locations three and four were found to have high-moderate impacts associated with nearby low to medium density residential dwellings. This is primarily due to the residential receiver type, the scale of change to the view, and the location in close proximity to the Proposal.

Table 8 Summary of visual impacts

LCT	Description	Sensitivity to change	Magnitude of change	Overall Rating
VP1	105 Como Parade	Moderate	Low	Moderate-Low
VP2	Warraba Street	Moderate	Negligible	Negligible
VP3	109-111 Como Parade	High	Moderate	High-Moderate
VP4	113 Como Parade	High	Moderate	High-Moderate
VP5	Yamba Road	Moderate	Low	Moderate-Low
VP6	Novara Crescent	Low	Low	Low
VP7	Railway Road Bridge	Low	Low	Low
VP8	Railway Road	Low	Moderate	Moderate-Low
VP9	19 Riverview Road	Moderate	Negligible	Negligible

6.2.3 Mitigation measures

Vegetation and tree canopy

General considerations for the retention of vegetation associated with the Proposal include:

- where possible, retain the existing Angophora tree near the commuter car park entry, as this individual tree contributes positively to the character and identity of the station precinct
- retain and protect the existing Fig tree within the station precinct on Como Parade for its positive contribution to landscape character and visual amenity of the station precinct
- retain and protect as much existing vegetation as possible, particularly mature canopy trees, for their provision of visual amenity, visual integration for the Proposal, and screening
- ensure any infill landscape treatment to the existing access ramp from Como Parade utilises a planting palette consistent with the existing station precinct to achieve an integrated outcome
- where possible, introduce new tree planting in the immediate vicinity of trees to be removed, of a similar scale and character to existing, to mitigate any visual impact of the Proposal and ensure integration of the Proposal into the station precinct context.

Urban Design

General considerations for the construction phase include:

- take all practical measures to ensure construction equipment, stockpiles, and other visible elements are located away from key views to or from the sensitive visual receivers identified in this assessment. Should such equipment or stockpiles be located in a visually prominent location for any reasonable period of time, incorporate screening measures and practices to ensure sites are kept tidy

- ensure construction activities, equipment and storage areas are, where possible, located away from existing vegetation, the dripline of canopy trees, and other natural landscape features.

Construction activity and storage

General considerations for the construction phase include:

- take all practical measures to ensure construction equipment, stockpiles, and other visible elements are located away from key views to or from the sensitive visual receivers identified in this assessment. Should such equipment or stockpiles be located in a visually prominent location for any reasonable period of time, incorporate screening measures and practices to ensure sites are kept tidy
- ensure construction activities, equipment and storage areas are, where possible, located away from existing vegetation, the dripline of canopy trees, and other natural landscape features.

Refer to Table 21 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.3 Noise and vibration

The *TAP 3 – Como Station Noise and Vibration Impact Assessment* (NVIA) was prepared by GHD in January 2019 for Transport for NSW (GHD, 2019b). The NVIA provides an assessment of the noise and vibration impacts for the construction and operational phases of the Proposal. The findings of the assessment are summarised in this section.

Nearby noise and vibration sensitive receivers were identified and unattended noise measurements were completed to characterise the existing noise environment. The measured noise levels were used to establish construction and operational noise management levels. Construction and operational noise impact assessments were then completed to assess the impacts of the proposed works associated with the Proposal.

6.3.1 Existing environment

The existing noise environment in the vicinity of Como Station is typical of a suburban area with intermittent road traffic noise along local roads and rail traffic noise from the trains passing through the station.

Noise sensitive receivers

The following sensitive receivers and land uses have been identified in close proximity to the Proposal:

- residential properties located in the area surrounding the station including Railway Road which is located 15 metres to the east of the station; Como Parade located about 40 metres to the west of the station and Warraba Street which are located about 45 metres to the west of the station
- residential properties located up to 500 metres away from the station in surrounding streets including Yamba Road, Binya Place, Currawang Place, Mindar Street, Mulyan Street, Taronga Street, Taplan Street, Wollun Street, Evans street, Burunda Street, Ineglah Road, Cremona Road, Verona Range, Loretta Avenue, Bulumin Street, Currah Road, Oyster Bay Road, Tivoli Esplanade, Riverview Road
- Como School of Arts located 95 metres north east of the Proposal

- Como Pre-school and Kindergarten located 110 metres to the north of the Proposal
- Como Public School location 260 metres to the north east of the Proposal.

All modelled sensitive receivers are shown in Figure 21.

Background noise levels

Background noise monitoring was undertaken at one location considered to be representative of the nearby sensitive receivers. Long term monitoring was undertaken for a period of 11 days between 11 December and 20 December 2018 at

Location 1 - 19 Novara Crescent, Como, about 80 metres north-east of the Proposal.

This location is shown on Figure 21.

A detailed monitoring methodology and daily noise level charts are included in the NVIA (GHD, 2019b).

The measured noise monitoring data were used to determine the Rating Background Levels (RBL) for the assessment during the day, evening and night-time periods in accordance with the *Noise Policy for Industry* (NPI) (EPA, 2017). A summary of the measured RBL and ambient noise levels is provided in Table 9.

Table 9 Summary of measured noise levels, dBA

Location	Rating background level, L_{A90}			Ambient level, L_{Aeq}		
	Day 7am to 6pm	Evening 6pm to 10pm	Night 10pm to 7am	Day 7 am to 6 pm	Evening 6pm to 10pm	Night 10pm to 7am
Location 1	44	40	31	63	65	52

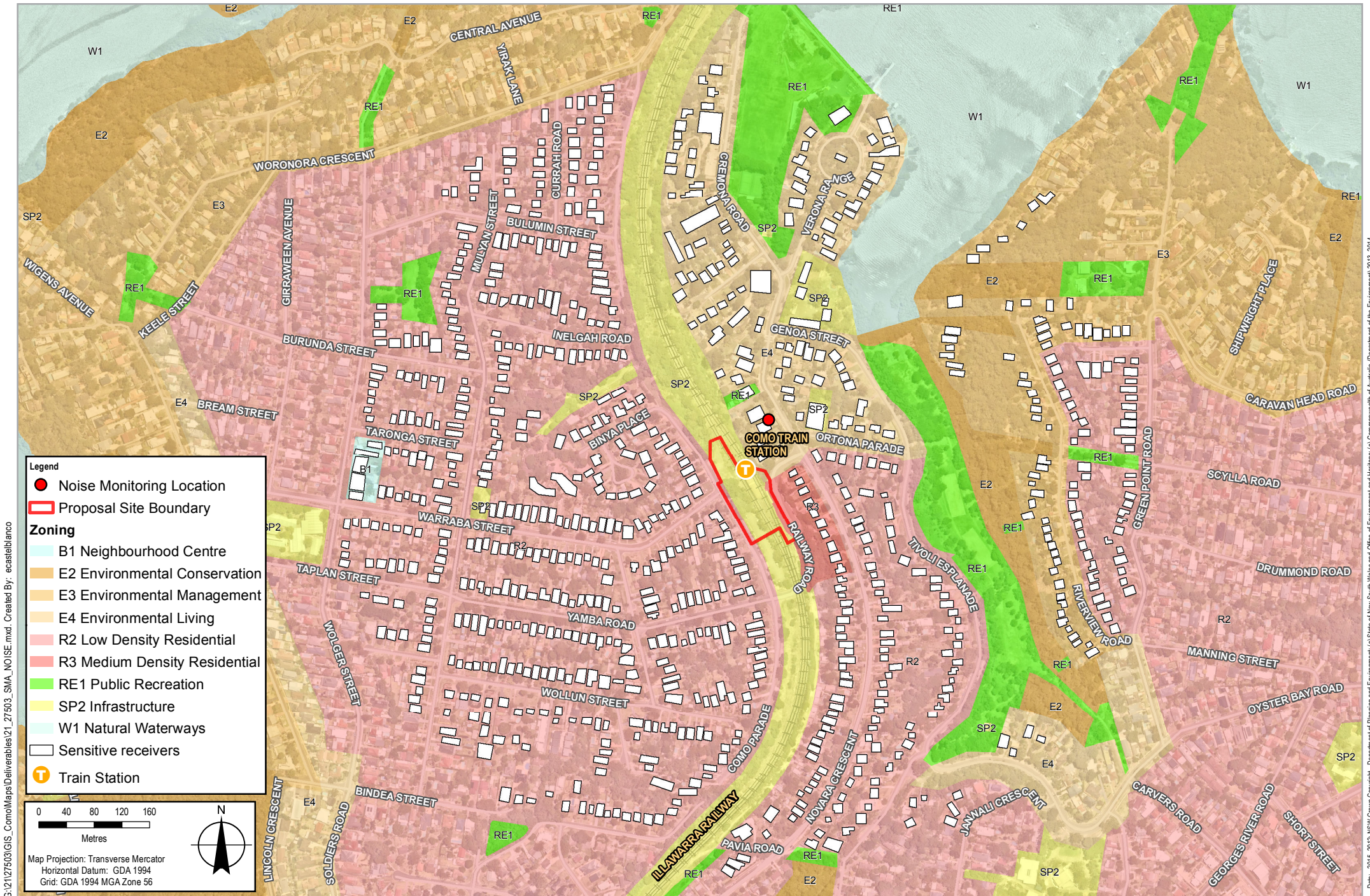


Figure 21 Sensitive noise receivers and noise monitoring location

6.3.2 Criteria

Construction noise

Construction noise management levels

The construction noise management levels for the Proposal are based on the *Interim Construction Noise Guideline* (ICNG) (DECC, 2009) and the *Construction Noise and Vibration Strategy* (CNVS) (TfNSW, 2018b). The ICNG specifies the method used to determine the noise management levels for residential receivers during standard construction hours and out of hours works. A fixed noise management level is set by the ICNG for receiver types classed as commercial, schools and places of worship.

Guidelines to determine the noise management levels for residential receivers, during and outside of standard recommended hours provided in the ICNG, are summarised in Table 10.

Table 10 Construction noise management level guidelines for residences

Time of day	Noise management level $L_{Aeq(15min)}$
Recommended standard hours	Noise affected: Rating background level + 10 dBA
	Highly noise affected: 75 dBA
Outside recommended standard hours	Noise affected: Rating background level + 5 dBA

Noise management levels for other sensitive land uses are provided in Table 11. These levels only apply when the relevant land use is in use.

Table 11 Noise management levels for other sensitive land uses

Land use	Noise management level, $L_{Aeq(15min)}$
Commercial premises	70 dBA (external)
Educational institutes	45 dBA (internal)
Hospital wards and operating theatres	45 dBA (internal)
Places of worship	45 dBA (internal)
Active recreation areas	65 dBA (external)

The specific construction noise management levels are outlined in Table 12.

Sleep disturbance

The ICNG recommends that maximum noise level events and the frequency of maximum noise level events exceeding the RBL should be assessed where construction works are planned to extend over two or more consecutive nights.

The NPI (EPA, 2017) provides the most updated guidance for the assessment of sleep disturbance. The NPI recommends a maximum noise level assessment to assess the potential for sleep disturbance impacts which include awakenings and disturbance to sleep

stages. An initial screening test for the maximum noise levels events should be assessed to the following levels.

- $L_{Aeq(15\text{ min})}$ 40 dBA or the prevailing RBL plus 5 dB, whichever is greater, and/or
- L_{AFmax} 52 dBA or the prevailing RBL plus 15 dB, whichever is greater.

If the screening test indicates there is a potential for sleep disturbance then a detailed maximum noise level assessment should be undertaken. The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.

Specific construction noise management levels

A summary of the construction noise management levels for each identified sensitive receiver type is provided in Table 12.

Table 12 Construction noise management levels

Receiver type	Time of day	Management level (dBA)
Residential	Recommended standard hours	Noise affected: 54
		Highly affected: 75
	Outside recommended standard hours ¹	Day: 49
		Evening: 45
		Night: 36
Commercial	When in use	70 (external)
Educational institutes		45 (internal)
Hospital wards and operating theatres		45 (internal)
Places of worship		45 (internal)
Active recreation areas		65 (external)

Note 1: The *Noise Policy for Industry* (EPA, 2018) defines day, evening and night time periods as:

- Day: the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays.
- Evening: the period from 6pm to 10pm.
- Night: the remaining periods.

Construction vibration

Human comfort

Acceptable vibration levels for human comfort have been set with consideration to *Assessing Vibration: a Technical Guideline* (DEC, 2006) which is based on the guidelines contained in British Standard BS 6472 – 1992, *Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)*.

Typically, construction activities generate ground vibration of an intermittent nature. Intermittent vibration is assessed using the vibration dose value. Acceptable values of vibration are presented in Table 13 for sensitive receivers.

Table 13 Human comfort intermittent vibration limits (BS 6472-1992)

Receiver type	Period	Intermittent vibration dose value (m/s ^{1.75})	
		Preferred value	Maximum value
Residential	Day (7am and 10pm)	0.2	0.4
	Night (10pm and 7am)	0.13	0.26
Offices, schools, educational institutes and places of worship	When in use	0.4	0.8

Structural damage to buildings

The effects of transient vibration on structures is considered in *BS 7385 Part 2 – 1993 Evaluation and measurement for vibration in buildings*. The criteria provided in BS 7385 are presented in Table 14.

Table 14 Transient vibration guide values – minimal risk of cosmetic damage (BS 7385-2)

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	50 mm/s at 4 Hz and above
Unreinforced or light framed structures. Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above.

Construction traffic

The *Road Noise Policy* (RNP) (DECCW, 2011) provides road traffic noise criteria for residential land uses affected by construction traffic on the public road network.

The *Road Noise Policy application notes* state that any increase in the total noise level at existing residences and other sensitive land uses affected by traffic generation on existing roads should be limited to two dBA above current levels. This limit only applies when the noise level without the development is within two dBA or exceeds the road traffic noise criterion provided in the RNP.

Where construction traffic increases the existing road traffic noise levels by more than two dBA then further assessment against the road traffic noise criteria in Table 15 is required.

Table 15 Roads traffic noise criteria

Type of development	Day 7am to 10pm	Night 10pm to 7am
Existing residence affected by additional traffic on arterial roads generated by land use developments	60 L _{Aeq} (15 hour)	55 L _{Aeq} (9 hour)
Existing residence affected by additional traffic on local roads generated by land use developments	55 L _{Aeq} (1 hour)	50 L _{Aeq} (1 hour)

Operational noise

Operational noise is assessed in accordance with the *Noise Policy for Industry* (NPI) (EPA, 2017). The NPI addresses noise emanating from fixed facilities through assessing its intrusiveness based on the rating background noise level, and is presented below in Table 16.

Table 16 NPI noise intrusiveness criteria

Time of day	RBL (L _{A90,15min}), dBA	Intrusiveness trigger level
7am-6pm (daytime)	44	49 (RBL + 5 dB)
6pm-10pm (evening)	40	45 (RBL + 5 dB)
10pm-7am (night time)	31	36 (RBL + 5 dB)

Table 17 outlines the recommended amenity noise levels for different land uses for operational noise.

Table 17 Operational noise - amenity noise levels

Receiver	Noise amenity area	Time of day	L _{Aeq} , dBA
Residential	Suburban	Day	55
		Evening	45
		Night	40
Commercial	All	When in use	65
Industrial	All	When in use	70
Educational	All	Noisiest 1 hour	35 (internal)
Hospital/Medical	All	When in use	35 (internal) 50 (external)
Place of Worship	All	When in use	40 (internal)
Passive recreation	All	When in use	50
Active recreation	All	When in use	55

The noise trigger level adopted for the Proposal is the lower (the more stringent) value of the intrusiveness trigger level outlined in Table 16 and project amenity noise level outlined in Table 17.

6.3.3 Potential impacts

Construction phase

Construction noise

A number of construction noise scenarios were considered as part of the construction noise and vibration assessment. A summary of these scenarios is provided in Table 18.

Table 18 Construction scenarios

Construction scenario	Construction phase	Time frame
CS01	Site establishment and relocation of services	Standard hours OOHW Period 1 OOHW Period 2
CS02	Vegetation removal	Standard hours
CS03	Piling works	Standard hours
CS04	Stairs, ramps and lift upgrades	Standard hours OOHW Period 1 OOHW Period 2
CS05	Station fit out and systems Underpass construction Car park construction	Standard hours OOHW Period 1 OOHW Period 2
CS06	Platform level works Furniture installations	Standard hours OOHW Period 1 OOHW Period 2
CS07	Compound operations	Standard hours OOHW Period 1 OOHW Period 2

Exceedances of the construction noise management levels are typical for construction projects of this scale. The noise impacts would be limited to the construction period only and would not have lasting effects on the community. The maximum noise impacts would be expected during underpass construction and works at the platform level involving the use of a concrete saw.

Impacts during standard hours

Residences located within 400 metres of the Proposal site are expected to be noise impacted at some point during construction. The noise management level is predicted to be exceeded by up to 30 dBA due to the low background noise levels and the receiver's proximity to the proposed construction. The CNVS considers this level of exceedance as 'highly intrusive' and the additional mitigation measures discussed in Section 6.3.4 should be implemented at the affected receivers.

The highly noise affected level of 75 dBA is expected to be exceeded at 11 residential receivers. This exceedance is due to the receivers' proximity to the proposed construction works

Construction noise impact zones for typical (CS02) and worst-case (CS06) construction activities are provided in Figure 22 and Figure 23. The figures also show the worst affected receivers for all construction scenarios.

Construction noise contours for all modelled scenarios are provided in the NVIA (GHD, 2019b).

Impacts outside standard hours

Works outside standard construction hours are expected during rail possessions to complete installation works for the lift, stair rails and roofing. Works during the rail possession have been assessed for all modelled scenarios during the day, evening and night-time assessment periods. The rail possessions would be required to limit the effect on normal rail operations and to improve worker safety.

Residences located within 900 metres to the west and 1,100 metres to the east of the Proposal are expected to experience noise impacts during construction. These impacts would be over a short term period and limited to the proposed rail possession periods (weekend closures).

The noise management levels are predicted to be exceeded by up to 35 dBA (OOHW Period 1, day), 39 dBA (OOHW Period 1, evening) and 48 dB(A) (OOHW Period 2, night) during works outside of standard hours.

The CNVS considers these level of exceedances as 'highly intrusive' and the additional mitigation measures discussed in Section 6.3.4 should be implemented at the affected receivers.

Construction noise impact zones for typical (CS01) and worst-case (CS06) construction activities are provided in Figure 24 and Figure 25 for construction activities during OOHW period 2 (night). The figures also show the worst affected receivers for all construction scenarios.

Construction noise contours for all modelled scenarios are provided in the NVIA (GHD, 2019b).



Figure 22 Construction noise impact zones (worst-case)

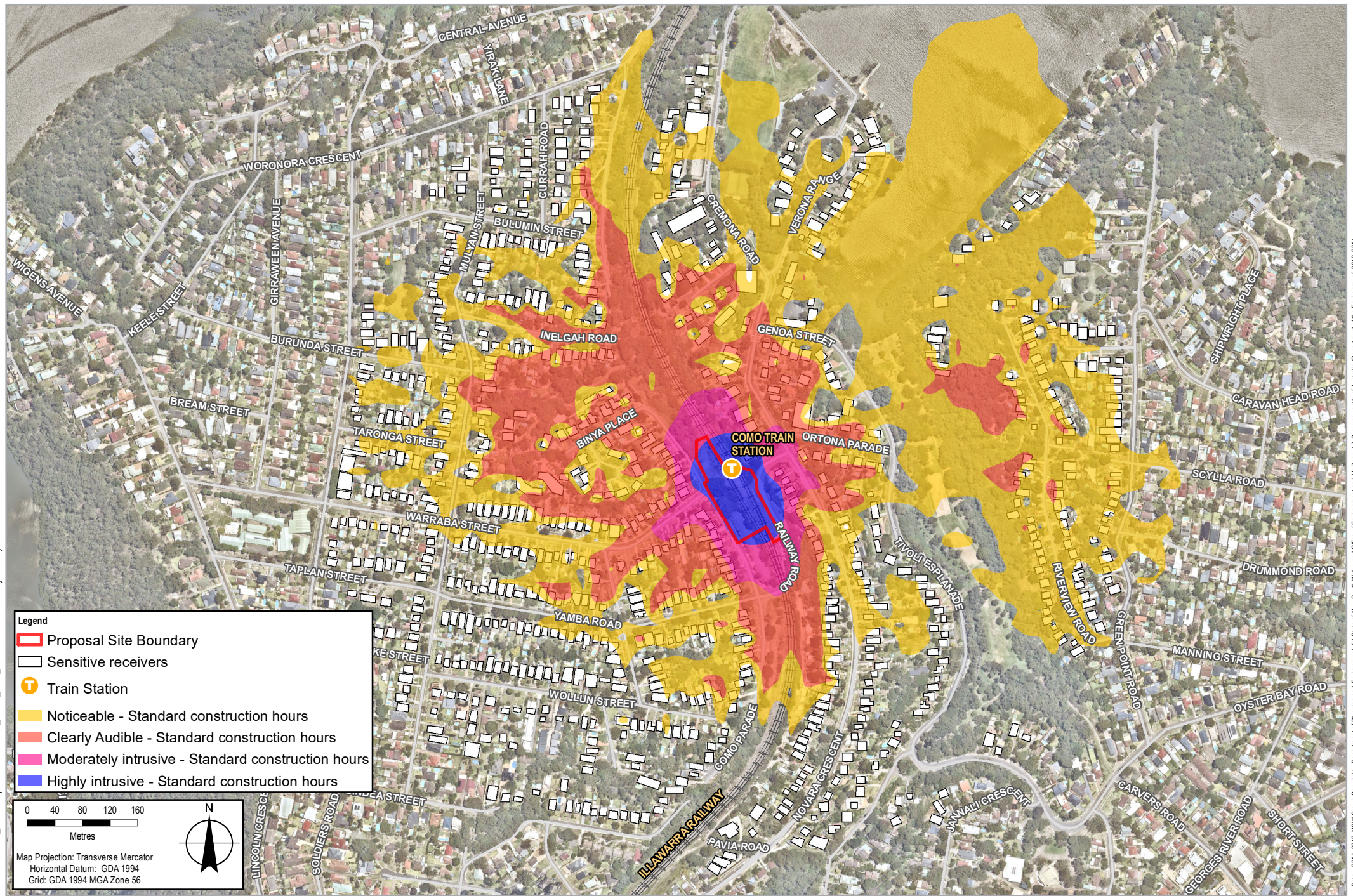


Figure 23 Construction noise impact zones for OOHW (typical)



Figure 24 Construction noise impact zones OOHW (worst case)

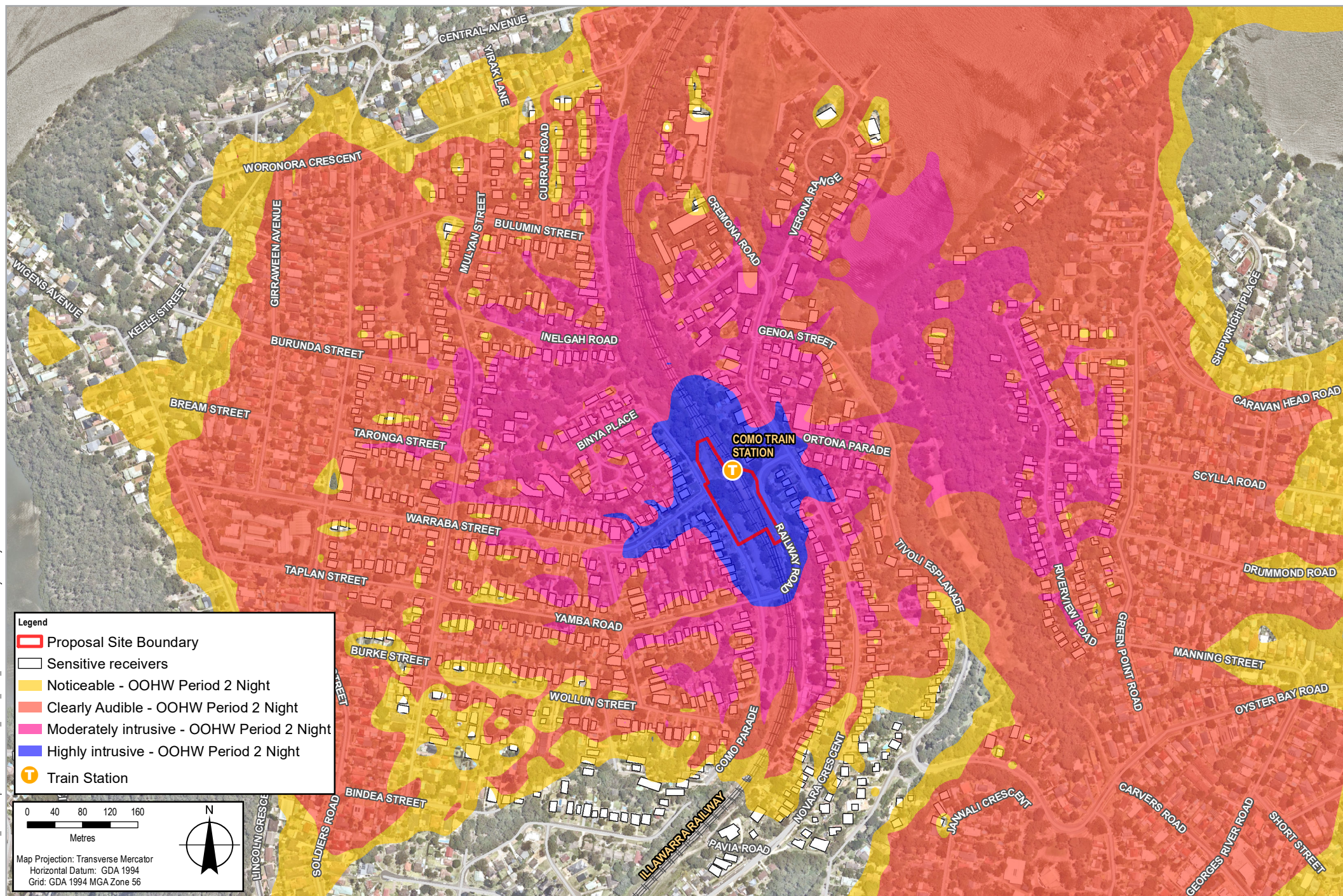


Figure 25 Construction noise impact zones OOHW (worst case)

Sleep disturbance impacts

Construction activities are expected outside standard construction hours to minimise the impacts on the rail network during construction. The sleep disturbance screening criteria of 52 dBA is predicted to be exceeded at 452 residential receivers. Therefore a detailed maximum noise level assessment has been undertaken. The RNP states that maximum internal noise levels between 50 to 55 dBA are unlikely to awaken people from sleep. Using a conservative assessment where windows are assumed to be partially opened, a 10dBA reduction is applied.

Based on this assessment 38 receivers would potentially experience sleep disturbance impacts. The details of these receivers where exceedances are found are outlined in the NVIA (GHD, 2018b). These impacts would be minimised with the implementation of mitigation measures which included scheduling noisier activities outside the sensitive parts of the night time period.

Construction traffic

Access to the Proposal site would be along Old Princes Highway and Toronto Parade/Railway Road/Novara Crescent. A significant increase in traffic volumes would be required along Old Princes Highway in order to increase road traffic noise by two dBA (a doubling in traffic roughly corresponds to a three dBA increase). The construction traffic increase is not considered likely to result in a doubling of traffic and therefore noise increase would be less than two dBA and further assessment of construction traffic noise along this route is not required.

These roads are local roads and would likely experience construction road traffic noise impacts as existing heavy vehicle traffic volumes would be low. Construction traffic would be scheduled during less sensitive time periods during the day in accordance with mitigation measures provided in Section 6.3.4.

Construction vibration

The CNVS specifies a safe working buffer distance of 22 metres for standard structures. The following standard structures, which are commercial receivers, have been identified within 22 metres of the construction area:

- 3 Railway Road
- 101 to 111 Como Parade.

The following residential structures have been identified within 100 metres of the construction activities and could potentially experience human comfort impacts:

- 95 – 117 Como Parade
- 1A – 12 Warraba Street
- 15 – 39 Novara Crescent.

Impacts on these properties would be minimised through the implementation of mitigation measures outlined in Table 21 in Section 7.2.

Operational phase

The Proposal would not increase the operations of the rail line and there would be no increase from the rail noise of Como Station due to the operation of the station upgrades. All other operational noise impacts from the station (lift, plant, public address systems) are not expected to increase noise levels past the operational noise criteria.

6.3.4 Mitigation measures

Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the *Construction Noise and Vibration Strategy* (TfNSW, 2018b).

The CNVMP would be the key management document that would prescribe specific mitigation measures to help reduce the impacts of construction noise and vibration. The measures would focus on Contractor inductions, the efficient operation of plant and equipment, along with prescribing safe working distances for vibration intensive equipment and detailing procedures for noise and vibration monitoring, and for obtaining TfNSW approval for out of hours works.

Noise management zones have been calculated for each construction stage showing the recommended additional mitigation measure for each time period. Noise management zones are shown for levels that are moderately intrusive and highly intrusive for distances up to one kilometre from the Proposal site as it is assumed distances greater than this would not be feasible or reasonable to implement in practice (GHD, 2018c).

The CNVMP would also be supported by the Community Liaison Plan to be prepared for the Proposal, which would detail community notification requirements.

Refer to Table 21 in Section 7.2 for a full list of proposed mitigation measures as per the TfNSW Construction Noise and Vibration Strategy (TfNSW, 2018b). All mitigation measures are to be incorporated into the CEMP.

Additional noise mitigation measures

The CNVS provides the following information regarding further mitigation measures for certain receivers exceeding noise management levels, these are outlined in Table 6-2 of the NVIA (GHD, 2018c).

The CNVS outlines the various trigger levels to warrant these mitigation measures, and such is presented below in Table 19.

The predicted noise levels for each receiver, and hence any additional noise mitigation measures, are presented in Appendix B of the NVIA prepared by GHD (GHD, 2018c).

Table 19 Triggers for Additional Mitigation Measures - Airborne Noise

Construction hours	Receiver perception	dBA above RBL	dBA above NML	Additional management measures
Standard hours Monday – Friday (7am-6pm) Saturday (8am-1pm)	Noticeable	5 to 10	0	-
	Clearly audible	> 10 to 20	< 10	-
	Moderately intrusive	> 20 to 30	> 10 to 20	PN, V
	Highly intrusive	> 30	> 30	PN, V
	75 dBA or greater	N/A	N/A	PN, V, SN
OOHW Period 1 Monday – Friday (6pm-10pm) Saturday (7am-8am, 1pm-10pm) Sunday/PH (8am-6pm)	Noticeable	0 to 10	< 5	-
	Clearly audible	> 10 to 20	5 to 15	PN
	Moderately intrusive	> 20 to 30	> 15 to 25	PN, V, SN, RO
	Highly intrusive	> 30	> 25	PN, V, SN, RO, RP ¹ , DR ¹
OOHW Period 2 Monday – Saturday (12am-7am, 10pm-12am) Sunday/PH (12am-8am, 6pm-12am)	Noticeable	0 to 10	< 5	PN
	Clearly audible	> 10 to 20	5 to 15	PN, V
	Moderately intrusive	> 20 to 30	> 15 to 25	PN, V, SN, RP, DR
	Highly intrusive	> 30	> 25	PN, V, SN, AA, RP, DR

Note 1: Respite periods and duration reduction are not applicable when works are carried out during OOHW Period 1 Day only.

Note 2: PN = Periodic Notification, V = verification monitoring, SN = specific notification, RO = respite offer, AA = alternative accommodation, AC = alternative construction methodology, RP = respite period, DR = duration reduction. A more detailed description of the additional management measures mentioned above are located TfNSW CNS.

Construction vibration

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

- Site tests to review of the measured frequency content to determine the structural damage criteria as per Table 14 for standard dwellings.
- Continuous vibration monitoring with a visual alarm installed to warn the equipment operator when the structural damage vibration criteria (considering frequency content) is being approached.

These mitigation measures pertain to the structures identified within the safe working buffer distance as outlined in Section 6.3.3.

6.4 Indigenous heritage

6.4.1 Existing environment

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) was undertaken on 07 January 2019 covering a one kilometre radius around Como Station. The closest Aboriginal site identified was in excess of 200 metres away and therefore would not be impacted by the Proposal.

The extensive landscape modification that has occurred across the Proposal area suggests that intact evidence of Aboriginal land use is unlikely to occur within the boundaries of the Proposal area. Similarly, the high level of disturbance would suggest the archaeological potential of the areas is low.

6.4.2 Potential impacts

Construction phase

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

- the extension of the underpass, the foundations and pits for the two new lift shafts and lifts
- construction of new stairs and ramps
- services relocation including construction of new combined services route.

Ground disturbing activities have the potential to impact Indigenous sites, if present.

As no known Indigenous heritage items are located in the vicinity of the Proposal area and no high risk landscape features are located at or near the Proposal area, the potential for unknown items to be present is considered to be low. As such, the Proposal is unlikely to affect Indigenous heritage during construction.

Operational phase

There would be no risks to Indigenous heritage from the operation of the Proposal.

6.4.3 Mitigation measures

Mitigation of Indigenous heritage impacts is not expected to be required as no known Indigenous heritage items or high risk landscape features have been identified near the Proposal area. Mitigation would therefore be limited to the management of any unknown impacts to Indigenous heritage through worker inductions and protocols for unexpected finds.

Refer to Table 21 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

The project will also investigate opportunities for recognising and celebrating Aboriginal Culture during design and construction. Specific design responses and initiatives will be developed in consultation with key stakeholders. This approach is outlined in the TAP 3 Aboriginal Inclusion Plan.

6.5 Non-Indigenous heritage

6.5.1 Existing environment

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

- National Heritage List
- Commonwealth Heritage List
- Register of the National Estate (non-statutory archive)
- NSW State Heritage Register
- Sutherland LEP.

The search identified no items listed on the Commonwealth, National or State Heritage Register within the Proposal area or immediate surrounds. Two locally listed heritage items were identified within 200 metres of the Proposal:

- House (item 0902 under Sutherland LEP) located about 60 metres west of the Proposal
- Woronora-Penshurst pipeline (archaeological item A4302 under Sutherland LEP) located about 200 metres north of the Proposal.

These items are shown in Figure 26.

6.5.2 Potential impacts

Construction phase

The Proposal would be confined to the boundary shown in Figure 26. One locally listed heritage item is located about 60 metres away from the Proposal area. It is unlikely that the Proposal would result in any direct or indirect (i.e. vibration) impacts on this heritage item.

Operational phase

There would be no risks to non-Indigenous heritage from the operation of the Proposal.

6.5.3 Mitigation measures

Mitigation of non-Indigenous heritage impacts is not expected to be required due to the lack of any potential impacts. Mitigation would therefore be limited to the management of any unknown impacts to non-Indigenous heritage through worker inductions and protocols for unexpected finds.

Refer to Table 21 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.6 Socio-economic impacts

6.6.1 Existing environment

Como is a suburb located in Southern Sydney at the southern bank of Georges River. It is located just north of Sutherland, which is one of the strategic centres of the community in far southern Sydney, mainly due to the presence of shopping areas. Como is a largely residential suburb with two primary schools and some small businesses located on Wolger Street and Cremona Road.

A review of the 2016 Australian Bureau of Statistics (ABS) Census data was undertaken for Como. The suburb of Como had a population of 3,977 people with a relatively even age distribution.

As a result of a disability, 2.25 per cent of residents within Como reported the need for assistance which is low compared to the wider Sutherland LGA of which 4.3 per cent of the population require assistance.

The population of Como is dependent on private vehicles for the primary mode of travel to work with 55.9 per cent of the population being the driver or passenger. Public transport was utilised by 28.1 per cent of the population to travel to work, with 23.9 per cent (of the total population) utilising trains. The use of cars for travel to work for Como is below both the NSW and Australian averages and the Sutherland LGA percentage of 97.7 per cent. The reliance on the use of vehicles is reflected in that 95.1 per cent of the population own at least one vehicle. This is well above both the NSW average of 87.1 and the Sutherland LGA average of 91.7 per cent.

6.6.2 Potential impacts

Construction phase

The Proposal has the potential to temporarily impact customers, pedestrians and the surrounding community as a result of:

- temporary changes to pedestrian access to, through and movements around the station (i.e. including along platforms)
- temporary impacts to local traffic movements and car park access
- increased truck movements delivering materials and equipment and transporting waste
- construction amenity impacts such as noise, vibration, dust and visual impacts.

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

The Proposal would not result in any acquisition and would not result in any impacts to any adjacent land uses as works would be located on RailCorp land with the exception of the roads and footpaths.

Operational phase

The Proposal would provide positive, long term socio-economic benefits to the broader Como community, including:

- improved accessibility for station customers and pedestrians, particularly people with a disability, elderly people and those with prams or luggage

- improved customer amenity and facilities, including accessible toilets
- improved access to transport interchange facilities through improved paths 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 also ensure that the station would be able to handle the predicted increase in patronage in 2036.

No adverse impacts are considered to result from the Proposal.

6.6.3 Mitigation measures

Potential impacts on the community would be managed through ensuring that access to, from and around the station would be maintained at all times, albeit with potential changes to access. The community would be provided with information of any changes in advance and would also be provided with contact details to make any complaints regarding the construction of the Proposal.

Refer to Table 21 in Section 7.2 for a full list of proposed mitigation measures (including traffic, transport and access measures). All mitigation measures are to be incorporated into the CEMP.

6.7 Biodiversity

A biodiversity impact assessment was prepared by GHD in January 2019 for the Proposal (GHD, 2019c). A desktop review of existing information was undertaken prior to the site inspection to identify biodiversity values that may be of relevance to the proposal. A site inspection was completed by a GHD ecologist on 12 December 2018 to identify vegetation, conservation significance, and habitat. The findings of the assessment are summarised in this section.

6.7.1 Existing environment

Flora

The vegetation on the eastern side of the station consists of planted native and exotic trees, shrubs, forbs and grasses which have either been planted or have self-recruited. The vegetation is located within a fenced area, adjacent to the footpath which follows Railway Road. A dense groundcover of mostly exotic grasses and forbs extends along this fenced section of railway reserve. The vegetation on the western side of the station includes indigenous species.

Regional-scale mapping of vegetation (OEH, 2013) of the Proposal site indicates the occurrence of patches of “Urban: Weeds and Exotics” on both sides of Como Station. North of the station, the patches of vegetation on both sides of the railway line are described as “Coastal Enriched Sandstone Dry Forest”. The occurrence of numbers of Smooth-barked Apple (*Angophora costata*) within the western side of the Proposal site indicate a gradient between planted non-indigenous species and self-recruitment of components of Coastal Enriched Sandstone Dry Forest, the vegetation type which probably originally occurred on the site (Photo 1).



Photo 1 Patch of Coastal Enriched Sandstone Dry Forest on western side of railway line, viewed from station platform

Flora and fauna habitats

The vegetation on the western side of the station occurs as a small linear patch the railway line with canopy connection extending northwards and southwards adjacent to the railway line. Although several hollow-bearing trees were recorded to the north of the site, no hollow bearing trees were recorded at the Proposal site.

The vegetation on the eastern side of the Proposal site consists of a short narrow band of fenced shrubbery which is not maintained. No nests or drey were recorded during the survey at this location.

A number of bird species were observed during the survey including the Spotted Pardalote (*Pardalotus punctatus*), Crested Pigeon (*Ocyphaps lophotes*), Noisy Miner (*Manorina melanocephala*), Magpie (*Cracticus tibicen*), Magpie-lark (*Grallina cyanoleuca*), Little Wattlebird (*Anthochaera chrysoptera*), Rainbow Lorikeet (*Trichoglossus haematodus*) and Australian Raven (*Corvus coronoides*).

Microchiropteran bats that forage within the complete, continuous patches of native vegetation in Georges River National Park to the west and Towra Point Nature Reserve and Botany Bay National Park to the east may occur on the site. These bats are unlikely to roost in trees on the site, given the narrow width of the vegetated section of the Proposal site and absence of hollows for roost sites. There is no suitable roosting habitat for cave-roosting species.

Small, common garden skinks may occur in the mulched beds and sandstone cliff faces (Photo 2), but no individuals were detected during the site inspection.



Photo 2 Sandstone cliff, showing available habitat for reptiles.

6.7.2 Threatened biota and migratory species

Threatened flora

Background investigations identified five threatened flora species listed under the BC Act and/or EPBC Act that were considered to have the potential to occur within the locality of the study area (GHD 2019c). Of the threatened plant species previously recorded or predicted to occur in the locality, the most likely occurrences include two Eucalypt species; Camfield's Stringybark (*Eucalyptus camfieldii*) and Yellow-Top Ash (*Eucalyptus luehmanniana*). No evidence of these or any other threatened plants was detected during searches within the Proposal site and in areas of self-recruited natives on the railway batters on both sides of the railway station. Given that no complete, continuous stands of vegetation occur in the Proposal site, and the modified nature of the areas to be affected by the proposal, threatened flora species are unlikely to occur.

Threatened fauna

Background investigations identified 18 threatened fauna species listed under the BC Act and/or EPBC Act that have been previously recorded or have the potential to occur within the locality (GHD 2019c). No threatened fauna species were observed during the site inspection. Of the threatened fauna species listed under the BC Act and EPBC Act that have been previously recorded in the locality, the Grey-headed Flying Fox (*Pteropus poliocephalus*), Powerful Owl (*Ninox strenua*) and several microbats species are the most likely to occur at the Proposal site.

However the Proposal site does not provide suitable hollows for breeding and would not comprise core habitat for these species.

While it is possible that more mobile threatened species, such as micobat species, may occur at the Proposal site on occasion, they would not be reliant on the small number of individual trees to be removed for the proposal for their persistence in the locality.

The Proposal site does not contain suitable habitat for other threatened and migratory fauna species, including forest and woodland birds, known from the locality that rely on more structurally and floristically complex stands of native vegetation for foraging and roosting. There is no suitable habitat in the study area for threatened reptiles, frogs or migratory waders.

6.7.3 Trees

The location of trees and tree groups assessed are shown in Figure 27.

All of the surveyed trees on the eastern side of the station appear to have been planted, while the surveyed trees on the western side are a combination of naturally occurring indigenous species and planted specimens. Most of the surveyed trees are in good condition and form.

The Hill's Weeping Fig (*Ficus microcarpa* var. *hillii*) is located outside of the Proposal site (Photo 3). The large, mature Hill's Weeping Fig has landscape value, as well as habitat value, even though this species is not indigenous to Sutherland Shire.

Hill's Weeping Fig, is "widely grown in New South Wales and northwards, especially as a roadside tree especially near the coast" (Spencer, 1997). This specimen has a low, broadly-spreading canopy which may require management to allow vehicular access.



Photo 3 View of the Hill's Weeping Fig, viewed from the western side of Como Parade.



Figure 27: Trees and tree groups

6.7.4 Potential impacts

Construction phase

Tree removal

The following trees and tree groups occur on the eastern side of the station, are associated with direct impacts from construction and would require removal (see Figure 27):

- Tree group 1 (River Bottlebrush, Brush Daphne and African Olive)
- Tree 2 (Coast Banksia); and
- Tree 3 (Sweetgum)

The following trees occur on the western side of the station, are located within construction areas and would require removal (see Figure 27):

- Tree 9 (Smooth-barked Apple)
- Tree 10 (Smooth-barked Apple)
- Tree 13 (Spotted Gum)
- Tree 14 (Smooth Cheesetree)
- Tree 15 (Smooth-barked Apple)

Tree removal and excavation for construction of the lift would also require the removal of numbers of small trees, shrubs and forbs.

The following trees (see Figure 27) are not designated for removal, but may also require removal to allow access for construction:

- Tree 8 (Smooth-barked Apple) is located near the proposed construction area and may require removal for machinery access. If retained it is likely that a portion of the Tree protection Zone (TPZ) would be removed
- Tree 11 (Smooth-barked Apple) is located near the southern edge of the construction area. Its removal should be considered because of its instability and the likelihood of leaders falling onto the railway line, or the lift building
- Tree 12 (Smooth-barked Apple) may require removal to provide machinery access from Como Parade to the car park. This tree has good landscape and habitat value and would be retained if possible. If possible, preference should be given to retention of Tree 12 and removal of an over-mature *Bauhinia variegata* growing to the south of Tree 12 for machinery access
- Tree 16 would be located adjacent to the construction area. The original tree has died and the necrotic growth is covered by the indigenous vine *Hibbertia scandens*.

If Trees 11 (Smooth-barked Apple), 12 (Smooth-barked Apple) and 8 (Smooth-barked Apple) are to be retained, temporary protective fencing would be required during construction.

Offset for tree removal and landscaping would be undertaken in accordance with TfNSW's *Vegetation Offset Guide* (TfNSW, 2017d) and in consultation with the relevant council, and/or the owner of the land upon which the vegetation is to be planted. The nine trees identified for removal would be offset with a minimum of 36 trees. Offset would also be required for any additional clearing, including for the four additional trees identified above as possibly requiring removal.

It is likely that construction machinery would be used beneath the section of canopy which projects from the Hill's Weeping Fig (a component of Tree group 4) over the footpath. Appropriate mitigation measures have been included in Section 6.7.5 to ensure damage to protruding branches are minimised during construction.

Impacts to native vegetation and threatened flora and fauna

The Proposal site does not contain any threatened ecological communities or habitat for threatened flora. The vegetation on the Proposal site does not provide important resources for any threatened fauna species or migratory birds previously recorded or predicted to occur in the locality given the small isolated nature of the vegetation patches, the absence of important habitat features and the lack of connectivity with areas of known habitat. Any local population of such species would not be reliant on the vegetation to be affected by the proposal for their persistence in the locality.

The removal of four planted trees from the eastern side of the station and five trees from the western side of the station, along with a small number of shrubs would have a negligible impact on native flora and fauna within the locality. The Proposal would therefore not have a significant impact on any threatened species, population or ecological community listed under the BC Act.

Operational phase

The Proposal site is located within a highly modified urban environment and the operational phase of the proposal would not involve any additional impacts on native flora and fauna beyond existing conditions.

6.7.5 Mitigation measures

The following mitigation measures are recommended with respect to tree removal, and the protection and management of trees at the Proposal site:

- Construction of the Proposal must be undertaken in accordance with TfNSW's *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2015a) and TfNSW's *Fauna Management Guideline* (TfNSW, 2017e).
- 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 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.
- The shrubs and trees which require removal would be removed in accordance with applicable Safe Work Australia (2016) and Safework NSW guidelines.
- If appropriate, the felled trees would be mulched and spread over the TPZ of retained trees or regeneration areas.
- Although Tree 11 was not considered for removal in the construction design, its removal or pollarding should be considered because of its proximity to the cliff edge and the railway line for safety concerns.

- Removal of Trees 12, 16 and 8 should be determined once the final design details and machinery requirements are available. If the trees are to be retained, protection measures for retained trees should be followed (as outlined below).
- Those trees proposed for retention should be protected by temporary fencing. Fencing should be installed prior to demolition and should be kept in place during excavation and construction. Tree 5 (Port Jackson Cypress), Tree 6 (Smooth-barked Apple) and Tree 7 (Smooth-barked Apple) would not require fencing if the existing fence is retained.
- Protection of Trees 4, 5, 6 and 7 would be undertaken in line with Australian Standard AS 4970-2009 *Protection of Trees on Development Sites*, and may require exclusion fencing of the TPZ
- The following actions would not be permitted within TPZs:
 - Storage of materials, plants or equipment
 - Installation of site sheds or portable toilets
 - Excavations, trenching, ripping or cultivation of soils
 - Modification of existing soil level or addition of fill materials
 - Disposal of waste materials and chemicals (both solid or liquid)
 - Mechanical removal of vegetation
 - Pedestrian or vehicular movement.
- Any root pruning required within the TPZ should be approved by the project arborist and any digging and pruning of roots (only roots < 5cm may be pruned) within the TPZ should be conducted by hand for a clean cut.
- To protect soil within the TPZ, a layer of organic mulch may be applied (no more than 75 mm thick). Any mulch used should comply with the Australian Standard – composts, soil conditioners and mulches AS4454-2012 (SA 2012).
- A project arborist should supervise works and inspect excavated areas adjacent to retained trees, in order to assess the amount of tree fine roots affected, the loss of which may affect tree health as well as the amount of supporting roots affected, the loss of which may affect tree stability. The project arborist would then determine appropriate ameliorative measures for retained trees (e.g. canopy reduction, irrigation, fertiliser applications) or provide recommendations for tree removal if required.
- If tall machinery needs to pass beneath the canopy of the Hill's Weeping Fig (a component of Tree group 4), the projecting lower branches should be tied back by a qualified arborist, in order to lift them above the height of the machinery. Any damage to the lower canopy resulting from machinery should be treated by a qualified arborist.
- Offset for tree removal and landscaping would be undertaken in accordance with TfNSW's *Vegetation Offset Guide* (TfNSW, 2017d) and in consultation with the relevant council, and/or the owner of the land upon which the vegetation is to be planted. The 9 trees identified for removal would be offset with a minimum of 34 trees. Offset would also be required for any additional clearing, including for the 4 additional trees identified as possibly requiring removal.
- Weed control measures, consistent with TfNSW's *Weed Management and Disposal Guideline* (TfNSW, 2015b), 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.

The removal of individual trees for the proposal would be offset in accordance with the TfNSW *Vegetation Offset Guide* (2017d) and outlined in Table 20. Offsets would be implemented once the exact extent of the clearing required and the number of trees to be removed has been confirmed with TfNSW. Under the TfNSW *Vegetation Offset Guide* (2017d), trees are defined as a 'woody plant greater than two metres tall with a single stem or branches above the base'.

Table 20 Offsetting for individual tree removal

Size of tree (Diameter at Breast Height)	Offset required
Large tree (DBH>60cm)	Plant minimum of 8 trees
Medium tree (DBH 15-60cm)	Plant minimum of 4 trees
Small young tree (DBH<5cm)	Plant minimum of 2 trees

6.8 Contamination, landform, geology and soils

A desktop geotechnical and contamination assessment was undertaken as part of the REF. A preliminary contamination assessment was undertaken as part of the Scoping Design Report (Aurecon, 2018). The findings are summarised in this section.

6.8.1 Existing environment

Landform

The landform in the vicinity of Como Station is gently inclined towards the east. The station is positioned in a cutting and the station underpass is located below track level.

Soils and geology

Geological Series Sheet 9029-9129 (Stroud, Sherwin, Roy and Baker, 1985) shows that Como Station is underlain with Hawkesbury Sandstone. The Hawkesbury Sandstone is generally medium to coarse grained quartz sandstone with minor shale and laminate lenses.

The soil landscape at the Como Station is underlain by Gynea landscape that comprises undulating to rolling rises and low hills on Hawkesbury Sandstone. This landscape comprises shallow discontinuous earth sands and yellow earths on crests and shallow to moderately deep leached sands, grey earths and gleyed podzolic soils in poorly drained areas.

The Australian Soil Resource Information System (ASRIS) and the SSLEP showed that Como Station and surrounds was mapped as Class 5 and located in low probability of Occurrence of Acid Sulphate Soils.

Based on the Scoping Design Report (Aurecon, 2018), the likelihood of the occurrence of saline soil conditions is considered to be very high.

Contamination

Australian Standard AS 4482. 1-2005 – *Guide to the investigation and sampling of sites with potentially contaminated soils – 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 and may be present at Como Station:

- hydrocarbons

- arsenic
- phenolics
- heavy metals
- nitrates and ammonia.

The EPA contaminated lands register was searched on 11 December 2018. No identified contaminated lands are located within the suburb of Como. A search of the List of NSW Contaminated Sites Notified to the EPA was also undertaken (list current at 11 December 2018), no sites within Como are listed.

The station may contain contaminated materials with the fabric of the existing buildings including:

- asbestos
- lead paint
- polychlorinated biphenyls in light fittings
- synthetic mineral fibres.

There may be contaminated fill present onsite, in particular beneath the hardstand of the platform and within the footprint of the railway corridor. Soils underlying the railway corridor may have also been impacted from previous spills or leaks.

6.8.2 Potential impacts

Construction phase

Erosion and sedimentation

The Proposal would require rock cutting and excavation work for the extension of the underpass. Other excavation work would be required for the installation of the lift shaft pits, new footpaths, new ramp and stairs, and associated sign posts. Other trenching or excavation may be required for the relocation of services or vegetation removal.

Excavation and other earthworks such as trenching can result in erosion and sedimentation if not undertaken with appropriate controls. Impacts could include:

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

Such impacts can also lead to an adverse effect on water quality and biodiversity through the introduction of sediments into waterways. Erosion and sedimentation risks for the Proposal are considered to be low, as it is expected that erosion could be adequately managed through the implementation of mitigation measures outlined in Table 21 in Section 7.2.

Contamination

Excavation also has the potential to expose contaminants, which if not appropriately managed, can present a health risk to construction workers and the community. Contaminants would also pose an environmental risk if they were to enter nearby waterways through the stormwater infrastructure. As there are no confirmed contaminated sites within close proximity of the Proposal site, contamination is not expected to be encountered.

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

Such impacts would be managed with the implementation of mitigation measures outlined in Table 21 in Section 7.2.

Prior to works commencing on any existing buildings or structures, a hazardous materials survey for lead paint, asbestos and other potentially hazardous materials would be required.

The disturbance of saline soils would have the potential to impact the local environment if not managed properly. The erosion and transfer of saline sediments offsite has the potential to alter the water quality of receiving environments which in turn may impact flora and fauna that is sensitive to elevated levels of salinity.

The implications of salinity would be considered prior to undertaking excavation works. Mitigation measures such as monitoring for salinity during excavation and ensuring saline soils are stockpiled separately and disposed of appropriately would be included in the CEMP.

Caution would be exercised in undertaking excavation in areas of salinity, particularly for the lift shafts where deeper excavations are required. Impacts associated with improper management or re-use of excavated saline soils would be avoided during construction with the implementation of mitigation measures outlined in Table 21 in Section 7.2.

Operational phase

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

6.8.3 Mitigation measures

- As part of the CEMP, a site-specific erosion and sediment controls plan would be prepared and implemented in accordance with the 'Blue Book' - Managing Urban Stormwater: Soils and Construction Guidelines (Landcom, 2004). The plan would be established prior to the commencement of construction and be updated and managed throughout as relevant to the activities during the construction phase.
- An environmental risk assessment is to be undertaken prior to construction and must include a section on contamination as per the Transport for NSW Standard Requirements. Measures to mitigate potential impacts from any contaminated soil/materials during construction would be developed and implemented through an unexpected contamination finds procedure and Waste Management Plan as part of the CEMP. Prior to works commencing on buildings and structures a hazardous materials surveys would be completed. Remediation would be undertaken if identified contamination poses a risk to human health or the environment. All waste would be managed in accordance with relevant legislation.

Refer to Table 21 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.9 Hydrology and water quality

6.9.1 Existing environment

Surface water

The Proposal site is located within the Carina Bay sub catchment which is located within the Georges River catchment. An unnamed ephemeral tributary of Carina Bay is located about 310 metres east of the station. This tributary is a drainage line running through Carina Bay Reserve (open space).

Surface water in the vicinity of the Proposal site is managed by the Council stormwater drainage system consisting mainly of kerb and gutter drainage connected to an underground pipe network.

Surface water quality in the vicinity of the Proposal is considered to be consistent with an urbanised environment with many sources of pollution such as oils from adjacent road, rubbish and leaf litter.

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 1.3 kilometres south of the Proposal. The groundwater levels at this bore and surrounding bores is about three metres below the surface.

Flooding

The proposal site is not considered to be flood prone due to the distance to any nearby watercourses which would be subject to flooding. Flood mapping provided in the Sutherland LEP indicates that the proposal is not located in a flood planning area. The stormwater drainage system in the vicinity of the Proposal is considered to appropriately manage any surface water to prevent flooding.

6.9.2 Potential impacts

Construction phase

Surface water

The Proposal would have limited impacts on surface water during the construction phase. Surface water would be diverted around the proposed works, with existing stormwater infrastructure to remain in operation throughout construction. Where impacts to existing stormwater infrastructure is required, alternative arrangement (diversions) would be put in place.

Without the appropriate management of pollutants (such as fuel, chemicals or wastewater from accidental spills, and sediment from excavations and stockpiles), the Proposal has the potential to result in impacts on water quality in nearby stormwater infrastructure and watercourses. With the implementation of mitigation measures outlined in Section 6.9.3 and Table 21 in Section 7.2, water quality impacts associated with the Proposal are considered to be manageable.

Groundwater

Excavation depths for the underpass would be around six to eight metres. The lift shaft would require excavation to an additional two metres. As groundwater depths at the station is unknown, the likelihood of encountering groundwater is unknown. However, due to the limited extents of excavation required it is not anticipated that significant volumes of groundwater would be encountered. Should groundwater be encountered any dewatering activities would be undertaken in line with TfNSW's *Water Discharge and Reuse Guideline* (TfNSW, 2017f).

Areas of excavation such as the lift shafts have the potential to accumulate water due to rainfall or seepage in the excavations. Water from excavation would be required to be removed. Incorrect dewatering methods have the potential to result in impacts on nearby watercourses or stormwater infrastructure. If the groundwater is acidic or saline, discharge to the environment may cause adverse impacts to waterways and scalding of vegetation. Such impacts would be minimised through undertaking any dewatering activities in accordance with TfNSW's *Water Discharge and Reuse Guideline* (TfNSW 2017f).

Flooding

The Proposal site is not expected to be subject to wide spread flooding, however following larger rainfall events some localised flooding may occur. This flooding has the potential to increase the risk of erosion and sedimentation particularly in areas where vegetation clearing or excavation have been undertaken. These impacts would be minimised through implementing the mitigation measures outlined in Table 21 in Section 7.2.

Operational 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 the underpass and establishment of the new station entrances (particularly the western entrance). 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 that the Proposal would not be impacted by flooding and would not worsen local flooding patterns.

6.9.3 Mitigation measures

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

Surface water movement around the site would be maintained where possible. Any clean water flows would be diverted around the Proposal site to avoid the polluting of these flows.

Refer to Table 21 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.10 Air quality

6.10.1 Existing environment

Air quality in the vicinity of the Proposal site is considered to be typical of an urban environment which is located adjacent to a rail corridor which is utilised by diesel services. Local air quality is also impacted by vehicles on the surrounding local network. Some local industries are also considered to contribute to the local air quality.

Sensitive receivers in the vicinity of the Proposal site include:

- staff and customers at Como Station
- residents to the east and west of the station
- students, teachers and users of Como Pre-school Kindergarten and Como Public School to the north and north east of the station.

The Department of Environment's *National Pollutant Inventory* was searched on 2 January 2019, which showed no polluting facilities exist within the Como postcode.

The Office of Environment and Heritage (OEH) operates a number of air quality monitoring sites in Sydney's south west. The Regional Air Quality Index for south-west Sydney was generally considered to be between fair and good for December 2018. Some elevated ratings including a very poor rating, were recorded during this period, however it was limited

to one day which can be attributed to an event such as bushfire (or hazard reduction burning).

6.10.2 Potential impacts

Construction phase

The main air quality impacts that have the potential to occur during construction would be temporary and associated with dust generation and emissions from construction vehicles and equipment.

Anticipated sources of dust and dust-generating activities include:

- excavation for the underpass extension, foundations and footings for the lifts and new stairs
- other trenching or excavation may be required for footpath and road works, relocation of services, drainage works and vegetation removal
- stockpiling activities
- dust generated from the loading and transfer of material to and from trucks
- movement of vehicles over disturbed areas.

The Proposal would require rock cutting and excavation work for the extension of the underpass. These works have the potential to impact air quality with the potential to generate dust. However these impacts would be reduced through the implementation of mitigation measures outlined in Table 21 in Section 7.2.

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.

Sources of a reduction to air quality associated with the Proposal are considered to be able to be appropriately managed with the implementation of mitigation measures outlined in Table 21 in Section 7.2.

Operational phase

There are no anticipated impacts to air quality during operation of the Proposal. As the Proposal would increase access to public transport, the use of public transport would be anticipated to increase and lead to a relative reduction in the amount of private vehicle related emissions in the long-term.

6.10.3 Mitigation measures

Mitigation measures are aimed around maintaining and operating plant and equipment efficiently and implementing measures for dust suppression including watering, covered loads and appropriate management of tracked dirt/mud on vehicles.

Refer to Table 21 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.11 Other impacts

6.11.1 Waste

The construction of the Proposal would generate the following waste:

- earthworks spoil
- green waste

- asphalt and concrete
- various building material wastes (including metals, timbers, plastics, fencing etc)
- electrical wiring and conduit wastes (from electrical connections)
- hazardous wastes
- general waste, including food and other wastes generated 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 works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities along with other onsite management practices such as keeping areas tidy and free of rubbish.

Waste management targets in accordance with the *ISCA IS Rating Tool v1.2 (2017)* would be developed for the Proposal and would include reuse and recycling.

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

Refer to Table 21 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.12 Cumulative impacts

Cumulative impacts occur when two or more projects are carried out concurrently and in close proximity to one another. The impacts may be caused by both construction and operational activities and can result in a greater impact to the surrounding area than would be expected if each project was undertaken in isolation. Multiple projects undertaken at a similar time/similar location may also lead to construction fatigue, particularly around noise, traffic and air quality impacts, if not appropriately managed.

A search of the Department of Planning and Environment's Major Projects Register, Sydney South Joint Regional Planning Panel Development and Planning Register, and the Sutherland Shire City Council Development Application Register on 9 January 2019 identified no major developments in the vicinity of the Proposal likely to be constructed at the same 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.

6.13 Climate change and sustainability

6.13.1 Greenhouse gas emissions

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

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

Due to the small scale of the Proposal and the short term temporary nature of the individual construction works, it is considered that greenhouse gas emissions resulting from the construction of the Proposal would be minimal. Furthermore, greenhouse gas emissions

generated during construction would be kept to a minimum through the implementation of the standard mitigation measures detailed in Table 21 in Section 7.2.

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

6.13.2 Climate change

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

Climate change could lead to an increase in the intensity of rainfall events, whereby the rainfall expected to occur in a 100-year average recurrence interval flood event would occur more frequently.

A climate risk assessment was undertaken during the scoping design. This assessment looked at the following factors across two timelines: 2030 and 2070:

- Temperature;
- Heat;
- Precipitation; and
- Bushfire.

There were no 'extreme' risks identified. The following high risks were identified:

- More high heat days by 2070.

In order to mitigate this risk, a new steel roof will be installed at the lift to reduce impacts to waiting customers.

Rainfall events and flooding are unlikely to impact on the Proposal (see Section 6.9 for an assessment on flood impacts).

Climate change could lead to an increase in frequency and severity in bushfires. The Proposal is not situated on land mapped as bush fire prone, but would be designed with appropriate fire protection measures. The closest bush fire prone lands are mapped in the SSLEP Bushfire Prone Land maps at distances of approximately 285 metres to the east, 400 metres to the south and 700 metres to the west.

6.13.3 Sustainability

The design of the Proposal would be based on the principles of sustainability, including aiming for an excellent rating as a program under the Infrastructure Sustainability Council of Australia's (ISCA) Infrastructure Sustainability (IS) Rating Tool Version 1.2 and the TfNSW Environmental Management System (EMS). These guidelines require a number of mandatory and discretionary initiatives to be applied. Refer to Section 3.1.4 for more information regarding the application of these guidelines.

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

7 Environmental management

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

7.1 Environmental management plans

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

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

7.2 Mitigation measures

Mitigation measures for the Proposal are listed below in Table 21. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6 should the Proposal proceed.

Table 21 Proposed mitigation measures

No.	Mitigation measure
General	
1.	A Construction Environmental Management Plan (CEMP) would be prepared by the 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 TfNSW, prior to the commencement of construction and following any revisions made throughout construction.
2.	A project risk assessment including environmental aspects and impacts would be undertaken by the Contractor prior to the commencement of construction and documented as part of the CEMP.
3.	An Environmental Controls Map (ECM) would be developed by the Contractor in accordance with TfNSW's <i>Guide to Environmental Controls Map</i> (TfNSW, 2017g) for approval by TfNSW, prior to the commencement of construction and following any revisions made throughout construction.
4.	Prior to the commencement of construction, all contractors would be inducted on the key project environmental risks, procedures, mitigation measures and conditions of approval.
5.	Site inspections to monitor environmental compliance and performance would be undertaken during construction at appropriate intervals.
6.	Service relocation would be undertaken in consultation with the relevant authority. Contractors would mark existing services on the ECM to avoid direct impacts during construction.

No.	Mitigation measure
7.	Any modifications to the Proposal, if approved, would be subject to further assessment and approval by TfNSW. This assessment would need to demonstrate that any environmental impacts resulting from the modifications have been minimised.
Traffic and site access	
8.	Prior to the commencement of construction, a Traffic Management Plan (TMP) would be prepared as part of the CEMP and would include at a minimum: • vehicle approach routes • Traffic management and TCP • workers transportation and on-site parking provisions • pedestrian and bicycle rider management • oversize vehicle permit requirements • road hazards (including environmental, transportation infrastructure, emergency services and public facilities) • methods of communicating traffic changes to the local community and visitors to the area. • recommended mitigation measures during construction. The TMP would be developed in consultation with Sutherland Shire Council, Transport for NSW and Roads and Maritime Services. Consultation with the relevant roads authorities would be undertaken during preparation of the construction TMP. The performance of all project traffic arrangements must be monitored during construction.
9.	Communication would be provided to the community and local residents to inform them of changes to parking, pedestrian access and/or traffic conditions including vehicle movements and anticipated effects on the local road network relating to site works.
10.	Road Occupancy Licences for temporary road closures would be obtained, where required.
Urban design, landscape and visual amenity	
11.	An Urban Design Plan (UDP) would be prepared by the Contractor, in consultation with the relevant council, and submitted to TfNSW for endorsement by the Precincts and Urban Design team, prior to finalisation of the detailed design. The UDP, at a minimum, would address the following: • the appropriateness of the proposed design with respect to the existing surrounding landscape, built form, behaviours and use-patterns (including consideration of Crime Prevention Through Environmental Design principles). This is to include but not be limited to: ○ connectivity with surrounding local and regional movement networks including street networks, other transport modes and active transport networks. Existing and proposed paths of travel for pedestrians and bicycles should be shown ○ integration with surrounding local and regional open space and or landscape networks. Existing and proposed open space infrastructure/landscape elements should be shown ○ integration with surrounding streetscape including street wall height, active frontages, awnings, street trees, entries, vehicle cross overs etc ○ integration with surrounding built form (existing or desired future) including building height, scale, bulk, massing and land-use

No.	Mitigation measure
	design detail that is sensitive to the amenity and character of heritage items located within or adjacent to the Proposal site.
12.	A Public Domain Plan (PDP) would be prepared by the Contractor, in consultation with the relevant council, and submitted to TfNSW for endorsement by the Precincts and Urban Design team, prior to finalisation of the detailed design. The PDP, at a minimum, would address the following: - materials, finishes, colour schemes and maintenance procedures including graffiti control for new walls, barriers and fences - location and design of pedestrian and bicycle pathways, street furniture including relocated bus and taxi facilities, bicycle storage (where relevant), telephones and lighting equipment - landscape treatments and street tree planting to integrate with surrounding streetscape - opportunities for public art created by local artists to be incorporated, where considered appropriate, into the Proposal - total water management principles to be integrated into the design where considered appropriate - identification of design and landscaping aspects that would be open for stakeholder input, as required.
13.	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> .
14.	The Detailed design of the Proposal would comply with Crime Prevention Through Environmental Design principles.
15.	Worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.
16.	Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
17.	During construction, graffiti would be removed in accordance with TfNSW's Standard Requirements.
18.	Where possible retain the existing Angophora Costata tree to the commuter car park entry, as this individual tree contributes positively to the character and identity of the station precinct
19.	Retain and protect the existing Fig tree within the station precinct on Como Parade for its positive contribution to landscape character and visual amenity of the station precinct
20.	Retain and protect as much existing vegetation as possible, particularly mature canopy trees, for their provision of visual amenity, visual integration for the Proposal, and screening
21.	Ensure any infill landscape treatment to the existing access ramp from Como Parade utilises a planting palette consistent with the existing station precinct to achieve an integrated outcome
22.	Where possible, introduce new tree planting in the immediate vicinity of trees to be removed, of a similar scale and character to existing, to mitigate any visual impact of the Proposal and ensure integration of the Proposal into the station precinct context.

No.	Mitigation measure
Noise and vibration	
23.	Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the <i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2009), <i>Construction Noise and Vibration Strategy</i> (TfNSW, 2018b) and the Noise and Vibration Impact Assessment for the Proposal (GHD, 2019b). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.
24.	The CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which would be considered, include: - regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise - avoiding any unnecessary noise when carrying out manual operations and when operating plant - ensuring spoil is placed and not dropped into awaiting trucks - avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where practicable - switching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloaded - avoiding deliveries at night/evenings wherever practicable - no idling of delivery trucks - keeping truck drivers informed of designated vehicle routes, parking locations and acceptable delivery hours for the site - minimising talking loudly; no swearing or unnecessary shouting, or loud stereos/radios onsite; no dropping of materials from height where practicable, no throwing of metal items and slamming of doors.
25.	The CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which would be considered, include: - maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances - using the most suitable equipment necessary for the construction works at any one time - directing noise-emitting plant away from sensitive receivers - regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc - using non-tonal reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms for all plant used regularly onsite (greater than one day), and for any out of hours works - use of quieter and less vibration emitting construction methods where feasible and reasonable.
26.	Works 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 works outside these hours may be undertaken if approved by TfNSW and the community is notified prior to these works commencing. An Out of Hours Work application form would need to be prepared by the Contractor and submitted to the TfNSW Environment and Planning Manager for any works outside normal hours.

No.	Mitigation measure
27.	Where the L_{Aeq} (15minute) 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 TfNSW's <i>Construction Noise and Vibration Strategy</i> (TfNSW, 2018b). This would include restricting the hours that very noisy activities can occur.
28.	To avoid structural impacts as a result of vibration or direct contact with structures, the proposed works would be undertaken in accordance with the safe work distances outlined in the Noise and Vibration Assessment (GHD, 2019b) and attended vibration monitoring or vibration trials would be undertaken where these distances are required to be challenged.
29.	Vibration resulting from construction and received at any structure outside of the project would be managed in accordance with: - for structural damage vibration - German Standard DIN 4150: Part 3 – 1999 Structural Vibration in Buildings: Effects on Structures and British Standard BS 7385-2:1993 Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz) - 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 7385-2:1993 Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz).
30.	Property conditions 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 50 metres from the works and all heritage listed buildings and other sensitive structures within 150 metres of the works (unless otherwise determined following additional assessment they are not likely to be adversely affected).
Indigenous heritage	
31.	All construction staff would undergo an induction in the recognition of Indigenous cultural heritage material. This training would include information such as the importance of Indigenous cultural heritage material and places to the Indigenous community, as well as the legal implications of removal, disturbance and damage to any Indigenous cultural heritage material and sites.
32.	If unforeseen Indigenous objects are uncovered during construction, the procedures contained in TfNSW's <i>Unexpected Heritage Finds Guideline</i> (TfNSW, 2016a) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the TfNSW Project Manager and TfNSW 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-Indigenous heritage	
33.	A heritage induction would be provided to workers prior to construction, informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction.

No.	Mitigation measure
34.	In the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in TfNSW's <i>Unexpected Heritage Finds Guideline</i> (TfNSW, 2016a) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the TfNSW Project Manager and the TfNSW Environment and Planning Manager so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and OEH. Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to works recommencing at the location.
Socio-economic	
35.	Sustainability criteria for the Proposal would be established to encourage the Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.
36.	Feedback through the submissions process would be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where practicable.
37.	A Community Liaison Plan would be prepared prior to construction to identify all potential stakeholders and best practice methods for consultation with these groups during construction. The plan would also encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where practicable.
38.	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.
39.	The community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Plan to be developed prior to construction.
Biodiversity	
40.	Construction of the Proposal must be undertaken in accordance with TfNSW's <i>Vegetation Management (Protection and Removal) Guideline</i> (TfNSW, 2015a) and TfNSW's <i>Fauna Management Guideline</i> (TfNSW, 2017e).
41.	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.
42.	Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees nominated to be removed in the Ecological Impact Assessment (GHD, 2019c) 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.
43.	Tree Protection Zones (TPZs) would be established around trees to be retained, as nominated in the Ecological Impact Assessment (GHD, 2019c). Tree protection would be undertaken in line with <i>AS 4970-2009 Protection of Trees on Development Sites</i> and would include exclusion fencing of TPZs.
44.	The shrubs and trees which require removal should be removed in accordance with applicable Safe Work Australia (2016) and Safework NSW guidelines.
45.	If appropriate, the felled trees should be mulched and spread over the TPZ of retained trees or regeneration areas.

No.	Mitigation measure
46.	Although Tree 11 was not considered for removal in the construction design, its removal or pollarding should be considered because of its proximity to the cliff edge and the railway line and safety concerns.
47.	Removal of Trees 12, 16 and 8 should be determined once the final design details and machinery requirements are available. If the trees are to be retained, protection measures for retained trees should be followed (as outlined below).
48.	Those trees proposed for retention should be protected by temporary fencing. An example of suitable protective fencing is indicated in Appendix 4. Fencing should be installed prior to demolition and should be kept in place during excavation and construction. Tree 5 (Port Jackson Cypress), Tree 6 (Smooth-barked Apple) and Tree 7 (Smooth-barked Apple) would not require fencing if the existing fence is retained.
49.	Protection of Trees 4, 5, 6 and 7 would be undertaken in line with Australian Standard AS 4970-2009 <i>Protection of Trees on Development Sites</i> , and may require exclusion fencing of the TPZ
50.	The following actions would not be permitted within TPZs: • Storage of materials, plants or equipment • Installation of site sheds or portable toilets • Excavations, trenching, ripping or cultivation of soils • Modification of existing soil level or addition of fill materials • Disposal of waste materials and chemicals (both solid or liquid) • Mechanical removal of vegetation • Pedestrian or vehicular movement.
51.	Any root pruning required within the TPZ should be approved by the project arborist and any digging and pruning of roots (only roots < 5cm may be pruned) within the TPZ should be conducted by hand for a clean cut.
52.	To protect soil within the TPZ, a layer of organic mulch may be applied (no more than 75 mm thick). Any mulch used should comply with the Australian Standard – composts, soil conditioners and mulches AS4454-2012 (SA 2012).
53.	A project arborist should supervise works and inspect excavated areas adjacent to retained trees, in order to assess the amount of tree fine roots affected, the loss of which may affect tree health as well as the amount of supporting roots affected, the loss of which may affect tree stability. The project arborist would then determine appropriate ameliorative measures for retained trees (e.g. canopy reduction, irrigation, fertiliser applications) or provide recommendations for tree removal if required.
54.	If tall machinery needs to pass beneath the canopy of the Hills Weeping Fig (a component of Tree group 4), the projecting lower branches should be tied back by a qualified arborist, in order to lift them above the height of the machinery. Any damage to the lower canopy resulting from machinery should be treated by a qualified arborist.
55.	Offset for tree removal and landscaping would be undertaken in accordance with TfNSW's <i>Vegetation Offset Guide</i> (TfNSW, 2017d) and in consultation with the relevant council, and/or the owner of the land upon which the vegetation is to be planted. The 9 trees identified for removal would be offset with a minimum of 34 trees. Offset would also be required for any additional clearing, including for the 4 additional trees identified as possibly requiring removal.

No.	Mitigation measure
56.	Any root pruning required within the TPZ would be approved by the Project Arborist and any digging and pruning of roots (only roots < 5cm may be pruned) within the TPZ would be conducted by hand for a clean cut.
57.	In the event of any tree to be retained becoming damaged during construction, the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.
58.	Should the detailed design or onsite works determine the need to remove or trim any additional trees, which have not been identified in the REF, the Contractor would be required to complete TfNSW's Tree Removal Application Form and submit it to TfNSW for approval.
59.	For new landscaping works, mulching and watering would be undertaken until plants are established.
60.	Weed control measures, consistent with TfNSW's <i>Weed Management and Disposal Guideline</i> (TfNSW, 2015b), 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>Noxious Weeds Act 1993</i> .
Soils and water	
61.	Prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the 'Blue Book' <i>Managing Urban Stormwater: Soils and Construction Guidelines</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.
62.	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.
63.	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.
64.	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 TfNSW's <i>Chemical Storage and Spill Response Guidelines</i> (TfNSW, 2016b).
65.	Adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the TfNSW <i>Chemical Storage and Spill Response Guidelines</i> (TfNSW, 2016b) 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.
66.	In the event of a pollution incident, works would cease in the immediate vicinity and the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager. The EPA would be notified by TfNSW if required, in accordance with Part 5.7 of the POEO Act.

No.	Mitigation measure
67.	The existing drainage systems would remain operational throughout the construction phase.
68.	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 TfNSW's <i>Water Discharge and Reuse Guideline</i> (TfNSW, 2017f).
Air quality	
69.	Air quality management and monitoring for the Proposal would be undertaken in accordance with TfNSW's <i>Air Quality Management Guideline</i> (TfNSW, 2017h).
70.	Methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks.
71.	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.
72.	Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.
73.	To minimise the generation of dust from construction activities, the following measures would be implemented: • apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces) • cover stockpiles when not in use • appropriately cover loads on trucks transporting material to and from the construction site and securely fix tailgates of road transport trucks prior to loading and immediately after unloading • prevent mud and dirt being tracked onto sealed road surfaces.
Waste and contamination	
74.	The CEMP (or separate Waste Management Plan, if necessary) must address waste management and would at a minimum: • identify all potential waste streams associated with the 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.
75.	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.
76.	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.
77.	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.

No.	Mitigation measure
78.	Any concrete washout would be established and maintained in accordance with TfNSW's <i>Concrete Washout Guideline</i> – draft (TfNSW, 2015c) with details included in the CEMP and location marked on the ECM.
79.	Hazardous material surveys are to be undertaken for the station to confirm the presence of any potentially hazardous materials.
80.	An environmental risk assessment is to be undertaken prior to construction and must include a section on contamination as per the Transport for NSW Standard Requirements.
Climate change and sustainability	
81.	Detailed design of the Proposal would target a rating of 'Excellent' using the ISCA Infrastructure Sustainability Rating Scheme (v1.2)
Cumulative impacts	
82.	The potential cumulative impacts associated with the Proposal would be further considered as the design develops and as further information regarding the location and timing of potential developments is released. Environmental management measures would be developed in the CEMP, and implemented as appropriate.

8 Conclusion

This REF has been prepared in accordance with the provisions of section 5.5 of the EP&A Act, taking into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The Proposal would provide the following benefits:

- improved accessibility for station customers and pedestrians, particularly people with a disability, less mobile and those with prams or luggage
- improved customer amenity and facilities, including accessible toilets
- improved access to transport interchange facilities 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 likely key impacts of the Proposal are as follows:

- temporary noise and vibration impacts during construction
- temporary traffic impacts during construction
- temporary disruptions to station facilities and amenities during construction
- removal of trees/vegetation that would require planting offsets
- visual impacts to sensitive receivers during operation including the introduction of new elements, such as lift shafts, into the visual environment.

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

The Proposal would also take into account the principles of ESD (refer to Section 3.1.4 and Section 4.6). These would be considered during the detailed design, construction and operational phases of the Proposal. This would ensure the Proposal is delivered to maximum benefit to the community, is cost effective and minimises any adverse impacts on the environment.

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Appendix A Consideration of matters of National Environmental Significance

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

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

Appendix B Consideration of clause 228

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

Factor	Impacts
(a) Any environmental impact on a community? There would be some temporary impacts to the community during construction, particularly in relation to noise, traffic, access and visual amenity. Mitigation measures outlined in Section 7.2 would be implemented to manage and minimise adverse impacts.	Minor
(b) Any transformation of a locality? The Proposal would include the introduction of new visible elements in the landscape (including two new lifts structures). The appearance of the new elements would be consistent with the existing station elements and are considered to be common features in urban areas. Vegetation removal is limited to the removal of about five trees on the westerns side of the station and four trees on the eastern site of the station. This would be offset by the planting of 34 new trees.	Minor
(c) Any environmental impact on the ecosystem of the locality? The Proposal would require the removal of about nine trees, however this vegetation does not form part of any threatened ecological communities, or is likely to provide habitat for threatened species and so would have a negligible impact to the ecosystem. The extent of vegetation trimming and removal has been minimised as far as practicable. Any additional trees that are found to require removal, not assessed in this REF, would be subject to further assessment, offsetting and approval from TfNSW.	Minor
(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? There would be some temporary impacts during construction particularly in relation to noise, traffic and access and visual amenity. The removal of vegetation would also result in a visual change however the number of trees to be removed is limited and would be managed via offsetting. Operational landscape impacts on the locality would be either negligible or would not impact on identified sensitive receivers. Operational visual impacts range from high moderate to negligible.	Moderate

Factor	Impacts
(e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations? The Proposal would have a positive contribution to the locality by creating equitable access to the station and the platform. Non-Aboriginal heritage items are unlikely to be impacted by the Proposal. A desktop archaeological assessment has been undertaken which determined that there is a low risk of encountering archaeological items/deposits and that the Proposal is unlikely to expose historical archaeological relics.	Nil
(f) Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)? The Proposal is unlikely to have any impact on the habitat of protected fauna.	Nil
(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? The Proposal is unlikely to have any impact on endangering any species of animal, plant or other form of life, whether living on land, in water or in the air.	Nil
(h) Any long-term effects on the environment? The Proposal is unlikely to have any long-term effects on the environment.	Nil
(i) Any degradation of the quality of the environment? The Proposal is unlikely to have any degradation of the quality of the environment.	Nil
(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 works.	Minor
(k) Any reduction in the range of beneficial uses of the environment? The Proposal is unlikely to have any reduction in the range of beneficial uses of the environment.	Nil
(l) Any pollution of the environment? The Proposal is unlikely to cause any pollution of the environment provided the recommended mitigation measures are implemented as outlined in section 7.2.	Nil

Factor	Impacts
(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 prepared as part of the Construction Environmental Management Plan. Mitigation measures would be implemented to ensure waste is reduced, reused or recycled where practicable.	Minor
(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.	Nil
(o) Any cumulative environmental effect with other existing or likely future activities? Cumulative effects of the Proposal are described in Section 6.12. Where feasible, 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.	Nil
(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.	Nil