NSW GOVERNMENT

Transport Access Program

Yagoona Station Upgrade

Review of Environmental Factors

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

May 2021

Yagoona Station Upgrade Review of Environmental Factors

Transport Access Program
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Abbreviations

Term	Meaning
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
ASB	Asset Standards Branch (refer to Definitions)
ASRIS	Australian Soil Resource Information System
ASS	Acid Sulfate Soils
BCA	Building Code of Australia
BC Act	*Biodiversity Conservation Act 2016* (NSW)
CBD	Central Business District
CCTV	Closed Circuit TV
CEMP	Construction Environmental Management Plan
CLM Act	*Contaminated Land Management Act 1997* (NSW)
CNVMP	Construction Noise and Vibration Management Plan
CPTED	Crime Prevention Through Environmental Design
CTMP	Construction Traffic Management Plan
DAWE	Department of Agriculture, Water and the Environment (Cwlth)
DBYD	Dial Before You Dig
D&C	Design & Construct
DDA	*Disability Discrimination Act 1992* (Cwlth)
DPIE	NSW Department of Planning, Industry and Environment
DSAPT	*Disability Standards for Accessible Public Transport (2002)*
DSS	Detailed Services Searches
EMS	Environmental Management System
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EPI	Environmental Planning Instrument

Term	Meaning
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development (refer to Definitions)
FM Act	*Fisheries Management Act 1994* (NSW)
Heritage Act	*Heritage Act 1977* (NSW)
HRV	Heavy Rigid Vehicle
ICNG	*Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2000).
Infrastructure SEPP	*State Environmental Planning Policy (Infrastructure) 2007* (NSW)
IS rating	Infrastructure Sustainability rating under ISCA rating tool (v 1.2)
ISCA	Infrastructure Sustainability Council of Australia
LEP	Local Environmental Plan
LGA	Local Government Area
LoS	Level of Service
MRV	Medium Rigid Vehicle
NES	National Environmental Significance
NPI	Noise Policy for Industry
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
OEH	Formerly NSW Office of the Environment and Heritage
OHWS	Overhead Wire Structure
OOHW	Out of hours works
PA system	Public Address system
PDP	Public Domain Plan
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
RailCorp	(former) Rail Corporation of NSW
RAP	Remediation Action Plan
RBL	Rating Background Level
REF	Review of Environmental Factors (this document)
Roads Act	*Roads Act 1993* (NSW)
Roads and Maritime	NSW Roads and Maritime Services (formerly Roads and Traffic Authority)

Term	Meaning
SEPP	State Environmental Planning Policy
SEPP 55	State Environmental Planning Policy No.55 — Remediation of Land
SHR	State Heritage Register
TAHE	Transport Asset Holding Entity
TEC	Threatened Ecological Communities
TCP	Traffic Control Plan
TGSI	Tactile Ground Surface Indicators (“tactiles”)
TMP	Traffic Management Plan
TPZ	Tree Protection Zone
TVM	Ticket Vending Machine
UDP	Urban Design Plan
WARR Act	*Waste Avoidance and Resource Recovery Act 2001* (NSW)
WM Act	*Water Management Act 2000* (NSW)

Definitions

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

Term	Meaning
Out of hours works	Defined as works *outside* 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, Transport for NSW.
Rail shutdown	Shutdown is the term used by railway building/maintenance Contractors to indicate that they have taken possession of the track (usually a block of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.
Reasonable	Selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure.
Sensitive receivers	Land uses which are sensitive to potential noise, air and visual impacts, such as residential dwellings, schools and hospitals.
Sydney Trains	From 1 July 2013, Sydney Trains replaced CityRail as the provider of metropolitan train services for Sydney.
Tactiles	Tactile tiles or tactile ground surface indicators 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 Yagoona Station Upgrade.
Vegetation Offset Guide	The Transport for NSW guide that applies where there is vegetation clearing proposed, and where the impact of the proposed clearing is not deemed 'significant' for the purposes of Section 5.5 of the EP&A Act. 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 centimetres, four trees where the DBH is 15-60 centimetres, or two trees where DBH is less than 15 centimetres.

Executive summary

Overview

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

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

The NSW Government is improving accessibility at Yagoona 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, secure and integrated transport infrastructure.

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

Description of the Proposal

The key features of the Proposal are summarised as follows:

- new station entry concourse from the Hume Highway including a new lift and stairs to provide access to the station platforms
- new station building on the island platform for all station facilities, including a new family accessible toilet and new male and female ambulant toilets
- additional platform canopies to provide continuous cover from the new lift and stairs to the boarding assistance zones on both platforms
- two new accessible parking spaces in the Breasley Place commuter car park and upgrade of the two existing accessible parking spaces in the Ritchie Road commuter car park
- upgrade of pathways from both commuter car parks to the station entrance
- new kiss and ride bay on the Hume Highway
- platform regrading and resurfacing
- relocating existing bike hoops
- ancillary work including service upgrades and/or relocation, minor drainage work, adjustments to fencing and lighting, relocation of station furniture, new Opal card readers, installation of new tactile ground surface indicators, improvements and modifications to station communications and security systems (including closed-circuit television (CCTV) cameras) and wayfinding signage.

Subject to approval, construction is expected to commence in mid-2021 and take up to 18 months to complete. A detailed description of the Proposal is provided in Chapter 3 of this REF. An overview of the Proposal is shown in Figure E.1.

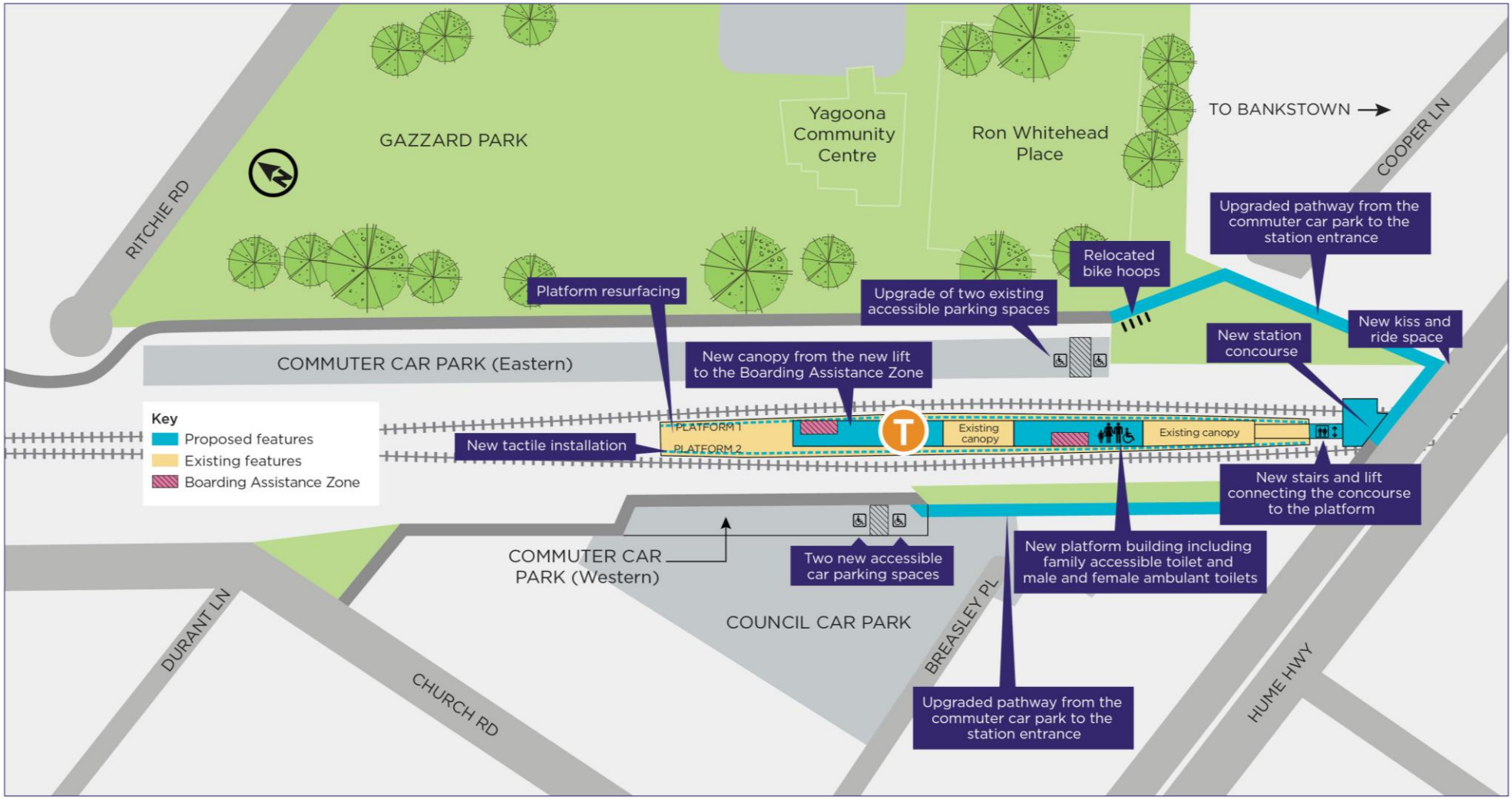

Figure E.1 Key features of the Proposal (indicative only, subject to detailed design)

Need for the Proposal

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

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

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

Community and stakeholder consultation

Community consultation activities for the Proposal would be undertaken during the public display period of this REF with the public invited to submit feedback to help Transport for NSW understand what is important to customers and the community. The REF would be displayed for a period of two weeks. Further information about these specific consultation activities is included in Section 5 of this REF.

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

In accordance with the requirements of the *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP), consultation is required with local councils and/or public authorities in certain circumstances, including where council managed infrastructure is affected. Consultation has been undertaken with the City of Canterbury-Bankstown and Sydney Trains during the development of designs and the preferred option. Consultation with these stakeholders will continue through the detailed design and construction of the Proposal.

Feedback can be submitted by:

- Emailing: projects@transport.nsw.gov.au
- Completing the feedback form at www.transport.nsw.gov.au/yagoona or www.nsw.gov.au/have-your-say/yagoona-station-upgrade
- Mailing:

  Transport Access Program – Yagoona Station Upgrade
  Associate Director Environmental Impact Assessment
  Transport for NSW
  PO Box K659
  Haymarket NSW 1240

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

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

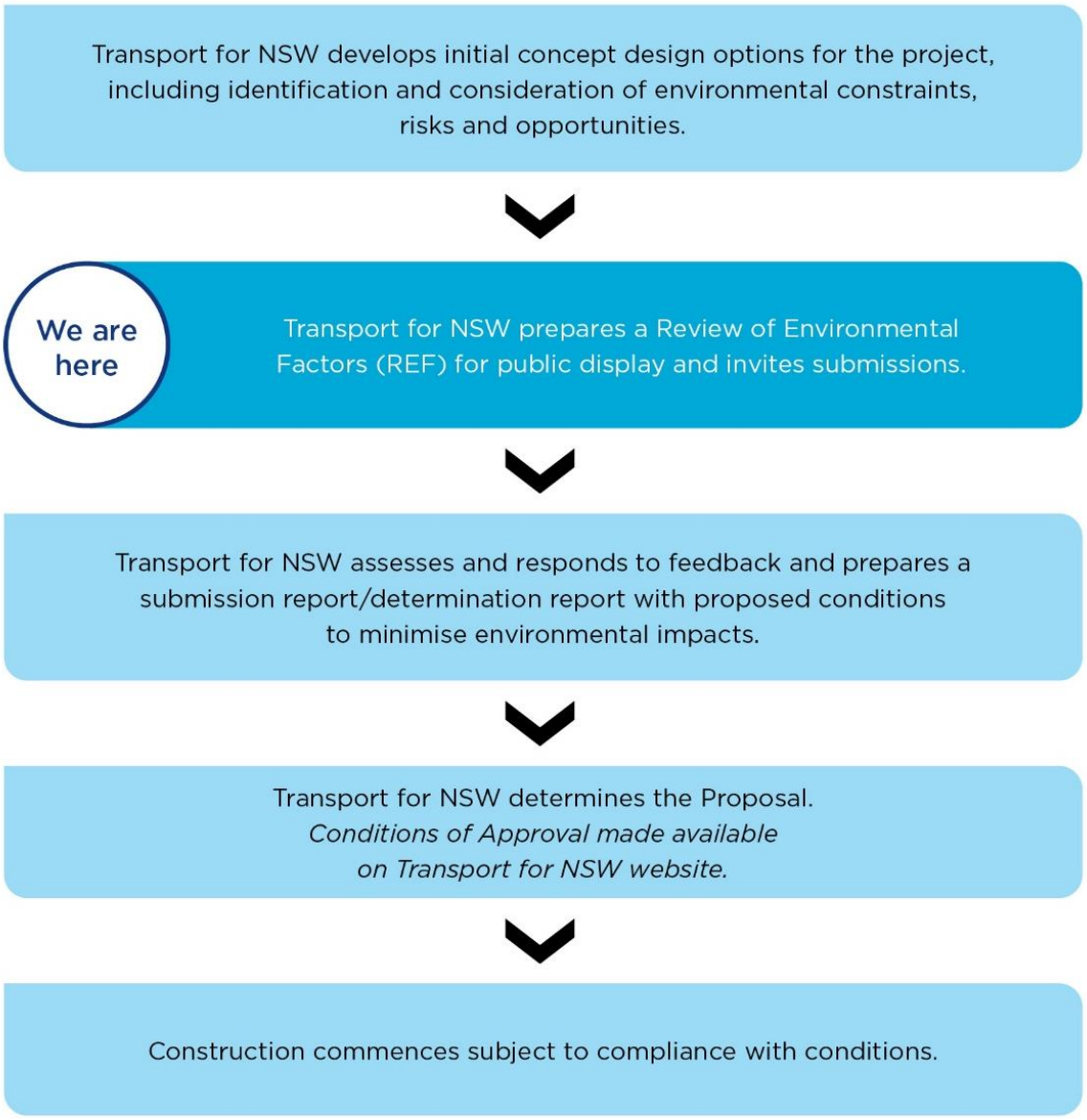

Figure E.2 Planning approval and consultation process for the Proposal

Environmental impact assessment

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

The Proposal would provide the following benefits:

- improved accessibility for station customers, particularly people with a disability, limited mobility and those with prams or luggage by providing a new lift and accessible pedestrian pathways around the station
- improve customer amenity by installing new canopies on the platforms to provide weather protection, and installing a new family accessible toilet, female ambulant toilet and male ambulant toilet within a new platform building
- improve accessibility and interchange facilities at the station by providing a new kiss and ride area and accessible parking spaces
- improved access to car parks and interchange facilities through upgraded pedestrian footpaths to meet DSAPT requirements
- improve customer safety by platform regrading and installing new tactiles along the platforms, improving station lighting and CCTV
- improve customer experience by upgrading customer information and communication systems, adjusting wayfinding signage and landscaping work.

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

- temporary noise and vibration impacts during construction
- temporary disruptions to station facilities and amenities during construction
- temporary changes to pedestrian movements from both the eastern and western commuter car parks during the regrading of the pedestrian footpaths
- temporary changes to traffic movements and loss of parking at the Breasley Place Council and commuter car park due to its potential use as a construction compound and laydown area
- temporary loss of parking at the southern end of the Ritchie Road commuter car park during construction of accessible car parking spaces
- increased platform congestion due to localised platform closures and diversions during platform building construction
- temporary change to the visual environment during construction phase due to fencing and hoarding, road barriers and signage, formwork and scaffolding, cranes and other construction equipment, site office and amenities, and night lighting
- removal of approximately 23 trees to facilitate the regrading of the pedestrian footpath on the western side of the station that would require off set planting
- loss of the retail kiosk at the concourse
- social impacts due to loss of the public mural.

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 EP&A Regulation, to ensure that Transport for NSW takes into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

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

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

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

Figure E.3 Photomontage of the Proposal (subject to detailed design)

1 Introduction

Transport for NSW is responsible for strategy, planning, policy, procurement, regulation, funding allocation and other non-service delivery functions for all modes of transport in NSW including road, rail, ferry, light rail, point to point, cycling and walking. Transport for NSW is the proponent for the Yagoona 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 use of public transport, such as trains, by upgrading stations to make them more accessible, and improving interchanges around stations with other modes of transport such as buses, bicycles and cars. The Transport Access Program is an initiative targeted at achieving compliance with the DSAPT Regulations across the network.

Yagoona Station has been identified for an accessibility upgrade as it currently does not meet key requirements of the DSAPT or the Commonwealth *Disability Discrimination Act 1992* (DDA). Yagoona Station comprises one island platform, with stairs from the concourse off the Hume Highway providing the only means of access and therefore does not allow for equitable access to the station platforms.

The non-compliant footpaths to the Yagoona Station concourse and the stairs to the platforms do not facilitate equal access for people with reduced mobility, parents/carers with prams or customers with luggage. There are no accessible toilet facilities at the station, no lift facilities, and inadequate tactile ground surface indicators to stairs and platforms.

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

1.1.2 Key features of the Proposal

The key features of the Proposal are summarised as follows:

- new station entry concourse from the Hume Highway including a new lift and stairs to provide access to the station platforms
- new station building on the island platform for all station facilities, including a new family accessible toilet and new male and female ambulant toilets
- additional platform canopies to provide continuous cover from the new lift and stairs to the boarding assistance zones on both platforms
- two new accessible parking spaces in the Breasley Place commuter car park and upgrade of the two existing accessible parking spaces in the Ritchie Road commuter car park
- upgrade of pathways from both commuter car parks to the station entrance
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- platform regrading and resurfacing
- relocating existing bike hoops

- ancillary work including service upgrades and/or relocation, minor drainage work, adjustments to fencing and lighting, relocation of station furniture, new Opal card readers, installation of new tactile ground surface indicators, improvements and modifications to station communications and security systems (including closed-circuit television (CCTV) cameras) and wayfinding signage.

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

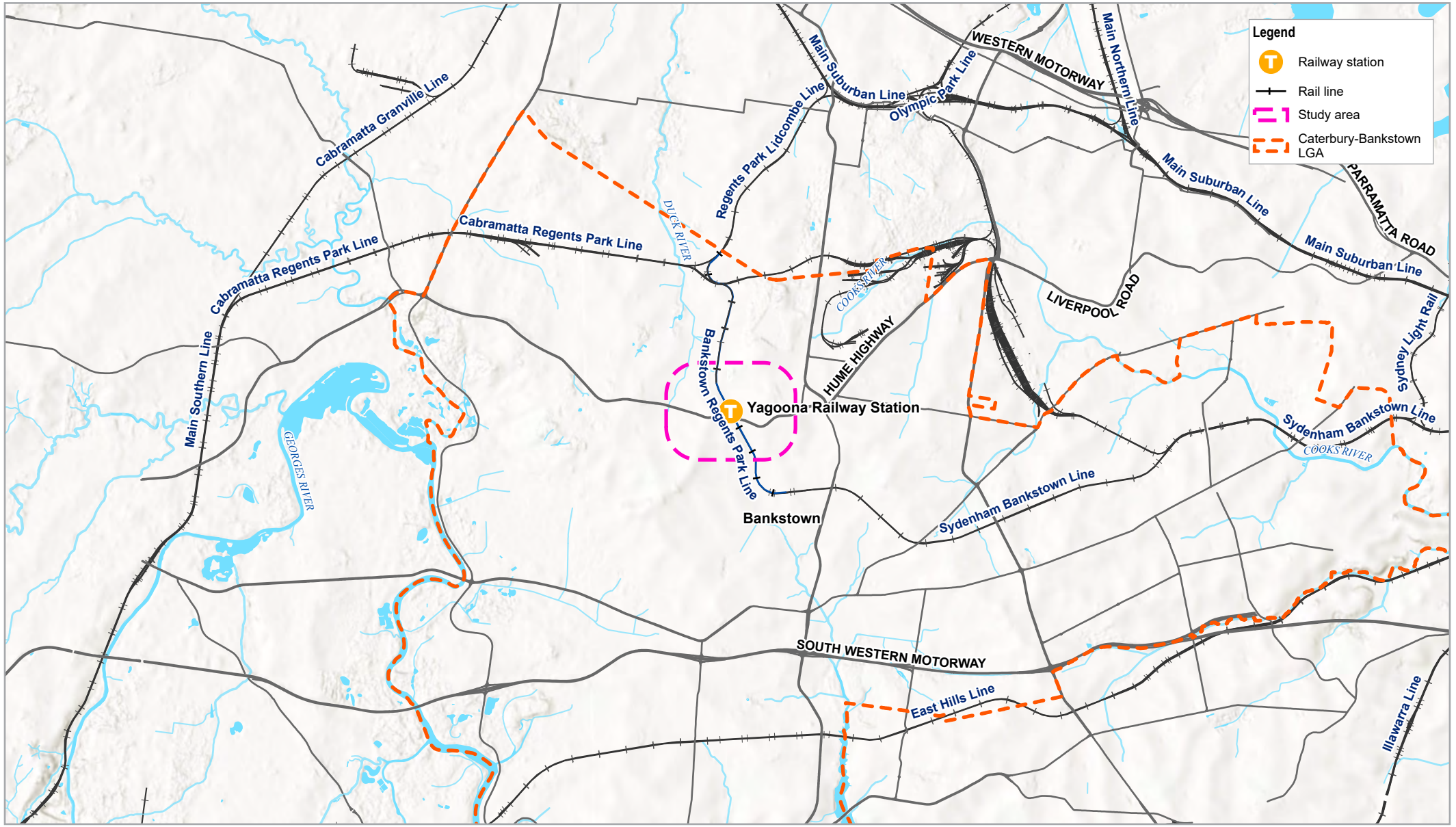
A detailed description of the Proposal is provided in Chapter 3 of this REF.

1.2 Location of the Proposal

The Proposal is located off the Hume Highway in the suburb of Yagoona and is approximately 20 kilometres south west of Sydney's Central Business District (CBD). It is within the Canterbury-Bankstown Local Government Area (LGA). The location of the Proposal in a regional context is shown in Figure 1.1.

The Proposal is bounded by the rail corridor to the north, commuter and council car park to the west, Ron Whitehead Place and Gazzard Park to the east and the Hume Highway to the south.

Yagoona Station is serviced by the T3 Bankstown Line providing connections to the metropolitan train network.



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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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Transport for NSW
Yagoona Station Upgrade
Review of Environmental Factors

Project No. **12544729**
Revision No. **0**
Date **13/05/2021**

Regional context

FIGURE 1.1

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1.3 Existing infrastructure and land uses

Yagoona Station is located on the northern side of the Hume Highway in the Yagoona town centre. It is surrounded by mixed land uses including residential areas, businesses, schools, recreational facilities and a community centre.

The Yagoona town centre runs along the Hume Highway on the eastern and western sides of the Proposal area. The centre contains a range of retail and commercial properties, including essential services such as a post office, butchers and a supermarket. There are community facilities to the east of the Proposal area, including Gazzard Park, the Yagoona Community Centre and Ron Whitehead Place. The Yagoona town centre also contains a number of education facilities and childcare services. Al Sadiq College is located to the east of Proposal area, while Yagoona Public School is located to the south-east across the Hume Highway.

The wider locality is made up of low-density residential zoning, with areas of high-density residential zoning closer to the Yagoona town centre and to the south-east towards Bankstown. Features of the surrounding locality are shown in Figure 1.2.

Access to the Yagoona train station is available via local roads including Cooper Road, Ritchie Road, Church Road and Breasley Place. Parking around the station is provided in commuter car parks to the east and west of the station. Pedestrian access between the car parks and the station is provided via a walkway off Breasley Place on the western side of the station and Cooper Lane on the eastern side of the station. Two accessible car parking spaces are provided in the eastern car park. There are currently no accessible parking spaces in the western car park. There are also no taxi ranks or kiss and ride areas in proximity to the station entry.

Yagoona Station consists of a station concourse and a single island platform. The station concourse is accessed off the Hume Highway. The station concourse accommodates a convenience store as well as a station building containing a unisex toilet, a staff room and a station services room. The station platform can be accessed from the station concourse via a single set of stairs. The eastern side of the station platform (Platform 1) provides services to Central Station and the City Circle while the western side of the platform (Platform 2) provides services to Lidcombe and Liverpool. There is an Opal card top up and single trip ticketing machine, an emergency help-point, and a payphone on the station platform.

Features of the surrounding locality are shown in Figure 1.2.

Paper Size ISO A4

0 50 100

Meters

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

GHD

Transport for NSW
Yagoona Station Upgrade
Review of Environmental Factors

Project No. **12544729**
Revision No. **0**
Date **13/05/2021**

Site locality

FIGURE 1.2

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Data source: LPI: DCDM/DTDB/imagery, 2021 Image: . Created by: kpsroba

Photo 1.1 Yagoona Station looking north, showing the station entry

Photo 1.2 Yagoona Station, looking north

Photo 1.3 Yagoona Station concourse and entrance

Photo 1.4 Yagoona Station, from the northern end of the platform, looking south

Photo 1.5 Shared path on the eastern side of the station, looking south

Photo 1.6 Shared path on the eastern side of the station, looking south towards public mural

Photo 1.7 Ron Whitehead Place, facing south-west

Photo 1.8 Footpath on the western side of the station, facing south

1.4 Purpose of this Review of Environmental Factors

This REF has been prepared by GHD on behalf of Transport for NSW to assess the potential impacts of the Yagoona Station Upgrade. For the purposes of these works, Transport for NSW is the proponent and the determining authority under Division 5.1 of the EP&A Act.

The purpose of this REF is to describe the Proposal, to assess the likely impacts of the Proposal having regard to the provisions of Section 5.5 of the EP&A Act, and to identify mitigation measures to reduce the likely impacts of the Proposal. This REF has been prepared in accordance with clause 228 of the *Environment Planning and Assessment Regulation 2000* (EP&A Regulation).

This assessment has also considered the relevant provisions of other relevant environmental legislation, including the *Biodiversity Conservation Act 2016* (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 the Environment and Energy 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

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 Yagoona 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.

Table 2.1 provides an overview of NSW Government policies and strategies relevant to the Proposal.

Table 2.1 Key NSW Government policies and strategies applicable to the Proposal

Policy / Strategy	Overview	How the Proposal aligns
Future Transport Strategy 2056 (Transport for NSW, 2018a)	*Future Transport 2056* is an update of NSW's *Long Term Transport Master Plan*. It is a suite of strategies and plans for transport to provide an integrated vision for the state. *Future Transport 2056* identifies 12 customer outcomes to guide transport investment in Greater Sydney. These outcomes include transport providing convenient access, supporting attractive places and providing 30-minute access for customers to their nearest centre by public transport.	The Proposal is consistent with the overall aims and objectives of the *Future Transport Strategy 2056* to improve transport infrastructure across NSW. The Proposal would support accessible services (Outcome 5) by improving accessibility to public transport, including the provision of lifts, accessible parking spaces and improved assistive services. The Proposal also supports the sustainability objective by encouraging the use of public transport (Outcome 6). Safety is also being addressed (Outcome 4) with the installation of additional CCTV and improved lighting.

Policy / Strategy	Overview	How the Proposal aligns
NSW State Infrastructure Strategy 2018-2038 (NSW Government, 2018)	The *NSW State Infrastructure Strategy 2018–2038* builds on the NSW Government's major long-term infrastructure plans over the last seven years. The strategy sets out the government's priorities for the next 20 years, and combined with the *Future Transport Strategy 2056*, the *Greater Sydney Region Plan* and the *Regional Development Framework*, brings together infrastructure investment and land-use planning for our cities and regions. Public transport is viewed as critical to urban productivity, expanding employment opportunities by connecting people to jobs, reducing congestion, and supporting delivery of urban renewal.	The Proposal is consistent with the six directions outlined in this strategy, including: • integrating land use and infrastructure planning; the Proposal is improving existing land use through upgrades to existing infrastructure at Yagoona Station • infrastructure planning, prioritisation and delivery; the Proposal is targeting the needs of the local community, and would improve travel for employment • digital connectivity and technology; the Proposal is implementing improved technology for communications at the station • innovative service and delivery models; the Proposal would improve connectivity at a customer-centric level.
Disability Inclusion Action Plan (2018-2022) (Transport for NSW, 2017a)	The *Disability Inclusion Action Plan 2018-2022* was developed by Transport for NSW in consultation with the Accessible Transport Advisory Committee, which consists of representatives from peak disability and ageing organisations within NSW. The Disability Plan identifies the challenges, the achievements to date, the considerable undertaking that is required to finish the job and provides a solid and practical foundation for future progress over the next five years.	The Proposal supports investment in rail infrastructure and aligns with the need to continue to provide urban public transport to support increasing population. The Proposal is consistent with the guiding principles and strategic objectives of the plan. The Proposal would implement assistive technologies and improve opportunities for people with a disability, by providing accessible services at the station.

Policy / Strategy	Overview	How the Proposal aligns
A Metropolis of Three Cities - Greater Sydney Region Plan (Greater Sydney Commission, 2018a)	The *Greater Sydney Region Plan* is the NSW Government's 40-year land use plan for Sydney. It establishes a vision for a metropolis of three cities – the Eastern Harbour City, Central River City and Western Parkland City. The plan includes a number of objectives related to transport networks including: • provision of transport infrastructure to support liveability of the city • optimising existing infrastructure where possible.	The Proposal is consistent with the overall objectives of the plan, including: • liveability (a city for the people) • productivity (a well-connected city) • sustainability (a low-carbon city). The Proposal would improve accessibility at and around Yagoona Station, which would cater to the needs of the community and remove the transport barrier. This would encourage the use of public transport, to improve liveability and reduce the use of personal vehicles. As a result, carbon emissions are likely to be reduced. The plan is expanded on with priorities in the South District Plan (see below).
South District Plan (Greater Sydney Commission, 2018b)	The South District Plan applies to the Canterbury-Bankstown local government area. The plan describes the planning priorities and actions to improve liveability and achieve a productive and sustainable future for the District. The plan was developed to support the objectives of the Greater Sydney Plan.	The Proposal would assist in meeting these objectives as it would involve the upgrade of existing infrastructure to enable it to better serve the community. This includes addressing issues with accessibility by providing transport access without the need for new investment.
Building Momentum – State Infrastructure Strategy 2018-2038 (Infrastructure NSW, 2018)	The *State Infrastructure Strategy 2018-2038* makes recommendations for each of NSW's key infrastructure sectors including transport. The plan also aims to ensure the transport system creates opportunities for people and businesses to access the services and support they need.	The Proposal is consistent with the following planning priorities for the South District: • Planning Priority S1: Planning for a city supported by infrastructure • Planning Priority S5: Providing housing supply, choice and affordability, with access to jobs, services and public transport.
NSW: Premier Priorities *(NSW Government, 2019)*	In June 2019, 14 new Premier's Priorities were announced that would allow the Government to measure and deliver in areas where NSW can do better. The key policy priorities, include the following: • a strong economy • highest quality education • well-connected communities with quality local environments • putting customer at the centre of everything we do • breaking the cycle of disadvantage.	The Proposal supports the Premier's Priorities in the key area of 'breaking the cycle of disadvantage'. The Proposal would be reducing the disadvantage of people with a disability in the local community. The Proposal would enhance accessibility by providing a lift, improved paths, and use of assistive communication technology.

Policy / Strategy	Overview	How the Proposal aligns
The ***Canterbury-Bankstown Community Strategic Plan 2028 (CB2028) (Canterbury-Bankstown Council, 2018)***	The CB2028 strategy includes seven key goals to achieve a sustainable, connected and healthy city. The priority areas are: • safe and strong • clean and green • prosperous and innovative • moving and integrated • healthy and active • liveable and distinctive • leading and engaged.	The Proposal would assist in meeting the priorities under 'moving and integrated', which aims to provide 'an accessible city with great local destinations and many options to get there'. The Proposal would provide convenient and accessible public transport facilities for all users and encourage healthy living by improving paths.

2.2 Objectives of the Transport Access Program

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

- stations that are accessible to people with disabilities or limited mobility, and parents/carers with prams and customers with luggage
- modern buildings and facilities for all modes that meet the needs of a growing population
- modern interchanges that support an integrated network and allow seamless transfers between all modes for all customers
- safety improvements including extra lighting, lift 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
- other improvements and maintenance such as painting, new fencing and roof replacements.

2.3 Objectives of the Proposal

The specific objectives of the Yagoona Station Upgrade are to:

- provide a station that is accessible to people with a disability, limited mobility, parents/carers with prams, and customers with luggage
- improve customer experience (weather protection, better station facilities and visual appearance)
- improve integration with surrounding precinct
- improve customer safety
- improve wayfinding in and around the station
- improve customer amenity
- improve pedestrian connectivity between the commuter car parks and the station.

2.4 Design development

Options for improving access at Yagoona Station were identified as part of a feasibility study prepared by Transport for NSW (2019a) which made recommendations to achieve DSAPT compliance. Four main design options were developed to address accessibility and customer experience needs. The options are discussed further below.

2.5 Alternative options considered

Options considered for the upgrade of Yagoona Station are presented in Table 2.2.

Table 2.2 Alternative options considered

Option	Key features
Option 1	• removal of the existing concourse and stairs • new larger concourse with one new lift and stairs down to the platform • new staff and customer facilities located in the concourse • accessible footpaths from the car parks to the Hume Highway and new concourse.
Option 2	• removal of the existing concourse, and stairs • new footbridge located approximately mid-way along the platform with three new lifts and stairs providing access to the platform and the east and west of the rail corridor • new ramp connecting the Hume Highway with the new footbridge on the west of the station • regraded accessible footpaths from the car parks to the Hume Highway and new footbridge entries • new platform building for staff and customer facilities.
Option 3	• maintain existing concourse with a new concourse extension/widening to facilitate circulation around the stairs • one new lift to the north of the existing concourse and a FAT and ambulant toilet to either side of the lift at concourse level • removal of the concourse shop and addition of new staff and customer facilities within the concourse • replacement of the existing stairs • accessible paths from car parks to Hume Highway and new concourse • new canopy extensions on Platform one at the boarding assistance zone.
Option 3b	Option 3 was further developed with the following amendments: • retention of the existing concourse and stairs • provision of an extended walkway to the new lift • new customer facilities to one side of the concourse adjacent to the station entry instead of either side of the lifts (as proposed in Option 3).
Option 4	• removal of the existing concourse and stairs • new concourse, one new lift and stairs to platform • new platform building with new staff and customer facilities • accessible footpaths from the car parks to the Hume Highway and new concourse • canopy extensions to the boarding assistance zones.

A ‘do-nothing’ option was also considered where existing access to the platform and station amenities would remain the same and there would be no changes to the way the station and interchanges currently operates.

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 Yagoona community.

2.5.1 Assessment of identified options

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

These were also considered as part of a design workshop which informed the feasibility study (Transport for NSW, 2019a). The options were considered on risks and opportunities and the delivery of DSPAT compliance.

2.6 Justification for the preferred option

A concourse with direct access from the Hume Highway, with a single point of entry for security purposes, was found to be the preferred option for the station entry. Option 2 (new footbridge) was discounted as it would not provide direct access from the Hume Highway and due to space and service relocation constraints along the sides of the station.

Option 1 was not preferred due to the following identified constraints:

- the requirement of temporary footbridge and stairs during construction
- circulation space at lift base and access to southern end of platform would be restricted
- new concourse would require increased supporting structure
- customer facilities located on concourse are inconveniently located for customers waiting on the platform.

Option 3 was initially identified as the preferred option during early stages of design conception. However, following design optioneering and constructability workshops, options 3 and 3b were not progressed due to the following:

- the requirement for additional supporting structures for concourse extension would be bulky, restricting platform access
- enclosing the existing concourse with a new structure would make is difficult to access elements of the existing concourse for maintenance and repairs
- potential conflict between customers using the lift and stairs at platform level
- customers using the stairs would enter platform level facing a blank wall (part of the lift shaft) which would result in a poor customer experience.

A station platform building was found to be preferred to allow station facilities to be readily accessible for customers. Option 4 was confirmed as the preferred option and was further developed for concept design. Option 4 would maintain one single point of entry that is familiar to customers and close to retail facilities and mode change locations. The separate platform building would allow construction to be staged so that the new station facilities would be available to customers before existing facilities are removed. This option also included extensive canopy coverage across the platform from the lift and the boarding assistance zones which provides better weather protection for all customers.

Overall, Option 4 was considered the preferred option as it best achieves the objectives of the Proposal with less impact to the local community during construction and would achieve a more functional outcome during operation.

3 Proposal description

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

3.1 The Proposal

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

The Proposal would include the following key features:

- new station entry concourse from the Hume Highway, new stairs and one new lift to provide access to the station platforms
- closure and removal of the existing concourse and stairs, including concourse level station facilities and shop
- new station building on the platform to house the station facilities including:
  - family accessible toilet
  - male and female ambulant toilets
  - staff room
  - staff toilet
  - cleaner's storage room
  - station services equipment room
  - main switchboard room
- additional platform canopies to provide continuous cover from the new lift and stairs to the boarding assistance zones on both platforms
- re-grading and re-surfacing of existing platform surfaces
- new line markings to identify the safety zone and boarding assistance zones on each platform
- two new accessible parking spaces in the Breasley Place commuter car park and upgrade of the existing footpath to provide a compliant accessible footpath to the station
- upgrade of the two existing accessible parking spaces in the Ritchie Road commuter car park and upgrade of the existing footpath to provide a compliant accessible footpath to the station
- provision of a new kiss and ride bay on the Hume Highway to the east of the station entrance, including the possible removal and/or relocation of the planter box, phone booth and public seating
- relocation of bike hoops
- utility works including:
  - upgrades to and relocation of services from the concourse to the new station platform building
  - temporary service installations for site compounds during construction
  - adjustment of platform drainage

- other ancillary works including:
    - vegetation trimming and removal to accommodate new accessible footpaths and adjustments to fencing and lighting
    - relocation of station furniture including seating, rubbish bins and removal of the platform payphone
    - new and relocated Opal card readers
    - improvements and modifications to station communications and security systems (including CCTV, public address system, hearing induction loops and station passenger information)
    - wayfinding signage modifications
    - installation of tactile ground surface indicators.

Figure 3.1 shows the key features of the Proposal.

Photomontages of the Proposal are shown in Figure 3.2, Figure 3.3 and Figure 3.4.

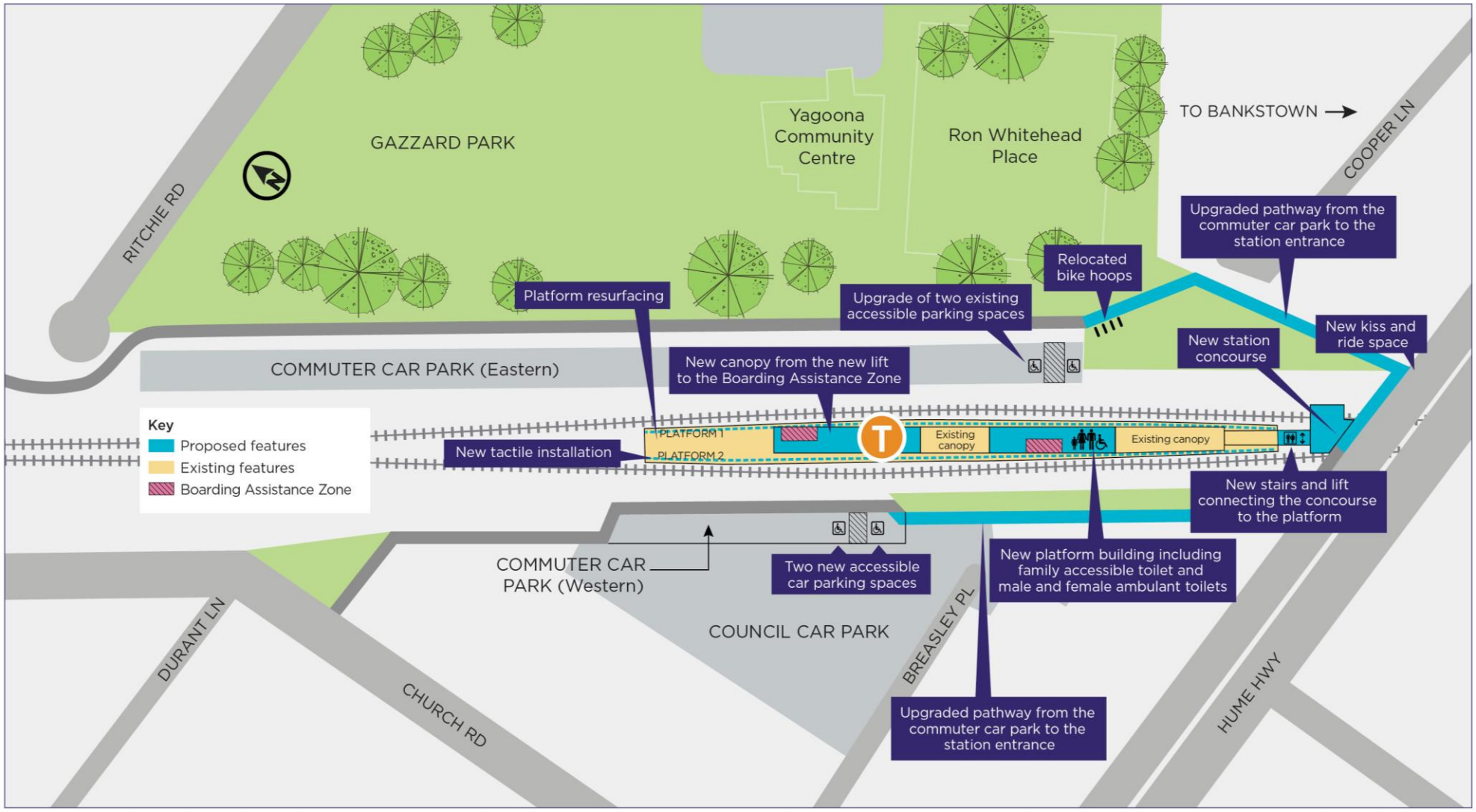


Figure 3.1 Key features of the Proposal

(Indicative only, subject to detailed design)

Figure 3.2 Indicative view of the Proposal looking north-west from the Hume Highway

Figure 3.3 Indicative view of the Proposal looking north-east from the Hume Highway

Figure 3.4 Indicative view of the Proposal from Gazzard Park looking south

3.2 Scope of work

The Proposal includes the upgrade of Yagoona Station to improve accessibility, and amenity for customers. The upgrade works includes the construction of a new concourse, lift and stairs, a new station building on the island platform, and upgrades to accessible parking in the commuter car parks and improvements to connecting footpaths. The work is described in further detail below.

3.2.1 Station entry upgrade

Details of the proposed work to take place at the station:

- construction of new station entry concourse from the Hume Highway to provide access to the platforms
- construction of new stairs to connect the new concourse to the platforms
- construction of a new 17 person lift to provide access between the new concourse and the platforms
- removal of the existing concourse, including concourse level station facilities and shop front
- removal of existing stairs to the platform.

Pedestrian access to the platforms would be maintained during construction of the new concourse and station entry. The existing stairs and concourse would be removed during a rail shutdown, with either temporary stairs, or the new stair access to the platforms, installed during the same shutdown period.

3.2.2 Platform work

The Proposal includes the construction of a new station building on the platform to house the station facilities and would include:

- staff room with kitchenette
- staff toilet
- cleaner’s storage room
- family accessible toilet
- female ambulant toilet
- male ambulant toilet
- main switchboard room
- station services equipment room
- fan room.

Other work along the platform includes:

- relocation of existing services and utilities from the concourse to the new platform building, including new services routes within the platforms
- regrading and resurfacing of the platform surfaces to provide compliant access paths along the length of the platforms
- provision of new hearing induction loops on the platforms

- relocation of and modification to existing platform infrastructure and furniture as required, including seats, signage, guard indicators, Opal card readers, Opal top up machine, lighting, CCTV, fencing, vending machines and rubbish bins
- line marking of the boarding assistance zones and safety zones on each platform
- installation of new tactile ground surface indicators.

New canopies would also be installed between the existing canopies and the new station building to achieve continuous cover from the new lift and stairs to the boarding assistance zones on both platforms. The design of these canopies and the station building is yet to be determined and would be finalised during detailed design.

3.2.3 Commuter car parks and pedestrian access to station

The following upgrade work would be undertaken to the existing commuter car parks to the east and west of the station:

- upgrade of the existing accessible parking spaces in the Ritchie Road commuter car park to the east of the station, including adjustments to the turning bay, relocation of bike hoops, line marking, signage, new kerb ramp and kerb adjustments
- provision of two new accessible spaces in the commuter car park on Breasley Place to the west of the station, including line marking, signage, tree trimming, new kerb ramp and kerb adjustments.

The existing footpaths connecting the car parks to the station entrance would be upgraded to provide compliant accessible footpaths, the works would include:

- realignment and regrading of the footpath from the eastern commuter car park to the station entrance to provide a compliant footpath
- realignment and regrading of the footpath from the new accessible parking spaces in the western commuter car park to the station entrance to provide a compliant footpath
- provision of rest areas including seating and landscaping works as required along the upgraded footpaths.

Provision of the new access path on the western side of the station may involve partial realignment through part of the rail corridor to achieve the required ramp grades. Some vegetation trimming and removal would be required to accommodate the new footpath. The existing access to the station from the commuter car parks would need to be disrupted during the works with temporary detours in place. The design and staging of the new accessible footpaths would be determined during detailed design. Access from the western commuter car park to the station would be temporarily closed for the construction of the new footpath. However, access to businesses from the Breasley Place Council car park would be maintained at all times.

3.2.4 Interchange facilities

The following works would be undertaken to interchange facilities around the station:

- provision of a new accessible kiss and ride bay to accommodate one car on the Hume Highway to the east of the station entry; including line marking, signage, new kerb ramp and kerb and pavement adjustments
- relocation of planter boxes, payphone and public bench adjacent to the Hume Highway, as required to accommodate the new kiss and ride bay
- provision of an accessible footpath between the station entrance and Bus Stop 219911 Yagoona Station, Hume Highway.

Provision of the new kiss and ride bay on the Hume highway would result in the loss of two time-limited parallel parking spaces on the Hume.

3.2.5 Ancillary work

The following ancillary work is required as part of the Proposal and would include:

- adjustments to platform drainage
- services relocation and/or adjustments, including lighting and communications systems (e.g. CCTV), water, sewage and stormwater
- electrical upgrade work, which could include an upgrade to the existing transformers, main switch board and station distribution boards, and earthing/bonding provisions as required to accommodate the power requirements for the Proposal (specific power and upgrade requirements to be determined during detailed design)
- improvements to existing station systems (including installing additional CCTV cameras as required, installing new LED lighting, and provision of additional Public Address (PA) system speakers as required)
- adjustments to rail boundary fencing to accommodate the upgraded footpath on the western side of the station
- adjustment to station ticketing facilities, including new and or relocated Opal card readers to suit the Proposal
- provision of wayfinding signage and other station signage as required for the new work
- temporary site compound areas for site office, sheds, amenities, storage of materials, plant and equipment (refer to Section 3.2.5 for additional details)
- temporary service connections for site compound facilities
- temporary work (where required), to facilitate construction and to maintain customer access to the station
- vegetation trimming and removal to accommodate new footpaths.

3.2.6 Materials and finishes

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

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

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

- lift shafts – concrete and glass
- concourse – concrete base with mesh throw screens, decorative panels and steel roof

- platform stairs – concrete with mesh throw screens and canopy, stainless steel handrails
- platform building – painted composite cladding, decorative panels and steel roof, internal fittings and fixtures to suite Sydney Trains requirements
- platform canopies – steel frame and roofing
- accessible footpaths – concrete with stainless steel handrails where required
- platform regrading – asphalt.

The design would be presented to Transport for NSW's Design Review Panel during detailed design development for comment before being finalised. An Urban Design Plan (UDP) and/or Public Domain Plan (PDP) would also be prepared by the Contractor, prior to finalisation of detailed design for endorsement by Transport for NSW.

3.3 Design development

3.3.1 Engineering constraints

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

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

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: Detailed Services Searches (DSS) and a Dial Before You Dig (DBYD) search has identified a number of utilities in the vicinity of the proposed work including:

- aerial high voltage cables and feeders, primarily located on the eastern side of the rail corridor services in the concourse and platforms including electrical and communications
- stormwater services
- water and sewer services
- rail systems including signalling infrastructure and cabling, communications optic fibre, and overhead wiring.

3.3.2 Design standards

The Proposal would be designed having regard to the following:

- DSAPT (issued under the Commonwealth DDA)
- Building Code of Australia
- relevant Australian Standards
- Asset Standards Authority standards
- Sydney Trains standards and guidelines
- Infrastructure Sustainability Council of Australia (ISCA) Infrastructure Sustainability Rating Scheme (V1.2)
- *Guidelines for the Development of Public Transport Interchange Facilities* (Ministry of Transport, 2008)

- Crime Prevention Through Environmental Design (CPTED) principles
- other Transport for NSW policies and guidelines
- council standards where relevant.

3.3.3 Sustainability in design

The Proposal is targeting a rating of 'Excellent' using the ISCA Infrastructure Sustainability (IS) Rating Scheme (v1.2). The rating scheme provides an independent and consistent methodology for the application and evaluation of sustainability outcomes in infrastructure projects. The sustainability outcomes address environmental, social, economic and governance aspects.

The IS Rating Scheme is grouped into six key themes:

- management and governance
- using resources
- emissions, pollution and waste
- ecology
- people and place
- innovation.

These sustainability themes are divided into 15 performance categories, against which the Proposal would be independently assessed and assigned a rating level.

3.4 Construction activities

3.4.1 Work methodology

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

The proposed construction activities for the Proposal are identified in Table 3.1. This staging is indicative and is based on the current concept design and may change once the detailed design methodology is finalised. The staging is also dependent on the Contractor's preferred methodology, program and sequencing of work.

Table 3.1 Indicative construction staging for key activities (subject to detailed design)

Stage	Activities
Site establishment and enabling work	• site investigations and survey • establishment of site compounds (i.e. erect fencing, tree protection zones, site offices, amenities and plant/material storage areas) • establish temporary facilities as required (e.g. temporary access stairs, temporary toilets, temporary construction lights etc.) • erect temporary site hoarding and fencing as required • relocation of services • installation of power where required • traffic control measures

Stage	Activities
Lift, stairs and concourse work	• excavate lift foundations • demolish existing concourse • construct new stairs • piling for footings and in situ concrete work • waterproofing (as required), install reinforcement, formwork and concrete to form the lift pit • erect precast concrete structures and steel canopies • demolish existing stairs • lift installation and commissioning • architectural fit-out around lift shaft including new awning and anti-throw screens
Platform building enabling work	• excavation of footings and piling for building foundations • installation of in ground services route along platform • pour concrete foundations
Platform building installation	• installation of modular building sections
Eastern footpath work	• tree trimming • demolition of existing path • concrete new footpaths including retaining walls and footings • landscaping • installation of handrails
Western (Breasley Place) footpath work	• demolition of existing footpath • concrete existing footpaths including retaining walls and footings • tree removal and landscaping • installation of handrails • installation of new walkway
Station building work	• fit out of all station building rooms including services, wall and floor finishes
Platform modification work	• regrade platform surface • relocate platform furniture including seating • installation of tactile ground surface indicators and new yellow line along platforms • installation of new canopy
Track services crossing	• excavate and install service routes under tracks and into platform, reinstate excavation and recertify track
Demobilisation	• install other ancillary features and landscaping • remove hoardings • clear site • remove environmental, safety and traffic controls.

3.4.2 Plant and equipment

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

- trucks
- rail mounted elevated work platforms
- concrete pump and trucks
- jack hammers
- forklift
- lighting towers
- chainsaw
- hand tools
- piling rig
- vibrating roller/ compaction plate
- skip trucks
- franna/mobile cranes
- road rail excavator
- hammer drills
- coring machine
- bobcat
- water cart
- excavator
- impact wrenches
- suction trucks
- demolition saw
- grinders
- hi-rail plant
- elevated work platform (EWP)
- dump trucks
- vacuum trucks.

3.4.3 Working hours

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

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

Out of hours work is required in some cases to minimise disruptions to customers, pedestrians, motorists and nearby sensitive receivers; and to ensure the safety of railway and construction workers and operational assets. Some of the out of hours work would occur during predetermined rail showdown periods when the station is closed for maintenance. It is estimated that approximately eight rail shutdowns would be required to facilitate the following:

- installation of hoarding to construction areas
- demolition and removal of the existing concourse and stairs
- excavation of the new concourse, stair and lift foundations
- construction of the new concourse, lift and stair structures
- trenching along the platform for new services routes and relocation of station services to the new platform building
- installation of the platform building
- platform re-grading and installation of the new canopy extensions.

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

3.4.4 Extended Working Hours during COVID-19

The Minister for Planning and Public Spaces has made a number of Orders under Section 10.17 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) in response to the COVID-19 pandemic. This includes the *Environmental Planning and Assessment (COVID-19 Development -Infrastructure Construction Work Days No. 2) Order 2020* (the 'Order'), which commenced on 24 December 2020, and is applicable to construction activities for projects which have been subject to an assessment under Division 5.1, or approval under Division 5.2 of the EP&A Act.

The Order extends the standard construction hours to allow infrastructure construction work on Saturday, Sunday and Public holidays (7am to 6pm), without the need for approval (excluding high noise generating work such as rock breaking or pile driving and the like). Whilst no further approvals are required for these extended working hours, in the event that Transport for NSW would seek to utilise the extended working hours permitted by the Order, advance notification would be provided to the community.

3.4.5 Earthworks

Excavations and earthworks would generally be required for the following:

- regrading and construction of the footpaths
- removal of vegetation within the rail corridor
- installation of the new lift shaft and stairs
- trenching for service adjustments and relocations.

Excavated material would be reused onsite where possible. Any fill material that is odorous and suspected of being potentially contaminated would be sampled and treated and/or disposed in accordance with relevant legislative and sustainability requirements.

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

3.4.6 Source and quantity of materials

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

3.4.7 Traffic access and vehicle movements

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

- impacts to pedestrian, rail customers and cyclists, including temporary detours to pedestrian access from station to car parks
- impact to pedestrian and cyclist movements on both sides of the station due to the movement of construction material, traffic diversions and the location of crane/s during construction
- increased vehicle movements may reduce safety

- impacts to off-street parking in the Council car park located on the western side of the station (Breasley Place), and to the commuter car parks located to the east and west of the station
- impacts to on-street car parking locations along the Hume Highway.

3.4.8 Ancillary facilities

A temporary construction compound would be required to accommodate a site office, amenities, laydown and storage area for materials. Two areas have been nominated as compound sites for construction compounds:

- Ron Whitehead Place to the east of Yagoona Station
- Breasley Place Council and commuter car park located to the west of Yagoona Station.

Both these nominated sites are on land owned by the City of Canterbury-Bankstown. A construction laydown area is also nominated within the rail corridor to the north-west of the station. The areas nominated for ancillary facilities are shown on Figure 3.5. The extent to which these sites would be utilised would be determined during detailed design and in consultation with Council.

Impacts associated with utilising these areas have been considered in the environmental impact assessment (refer to Chapter 6) including requirements for rehabilitation.

3.4.9 Public utility adjustments

The Proposal has been designed to avoid relocation of services where feasible, however further investigations may be required. It is likely some services would require relocation or adjustment including potential utility adjustments to accommodate new infrastructure (such as the new pedestrian footpaths).

These relocations are unlikely to occur outside of the footprint of the works assessed in this REF. However, in the event that work would be required outside of this footprint, further assessment would be undertaken. Relocation or other work that may affect services would be undertaken in consultation with the respective utility authorities during detailed design.

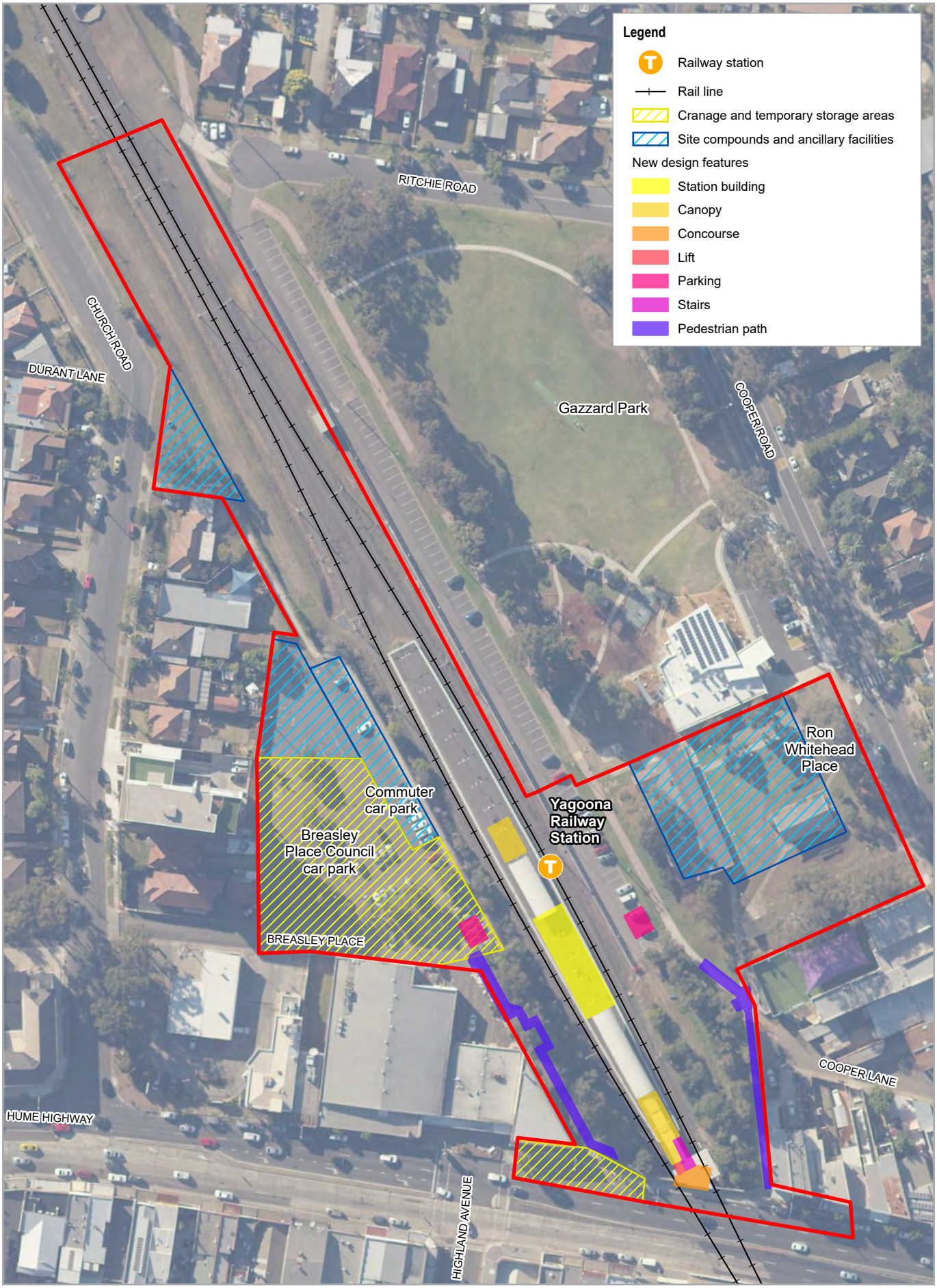
3.5 Property acquisition

Transport for NSW does not propose to acquire any property as part of the Proposal. Transport for NSW would obtain temporary licences to occupy or lease the land from City of Canterbury-Bankstown for the temporary site compounds.

As part of the Proposal, the retail lease for the shop situated on the existing concourse would cease. This process would not involve any property acquisition.

3.6 Operation and maintenance

The future operation and maintenance of the new station facilities are subject to further discussions with Sydney Trains, Transport for NSW and City of Canterbury-Bankstown. Rail structures constructed under this Proposal would be maintained by Sydney Trains. It is expected that adjacent footpaths would continue to be maintained by City of Canterbury-Bankstown.



Paper Size ISO A4

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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GHD

Transport for NSW
Yagoona Station Upgrade
Review of Environmental Factors

Site compounds and ancillary facilities

Project No. **1254729**
Revision No. **0**
Date **13/05/2021**

FIGURE 3.5

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Print date: 14 May 2021 - 10:16

4 Statutory considerations

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

4.1 Commonwealth legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The (Commonwealth) EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places - defined in the EPBC Act as 'matters of National Environmental Significance (NES)'. The EPBC Act requires the assessment of whether the Proposal is likely to significantly impact on matters of NES or Commonwealth land. These matters are considered in full in 0.

The Proposal would require the removal of up to 23 trees, 19 of which are native, throughout an area of about 0.05 hectares. An additional 0.05 hectares of vegetation would be trimmed. No vegetation to be impacted is listed under the EPBC Act.

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

4.1.2 Other Commonwealth legislation

Other Commonwealth legislation applicable to the Proposal is discussed in Table 4.1.

Table 4.1 Other Commonwealth legislation applicable to the Proposal

Applicable legislation	Considerations
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	There is an obligation on a person who discovers anything which he or she has reasonable grounds to suspect are Aboriginal remains to report that discovery to the Minister, giving particulars of the remains and their location. The Proposal does not include any previously identified Aboriginal sites and/or places (refer to Section 6.4); however, considerations for unexpected finds further detailed in mitigation measures and applies to this Act.
Disability Discrimination Act 1992 (DDA)	This Act aims to eliminate as far as possible, discrimination against persons on the ground of disability in areas including access to premises and the provision of facilities, services and land. The Proposal would be designed having regard to the requirements of this Act. The key objective of the Proposal is to improve the accessibility of Yagoona Station which is consistent with the objectives of this Act.

4.2 NSW legislation and regulations

4.2.1 Transport Administration Act 1988

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

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

2A Objects of Act

…

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

b) to promote the integration of the transport system,

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

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

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

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

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

(a) ***Environmental sustainability***

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

(b) ***Social benefits***

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

4.2.2 Environmental Planning and Assessment Act 1979

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

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

Clause 228 of EP&A Regulation defines the factors which must be considered when determining if an activity assessed under Division 5.1 of the EP&A Act has or is likely to have a significant impact on the environment. Chapter 6 of the REF provides an environmental impact assessment of the Proposal in accordance with clause 228 and 0 specifically responds to the factors for consideration under clause 228.

4.2.3 Other NSW legislation and regulations

Table 4.2 provides a list of other relevant legislation applicable to the Proposal.

Table 4.2 Other legislation applicable to the Proposal

Applicable legislation	Considerations
Biodiversity Conservation Act 2016 (BC Act) (NSW)	The Proposal area contains suitable habitat for listed threatened species. However, the Proposal is unlikely to have a significant impact on threatened biota (refer to Section 6.7).
Biosecurity Act 2015 (NSW)	Clause 22 requires any person who deals with a biosecurity matter has a duty to ensure that in so far as is reasonably practicable, the potential biosecurity risk is prevented, eliminated or minimised. Appropriate management methods would be implemented during construction if declared noxious weeds in the Canterbury-Bankstown LGA are identified (refer to Section 6.7).
Contaminated Land Management Act 1997 (CLM Act) (NSW)	Section 60 of the CLM Act imposes a duty on landowners to notify the Department of Planning, Industry and Environment (DPIE), and potentially investigate and remediate land if contamination is above EPA guideline levels. The site has not been declared under the CLM Act as being significantly contaminated (refer to Section 6.8).
Crown Lands Act 1987 (NSW)	The Proposal does not involve works on any Crown land.
Disability Discrimination Act 1992 (DDA Act) (Cwlth)	The Proposal would be designed having regard to the requirements of this Act.
Heritage Act 1977 (Heritage Act) (NSW)	• Sections 57 and 60 (approval) where items listed on the State Heritage Register are to be impacted • Sections 139 and 140 (permit) where relics are likely to be exposed • Section 170 where items listed on a government agency Heritage and Conservation Register are to be impacted. 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.
National Parks and Wildlife Act 1974 (NPW Act) (NSW)	Sections 86, 87 and 90 of the NPW Act require consent from DPIE for the destruction or damage of Indigenous objects. The Proposal is unlikely to disturb any Indigenous objects (refer to 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.
Protection of the Environment Operations Act 1997 (PoEO Act) (NSW)	The Proposal does not involve a 'scheduled activity' under Schedule 1 of the PoEO Act. Accordingly, an Environment Protection Licence (EPL) is not required for the Proposal. However, in accordance with Part 5.7 of the PoEO Act, Transport for NSW would notify the EPA of any pollution incidents that occur onsite. This would be managed in the Construction Environmental Management Plan (CEMP) to be prepared and implemented by the Contractor.
Roads Act 1993 (Roads Act) (NSW)	Section 138 of the Roads Act requires consent from the relevant road authority for the carrying out of work in, on or over a public road. However, clause 5(1) in Schedule 2 of the Roads Act states that public authorities do not require consent for works on unclassified roads.

Applicable legislation	Considerations
	The Proposal would involve limited impacts to existing roads surrounding the station, however would include works to the footpath along the Hume Highway (which is a classified road). The works would be undertaken in consultation with Transport for NSW and the City of Canterbury-Bankstown including the need to obtain Road Occupancy Licence(s) (ROL) for temporary road closures to facilitate works (where required, such as for temporary crane operations) or impacts to classified roads.
Sydney Water Act 1994 (NSW)	The Proposal would not involve discharge of wastewater to the sewer.
Waste Avoidance and Resource Recovery Act 2001 (WARR Act) (NSW)	Transport for NSW would carry out the Proposal having regard to the requirements of the WARR Act. A site-specific Waste Management Plan would be prepared.
Water Management Act 2000 (NSW)	The Proposal would not involve any water use (from a natural source e.g., aquifer, river – only from the network), water management works, drainage or flood works, controlled activities or aquifer interference.

4.2.4 State Environmental Planning Policies

State Environmental Planning Policy (Infrastructure) 2007

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

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

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

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

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

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

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

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

State Environmental Planning Policy 55 – Remediation of Land

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

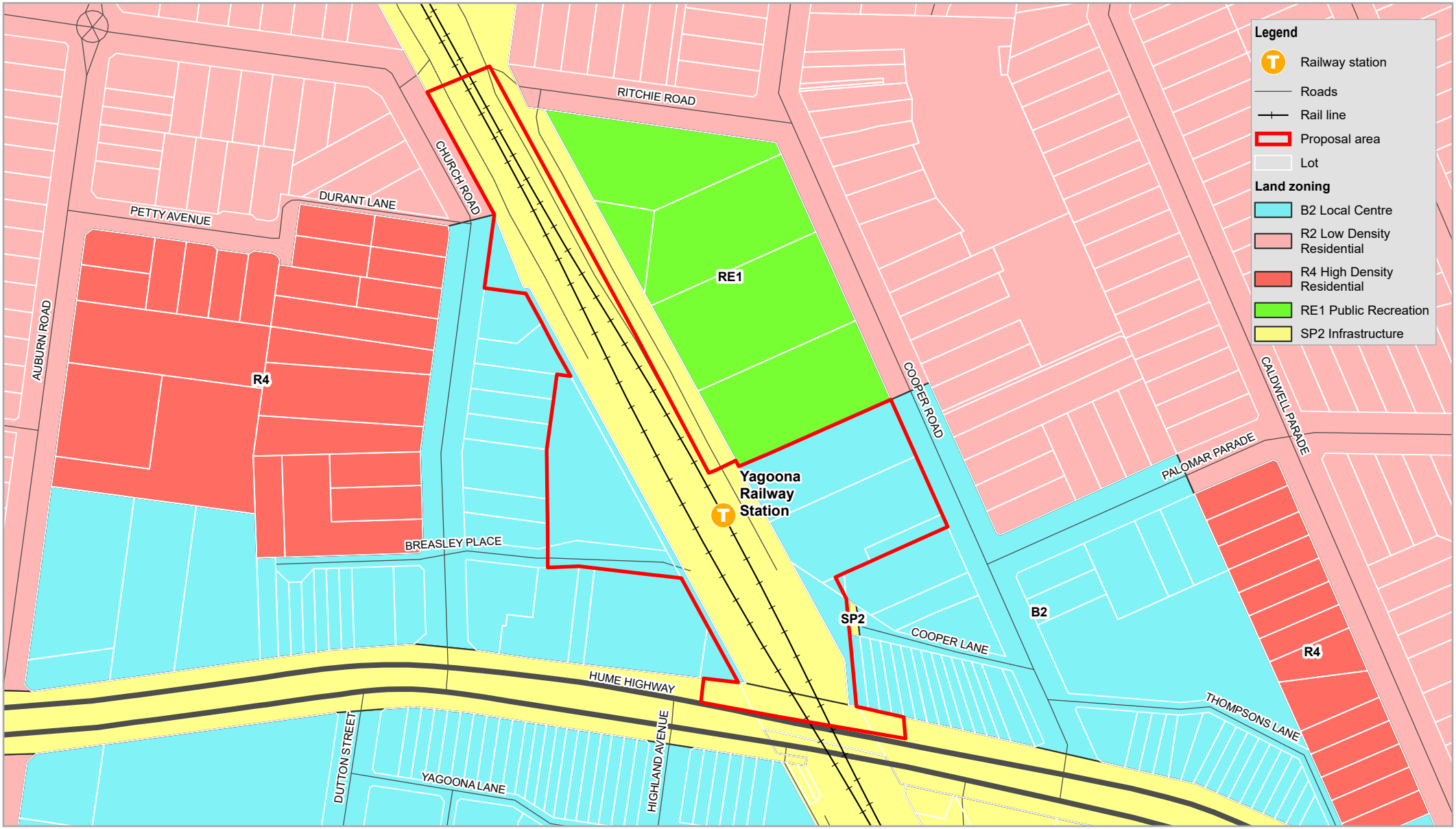
Section 6.8 of this REF contains an assessment of the potential contamination impacts of the Proposal. It is not expected that any large-scale remediation (Category 1) work would be required as part of the Proposal. The proposed land use would not differ to the existing use and is, therefore, unlikely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

4.2.5 Bankstown Local Environmental Plan 2015

The Proposal is located within the Canterbury-Bankstown LGA. The Infrastructure SEPP prevails over all other environmental planning instruments (such as LEPs) except where there is an inconsistency with the *State Environmental Planning Policy (State Significant Precincts) 2005* or certain provisions of *State Environmental Planning Policy (Coastal Management) 2018*.

Council is currently in the process of combining and aligning the *Bankstown Local Environmental Plan 2015* (Bankstown LEP 2015) and the *Canterbury Local Environmental Plan 2012* (Canterbury LEP 2012) into a consolidated LEP. When finalised, the Consolidated LEP will be a legal planning instrument used by planning authorities when assessing development applications. It will apply to the Canterbury-Bankstown LGA.

During the preparation of this REF, the provisions of the Bankstown LEP 2015 were considered. The Bankstown LEP 2015 is the governing plan for part of Canterbury-Bankstown LGA, including Yagoona. Table 4.3 summarises the relevant provisions of the Bankstown LEP 2015 applicable to the Proposal. Land zoning within the study area is shown on Figure 4.1.



Paper Size ISO A4

0 25 50

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Transport for NSW
Yagoona Station Upgrade
Review of Environmental Factors

Project No. **12544729**
Revision No. **0**
Date **13/05/2021**

Bankstown LEP zoning

FIGURE 4.1

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Print date: 13 May 2021 - 15:05

Data source: LPI: DCDB/DTDB 2021. EPI: Land zoning, 2020, . Created by: kpsroba

Table 4.3 Relevant provisions of the Bankstown LEP 2015

Provision description	Relevance to the Proposal
Clause 2.3 – Zone objectives and Land Use Table .	Under the Bankstown LEP, the Proposal is located in areas zoned as: • SP2 Infrastructure: Yagoona Station and the railway corridor • B2 Local Centre: location of accessible pathways, car parks and ancillary facilities. **Zone objectives** <u>SP2 Infrastructure zone:</u> • to provide for infrastructure and related uses • to prevent development that is not compatible with or that may detract from the provision of infrastructure. <u>B2 Local Centre zone:</u> • to provide a range of retail, business, entertainment and community uses that serve the needs of people who live in, work in and visit the local area • to encourage employment opportunities in accessible locations • to maximise public transport patronage and encourage walking and cycling to provide for certain residential uses that are compatible with the mix of uses in local centres. The Proposal is consistent with the objectives of both zones. The Proposal is permissible within the SP2 Infrastructure zone. Ancillary facilities would be not be subject to long-term infrastructure within the B2 Local Centre zone and would return to the existing use following construction.
Clause 4.3 – Height of buildings:	The maximum height of buildings in the SP2 Infrastructure zone is 20 metres. The Proposal is not expected to exceed the height of the existing structure and would be consistent with the maximum height of buildings in the Bankstown LEP. No new structures are proposed on land located within the B2 Local Centre zone.
Clause 5.12 – Infrastructure development and use of existing buildings of the Crown	The Bankstown LEP does not restrict or prohibit, or enable the restriction or prohibition of, the carrying out of any development, by or on behalf of a public authority, that is permitted to be carried out with or without development consent, or that is exempt development, the Infrastructure SEPP.

4.3 Ecologically sustainable development

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

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

The principles of ESD have been adopted by Transport for NSW throughout the development and assessment of the Yagoona Station Upgrade. Section 3.3.3 summarises how ESD would be incorporated in the design development of the Proposal. Section 6.13 and 6.14 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 Yagoona Station, including a range of Transport for NSW divisions and Sydney Trains, were engaged during the development of the Proposal to provide insights into the scope of work, and to also participate in the development and assessment of the station improvement options.

5.2 Consultation requirements under the Infrastructure SEPP

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

Table 5.1 provides details of consultation requirements under the Infrastructure SEPP for the Proposal.

Table 5.1 Infrastructure SEPP consultation requirements

Clause	Clause particulars	Relevance to the Proposal
Clause 13 | Consultation with Councils – development with impacts on council related infrastructure and services	Consultation is required where the Proposal would result in: • substantial impact on stormwater management services • generating traffic that would place a local road system under strain • involve connection to or impact on a council owned sewerage system • involve connection to and substantial use of council owned water supply • significantly disrupt pedestrian or vehicle movement • involve significant excavation to a road surface or footpath for which Council has responsibility.	The Proposal includes 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 the City of Canterbury-Bankstown has been undertaken and would continue throughout the detailed design and construction phases.
Clause 14 | Consultation with Councils – development with impacts on local heritage	Where railway station 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/heritage conservation areas. Accordingly, consultation with Council under Clause 14 is not required. Refer to Section 6.5.

Clause	Clause particulars	Relevance to the Proposal
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 *Floodplain Development Manual: the management of flood liable land.*	The Proposal is not located on land that is susceptible to flooding. Accordingly, consultation with Council under Clause 15 is not required. Refer to Section 6.9.
Clause 15A Consultation with Councils – development with impacts on certain land within the coastal zone	Where railway station works: • impact on land within a coastal vulnerability area and is inconsistent with certified coastal management program that applies to that land.	The Proposal is not located on land within a coastal vulnerability area. Accordingly, consultation with Council under Clause 15A is not required.
Clause 15AA Consultation with State Emergency Service – development with impacts on flood liable land	Where railway station works: • impact on flood liable land -written notice must be given (together with a scope of works) to the State Emergency Services and taken into consideration any response to the notice received from the State Emergency Service within 21 days after the notice is given.	The Proposal is not located on flood liable land. Accordingly, consultation with State Emergency Service under Clause 15AA is not required. Refer to Section 6.9.
Clause 16 | Consultation with public authorities other than Councils	For specified development which includes consultation with the NSW Department of Planning, Industry and Environment (DPIE) (formerly OEH) for development that is undertaken adjacent to land reserved under the NPW Act, and other agencies specified by the Infrastructure SEPP where relevant. Although not a specific Infrastructure SEPP requirement, other agencies Transport for NSW may consult with could include: • Transport for NSW (Roads) • Sydney Trains • Heritage NSW.	The Proposal is not located adjacent to land reserved under the NPW Act. Accordingly, consultation with DPIE and/or Heritage NSW under Clause 16 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

Community consultation activities for the Proposal would be undertaken during the public display of this REF. The public display period would occur over a 14 day period. The community consultation will adopt a range of online and non-face-to-face consultation mechanisms to ensure social distancing are practiced to limit the spread of COVID-19.

Community consultation activities during the public display period will include:

- a dedicated webpage for the project on the Transport for NSW website with an online feedback form
- public display of the REF on the project webpage
- installation of information signage at the station with quick response (QR) codes taking customers to the project webpage
- distribution of a project newsletter to the local community, including businesses and residents, key stakeholder groups and customers, outlining the Proposal and inviting feedback on the REF
- advertisement of the REF public display in local newspapers including a summary of the Proposal and information on how to view the REF, information on how to provide feedback and Transport for NSW's contact details
- consultation with the City of Canterbury-Bankstown and Sydney Trains and other non-community stakeholders
- a geo-targeted social media campaign during the public display period
- emails to members of the community who have registered to be on the project mailing list.

The REF will be placed on public display on the Transport for NSW website, (www.transport.nsw.gov.au/yagoona) with feedback from the community and other stakeholders invited between Tuesday 18 May to Tuesday 1 June 2021. Further information on the Proposal may be requested by contacting the Project Infoline on 1800 684 490 or by email at projects@transport.nsw.gov.au.

Feedback can be submitted by:

- Emailing: projects@transport.nsw.gov.au
- Completing the feedback form at www.transport.nsw.gov.au/yagoona or www.nsw.gov.au/have-your-say/yagoona-station-upgrade
- Mailing:

  Transport Access Program – Yagoona Station Upgrade
  Associate Director Environmental Impact Assessment
  Transport for NSW
  PO Box K659
  Haymarket NSW 1240

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

5.5 Aboriginal community involvement

An Aboriginal Heritage Information Management System (AHIMS) search was undertaken for the area covered by the Proposal (the area around Yagoona Station) plus a one kilometre radius, on 3 March 2021. No Aboriginal sites or items were identified within the search area, and therefore no sites would 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 that the archaeological potential of the area is low. Therefore, it was not considered necessary to undertake specific Aboriginal consultation.

Members of the local Aboriginal community are encouraged to participate in consultation activities and to provide feedback on the Proposal as described in Section 5.4.

5.6 Ongoing consultation

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

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

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

6 Environmental impact assessment

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

This environmental impact assessment has been undertaken in accordance with clause 228 of the EP&A Regulation. A checklist of clause 228 factors and how they have been specifically addressed in this REF is included at 0.

6.1 Traffic and transport

A Traffic, Transport and Access Impact Assessment was prepared for the Proposal (GHD 2021a). The assessment involved a site inspection undertaken on the 26 March 2021.

6.1.1 Existing environment

Road network

The main access to Yagoona Station is provided on the Hume Highway. The Hume Highway is an arterial road that provides three travel lanes in either direction. In proximity to the station, time-restricted on-street parking is provided on both sides of the highway to support retail and commercial activity in the Yagoona town centre.

The commuter car park to the east of Yagoona Station is accessed from a cul-de-sac at the end of Richie Road via Cooper Road. The Council car park to the west of Yagoona Station is accessed from Breasley Place via Church Road.

The key roads in proximity to Yagoona Station are shown below in Figure 6.1.

Figure 6.1 Road network

Car parking

Car parks are located on the eastern and western sides of Yagoona Station. The eastern car park provides approximately 80 parking bays, including two accessible parking spaces. These parking bays are allocated for all-day commuter parking. A turnaround bay is provided at the northern end to enable vehicles to exit the car park if all the available parking bays are full.

The western council car park provides approximately 110 parking bays, including two accessible parking bays. The car park provides a combination of three-hour time restricted parking available for the Yagoona business precinct (75 bays) and all-day commuter parking (35 parking bays).

It is understood that demand at both car parks is high, and they typically operate at or near capacity on weekdays.

In proximity to the station, time-restricted parking is provided on the Hume Highway (half an hour parking between 10am and 6pm Monday to Friday and 8am and 12pm on Saturdays).

Parking on Cooper Street between the Hume Highway and Ritchie Road is time-restricted, a combination of one hour and two-hour parking (8:30am to 6pm Monday to Friday and 8:30am to 12:30pm on Saturdays). Parking along the Hume Highway, east of the station, has a half

hour restriction at all times. Two-hour parking restrictions are also provided on Church Street in proximity to Yagoona Station.

The time-restricted parking areas support the operation of the Yagoona town centre and discourage commuters from parking on the road network in proximity to Yagoona Station.

Kiss and ride

There are currently no formal kiss and ride and taxi zones at Yagoona Station.

A No Parking zone (for a single vehicle) is provided on the northern side of the Hume Highway, adjacent to the east of Yagoona Station. No Parking signage requires drivers to stop for a maximum of two minutes and stay within three metres of their vehicle. Accordingly, the zone operates as an informal kiss and ride/taxi facility for Yagoona Station.

Pedestrian and bicycle facilities

The main station access is provided from the Hume Highway. Footpaths are provided to the east and west of Yagoona Station linking the parking areas to the station entrance on the Hume Highway.

Signalised pedestrian crossing points are provided on the Hume Highway to the east of the station (at the intersection with Cooper Road) and the west of the station (at the intersection with Highlands Avenue).

A shared path is provided to the east of Yagoona Station adjacent to the car park and connects to the footpath on the Hume Highway. There are pedestrian footpaths on both sides of the Hume Highway, of about four metres wide. Narrower footpaths are also provided on both sides of Cooper Road and Church Road.

A bicycle rack that provides parking for up to five bicycles, is provided on the southern end of the eastern car park (refer to Figure 6.2).

Figure 6.2 Bicycle parking located to the east of Yagoona Station

Public transport

Rail

Yagoona Station is located on the T3 Bankstown Line. The T3 Bankstown Line operates between Liverpool and Sydney CBD via Lidcombe, Bankstown and Sydenham. Train services typically run with:

- 15 minute frequencies on weekdays between 4am and 12am
- 12 to 18 minute frequencies on weekends and public holidays.

Bus services

A bus stop is located on the northern side of the Hume Highway, adjacent to the station entrance. A bus stop is also located on the southern side of the Hume Highway, approximately 100 metres to the west of the station entrance.

The signalised crossings at the intersection of the Hume Highway and Highlands Avenue supports the safe movement of pedestrians between bus stops.

The bus services operating at these bus stops include:

- 907 Parramatta to Bankstown via Bass Hill, typically operates with 20 minute frequencies
- M91 Parramatta to Hurstville via Chester Hill and Padstow, typically operates with 10 to 15 minute frequencies.

Bus stops are also provided on both sides of Church Road at its intersection with the Hume Highway, approximately 150 metres to the west of Yagoona Station.

6.1.2 Potential impacts

a) Construction phase

Traffic impacts

Access to the site would require the use of the local road network. In determining appropriate access/egress routes for construction vehicles, an effort would be made to minimise impacts on local and collector roads. The Hume Highway would be the primary route to and from the construction compounds. Transport for NSW designates the Hume Highway as being able to accommodate 19 metre semi-trailers and 26 metre B-double routes.

There are two potential compound locations to support construction of the Proposal (refer to Section 3.4.8).

For the proposed construction compound in the Breasley Place Council and commuter car park, vehicles would access/egress the site via Hume Highway, Church Road and Breasley Place. For the construction compound in Ron Whitehead Place, vehicles would access/egress the site via Hume Highway and Cooper Road.

The recommended haulage routes to the Proposal area are shown in Figure 6.3.

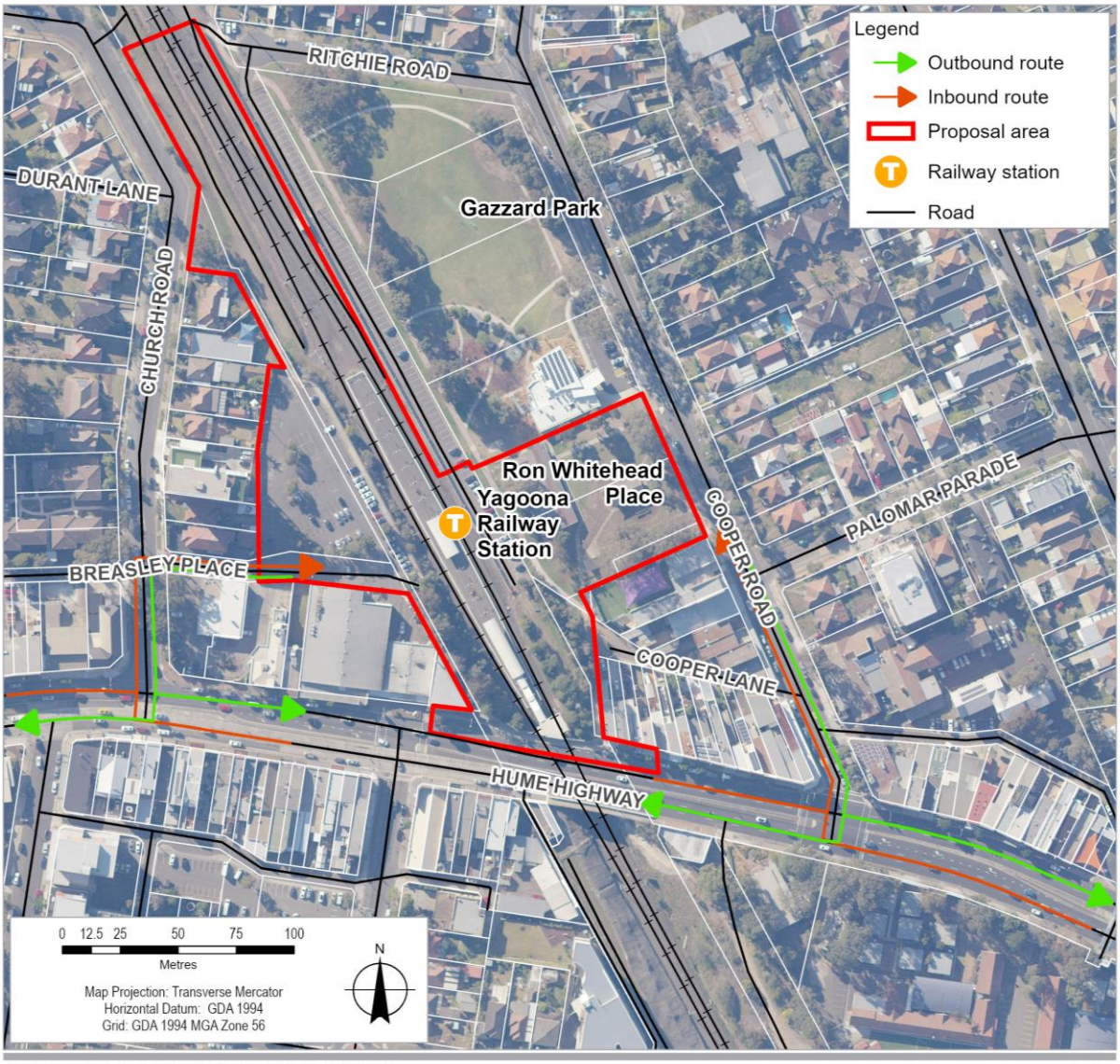


Figure 6.3 Recommended haulage routes

Swept path analysis has been undertaken for:

- 8.8 metre medium rigid vehicle (MRV) and 12.5 metre heavy rigid vehicle (HRV) accessing and egressing both construction compounds
- 15.7 metre crane accessing and egressing the western compound.

Based on the analysis, a MRV and HRV would be able to access and egress the construction compounds. The use of Ron Whitehead Place as a temporary construction compound would require the temporary relocation of the pedestrian crossing to accommodate vehicle access.

The swept path analysis concluded that there was insufficient space available on Breasley Place for a crane of 15.7 metres to access the compound. Accordingly, the provision of a 250 tonne crane on the western compound would be difficult to achieve. Cranes of smaller dimensions would need to be considered or an alternative location for cranage activities identified.

Work during rail shutdowns (scheduled weekend closures when part of the rail network is temporarily closed and trains are not operating), approximately six heavy vehicles are expected to access/egress the construction compounds over the course of each day. Outside of rail shutdowns, up to three heavy vehicles are expected to access/egress the construction compounds over the course of the day. During rail shutdowns, up to 20 workers are expected onsite, with up to 10 workers expected outside of these periods.

Construction vehicle movements are expected to fall within typical fluctuations of daily traffic movements and therefore not adversely alter the existing operation of the road network in proximity to Yagoona Station.

Parking impacts

The compound on the western side of the station would not require use of the entire car park. A small area at the northern end of the car park would be used. This would result in the temporary loss of approximately 20 to 25 timed and untimed parking spaces for the duration of construction. The cranage and temporary storage area proposed on the eastern side of the station would result in the temporary loss of approximately 20 timed and untimed car parking spaces.

The entire western car park would be closed and utilised for certain construction activities such as during:

- the lift and concourse work and platform building installation where a 250 tonne crane would be required onsite
- on weekends, during rail shutdowns (up to eight times during the construction period) where commuter parking demands is at its lowest.

Individuals using the commuter and council car parks on the western side of the station during rail shutdowns would need to find alternative parking areas.

While time-restricted parking (one hour and two hour) is provided on Cooper Road and Church Road, both car parks are heavily utilised by shoppers and the loss of parking spaces would impact their mobility and access to the shops.

Alternative parking measures and controls to mitigate the loss of parking expected to occur during the construction of the Proposal would be considered in consultation with Council, prior to the commencement of construction.

Mitigation measures discussed in Section 6.1.3 and listed in Table 7.1 would be implemented to minimise traffic and parking impacts.

Public transport

As detailed above, some construction work would occur on weekends during scheduled rail shutdowns. Buses would replace trains during rail shutdown periods. Bus services may be subject to minor delays due to interactions with construction vehicles accessing/egressing the site compounds from the Hume Highway.

The bus stop on the Hume Highway would be temporarily closed for temporary crane operations and during work on the footpath. An alternative bus stop is located about 150 metres west of the existing bus stop (on Church Road).

Mitigation measures discussed in Section 6.1.3 and listed in Table 7.1 would be implemented to minimise traffic and parking impacts. Proposed traffic controls would be detailed in the Construction Traffic Management Plan (CTMP) and Traffic Control Plan (TCP) which would be prepared by the Contractor prior to the commencement to construction. Any impacts on bus operations would be undertaken in consultation with bus operators, Council and Transport for NSW (Roads). Relevant road occupation licences would be obtained prior to works being undertaken on the Hume Highway.

Pedestrian access

Regrading and realignment of the footpaths on both sides of the station would require the temporary closures of the footpaths. These footpaths connect the car parks to the station entry and to the Hume Highway. The eastern footpath would be closed for approximately five months and sections of the western footpath closed for approximately three months. However, access to businesses from the Breasley Place Council car park would be maintained at all times.

The proposed new footpath would be parallel to the existing footpath within the rail corridor for much of its length. This would allow access to the businesses along the existing footpath to be maintained from Hume Highway during most construction activities. During these closures, commuters utilising the car parks, and members of the public accessing the Community Centre or Gazzard Park, would need to utilise alternative routes to access and egress Yagoona Station.

For access to Ron Whitehead Place, Cooper Lane is very narrow and has poor pedestrian facilities. It is recommended that pedestrians are directed through Ron Whitehead Place. The construction compound proposed within the reserve would need to be fenced off and provided with a wide easement and wayfinding signage for pedestrians.

For access to the Breasley Place Council and commuter car park, Breasley Place provides a narrow footpath. Accordingly, barricades or similar measures would be located on the southern side of Breasley Place to provide a designated footpath, separated from vehicle movements. The temporary pedestrian footpaths may result in temporary impacts on pedestrians due to the change in access arrangements and the additional distances required to access the station, particularly for individuals with reduced mobility.

The recommended pedestrian routes to and from the car parks are shown on Figure 6.4 and include:

- eastern commuter car park – Ron Whitehead Place, Cooper Road and Hume Highway
- western commuter car park – Breasley Place, Church Road and Hume Highway.

The distances of proposed pedestrian diversions are approximately 300 metres.

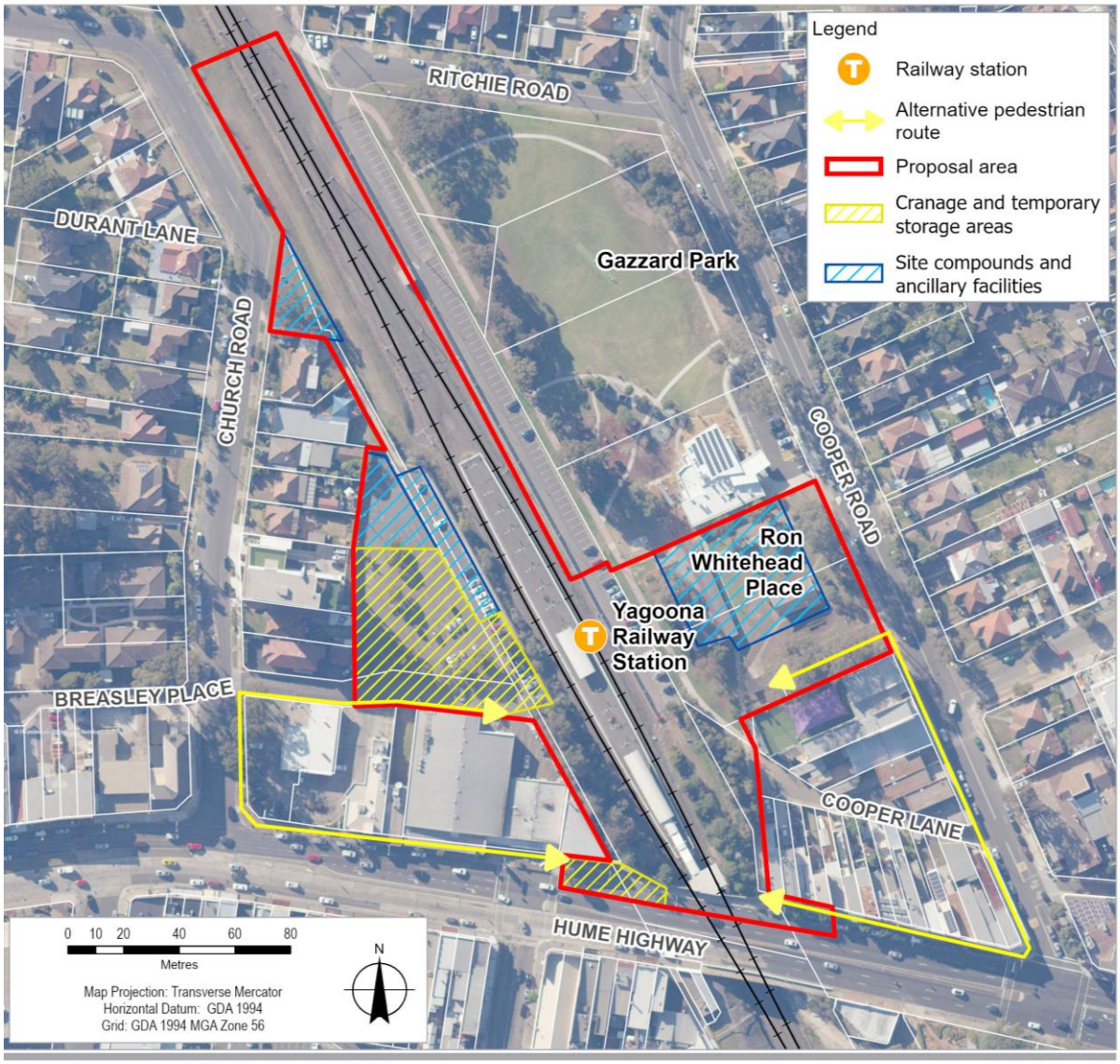


Figure 6.4 Recommended alternative pedestrian routes

These impacts are considered to be manageable with a CEMP (and CTMP) to be prepared by the Contractor outlining how pedestrian connectivity and safety would be maintained during the works. Wayfinding signage would be provided to indicate alternative routes to and from the station. The community would be notified of any footpath modifications during construction and diversions as part of the Community Liaison Management Plan.

Bicycle facilities

The bicycle rack on the eastern side of the station would be temporarily unavailable during construction of the footpath and car park work. These would be reinstated following the completion of construction.

b) Operational phase

Parking

The accessible parking bays in the western car park would be adjusted with new line marking, signage, tree trimming, new kerb ramp and kerb adjustments. The adjustment of the accessible parking bays would result in the loss of a single parking bay.

The loss of a single parking bay is expected to have a negligible impact on the operation of the western car park.

The introduction of the proposed kiss and ride zone would result in the loss of two parking spaces on the Hume Highway. Alternative time-restricted parking is available along the Hume Highway and within the western car park. The loss of two parking spaces is expected to have a minor impact on parking availability in proximity to the station.

Public transport operations

The Proposal is not expected to have an impact on the timetabling or operation of bus or train services at Yagoona Station.

Active transport impacts

The Proposal would enhance active transport connectivity to Yagoona Station by upgrading the accessible footpaths between the car parks and the station entry on the Hume Highway. The upgraded footpaths are also expected to contribute to an improvement in pedestrian safety.

The bike rack would be relocated to be closer to the eastern footpath and further away from the station's waste storage area. This would improve the general amenity of the bike parking area.

Kiss and ride facility

The Proposal includes the provision of an accessible kiss and ride zone on the northern side of the Hume Highway, adjacent to the east of Yagoona Station. The kiss and ride facility would provide an improved and safer environment for people being dropped off by car at Yagoona Station.

Traffic impacts

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

6.1.3 Mitigation measures

A CTMP would be prepared by the Contractor in consultation with Transport for NSW and provided to City of Canterbury-Bankstown (as required). The CTMP would be the primary management tool to manage potential traffic impacts associated with construction. The CTMP, at a minimum would include a description of:

- procedures for preparing and implementing Pedestrian Management Plans (PMPs), in particular for arrangements/detours to maintain access to and from the station at all times, and safely manage pedestrian and cyclist route changes/diversions
- final construction traffic approach and departure routes
- location of access to and from the local road network
- scheduling of work/deliveries to avoid peak times
- measures to:
    - limit temporary parking losses
    - maintain customer access to and from the station at all times
    - maintain access to private property, unless otherwise agreed
- details of construction signage, traffic controllers and other community notification.

Refer to Table 7.1 for a list of proposed mitigation measures.

6.2 Urban design, landscape and visual amenity

This section provides a summary of the Landscape Character and Visual Impact Assessment prepared by GHD (2021b). The assessment involved:

- desktop analysis and a site visit on 4 March 2021
- identifying landscape character zones, the zone of theoretical visibility, key views of the Proposal, potentially sensitive visual receivers and representative viewpoints assessing the potential for landscape character and visual impacts
- determining the potential significance of impacts through a combined assessment of sensitivity and magnitude
- recommending mitigation and management measures.

The study area for the Landscape Character and Visual Impact Assessment was defined as within 750 metres (north-south) to one kilometre (east-west) of Yagoona Station.

6.2.1 Existing environment

Landscape character zones

Six landscape character zones were identified in the study area and are described in Table 6.1 and shown on Figure 6.5.

Table 6.1 Landscape character zones

Landscape character zone	Key characteristics	Landscape value
Landscape character zone 1 – Major transport corridors	Landscape character zone 1 consists of the major transport corridors along the Hume Highway extending east-west, and the rail corridor, extending in a north-south direction. It also includes the commuter and Council car parks, footpaths to the station concourse and elevated walkway above the Hume Highway, near Yagoona Public School. Landscape character zone 1 generally, consists of: • rail infrastructure along the rail corridor • vegetation cover immediately east and west of the station • at-grade car parks to the east and west of the station • Hume Highway linear road corridor, with three lanes of traffic in each direction • brick bridge barrier adjacent to station concourse • elevated walkway near Yagoona Public School.	Moderate
Landscape character zone 2 – Yagoona retail village	Landscape character zone 2 consists of the retail village centred on the Hume Highway which includes: • commercial and retail uses including specialty and service retail • typically, one to two storey shop fronts with larger tenancies immediately west of station • laneways utilised for servicing and parking areas • raised garden beds, planters and seating near crossing points.	Moderate

Landscape character zone	Key characteristics	Landscape value
Landscape character zone 3 – Neighbourhood living	Landscape character zone 3 is located further north-east, north-west and south-west of the station, and consist of: • generally low density housing with one and two story brick single detached dwellings • predominantly zoned Low-Density Residential (R2) • street trees and shrubs comprising a mix of native and exotic species.	Low
Landscape character zone 4 – Mixed use and high-rise living	Landscape character zone 4 is located to the west of the station and is undergoing change with greater building heights and densities. It includes: • plaza style retail tenancies set back from the Hume Highway • retail/commercial tenancies on lower floors • construction of buildings up to eight floors in height.	Low
Landscape character zone 5 – Open space and recreation and community	Landscape character zone 5 comprises Gazzard Park, Yagoona Community centre, Ron Whitehead Place and pockets of open space are located north-east and south-east of the station. The landscape generally includes: • upgraded park with passive and active recreation facilities • pedestrian and cycle paths • large canopy trees • new modern architecturally designed community centre building.	Moderate
Landscape character zone 6 – Education precincts	Landscape character zone 6 consists of two distinct precincts including: • Al Sadiq College immediately to the east comprises a compact campus • Yagoona Public School, 250 metres to the east and a larger campus with a mixture of buildings and outdoor areas.	Low

Photo 6.1 LCZ1, rail corridor looking south from end of platform

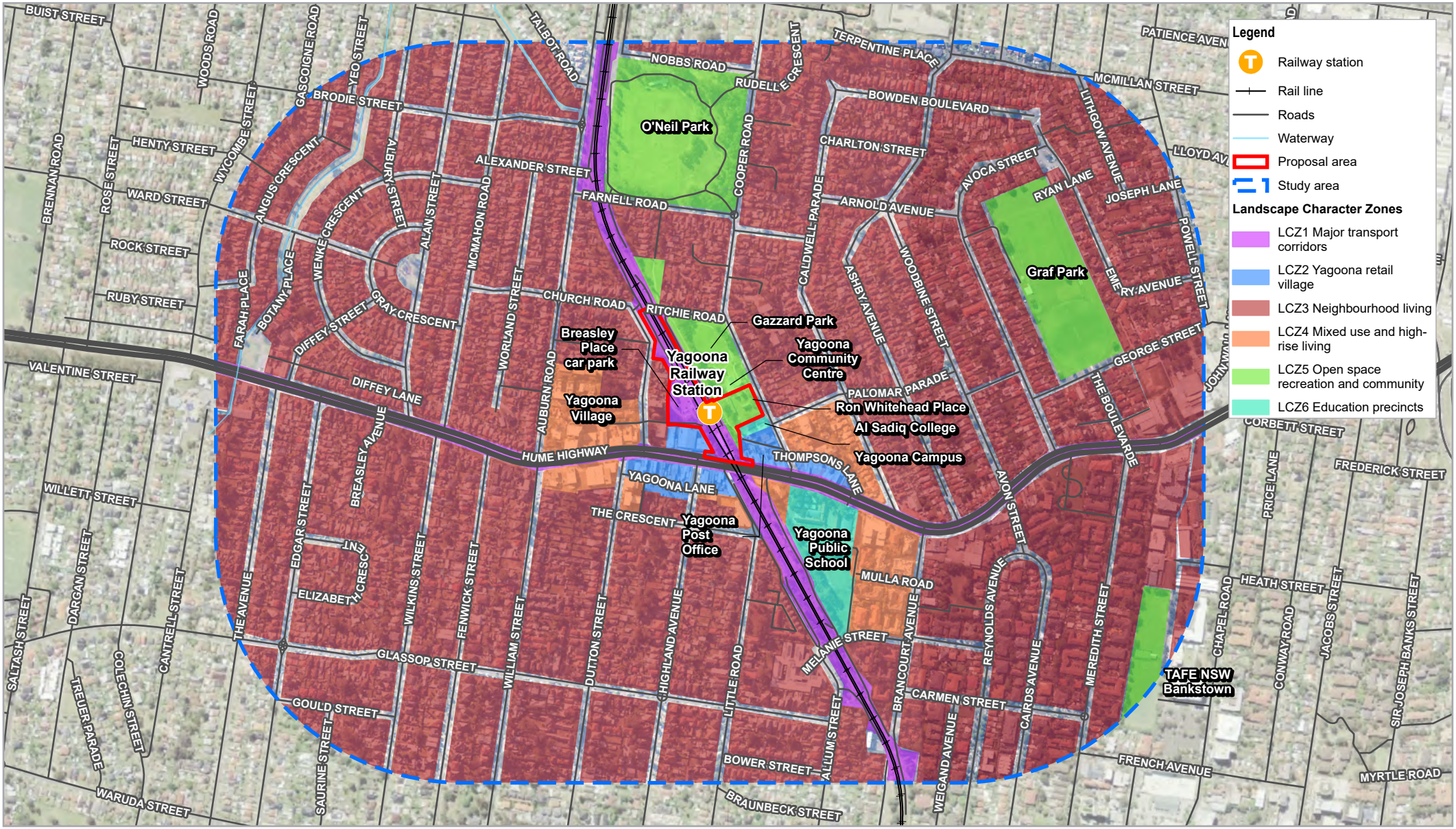
Photo 6.2 LCZ1, Hume Highway looking east from the station entry

Photo 6.3 LCZ2, plaza near intersection of Hume Highway and Highland Avenue

Photo 6.4 LCZ3, typical street profile and residential interface, Church Road

Photo 6.5 LCZ4, commercial/ high-rise living – Hume Highway

Photo 6.6 LCZ5, play equipment and setting within Gazzard Park



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Landscape character zones

FIGURE 6.5

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Image: . Created by: kpsroba

Sensitive receivers and viewpoints

Sensitive visual receivers within the study area include the following:

- residential properties along the eastern side of Church Road
- residential properties east of Cooper Road, primarily between Ritchie Road and Palomar Parade
- medium density residential apartment blocks along Church Road, Hume Highway and at the end of The Crescent
- commuters using Yagoona Station, including platforms, concourse, commuter car parks and graded footpaths, east and west
- commuters using bus stops immediately west near concourse entry and further east, near Yagoona Public School
- pedestrians and road users on the Hume Highway and elevated walkway, Breasley Place, Cooper Road and Cooper Lane
- Gazzard Park, Ron Whitehead Place and Yagoona Community centre users
- Al Sadiq College users.

Six viewpoints were selected as representative locations (refer to Figure 6.6) to assess the potential impacts of the Proposal. Representative viewpoints are described in Table 6.2.

Table 6.2 Key viewpoints

Viewpoint	Location	Description
VP1	Hume Highway (south-east)	This view represents road users and pedestrians along the Hume Highway, south-east of the concourse and station entry (refer to Photo 6.7).
VP2	Hume Highway (road median)	This view represents road users and pedestrians along the Hume Highway, upon approaching the station precinct from the east (refer to Photo 6.8).
VP3	Hume Highway (west)	This view represents pedestrians and businesses, from a crest along the Hume Highway, west of the Proposal area (refer to Photo 6.9).
VP4	Gazzard Park and Ron Whitehead Place	This view represents park and community centre users, pedestrians and cyclists using the footpath within Gazzard Park and Ron Whitehead Place (refer to Photo 6.10).
VP5	Western commuter car park (off Breasley Place)	This view represents that of commuters and occupants at properties along Church Road/backing onto the Council and commuter car park (refer to Photo 6.11).
VP6	Cooper Road	This view represents that of pedestrians at the crossing point and occupants of nearby residential properties (refer to Photo 6.12).

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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Viewpoint locations

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FIGURE 6.6

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Photo 6.7 Viewpoint 1 – view north-west from the Hume Highway

Photo 6.8 Viewpoint 2 – view north-east from pedestrian median along the Hume Highway

Photo 6.9 Viewpoint 3 – view east from the footpath along the Hume Highway

Photo 6.10 Viewpoint 4 – view south from Gazzard Park and Ron Whitehead Place

Photo 6.11 Viewpoint 5 – view south-east from Breasley Place Council and commuter car park

Photo 6.12 Viewpoint 6 – view west from Cooper Road

6.2.2 Potential impacts

a) Construction phase

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

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

- establishment of site compounds for plant/material storage, sites offices, temporary parking areas, staff amenities and associated fencing
- the presence of a crane required to erect the new station building components, station concourse and lift shaft construction, to be located within the Breasley Place Council and commuter car park
- the presence of a piling rig, bobcat, excavator, mobile cranes, vibrating roller, suction trucks, concrete truck and pump, construction related vehicles (dump and skip trucks)
- elevated work platform
- temporary hoarding around the Proposal area, Ron Whitehead Place, commuter car parks and footpath upgrade areas
- lighting towers
- presence of construction traffic and workers.

b) Operational phase

Potential visual impacts from the operation of the Proposal 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:

- upgraded station facilities, including new concourse, lift shaft and platform building
- regraded and new walkways
- removal of vegetation
- removal of public art mural along the eastern side of the station
- materials and building design.

Operational impacts are assessed based on the degree of magnitude of the impact and the sensitivity to change of the environment to give a final rating on the significance of the impact.

Table 6.3 Significance of impact matrix

Sensitivity	Magnitude of impact				
		High	Moderate	Low	Negligible
	High	High Impact	High-Moderate	Moderate	Negligible
	Moderate	High-Moderate	Moderate	Moderate-Low	Negligible
	Low	Moderate	Moderate-Low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Landscape character impacts

The landscape character assessment found that the Proposal would result in moderate to negligible impacts on all landscape character zones. This is because the Proposal would be consistent with the landscape character and would have negligible impacts on the surrounding landscape. The greatest impact would be in LCZ1. While the primary built form change is constrained to within the current station footprint, vegetation removal along the upper slope of the rail corridor, west of the station, would result in noticeable changes to the landscape character of LCZ1.

Table 6.4 provides a summary of predicted landscape character impacts.

Table 6.4 Summary of landscape character impacts

Landscape character zone	Sensitivity to change	Magnitude of change	Significance of impact
1 – Major transport corridors	Moderate	Moderate	**Moderate** The Proposal is located within this landscape character zone. The anticipated change to landscape character includes a new concourse and lift opening out to the Hume Highway entrance. While the primary built form change is constrained to within the current station footprint, vegetation removal west of the station would result in discernible changes to the landscape character. This is considered to adversely impact the vegetated character of the immediate area, particularly along the Hume Highway. These impacts could however be partly mitigated. The canopy and lift proposed within the concourse area are in keeping with the scale of adjacent retail properties within landscape character zone 2. While new elements are proposed, they are not uncharacteristic within the existing landscape.

Landscape character zone	Sensitivity to change	Magnitude of change	Significance of impact
2 – Yagoona retail village	Low	Low	**Low** The station is a focal point and creates activity within the retail village. Given the Proposal is located on the edge of this character zone key changes to the landscape character within LCZ1 would be visible from LCZ2. The Proposal would not impact any of the key features for LCZ2, however as vegetation removal is proposed along the upper slope, to the west of the station and adjacent to retail tenancies, some change is anticipated to the landscape character of LCZ2. The new footpath would also redirect some foot traffic between the commuter car park and station, which would normally pass these retail tenancies.
3 – Neighbourhood living	Negligible	Negligible	**Negligible** The Proposal is not located in the character zone and would not impact on any of the key features within the existing character zone.
4 – Mixed use and high-rise living	Negligible	Negligible	**Negligible** The Proposal is not located in the character zone and would not impact on any of the key features within the existing character zone.
5 – Open space and recreation and community	Low	Low	**Low** The Proposal is located adjacent to LCZ5. The anticipated changes include the new station concourse and lift, station building, extension of canopy along the platform and upgrade to the footpath connecting to the eastern car park (from Ritchie Road), Gazzard Park, Ron Whitehead Place and the Yagoona Community Centre. The Proposal would not impact any of the key features for LCZ5. However, there are multiple vantage points from Gazzard Park and the Yagoona Community Centre, overlooking the station precinct, which contributes to the landscape character in this location. The consequential level of change to LCZ5 on account of vegetation removal within LCZ1, would not substantially change the value or character of LCZ5.
6 – Education precincts	Negligible	Negligible	**Negligible** The Proposal is not located in the character zone and would not impact on any of the key features within the existing character zone.

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.

In summary, the Proposal would introduce new built elements into the landscape, including the new concourse, lift shafts, platform building, canopies and regraded walkways. The increase in height of the station concourse canopy and lift shaft may be seen above the existing brick wall along the Hume Highway. However, the height of the new concourse would be consistent with the height of surrounding buildings along the Hume Highway.

Viewpoints 4 and 5 would experience the highest visual impacts (moderate to low impacts) due to the types of receivers, proximity to the Proposal are and the visual exposure to change associated with the Proposal. Visual impacts from viewpoints 1, 2 and 3 were assessed as low-moderate to low.

A summary of the results of the visual impact assessment for the representative viewpoints is provided in Table 6.5. Photomontages of the Proposal from viewpoints 1, 2 and 4 are provided in **Figure** 3.2, Figure 3.3 and Figure 3.4 respectively.

Table 6.5 Summary of visual impacts

Viewpoint	Description of visual impact	Sensitivity to change	Magnitude of change	Significance of impact
VP1	The Proposal would result in an increase in height for the station concourse canopy and lift shaft; and changes to the station entry including location of stairway and new lift access. Vegetation removal along the upper slope of the rail corridor west of the station would be visible from this viewpoint. Vegetation clearing would impact the visual amenity and green character of the rail corridor, resulting in a more exposed setting.	Low	Moderate	**Low-Moderate**
VP2	The Proposal would result in an increase in height of the station concourse canopy and lift shaft that may be seen above the station brick wall. The removal of vegetation along the western upper slope along the rail corridor may create new views towards the rail corridor and station precinct and a more exposed setting.	Low	Moderate	**Low - Moderate**

Viewpoint	Description of visual impact	Sensitivity to change	Magnitude of change	Significance of impact
VP3	The Proposal would result in an increase in height of the station concourse canopy and lift shaft that may be seen above the station brick wall. The changes to the east and west walkway of the station precinct would result in the removal of some of the prominent vegetation along the upper slope, west of the rail corridor, which would visually alter the density of vegetation cover seen from this viewpoint.	Low	Low	**Low**
VP4	The Proposal would result in an increase in height of the station concourse canopy and lift shaft that may be visible. The station stairway would be repositioned to the left of the concourse and a new platform canopy would connect to the existing platform canopy, along with an extension to the end canopy closest to this viewpoint. A new bike rack would be installed towards the end of this footpath that is currently visible. To the west of the station, vegetation clearing and the walkway would also be visible.	Moderate	Low	**Moderate-Low**
VP5	Anticipated changes would include alterations to the height of the existing station, bringing the new concourse into view above the fence line. The new platform canopy structures may become visible above the fence. Vegetation removal from the upper slope of the rail corridor would impact the canopy cover and screening. This would result in new views to the Hume Highway and town centre (LCZ2).	Moderate	Low	**Moderate-Low**
VP6	Anticipated changes include the new platform canopy structure, which will potentially be visible from a distance within VP06	High	Negligible	**Negligible**

6.2.3 Mitigation measures

Measures to mitigate visual impacts during construction would be included in a CEMP for the Proposal and would include measures such as minimising light spill during night work, screening of compounds and minimising tree removal. Refer to Table 7.1 for a full list of proposed mitigation measures.

Detailed design of the Proposal would be undertaken with reference to the recommendations included in the Landscape Character and Visual Impact Assessment (GHD, 2021b) which are included in the list of proposed mitigation measures in Table 7.1

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

- ensure the design, location and materiality of the Proposal components contribute positively to the station and retail village setting, to achieve a high-quality public realm
- ensure the lift, stair and new canopy components of the Proposal integrate well with existing elements remaining intact, through appropriate colour and materiality selections
- consider the design of new vertical built form elements such as new walls and lift shaft, to assist with visual integration and keep below the existing building height of retail premises along the Hume Highway
- consider ways to achieve more seamless integration between new and existing covered canopies over stairs and seating areas along the platform
- minimise vegetation clearance within the immediate vicinity of the station precinct to maximise retention of the green character of the station precinct. In particular, the design should seek to retain the following trees:
    - trees 1, 2-8, 31 to the west
    - tree 11 and tree groups 19, 20 and 27 to the east
- ensure the Proposal's urban design solution contributes to the streetscape setting along the Hume Highway, through a well-considered design for the concourse
- maintain the Hume Highway brick barrier wall, which contributes to the character of the station and village precinct
- ensure the Proposal components and materiality complement the existing character of the station precinct and urban context
- provide public art to a similar level, in an appropriate location close to the original site of the mural. Any art procurement must be in accordance with the processes and policies of the relevant authority. This could include, for example, an art competition with local schools or similar in consultation with the City of Canterbury-Bankstown.

6.3 Noise and vibration

This section summarises the Noise and Vibration Impact Assessment prepared by GHD (2021c). The Noise and Vibration Impact Assessment 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

Noise sensitive receivers

Sensitive receivers within close proximity to the Proposal include:

- residential areas to the north west and south the station (nearest located about 30 metres to the west of the station)
- a commercial precinct along Hume Highway (located about 5 metres south of the station)
- Yagoona public school (located about 130 metres south east of the station)
- Al Sadiq College (located about 75 metres east of the station)
- White Bunny Child Care Centre (located about 150 metres north west of the station, directly behind the Breasley Place Council car park)
- Yagoona medical centre (located about 150 metres west of the station)
- Gazzard Park (located about 120 metres east of the station)
- Ron Whitehead Place (located about 20 metres east of the station).

Sensitive receivers are shown on Figure 6.7.

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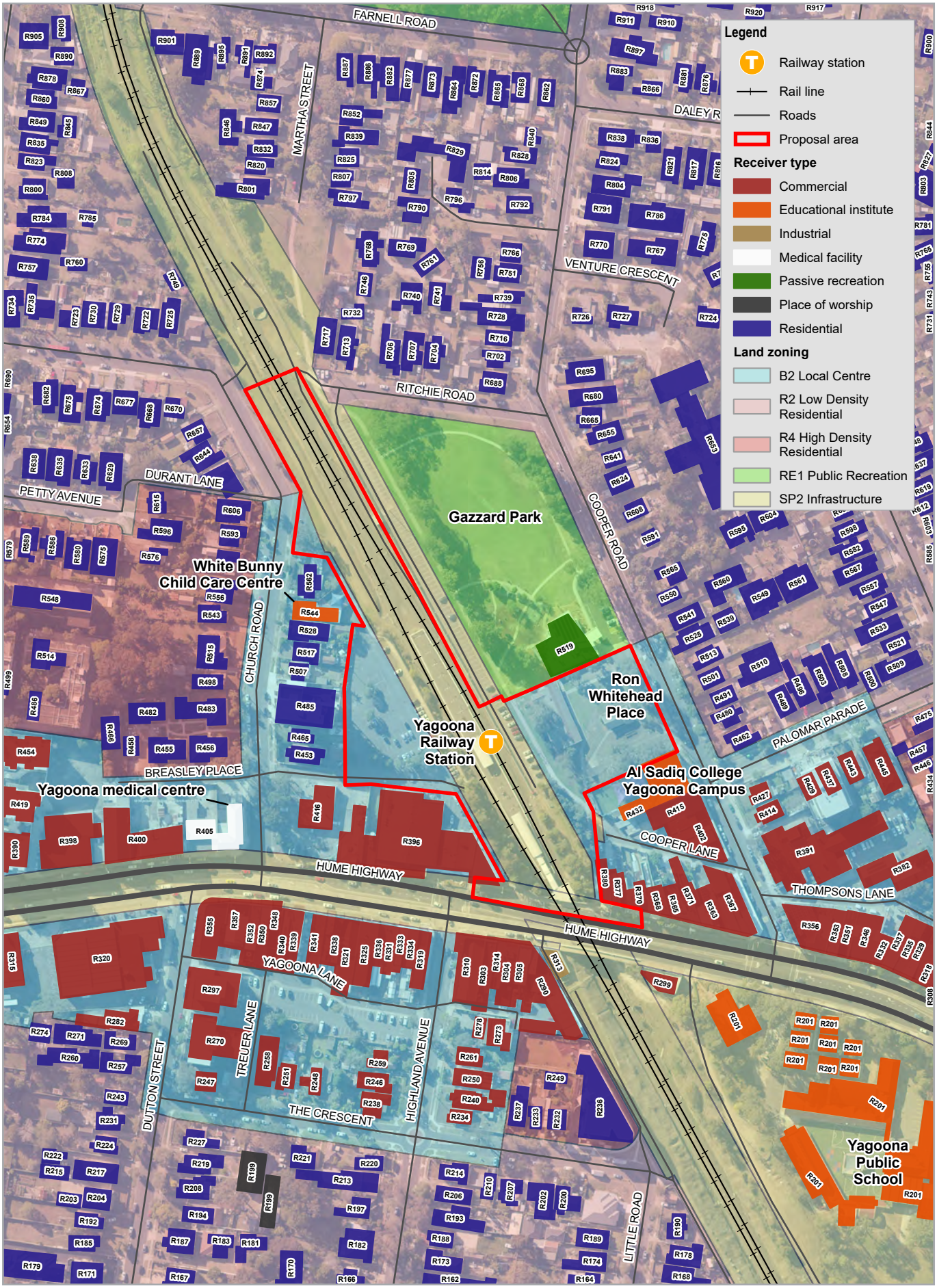

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Meters

Map Projection: Transverse Mercator
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Grid: GDA 1994 MGA Zone 56

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Sensitive receivers

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FIGURE 6.7

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Background noise levels

Background noise monitoring was undertaken at one location considered to be representative of the nearby sensitive receivers. Unattended noise logging was conducted from Friday 26 February 2021 to Tuesday 9 March 2021 at 15 Church Road, Yagoona. This location was representative of the worst affected residential receivers.

A detailed monitoring methodology and daily noise level charts are included in the Noise and Vibration Impact Assessment (GHD, 2021c).

The measured noise monitoring data was 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 6.6.

Table 6.6 Summary of measured noise levels dBA

Location	Background noise descriptors[1] $L_{A90(Period)}$			Ambient noise descriptors[1] $L_{Aeq(15m)}$		
	Day	Evening	Night	Day	Evening	Night
15 Church Road, Yagoona	40	40(44)[2]	36	50	50	47

Notes:
1. The *NPI* defines day, evening and night-time periods as:
   a. Day: 7am to 6pm Monday to Saturday and 8am to 6pm Sunday
   b. Evening: 6pm to 10pm
   c. Night: 10pm to 7am Monday to Saturday and 10pm to 8am Sunday.
2. Where evening or night background noise levels exceed that of the previous period, they have been set at the background noise level of the previous period, in line with the NPI, to reflect community's expectation for greater noise control during more sensitive periods.

6.3.2 Potential impacts

a) Construction phase

Noise

Noise management levels

Noise management levels have been determined based on the *Interim Construction Noise Guideline* (ICNG) (DECC, 2000) and *Construction Noise and Vibration Strategy* (CNVS) (TfNSW, 2019) The ICNG prescribes noise management levels for non-residential receivers such as commercial, schools and medical centres, while noise management levels for residential receivers are calculated based on the RBL + 10 dBA (for daytime periods) or the RBL + 5 dBA (for evening and night-time periods). In addition, a 'highly noise affected' level of 75 dBA for residential receivers represents the point above which there may be strong community reaction to noise. The Proposal specific noise management levels are outlined in Table 6.7.

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

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

Table 6.7 Proposal construction noise management levels, dBA

Receiver type	Time of day		Management level, dBA
Residential	Recommended standard hours		Noise affected: 50
			Highly noise affected: 75
	Outside recommended standard hours	Day	45
		Evening	49
		Night	41
			L_{AFmax} 52
Commercial	When in use		70 (external)
Industrial	When in use		75 (external)
School, hospital, POW	When in use		45 (internal)
Recreation	When in use		60 (external)

Note: 1. Day period refers to 7am to 6pm or 8am to 6pm Sunday and public holidays
Evening period refers to 6pm to 10pm
Night period refers to 10pm to 7am Monday to Saturday, 10pm to 8am Sunday.

Noise modelling

Construction of the Proposal would be undertaken over a period of about 18 months in various stages (refer to Chapter 3 Construction staging). Modelling of noise sources for each of the ten representative construction scenarios shown in Table 6.8 was undertaken. In addition, the two potential compound sites (identified in Table 6.8) were also modelled.

Table 6.8 Construction scenarios and potential compound locations

Construction scenario	Construction phase	Time frame
S01	Site establishment and enabling work	Standard hours 1-2 months
S02	Lift, stairs and concourse work	Standard hours, night-works and 48-hour and 2 week rail shutdown 8 months
S03	Platform building enabling works	Standard hours 2 months
S04	Platform building installation	48-hour rail shutdown 2 weekends
S05	Eastern ramp works	Standard hours 5 months
S06	Western (Breasley Place) ramp works	Standard hours 5 months
S07	Station building works	Standard hours 2 months
S08	Platform modification work	Standard hours or 48-hour rail shutdown 1 month

Construction scenario	Construction phase	Time frame
S09	Under track services crossing	48-hour rail shutdown Multiple weekends
S10	Demobilisation	Standard hours 1 month
CC1	Construction compound within the Breasley Place Council and commuter car park on the western side of Yagoona Station	
CC2	Construction compound within Ron Whitehead Place on the eastern side of Yagoona Station	

Construction scenarios were created based on construction equipment operating simultaneously at any given time. Although this is unlikely to occur (as the modelling assumes), the 'worst-case' scenario has been adopted to identify where noise impacts could be a concern and require mitigation.

Impacts on residential receivers

Predicted noise levels have been compared to the noise management levels outlined in Table 6.7. Detrimental impacts to sensitive receivers have the potential to occur where the predicted noise level exceeds the construction noise management level. As construction works are temporary in nature the impacts on the community and surrounding environment would not be permanent, however, where possible the impacts due to construction noise should be minimised.

Residences located up to approximately 600 metres away from the Proposal are expected to be noise impacted at some point during construction. Table 6.9 provides a summary of predicted noise management level exceedances for residential receivers in all scenarios during standard hours.

Table 6.9 Summary of noise management level exceedances for residential receivers during standard working hours

Construction scenario	Number of exceedances	Highest noise level (dBA)	Highest exceedance (dBA)	Worst affected receiver (dBA)
S01	127	81	31	R562
S02	157	69	19	R236
S03	91	70	20	R528
S04	50	66	16	R528
S05	138	68	18	R334, R485
S06	159	74	24	R485
S07	9	60	10	R528
S08	91	70	20	R528
S09	155	**81**	31	R526
S10	77	69	19	R528
CC1	96	**88**	38	R548

Construction scenario	Number of exceedances	Highest noise level (dBA)	Highest exceedance (dBA)	Worst affected receiver (dBA)
CC2	75	70	20	R525

During the track cabling works (Scenario 9) the following exceedances are expected at the nearest sensitive receiver:

- the noise management level is predicted to be exceeded by up to 38 dB. The noise management level is predicted to be exceeded by up to 38 dB from the use of the construction compound at CC1 (western side of the station)
- the highly noise affected level of 75 dB(A) is also predicted to be exceeded at 21 Church Road, Yagoona.

This scenario is scheduled for weekend shutdown periods only and impacts are likely to be short in duration with minimal long-term effects.

Furthermore, should the construction compound be located in the Breasley Place Council and commuter car park on the western side of the station, the highly noise affected level is predicted to be exceeded at the following residents:

- 5 Church Road, Yagoona
- 7 Church Road, Yagoona
- 11 Church Road, Yagoona
- 13 Church Road, Yagoona
- 15 Church Road, Yagoona
- 17 Church Road, Yagoona.

The construction compound is proposed to be operational throughout the construction period and no exceedances of the highly noise affected level are predicted at the proposed compound on the eastern side of the station at Ron Whitehead Place (CC2).

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 and would not have lasting effects on the community. The maximum noise impacts would be expected during the required demolition of pavements and kerbs and is primarily due to the use of demolition saws, excavators, pilling rigs and jackhammers. Furthermore, all construction equipment would be operational intermittently and not continuously. As such, impacts on nearby sensitive receivers would only occur over a short duration.

The addition of a temporary construction noise wall along the western perimeter of the Breasley Place Council car park would reduce the predicted noise levels at most sensitive residential receivers along Church Road. However, one sensitive residential receiver (11 Church Road, Yagoona) still predicted to exceed the highly noise affected level.

Mitigation measures discussed in Section 6.3.3 and listed in Table 7.1 would be implemented to minimise noise impacts.

Out of hours impacts

Table 6.10 provides a summary of the noise management level exceedances for residential receivers in all scenarios during out of hours work.

Table 6.10 Summary of noise management level exceedances for residential receivers during out of hours work

Construction scenario	Out of hours work day/evening		Out of hours work night		Highest noise level
	Number of exceedances	Worst affected receiver	Number of exceedances during	Worst affected receiver	(dBA)
S01	-		528		-
S02	358	R325, R453	535	R325, R453	69
S03	-		332		-
S04	99	R528	178	R528	66
S05	-		550		-
S06	-		513		-
S07	-		76		-
S08	178	R528	332	R528	70
S09	276	R562	447	R562	**85**
S10	-		312		
CC1	222	R485	369	R485	**88**
CC2	174	R525	327	R525	70

Out of hours night work have the potential to cause sleep disturbance impacts at sensitive receivers. The ICNG states that 'where construction works are planned to extend over more than two consecutive nights, the impact assessment should cover the maximum noise level from the proposed works.'

Exceedances may occur outside of standard construction hours in construction scenarios S02 (lift, stairs and concourse work), S04 (platform building installation), S08 (platform modification work) and S09 (under track services crossing), and during activities at both construction compounds.

Exceedance of the sleep disturbance criteria is predicted for all these scenarios where night works are proposed. The greatest number of exceedances would occur during Scenario 2 (lift, stairs and concourse work).

All workers would be briefed on the need to minimise noise as a result of their activities. Mitigation measures discussed in Section 6.3.3 and listed in Table 7.1 would be implemented to minimise noise impacts.

Impacts on other receivers

As most construction activities are to take place within standard construction hours, there would be some noise impacts to other non-residential noise sensitive land uses during construction.

Non-residential sensitive receivers predicted to exceed the relevant construction noise management levels are summarised in Table 6.11. Exceedances of the relevant noise management levels are predicted for commercial and industrial uses along the Hume Highway, the Yagoona Medical Centre and the three educational institutions (Yagoona Public School, Al Sadiq College and White Bunny Child Care Centre) during the construction period.

Table 6.11 Predicted number of exceedances at non-residential receivers

Receiver type	S01	S02	S03	S04	S05	S06	S07	S08	S09	S10	CC1	CC2
Commercial	11	18	6	3	15	16	0	6	0	11	2	0
Industrial	0	1	0	0	1	1	0	0	0	0	0	0
Medical	1	0	1	1	1	1	0	1	1	1	1	1
Educational	3	3	3	2	3	3	1	3	2	3	3	2
Place of worship	0	0	0	0	2	1	0	0	0	0	1	0
Passive recreation	3	1	2	2	2	2	0	2	3	2	2	1
Active recreation	0	0	0	0	0	0	0	0	0	0	0	0

Construction noise impacts on the community and surrounding environment would not be permanent and would be limited to the duration of the construction period. These impacts can be minimised by implementing mitigation measures discussed in Section 6.3.3 and listed in Table 7.1

Construction traffic impacts

Construction of the Proposal would generate heavy vehicle movements associated with the transportation of construction machinery, equipment and materials to the site. Light vehicle movements would be associated with employees and smaller deliveries. Based on the high existing road traffic levels and low anticipated additional construction traffic volumes, the predicted increase in road traffic noise levels is negligible for the Hume Highway, which is the main access to Yagoona Station. As such, no additional construction traffic assessment is required at this stage.

Access to the construction compounds would be via locals roads Church Road and Breasley Place should the compound be located within the Breasley Place Council car park (CC1) and via Cooper Road and Ritchie Road should the compound be located within Ron Whitehead Place (CC2). Local roads are assessed to a worst-case hour. Based on the construction traffic generation provided, the additional traffic during the worst-case hour would be minimal and as such no impacts on these routes are likely.

Vibration

Criteria

Vibration from surface construction plant and equipment was predicted and assessed with consideration to *Assessing Vibration: A Technical Guideline* and German Standard *DIN 4150-3: 1999 Structural Vibration – Part 3: Effects of vibration on structures*.

The criteria for human comfort and cosmetic damage as contained in in British Standard *BS 6472 – 1992, Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)* are shown in Table 6.12.

Table 6.12 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 (7 am to 10 pm)	0.2	0.4
	Night (10 pm to 7 am)	0.13	0.26
Offices, schools, educational institutes and places of worship	When in use	0.4	0.8

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* is presented in Table 6.13.

Table 6.13 Transient vibration guide values – minimal risk of cosmetic damage

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced of 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 building	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

Safe working buffer distances to comply with the human comfort and cosmetic damage were taken from the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019) and are provided in Table 6.14.

Table 6.14 Vibration safe working buffer distances, metres

Activity	Human comfort	Structural damage to standard dwellings (metres)
Piling rig – Bored	N/A	2 m (nominal)
Piling rig – Hammer	50 m	15 m
Vibratory roller (>18 tonnes)	100 m	25 m
Vibratory roller (13-18 tonnes)	100 m	20 m
Vibratory roller (7-13 tonnes)	100 m	15 m
Vibratory roller (4-6 tonnes)	40 m	12 m
Vibratory roller (2-4 tonnes)	20 m	6 m
Vibratory roller (1-2 tonnes)	15 m	5 m
Large hydraulic hammer	73 m	22 m
Jackhammer	Avoid contact with structure	1 m (nominal)

Potential impacts

After implementing buffer distances in Table 6.14, structures located within two metres of bored piling works or within one metre of jackhammering may experience structural damage Human comfort impacts may also be experienced by construction workers near piling or jackhammering activities. Caution should be taken to avoid contact with structures during vibration intensive activities.

b) Operational phase

Operational noise criteria

Operational noise from the Proposal were assessed against the project noise trigger levels provided in the *Noise Policy for Industry* (NPI) (EPA, 2017). The project noise trigger level is the lower value of the intrusiveness noise level and the amenity noise level. The intrusiveness noise aims to protect against significant changes in noise levels and the amenity noise level aims to protect against cumulative noise impacts from operations.

The trigger noise levels for different uses are listed in Table 6.15.

Table 6.15 NPI operational criteria for receivers

Receiver Type	Time of day	Project noise trigger Level $L_{Aeq(15\ min)}$, dBA
Residential	Day 7 am to 6 pm	**45**
Residential	Evening 6 pm to 10 pm	**43**
Residential	Night 10 pm to 7 am	**38**
Commercial	When in use	63
Industrial	When in use	68
Educational	Noisiest 1 hour	35 (internal) 45 (external)
Hospital / medical	When in use	35 (internal) 45 (external)

Operational noise impacts

The Proposal would not significantly change the operational activities at Yagoona Station and as a result the existing noise and vibration levels are unlikely to change. Standard noise controls such as appropriate selection of mechanical plant and periodic maintenance would reduce any potential noise emissions. If required, operational noise emissions would be addressed during the detailed design phase to comply with operational noise criteria as per the *Noise Policy for Industry*.

6.3.3 Mitigation measures

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

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 Transport for NSW approval for out of hours works.

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

A temporary construction noise wall along the perimeter car park on the western side of the station extending between the junction of Church Street and the rail corridor is recommended.

Refer to Table 7.1 in Section 7.2 for a full list of proposed mitigation measures as per the Transport for NSW *Construction Noise and Vibration Strategy* (Transport for NSW, 2019b).

6.4 Indigenous heritage

6.4.1 Existing environment

A search of the AHIMS database was undertaken on 3 March 2021 and an area within a one kilometre buffer around the Proposal area was searched to gain information on the archaeological context of the area, and to ascertain whether there are any previously recorded Aboriginal sites.

No Aboriginal sites have been recorded within or in the vicinity of the Proposal area, and the site is not located within a landscape feature likely to indicate the presence of Aboriginal objects in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (OEH, 2010).

The Proposal is in an area that has been highly modified for the construction of the station and associated infrastructure. It is therefore considered unlikely that any Indigenous heritage items would be within or in the vicinity of the Proposal area, due to this history of disturbance.

6.4.2 Potential impacts

a) Construction phase

Construction of the Proposal would involve minor earthworks and other ground disturbance activities which has the potential to impact Indigenous sites, if present. As no known Indigenous sites or areas are located in the vicinity of the Proposal area, and the potential for unknown items is considered to be low, the Proposal is unlikely to affect Indigenous heritage during construction.

b) Operational phase

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

6.4.3 Mitigation measures

If unforeseen Indigenous objects are uncovered during construction, the procedures contained in Transport for NSW's *Unexpected Heritage Finds Guideline* (Transport for NSW, 2019g) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager so they can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, Heritage NSW and the Local Aboriginal Land Council. If human remains are found, work would cease, the site secured and the NSW Police and Heritage NSW notified.

If changes are made to the Proposal that may result in impacts to areas not covered by this assessment, further assessment would be required.

Refer to Table 7.1 for a list of proposed mitigation measures.

6.5 Non-Indigenous heritage

6.5.1 Existing environment

A search of the following heritage databases was undertaken for the Proposal area on 12 March 2021:

- National Heritage List
- Commonwealth Heritage List
- NSW State Heritage Register
- RailCorp Section 170 Heritage and Conservation Register
- Bankstown LEP.

The desktop search identified no items listed on the Commonwealth or National Heritage Register within the Proposal area or immediate surrounds. One locally listed heritage item was identified within 500 metres of the Proposal. The Shop (former Brancourt's Garage and Motor Showroom) is the closest listed item and is listed as a local heritage item in the Bankstown LEP (Item no. I37). The former Brancourt's Garage and Motor Showroom shop is located about 460 metres south east of the Proposal.

6.5.2 Potential impacts

a) Construction phase

The Proposal would be confined to the boundary shown in Figure 1.2. The closest item, the former Brancourt's Garage and Motor Showroom shop, is located 460 metres to the south east of the Proposal and would not be impacted by the Proposal due to proximity to the site. The Proposal would not result in any direct or indirect (i.e. vibration) impacts on any heritage items.

b) 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. In the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in Transport for NSW's *Unexpected Heritage Finds Guideline* (Transport for NSW, 2019g) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the Transport for NSW Project Manager and the Transport for NSW Environment and Planning Manager so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and Heritage NSW.

Refer to Table 7.1 in Section 7.2 for proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.6 Socio-economic impacts

6.6.1 Existing environment

Yagoona is a suburb located in South Western Sydney and just north of Bankstown. While not a key centre within the region, Yagoona contains large industrial areas that service the wider region and provide local employment.

The Proposal is located within the Yagoona town centre along the Hume Highway. The area surrounding the Proposal consists of commercial, residential, transport corridor, educational, recreational and community uses. The land uses adjacent to the Proposal include:

- the Hume Highway road corridor (located about 5 metres to the south)
- Yagoona Public School (located about 80 metres to the south east)
- Yagoona Community Centre (located about 70 metres to the north east)
- Ron Whitehead Place (located about 20 metres to the east)
- Gazzard Park (located about 120 metres to the east)
- residential properties (nearest located about 30 metres to the east).

A review of the 2016 Australian Bureau of Statistics (ABS) Census data was undertaken for Yagoona. The suburb of Yagoona had a population of 18,032 people with a median age of 34 and a typical age distribution for the region.

The percentage of residents within Yagoona that reported the need for assistance as a result of a disability is consistent with the wider Canterbury-Bankstown LGA at 12.3 per cent of the population requiring assistance.

The population of Yagoona is heavily dependent on private vehicles as the primary mode of travel to work with 71 per cent of the population being the driver or passenger. The population that uses public transport to travel to work is 16.4 per cent, with 10 per cent (of the total population) utilising trains. The use of cars for travel to work for Yagoona is higher compared to the NSW and Canterbury-Bankstown LGA averages (64.6 and 65.3 per cent respectively). The use of vehicles is reflected in that 84.9 per cent of the population own at least one vehicle which is lower than the NSW average of 87.1 and marginally higher than the Canterbury-Bankstown LGA average of 84.8 per cent.

6.6.2 Potential impacts

a) Construction phase

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

- changes to pedestrian and cyclist access to and through movements around the station (including along platforms)
- impacts to local traffic movements
- access and noise impacts to surrounding businesses, in particular business located adjacent to the walkway on the western side of the station
- loss of parking on nearby streets
- closure of commuter and Council car parks to the east and west of the site
- use of Ron Whitehead Place for a construction compound area
- increased truck movements delivering materials and equipment and transporting waste

- construction amenity impacts such as noise, vibration, dust and visual impacts to surrounding residences and businesses.

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 rail shutdowns when movements in the vicinity of the station would be lower as a result of the trains not operating. The use of existing rail shutdowns would mean that there are no additional track work periods and potential inconveniences beyond those that are already scheduled to occur on the line.

However, during rail shutdowns, the car parks (east and west of the Proposal) would be closed to public and commuter use, which would impact community access to local businesses around Yagoona Station. These impacts would be short term in nature and the community would be notified in advance of any proposed car park closures.

The Proposal would not result in any residential acquisition, as works would be carried out mostly on land owned by TAHE. Impacts due to work carried out on Council land, including the ancillary facilities at Ron Whitehead Place, works on footpaths to car parks and works in the kiss and ride bay, would be minimised by the implementation of mitigation measures outlined in Table 7.1.

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

It is noted that the Proposal would require the removal of the existing kiosk in the station concourse. However similar services are provided for in close proximity in the Yagoona town centre so it is expected that this would have a minor impact only to the community and station users.

The public art mural proposed to be removed to the immediate east of the Proposal would be replaced with a similar art work within the local area. The proposal may also provide opportunities for public art on the hoardings. This is discussed further in Section 6.2.2.

b) Operational phase

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

- improved accessibility for station customers and pedestrians, particularly people with a disability, elderly people and those with prams or luggage with the construction of a new concourse, lift and boarding assistance zones
- improved customer amenity and facilities, including accessible toilets
- improved access to transport interchange facilities through improved footpaths to meet DSAPT requirements, additional canopy coverage, boarding assistance zones and the inclusion of a kiss and ride bay on the Hume Highway
- improved safety for customers on the station platform, including upgrade of station systems such as CCTV and emergency help points
- improved access from Breasley Place Council and commuter car park and the Ritchie Road commuter car park to the station and the Yagoona town centre.

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 up to 2036.

No adverse socio-economic impacts are considered to result from the operation of the Proposal.

6.6.3 Mitigation measures

A number of environmental safeguards would be implemented to minimise potential impacts on the community including:

- managing access to, from and around the station would be maintained at all times, albeit with potential changes to access (refer to relevant sections of this report and mitigation measures listed in Section 7.2)
- mitigation measures in respect of potential impacts to amenity (such as noise, dust and visual) as assessed in the relevant sections of this report and listed in Section 7.2 of this report
- development of a Community Liaison Management Plan (to be developed by the Construction Contractor prior to construction) which would identify potential stakeholders and the best-practice methods for consultation. The Plan would identify tools to effectively communicate with each stakeholder group during construction and encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where possible
- informing the community of construction progress, activities and impacts in accordance with the Community Liaison Management Plan
- providing contact details for a 24-hour construction response line, Project Infoline and email address provided for ongoing stakeholder contact throughout the construction phase.

Refer to Table 7.1 for a full list of proposed mitigation measures.

6.7 Biodiversity

A Biodiversity and Arboricultural Assessment for the Proposal was prepared by GHD (GHD, 2021d). The assessment involved a desktop review of existing information to identify biodiversity values that may be impacted by the Proposal. A site inspection was undertaken by a GHD ecologist and arborist on 23 February 2021 to identify vegetation, conservation significance, and habitat. The findings of the assessment are summarised in this section. The study area defined for the biodiversity and arboricultural assessment is shown in Figure 6.8.

6.7.1 Existing environment

The study area for the biodiversity and arboricultural assessment is located within and around Yagoona Station. Land uses adjoining the study area consist primarily of urban streetscapes and residential, commercial and industrial developments, interspersed with urban parklands.

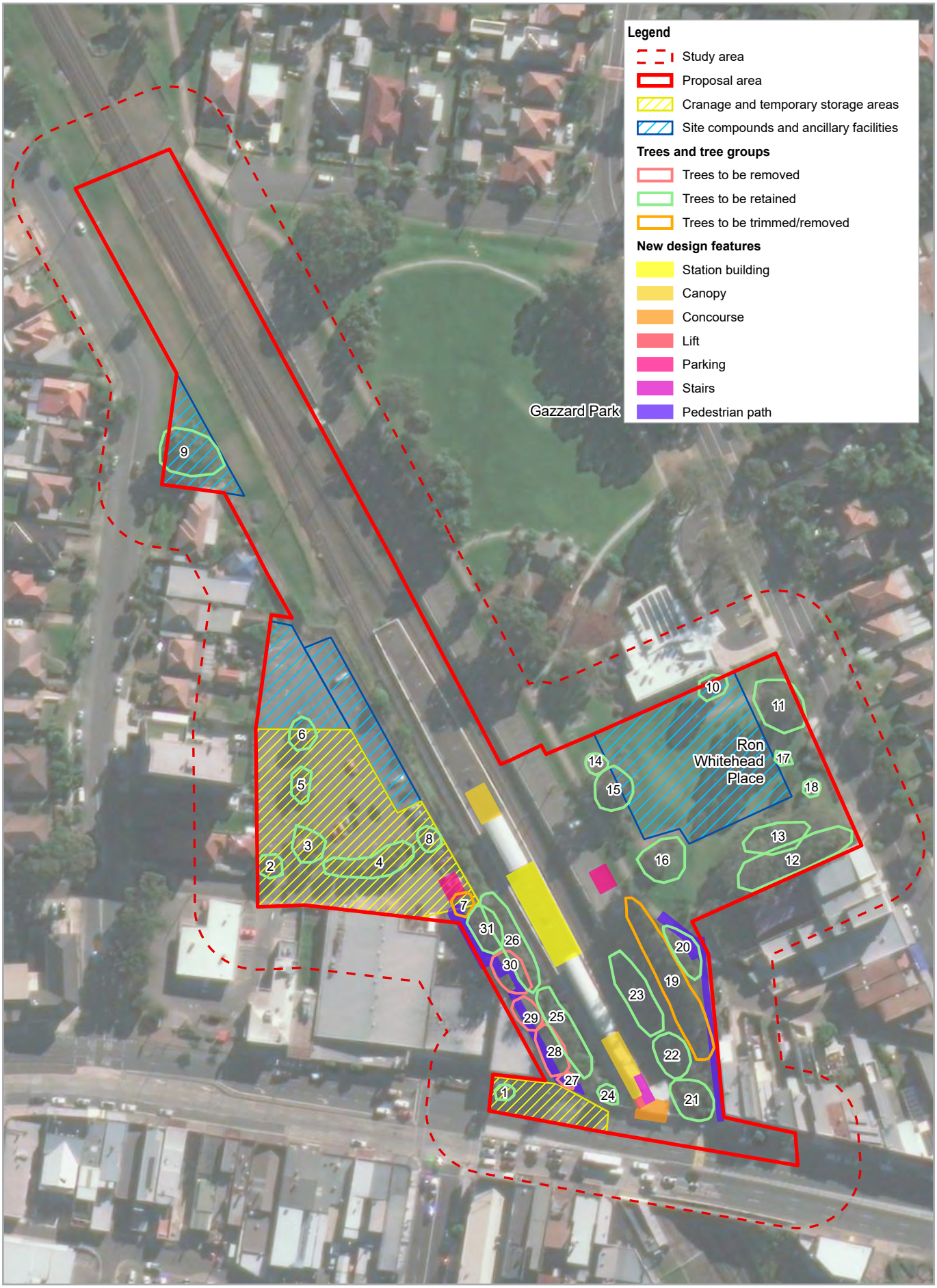
Vegetation

Native vegetation in the study area is almost completely cleared, with all canopy vegetation comprising planted native species. Canopy vegetation in the Proposal site is isolated and occurs in small patches on both sides of the rail corridor and at Ron Whitehead Place. Existing vegetation consists of a combination of planted indigenous and exotic trees and shrubs, in association with self-recruited native and exotic species.

There are no mapped native Plant Community Types (OEH, 2021c) within the study area. There are three vegetation types identified as:

- Exotic grassland: this vegetation type occurs as a narrow band along the eastern side of the railway line, at the southern limit of the study area. No threatened flora species were recorded in this community in the Proposal area.

- Parkland: This vegetation types occurs as an open, maintained space to the north east and east of the station including Gazzard Park and Ron Whitehead Place. No threatened flora species were recorded in this community in the Proposal site.
- Planted exotic and native vegetation (including self-recruitment): This vegetation type occurs as narrow bands along the eastern and western sides of the railway line, mostly on constructed batters and in the car park on the eastern side of the station. Two planted threatened flora species (*Eucalyptus scoparia and Eucalyptus nicholii*) were recorded in this vegetation type. The threatened Downy Wattle (*Acacia pubescens*) was recorded on both sides of the railway line. The locations of both flora species are shown on Figure 6.8.



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0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Transport for NSW
Yagoona Station Upgrade
Review of Environmental Factors

Project No. **1254729**
Revision No. **0**
Date **13/05/2021**

Tree plan

FIGURE 6.8

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Data source: World Imagery: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community; Boundaries: GHD, 2021; Habitat Resources: GHD, 2021; Threatened species: GHD, 2021; Tree groups: GHD, 2021; Cadastre: Sixmaps, 2021. Created by: kpsroba

Significant landscape trees

Several trees are identified as having landscape significance, either because of their dimensions, location or species. These trees are shown in Figure 6.8.

Fauna and fauna habitats

A total of 11 species of native fauna were previously recorded in the study area. Fauna observed were all common and widespread species, capable of persisting in highly urbanised habitats such as those within the study area. Native fauna species regularly recorded included the Noisy Miner (*Manorina melanocephala*), Little Corella (*Cacatua sanguinea*) and Australian White Ibis (*Threskiornis molucca*).

Three exotic species were recorded during the survey: Common Myna (*Sturnus tristis*), Rock Dove (*Columba livia*) and Spotted Turtle-dove (*Streptopelia chinensis).* Other introduced species likely to occur within the study area include the Black Rat (*Rattus rattus*) and Red-whiskered Bulbul (*Pycnonotus jocosus*).

Exotic and native grassland contains few habitat resources of relevance to most native species. Grasses and herbs would provide foraging resources for relatively mobile and opportunistic native fauna, including birds such as the Australian Magpie (*Cracticus tibicen*) and Magpie-lark (*Grallina cyanoleuca*). Microbat species, including the threatened Eastern Bentwing Bat may forage within the study area on occasion. Small, common lizards such as the Dark-flecked Garden Sunskink (*Lampropholis delicata*) would occur, particularly in areas where shelter such as ballast, rocks and shrubs were present.

Common native frog species, including the Brown Striped Frog (*Limnodynastes peronii*) and Common Eastern Froglet (*Crinia signifera*) would also likely utilise habitats present in small drainage depressions in these areas.

Planted native species within the study area provide potential foraging habitat for a range of common bird species and mammal species. Melaleuca plantings at Ron Whitehead Place and the eastern commuter car park would comprise foraging habitat for nectivorous bird species.

Common Ringtail Possum (*Pseudocheirus peregrinus*) are likely to occur in the rail corridor where a dense midstorey is present. Common Brushtail Possum (*Trichosurus vulpecula*) are likely to also forage in large mature trees at Ron Whitehead Place. Powerful Owl (*Ninox strenua)* would forage for possums in the study area on occasion.

The Grey-headed Flying-fox is likely to forage in planted trees throughout the construction footprint. The Eastern Bentwing bat is also likely to forage above planted vegetation.

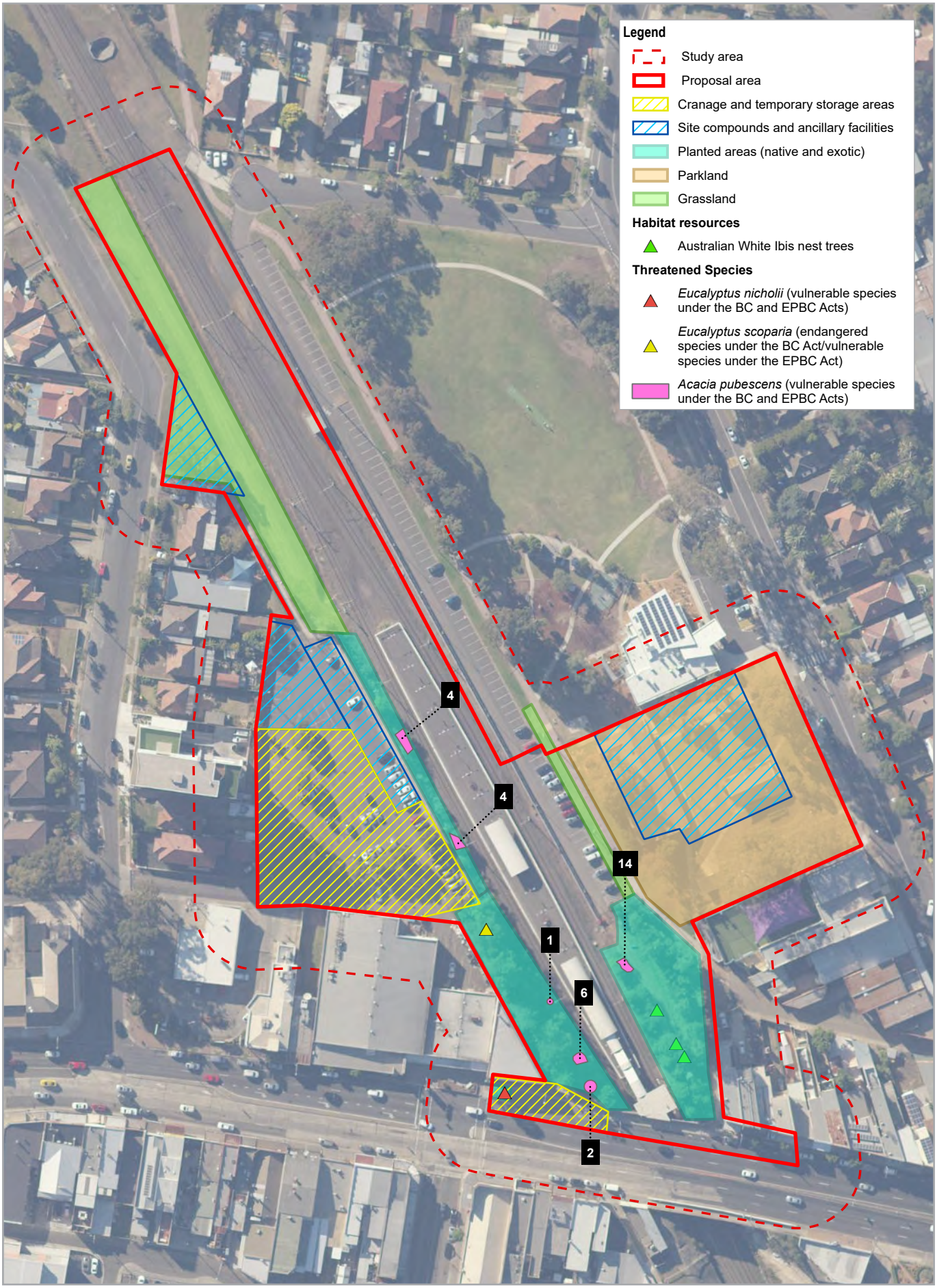
Threatened and migratory biota

There are no threatened ecological communities (TECs) recorded within the study area.

Several ramets of the threatened flora species Downy Wattle (*Acacia pubescens*) can be found growing on both sides of the railway line. Their locations were verified and are shown in Figure 6.9.

Background investigations identified 54 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 2021d). No threatened fauna species were recorded during the survey.

The study area contains mostly exotic grassland and planted native species (both managed and unmanaged) within the rail corridor, car parks and also Ron Whitehead Place. Most of the threatened fauna recorded in the locality are unlikely to occur given their specific habitat requirements, preference for larger tracts of native vegetation and a general absence of important habitat resources within the study area.



Paper Size ISO A4

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Transport for NSW
Yagoona Station Upgrade
Review of Environmental Factors

Vegetation types, threatened biota and habitat resources

Project No. **1254729**
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FIGURE 6.9

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Print date: 14 May 2021 - 12:33

Data source: NSW_Imagery: © Department of Customer Service 2020; Boundaries: GHD, 2021; Habitat Resources: GHD, 2021; Threatened species: GHD, 2021; Tree groups: GHD, 2021; Cadastre: Sixmaps, 2021. Created by: kpsroba

The Grey-headed Flying-fox (*Pteropus poliocephalus*), a vulnerable species listed under the BC Act and EPBC Act, has been previously recorded approximately 50 metres away to the west of Yagoona Station. There are a large number of records of the species in the locality (OEH, 2021a). No breeding camps occur in the study area.

Threatened microbats previously recorded in the locality, including the Southern Myotis (*Myotis macropus*), Large Bent-winged Bat (*Miniopterus orianae oceanensis*) and Eastern Freetail Bat (*Micronomus norfolkensis*) have a low likelihood of occurrence in the study area.

The Proposal area does not contain important habitat for other threatened 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, roosting and nesting. There is no suitable habitat in the study area for threatened reptiles and frogs.

No migratory species were recorded during field surveys. There is very limited potential for migratory woodland species to occur given the nature of the modified habitats present.

Habitat in the study area is unlikely to be important for these species as it is highly fragmented and subject to substantial disturbance.

6.7.2 Potential impacts

a) Construction phase

Tree removal and vegetation disturbance

To accommodate the construction of the footpath on the western side of the station, removal of up to 23 mature and early-mature planted trees as well as self-recruited specimens is required within this area. This results in up to 0.05 hectares of vegetation comprising native planted vegetation. The trees to be removed all occur along the top and upper slopes of a batter on the western side of the railway line, within the rail corridor and as identified in Figure 6.8 and Table 6.16.

A further 0.046 hectares of vegetation comprising a line of Swamp Oak may require trimming and/or topping for crane access during construction.

The proposed removal of these trees would comprise a minor reduction in the extent of vegetation from the station precincts and would not threaten the persistence of any local populations of native plants. The removal of a small number of planted trees from within an urban garden setting is of negligible concern and could be eventually corrected by judicious planting and landscaping in adjacent areas.

Up to 0.51 hectares of parkland and grassland vegetation would be temporarily disturbed during construction for the placement of site compounds and ancillary facilities. Parkland vegetation to be disturbed would not include canopy trees recorded within Ron Whitehead Place and comprises only groundcover vegetation.

The Downy Wattle is listed as a vulnerable species under the BC and EPBC Acts. Up to 31 stems of the Downy Wattle were recorded within planted vegetation on both the eastern and western side of Yagoona Station. The patch of vegetation where the Downy Wattle occurs, is currently fenced and within land owned by the Transport Asset Holding Entity (TAHE). The Downy Wattle within the study area would be retained as part of the Proposal and are unlikely to be indirectly impacted by the Proposal given the vegetated buffer between the ramets and the small areas of adjacent vegetation to be cleared.

Environmental safeguards to minimise the clearing of planted native vegetation have been included as mitigation measures in Section 6.7.2. Offset for tree removal and landscaping would be undertaken in accordance with Transport for NSW's *Vegetation Offset Guide* (Transport for NSW, 2019c) and in consultation with the relevant council, and/or the owner of

the land upon which the vegetation is to be planted. The 23 trees identified for removal would be offset with a minimum of 90 trees.

Table 6.16 Proposed tree removal

Tree or tree group number (shown on Figure 6.8)	Botanical name	Common name	Comments
27	**Araucaria heterophylla*	Norfolk Island Pine	Emergent specimen, visible from station
	Melaleuca styphelioides	Prickly-leaved paperbark	
	Eucalyptus haemastoma	Scribbly Gum	
	Prunus persica[1] *x 3*	Peach	
	Callistemon viminalis[2] *x 2*	River Bottlebrush	
	Callistemon salignus	Pink Tips	
28	*Elaeocarpus reticulatus*	Blueberry Ash	
	Eucalyptus haemastoma	Scribbly Gum	Tall specimens; leaning towards tracks
	Casuarina glauca	Swamp Oak	
29	*Backhousia myrtifolia*	Ironwood	Growing close to fence; flowers visible at time of survey
	Eucalyptus curtisii[2]	Plunkett Mallee	Sprawling growth, extending over fence; flowers visible at time of survey
	Casuarina glauca x 2	Swamp Oak	
	Melaleuca styphelioides	Prickly-leaved Paperbark	
30	*Casuarina glauca*	Swamp Oak	Large thicket, growing near fence
31[3]	*Banksia integrifolia subsp. integrifolia x 2*	Coast Banksia	
	Melaleuca styphelioides	Prickly-leaved Paperbark	
	Casuarina glauca	Swamp Oak	
	Callistemon salignus	Pink Tips	

Notes: 1. Native species not indigenous to Canterbury-Bankstown LGA
2. Introduced species
3. All trees within Tree group 31 would be removed with the exception of a single specimen of Wallangarra White Gum.

Impacts on fauna and habitats

The Proposal area does not contain any threatened ecological communities or habitat for threatened fauna.

The vegetation to be removed includes potentially small mid-storey plantings and canopy trees mostly comprising Swamp Oak. Swamp Oak is generally not a productive food source of pollen, nectar or leaves and is likely to provide low habitat value for fauna species. The vegetation to be removed would not provide critical or important habitat for any local populations of native fauna.

The use of machinery and general disturbance associated with construction may deter some common fauna species from utilising potential habitat in the study area. However, this would only be temporary for the duration of the works and is unlikely to cause significant impacts to fauna in the study area that would already be habituated to noise and vibration given the proximity of major roads and train line.

b) Operational phase

The Proposal area is located within a highly modified urban environment and the operational phase of the Proposal would not impact on native flora or fauna.

6.7.3 Mitigation measures

The CEMP would include measures provided in the Biodiversity and Arboricultural Assessment (GHD, 2021d) to ensure vegetation to be retained within the site is appropriately protected. This would include:

- fencing around trees to be retained and protection of the threatened *Acacia pubescens*
- measures to control weeds
- measures to minimise potential indirect impacts on the patches of the threatened *Acacia pubescens*
- fauna management measures including suitable handling and removal of unexpected wildlife.

Offsetting

The removal of trees for the Proposal would be offset in accordance with the Transport for NSW *Vegetation Offset Guide* (2019b) and outlined in Table 6.17. Offsets would be implemented once the exact extent of the clearing required and the number of trees to be removed has been confirmed with Transport for NSW.

Table 6.17 Offsetting for tree removal

Offset trigger	Impact	Impact category	Offset multiplier	Offset provision
Secondary offset- Clearing of trees that have heritage, streetscape, community/public amenity or intrinsic value	n/a	Large trees (DBH[1] greater than 60 cm)	Plant minimum eight trees for each tree cleared	n/a
Secondary offset- Clearing of trees that have heritage, streetscape, community/public amenity or intrinsic value	Removal of up to 22 trees on the western side of Yagoona Station	Medium trees (DBH greater than 15 cm, but less than 60 cm)	Plant minimum four trees for each tree cleared	Plant 88 trees
Secondary offset- Clearing of trees that have heritage, streetscape, community/public amenity or intrinsic value	Removal of up to one tree on the western side of Yagoona Station	Young trees (DBH less than 15 cm)	Plant minimum two trees for each tree cleared	Plant two trees

Note: 1. Diameter at breast height

6.8 Contamination, landform, geology and soils

6.8.1 Existing environment

Landform

The landform in the vicinity of Yagoona Station is undulating, with the station platform and rail tracks positioned within a cutting at a lower level with respect to the surrounding area. The railway line has an elevation of about 43 metres Australian Height Datum (AHD) above sea level. To the immediate east and west of the site, the landform rises to about 48 to 52 metres AHD above sea level. The Proposal area slopes down from the Hume Highway towards the north, with an elevation of about 46 metres AHD at the Hume Highway, down to about 40 metres AHD at Richie Road towards the north.

Geology and soils

Geological Series Sheet 9130 (Herbert, 1983) shows that Yagoona Station is underlain with Bringelly shale overlying the Wiannamatta Group formation. The Bringelly Shale consists of shale, carbonaceous claystone, laminite, fine to medium-grained lithic sandstone, and rare coal.

A search of the Mitchell Soil Landscapes (OEH, 2017) identifies that the site is located within the Blacktown soil landscape. This landscape consists of shallow to moderately deep red and brown podzolic soils on crests, upper slopes and well-drained areas, and deep yellow podzolic soils and soloths on lower slopes and in areas of poor drainage. The site is also in close proximity to land located within the Glenorie soil landscape, however, is not within the site boundary.

A search of the NSW Planning portal tool and the Sharing and Enabling Environmental Data (SEED) showed no occurrences of Acid Sulfate Soils (ASS). The Australian Soil Resource Information System (ASRIS) showed a low probability of occurrence of ASS.

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 Yagoona Station:

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

The EPA contaminated lands register was searched on 19 February 2021. No identified contaminated lands are located within one kilometre of the Proposal area. A search of the List of NSW Contaminated Sites Notified to the EPA was also undertaken (list current at 19 February 2021), and the following two sites within one kilometre of the site are listed:

- 7-Eleven (former Mobil) Service Station (345 metres to the west)
- Sydney Water Corporation Potts Hill Complex (one kilometre to the north).

Regulation under the CLM Act is not required for either site.

Land within the confines of the Proposal has the potential to contain contaminated materials with the fabric of the existing buildings and concourse structures 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

a) Construction phase

Erosion and sedimentation

The Proposal would require some excavation work for the installation of the lift shaft pit, footpath upgrades, canopy footings, new station building footings and stair footings. Trenching or excavation is also required for the relocation of services and vegetation removal.

Excavation and other earthworks such as trenching and regrading may disturb soils, causing the following impacts if not undertaken with appropriate controls:

- dust generation from exposed soils and truck movements
- erosion of exposed soils and stockpiles
- sedimentation within drainage systems and railway cutting.

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 7.1 in Section 7.2.

Contamination

During construction, soil disturbance can also expose contaminants which may be harmful to workers and the community. Contaminants may also enter the drainage system and contaminate waterways. As the site is not a known contaminated site, and excavation works would be minor, the risk is considered low.

There is also potential for activities to result in the contamination of soil through accidental fuel or chemical spills from construction plant and equipment. Such impacts would be managed with the implementation of mitigation measures outlined in Table 7.1 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.

b) 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 Erosion and Sediment Control Plan would be established prior to the commencement of construction and be updated and managed throughout as relevant to the activities during the construction phase.

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

Appropriate mitigation measures would be implemented to manage hazardous substances during demolition work. This would include the identification of hazardous materials from existing registers or identified during construction. Removal of hazardous materials from the structure will be completed by appropriately licensed asbestos/hazardous waste removalists and in accordance with relevant legislation and guidelines

Refer to Table 7.1 for a list of proposed mitigation measures.

6.9 Hydrology and water quality

6.9.1 Existing environment

Surface water

The Proposal area is located within the Duck River sub catchment of the Parramatta River Catchment. The south of the site also borders the Salt Pan Creek sub catchment. An unnamed drainage line is located about 700 metres north west of the site, and drains north into Duck River, a tributary of Parramatta River.

Stormwater runoff within the Proposal area is managed by the City of Canterbury-Bankstown, which predominantly includes an underground drainage system, which enters through kerbs and gutters, flowing into Duck River and eventually into Parramatta River.

Water quality is generally impacted by runoff from the surrounding land uses, including the operation of local roads and highways, the railway corridor and associated infrastructure, the town centre and residential areas.

Groundwater

A search of the Australian Groundwater Explorer (BOM, 2020) website identified no existing groundwater bores in the vicinity of the Proposal. The nearest groundwater bore is located about 1.7 kilometres east of the Proposal, with drill depths between 3.7 metres to 13 metres below the surface. No water levels have been recorded, and the bore is used for monitoring purposes.

Flooding

The Proposal area is not within a flood prone area due to the distance to any nearby watercourses which would be subject to flooding. A review of the Bankstown 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 surface water.

6.9.2 Potential impacts

a) 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, diversions would be implemented.

Without appropriate safeguards, pollutants (fuel, chemicals or wastewater from accidental spills, and sediment from excavations and stockpiles) could potentially reach nearby stormwater drains and flow into nearby waterways. Activities which would disturb soil during construction work have the potential to impact upon local water quality as a result of erosion and run off sedimentation. Potential impacts would be managed with the mitigation measures outlined in Table 7.1.

Groundwater

Impacts to groundwater are considered to be unlikely as the majority of works would not require excavation to a depth that would intercept the groundwater. However, works such as excavation for the lift shaft would require deeper excavations. As the water levels are unknown, there is potential for groundwater interaction. Should groundwater be encountered any dewatering activities would be undertaken in line with Transport for NSW's *Water Discharge and Reuse Guideline* (Transport for NSW, 2019d).

Flooding

The Proposal area is not expected to be subject to widespread 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 7.1.

b) Operational phase

The Proposal is unlikely to substantially change the hydrology of the area surrounding the site. The existing stormwater system would continue to manage surface water around the site. The Proposal would result in a minor increase in hardstand areas due to the establishment of the new station entrance concourse area and a continuous canopy over the lift and stairs. 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 area to avoid the polluting of these flows.

Should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the *Waste Classification Guidelines* (EPA, 2014) and Transport for NSW's *Water Discharge and Reuse Guideline* (Transport for NSW, 2019d).

Refer to Table 7.1 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 and around the Proposal area is considered to be typical of an urban setting. Air quality around the Proposal is influenced by being adjacent to a major road (Hume Highway) and a rail corridor which is utilised by diesel services. Local air quality is also impacted by vehicles on the surrounding local network. Sensitive receivers in the vicinity of the Proposal area include:

- residential areas to the north west
- a commercial precinct along Hume Highway to the south of the station
- Yagoona public school approximately 130 metres from the station
- Al Sadiq College approximately 75 meters to the east of the station
- White Bunny Child Care Centre directly behind the western commuter car park
- Yagoona medical centre approximately 150 metres from the station
- Gazzard Park to the east of the station.

The Department of Agriculture, Water and the Environment's (DAWE) National Pollutant Inventory was searched on 19 February 2021, which showed no polluting facilities exist within one kilometre of the Proposal area. The closest polluting facility to the Proposal, Galserv Galvanising Services, is located about 1.8 kilometres to the northwest.

The Canterbury-Bankstown LGA forms part of the Sydney South West monitoring region with air quality monitored from two fixed locations at Chullora and Lidcombe. A search of the daily regional air quality index for the Sydney South West region for the last year (February 2020 to February 2021) showed that the region experienced predominantly 'good' air quality.

6.10.2 Potential impacts

a) 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 foundations and footings for the lift, new stairs, canopies and station building
- other trenching or excavation may be required for footpaths, relocation of services, 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 have minimal impact on air quality as it would not involve extensive excavation or other land disturbance with the potential to generate significant quantities of dust. The operation of plant, machinery and trucks may also lead to increases in exhaust emissions in the local area however these impacts would be minor and short term. Sources of pollution 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 7.1 in Section 7.2.

b) 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

Table 7.1 provides a list of mitigation measures that are proposed to manage air quality issues during construction. They are aimed around maintaining and operating plant and equipment efficiently and implementing measures for dust suppression including watering, covered loads and appropriate management of tracked dirt/mud on vehicles. Such measures would be included in the CEMP to be prepared for the Proposal.

6.11 Waste

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

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

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

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

6.12 Sustainability

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

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

6.13 Climate change

The dynamic nature of our climate system indicates a need to focus attention on how to adapt to 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. Rainfall events and flooding are unlikely to impact on the Proposal (refer to 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.

A climate change risk assessment would be carried out for the project during design development in line with the TfNSW Climate Risk Assessment Guidelines – DMS-SD-081. Mitigation and adaptation measures would be considered to treat identified risks and incorporated into the detailed design where appropriate.

6.14 Greenhouse gas emissions

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

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

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 7.1.

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

6.15 Cumulative impacts

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

A search of the DPIE Major Projects Register, Sydney South Joint Regional Planning Panel Development and Planning Register, and Canterbury-Bankstown Council Development Application Register on 12 March 2021 identified two major developments within one kilometre of the Proposal. The relevant projects have been listed in Table 6.18.

Table 6.18 Projects within the vicinity of the Proposal

Name of project	Status of project	Address	Distance from Proposal (metres)
348 Hume Highway, Bankstown – residential flat buildings	Under construction	348 Hume Highway, Bankstown	950 metres east
350 Hume Highway, Bankstown – residential flat buildings	Under construction	350 Hume Highway, Bankstown and 18 George Street	900 metres east
Sydney Metro Construction	Under construction	Bankstown Station	1.45 kilometres south-east

During construction, the work would be coordinated with any other construction activities in the area, including those listed in Table 6.18. With consideration to the distance between the Proposal and those identified in this assessment, cumulative noise impacts are predicted to be minimal, with the exception of the Sydney Metro project. The Sydney Metro would be coordinating track shutdowns along the Lidcombe-Bankstown line during construction. Impacts at Yagoona Station are likely to involve some disruptions to services. It is expected that the works would be carried out during scheduled shutdown periods for the Sydney Metro project to minimise cumulative disruption to services. Consultation and liaison would occur with the City of Canterbury-Bankstown, Sydney Trains, Sydney Metro, and any other developers identified, to minimise cumulative construction impacts such as traffic, noise and service disruption.

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

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

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

7 Environmental management

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

7.1 Environmental management plans

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

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

7.2 Mitigation measures

Mitigation measures for the Proposal are listed below in Table 7.1. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6 should the Proposal proceed.

Table 7.1 Proposed mitigation measures

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

No.	Mitigation measure
7.	Any modifications to the Proposal, if approved, would be subject to further assessment and approval by Transport for NSW. This assessment would need to demonstrate that any environmental impacts resulting from the modifications have been minimised.
	Traffic and site access
8.	Prior to the commencement of construction, a Traffic Management Plan (TMP) would be prepared as part of the CEMP and would include at a minimum: • ensuring adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised • maximising safety and accessibility for pedestrians and cyclists • ensuring adequate sight lines to allow for safe entry and exit from the site • ensuring access to railway stations, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made) • managing impacts and changes to on and off -street parking and requirements for any temporary replacement provision • parking locations for construction workers away from stations and busy residential areas and details of how this will be monitored for compliance • routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses • details for relocating kiss and ride, taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired • measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the TMP. 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.
11.	The queuing and idling of construction vehicles in residential streets would be minimised through staging of deliveries where practicable.
12.	Should road closures be required, signage would be erected to clearly delineate alternative access and that nearby businesses would operate as normal.
13.	Pedestrian access to and from the station would be maintained at all times during construction where practicable.
14.	The performance of all project traffic arrangements would be monitored during construction.
15.	Workers would be encouraged to access the proposal site via public transport.
16.	Deliveries and road work would be scheduled to avoid peak times.

No.	Mitigation measure
	Urban design, landscape and visual amenity

17.	An Urban and Landscape Design Plan (ULDP) would be prepared by the Contractor, in consultation with the City of Canterbury-Bankstown, and submitted to Transport for NSW 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:
	  ○ site analysis
	  ○ vision and objectives for the infrastructure
	  ○ strategies that apply to ISCA approved guidelines in accordance with Urb-1 (ISCA V1.2)
	• 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 would be shown
	• integration with surrounding local and regional open space and or landscape networks. Existing and proposed open space infrastructure/landscape elements would be shown
	• integration with surrounding streetscape including 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.

18.	A Public Domain Plan (PDP) would be prepared by the Contractor, in consultation with the relevant council, and submitted to Transport for NSW 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 paths, 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 • design measures included to meet ISCA v1.2 • identification of design and landscaping aspects that will be open for stakeholder input, as required.

No.	Mitigation measure

19.	The following measures would be considered further during detailed design:
	• ensure the design, location and materiality of the Proposal components contribute positively to the station and retail village setting, to achieve a high-quality public realm
	• ensure the lift, stair and new canopy components of the Proposal integrate well with existing elements remaining intact, through appropriate colour and materiality selections.
	• consider the design of new vertical built form elements such as new walls and lift shaft, to assist with visual integration and keep below the existing building height of retail premises along the Hume Highway.
	• consider ways to achieve more seamless integration between new and existing covered canopies over stairs and seating areas along the platform
	• minimise vegetation clearance within the immediate vicinity of the station precinct to maximise retention of the green character of the station precinct. In particular, the design should seek to retain the following trees:
	  ○ trees 1, 2-8, 31 to the west
	  ○ tree 11 and tree groups 19, 20 and 27 to the east
	• ensure the Proposal's urban design solution contributes to the streetscape setting along the Hume Highway, through a well-considered design for the concourse
	• maintain the Hume Highway brick barrier wall, which contributes to the character of the station and village precinct
	• ensure the Proposal components and materiality complement the existing character of the station precinct and urban context.

20.	Provide public art to a similar level, in an appropriate location close to the original site of the mural. Any art procurement must be in accordance with the processes and policies of the relevant authority. This could include, for example, an art competition with local schools or similar in consultation with the City of Canterbury-Bankstown.
21.	All permanent lighting would be designed and installed in accordance with the requirements of standards relevant to *AS 1158 Road Lighting* and *AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting.*
22.	The detailed design of the Proposal would comply with Crime Prevention Through Environmental Design principles.
23.	Worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.
24.	Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
25.	During construction, graffiti would be removed in accordance with Transport for NSW's Standard Requirements.

No.	Mitigation measure
	Noise and vibration
26.	Prior to commencement of work, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009), *Construction Noise and Vibration Strategy* (Transport for NSW, 2019b) and the Noise and Vibration Impact Assessment for the Proposal (GHD, 2021c). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.
27.	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.
28.	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.
29.	Work would generally be carried out during standard construction hours (i.e. 7am to 6pm Monday to Friday; 8am to 1pm Saturdays). Any work outside these hours may be undertaken if approved by Transport for NSW or authorised under the *Environmental Planning and Assessment (COVID-19 Development – Infrastructure Construction Work Days No. 2) Order 2020* (whilst the Order is in effect), and the community is notified prior to these works commencing. An Out of Hours Work application form would need to be prepared by the Contractor and submitted to the Transport for NSW Environment and Planning Manager for any works outside normal hours.

No.	Mitigation measure
30.	As per the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019d), construction activities with special audible characteristics (high noise impact, intensive vibration, impulsive or tonal noise emissions) would be limited to standard hours, starting no earlier than 8am; and to continuous blocks not exceeding three hours each with a minimum respite from those activities and works of not less than one hour between each block, unless otherwise approved by Transport for NSW.
31.	Work would be conducted behind temporary hoardings/screens wherever practicable. The installation of construction hoarding would take into consideration the location of residential receivers to ensure that 'line of sight' is broken, where feasible.
32.	To avoid structural impacts as a result of vibration or direct contact with structures, the proposed work would be undertaken in accordance with the safe work distances outlined in the Noise and Vibration Assessment (GHD, 2021c) and attended vibration monitoring or vibration trials would be undertaken where these distances are required to be challenged.
33.	Vibration (other than from blasting) resulting from construction and received at any structure outside of the project would be managed in accordance with: • for structural damage vibration –British Standard BS 7385-2:1993 Evaluation and measurement for vibration in buildings Part 2 and German Standard DIN 4150:Part 3 – 1999: Structural Vibration in Buildings: Effects on Structures • For human exposure to vibration the acceptable vibration - values set out in the *Environmental Noise Management Assessing Vibration: A Technical Guideline* (Department of Environment and Conservation, 2006) which includes British Standard BS 6472-2:1992 *Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz).*
34.	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 work and other sensitive structures within 150 metres of the works (unless otherwise determined following additional assessment they are not likely to be adversely affected).
35.	Noise with special audible characteristics and vibration generating activities (including jack and rock hammering, sheet and pile driving, rock breaking and vibratory rolling) may only be carried out in continuous blocks, not exceeding 3 hours each, with a minimum respite period of one hour between each block. 'Continuous' includes any period during which there is less than 1 hour respite between ceasing and recommencing any of the work. No more than two consecutive nights of noise with special audible characteristics and/or vibration generating work may be undertaken in the same Noise Catchment Area (NCA) over any 7-day period, unless otherwise approved by the relevant authority.
36.	Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when situating plant.

No.	Mitigation measure
	Indigenous heritage
37.	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.
38.	If unforeseen Indigenous objects are uncovered during construction, the procedures contained in Transport for NSW's *Unexpected Heritage Finds Guideline* (Transport for NSW, 2019g) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager so they can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, Heritage NSW and the Local Aboriginal Land Council. If human remains are found, work would cease, the site secured and the NSW Police and Heritage NSW notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to works recommencing at the location.
	Non-Indigenous heritage
39.	In the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in Transport for NSW's *Unexpected Heritage Finds Guideline* (Transport for NSW, 2019g) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the Transport for NSW Project Manager and the Transport for NSW Environment and Planning Manager so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and Heritage NSW. Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to works recommencing at the location.
	Socio-economic
40.	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.
41.	Feedback through the submissions process would be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where practicable.
42.	A Community Liaison Management Plan would be prepared prior to construction to identify all potential stakeholders and best practice methods for consultation with these groups during construction. The plan would also encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where practicable.
43.	Contact details for a 24-hour construction response line, Project Infoline and email address would be provided for ongoing stakeholder contact throughout the construction phase.
44.	The community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Plan to be developed prior to construction.

No.	Mitigation measure
	Biodiversity
45.	Construction of the Proposal must be undertaken in accordance with *Transport for NSW's Vegetation Management (Protection and Removal) Guideline* (Transport for NSW, 2019h) and Transport for NSW's *Fauna Management Guideline* (Transport for NSW, 2019i).
46.	The CEMP would include measures provided in the Biodiversity and Arboricultural Assessment (GHD, 2021d) to ensure vegetation to be retained within the site is appropriately protected. This would include: • fencing around trees to be retained and protection of the threatened *Acacia pubescens* • measures to control weeds • measures to minimise potential indirect impacts on the patches of the threatened *Acacia pubescens* • fauna management measures including suitable handling and removal of unexpected wildlife.
47.	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.
48.	Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees nominated to be removed in the REF 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.
49.	Tree Protection Zones (TPZs) would be established around trees to be retained, as nominated in the Biodiversity and Arboricultural Assessment (GHD, 2021d) that would be undertaken during detailed design. Tree protection would be undertaken in line with *AS 4970-2009 Protection of Trees on Development Sites* and would include exclusion fencing of TPZs. The following actions should not be permitted within the Tree Protection Zone (TPZ) of any tree: • 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.
50.	In the event of any tree to be retained becoming damaged during construction, the Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.
51.	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 Transport for NSW's Tree Removal Application Form and submit it to Transport for NSW for approval.

No.	Mitigation measure
52.	Weed control measures, consistent with Transport for NSW's *Weed Management and Disposal Guideline* (Transport for NSW, 2019j), would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the project. This would include the management and disposal of weeds in accordance with the *Biosecurity Act 2015*.
53.	Offsets and/or landscaping would be undertaken in accordance with Transport for NSW's *Vegetation Offset Guide* (Transport for NSW, 2019c) as outlined in Table 6.17 and in consultation with the relevant council, and/or the owner of the land upon which the vegetation is to be planted.
	Soils and water
54.	Prior to commencement of work, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the 'Blue Book' *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of works and maintained throughout construction.
55.	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.
56.	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.
57.	All fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and Transport for NSW's *Chemical Storage and Spill Response Guidelines* (Transport for NSW, 2019j).
58.	Adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the Transport for NSW *Chemical Storage and Spill Response Guidelines* (Transport for NSW, 2019k) 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.
59.	In the event of a pollution incident, works would cease in the immediate vicinity and the Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager. The EPA would be notified by Transport for NSW if required, in accordance with Part 5.7 of the POEO Act.
60.	The existing drainage systems would remain operational throughout the construction phase.
61.	Should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the *Waste Classification Guidelines* (EPA, 2014) and Transport for NSW's *Water Discharge and Reuse Guideline* (Transport for NSW, 2019d).

No.	Mitigation measure
	Air quality
62.	Air quality management and monitoring for the Proposal would be undertaken in accordance with Transport for NSW's *Air Quality Management Guideline* (Transport for NSW, 2019l).
63.	Methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks.
64.	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.
65.	Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.
66.	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
67.	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 and monitoring regime for collating construction waste data.
68.	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 SafeWork NSW requirements.
69.	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.
70.	All excavated spoil suitable for reuse would be reused on site and distributed as agreed with Transport for NSW and the Contractor. The reuse of excavated material would be further reviewed and confirmed during construction.
71.	All spoil and waste must be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying waste (*EPA, 2014) prior to disposal.
72.	Any concrete washout would be established and maintained in accordance with Transport for NSW's *Concrete Washout Guideline* – draft (Transport for NSW, 2019m) with details included in the CEMP and location marked on the ECM.

No.	Mitigation measure
	Sustainability, climate change and greenhouse gases
73.	Detailed design and construction of the Proposal is to be undertaken in accordance with the ISCA Infrastructure Sustainability Rating Scheme (v1.2).
74.	The detailed design process would undertake a compliant carbon footprinting exercise in accordance with Transport for NSW 's *Carbon Estimate and Reporting Tool Manual* (Transport for NSW, 2019e) or other approved modelling tools. The carbon footprint would to be used to inform decision making in design and construction
	Cumulative impacts
75.	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, particularly people with a disability, lower mobility and those with prams or luggage by providing a new lift and accessible footpaths around the station
- improve customer amenity by installing new canopies on the platforms to provide weather protection, and installing a new family accessible toilet, female ambulant toilet and male ambulant toilet within a new platform building
- improve accessibility and interchange facilities at the station by providing a new kiss and ride area and accessible parking spaces
- improved access to car parks and interchange facilities through improved footpaths to DSAPT requirements
- improve customer safety by platform regrading and installing new tactiles along the platforms, improving station lighting and CCTV
- improve customer experience by upgrading customer information and communication systems, adjusting wayfinding signage and landscaping work.

The likely key impacts of the Proposal are as follows:

- temporary noise and vibration impacts during construction
- temporary disruptions to station facilities and amenities during construction
- temporary changes to pedestrian movements from both the eastern and western car parks during the regrading of the footpaths
- temporary changes to traffic movements and loss of parking at the Breasley Place Council and commuter car park due to its potential use as a construction compound and laydown area
- temporary loss of parking at the southern end of the Ritchie Road commuter car park during construction of accessible car parking spaces
- increased platform congestion due to localised platform closures and diversions during platform building construction
- temporary change to the visual environment during construction phase due to fencing and hoarding, road barriers and signage, formwork and scaffolding, cranes and other construction equipment, site office and amenities, and night lighting
- removal of approximately 23 trees to facilitate the regrading of the footpath on the western side of the station that would require off set planting
- loss of the retail kiosk at the concourse
- social impacts due to loss of the public art mural.

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, 0 and 0). Based on the assessment contained in this REF, it is considered that the Proposal is not likely to have a significant impact upon the environment or any threatened species, populations or communities. Accordingly, an EIS is not required, nor is the approval of the Minister for Planning and Public Spaces.

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

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Appendix A Consideration of matters of National Environmental Significance

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

Matters of NES	Impacts
Any impact on a World Heritage property? There are no World Heritage Properties 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 Transport for NSW's consideration of the specific factors of clause 228 of the EP&A Regulation in determining whether the Proposal would have a significant impact on the environment.

Factor	Impacts
(a) Any environmental impact on a community? There 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. 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 23 trees on the western side of the station. This would be offset by the planting of 90 new trees.	Minor
(c) Any environmental impact on the ecosystem of the locality? The Proposal would require the removal of 23 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 Transport for NSW.	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 this 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 moderate to low.	Moderate
(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 *National Parks and Wildlife Act 1974*)? The Proposal is unlikely to have any impact on the habitat of protected fauna.	Nil

Factor	Impacts
(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? The Proposal is unlikely to have any impact on endangering any species of animal, plant or other form of like, 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
(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