

Moss Vale Station and Stabling Yard Upgrade

Review of Environmental Factors

DeskSite: 6737472

November 2023



Acknowledgement of Country

Transport for NSW acknowledges the traditional custodians of the land on which the Moss Vale Station and Stabling Yard Upgrade is proposed.

We pay our respects to Elders past and present and celebrate the diversity of Aboriginal people and their ongoing cultures and connections to the lands and waters of NSW.


Many of the transport routes we use today – from rail lines, to roads, to water crossings – follow the traditional Songlines, trade routes and ceremonial paths in Country that our nation's First Peoples followed for tens of thousands of years.

Transport for NSW is committed to honouring Aboriginal peoples' cultural and spiritual connections to the land, waters and seas and their rich contribution to society.



Prepared by AECOM and Transport for NSW.

Approval and authorisation

Title	Moss Vale Station and Stabling Yard Upgrade Review of Environmental Factors
Accepted on behalf of Transport for NSW by:	Sam Knight Regional Director South
Signed	
Date:	14 November 2023
DeskSite Reference:	6737472



Executive summary

The proposal

Transport for NSW is proposing to upgrade Moss Vale Station and the nearby stabling yard.

The station upgrade would provide a better experience for public transport customers, by improving access to the station, particularly for those with a disability, limited mobility, parents/carers with prams and passengers with luggage.

Upgrades to the Moss Vale stabling yard would improve stabling capacity to accommodate new trains being delivered by the NSW Government under the Regional Rail Project, which are replacing the current aging NSW regional fleet of trains. The new trains will result in improved accessibility, including accessible toilets on every train, wider doors, single-deck carriages, priority seating and accessible help points.

Key features of the proposal include:

Moss Vale Station upgrade:

- upgrading the station's eastern access from Argyle Street, including:
 - installing two new lifts, one at each end of the existing footbridge
 - upgrading existing footbridge, stairs and walkway
 - upgrading accessibility to the existing bus stop and taxi drop-off near Diamond Jubilee Park
 - upgrading Argyle Street entrance including seating and signage, and improving accessible pedestrian pathway at the forecourt
- formalising parking within the station forecourt, including new accessible parking spaces, kiss-and-ride zone and bus/coach drop-off
- adjusting some station doors and ground levels at the station including resurfacing at Platform 2
- replacing existing unisex toilet with a family accessible bathroom
- installing tactile markers and boarding assistance zones on both platforms
- improving communications equipment, public address (PA) system, and security features/systems
- upgrading station power services, communications room, lighting and CCTV, line marking, landscaping, and adjustment to station ticketing facilities
- upgrading the station's western access from Lackey Road, including:
 - installing a new lift providing access to the existing footbridge
 - upgrading existing footbridge and stairs including new handrails and decking
 - upgrading footpath and installing new seating at the new lift entrance near Lackey Road
 - installing pedestrian crossing at Lackey Road and Dalys Way
 - upgrading footpath accessibility at Dalys Way towards the station, including fencing, drainage, car parking and retaining wall.

Moss Vale Stabling Yard upgrade:

- upgrading the train stabling area to accommodate the new regional intercity trains, including track lengthening at the stabling yard and providing train clearances and buffer stops
- installing new walkways within the stabling yard and a dedicated access driveway for Australian Rail Track Corporation (ARTC)

- upgrading the existing Lackey Road staff vehicle access area including entry and exit gates, and a new sealed car park
- building retaining walls
- installing noise treatments. Based on the recommendations of the noise assessment, operational noise treatment may include the installation of a noise barrier approximately 250 metres in length and up to 5.5 metres in height, along the western side of the stabling yard. The noise barrier is subject to further assessment and the final operational noise solution may include at-property treatments
- installing Combined Services Route (CSR) along the western side of the station and both sides of stabling yard
- installing provisioning services
- upgrading low voltage and shore power supply for existing and new equipment, including communications equipment
- relocating existing amenity blocks and storage container about 60 metres north to the new stabling yard access area
- carrying out ancillary work including utilities/services relocations, lighting, fencing and gates, and drainage
- building a temporary stabling yard for use during construction of the upgrades to the existing stabling yard
- installing a new diesel exhaust fluid system including 10,000-litre capacity self-bunded tank, to service the train fleet
- building elevated safety access platforms, new hose reels and water supply points for each set of trains.

Mobile train simulator compound

- building a permanent hardstand compound area with amenities to accommodate a mobile train simulator (MTS) that would periodically park in the area.

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

Construction is expected to start in early 2024 and be completed by late 2025.

Need for the proposal

Improving transport customer experience is the focus of the NSW Government's transport initiatives. Interchanges and train stations are important gateways to the transport system, and are critical in shaping passenger experience and perception of public transport.

The proposal would ensure that Moss Vale Station and Stabling Yard 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 support growth in commercial and residential development for the Moss Vale area.

The proposed stabling yard upgrade would provide the required stabling facilities for new trains which are to replace the ageing NSW regional train fleet of XPT, Xplorer and Endeavour trains as part of the Regional Rail Project. These trains will enhance customer experience through greater accessibility, enhanced customer comfort and convenience as well as significant environment and sustainability improvements.

Chapter 3 of this REF further describes the need for the proposal.

Proposal objectives

The objectives of the proposal are to:

- achieve 100 per cent DSAPT compliance of Moss Vale Station
- protect and enhance heritage significance and character of Moss Vale Station
- achieve a rating under Transport’s Sustainable Design Guidelines (Transport for NSW, 2020)
- encourage mode shift through improved pedestrian and cycling connectivity
- enhance connectivity between the station and Moss Vale town centre
- support NSW Government COVID-19 Economic Stimulus Package
- accommodate the stabling of six new three-car regional intercity trains within the existing stabling yard to support operational requirements of the new rolling stock.

Options considered

Moss Vale Station

Initial design options for improving access to Moss Vale Station and achieving DSAPT compliance were developed following workshops with a stakeholder working group that included representatives from Transport and the design team. Options for the station upgrade were assessed by customer experience, accessibility, urban form and land use integration, transport integration, engineering constraints, facility operations and maintenance, and heritage and environment. Four options were identified that provided DSAPT and place-making compliance for the proposal.

The preferred option was chosen as it would improve east and west connectivity to the station and adjacent areas, complement existing station architecture and local biodiversity, protect and enhance heritage features and minimise negative visual impacts. The preferred option would also provide a quicker and safer circulation and minimise mode conflict within the station precinct.

Stabling yard

Transport has conducted an initial investigation to identify modifications and upgrades needed across the rail network to accommodate the new Regional Rail fleet.

The Moss Vale stabling yard was identified as an area that would require work to enable the stabling of the new fleet, due to limitations of the existing stabling infrastructure and other constraints within the yard. Design options were identified to meet this need, and to find a location for a mobile train simulator.

The constraints posed by the size of the stabling yard site restricted optioneering to three options including a ‘do nothing’ option. The preferred option provided the required stabling length and width of tracks for the new fleet and the necessary spatial clearances required to avoid impacting on the existing ARTC mainline signalling equipment.

Statutory and planning framework

The proposal is for railway and railway facilities and is to be carried out on behalf of Transport and can therefore be assessed under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Development consent from council is not required.

Transport is the determining authority for the proposal. This REF satisfies Transport’s requirements under section 5.5 of the EP&A Act 1979 to “examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity”. The REF also fulfils the requirements of Clause 2.92 of *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport & Infrastructure SEPP), as it allows for the development of ‘rail infrastructure facilities’ by or on behalf of a public authority without consent

on any land. Clause 2.91 defines 'rail infrastructure facilities' as including elements such as 'railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms', 'public amenities for commuters' and 'associated public transport facilities for railway stations'.

As Transport is a public authority and the proposed activity falls within the definition of rail infrastructure facilities under the Transport and Infrastructure SEPP, the proposal is permissible without consent. Consequently, the environmental impacts of the proposal have been assessed by Transport under Division 5.1 of the EP&A Act.

Community and stakeholder consultation

Further community consultation for the proposal would be carried out during the public display period of this REF, with the public invited to submit feedback to help Transport understand what is important to customers and the community. The REF would be displayed for a period of about four weeks.

Further information about these specific consultation activities is included in Section 5.4 of this REF.

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

In accordance with the requirements of the Transport and 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 carried out with Sydney Trains, ARTC, NSW TrainLink, Transport and Wingecarribee Shire Council during the development of design options and the preferred options. Consultation with these stakeholders would continue through the detailed design and construction of the proposal.

Transport would review and assess all feedback received during the public display period, prior to determining whether to proceed with the proposal.

Should the proposal proceed to construction, the community would be kept informed throughout the duration of the construction period.

Environmental impacts

The main environmental impacts of the proposal are:

Non Aboriginal heritage

Moss Vale Station is of State significance and is listed on the NSW State Heritage Register ('Moss Vale Railway Station and Stabling Yard Group', SHR#01200) and the Transport Asset Holding Entity (TAHE) and the ARTC Section 170 Heritage and Conservation Register, item number 4806253 and 4280253 respectively.

The proposal lies within the Argyle Street North Conservation Area (C1836) listed in Schedule 5 of the Wingecarribee Local Environment Plan (LEP) 2010. 'Moss Vale Railway Station' (I244) is also listed in Schedule 5.

The *Moss Vale Railway Station Precinct Conservation Management Plan* (OCP Architects, 2020a) states that the Moss Vale Railway Station Precinct is of State significance as one of NSW's largest regional railway stations, containing a rare and largely intact collection of Victorian and Federation buildings and other structures that remain an important landmark in the town of Moss Vale. The Moss Vale Railway Station Precinct is significant and unique for its association with a succession of NSW Governors from the 1880s until 1946. The 1889 additions to the station platform building included the unique arrangement of a Governor's waiting room within an Australian railway station.

The stabling yard is a large linear area of land that falls within the rail corridor of the Moss Vale Railway Station Precinct. The historically significant signal box is demonstrative of the 1915 period of duplication which occurred within the Moss Vale Railway Station Precinct while the brick retaining wall built around 1910, which runs along the rail corridor boundary, has no considerable historic significance.

The heritage impact assessment for elements and heritage fabric in Section 8 of the *Moss Vale Station and Stabling Yard Statement of Heritage Impact* (SOHI) (AECOM, 2023a) ranked the impact of the proposal to heritage fabric from works including the eastern station access from Argyle Street, western access from Lackey Road and works to platforms and buildings as a moderate adverse impact which would be mitigated through design. The assessment rated the impacts to the heritage fabric from the Dalys Way forecourt modification and installation of communications and services as minor adverse.

The current design has used the Heritage Design Principles outlined in the Heritage Design Report (GML Heritage Pty Ltd, 2023) prepared for the proposal (refer Appendix C). These have been informed by the *Design in Context :Guidelines for Infill Development in the Historic Environment* (NSW Heritage Office and the Royal Australian Institute of Architects NSW, 2005), to produce lift and ramp structures which are appropriate within the setting of Moss Vale Station.

The potential impacts to the 'Moss Vale Railway Station and Stabling Yard Group' were also assessed against the criteria outlined in the *Guidelines for Preparing a Statement of Heritage Impact* (Office of Environment and Heritage NSW, 2023). The assessment found the proposal would have no major adverse impacts (substantially affecting fabric or values of State significance).

The upgrades to the eastern access from Argyle Street and the western access from Lackey Road would however result in the irreversible loss of significant fabric and both accesses, together with the Dalys Way forecourt modification, would have a moderate adverse impact on historical, association, aesthetic, rarity, representative and associative values of Moss Vale Station. The works to platforms and buildings would also result in a moderate adverse impact on historical, and rarity values of Moss Vale Station.

The proposal would improve safety and access to and within the station, and would have a major positive impact on the social values of the station.

While the proposed modification to the station would have a minor adverse visual impact to the Argyle Street North Conservation Area, the proposed modification to the overall station would have a physical and visual impact assessed to be minor adverse, given the heritage fabric which contributes to its local listing in Wingecarribee LEP 2010 is largely retained.

The proposed stabling yard upgrade works are relatively minor in nature and do not impede the setting or visual prominence of the existing signal box, or the station, nor would they compromise the State significant historic, technical, rarity and representative values of the signal box or station.

Given the history and long occupation of the site, it is possible that significant features not previously recorded could exist within the station precinct and therefore be inadvertently uncovered during works. To manage such an unlikely event, Transport's *Unexpected Heritage Items Procedure* would be followed (Transport for NSW, 2022a).

Noise

Construction

Construction noise impacts would be mostly limited to standard working hours, however out-of-hours work would be required during about seven rail possession periods over the construction period. Out-of-hours work allows for work requiring track access to be carried out safely while also minimising traffic impacts. Night works would not occur over more than two consecutive nights, to provide respite to surrounding receivers.

Construction noise modelling was undertaken to determine the number of receivers where construction Noise Management Levels (NMLs) are likely to be exceeded during standard hours and night-time hours. Results show construction noise levels are predicted to exceed the NMLs during both standard hours and night-time hours for residential receivers for all assessed construction stages. The largest number of exceedances (based on a worst-case scenario) would occur during standard construction hours from construction of the permanent stabling yard site, and during night-time hours from the station entrance work. Given the number of NML exceedances, noise management measures and an effective communication plan would be developed during detailed design to minimise the impacts upon affected residential receivers.

Operation

The noise environment of the station is expected to remain largely unchanged during operation of the proposal.

The proposed upgrades to the stabling yard would not introduce new stabling activities at this location, however with the introduction of the New Regional Rail Fleet, a mobile train simulator would be located in the vicinity of the yard on an as needs basis. The horns on the new regional rail fleet would also be louder than the current fleet operated by NSW TrainLink.

Noise levels associated with stabling yard operations for both the existing train fleet and proposed new train fleet would frequently exceed the project operational noise trigger levels when the horns are sounded at the nearest receivers within all assessed noise catchment areas. The worst affected receivers from the stabling yard operation would be the residential receivers to the west of the stabling yard, along Lackey Road, Garrett Street, and Parkes Road. The 'horn testing' scenario was assessed to result in higher impacts than the 'horn warning' scenario assessed.

Noise modelling showed that the potential noise barrier would provide noise attenuation for most operational scenarios within the stabling yard. However, the results show the attenuation is generally limited to residential receivers to the west of the stabling yard and may increase noise levels at residential receivers to the east. The noise barrier would reduce noise impacts of the horn testing scenario but not to the extent to achieve compliance.

To mitigate operational noise, a hierarchical approach was considered with strategies including:

- controlling noise at the source - e.g. use of track lubrication, soft rail pads, etc.
- controlling noise in transmission - e.g. design and potential installation of the noise barrier. The design of the noise barrier would be investigated in greater detail in future design stages of the proposal to determine if it is feasible and reasonable to construct
- controlling noise at the receiver - e.g. an Operational Noise and Vibration Management Plan would be developed and implemented during detailed design of the proposal, including consideration of architectural treatments for affected receivers and installing Automatic Warning Systems and trainbased warning systems instead of horn use.

Mitigation measures are proposed and additional investigations would be carried out during detailed design.

Traffic and transport

Construction

The proposal would cause temporary disruptions to pedestrian access to the station as Argyle Street footbridge would be closed for the majority of the construction period. This would cause slight travel delays for passengers as they are re-routed to access the station via Dalys Way. Lift installation would improve pedestrian access as stairs would no longer be the only way to access the station. Access to the stabling yard would also be improved for staff, with a dedicated access driveway for ARTC and new walkways.

During rail possession periods, minor travel delays would be experienced for buses travelling on the surrounding road network to allow safe construction to occur. The proposal does not include changes to bus or rail services and would not impact these during operation. The proposal would improve accessibility and active transport to the station, which may increase rail patronage.

The proposal would generate an increase in traffic volumes along Argyle Street and Lackey Road which may contribute to local traffic delays for the duration of the construction period. A lane closure along Lackey Road would occur intermittently during the construction period to accommodate construction activities (including potential construction of the noise barrier), which would contribute to traffic delays.

There would be a temporary loss of commuter parking at the station forecourt on Dalys Way. Provision for a small number of accessible parking spaces and other parking spots would be maintained as well as space for the kiss

and ride drop-off area. The Lackey Road lane closure would also temporarily remove capacity of unmarked street parking which may contribute to an increased demand in street parking in the surrounding area during construction of the proposal. A Traffic Management Plan would be prepared to mitigate the impacts of construction traffic and parking where possible.

Operation

Once operational, the proposal would improve accessibility and pedestrian and cyclist features at the station. Accessibility upgrades including installation of the lifts, and upgrades to the footbridges, ramps/grades, footpaths, station buildings, platforms and interchange facilities, and new bicycle parking facilities would improve the user experience around the station. Accessibility at the stabling yard would also be improved, including installation of a new footpath areas and safer egress for rail staff.

The proposal is expected to increase demand by customers, and proposed upgrades to pathways and platforms have been designed to accommodate predicted customer volumes forecast.

The proposal would not impact the operation (service operation or timetabling) of public transport (buses, coach or rail services) in the vicinity of Moss Vale Station. The upgraded stabling area would accommodate and service the new regional intercity trains which would service the network and provide an improved experience for customers. The new trains would be fuelled by the new diesel exhaust fluid system (which would result in cleaner emissions).

Operation of the proposal would not generate additional traffic on the surrounding road network, except for the periodic mobilisation of the Mobile Train Simulator to the compound site via semi-trailer.

The formalisation of the commuter car park in the station forecourt would provide 22 car parking spaces in total (ten less than the current situation), including three accessible spaces and one loading space. The re-configured car park would also provide more adequate space for manoeuvring of coaches and buses. The current 'kiss and ride' feature would be retained. The overall loss of parking spaces in this car park would increase demand in the other commuter car parks and surrounding parking at times. However the parking provided is expected to be sufficient to service the demand at the station for the majority of the time, while accessibility would be improved from Dalys Way to the station.

A staff car park would also be constructed at the stabling yard with access from Lackey Road. The car park would provide four new parking spaces for rail staff. This would reduce demand for street parking in the vicinity where staff may currently park at times.

Urban design, landscape and visual amenity

Construction

Construction of the proposal would have visual impacts for several receivers, including passengers, nearby residents and people accessing the Moss Vale town centre. Construction activities would involve several visual elements, with the most prominent being construction of the three lifts, upgrade of the footbridges, upgrade work to the station entrances, traffic control (including a single lane closure along Lackey Road for intermittent periods) and potential installation of the noise barrier along the western side of the stabling yard. Construction work on the platform and station buildings would be difficult to see from outside the rail corridor and would primarily be viewed by users of the station/rail facilities.

The most sensitive visual receivers would be residents viewing changes from their homes. Views to the construction activity and ancillary facilities would be consistent with similar temporary construction work sites and activities at rail stations, and transitory until completion of the proposal. Vegetation screening and/or fencing would be installed within road verges and rail corridor edges.

Operation

Ten representative viewpoints have been assessed for the operational phase of the proposal. They represent a range of directions, distances and sensitive receivers within the proposal area. The assessment found views to

the station are mostly seen by visual receivers directly around the station, including those passing the station in vehicles and trains. The most visually prominent parts of the proposal include installation of three lifts, changes to the footbridges, removal of vegetation (47 trees would be removed), changes to the footpaths and station entrances, and potential installation of a noise barrier and changes to stabling yard infrastructure.

Overall, the visual impact to receivers has been assessed between low (neutral) to moderate (adverse) (views from Platform 1), with no viewpoints assessed as having a significant change in views (i.e. overall ratings of high to moderate or high). The proposed changes include an upgrade to an existing rail precinct with modern additions to the rail concourse (such as the lifts). These changes are considered appropriate given the benefit of the proposal in comparison to the low number of sensitive visual receivers that would see the changes. The design and materiality of the proposed elements would fit within the greater suite of architectural elements within the wider rail corridor.

The visual sensitivity of the receivers surrounding the station (particularly from the more sensitive residential receivers to the west of the rail corridor) to the operational elements of the proposal is generally low, given views are largely obscured by screening vegetation along the rail corridor edge and private residences.

While the upgrade of existing rail infrastructure would not result in a change to the landscape character of the nearby residential area, the addition of three larger structures (the lifts) would result in the modernisation of rail infrastructure within the rail corridor. This would result in a change in the existing suburban character of the station precinct, elements of which are heritage-listed.

Visual changes within the landscape surrounding the station (primarily the residential areas and town centre) vary between no changes to moderate, however, the sensitivity of these areas lies largely in the heritage setting of the local suburb. Changes to the road verge and station entrance within this context were considered to have a moderate impact.

Air quality

Construction

Construction has the potential to impact air quality through the generation of dust and emissions from construction plant and equipment, including particulate matter, carbon monoxide, sulfur dioxide, nitrous oxides, volatile organic compounds and other substances. However, the generation of exhaust emissions in the local area would be minor and short-term as only a limited number of plant, machinery and vehicles would be used in construction.

Operation

Operation of the proposal would not introduce any new sources of air emissions or result in a change in land use that might otherwise impact upon air quality. The introduction of Diesel Exhaust Fluid (or AdBlue) for use in the new trains would reduce air emissions compared to the current trains.

Justification and conclusion

This REF has been prepared regarding sections 5.5 and 5.7 of the EP&A Act, and section 171 of the EP&A Regulation, to ensure Transport takes into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the proposal.

Detailed design of the proposal would also be in accordance with the *NSW Sustainable Design Guidelines – Version 4.0* (Transport for NSW, 2020) considering the principles of ecologically sustainable development.

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.

Display of the review of environmental factors

This REF is on display for comment between Monday 20 November and Wednesday 20 December 2023. You can access the document in the following ways:

Internet

The documents are available as pdf files on the Transport for NSW website at transport.nsw.gov.au/mossvale and 'Have your say' website at haveyoursay.nsw.gov.au/moss-vale-station.

Printed copies

The documents can be viewed during open hours at the following locations:

- Wingecarribee Shire Council
Civic Centre
68 Elizabeth Street
Moss Vale NSW 2577
- Moss Vale Public Library
Civic Centre
68 Elizabeth Street
Moss Vale NSW 2577

Copies by request

Printed and electronic copies are available by contacting Transport for NSW on 1800 684 490 or emailing projects@transport.nsw.gov.au, noting that there may be a charge for hard copies or USB.

Staffed displays

The community is invited to drop-in to the Moss Vale Services Club on Monday 4 December 2023 anytime between 10am to 2pm.

Representatives from the project will be on-hand to answer your questions, provide you with more details or help you submit feedback.

How can I make a submission?

Comments about this proposal can be submitted via:

- the 'Have your say' website
- in person at the project community information session
- email: projects@transport.nsw.gov.au
- mail: Moss Vale Station and Stabling Yard Upgrade PO
Box 484, Wagga Wagga, NSW 2650
- telephone: 1800 684 490

Submissions must be received by 11:59pm on Wednesday 20 December 2023. Submissions will be managed in accordance with the [Transport for NSW Privacy Statement](#). A copy can be made available upon request.

What happens next?

Transport will gather and consider submissions received during public display of the REF.

After this consideration, Transport will determine if the proposal should proceed as proposed and will inform the community and stakeholders of this decision.

If the proposal is determined to proceed, Transport will continue to consult with the community and stakeholders prior to and during construction.

Table of contents

Acknowledgement of Country	2
Approval and authorisation	3
Executive summary	4
Table of contents.....	9
1. Introduction.....	15
1.1 Proposal identification.....	15
1.2 Location of the proposal.....	16
1.3 Existing infrastructure and land uses.....	20
1.4 Purpose of the report.....	26
2. Need and options considered	28
2.1 Strategic need for the proposal	28
2.2 Proposal objectives and design development	30
2.3 Alternative options considered	31
3. Description of the proposal	39
3.1 The proposal	39
3.2 Scope of work	40
3.3 Elements considered in design development.....	43
3.4 Construction activities	45
3.5 Ancillary facilities.....	50
3.6 Public utility adjustment.....	52
3.7 Property acquisition	52
3.8 Operation and maintenance.....	52
4. Statutory and planning framework	53
4.1 Commonwealth legislation	53
4.2 NSW legislation and regulations.....	53
4.3 Ecologically sustainable development.....	60
5. Consultation	61
5.1 Stakeholder consultation during concept design	61
5.2 Consultation requirements for Section 60 Application	61
5.3 SEPP (Transport and Infrastructure) consultation	62
5.4 Consultation strategy.....	63
5.5 Public display	63
5.6 Ongoing or future consultation	64

6.	Environmental assessment	65
6.1	Non-Aboriginal heritage	65
6.2	Noise and vibration	72
6.3	Traffic and transport	91
6.4	Urban design, landscape and visual amenity	97
6.5	Biodiversity	112
6.6	Hydrology and water quality	120
6.7	Contamination, landform, geology and soils	123
6.8	Aboriginal cultural heritage	130
6.9	Socio-economic	131
6.10	Climate resilience/sustainability	135
6.11	Air quality	140
6.12	Other impacts	142
6.13	Cumulative impacts	144
7.	Environmental management	148
7.1	Environmental management plans (or system)	148
7.2	List of mitigation measures	149
7.3	Licensing and approvals	173
8.	Conclusion	174
8.1	Justification	174
8.2	Objects of the EP&A Act	175
8.3	Conclusion	178
9.	Certification	180
10.	EP&A Regulation publication requirement	181
11.	References	182
	Terms and acronyms used in this REF	186
	Appendix A - Consideration of section 171(2) factors, section 171A factors and matters of national environmental significance and Commonwealth land	A
	Appendix B – Statutory consultation checklists	B
	Appendix C – Heritage Impact Assessment	C
	Appendix D – Noise and Vibration Impact Assessment	D
	Appendix E – Landscape Character and Visual Assessment Report	E

Appendix F – Arboricultural Impact Assessment Reports F

Tables

Table 2-1 Key NSW Government policies and strategies applicable to the proposal	28
Table 2-2 Moss Vale Station – alternative options considered	31
Table 3-1 Indicative construction staging for key activities	45
Table 3-2 Proposed property acquisition.....	52
Table 4-1 Other Commonwealth legislation applicable to the proposal	53
Table 4-2 Other legislation applicable to the proposal.....	54
Table 4-3 Relevant provisions of the Wingecarribee LEP.....	57
Table 5-1 Transport and Infrastructure SEPP consultation requirements.....	62
Table 6-1 Timeline of events (OCP Architects, 2020a).....	66
Table 6-2 Summary of the nature of the direct impacts.....	68
Table 6-3 Impacts to LEP listed heritage items	69
Table 6-4 Potential impacts to Moss Vale Railway Station and Yard Group and Moss Vale Railway Precinct (adapted from Aurecon 2021)	70
Table 6-5 Site specific non-Aboriginal cultural heritage mitigation measures.....	71
Table 6-6 Existing background (L _{A90}) and ambient (L _{Aeq}) noise levels	75
Table 6-7 Noise catchment areas and construction noise management levels.....	76
Table 6-8 Construction noise management levels – non-residential sensitive land uses.....	76
Table 6-9 Sleep disturbance criteria	77
Table 6-10 Project specific noise levels.....	78
Table 6-11 Number of residential receivers where noise levels may exceed NMLs during standard construction hours.....	79
Table 6-12 Number of residential receivers where noise levels may exceed NMLs during night- time work.....	79
Table 6-13 Number of non-residential receivers where noise levels may exceed NMLs when in use	80
Table 6-14 Number of residential receivers where noise levels exceed the sleep disturbance criteria	81
Table 6-15 Number of residential receivers where noise levels may exceed NMLs during standard hours due to cumulative construction noise	82
Table 6-16 Recommended safe working distances for vibration intensive plant.....	83
Table 6-17 Site specific noise and vibration mitigation measures.....	85
Table 6-18 Additional mitigation measures during construction.....	90
Table 6-19 Site specific traffic, transport and access mitigation measures	95

Table 6-20 Landscape character and visual impact grading matrix	97
Table 6-21 Representative viewpoints.....	98
Table 6-22 Summary of visual impact assessment ratings	101
Table 6-23 Summary of landscape character impact assessment ratings	107
Table 6-24 Site specific urban design, landscape and visual amenity mitigation measures.....	110
Table 6-25 Database search results with respect to key ecological sensitivities	115
Table 6-26 Site specific biodiversity mitigation measures	118
Table 6-27 Site specific hydrology and water quality mitigation measures.....	122
Table 6-28 Summary of Geological Units (Source: Aurecon, 2020)	123
Table 6-29 Summary of Geotechnical Investigation results (Source: Transport, 2022)	125
Table 6-30 Summary of Soil Landscapes (Source: Aurecon, 2020)	125
Table 6-31 Site specific contamination, landform, geology and soils mitigation measures	128
Table 6-32 Site specific Aboriginal cultural heritage mitigation measures	131
Table 6-33 Site specific socio-economic mitigation measures.....	134
Table 6-34 Long-term weather and climate averages (Moss Vale 2001-2023 (BOM, 2023)) ...	136
Table 6-35 NARClIM climate projections	137
Table 6-36 Medium inherent risk statements.....	138
Table 6-37 Site specific climate resilience mitigation measures.....	139
Table 6-38 Site specific Air quality mitigation measures	142
Table 6-39 Other potential impacts	142
Table 6-40 Site specific other impact mitigation measures	144
Table 6-41 Projects with the potential to contribute to cumulative impacts with the proposal	145
Table 7-1 Mitigation measures	149
Table 7-2 Summary of licensing and approvals required.....	173
Table 8-1 Objects of the Environmental Planning and Assessment Act 1979.....	175
Table 10-1 EP&A Regulation publication requirement	181

Figures

Figure 1-1 Regional context of the proposal.....	18
Figure 1-2 The proposal (subject to detailed design)	19
Figure 1-3 Site locality map	21
Figure 1-4 Moss Vale station entrance from Dalys Way	22
Figure 1-5 Station Platform 1.....	22
Figure 1-6 Station Platform 2.....	23
Figure 1-7 Station courtyard garden	23
Figure 1-8 Dalys Way commuter car park.....	24
Figure 1-9 Argyle Street footbridge stairs.....	24
Figure 1-10 Argyle Street footbridge (looking west).....	24
Figure 1-11 Ramp to Argyle Street footbridge.....	24
Figure 1-12 Diamond Jubilee Park and Fountain	25
Figure 1-13 Footbridge to Lackey Road (looking west from Dalys Way).....	25
Figure 1-14 Lackey Road footbridge (looking east).....	26
Figure 2-1 Option 1	34
Figure 2-2 Option 2	34
Figure 2-3 Option 3	35
Figure 2-4 Option 4.....	35
Figure 2-5 Mobile train simulator compound location options.....	38
Figure 3-1 Proposed construction ancillary facilities	51
Figure 4-1 LEP zoning map.....	59
Figure 6-1 Noise catchment areas	74
Figure 6-2 Landscape Character Zones within the study area (Source: AECOM, 2023).....	99
Figure 6-3 Representative viewpoints for visual impact assessment (Source: AECOM, 2023)	100
Figure 6-4 Viewpoint 3: Existing view from the park bench within Diamond Jubilee Park looking north west towards Moss Vale Station entry (Source: AECOM)	102
Figure 6-5 Viewpoint 3: View after proposal from the park bench within Diamond Jubilee Park looking north west toward Moss Vale Station entry (Source: AECOM)	102
Figure 6-6 Viewpoint 4: Existing view looking northeast from Platform 2 at Moss Vale Station (Source: AECOM)	102
Figure 6-7 Viewpoint 4: View after proposal looking north east from Platform 2 at Moss Vale Station (Source: AECOM)	103
Figure 6-8 Viewpoint 5: Existing view from Moss Vale Station looking north along Dalys Way (Source: AECOM)	103
Figure 6-9 Viewpoint 5: View after proposal from Moss Vale Station looking north along Dalys Way (Source: AECOM)	103

Figure 6-10 Viewpoint 8: The existing view from the intersection of Lackey Road and Garrett Street, looking north along Lackey Road towards the station entrance (Source: AECOM) 104

Figure 6-11 The view after proposal from the intersection of Lackey Road and Garrett Street, looking north along Lackey Road towards the station entrance (Source: AECOM) 104

Figure 6-12 The existing view from Lackey Road looking south-east toward the southern portion of the stabling yard (Source: AECOM)..... 104

Figure 6-13 Viewpoint 10: The view after proposal from Lackey Road looking south-east toward the southern portion of the stabling yard (Source: AECOM)..... 105

Figure 6-14 Example of articulation of the proposed noise barrier and planting along Lackey Road to reduce the visual prominence of the noise barrier and provide increased visual amenity within the residential streetscape 106

Figure 6-15 Vegetation on the track embankment looking south from the Lackey Road bridge 113

Figure 6-16 Vegetation on the track embankment looking north from the Lackey Road bridge 113

Figure 6-17 Vegetation next to Lackey Road looking south towards the platform buildings ... 114

Figure 6-18 Vegetation on the track embankment looking south from the pedestrian overbridge 114

Figure 6-19 Geotechnical investigation location map..... 124

1. Introduction

This chapter introduces the proposal and provides context for the environmental assessment. The objectives and proposal development history are detailed and the purpose of the report provided.

1.1 Proposal identification

Transport for NSW (Transport) 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 is the proponent for the Moss Vale Station and Stabling Yard upgrade (the 'proposal').

Transport proposes to upgrade aspects of Moss Vale Station and the nearby stabling yard. The upgrades are designed to improve access to the station, particularly for those with a disability, limited mobility, parents/carers with prams and customers with luggage, while also improving stabling capacity to accommodate the new Regional Rail fleet.

The proposal includes an initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure in line with the requirements of the Commonwealth *Disability Discrimination Act 1992* (DDA) and the *Disability Standards for Accessible Public Transport 2002* (DSAPT). In addition, the Moss Vale stabling yard is being upgraded as part of the Regional Rail Project, to stable the new regional fleet of trains replacing the ageing NSW regional fleet of XPT, Explorer and Endeavour trains. As part of this, a diesel exhaust fluid system would be installed, and a mobile train simulator would be used as a training tool to provide train crews initial and ongoing training requirements for the new train fleet. The Regional Rail Project is delivering new trains that would provide an enhanced experience for customers travelling across NSW and between Sydney, Canberra, Melbourne and Brisbane.

Key features of the proposal would include:

Moss Vale Station upgrade:

- upgrading the station's eastern access from Argyle Street, including:
 - installing two new lifts, one at each end of the existing footbridge
 - upgrading existing footbridge, stairs and walkway
 - upgrading accessibility to the existing bus stop and taxi drop-off near Diamond Jubilee Park
 - upgrading Argyle Street entrance including seating and signage, and improving accessible pedestrian pathway at the forecourt
- formalising parking within the station forecourt, including new accessible parking spaces, kiss-and-ride zone and bus/coach drop off
- adjusting some station doors, and ground levels at the station including resurfacing at Platform 2
- replacing existing unisex toilet with a family accessible bathroom
- installing tactile markers and boarding assistance zones on both platforms
- improving communications equipment, public address (PA) system, and security features/systems
- upgrading station power services, communications room, lighting and CCTV, line marking, landscaping, and adjustment to station ticketing facilities.
- upgrading the station's western access from Lackey Road, including:
 - installing a new lift providing access to the existing footbridge
 - upgrading existing footbridge and stairs including new handrails and decking

- upgrading footpath and installing new seating at the new lift entrance near Lackey Road
- installing a pedestrian crossing at Lackey Road and Dalys Way
- upgrading footpath accessibility at Dalys Way towards the station, including fencing, drainage, car parking and retaining wall.

Moss Vale Stabling Yard upgrade:

- upgrading the train stabling area to accommodate the new regional intercity trains, including track lengthening at the stabling yard and providing train clearances and buffer stops
- installing new walkways within the stabling yard and a dedicated access driveway for Australian Rail Track Corporation (ARTC)
- upgrading existing Lackey Road staff vehicle access area including entry and exit gates, and a new sealed car park
- building retaining walls
- installing noise treatments. Based on the recommendations of the noise assessment, operational noise treatment may include the installation of a noise barrier approximately 250 metres in length and up to 5.5 metres in height, along the western side of the stabling yard. The noise barrier is subject to further assessment and the final operational noise solution may include at-property treatments. Further discussion is provided in Section 6.2
- installing Combined Services Route (CSR) along the western side of the station and both sides of stabling yard
- installing provisioning services
- upgrading low voltage and shore power supply for existing and new equipment, including communications equipment
- relocating existing amenity blocks and storage container about 60 metres north to the new stabling yard access area
- carrying out ancillary work including utilities/services relocations, lighting, fencing and gates, and drainage
- building a temporary stabling yard for use during construction of the upgrades to the existing stabling yard
- installing a new diesel exhaust fluid system including 10,000-litre capacity self-bunded tank, to service the train fleet
- building elevated safety access platforms, new hose reels and water supply points for each set of trains
- Mobile train simulator compound
- building a permanent hardstand compound area with amenities to accommodate a mobile train simulator (MTS) that would periodically park in the area.

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

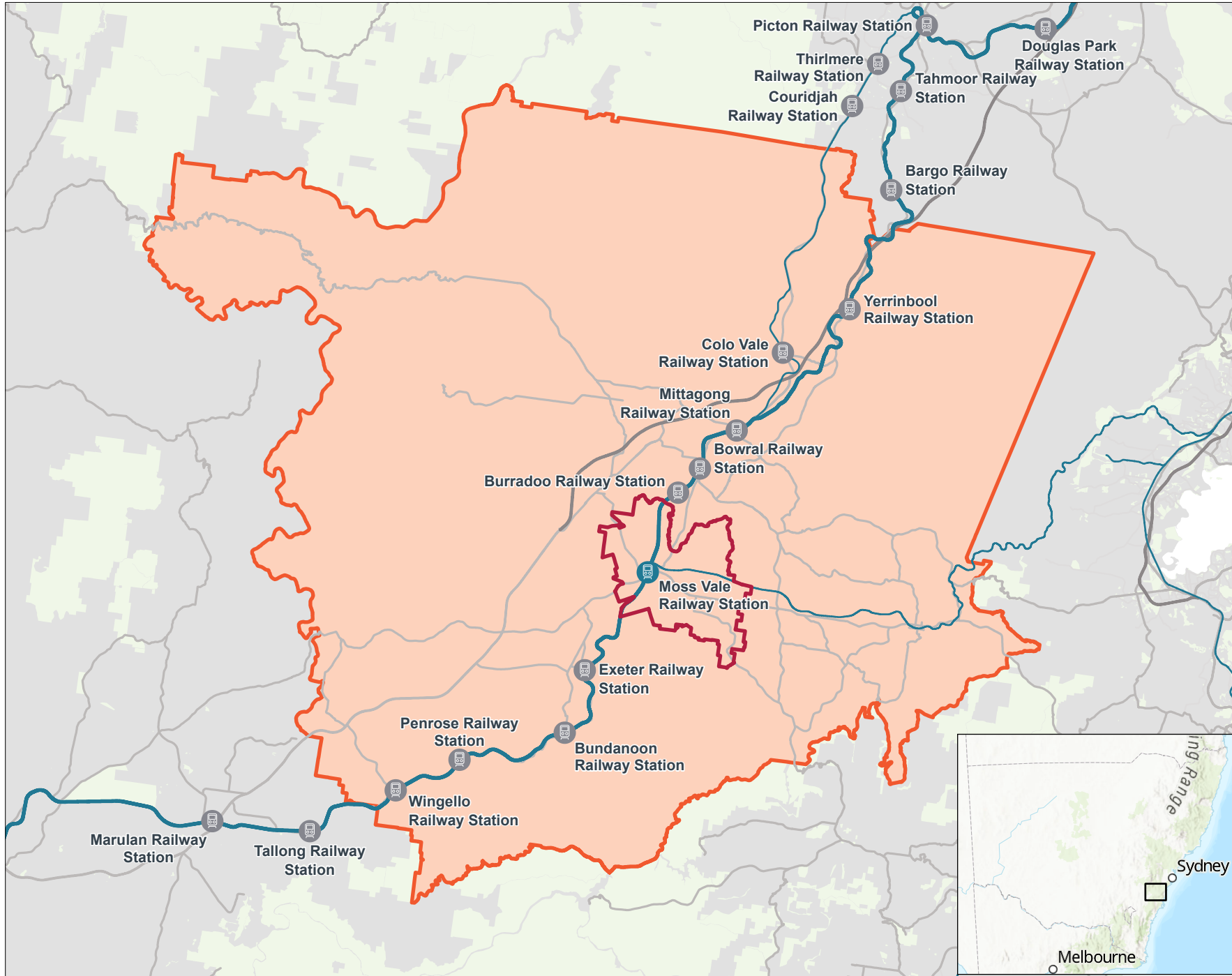
1.2 Location of the proposal

Moss Vale Station is located about 127 kilometres south of the Sydney Central Business District (CBD) in the suburb of Moss Vale, adjacent to Argyle Street, Lackey Road and Dalys Way. The station is located within the Wingecarribee Shire Local Government Area (LGA). The Moss Vale stabling yard is located within the rail corridor about 150 metres north of the station.

The proposal would be carried out on land owned by Transport as well as the NSW Government Transport Asset Holding Entity (TAHE) and Wingecarribee Shire Council.

The location of the proposal is shown in Figure 1-1 and an overview of the proposal is provided in Figure 1-2. Chapter 3 describes the proposal in more detail.

FIGURE 1-1:
REGIONAL CONTEXT



Legend

- Moss Vale Railway Station
- Other Railway Station
- Wingecarribee Shire Council
- Suburb of Moss Vale
- Railway
- Motorway
- Primary Road
- Secondary Road

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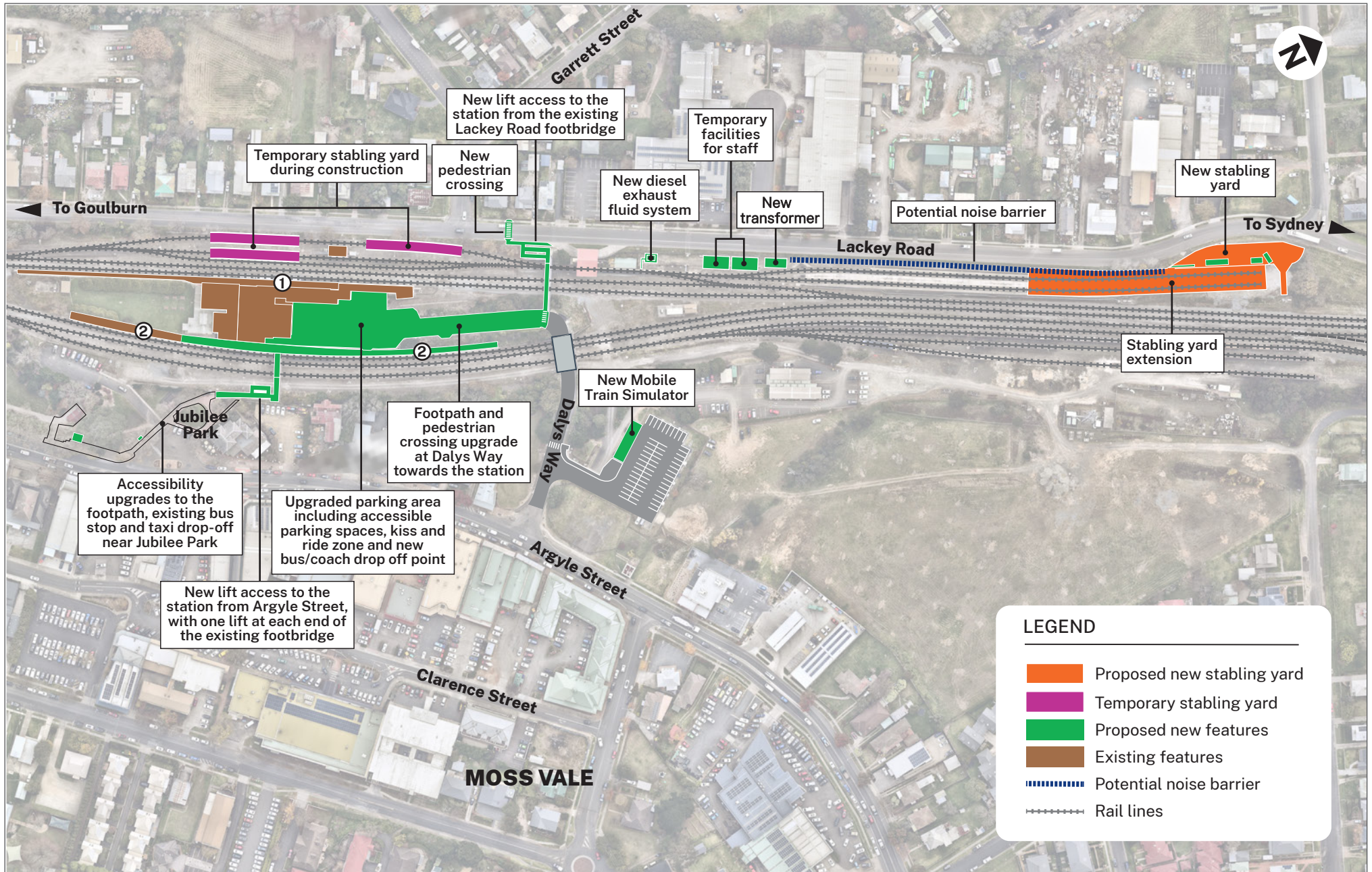


Figure 1-2 The proposal (subject to detailed design)

1.3 Existing infrastructure and land uses

1.3.1 Moss Vale Station and Stabling Yard

The island platform at Moss Vale Station is accessed via two pedestrian footbridges from Lackey Road and Argyle Street, with road access via Dalys Way to the station forecourt and parking area. The station is serviced by NSW TrainLink Southern Highlands Line, and NSW TrainLink Xplorer and XPT long-distance services from Sydney to Canberra, Griffith and Melbourne. The station is also serviced by a local and regional bus route. Interchange facilities include a taxi stand, commuter parking and informal kiss and ride interchange functions.

The station buildings include offices, ticket office and waiting room, public and staff amenities, communications room, and an emergency help point.

Moss Vale Stabling Yard is operated by NSW TrainLink and Sydney Trains, and currently stables up to six (two-car) Endeavour trains daily. Key services include decanting, potable water refilling, refuelling, coolant refilling, cleaning and other train preparation activities.

The 'Moss Vale Railway and Yard Group' is listed as a heritage item on the NSW State Heritage Register (#01200). The station is also subject to three listings on the Section 170 Heritage and Conservation Register (S170 Register):

- Moss Vale Railway Precinct – TAHE (former Railcorp)
- Moss Vale Railway Precinct – ARTC
- Moss Vale Rail Underbridge (Argyle Street) – ARTC.

The station is also listed as a heritage item under the Wingecarribee Local Environmental Plan 2010 (Wingecarribee LEP). Refer to Section 6.1 for further assessment of heritage associated with the station.

1.3.2 Land uses

The station and stabling yard are located within the existing rail corridor, which runs through the centre of Moss Vale. Moss Vale Station is bounded by Argyle Street to the east which is part of the Moss Vale town centre. Argyle Street has a range of mixed uses including commercial, retail, cafes, a post office and other services. Nearby parks, Leighton Gardens and the Diamond Jubilee Park and Fountain, are next to the station.

To the west of the station along Lackey Road, there is low to medium-density residential developments and light industrial development, as well as St Paul's Catholic Parish Primary School and St Paul's International College.

Further information on land use zoning is provided in Section 4.

The location of the proposal, including surrounding points of interest, is shown in Figure 1-3. Photographs of the existing station and surrounds are provided in Figure 1-4 to Figure 1-14.

FIGURE 1-3:
SITE LOCALITY



Legend

Proposal location

Railway station

Points of Interest

Diamond Jubilee Park and Fountain

Leighton Gardens

St Paul's Catholic Primary School

St Paul's International College

Moss Vale CBD

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Figure 1-4 Moss Vale station entrance from Dalys Way



Figure 1-5 Station Platform 1



Figure 1-6 Station Platform 2



Figure 1-7 Station courtyard garden



Figure 1-8 Dalys Way commuter car park

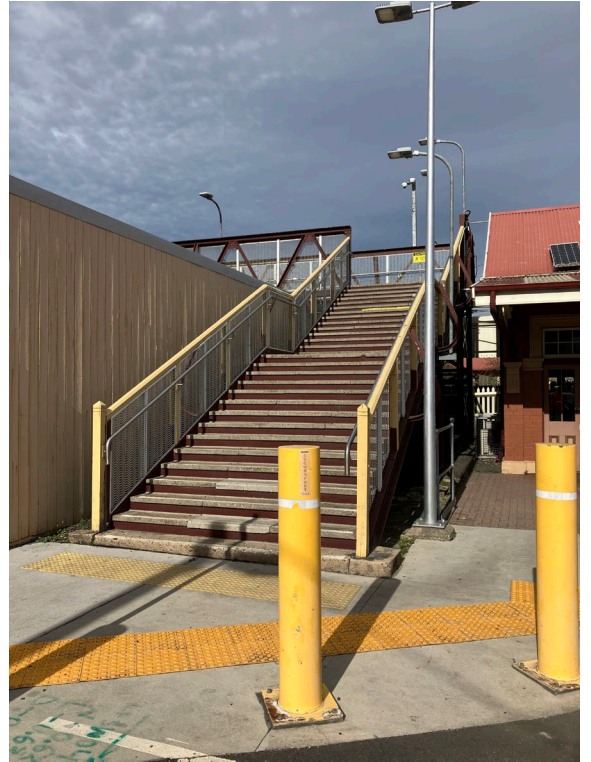


Figure 1-9 Argyle Street footbridge stairs



Figure 1-10 Argyle Street footbridge (looking west)



Figure 1-11 Ramp to Argyle Street footbridge



Figure 1-12 Diamond Jubilee Park and Fountain



Figure 1-13 Footbridge to Lackey Road (looking west from Dalys Way)



Figure 1-14 Lackey Road footbridge (looking east)

1.4 Purpose of the report

This review of environmental factors (REF) has been prepared by AECOM on behalf of Transport. For the purposes of these works, Transport is the proponent and determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979 (NSW)* (EP&A Act).

The purpose of the REF is to describe the proposal, to document the likely impacts of the proposal on the environment, and to detail mitigation measures to be implemented.

The description of the proposed work and assessment of associated environmental impacts has been undertaken in the context of Section 171 of the Environmental Planning and Assessment Regulation 2021, the factors in *Guidelines for Division 5.1 assessments, (DPE 2022)*, the *Biodiversity Conservation Act, 2016 (BC Act)*, the *Fisheries Management Act 1994 (FM Act)*, and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)* (EPBC Act).

In doing so, the REF helps to fulfil the requirements of:

- Section 5.5 of the EP&A Act including that Transport examine and take into account, to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- whether the proposal is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval sought from the Minister for Planning and Public Spaces under Division 5.2 of the EP&A Act
- the significance of any impact on threatened species as defined by the BC Act and/or FM Act, in section 1.7 of the EP&A Act and therefore the requirement for a Species Impact Statement or a Biodiversity Development Assessment Report

- the significance of any impact on nationally-listed biodiversity matters under the EPBC Act, including whether there is a real possibility that the activity may threaten long-term survival of these matters, and if offsets are required and able to be secured
- the potential for the proposal to significantly impact any other matters of national environmental significance or Commonwealth land and the need to make a referral to the Australian Department of Climate Change, Energy, the Environment and Water for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.

2. Need and options considered

This chapter describes the need for the proposal in terms of its strategic setting and operational requirements. It identifies the various options considered and the selection of the preferred option for the proposal.

2.1 Strategic need for the proposal

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

The proposed Moss Vale station upgrade, the subject of this REF, aims to achieve DSAPT compliance. This part of the proposal is designed to drive a stronger customer experience outcome to deliver seamless travel to and between modes, encourage greater public transport use and better integrate station interchanges with the role and function of town centres within the metropolitan area and developing urban centres in regional areas of NSW.

The proposed stabling yard upgrade, the subject of this REF, is part of the Regional Rail Project, which is replacing the ageing NSW regional train fleet of XPT, Xplorer and Endeavor trains.

2.1.1 Strategic planning framework

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 (Transport for NSW, 2022b)	<p>The <i>Future Transport Strategy</i> is an update of NSW’s <i>Future Transport 2056</i> and NSW’s Long Term <i>Transport Master Plan</i>. It is a suite of strategies and plans for transport to provide an integrated vision for the state.</p> <p>The Strategy works to deliver against three high level outcomes:</p> <ul style="list-style-type: none"> • connecting customers' whole lives • successful places for communities • enabling economic activity <p>The <i>Future Transport Strategy</i> identifies 14 strategic directions in response to these outcomes to guide transport investment in Greater Sydney. These include transport providing convenient access, supporting attractive places and providing 30-minute access for customers to their nearest centre by public transport.</p>	<p>The proposal aligns with the <i>Future Transport Strategy</i> by providing accessible services for people who find it difficult to access public transport services.</p> <p>New lifts and upgrades to access paths would provide a more physically accessible and safe network allowing greater choice for people with mobility constraints to access public transport. Greater accessibility would also mean better connections to places and opportunities for employment, education, business and recreation.</p> <p>The proposal would also allow an improved customer experience for passengers who travel from many NSW regional centres to Sydney as well as Canberra, Melbourne and Brisbane by providing a stabling facility at Moss Vale for the new Regional Rail fleet.</p>
NSW Disability Inclusion Action Plan (2021-2025) (NSW Government, 2021)	<p>The <i>NSW Disability Inclusion Action Plan 2021-2025</i> was developed by the NSW Government and seeks to provide actions to support making mainstream services and community facilities accessible for people with a disability.</p>	<p>The proposal has been developed with consideration of the objectives of this plan and seeks to improve and provide equitable access to Moss Vale Station.</p>

Policy / strategy	Overview	How the proposal aligns
	<p>The plan provides four focus areas for all of Government. Relating to public transport is Focus Area 2 which seeks to create liveable communities. This Focus Area actions an increase in the availability and accessibility of public and private transport options for people with disability</p>	<p>Transport’s next five-year <i>Disability Inclusion Action Plan 2023-2028</i> is currently being developed. The new plan will drive the way Transport embeds its policies, projects and day-to-day practices around disability inclusion and accessibility for customers, carers and employees.</p>
<p>Building Momentum – State Infrastructure Strategy 2018-2038 (Infrastructure NSW, 2018)</p>	<p>The <i>State Infrastructure Strategy 2018-2038</i> makes recommendations for each of NSW’s key infrastructure sectors including transport.</p> <p>The strategy sets out the government’s priorities for the period and combined with the Future Transport Strategy brings together infrastructure investment and land-use planning for NSW’s cities and regions.</p> <p>Public transport is viewed as critical to productivity, expanding employment opportunities by connecting people to jobs, and reducing congestion. It is vital that access to public transport is provided to support those with a disability.</p>	<p>The proposal is consistent with overall aims and objectives of the Future Transport Strategy to improve transport infrastructure across NSW.</p>
<p>Staying Ahead – State Infrastructure Strategy 2022 – 2042 (Infrastructure NSW, 2022)</p>	<p>The 2022-2042 version of the State Infrastructure Strategy sets out Infrastructure NSW’s independent advice to the NSW Government on the state’s needs and strategic priorities for infrastructure over the long-term. The strategy is framed around nine long-term objectives and makes 57 key recommendations to the NSW Government aimed at improving outcomes and living standards for the people of NSW.</p>	<p>The proposal is consistent with key objectives of the strategy to service growing communities and integrate infrastructure, land use and service planning. The proposal would improve access to public transport and facilitate the new regional train fleet, to connect people with jobs, services and communities.</p>
<p>Community Strategic Plan – Wingecarribee 2041 (Wingecarribee Shire Council, 2023a)</p>	<p>This Community Strategic Plan is designed to assist in shaping the future of the Wingecarribee Shire and respond to emerging challenges and opportunities, and delivering outcomes that benefit the whole community.</p>	<p>The proposal aligns with the Community Strategic Plan as one of its goals is to provide accessible, efficient and interconnected public transport systems and infrastructure within and out of the Shire. The proposal would directly contribute to this goal.</p>
<p>Town Centre Master Plan (Wingecarribee Shire Council, 2014)</p>	<p>This document endorses the current Wingecarribee LEP objectives for the Local Business Zones. Its key objectives are:</p> <ul style="list-style-type: none"> • protect and enhance the rural/urban feel through the enhancement of views and physical connection to the rural interface • provide an environment that retains a strong connection to the sense of place and identity established. 	<p>The proposal aligns with the Master Plan’s stated aim to improve accessibility and pedestrian access within and around Moss Vale.</p>

2.2 Proposal objectives and design development

2.2.1 Proposal objectives

The objectives of the proposal include the following:

- achieve 100 per cent DSAPT compliance of Moss Vale Station
- protect and enhance the heritage significance and character of Moss Vale Station
- encourage mode shift through improved pedestrian and cycling connectivity
- enhance connectivity between the station and Moss Vale Town Centre
- support the NSW Government COVID-19 Economic Stimulus Package
- support operational requirements of the new rolling stock.

2.2.2 Design development

Moss Vale Station upgrade

In 2019, an upgrade to Moss Vale Station was announced by the NSW Government as part of the NSW State Election Commitments. Although Moss Vale Station has ramps for wheelchair access, it requires accessibility upgrades to achieve DSAPT compliance.

Access is currently provided to Moss Vale Station via Dalys Way, Lackey Road footbridge and Argyle Street ramp/footbridge. There are no lifts from either side of the Station (Lackey Road or Argyle Street) at this time, limiting access for those with disabilities, limited mobility, prams or luggage to the station. The station and its surrounds have poor pedestrian connectivity due to road and rail infrastructure barriers which would particularly affect those with limited mobility.

Initial design options for improving access to Moss Vale Station and achieving DSAPT compliance were developed following workshops with a stakeholder working group that included representatives from Transport and the design team. These options for the station upgrade were assessed in a multi-criteria analysis (MCA) that included factors such as customer experience, accessibility, urban form and land use integration, transport integration, engineering constraints, facility operations and maintenance, heritage and environment. Following analysis, a number of options were selected for further consideration by the team. These options are described in Section 2.3.

Moss Vale Stabling Yard upgrade

The ageing NSW regional rail fleet of XPT, Xplorer and Endeavor trains are being replaced, to improve customer experience and ensure the new fleet is compliant with the latest Australian and international rolling stock standards and requirements. In 2019, Transport awarded a contract to Momentum Trains to design, build, and maintain a new Regional Rail fleet, to replace the existing regional fleet. The new trains will travel from many NSW regional centres to Sydney, Canberra, Melbourne, Brisbane and pass through Moss Vale Station. Transport conducted an initial investigation to identify modifications and upgrades needed across the rail network to accommodate the new fleet.

The Moss Vale stabling yard was identified as an area that would require work to facilitate the stabling of the new fleet, due to limitations of the existing stabling infrastructure and other constraints within the yard. Design options were identified to fulfill this need, and to find a location for the required mobile train simulator, which are described in Section 2.3.

2.3 Alternative options considered

2.3.1 Moss Vale Station options

Development and Evaluation of Options for Moss Vale Station

The process of developing and evaluating options proceeded in three distinct phases.

The first phase was the option development process – which drew on a Final Business Case Report prepared for Moss Vale Station (Transport for NSW, 2021a). This report identified two potential upgrade options to comply with DSAPT.

The second phase of development of options arose because of the limitation in the above two options solely focusing on DSAPT compliance. Accordingly, the project team developed four new options that would provide DSAPT compliance and place-making improvements at Moss Vale Station. The four options considered for the station upgrade are described in Table 2-2 and shown in Figure 2-1 to Figure 2-4. From these four options a preferred option was chosen.

The third phase was a value assessment/further optioneering of the preferred option which was based primarily on heritage considerations and documented in a Heritage Design Report. This is described further below.

Table 2-2 Moss Vale Station – alternative options considered

Option	Option features
Option 1 – Would provide the base scope (do minimum) accessibility upgrade at Moss Vale Station to achieve DSAPT compliance.	<ul style="list-style-type: none"> • upgrading the station and platform works • upgrading existing footbridge and walkway at Argyle Street and Lackey Road • upgrading Dalys Way footpath • resurfacing of the existing Lackey Road footbridge • installing one new lift from the Argyle Street footbridge down to the station forecourt on Platform 2 • installing one new lift at the Lackey Road footbridge • upgrading existing toilets • installing a new pedestrian crossing at Lackey Road.
Option 2 - In addition to the base scope, this option would provide accessibility upgrades and a new footbridge that provides a direct east-west connection through Moss Vale Station.	<ul style="list-style-type: none"> • creating two new gateways to and from Moss Vale Station by constructing a new footbridge connecting Argyle Street and Lackey Road via Moss Vale Station • installing two new lifts and ramps from the new footbridge to Platform 1 and Platform 2 and down to Lackey Road • constructing an at-grade pedestrian crossing of Lackey Road • upgrading the footpath on the opposite side of Lackey Road • improving pedestrian permeability and connectivity • integrating with the local context • maximising amenity of the public domain • protecting and enhancing heritage features and trees • providing lighting upgrades to maximise view opportunities.
Option 3 - In addition to the base scope, this option would provide improved east-west access by extending the eastern footbridge to Argyle Street and improving access from Lackey Road.	<ul style="list-style-type: none"> • extending the eastern side footbridge to Argyle Street through the Australia Post office car park • installing a new lift near Platform 1 within the station forecourt • constructing an at-grade pedestrian crossing Lackey Road • upgrading the footpath on the opposite side of Lackey Road • improving pedestrian permeability and connectivity • integrating with the local context

Option	Option features
	<ul style="list-style-type: none"> maximising amenity of the public domain protecting and enhancing heritage features and trees providing lighting upgrades to maximise view opportunities.
<p>Option 4 - In addition to the base scope, this option would provide improved east-west connectivity by repositioning the western footbridge at Lackey Road and constructing a new footpath on the rail corridor on the eastern side.</p>	<ul style="list-style-type: none"> constructing a new at-grade footpath inside the existing rail corridor with a lift to the existing Argyle Street footbridge repositioning a new footbridge on Lackey Road over the rail corridor with new stairs and landings constructing an at-grade pedestrian crossing on Lackey Road upgrading the footpath on the opposite side of Lackey Road improving pedestrian permeability and connectivity integrating with the local context maximising amenity of the public domain protecting and enhancing heritage features and trees providing lighting upgrades to maximise view opportunities.

A ‘do-nothing’ option was also considered whereby the existing station and its operation would remain the same. The NSW Government has identified the need for improving the accessibility of transport interchanges, train stations and commuter car parks across NSW. The ‘do nothing’ option was not considered a feasible alternative as it is inconsistent with NSW Government objectives, would not meet DSAPT requirements, and would not encourage the use of public transport or meet the needs of the Moss Vale community.

Analysis of options during Phase 2

A MCA was developed to guide and evaluate the four options during an Option Assessment workshop. The MCA found:

- Option 1 would not fully realise place-making and urban improvement opportunities
- Option 2 would change the visual characteristics of the station by constructing a new pedestrian footbridge across the station footprint. This option would provide two new gateways (a total of four) and would require property acquisition
- Option 3 would not change the station's characteristics; however, it would require property acquisition to construct an alternative gateway to Moss Vale Station through the Australia Post Office car park
- Option 4 would retain the characteristics of the station by repositioning the station upgrade works away from the station. Improvements at Diamond Jubilee Park would complement the heritage characteristics of Moss Vale Station and encourage visitation to the park.

Option 4 was selected as the preferred option as it would provide both DSAPT compliance and place-making improvements to Moss Vale Station.

Option 4 presented the highest score when considering factors such as customer experience; accessibility; urban form and land use integration; transport integration; engineering constraints; facility operations and maintenance; heritage and environment, as it would:

- improve east-west connectivity by constructing safe, easy access to and from the station and adjacent areas
- complement existing station architecture and local biodiversity
- activate the public spaces by integrating active transport, retail activities, public art and furniture into the design for the station upgrade
- protect and enhance heritage features of the station precinct and trees

- minimise negative visual impacts and reduce the divisive effect of the rail corridor, provide quicker and safer circulation and minimise mode conflict within the station precinct.

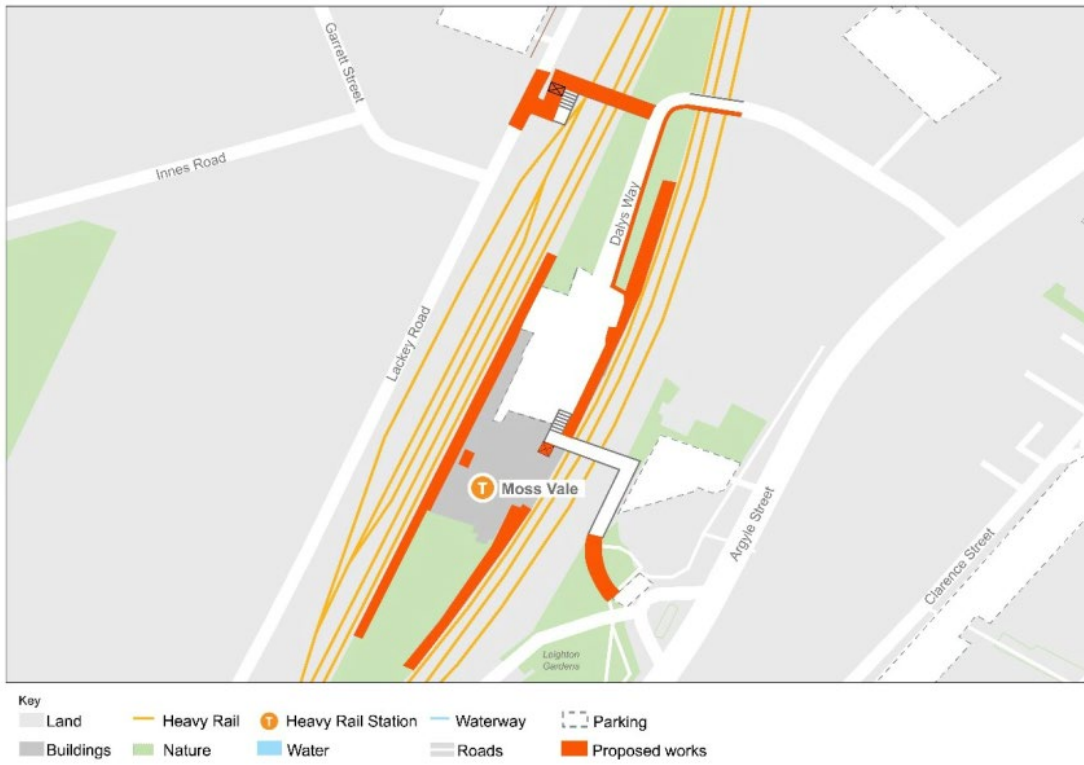


Figure 2-1 Option 1

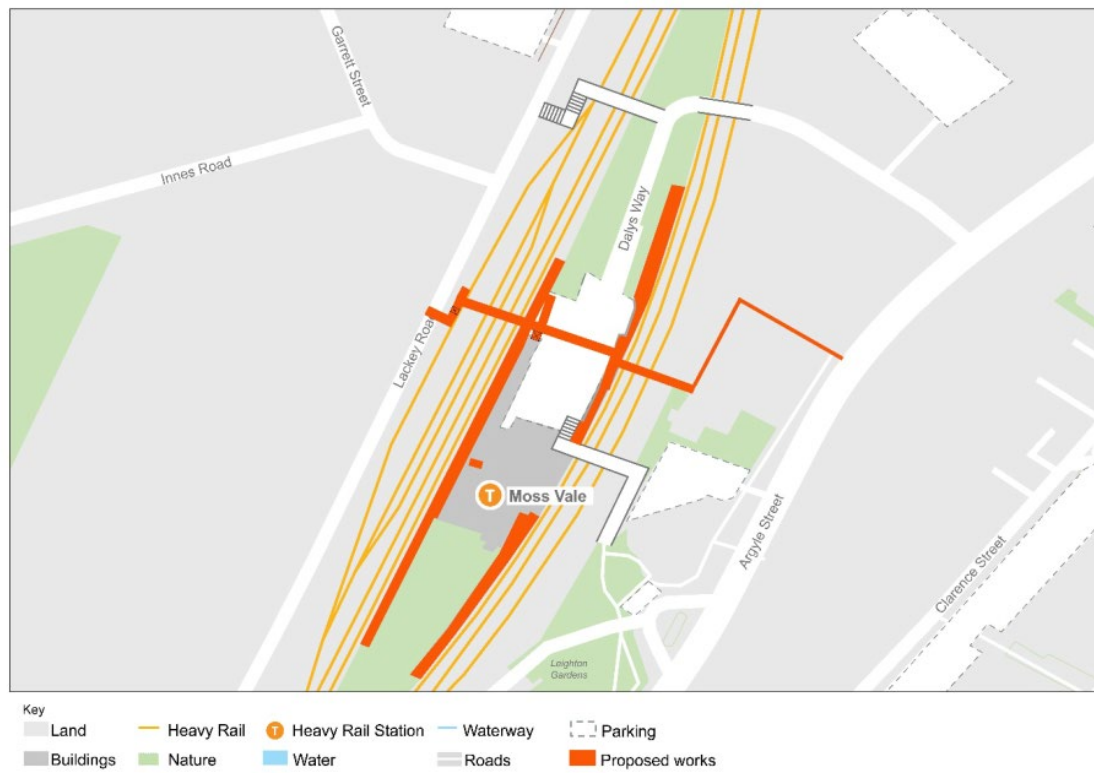


Figure 2-2 Option 2

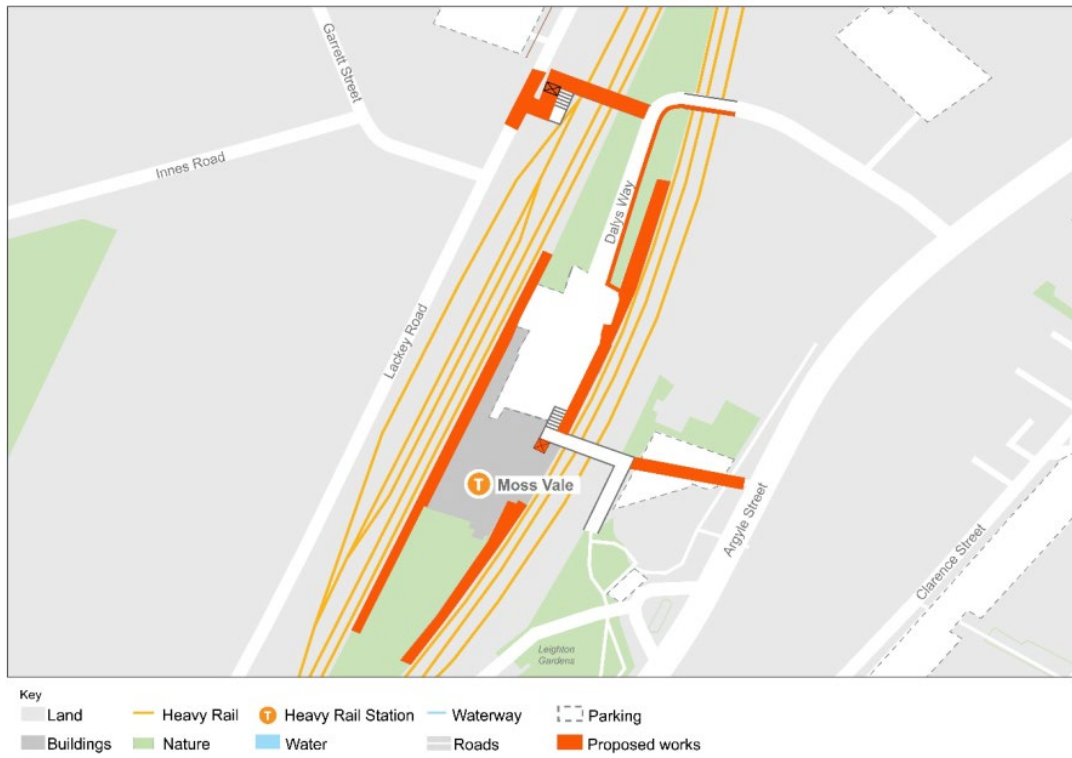


Figure 2-3 Option 3

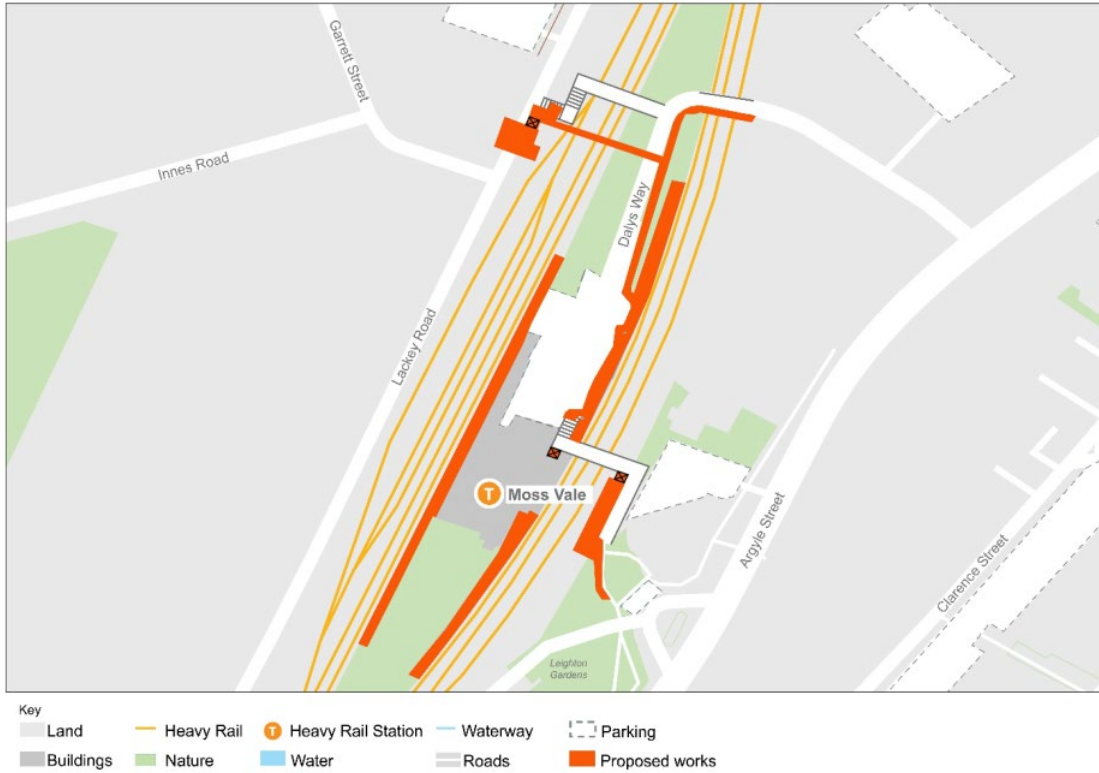


Figure 2-4 Option 4

Preferred Option

The third phase of developing and evaluating options for the station upgrade was to undertake a Value Assessment. Following the selection of a preferred base option (Option 4), further optioneering was then identified and assessed as part of the Heritage Design Report (HDR). These options were developed in consultation with a heritage consultant to address the proposal requirements of meeting accessibility and safety obligations, while considering potential impacts to the significance of heritage items. The specific areas for optioneering included:

- Argyle Street proposed lift, stairs and ramp – three options identified
- Station forecourt (Dalys Way), stairs, lifts and modification to footbridge (includes lift to courtyard) – 11 options identified
- Lackey Road lift and stair – two options identified
- materiality, colour and detailing for proposed lift in courtyard – five options identified
- Building A Station Services Equipment Room – two options identified
- Building A toilets including Family Accessible Toilet – three options identified.

Alternative options were generally discarded if they had a greater impact to the physical fabric and visual setting of the station.

The preferred option, known as the 'Value Managed Option' includes the following scope:

- DSAPT upgrades to Moss Vale Station and forecourt
- new footpath and lifts on the eastern side to Argyle Street footbridge
- upgrade pedestrian footpath on Dalys Way
- a new lift and stairs at the Lackey Road footbridge
- a grade pedestrian crossing on Lackey Road.

Elements of the Value Managed Option were further refined by the project team. Preferred design elements are discussed below, which were developed in light of the Heritage Design Recommendations detailed in the HDR (refer Appendix C).

The preferred design for the Argyle Street entrance would involve removing the existing non-compliant ramp to Argyle Street and replacing it with a light-weight ramp and balustrading over the existing footbridge section to achieve compliance. This was considered to be the most sympathetic to the existing footbridge as an element of moderate heritage significance would be retained. This was also considered to be best suited to the character, scale, form, siting, materials and colouring and detailing.

The preferred design for the platform entrance (from Argyle Street footbridge) was considered to be the most sympathetic in appearance as the location of the lift would be concealed within the centre of the station building. This positioning would minimise visual impacts from significant view corridors. The character of the station building would be retained as a whole and the addition of a lift would provide a new amenity to an under-utilised area. The proposed materials, colour and detail would reference the traditional appearance of the station.

The preferred design of the Lackey Road entrance would include installing panelling on the footbridge and handrail detailing to match the current panelling used.

The preferred design for the materials, colour and detailing would meet the requirements of referencing traditional materials. This would be achieved through the use of an overall steel frame within brick infill to the base of the lift shaft, and glass above the lift landing to provide a sense of transparency and reduced scale. Colour would be applied similar to that on the exterior of the station.

The preferred design for Dalys Way forecourt and car park would meet accessibility requirements and heritage conservation principles. This would successfully meet the proposal objectives as it would retain and interpret a like for like cobbled/crazing stone paving within the concourse (where required), salvage sandstone kerbing along the new alignment of the concourse and retain the memorial tree plantings. These elements would sympathetically address the heritage design of the station.

The preferred design for the station room upgrades would meet accessibility requirements whilst minimising heritage impacts, including being sympathetic to the existing character and design of the original rooms.

2.3.2 Stabling Yard options

Alternative options and 'do nothing' approach

There were limited design options identified for the stabling yard due to the constraints of the site, and physical requirements of the new train fleet. A combined value engineering and constructability workshop on the required design was undertaken, which identified the following options:

- Option 1: a curved extension of the existing track siding (a siding is a low speed track section separate from the through tracks) by the required new stabling length into an existing open area towards the north. The curved track extension would require the tracks to be extended outside of the existing Sydney Trains compound into ARTC leased land. The cleaning facilities/amenities would be relocated from the northern end of the stabling yard closer to the sidings for operational efficiency
- Option 2: straight extension of the existing track siding by realigning the existing curve and extending the new tracks straight towards the north by the required new stabling length. The straight track extension would require the tracks to be extended outside of the existing Sydney Trains compound into ARTC leased land. The cleaning facilities/amenities would be relocated from the northern end of the stabling yard closer to the sidings for operational efficiency.

Under a 'do-nothing' option, the configuration and operation of the existing stabling yard would remain unchanged. Without the proposed upgrade, the stabling yard would not provide adequate stabling to accommodate the new train fleet. This is not a viable option as a suitable stabling yard is required for the new train fleet to operate.

Preferred Option

Option 1 was chosen as the preferred option, as in addition to providing the required stabling track length and width for the new fleet, it would provide the necessary spatial clearances required to avoid impacting on the existing ARTC mainline signalling equipment.

2.3.3 Mobile Train Simulator (MTS) compound location options

Alternative options and 'do nothing' approach

As part of the Regional Rail Project, a compound for a MTS would be provided at Moss Vale Station for ongoing training for NSW TrainLink front-line staff. Three options were identified for the location of the proposed MTS compound, which are shown in Figure 2-5. All three options were located within or adjacent to the existing Moss Vale Station commuter car park off Dalys Way. A 'do nothing' option was also considered.



Figure 2-5 Mobile train simulator compound location options

Under the 'do nothing' option, the proposal would not see the benefit of locating an MTS onsite to train staff for the new regional fleet.

Preferred option

Transport held a stakeholder meeting with Sydney Trains, NSW TrainLink and Transport's Construction Contractor to determine which of the three location options would best meet operational requirements. Option C was selected as the preferred option for the MTS location (adjacent to the southern side of the commuter car park), based on feedback received from stakeholders and consideration of access requirements, utility/services locations, existing gradients, location of heritage items and heritage conservation areas.

3. Description of the proposal

This chapter describes the proposal, the design parameters including major design features, the construction method and associated infrastructure and activities.

3.1 The proposal

As described in Section 1.1, the proposal would involve an accessibility upgrade of Moss Vale Station, which would improve accessibility and amenities for customers. The proposal would also include an upgrade to the Moss Vale Stabling Yard as part of the Regional Rail Project, in order to accommodate a new fleet of trains and associated stabling and maintenance requirements.

The proposal would include the following key elements:

Moss Vale Station upgrade:

- upgrading the station's eastern access from Argyle Street, including:
 - installing two new lifts, one at each end of the existing footbridge
 - upgrading existing footbridge, stairs and walkway
 - upgrading accessibility to the existing bus stop and taxi drop-off near Diamond Jubilee Park
 - upgrading Argyle Street entrance including seating and signage, and improved accessible pedestrian pathway at the forecourt
- formalising parking within the station forecourt, including new accessible parking spaces, kiss-and-ride zone and bus/coach drop off
- adjusting some station doors, and ground levels at the station including resurfacing at Platform 2
- replacing existing unisex toilet with a family accessible bathroom
- installing tactile markers and boarding assistance zones on both platforms
- improving communications equipment, public address (PA) system, and security features/systems
- upgrading station power services, communications room, lighting and CCTV, line marking, landscaping, and adjustment to station ticketing facilities
- upgrading the station's western access from Lackey Road, including:
 - installing a new lift to provide access to the existing footbridge
 - upgrading existing footbridge and stairs including new handrails and decking
 - upgrading footpath and installing new seating at the new lift entrance near Lackey Road
 - installing a pedestrian crossing at Lackey Road and Dalys Way
 - upgrading footpath accessibility at Dalys Way towards the station, including fencing, drainage, car parking and retaining wall.

Moss Vale Stabling Yard upgrade:

- upgrading the train stabling area to accommodate the new regional intercity trains, including track lengthening at the stabling yard and providing train clearances and buffer stops
- installing new walkways within the stabling yard and a dedicated access driveway for ARTC
- upgrading the existing Lackey Road staff vehicle access area including entry and exit gates, and a new sealed car park
- building retaining walls

- installing noise treatments. Based on the recommendations of the noise assessment, operational noise treatment may include the installation of a noise barrier approximately 250 metres in length and 5.5 metres in height, along the western side of the stabling yard. The noise barrier is subject to further assessment and the final operational noise solution may include at-property treatments. Further discussion is provided in Section 6.2
- installing CSR along the western side of the station and both sides of stabling yard
- installing provisioning services
- upgrading low voltage and shore power supply for existing and new equipment, including communications equipment
- relocating existing amenity blocks and storage container about 60 metres north to the new stabling yard access area
- carrying out ancillary work including utilities/services relocations, lighting, fencing and gates, and drainage
- building a temporary stabling yard for use during construction of the upgrades to the existing stabling yard
- installing a new diesel exhaust fluid system including 10,000-litre capacity self-bunded tank, to service the train fleet
- building elevated safety access platforms, new hose reels and water supply points for each set of trains.

Mobile train simulator compound

- building a permanent hardstand compound area with amenities to accommodate a MTS that would periodically park in the area.

Key elements of the proposal are shown in Figure 1-2.

3.2 Scope of work

This section provides a more detailed explanation of the proposal.

3.2.1 Moss Vale Station upgrade

Further details of the proposed upgrades to Moss Vale Station to improve accessibility and customer experience are provided below:

- upgrading the station's eastern access from Argyle Street, including:
 - installing two new 17-person lifts at each end of the existing footbridge with lift landings, canopies and protection/safety screens (where required)
 - upgrading the existing footbridge and stairs, including re-grading to adjust the footbridge walkway height and ramp gradient
- upgrading the station's western access from Lackey Road, including:
 - installing a new lift to provide access to the existing footbridge
 - upgrading the existing footbridge including modification to existing stairs, and replacement of handrail and decking
- resurfacing of Platform 2, and installing tactile ground surface indicators (TGSIs) on both platforms including installing new boarding assistance zones
- ancillary work for the station upgrade – refer Section 3.2.3.

Station building modifications

Minor modifications would be required at Moss Vale Station. These modifications include:

- minor widening and upgrading of some station doors
- upgrading the ground levels of the offices, waiting room and ticket counter to comply with accessibility requirements
- reconfiguring the existing unisex toilet into a family accessible bathroom.

Station interchange facilities

As part of the station upgrade the following interchange upgrade work would be undertaken to improve connectivity within the station precinct:

- formalising the car parking and bus turnaround area within the station forecourt, including provision of new accessible parking spaces, kerb ramps, drop-and-go zone and coach drop off
- upgrading the interchange facilities on the eastern side of the station including:
 - upgrading accessibility of the existing bus stop and taxi drop-off near Diamond Jubilee Park
 - installing seating and signage, re-grading of pavement and upgrading the footpath at the entrance near Argyle Street.
- upgrading the interchange facilities on the western side of the station including:
 - installing pedestrian crossings across Lackey Road and Dalys Road
 - upgrading the footpath and new seating at the Lackey Road entrance
 - upgrading the footpath along Dalys Way leading to the station to provide compliant access, including modifications to fencing, drainage and installation of car parking and a retaining wall.

3.2.2 Stabling Yard upgrade

Further details of the proposed work to take place at the stabling yard are provided below:

- upgrading the train stabling area to accommodate the new regional intercity trains, including:
 - lengthening of track at the stabling yard by about 125 metres, and increasing the width of the track centres
 - provision of new buffer stops to stop trains at the end of the track
- providing new walkways at the stabling yard and adjacent to the existing signal box and fuelling station
- installing new fencing and gates at the stabling yard
- upgrading the existing staff vehicle access off Lackey Road including entry and exit gates and a new sealed car park within the stabling yard (for up to four car spaces)
- installing noise treatments, potentially including a noise barrier about 250 metres long and up to 5.5 metres high along the western side of the stabling yard. Further noise treatment analyses/assessments would be required and a final solution may include at-property noise treatments
- building retaining walls
- relocating the existing amenities blocks and storage container about 60 metres north to the new stabling yard access area
- installing new and upgraded drainage infrastructure
- building a temporary stabling yard adjacent to the station, to allow train maintenance activities to continue while the stabling yard upgrades are under construction, including:
 - installing temporary siding works including power supply, access pathways, site security, lighting and fencing

- installing a new Diesel Exhaust Fluid system, including:
 - 10,000 Litre containerised self-bunded tank on a concrete pad
 - two dispersing pumps, pipes and fittings
- installing elevated safety access platforms, new hose reels and water supply points for each set of trains
- installing a dedicated ARTC rail access driveway
- upgrading the power supply including provision of a new padmount transformer and shore supply
- ancillary work for the stabling yard upgrade – refer Section 3.2.3
- stabling of existing and new trains at the same time during the transition period.

Mobile train simulator compound

- building a permanent compound area next to the station to accommodate a MTS, which would be contained within a shipping container and mounted on a semi-trailer. The MTS will travel to various train stations in NSW including Moss Vale Station, typically staying for several weeks at a time. The establishment of the permanent compound would include:
 - establishing a new hardstand area
 - modifying the existing kerb and gutter and drainage
 - building a new retaining wall (maximum height of 1.4 metres) at the eastern side of the compound
 - installing a unisex toilet
 - installing new secure fencing and a footpath.

3.2.3 Ancillary work

Additional ancillary work within the station precinct and stabling yard would include:

- upgrading lighting and CCTV cameras
- relocating the station's existing communication room with new and existing communications equipment, installing a new public address (PA) system, audio frequency induction loop system (AFILS), Safety Performance Indicators (SPI) and other security features
- adjusting the station ticketing facilities, including relocating one Opal card reader
- installing new underground CSRs along the western side of the station and both sides of the stabling yard, including a new padmount and main switch board, and the installation and re-use of existing above ground Galvanised Steel Trough (GST) routes. The CSRs would provide:
 - power supply and communications services for the communications rooms, station main switchboard, lifts and other equipment
 - water sewerage and gas supply
 - stabling yard services including communication supply for existing and new equipment
- installing shore supply and low voltage power supply to the stabling yard for existing and new equipment, including communications equipment
- installing, relocating and protecting other services and utilities as required
- installing signage, including safety and wayfinding signage
- line marking to suit changed configurations of road and pedestrian accesses around the station precinct
- ancillary construction work including tree removal and trimming, and establishment of construction ancillary facilities/laydown areas

- landscaping.

3.2.4 Materials and finishes

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

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 would also be selected based on their suitability for meeting design requirements.

Each of the upgraded or new features would be constructed from a range of different materials, with a different palette for each architectural element. Subject to detailed design, materials that would be used for the most visible key features of the proposal include the following:

- lift shafts – concrete/brick lift shaft and steel frame
- lift doors – stainless steel
- lift sides – clear glass and steel
- lift roof and canopies – consistent or complementary with station roofing
- platform re-surfacing – concrete
- footbridge decking and footpaths – concrete
- station doors – timber and steel/glass
- potential noise barrier – concrete and structural steel
- car park / forecourt - asphalt.

The design would be submitted to Transport's Design Review Panel for comment before being accepted. An Urban Design, Landscaping and Public Domain Report would also be prepared by the Contractor, prior to finalisation of detailed design for endorsement by Transport.

3.3 Elements considered in design development

3.3.1 Engineering constraints

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

Existing structures: the placement and integrity of existing structures were considered during the development of the design. These structures included the platforms, station building, footbridge, stairs and existing elements within the station precinct with heritage value.

Sydney Trains' requirements: modifications to existing structures and new structures within the rail corridor must be designed and constructed with consideration of train impact loads, specifications of new trains to be stabled, structural clearances to the track, and safe working provisions. A temporary train stabling location would also be required to allow for construction to take place at the new stabling yard.

Utilities: existing services/utilities in the area to be designed around or if required identified to be adjusted or replaced.

Heritage: the proposal would have heritage impacts to the heritage items within the proposal area. Efforts to minimise potential heritage impacts have been considered during the design development for the proposal. Potential impacts to non-Indigenous heritage are assessed in Section 6.1.

Public access during construction: customer access to the station is required to be maintained throughout the construction period, except during scheduled rail possession periods when train services will not be operating.

3.3.2 Design standards

The proposal design has been developed with regard to the standards listed below.

Moss Vale Station

- DSAPT 2002 (issued under the Commonwealth *Disability Discrimination Act 1992*)
- National Construction Code
- relevant Transport Standards, Technical Notes, Technical Directions and Quality Assurance specifications
- relevant Australian Standards
- Transport for NSW Asset Management Branch standards
- Sydney Trains standards
- *NSW Sustainable Design Guidelines – Version 4.0* (Transport for NSW, 2020)
- *Guidelines for the Development of Public Transport Interchange Facilities* (NSW Ministry of Transport, 2008)
- Crime Prevention Through Environmental Design (CPTED) principles
- other Transport policies and guidelines
- Council standards where relevant.

Moss Vale Stabling Yard

- *Design Guidelines for the Upgrade and Construction of New and Existing Stabling Yards and Turnback Sidings* (RailCorp, 2006)
- relevant Transport Standards, Technical Notes, Technical Directions and QA specifications
- relevant Australian Standards
- Asset Management Branch standards
- *AGPT02-17 – Austroads Guide to Pavement Technology Part 2 Pavement and Structural Design* (Austroads, 2019)
- *ARTC STD – T0144 – Standard Rail Maintenance Access Road* (Aurecon, 2022).

3.3.3 Sustainability in design

The Transport *Environment and Sustainability Policy* (Transport for NSW, 2020a) committed to delivering transport which contributes to economic prosperity and social inclusion in an environmentally responsible and sustainable manner, consistent with the *Future Transport Strategy* (Transport for NSW, 2022b).

To meet this commitment, Transport has developed the *Sustainable Design Guidelines* (SDG) (Transport for NSW, 2020) as a mechanism to introduce and embed sustainability initiatives into all stages of transport infrastructure projects, including design, to improve the sustainability performance of transport infrastructure. The aims of the SDGs are:

- minimising impacts on the environment, whether through transport operations, infrastructure delivery or maintenance
- procuring, delivering and promoting sustainable transport options that achieve value for money and reduced life cycle costs, and
- developing, expanding and managing the transport network that is sustainable and climate resilient.

These guidelines have been reviewed and incorporated into the concept design where relevant and feasible.

3.4 Construction activities

3.4.1 Work methodology

Subject to approval, construction of the proposal is expected to commence in early 2024 and be completed in late 2025. The construction methodology would be further developed during the detailed design of the proposal by the nominated Contractor in consultation with Transport.

The proposed construction stages and 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 during detailed design. The staging is also dependent on the Contractor’s preferred methodology, program and sequencing of work.

Table 3-1 Indicative construction staging for key activities

Stage	Activities
Site establishment and enabling work (applicable to all work areas in the proposal area)	<ul style="list-style-type: none"> • implement traffic control • mobilise vehicles and machinery to site • carry out survey investigations including examining geophysical, hydrological and contamination conditions • carry out dilapidation surveys identifying and recording the condition and location of buildings, structures and services (including investigation of the crane location) • establish temporary fencing and other temporary features as required in work areas (e.g. temporary noise barriers, pedestrian diversions, signage, hoarding, scaffolding, formwork, establish crane and piling pads, temporary toilets, etc.) • install temporary erosion and sediment controls and fence off ‘no-go’ areas • establish ancillary facilities (e.g. erect fencing, site office/s, amenity blocks, temporary parking areas and plant/material storage areas) • carry out tree/vegetation removal and trimming • temporarily relocate utilities.
Building and platform works	<ul style="list-style-type: none"> • remove bins, seats and footings • install new drainage infrastructure • resurface Platform 2 • install new station furniture, line marking and wayfinding signage • strip out and relocate existing communications room, update room access, repaint and refloor.
Argyle Street entrance	<ul style="list-style-type: none"> • remove concrete footpath, pavements and existing stairs • install lift shafts, lifts and landings • carry out modifications to footbridge, stairs and ramp • construct drainage infrastructure • install street furniture, bus stop upgrades, signage and line marking.
Forecourt / interchange	<ul style="list-style-type: none"> • remove footpath and pavement • excavate areas of the forecourt • upgrade drainage infrastructure • install new kerb, footpath, line markings and street furniture.
Communication equipment and services	<ul style="list-style-type: none"> • install new communication services including communications equipment and cabling, CCTV, emergency help points, ticketing facilities and lighting • install mechanical services including the lifts and air conditioning

Stage	Activities
	<ul style="list-style-type: none"> • install the hearing loop and water fountain • install tactile markers and provide line markings.
Lackey Road entrance	<ul style="list-style-type: none"> • demolish exiting stairs, concrete and fencing • install lift shaft, lift and landing • carry out modifications to footbridge • construct new footpath and pedestrian crossing • line mark and install signage and tactile markers • install new rail boundary fencing • install drainage infrastructure and street furniture.
Dalys Way works	<ul style="list-style-type: none"> • install pedestrian crossing, modify footpath, ramps and fencing • carry out asphalt and kerb works.
Remaining buildings and platform works	<ul style="list-style-type: none"> • reconfigure bathroom to family accessible bathroom • upgrade ticketing room including the waiting room.
Temporary stabling yard provisions	<ul style="list-style-type: none"> • install temporary siding works including power supply, access pathways, site security and fencing • install temporary maintenance facilities • relocate and/or protect existing services • install temporary noise mitigation barrier (if required) • disconnect and remove redundant services.
Permanent Stabling Yard construction works	<ul style="list-style-type: none"> • extend storage and service roads • relocate stabling yard facilities buildings • construct stabling yard access roads, car park and footpaths • carry out CSR works • potentially install noise barrier • install diesel exhaust fluid system • complete drainage and stormwater works • install elevated safety access platforms • install MTS.
Stabling Yard services	<ul style="list-style-type: none"> • install electrical services including lighting • provide power supply • relocate services • install hydraulic services including water and sewerage supply • install wayfinding and legislation signage • install tactile markers • install fencing and security systems • carry out earthing and bonding.
Landscaping and other finishing works	<ul style="list-style-type: none"> • carry out landscaping (install new trees and plants, reinstate garden beds, etc.) • install signage • carry out line marking.
Demobilisation, testing and commissioning	<ul style="list-style-type: none"> • dismantle site compound/hoarding areas • test electrical, communications and signalling components.

3.4.2 Construction workforce

It is anticipated that a peak workforce of up to 46 workers per day would be required for station works and 36 workers at the stabling yard.

3.4.3 Construction traffic

During construction of the proposal, it is anticipated that 30 light vehicles and two heavy vehicles would service the station construction footprint and 15 light vehicles and 10 heavy vehicles at the stabling yard.

3.4.4 Construction hours and duration

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

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

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

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

- Platform 2 re-surfacing and installation of tactiles on both platforms
- lift shaft installation (using crane lifts)
- footbridge work including decking replacement
- footpath and paving works
- upgrades to station rooms
- electrical and communication services upgrades
- track drainage and sewerage upgrades
- painting, repairs and other structural upgrades.

Some out of hours work may also be scheduled outside rail possession periods. This may include the following:

- works which do not cause noise emissions more than 5dB(A) higher than the rating background level (RBL) at any nearby residential property and/or other noise sensitive receivers
- the delivery of plant, equipment and materials required outside these hours as requested by police or other authorities for safety reasons and with suitable notification to the community as agreed by Transport's Director of Environment and Sustainability (DES)
- emergency work to avoid the loss of lives, property and/or to prevent environmental harm
- any other work as agreed by the DES and considered essential to the proposal.

Approval from Transport would be required for any out of hours work and the affected community would be notified as outlined in Transport's *Construction Noise and Vibration Guideline* (public transport infrastructure) (Transport for NSW, 2023a) (refer to Section 6.2 of this REF for further details).

3.4.5 Plant and equipment

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

- asphalt paver

- asphalt truck
- boring rig
- concrete pump
- concrete trucks
- crane truck
- drill rig
- excavators
- franna crane
- hand tools
- heavy vehicles
- hi- rail crane
- kerb machine
- light vehicles
- mobile elevating work platform
- chainsaw
- mulcher
- paver
- road sweeper
- roller
- semi-trailers
- skid steer
- slew crane
- sucker truck.

3.4.6 Earthworks

Excavations and earthworks would be required for the following:

- foundations and pits for the new lift shafts and lifts, which would require excavation to depths of about 4.5 metres
- foundations for new stairs, which would require excavation to depths of 0.6 metres
- installation of concrete pads/hardstand, roadways, car park, footpaths and paved areas
- installation of CSRs including:
 - trenching along the southern side of the existing fuel point at the stabling yard for about 175 metres in length, 0.5 metres in width and up to 3 metre depths
 - trenching along the new tracks and parking bays proposed in the stabling yard, for varying lengths, 0.5 metres in width and ranging from about 0.5 to 2 metre depths
 - installation of other utilities/services and drainage
- potential installation of the noise barrier, which may require piles up to 7.5 metres in depth
- installation of retaining walls and fencing
- landscaping, signage, lighting, etc.

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

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

The proposal is expected to require excavation of a total of approximately 1625 cubic metres of material (i.e. 125 cubic metres from the station upgrade and 1500 cubic metres from the stabling yard upgrade) from the locations of the above listed features, which would be re-used onsite where possible (e.g. where backfill is required and material is uncontaminated), or managed and disposed of in accordance with relevant legislative requirements (e.g. for contaminated material). Refer to Section 6.12 for further information on spoil and waste management. The detailed design would confirm the volume of materials excavated to accommodate the lift pits and foundations, and other ancillary work.

Any fill material that is suspected of being potentially contaminated would be sampled and treated and/or disposed of in accordance with relevant legislative requirements.

3.4.7 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 *NSW Sustainable Design Guidelines – Version 4.0* (Transport for NSW, 2020). Materials would be sourced from local suppliers where practicable. Reuse of existing and recycled materials would be undertaken where practicable.

3.4.8 Traffic management and access

Traffic and transport impacts associated with the proposal are assessed in Section 6.3 of this REF. The potential traffic and access changes expected during the construction of the proposal include:

- temporary impacts to public parking availability including:
 - temporary removal of the majority of parking in the station forecourt on Dalys Way for the full duration of construction at the station. Provision for accessible parking spaces, buses and a small number of parking spots would be maintained for station / train staff during construction
 - temporary removal of parking at Diamond Jubilee Park off Argyle Street (south of Post Office/café) consisting of four, one-hour time limited parking spaces, for the full duration of construction at the station
- temporary disruptions to the existing pedestrian accesses surrounding the station, (particularly during construction work for the lifts, footbridge and footpaths from Argyle Street), requiring diversion routes for the majority of the construction period at the station
- closure of the Argyle Street footbridge for the majority of the construction period
- potentially higher level of platform congestion arising from restricted access to certain areas when under construction
- minor increases in traffic volumes on the local road network associated with construction vehicle movements. Construction traffic volumes expected would include:
 - about 30 light vehicles and two heavy vehicles for the station upgrade
 - about 15 light vehicles and 10 heavy vehicles for the stabling yard upgrade
- single lane closure along Lackey Road adjacent the station intermittently over a period of about 40 weeks during construction in this area, with automated stop-go signals operating at either end of the open lane.
- minor traffic control along Lackey Road when upgrading boundary fencing and potentially installing a noise barrier at the stabling yard.

Construction of the proposal would not impact regular train services including the Southern Cross, Southern Highland and South Coast train services.

Once constructed, the existing commuter parking in the station forecourt on Dalys Way would be reconfigured to provide 22 parking spaces (eight less than the existing spaces), including three accessible parking spaces and one loading space.

3.5 Ancillary facilities

Four temporary ancillary facilities would be required to accommodate a site office, amenities, laydown and storage area for materials. The ancillary facilities and associated access roads are shown in Figure 3-1. The areas nominated for the ancillary facilities are on land owned by Transport, subject to ARTC lease, TAHE and within the road reserve on land under the care, control and management of Wingecarribee Shire Council as the roads authority. Impacts associated with utilising these areas have been considered in the environmental impact assessment (Chapter 6 of this REF). These areas would be reinstated once construction is complete.

**FIGURE 3-1:
CONSTRUCTION
ANCILLARY FACILITIES**



Legend

- Railway station
- Proposal location
- Construction footprint
- Ancillary facility

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3.6 Public utility adjustment

The proposal has been designed to avoid relocation of services where feasible, however further investigation may be required. In addition to the CSRs proposed to service the station and stabling yard, it is likely other existing public services may require relocation, including electricity and drainage infrastructure. However, service relocation is unlikely to occur outside of the proposal area described in this REF. If work would be required outside of the proposal area, further assessment would be undertaken. The appropriate utility providers would be consulted during the detailed design phase.

3.7 Property acquisition

The proposal would require the temporary leasing of land and partial acquisition of land, as shown in Table 3-2. Transport would obtain temporary licenses from ARTC and obtain an agreement with TAHE in order to temporarily lease land from TAHE.

Based on the concept design and subject to negotiations in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW), the partial acquisition of land within the Lackey Road-road reserve would be required for the stabling yard.

The need for property acquisition would be further refined during detailed design.

Table 3-2 Proposed property acquisition

Description	Total area (square metres)	Acquisition type	Current owner	Lot and DP	Land use zone (LEP)
Lackey Road reserve Purpose: Initially to accommodate temporary Site Compound for siding extension for Stabling yard Permanent: Installation of elevated safety access platform and move track extension east due to ARTC signals cable	834	Partial Acquisition	Council	Lackey Road – Road Reserve	Local Road (SP2)

3.8 Operation and maintenance

Upon completion, the station’s accessibility would be improved and key elements of the station would be compliant with DSAPT, including interchange facilities. The station would be subject to existing maintenance procedures currently in place, which would be updated to include the new features (e.g. lift servicing and cleaning).

Operation at the stabling yard would involve regular stabling and maintenance of up to six (three car) new regional intercity trains, with a new diesel exhaust fluid system to be integrated into the existing refuelling infrastructure.

The MTS would be brought to Moss Vale Station and would be parked in the new compound area for a period of several weeks at a time while training activities are undertaken.

The majority of structures constructed under this proposal would be maintained by Sydney Trains and ARTC. However, footpaths and adjacent garden/landscape areas would continue to be maintained by Wingecarribee Shire Council as per existing arrangements. The operation and maintenance activities of the upgraded station and stabling yard components are subject to further discussions with Sydney Trains, ARTC, NSW TrainLink, Transport and Wingecarribee Shire Council.

4. Statutory and planning framework

This chapter provides the statutory and planning framework for the proposal and considers the provisions of relevant state environmental planning policies, local environmental plans and other legislation.

4.1 Commonwealth legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

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

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
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>	There is an obligation on a person who discovers anything which he or she has reasonable grounds to suspect are Aboriginal remains to report that discovery to the Minister, giving particulars of the remains and their location. The proposal does not include any previously identified Aboriginal sites and/or places (refer Section 6.8); however, considerations for unexpected finds further detailed in mitigation measures and applies to this Act.
<i>Disability Discrimination Act 1992 (DDA)</i>	This Act aims to eliminate as far as possible, discrimination against persons on the ground of disability in areas including access to premises and the provision of facilities, services and land. The proposal has been designed having regard to the requirements of this Act, and the DSAPT which were formulated under this Act. The key objective of the proposal is to improve the accessibility of Moss Vale Station which is consistent with the objectives of this Act.
<i>Native Title Act 1983</i>	This Act aims to provide for the recognition and protection of Native Title, how Native Title land is used and establishes a mechanism for determining claims to Native Title. A search of the National Native Title Tribunal database showed that there are no pending or approved Native Title claims over the land subject to the proposal.

4.2 NSW legislation and regulations

4.2.1 Transport Administration Act 1988

The *Transport Administration Act 1988* establishes Transport 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 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, which do not require development consent under Part 4 of the Act.

In accordance with section 5.5 of the EP&A Act, Transport, 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.

Section 171 of the *Environmental Planning and Assessment Regulation 2021* (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 section 171 and Appendix A specifically responds to the factors for consideration under section 171.

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

Provision description	Relevance to the Proposal
<i>Biodiversity Conservation Act 2016</i> (BC Act) (NSW)	A biodiversity assessment was undertaken for the proposal which is provided in Section 6.5. The proposal is unlikely to result in a significant impact to threatened species or ecological communities or their habitats listed under the BC Act.

Provision description	Relevance to the Proposal
<i>Biosecurity Act 2015</i> (NSW)	Clause 22 states that 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 are identified (refer to Section 6.5).
<i>Contaminated Land Management Act 1997</i> (CLM Act) (NSW)	Section 60 of the CLM Act imposes a duty on landowners to notify the Department of Planning and Environment (DPE), and potentially investigate and remediate land if contamination is above EPA guideline levels. The site has not been declared under the CLM Act as being significantly contaminated. (refer Section 6.7). Previous soil sampling undertaken within the proposal area indicated the presence of some contaminants (e.g. hydrocarbons, heavy metals), however it is not expected that any large-scale remediation (Category 1) work would be required as part of the proposal. Further soil sampling would be undertaken for the proposal to confirm the treatment and disposal options required for excavated soil, and notification under the CLM Act would be undertaken if required.
<i>Crown Lands Act 1987</i> (NSW)	The proposal does not involve work on any Crown land.
<i>Disability Inclusion Act 2014</i> (NSW)	The <i>Disability Inclusion Act 2014</i> requires all government departments to develop Disability Inclusion Action Plans. Transport's <i>Disability Inclusion Action Plan</i> (DIAP) 2018-2022 (and 2023 update to the plan under preparation) outlines practical measures to be taken across Transport to meet the objectives and principles of the Act. The proposal has been developed with consideration of the objectives of this plan and seeks to improve and provide equitable access to Moss Vale Station.
<i>Heritage Act 1977</i> (Heritage Act) (NSW)	The <i>Heritage Act 1977</i> contains provisions for the following approvals: <ul style="list-style-type: none"> Sections 57 and 60 (approval) where items listed on the State Heritage Register are to be impacted Sections 139 and 140 (permit) where relics are likely to be exposed Section 170 where items listed on a government agency Heritage and Conservation Register are to be impacted. <p>The proposal would result in impacts to the 'Moss Vale Railway and Yard Group' listed on the State Heritage Register, as well as listings under the Section 170 Heritage and Conservation Register (held by TAHE and ARTC). A Section 60 approval would therefore be required for the proposal to proceed.</p> <p>A Section 60 approval issued previously in relation to the stabling yard would also require modification.</p> <p>Non-Aboriginal heritage impacts are assessed in Section 6.1.</p>
<i>National Parks and Wildlife Act 1974</i> (NPW Act) (NSW)	Sections 86, 87 and 90 of the NPW Act require consent from DPE for the destruction or damage of Indigenous objects. The proposal is unlikely to disturb any Indigenous objects (refer Section 6.8). However, if unexpected archaeological items or items of Indigenous heritage significance are discovered during the construction of the proposal, all work would cease and appropriate advice sought.
<i>Protection of the Environment Operations Act 1997</i> (PoEO Act) (NSW)	The proposal does not involve a 'scheduled activity' under Schedule 1 of the PoEO Act. Accordingly, an environment protection licence is not required for the proposal. However, in accordance with Part 5.7 of the PoEO Act, Transport 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.
<i>Roads Act 1993</i> (NSW)	Section 138 of the <i>Roads Act 1993</i> 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 Act states that public authorities do not require consent for work on unclassified roads. The proposal would involve work on Lackey Road and Dalys Way (including minor excavation and lane closures) which are classified as local roads. A Road Occupancy Licence (ROL) would be obtained for road work and temporary lane closures required. Traffic and transport impacts are assessed in Section 6.3.
<i>Sydney Water Act 1994</i> (NSW)	The proposal would not involve discharge of wastewater to the sewer.

Provision description	Relevance to the Proposal
<i>Waste Avoidance and Resource Recovery Act 2001</i> (WARR Act) (NSW)	Transport would carry out the proposal having regard to the requirements of the WARR Act. A site-specific Waste Management Plan would be prepared as part of the CEMP.
<i>Water Management Act 2000</i> (NSW)	The proposal would not involve any water use (from a natural source e.g. aquifer, river – only from the network), water management work, drainage or flood work, controlled activities or aquifer interference, which would otherwise require an approval under clauses 89, 90 and 91 of the Act.

4.2.4 State Environmental Planning Policies

State Environmental Planning Policy (Transport and Infrastructure) 2021

The *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport and 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.

Chapter 2 (Infrastructure) of the Transport and Infrastructure SEPP aims to facilitate the effective delivery of infrastructure across the State.

Clause 2.92 of the Transport & 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 2.91 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
- b) signalling, train control, communication and security systems
- c) power supply (including overhead power supply) systems’
- 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...’
- g) facilities for the assembly, maintenance and stabling of rolling stock
- (i) refuelling depots, garages, maintenance facilities and storage facilities that are for the purposes of a railway.

Consequently, development consent is not required for the proposal which is classified under railway and railway infrastructure facilities, and the proposal is therefore subject to the provisions of Division 5.1 of the EP&A Act.

Part 2.2, Division 1 of the Transport and 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 5.3 of this REF discusses the consultation undertaken under the requirements of the Transport and Infrastructure SEPP.

The Transport and Infrastructure SEPP prevails over all other environmental planning instruments except where there is an inconsistency with Precincts SEPPs or certain provisions of *State Environmental Planning Policy (Resilience and Hazards) 2021*. The *State Environmental Planning Policy (Resilience and Hazards) 2021* is considered below, and the proposal does not require consideration under the Precincts SEPPs.

State Environmental Planning Policy (Resilience and Hazards) 2021

State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) 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 Resilience and Hazards SEPP have been considered in the preparation of this REF.

Section 6.7 of this REF contains an assessment of the potential contamination impacts of the proposal. Previous soil sampling undertaken within the proposal area indicated the presence of some contaminants (e.g. hydrocarbons, heavy metals), however it is not expected that any large-scale remediation (Category 1) work would be required as part of the proposal. Further soil sampling would be undertaken for the proposal to confirm the treatment and disposal options required for excavated soil.

4.2.5 Local Environmental Plans

Wingecarribee Local Environmental Plan 2010

The proposal is located within the Wingecarribee Shire LGA. The Transport and Infrastructure SEPP prevails over all other environmental planning instruments (such as LEPs) except where there is an inconsistency with *State Environmental Planning Policy (Precincts) 2021* or certain provisions of *State Environmental Planning Policy (Resilience and Hazards) 2021*. During the preparation of this REF, the provisions of Wingecarribee Local Environmental Plan were considered (refer Table 4-3).

Table 4-3 Relevant provisions of the Wingecarribee LEP

Provision description	Relevance to the proposal
<p>Clause 2.3 – Zone objectives and Land Use Table</p>	<p>The land use zoning of the proposal area and surrounds is shown on Figure 4-1. The majority of the proposal area is located on land zoned as SP2 Infrastructure. The proposal is consistent with the objectives of the SP2 infrastructure zoning as it would provide for infrastructure uses associated with the existing railway and would have a scale and character that is compatible with the landscape setting and built form of the surrounding development.</p> <p>Portions of the proposal area are also located within the following zones:</p> <ul style="list-style-type: none"> • R2 Low Density Residential: proposed to be used for a temporary construction ancillary facility in the northern portion of the proposal area. This temporary use would not affect the ongoing use of this land in accordance with the objectives of the R2 zone in the future. • E3 Productivity support: proposed footprint of the MTS, proposed pedestrian crossing and kerb upgrade on Lackey Road, and temporary construction ancillary facility off Argyle Street (near the MTS footprint). • The MTS is adjacent to the station’s commuter car park, however may represent a new use for this land. The upgrade across Lackey Road is consistent with the existing use (road and pedestrian facilities). The temporary ancillary facility would not affect future use of this land in accordance with the objectives of the E3 zone in future. • E4 General industrial: proposed for works on the boundary of the stabling yard (e.g. fencing). This is consistent with the existing use. • E1 Local Centre and RE1 Public Recreation: proposed interchange upgrade work at Argyle Street entrance (e.g. footpath and bus stop upgrade), which is consistent with the existing features and use of this land. <p>Development consent is not required for the proposal for the use of these zones by virtue of the permissibility provisions of the Transport and Infrastructure SEPP (refer Section 4.2.4).</p>

Provision description	Relevance to the proposal
<p>Clause 5.10 – Heritage Conservation</p>	<p>Clause 5.10 of the Wingecarribee LEP aims to conserve the environmental heritage within the LGA. There are two heritage items listed under the LEP within the proposal area:</p> <ul style="list-style-type: none"> • Moss Vale Railway Station (Item number I244) • Argyle Street North Conservation Area (Item number C1836). <p>A Statement of Heritage Impact (SoHI) has been prepared as part of this REF which considers the impact the proposal would have on these heritage listings.</p> <p>There are no Aboriginal heritage records within the proposal area.</p> <p>Potential impacts to Aboriginal and non-Aboriginal heritage are assessed in Section 6.8 and Section 6.1.</p>



FIGURE 4-1:
LAND USE ZONING
SURROUNDING THE
PROPOSAL



Legend

- Proposal location
- T Railway station

Land Zoning

- E1 - Local Centre
- E3 - Productivity Support
- E4 - General Industrial
- MU1 - Mixed Use
- R2 - Low Density Residential
- R3 - Medium Density Residential
- RE1 - Public Recreation
- RE2 - Private Recreation
- SP2 - Infrastructure

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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 section 193 of 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 throughout the development and assessment of the proposal. Section 3.3 summarises how ESD would be incorporated in the design development of the proposal and Section 8.2.1 discusses how ESD principles have been applied to the proposal. Section 6.10 addresses climate change and sustainability, Section 7.2 lists mitigation measures to incorporate ESD principles into the construction phase of the proposal.

5. Consultation

This chapter discusses the consultation undertaken to date for the proposal and the consultation proposed for the future.

5.1 Stakeholder consultation during concept design

In May and June 2021, consultation was undertaken with the local community and stakeholders for the station upgrade. Transport customers, key stakeholder groups and community members were initially asked to provide feedback on early design options for the station upgrade as well as their experience in using all modes of travel across the broader transport network. Key stakeholders consulted included Sydney Trains, ARTC, Regional Rail, Heritage NSW, Premier Illawarra Buses, Wingecarribee Shire Council, NSW TrainLink and divisions within Transport.

The following consultation activities were carried out as part of this engagement:

- community group and stakeholder meetings
- placement of project consultation signage at the Moss Vale Station and town centre
- distribution of 6,550 postcards to residents in Moss Vale with an invitation to have their say
- radio and newspaper advertisements with a call to action for residents to have their say
- webpage with project information including FAQs and link to online interactive mapping tool and surveys
- community infoline number and email address
- individual meetings/presentations with key stakeholder, disability, heritage and community groups.

Throughout the consultation period, there were three online surveys and two interactive mapping tools that were used to help encourage feedback. The three surveys targeted shoppers, transport users, business owners.

A total of 274 responses were received over a four-week feedback period through the various consultation channels used. Community feedback showed a high level of support for improving accessibility at Moss Vale Station, through the installation of lifts at both Argyle Street and Lackey Road entry points. A large number of comments also expressed support for improvements to pedestrian access from Dalys Way car park and station-specific facilities. The feedback received from the community also included requests to maintain the station's heritage features, to explore opportunities to improve the availability of parking, including long-term parking for transport customers, and for additional lighting and wayfinding signage in and around the station.

The feedback was provided to the project team for consideration and to help inform the development of the proposal design.

5.2 Consultation requirements for Section 60 Application

The public display of the REF also covers the requirement of Section 61 of *the NSW Heritage Act 1977* (Heritage Act) for 'public notice of certain applications' in the event that works would 'materially affect the significance' of a NSW State Heritage Register place, if approved. Provision is made under Section 61(1A) of the Heritage Act to avoid duplication of public displays of projects where that project is also exhibited under the EP&A Act.

This only applies where the Section 60 application is made at the same time as the REF public display and they are substantially the same. Any submissions relating to heritage would be provided to the Heritage Council of NSW prior to its determination of the Section 60 application, for consideration.

5.3 SEPP (Transport and Infrastructure) consultation

Part 2, Division 1 of SEPP Transport and Infrastructure contains provisions for public authorities to consult with local Councils and other public authorities prior to the commencement of certain types of development. Section 2.10 to 2.15 of SEPP Transport and Infrastructure 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 Transport and Infrastructure SEPP for the proposal. A checklist of the consultation requirements under the Transport and Infrastructure SEPP is provided in Appendix B.

Table 5-1 Transport and Infrastructure SEPP consultation requirements

Section	Section particulars	Relevance to the proposal
Section 2.10 Consultation with Councils – development with impacts on council related infrastructure and services	<p>Consultation is required where the proposal would result in:</p> <ul style="list-style-type: none"> substantial impact on stormwater management services generate 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. 	<p>The proposal would result in:</p> <ul style="list-style-type: none"> connection to a council sewerage system disruption to pedestrian and vehicle movements (e.g. along Lackey Road and Dalys Way). <p>Consultation with Wingecarribee Shire Council has been undertaken during the development of the proposal design. Council would also be notified in accordance with this section of the Transport and Infrastructure SEPP.</p>
Section 2.11 Consultation with Councils – development with impacts on local heritage	<p>Where railway station work would:</p> <ul style="list-style-type: none"> substantially impact a local heritage item (if not also a State heritage item) substantially impact on a heritage conservation area. 	<p>Moss Vale Railway Station is listed as a heritage item under the Wingecarribee LEP (Item number I244) and is also a State listed heritage item. However, the curtilage for the LEP listing extends north beyond the curtilage for the State heritage listing. As such, notification to Wingecarribee Shire Council would be undertaken.</p> <p>The proposal is also within the Argyle Street North Conservation Area (Item number C1836) listed under the Wingecarribee LEP, however would not substantially impact this area. Refer to Section 6.1 for further information on heritage impacts.</p>
Section 2.12 Consultation with Councils – development with impacts on flood liable land	<p>Where railway station work would:</p> <ul style="list-style-type: none"> impact on land that is susceptible to flooding – reference would be made to <i>Floodplain Development Manual: the management of flood liable land</i>. 	<p>The proposal is not located on land that is susceptible to flooding. Accordingly, consultation with Council is not required. Refer to Section 6.6 for further information.</p>
Section 2.13 Consultation with State Emergency Service – development with impacts on flood liable land	<p>Where railway station work would:</p> <ul style="list-style-type: none"> impact on flood liable land -written notice must be given (together with a scope of work) to the State Emergency Services and take into consideration any response to the notice received from the State Emergency Service within 21 days after the notice is given. 	<p>The proposal is not located on land that has been identified as prone to flooding. Accordingly, consultation with State Emergency Services is not required. Refer to Section 6.6.</p>

Section	Section particulars	Relevance to the proposal
Section 2.14 Consultation with Councils – development with impacts on certain land within the coastal zone	Where railway station work would: <ul style="list-style-type: none"> impact on land within a coastal vulnerability area and is inconsistent with a certified coastal management program that applies to that land. 	Moss Vale Station is not located on land that is within a coastal vulnerability area and therefore this clause does not apply. Accordingly, consultation with Council is not required.
Section 2.15 Consultation with public authorities other than Councils	For <i>specified development</i> which includes consultation with the NSW DPE for development that is undertaken adjacent to land reserved under the NPW Act 1974, and other agencies specified by the Transport and Infrastructure SEPP where relevant.	The proposal does not include specified development as defined, and does not trigger any of the consultation requirements under this clause. Although not a specific requirement under the Transport and Infrastructure SEPP, other agencies Transport would consult with would include: <ul style="list-style-type: none"> Sydney Trains ARTC Regional Rail NSW TrainLink Wingecarribee Shire Council Heritage NSW.

5.4 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 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 community sentiment towards the potential installation of a noise barrier
- 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.

5.5 Public display

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

- public display of the REF on the project webpage, local council office and public library
- installation of project signage at Moss Vale Station directing customers to the project webpage

- distribution of a community notification with details of the proposal to invite the local community to provide feedback on the REF
- advertisement of the REF public display in local newspapers with information on how to provide feedback.

The display period of the REF would be advertised in the week that the public display commences. The REF would be displayed for a period of approximately four weeks.

The REF would be placed on public display at the Wingecarribee Shire Council office (68 Elizabeth Street, Moss Vale). Moss Vale Public Library (68 Elizabeth Street, Moss Vale), as well as the Transport website at transport.nsw.gov.au/mossvale. Information on the proposal would be available through the Project Infoline (1800 684 490) or by [email](#).

5.6 Ongoing or future consultation

At the conclusion of the public display period for this REF, Transport would acknowledge receipt of feedback from each respondent. The issues raised by the respondents would be considered by Transport before determining whether to proceed with the proposal.

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

Should Transport 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 Plan to be developed prior to the commencement of construction.

6. Environmental assessment

This section of the REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. All aspects of the environment, potentially impacted upon by the proposal, are considered. This includes consideration of:

- potential impacts on matters of national environmental significance under the EPBC Act.
- the factors specified in the *Guideline for Division 5.1 Assessments* (DPE 2022) and as required under section 171 of the *Environmental Planning and Assessment Regulation 2021*. The factors specified in section 171 of the *Environmental Planning and Assessment Regulation 2021* are also considered in Appendix A.

Site-specific mitigation measures are provided to mitigate the identified potential impacts.

6.1 Non-Aboriginal heritage

Two Statement of Heritage Impact (SoHI) reports have been prepared for the proposal area:

- Moss Vale Station and Stabling Yard Upgrade: SoHI prepared by AECOM (AECOM, 2023a) to identify the heritage values of Moss Vale Station and assess the impact of the proposal on these heritage values
- Regional Rail Enabling Works – Moss Vale Stabling Upgrade SoHI (Aurecon, 2021) which assessed the likely impacts of the Regional Rail enabling works project on historical heritage within the northern yards of the Moss Vale Station precinct extending to the south past the signal box to the western side of Moss Vale Station.

The SOHIs are provided in Appendix C.

6.1.1 Methodology

The SOHI prepared by AECOM as part of this REF was undertaken in accordance with the Heritage NSW *Guidelines for Preparing Statements of Heritage Impact* (Heritage NSW, 2023). The methodology included:

- desktop searches of relevant heritage registers
- review of design drawings and project descriptions provided by Transport
- review of the following key documents:
 - Moss Vale Railway Station Precinct Conservation Management Plan, Volumes 1-3 (OCP Architects, 2020a), hereafter referred to as the 'CMP'
 - Moss Vale Station, Heritage Design Report (GML Heritage Pty Ltd, 2023) (Appendix A of Appendix C of this REF)
 - previous reports and other relevant documentation provided by Transport
- a site inspection carried out on 19 July 2023 by AECOM staff.

6.1.2 Existing Environment

Moss Vale Station

Historical context

Plans for a railway line through the Moss Vale district can be traced to as early as August 1846 but it was not until 1860 that definite plans were made to extend the Great Southern Line to Picton, with an extension to Goulburn. Moss Vale Station was built in the early 1860s and was originally known as Sutton Forrest Station. The station originally consisted of one platform, a platform building and a shed. Moss Vale Station has been subject

to a number of modifications since its opening in 1867. A summary of significant events associated with Moss Vale Station is provided in Table 6-1.

Table 6-1 Timeline of events (OCP Architects, 2020a)

Date	Event
1866	Construction of rail line
1867	First platform, platform building and shed constructed; station opened as "Sutton Forest"
1889	Alterations to platform building and additions to the south, including Governor's Waiting Room
1890	Work commences on Refreshment Room Building; Carriage shed for State car erected
1914	New down platform constructed
1915	Footbridges to Lackey Road and Booking Office constructed; courtyard formed
1916	Footbridges to Argyle Street constructed
1919-1927	Refreshment Room Building extended east
1927	Additional two storey accommodation wing added to Refreshment Room building and building extended east
1992	Remodelling of courtyard
2013	New station car park constructed over the site of the former barracks (outside heritage listed curtilage)
2014	Remediation works to Lackey Road footbridge undertaken.

The station was built to a standard Georgian-influenced design, the features of which included a rectangular shape, symmetrical plan, attached pavilions with lower roofs at both ends and a hipped roof of uncluttered appearance and posted awnings.

Today, Moss Vale Station has an island platform with two sides. There are three street entrances to Moss Vale Station. The principal entry is from Argyle Street, which forms part of the commercial centre of Moss Vale. The area within the vicinity of the Argyle Street footbridge entrance includes the former Post Office building, Diamond Jubilee Park and Fountain, Dr J. M. Alcorn Memorial and Leighton Gardens. The station platform can be accessed from the Argyle Street footbridge, Lackey Road footbridge and Dalys Way entrance.

The Argyle Street footbridge was constructed in c. 1916 and the Lackey Road footbridge in c. 1915. Both bridges are Warren Truss types, with the Argyle Street footbridge painted a deep Indian red, and the Lackey Road footbridge bridge grey. Within the fabric of the eastern footbridge are supporting posts embossed "Lanarkshire Steel Co. Ld Scotland". The eastern end of the Argyle Street footbridge is ramped.

The Argyle Steet footbridge connects to Argyle Street via a ramp partly supported by a steel framed structure and partly by a brick retaining wall. The steel framed structure is also dated 1916. The retaining wall and associated ramp dates between 1916-1930. A set of stairs are located at the western end of the Argyle Street footbridge and lead to the Dalys Way forecourt. The footbridges, ramps and stairs are in good condition, with some wear and tear to paint work.

The gardens at Moss Vale Station comprise of the former Refreshment Gardens adjacent to and at the south side of the former Refreshment Room Building. Dating from 1889, the Refreshment Room Garden was once part of the former Refreshment Room and comprised features such as ornamental plantings and a white brick feature spelling NSWGRRR (New South Wales Government Railways Refreshment Room) (OCP Architects, 2020b)The Refreshment Room Garden is rated as being of high heritage significance in the CMP, with the potential for its significance being increased to exceptional if its lost features were reconstructed/recreated (OCP Architects, 2020a).

There are two platforms currently in use at Moss Vale Station, Platform 1 on the western side of the station and Platform 2 on the eastern side. There is also a short siding platform, no longer in use which was formerly used for the Governors' carriage.

Statutory heritage listings

There are several listed heritage items within the proposal area, which are described below:

- Moss Vale Station is of State significance and is listed on the NSW State Heritage Register ('Moss Vale Railway Station and Stabling yard group', SHR#01200) and the Transport Asset Holding Entity (TAHE) and the ARTC S170 Heritage and Conservation Register, item number 4806253 and 4280253 respectively. No other items listed on any Government agency S170 register are located within the proposal area.
- The proposal lies within the Argyle Street North Conservation Area (C1836) listed in Schedule 5 of Wingecarribee LEP 2010. 'Moss Vale Railway Station' (I244) is also listed in Schedule 5. The curtilage for the LEP listed 'Moss Vale Railway Station' (I244) extends north of the State Heritage Register (SHR) curtilage.

Listed heritage items within the vicinity of the proposal area are discussed further in Section 2.4 of the SoHI (AECOM 2023) (Appendix C).

Significance of Moss Vale Station

In order to understand how a development would impact on a heritage item, it is essential to understand why an item is significant. An assessment of significance is undertaken to explain why a particular item is important and to enable the appropriate site management and curtilage to be determined.

Cultural significance is defined in *The Australia ICOMOS Charter for Places of Cultural Significance 2013* (Australia ICOMOS, 2013) as meaning "aesthetic, historic, scientific, social or spiritual value for past, present or future generations" (Article 1.2). Cultural significance may be derived from a place's fabric, association with a person or event, or for its research potential. The significance of a place is not fixed for all time, and what is of significance to us now may change as similar items are located, more historical research is undertaken, and community tastes change.

The process of linking this assessment with an item's historical context has been developed through the NSW Heritage Management System and is outlined in the guideline *Assessing Heritage Significance Guidelines for assessing places and objects against the Heritage Council of NSW criteria* (Heritage NSW, 2023), part of the NSW Heritage Manual (Heritage Branch, Department of Planning).

The following Statement of Significance is taken from the CMP (OCP Architects, 2020a):

- Moss Vale Railway Station Precinct is of State significance as one of NSW's largest regional railway stations, containing a rare and largely intact collection of Victorian and Federation buildings and other structures that remain an important landmark in the town of Moss Vale.
- At the time of its opening, Moss Vale served as the terminus of the Great Southern Line and at the time was one of only a few substantial railway buildings in NSW. The main wing of the 1867 station building is significant as one of the earliest railway buildings in NSW, and one of the oldest buildings in Moss Vale. The Railway Refreshment Room Building dating from 1890 is significant as one of the largest in NSW remaining and contains remnants of an impressive and elaborate Main Room, and a former suite of rooms used by Governors of NSW. These rooms are probably unique in Australia. Moss Vale Railway Station Precinct is thought to be the only railway station in NSW with a courtyard garden.
- Moss Vale Railway Station Precinct is significant and unique for its association with a succession of NSW Governors from the 1880s until 1946. The 1889 additions to the Station Platform Building included the unique arrangement of a Governor's Waiting Room within an Australian railway station. The former Railways Refreshment Room building appears to have been constructed directly as a result of Governor Carrington's request not to be delayed during his railway journeys from Moss Vale to Sydney. In this regard, it is probably unique in the history of railway building in Australia. The Booking Office building has a unique siting arrangement which appears directly from Governor Strickland's request to have road access to the platform for his daughter. The station is also associated with the 'Father of Railways', John Whitton, who designed the first station building.
- Moss Vale also has significance arising from its connections with the Australian military effort in the world wars as a transit and billeting point for soldiers and nurses.

- Many items within the precinct have representative significance, including the 1867 station building which was built to a standard design. The decorative cantilevered awning to the platforms was one of the first of its type in NSW. The Booking Office, two-storey signal box, brick overbridge, the two steel Warren Truss footbridges, jib crane, weighbridge and hut are all good representative examples of their type.

Stabling Yard

The Regional Rail Enabling Works – Moss Vale Stabling Upgrade SoHI (Aurecon 2021) (Appendix C) defines the stabling yard area as a large linear area of land that falls within the rail corridor of the Moss Vale Railway Station precinct.

A brick retaining wall runs along the rail corridor boundary on the Lackey Road side of the station, which dates to the period of duplication in about 1910, and has no considerable historic significance. However, its date of duplication makes it a contributory item to the signal box and siding, which also date from this period in the station’s history.

The historically significant signal box is demonstrative of the 1915 period of duplication which occurred within the Moss Vale Railway Station precinct – a period in which signalling technology underwent a big shift towards mechanical based interlocking systems in regional areas of the state.

6.1.3 Potential impacts

Moss Vale Station

This section provides the heritage impact assessment for the elements of the proposal related to the station upgrade. Refer to Section 8 of the SoHI (AECOM 2023) (Appendix C) for more detail on each element and the impact to heritage fabric.

The proposed upgrades provide equitable access throughout the station would enable the continued use of the station by increasing its efficiency and longevity, thereby ensuring the station is retained as a tangible link to the construction of the line. The configuration of the station and its key elements that contribute to the station’s historical significance (station buildings, footbridges, overbridges) would largely remain intact.

The proposal is a community focussed initiative to ensure ongoing access for the broadest possible cross section of the community which continues that story of connection and access to the station.

The heritage impact assessment for elements and heritage fabric in Section 8 of the SOHI (AECOM, 2023a) ranked the impact of the proposal to heritage fabric from works including the eastern station access from Argyle Street, western access from Lackey Road and works to platforms and buildings as a moderate adverse impact which would be mitigated through design. The assessment rated the impacts to the heritage fabric from the Dalys Way forecourt modification and installation of communications and services as minor adverse.

The current design has used the Heritage Design Principles outlined in the Heritage Design Report (GML Heritage Pty Ltd, 2023) prepared for the proposal. These have been informed by the *Design in Context: Guidelines for Infill Development in the Historic Environment* (NSW Heritage Office and the Royal Australian Institute of Architects NSW Chapter, 2005) to produce lift and ramp structures which are appropriate within the setting of Moss Vale Station.

The potential impacts to the ‘Moss Vale Railway Station and Stabling yard Group’ were also assessed against the criteria outlined in the NSW Heritage Division guidelines (Office of Environment and Heritage NSW, 2023). The potential impacts of the proposal are summarised and graded against the significance of the site in Table 6- and discussed in Section 9 of the SoHI (AECOM, 2023a) Appendix C.

Table 6-2 Summary of the nature of the direct impacts

Impact Type	Impact
Major negative impacts (substantially affects fabric or values of state significance)	None.

Impact Type	Impact
Moderate negative impacts (irreversible loss of fabric or values of local significance; minor impacts on State significance)	The eastern access from Argyle Street upgrade would result in the irreversible loss of significant fabric and would also have a moderate adverse impact on historical, association, aesthetic, rarity, representative and associative values of Moss Vale Station. The western access from Lackey Road upgrade would result in the irreversible loss of significant fabric and would also have a moderate adverse impact on historical, association, aesthetic, rarity, representative and associative values of Moss Vale Station. The Dalys Way forecourt modification would result in a moderate adverse impact on historical, aesthetic, rarity and associative values of Moss Vale Station. The works to platforms and buildings would result in a moderate adverse impact on historical, and rarity values of Moss Vale Station. The upgrades to communications and services would result in a moderate adverse impact on historical, aesthetic, rarity and associative values of Moss Vale Station.
Minor negative impacts (reversible loss of local significance fabric or where mitigation retrieves some value of significance; loss of fabric not of significance but which supports or buffers local significance values)	The Dalys Way forecourt modification would result in a minor adverse impact on aesthetic values of Moss Vale Station. The works to platforms and buildings would result in a minor adverse impact on aesthetic and associative values of Moss Vale Station.
Negligible or no impacts (does not affect heritage values either negatively or positively)	None.
Minor positive impacts (enhances access to, understanding or conservation of fabric or values of local significance)	None.
Major positive impacts (enhances access to, understanding or conservation of fabric or values of state significance)	The proposed works would improve safety and access to and within the station and would have a major positive impact on the social values of the station.

Impacts to other heritage items

The potential impact to other LEP listed heritage items within the proposal area are discussed in Table 6-25. Impacts to heritage items in the vicinity of the proposal area are in Section 8.2 of the SoHI (AECOM, 2023a) Appendix C.

Table 6-3 Impacts to LEP listed heritage items

Impact Type	Impact
Moss Vale Railway Station – The curtilage for the LEP listed item extends north of the State Heritage Register (SHR) curtilage. Proposal works including tree removal, landscaping, and ancillary works are outside the SHR curtilage.	The proposed modification to the overall station would have physical and visual impacts which are assessed to be minor adverse given that the heritage fabric which contributes to the LEP listing would be largely retained.
Argyle Street North Conservation Area – The proposal includes works contained within the conservation area. The boundary of the conservation area encompasses Moss Vale Railway Station to the north and west, Clarence Street to the east and Arthur Street to the south.	The proposed modification to the station would have a visual impact to the conservation area. However, views to the station from Argyle Street are oblique and set back, hence the proposed modification would have a minor adverse visual impact.

Stabling Yard

The proposal area runs north to south on the western side of Moss Vale Station, and runs from the stabling yard to the north of the station, underneath the pedestrian overbridge and past the signal box to the south. The proposal involves extension to around 130 metres of stabling track and associated services in the stabling yard, upgrade of around 280 metres of Combined Services Route (CSR), and construction of new pathways along the western side of the signal box at the station.

The potential impacts to the stabling yard in accordance with Heritage NSW *Guidelines for Statement of Heritage Impact* are outlined in Table 6-4.

Table 6-4 Potential impacts to Moss Vale Railway Station and Yard Group and Moss Vale Railway Precinct (adapted from Aurecon 2021)

Impact type	Discussion	Impact
Physical Impact	The proposed works to the siding next to the signal box would involve construction of an asphalt walkway and trenched CSR. The current design does not directly physically impact any potentially significant heritage fabric, including the signal box. No works would occur on or near the Station, its buildings and platforms as these structures all fall outside of the proposal area boundary. Therefore no adverse physical impacts are expected to the Station, its platforms or associated buildings.	Neutral
Visual and setting	The visual impacts to the c.1915 timber elevated signal box are expected to be neutral as works would be predominantly located below ground or at track level. These will therefore not impede the visual profile of the Box as viewed from the Station platforms or from Lackey Road or from the pedestrian footbridge. Setting impacts to the Box are also expected to be negligible as the open corridor landscape surrounding the Box and the associated siding road are not going to be modified as part of these works.	Neutral
Overall Impact	The overall heritage impact rating to the SHR and S170 listings is a minor adverse rating due to the risk of physical impacts to the State significant c.1915 elevated signal box. Largely the works are relatively minor in nature and do not impede the setting or visual prominence of the signal box, or the station, nor would they compromise the State significant historic, technical, rarity and representative values of the signal box or station. However as there is potential for vibration to exceed heritage criteria in relation to the 106-year old structure, the risk of indirect vibration impacts to the signal box results in the minor adverse impact. With the implementation of mitigation measures, the impact rating could be downgraded to neutral.	Minor adverse

Non-Aboriginal Archaeological Potential

The CMP included a historical archaeological and Industrial heritage assessment by AMBS Ecology & Heritage as an appendix (AMBS Ecology & Heritage, 2017). Overall, that assessment concluded that all areas within the SHR footprint would have moderate archaeological potential. The assessment largely focused on the goods yard and concluded that in that area of the precinct there was potential for subsurface remains relating to former structures that would contribute to the current understanding of the former goods yard.

The following works have the potential to impact archaeological deposits within the proposal area:

- installation of the lift in the courtyard
- installation of lift and ramp works in Argyle Street
- civil and drainage works in Dalys Way forecourt.

There are no known previous structures in the areas that would be impacted by the proposed works. Although AMBS assessed that archaeological potential is moderate throughout the station, it was also considered that such archaeological resources are likely to be ephemeral in nature and would merely confirm existing understanding of the precinct (AMBS Ecology & Heritage, 2017:41). Based on the known structures associated with Moss Vale Station and its environs, it is considered that no significant archaeological deposits would be impacted by the proposal.

Given the history and long occupation of the site, it is possible that significant features not previously recorded could exist within the station complex and therefore be inadvertently uncovered during works. To manage such

an unlikely event, Transport’s Unexpected Heritage Items Procedure would be followed (Transport for NSW, 2022a).

6.1.4 Mitigation measures

The mitigation measures in Table 6-5 are proposed to manage impacts to non-Aboriginal heritage.

Table 6-5 Site specific non-Aboriginal cultural heritage mitigation measures

No.	Mitigation measure	Responsibility	Timing
NAH1	The proposed works will comply with Article 22 of the Burra Charter, specifically Practice note article 22 — new work. New work is to be readily identifiable and not distort or obscure the cultural significance of the place or detract from its interpretation. New work will also be designed with a consideration of the architectural style and heritage elements of the station or precinct. The proposed elements will be sympathetic to the original design and seek to emphasise key details whilst not overwhelming or detracting from the heritage significance of the place.	Contractor	Construction
NAH2	Where service routes are proposed in areas of high significance, the design and detailing will be carefully considered to ensure they are not intrusive elements.	Contractor	Construction
NAH3	The Construction Noise and Vibration Management Plan will be implemented during construction works. A survey of the historic structures should be undertaken at the beginning and end of the main works to identify damage to structures. Construction noise and vibration resulting from the proposal will be closely monitored to ensure that they do not have physical impact to heritage elements at the station. Vibration intensive work will not proceed within the site-specific minimum working distances unless a permanent vibration monitoring system is installed about one metre from the building footprint, to warn operators (eg via flashing light, audible alarm, SMS) when vibration levels are approaching the peak particle velocity objective. Any damage to buildings will be avoided and if necessary repaired under the guidance of a Heritage Architect.	Contractor	Construction
NAH4	As part of the site induction, a heritage induction will be provided to workers prior to construction, informing them of the location of known heritage items and guidelines to follow if unexpected heritage items or deposits are located during construction.	Contractor	Pre-construction, construction
NAH5	A suitably qualified and experienced Heritage Architect who is independent of the design and construction team’s personnel will be engaged. The Heritage Architect will provide ongoing heritage, design and conservation advice throughout detailed design and any subsequent relevant design modifications to ensure that the final design adheres to the recommendations of this SoHI (Appendix C), and the approval issued by NSW Heritage under Section 60 of the <i>NSW Heritage Act 1977</i> .	Contractor	Pre-construction / Construction
NAH6	Heritage interpretation will be planned and integrated into the detailed design of the proposal. The heritage interpretation planning will be prepared by the Heritage Architect (and sub-consultants as required i.e., graphics) with reference to <i>Sydney Trains Heritage Interpretation Guidelines</i> . The heritage interpretation planning will be captured in a Heritage Interpretation Plan (HIP) that is to be issued as a progress report at each stage of detailed design. The final HIP will include all details necessary to proceed to fabrication and installation, and include general historic information as well as specific information on the significance of the station courtyard.	Contractor	Pre-construction / Construction

No.	Mitigation measure	Responsibility	Timing
NAH7	Archival recording of the station will be undertaken in accordance with the Heritage NSW guidelines prior to main works commencing. The archival recording shall be reviewed and approval by Transport prior to submission to Heritage NSW or other government body.	Contractor	Pre-construction / Construction
NAH8	During the detailed design phase, opportunities will be investigated to offset assessed heritage impacts from the proposal. Examples of potential offsets include, but are not limited to: <ul style="list-style-type: none"> providing all relevant information to Sydney Trains for any future updates to the current Conservation Management Plan (CMP), including the amended significance gradings identification of other redundant or current intrusive elements that can be investigated to be removed/relocated from the station review of the hard and soft landscaping in the courtyard to reduce the visual clutter of the area to create a more visually pleasant aesthetic. This should include the review of the memorials opportunity works listed in Section 10.3 of the Heritage Design Report (GML Heritage Pty Ltd, 2023) (Appendix A of Appendix C). 	Transport / Contractor	Pre-construction
NAH9	An appropriate lighting type will be selected for new lighting within the SHR curtilage, along the signal box siding, subject to heritage design advice. Lighting selection should give consideration to the relevant conservation policy (Policy 14.4) contained within the CMP available for the precinct.	Contractor	Pre-construction
NAH10	Ongoing heritage advice and input into the design will also be sought so the detailed design of other newly introduced elements (for example fencing, retaining walls and new structures) are designed sensitively to the heritage context of the SHR listing.	Contractor	Pre-construction / Construction
NAH11	All heritage curtilages and structures will be shown on the ECMs and design drawings so contractors are aware of when they are working in heritage areas, and can take extra precautions whilst onsite.	Contractor	Pre-construction / Construction
NAH12	The <i>Standard Management Procedure - Unexpected Heritage Items</i> (Transport for NSW, 2022a) will be followed in the event that any unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered. Work will only re-commence once the requirements of that Procedure have been satisfied.	Contractor	Construction

6.2 Noise and vibration

6.2.1 Methodology

A Noise and Vibration Impact Assessment was prepared for the proposal (AECOM, 2023b) (refer Appendix D). The assessment methodology included:

- establishing the existing background noise levels in the vicinity of the proposal
- establishing construction noise management levels (NMLs) and vibration limits that would apply to the proposal
- predicting noise levels at affected residential and non-residential receivers due to the construction of the proposal, including the predicted cumulative construction noise levels from the station and stabling yard upgrade
- considering the noise impact from operation of the station upgrade combined with operation of the stabling yard upgrade

- identifying mitigation measures for construction and operational phases of the proposal.

For predicted noise impacts from the stabling yard, the assessment relied upon a previous noise and vibration impact assessment carried out for the stabling yard upgrade (Aurecon, 2023) (appended to Appendix D) (Aurecon report).

6.2.2 Existing environment

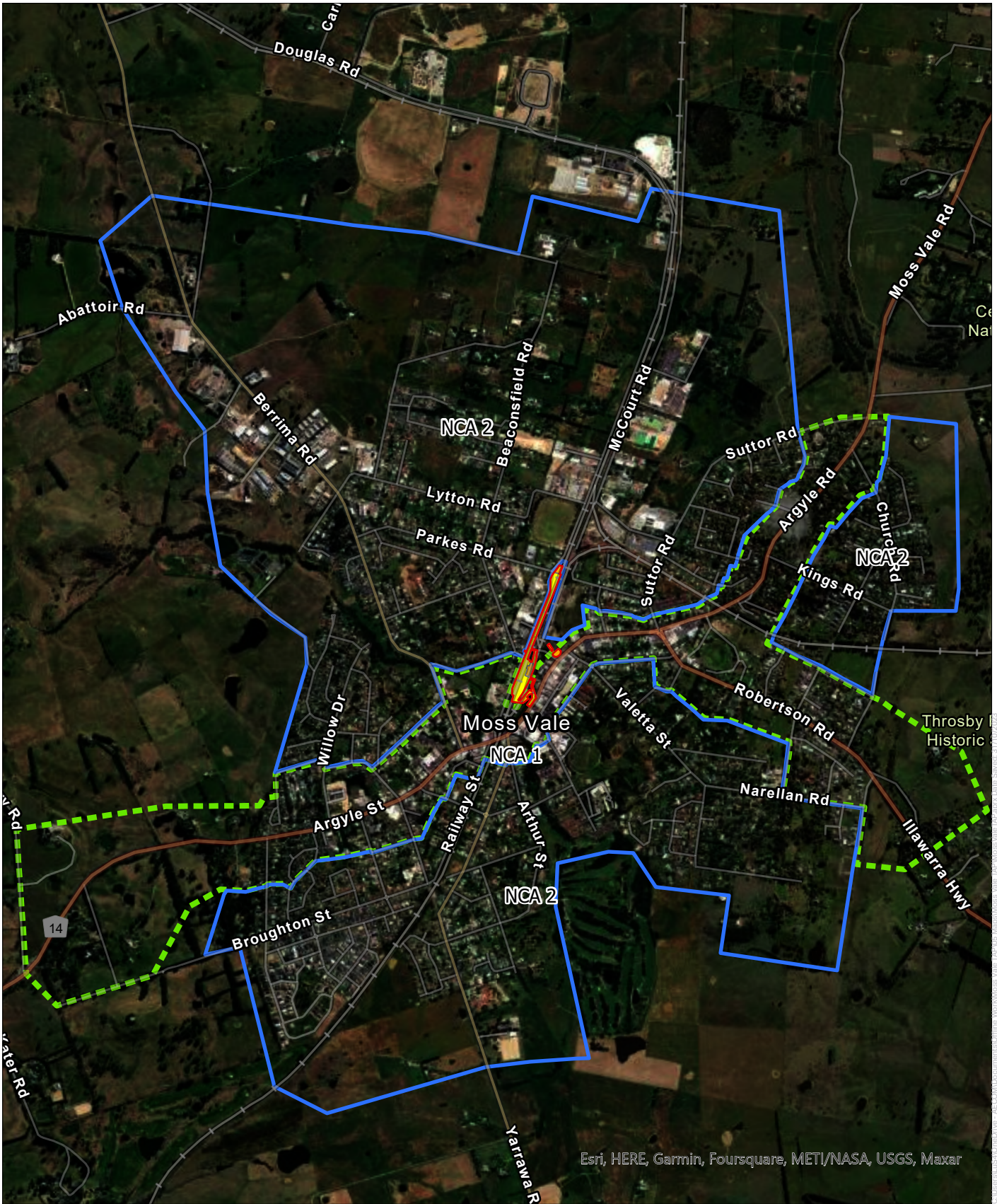
Moss Vale Station is located within a suburban environment containing commercial, residential and industrial land uses. Existing noise levels in the study area are generally influenced by light industrial and commercial sites, rail and road traffic noise. The closest residential receivers within a 1.5-kilometre radius from the proposal include:

- residential properties to the west along Lackey Road, Parkes Road, Innes Road, and Garrett Street
- residential properties to the east along Baker Road, Hoskin Street, Hawkins Street, and Valetta Street.

Several non-residential receivers potentially affected by the proposal include:

- St Paul's Catholic Parish Primary School to the west, along Garrett Street
- St Paul's Parish Catholic Church to the west, along Garrett Street
- Moss Vale Public Library to the south-east, along Elizabeth Street
- St Paul's International College to the south-west, along Waite Street
- Leighton Gardens, along Argyle Street
- Diamond Jubilee Park and Fountain, along Argyle Street
- Lackey Park, along Lackey Road.

To assist in determining noise criteria for the receivers surrounding the proposal, two noise catchment areas (NCAs) were identified. The noise environment at each residential receiver within each NCA is considered to be similar. The NCAs are shown in Figure 6-1. NCA 1 is a noise environment dominated by noise from commercial activities and road traffic noise from Lackey Road and Argyle Street/Illawarra Highway. NCA 2 is a noise environment dominated by general suburban noise and some rail/industrial noise.



Esri, HERE, Garmin, Foursquare, METI/NASA, USGS, Maxar

Figure 6-1 - Noise catchment areas



- Proposal Area
- Ancillary Facility
- Construction Footprint
- NCA 1
- NCA 2

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Background noise levels

Unattended noise monitoring

Unattended noise monitoring was carried out to establish the existing ambient and background noise environment at potentially affected receivers. Unattended monitoring was completed at two locations between Tuesday 27 June and Thursday 6 July 2023. The noise loggers were placed at 177 Lackey Road and the corner of Hoskins Street and Baker Road.

Measured noise levels have determined the existing noise environment and set the criteria that assesses potential impacts from the proposal. Table 6-6 presents the existing overall representative L_{Aeq} ambient noise level and the background L_{A90} noise levels for the day, evening and night periods, in accordance with the *Noise Policy for Industry (NPfI)* (NSW EPA, 2017). The L_{A90} noise levels are the levels exceeded for 90 per cent of the measurement period, while the L_{Aeq} level is the equivalent continuous sound level.

Table 6-6 Existing background (L_{A90}) and ambient (L_{Aeq}) noise levels

Noise monitoring location	L_{Aeq} ambient noise levels, dB(A)			L_{A90} background noise levels, dB(A)		
	Day ¹	Evening ¹	Night ¹	Day ¹	Evening ¹	Night ¹
L1	64	61	57	45	35	(29) 30 ²
L2	55	46	48	39	34	30

Notes:

1. Day is defined as 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays. Evening is defined as 6pm to 10pm Monday to Sunday and Public Holidays. Night is defined as 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays
2. Where the rating background level is found to be less than 35 dB(A) during the daytime then it is set to 35 dB(A). Where it is found to be less than 30 dB(A) during evening or night-time then it is set to 30 dB(A) in accordance with NSW NPfI.

6.2.3 Noise assessment criteria

Construction noise criteria

The *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009) (ICNG) is the principal guideline for assessing and managing construction noise in NSW. The ICNG recommends standard hours of construction as:

- Monday to Friday: 7am to 6pm
- Saturday: 8am to 1pm
- Sundays and public holidays: no work.

The ICNG also states that during recommended standard hours where construction noise levels reach 75 dB(A) at residences, residential receivers can be considered as 'highly noise affected' and the proponent may be required to consider restricting hours of very noisy work to provide respite periods.

NMLs were developed for the proposal. Where NMLs are predicted to be exceeded, the ICNG recommends certain measures to be implemented to minimise adverse impacts. In accordance with the ICNG, the NML for the proposal during standard construction hours is the applicable rating background level (RBL) plus 10 dB(A), while the NML outside of recommended standard hours is the applicable RBL plus 5 dB(A).

The construction NMLs for the residential receivers are provided in Table 6-7.

Table 6-7 Noise catchment areas and construction noise management levels

NCA	Representative logger	Period	Rating background level, dB(A)	Construction noise management level (NML) ²
1	L1	Day	45	55 (50) ³
		Evening	35	40
		Night	(29) 30 ¹	35
2	L2	Day	39	49 (44) ³
		Evening	34	39
		Night	30	35

Notes:

1. In accordance with Noise Policy for Industry Table 2.1, a minimum RBL has been adopted where the measured RBL is less than 35 dB(A) during the day, 30 dB(A) for the evening, or 30 dB(A) at night
2. Standard hours day noise management levels = RBL + 10 dB(A), out-of-hours (OOH) daytime/evening/night noise management levels = RBL + 5 dB(A)
3. Daytime OOH.

Construction NMLs for non-residential sensitive land uses, such as schools, hospitals or places of worship are provided in Table 6-8.

Table 6-8 Construction noise management levels – non-residential sensitive land uses

Land use	Construction noise management level, L _{Aeq} (15 min)
Education (classrooms at schools and other educational institutions)	Internal noise level 45 dB(A)
Places of worship	Internal noise level 45 dB(A)
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External noise level 65 dB(A)
Passive recreation areas (characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External noise level 60 dB(A)
Community centres	Depends on the intended use of the centre. Refer to the recommended “maximum” internal levels in AS2107 for specific uses.

Sleep disturbance criteria

Sleep disturbance research presented in the *NSW Road Noise Policy* (DECCW 2011) concludes that ‘maximum internal noise levels below 50-55 dB(A) are unlikely to cause awakening reactions’. Therefore, given that an open window provides about 10 dB in noise attenuation from outside to inside, external noise levels of 60-65 dB(A) are unlikely to result in awakening reactions.

Based on the measured background noise levels during the night-time period, the sleep disturbance criteria for the nearest noise sensitive residential receivers are presented in Table 6-9.

Table 6-9 Sleep disturbance criteria

Noise catchment area	Night-time background noise level	Sleep disturbance criteria, $L_{A1(1\text{ minute})}$, dB(A) (external)	
	(L_{A90}), dB(A)	Screening level	Awakening reaction
1	30	45	65
2	30	45	65

Construction traffic noise criteria

To assess noise impacts from construction traffic an initial screening test is required, by evaluating whether existing road traffic noise levels would increase by more than 2 dB(A), in line with the *Road Noise Policy* (Department of Environment, Climate Change and Water, 2011) (RNP). Where the predicted noise increase is 2 dB(A) or less, then no further assessment is required. However, where the predicted noise level increase is greater than 2 dB(A), and the predicted road traffic noise level exceeds the road category specific criterion, then noise mitigation should be considered for those receivers affected.

Construction vibration criteria

When assessing vibration there are two categories of vibration criteria: one related to the impact of vibration to human comfort (tactile vibration) and one relating to structural damage.

Structural damage to buildings

At present, no Australian Standards exist for the assessment of building damage caused by vibration. The German standard (DIN 4150) provides recommended maximum levels of vibration that reduce the likelihood of building damage caused by vibration. DIN 4150 states buildings exposed to higher levels of vibration than recommended limits would not necessarily result in damage.

Human comfort

The assessment of intermittent vibration outlined in the *Assessing Vibration: A Technical Guideline* is based on Vibration Dose Values (VDVs). The VDV accumulates the vibration energy received over the daytime and night-time periods. The VDV criteria are based on the likelihood that a person would be annoyed by the level of vibration over the entire assessment period.

Operational noise criteria

The NPfI provides guidance in relation to acceptable noise limits for industrial noise emissions, which includes, but is not limited to, noise emissions from mechanical plant. The assessment procedure in the NPfI has two components:

- controlling intrusive noise impacts in the short term for residences
- maintaining noise level amenity for residences and other land uses.

Both components are assessed at the boundary of the noise sensitive receiver site, or if the site boundary is more than 30 metres from the noise sensitive building, 30 metres from the noise sensitive building.

The specific noise levels established for the operation of the proposal are summarised in Table 6-10 and are based on the lower of the intrusive and amenity criteria. The criteria apply to environmental noise emissions from plant and equipment installed as part of the proposal.

Table 6-10 Project specific noise levels

Receiver area	Period ¹	RBL (L _{A90, 15 min})	Intrusive criterion (L _{Aeq, 15 min})	Amenity criterion ³ (L _{Aeq, 15 min})	Project specific noise criteria (L _{Aeq}) ⁴
NCA 1 ²	Day	45	50	53	53
	Evening	35	40	43	43
	Night	30	35	38	38
117-133 Lackey Road	Day	45	50	58	58
	Evening	35	40	48	48
	Night	30	35	43	43
NCA 2	Day	39	44	53	53
	Evening	34	39	43	43
	Night	30	35	38	38

Notes:

1. Day is defined as 7am to 6pm, Monday to Saturday and 8am to 6pm Sundays and Public Holidays. Evening is defined as 6pm to 10pm, Monday to Sunday and Public Holidays. Night is defined as 10pm to 7am, Monday to Saturday and 10pm to 8am Sundays and Public Holidays
2. Except for 117-133 Lackey Road, Moss Vale which are located within an industrial interface
3. 5 dB(A) is added to the recommended noise amenity levels for residential receivers within an industrial interface
4. Where an existing industry has been in operation for more than ten years and existing site operations exceed the project amenity noise level, the project amenity noise level may be adopted as the project noise trigger level to assess existing, and existing plus proposed site operations, as relevant.

6.2.4 Potential impacts

Construction noise

Construction is currently scheduled to start in early 2024 and continue until late 2025. The construction stages described in Section 3.4 were assessed for construction noise impacts. This section provides a quantitative assessment based on 'reasonable' worst case construction scenarios, in accordance with the ICNG.

All work stages have been assessed except for stage 5 (communication equipment and services upgrade) and stage 9 (landscaping work) as they are expected to include relatively low noise impact activities. Construction stage 5 (communication equipment and services upgrade) was also not modelled for out-of-hours work as it was expected to be the least noisy out of the other out-of-hours work scenarios (construction stage 2 (building and platform work), stage 3 (station entrance work) and stage 4 (forecourt/interchange work)).

Construction would generally be limited to standard working hours. Out-of-hours work would also likely be required during about seven rail possession periods over the construction period to minimise traffic impacts and allow for work which requires track access. It should be noted that night-time construction work during scheduled rail possession periods would effectively serve as a respite period/mitigative measure, as work would not take place over more than two consecutive nights. This would provide some respite to surrounding receivers during weekdays between work.

The assessment is conservative (i.e. overestimates likely noise impacts). For any sensitive receiver, the potential impacts would also vary over the duration of construction, depending upon factors such as the distance to the equipment, time of day, presence of physical obstructions, intensity and character of the construction noise.

The use of Car Siding Road 3 as a temporary stabling road is proposed during the project upgrade works. As a majority of the stabling yard operations occur during the night-time period, an assessment was completed of typical stabling yard activities including train arrivals and departures, trains idling, preparation works, brake release and horn testing.

Residential receivers

Residential receivers have been assessed against the standard hours and out-of-hours night-time NMLs.

All construction noise modelling scenarios were assessed during standard construction hours. Three scenarios – building and platform work, station entrance work, and forecourt/interchange work – were also assessed during night-time hours to assess the noise impacts of these scenarios during rail possession periods.

Table 6-11 and Table 6-12 present the construction noise modelling results for residential receivers and shows the number of receivers where the construction NMLs are likely to be exceeded during standard hours and night-time hours respectively. The tables also present the number of receivers where noise levels are predicted to exceed the highly affected level, 75 dB(A).

Table 6-11 Number of residential receivers where noise levels may exceed NMLs during standard construction hours

Construction stage	Number of residential receivers where noise levels may exceed the applicable NML			
	Exceedance of NMLs during ICNG standard construction hours			Highly affected
	1 – 10 dB(A)	11 – 20 dB(A)	> 20 dB(A)	> 75 dB(A)
Site establishment and enabling work	313	42	21	15
Building and platform work	367	30	13	12
Station entrance work	424	40	13	10
Forecourt/interchange work	233	22	9	7
Temporary stabling yard provisions	338	64	12	6
Permanent stabling yard construction work	457	96	18	7
Services upgrade at stabling yard	228	31	8	5
Demobilisation, testing and commissioning	214	31	16	14

Notes: 'clearly audible' (exceedance of 1 – 10 dB(A)); 'moderately intrusive' (exceedance of 11 – 20 dB(A)); 'highly intrusive' (exceedance over 20 dB(A)); 'highly affected' (exceedance over 75 dB(A)).

Table 6-12 Number of residential receivers where noise levels may exceed NMLs during night-time work

Construction stage	Number of residential receivers where noise levels may exceed the applicable NML				
	Exceedance of NMLs outside of standard construction hours (night-time)			Highly affected	
	1 – 5 dB(A)	6 – 15 dB(A)	16 – 25 dB(A)	> 25 dB(A)	> 75 dB(A)
Building and platform work	413	1,019	364	48	12
Station entrance work	450	1,041	421	65	10
Forecourt/interchange work	434	910	239	34	7

Notes: 'clearly audible' (exceedance of 1 – 10 dB(A)); 'moderately intrusive' (exceedance of 11 – 20 dB(A)); 'highly intrusive' (exceedance over 20 dB(A)); 'highly affected' (exceedance over 75 dB(A)).

Exceedances of the NMLs of up to 24 dB(A) were predicted for the use of the temporary stabling on Car Siding Road 3 for all scenarios. For arrivals, departures and brake release scenarios exceedances were predicted for residential receivers generally within NCA1. For the preparation works and idling scenarios exceedances were also predicted at residential receivers within NCA2.

The results show construction noise levels are predicted to exceed the NMLs during both standard hours and (out-of-hours) night-time hours for all assessed construction stages. The largest number of exceedances occur during permanent stabling yard construction work for standard construction hours, and during station entrance work for night-time hours.

It is important to consider this assessment is representative of the worst-case 15-minute period of construction activity, with the construction equipment located at the closest distance from each sensitive receiver location. The assessed scenarios do not represent the ongoing day-to-day noise impact at noise sensitive receivers for an extended period.

Particularly noisy activities, such as mulching and concrete sawing, would persist for only a fraction of the overall construction period. Typical noise levels could be 5 to 10 dB(A) lower dependent on the site and nature of work.

There are residential receivers predicted to be ‘highly affected’ for the construction stages assessed during standard and night-time hours. The ICNG states additional consideration for mitigation should be afforded for ‘highly noise affected’ receivers. These receivers would receive additional notification regarding specific timing and impacts of construction work. Respite periods would also be considered for these receivers in accordance with the ICNG. See Section 7.2 for relevant mitigation measures.

Non-residential receivers

Table 6-13 presents the construction noise modelling results of the proposal for non-residential receivers and shows the number of receivers where the NMLs are likely to be exceeded during the receivers’ hours of use.

This assessment is representative of the worst case 15-minute period of construction activity, while the construction equipment is at the nearest location to each receiver location. The results show construction activities are expected to exceed the NMLs at a number of non-residential receivers.

Table 6-13 Number of non-residential receivers where noise levels may exceed NMLs when in use

Construction stage	Number of non-residential receivers where noise levels may exceed NML across the proposal area		
	1 – 10 dB(A)	11 – 20 dB(A)	> 20 dB(A)
Site establishment and enabling work	19	9	0
Building and platform work	17	12	1
Station entrance work	15	13	2
Forecourt/interchange work	18	7	0
Temporary stabling yard provisions	18	5	2
Permanent stabling yard construction work	18	4	4
Services upgrade at stabling yard	9	6	0
Demobilisation, testing and commissioning	10	9	0

Notes: ‘clearly audible’ (exceedance of 1 – 10 dB(A)); ‘moderately intrusive’ (exceedance of 11 – 20 dB(A)); ‘highly intrusive’ (exceedance over 20 dB(A)); ‘highly affected’ (exceedance over 75 dB(A)).

Sleep disturbance

A sleep disturbance assessment was carried out to assess the potential impact of night-time work during the rail possession periods on sleep disturbance. Table 6-14 presents the number of residential receivers where predicted noise levels exceed the sleep disturbance criteria and the sleep awakening reaction criteria.

Table 6-14 Number of residential receivers where noise levels exceed the sleep disturbance criteria

Construction stage	Sleep disturbance criteria, dB(A)	Awakening reaction criteria, dB(A)	Maximum $L_{A1(1min)}$ noise level at receivers, dB(A)	Number of receivers where predicted noise levels exceed	
				Sleep disturbance criteria	Awakening reaction criteria
Building and platform work	45	65	98	1,844	145
Station entrance work	45	65	96	1,307	40
Forecourt/ interchange work	45	65	87	901	24

A large number of exceedances of the sleep disturbance screening criteria have been predicted due to the night-time construction work associated with the proposal. Exceedances of the awakening reaction screening criterion have also been predicted at receivers. These exceedances are attributed to the close proximity of the construction site to the residences.

It is noted the work would generally be progressive so not all receivers would be affected at any one time, or for the overall duration of the work. Most construction activities, including particularly noisy activities, would be carried out during the day where feasible.

Exceedances of the sleep disturbance external noise target were predicted for the use of the temporary stabling on Car Siding Road 3 during both brake release and horn testing operations. Residential properties in NCA1 are likely to be the most affected, with exceedances predicted above 35 dB(A) at the closet receivers on Lackey Road. Exceedances for residential receivers in NCA 2 are only predicted for the horn testing (both town and country).

Given the number of NML exceedances, an effective communication plan and noise management measures would be developed during detailed design to minimise the impacts upon affected residential receivers.

Overlapping construction stages

While most construction activities are expected to occur at distinct scheduled times and at different locations, it is possible that noisy construction activities for the proposal may occur at the same time near each other. In these cases, it is possible that an increase of up to 3 dB(A) of the highest noise level predicted for any construction stage may occur (assuming at any one location equal noise levels from two stages of work are experienced). In this case, this increase is not expected to create any further exceedances in the NMLs.

Overlapping construction stages and identification of receivers subject to increased noise levels would be determined during detailed design. Additional mitigation measures would also be identified during detailed design if required.

Overlapping station and stabling yard stages (worst case)

An assessment of the station and stabling yard construction stages was carried out, using the ‘permanent stabling yard construction work’ stage together with the noisiest station work stage (worst case). The noise levels were predicted for standard construction hours only as there would be no night work associated with the permanent stabling yard construction work stage. Table 6-15 presents the predicted cumulative construction noise results for residential receivers and shows the number of receivers where the construction NMLs are likely to be exceeded during standard hours, compared against the single construction scenarios assessed.

Table 6-15 Number of residential receivers where noise levels may exceed NMLs during standard hours due to cumulative construction noise

Construction stage	Number of residential receivers where noise levels may exceed NMLs across the proposal area			
	Exceedance of NMLs during ICNG standard construction hours			Highly affected
	1 – 10 dB(A)	11 – 20 dB(A)	> 20 dB(A)	> 75 dB(A)
Residential receivers				
Building and platform work	367	30	13	12
Permanent stabling yard construction work	457	96	18	7
Cumulative (both stages)	572	106	28	18
Non-residential receivers				
Building and platform work	17	12	1	17
Permanent stabling yard construction work	18	4	4	18
Cumulative (both stages)	20	12	4	20

Notes: 'clearly audible' (exceedance of 1 – 10 dB(A)); 'moderately intrusive' (exceedance of 11 – 20 dB(A)); 'highly intrusive' (exceedance over 20 dB(A)); 'highly affected' (exceedance over 75 dB(A)).

For residential receivers, the predicted results for the cumulative (station and stabling yard) construction scenario show an increase in the number of exceedances for receivers affected by noise levels considered to be 'clearly audible' (exceedance of 1 – 10 dB(A)), 'moderately intrusive' (exceedance of 11 – 20 dB(A)), and 'highly intrusive' (exceedance over 20 dB(A)), as well as 'highly affected' (exceedance over 75 dB(A)) receivers.

For non-residential noise sensitive receivers, the results for the cumulative construction scenario show a slight increase in the number of exceedances for receivers affected by noise levels considered to be 'clearly audible' (1 - 10 dB(A)). The number of exceedances for the cumulative construction scenario between 11-20 dB(A) and greater than 20 dB(A) remain the same between building and platform work and permanent stabling yard construction work respectively.

Although the cumulative construction scenario is predicted to have an impact on the surrounding receivers, it is important to consider:

- predicted construction noise impacts at each receiver are considered to be reasonable worst-case 15-minute impacts. Noise levels are likely to be lower than stated in this assessment for substantial periods of time
- where a receiver is affected by noise from two sources simultaneously, it is likely noise levels from one would be dominant and, therefore, overall noise levels would increase only slightly, if at all.

To ensure adverse impacts at sensitive receivers are minimised, the noise mitigation measures described in Section 7.2 should be implemented.

Road traffic noise

Construction vehicle movements would be in the order of 45 light vehicles and 12 heavy vehicles per day during peak construction periods across all ancillary facilities. Vehicles would access an ancillary facility primarily via Argyle Street for construction at the station and Lackey Road for construction at the stabling yard. Heavy vehicles would only access a facility from approved heavy vehicle routes.

Given the existing traffic volume on Argyle Street and Lackey Road, the indicative construction traffic volumes for the proposal of 45 light vehicles and 12 heavy vehicles per day would have a negligible impact on the road network. Road traffic noise levels would not increase by more than 2 dB(A) and would therefore comply with the RNP criteria.

Construction - vibration

Vibration intensive work may include the use of:

- jackhammer
- bored piling rig.

The minimum working distances of these items of equipment from off-site receivers are shown in Table 6-16. The potential impacts during vibration intensive work have been assessed using the CNVG minimum working distances for cosmetic damage and human response.

Table 6-16 Recommended safe working distances for vibration intensive plant

Plant	Rating/ Description	Minimum working distances		
		Cosmetic damage		Human response
		Heritage	Commercial/ Residential	
Jackhammer	Handheld	2 m (nominal)	1 m (nominal)	3 m
Piling rig – bored	≤ 800 mm	5 m	2 m (nominal)	7 m

The closest residential and commercial receivers are more than nine and 20 metres from the proposal area respectively, therefore, the proposal can comply with the minimum working distances for residential/commercial receivers at this location.

Several of the heritage-listed items are located within the proposal area, including Moss Vale Station. Vibration intensive work would likely be required within the minimum working distances of the heritage-listed station building and its associated components. In this case, mitigation measures to control excessive vibration would be implemented, as outlined in Section 7.2.

Operation - noise

Station operations

During operation of the new and upgraded features at the station (e.g. lifts, footbridges, interchange facilities, and station building upgrades), the operational noise environment of the station is expected to remain largely unchanged, and contribute negligible cumulative operational noise impacts with the stabling yard.

Stabling Yard operations

The proposed upgrades to the stabling yard would not introduce new stabling activities at this location, however with the introduction of the New Regional Rail Fleet a mobile train simulator would be located in the vicinity of the yard on an as needs basis, and the horns on the new regional rail fleet would be louder than the current fleet operated by NSW TrainLink.

The Aurecon report indicated noise levels associated with stabling yard operations for both the existing and proposed new train fleet would frequently exceed the project operational noise trigger levels when the horns

are sounded at the nearest receivers within all assessed NCAs. The worst affected receivers from the stabling yard operation would be the residential receivers to the west of the stabling yard, along Lackey Road, Garrett Street, and Parkes Road.

The operational scenarios included assessments of noise from horn operations (from a town horn and a country horn) on residential receivers, for horn testing and horn warning. The horn warning scenario considered two horn use locations – before entering the stabling yard, and before leaving the stabling yard. Residential receivers to the east along Hoskins Street, Baker Road, and Hawkins Street were predicted to be the most affected by horn warning noise at the two horn locations.

Horn testing was found to impact all NCAs and exceed the external noise criteria at more residential receivers than the horn warning scenarios. Overall, the horn testing scenarios resulted in 154 more exceedances of the external noise criteria than the horn warning scenarios combined. No exceedances were predicted at any of the non-residential receivers assessed.

The potential noise barrier was included as part of the noise modelling assessed in the Aurecon report. The report notes the noise barrier would provide noise attenuation for most operational scenarios within the proposed stabling yard re-configuration. However, the results show the attenuation is generally limited to residential receivers to the west of the stabling yard and may increase noise levels at residential receivers to the east. The noise barrier would reduce noise impacts of the horn testing scenario but not to the extent to achieve compliance.

To mitigate operational noise, a hierarchical approach was considered with strategies including:

- controlling noise at the source - e.g. use of track lubrication, soft rail pads, and welding to smooth discontinuities
- controlling noise in transmission - e.g. design and potential installation of a noise barrier. The design of the noise barrier would be investigated in greater detail in future design stages of the proposal to determine if it is feasible and reasonable to construct
- controlling noise at the receiver e.g. an Operational Noise and Vibration Management Plan would be developed and implemented during detailed design of the proposal, including consideration of architectural treatments for affected receivers and installing Automatic Warning Systems (AWSs) and train-based warning systems instead of horn use.

Mitigation measures are proposed and additional investigations would be carried out during detailed design when details of the noise levels for the new train fleet would have been confirmed.

6.2.5 Mitigation measures

Mitigation measures are presented in Table 6-17 to manage noise and vibration impacts.

Table 6-17 Site specific noise and vibration mitigation measures

No.	Mitigation measure	Responsibility	Timing
N1	<p>Before the start of construction, a Construction Noise and Vibration Management Plan (CNVMP) will be developed and implemented in accordance with the requirements of the EPA's <i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2009), <i>Transport's EMF-NV-GD-0060 Construction Noise and Vibration Guideline (Public Transport Infrastructure)</i> (Transport for NSW, 2023a) and the Noise and Vibration Impact Assessment for the proposal (AECOM, 2023b). The CNVMP shall include, but not be limited to:</p> <ul style="list-style-type: none"> • details of construction activities and an indicative schedule for construction • identification of construction activities that have the potential to generate noise and/or vibration impacts on surrounding land uses, particularly sensitive noise receivers • detail what reasonable and feasible actions and measures shall be implemented to minimise noise impacts (including those identified in the REF) • procedures for notifying sensitive receivers of construction activities that are likely to affect their noise and vibration amenity, as well as procedures for dealing with and responding to noise and vibration complaints • an Out of Hours Work Protocol (OOHWP) for the assessment, management and approval of works outside the standard construction hours is to be developed. This will include a risk assessment process which deems the out of hours activities to be of low, medium or high environmental risk. All out of hours works are subject to written approval by the Director of Environment and Sustainability (DES) or as approved by EPA (where relevant to the issuing of an EPL). The OOHWP should be consistent with the <i>Transport Construction Noise and Vibration Guideline (Public Transport Infrastructure)</i> (Transport for NSW, 2023a) • a description of how the effectiveness of actions and measures shall be monitored during the proposed works, identification of the frequency of monitoring, the locations at which monitoring shall take place, recording and reporting of monitoring results and if any exceedance is detected, the manner in which any non-compliance shall be rectified. 	Contractor	Pre-construction, construction

No.	Mitigation measure	Responsibility	Timing
N1	<p>The CNVMP shall consider and outline measures to reduce the noise and vibration impacts from construction activities. Where practicable at-source measures (including by construction planning/staging and equipment selection) shall be prioritised over at-receiver measures. Reasonable and feasible mitigation measures include:</p> <ul style="list-style-type: none"> • regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising emissions and how to use equipment in ways to minimise noise and vibration • scheduling high noise and/or vibration generating work during less sensitive time periods as far as practicable (e.g. use of demolition saws, grinders, impact drills and jackhammers) • avoiding any unnecessary emissions when carrying out manual operations and when operating plant • ensuring spoil is placed and not dropped into awaiting trucks or other plant/vehicles • avoiding/limiting simultaneous operation of noisy or vibratory plant and equipment within the discernible range of a sensitive receiver where practicable • switching off any equipment not in use for extended periods e.g. heavy vehicles engines will be switched off whilst being unloaded • considering noise emissions as part of the selection process of rental plant and equipment • using quieter and less vibration emitting construction methods where feasible and reasonable (e.g. using rubber-wheeled instead of steel-tracked plant) • avoiding deliveries at night/evenings or other sensitive times wherever practicable • no idling of delivery trucks • planning traffic flow, parking and loading/unloading areas to minimise reversing movements within the site • ensuring truck drivers are 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 • maximising the offset distance between noisy or vibratory plant and sensitive receivers and maintaining safe working distances for workers • directing noise-emitting plant away from sensitive receivers • regularly inspecting and maintaining plant to check that it is in good working order and avoid increased noise levels from rattling hatches, loose fittings etc • where possible, noise from mobile plant will be reduced through additional fittings including: <ul style="list-style-type: none"> – residential grade mufflers – silencing air parking brake engagement • using quieter and less vibration emitting construction methods where feasible and reasonable • using non-tonal movement alarms (or an equivalent mechanism) on all construction vehicles and mobile plant regularly used on-site (i.e. greater than one day) and for any out of hours work. 	Contractor	Pre-construction, construction

No.	Mitigation measure	Responsibility	Timing
N2	<p>Construction activities shall be restricted to the hours of 7:00 am to 6:00 pm (Monday to Friday); 8:00 am to 1:00 pm (Saturday) and at no time on Sundays and public holidays except for the following works which are permitted outside these standard hours:</p> <ul style="list-style-type: none"> any works which do not cause noise emissions to be more than 5dBA higher than the rating background level (RBL) at any nearby residential property and/or other noise sensitive receivers (subject to approval from Transport) out of hours work identified and assessed in the REF or the approved OOHWP the delivery of plant, equipment and materials which is required outside these hours as requested by police or other authorities for safety reasons and with suitable notification to the community as approved by the DES emergency work to avoid the loss of lives, property and/or to prevent environmental harm any other work as approved by the DES and considered essential to the proposal, or as approved by EPA (where an EPL is in effect). 	Contractor	Construction
N3	<p>As per the <i>Construction Noise and Vibration Guideline (Public Transport Infrastructure)</i> (Transport for NSW, 2023a), construction activities with special audible characteristics will be limited to standard hours and start no earlier than 8am unless otherwise approved by the DES in accordance with <i>EMF-NV-GD-0060 Construction Noise and Vibration Guideline (Public Transport Infrastructure)</i> (Transport for NSW, 2023a).</p> <p>Rock breaking or hammering, jack hammering, pile driving, vibratory rolling, cutting of pavement, concrete or steel and any other activities which result in impulsive or tonal noise generation shall not be carried out for more than three continuous hours, followed by a minimum one hour respite period, unless otherwise approved by the DES, or as approved by EPA (where relevant to the issuing of an EPL).</p> <p>‘Continuous’ includes any period during which there is less than a one hour respite between stopping and re-starting work.</p> <p>No more than two consecutive nights of noise with special audible characteristics and/or vibration generating work will be carried out in the same NCA over any seven-day period, unless otherwise approved by the relevant authority.</p> <p>Note. <i>Special audible characteristics</i> refers to noise with characteristics that can cause annoyance and disturbance, containing noticeable factors such as tonality, low frequency noise, impulsive or intermittent noise events. These characteristics may not be considered noisy in a quantitative sense.</p>	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
N4	<p>To avoid structural impacts as a result of vibration or direct contact with structures, the proposed work will be carried out in accordance with the safe work distances outlined in the Noise and Vibration Impact Assessment (refer Appendix D). Where these distances cannot be met, vibration trials and attended vibration monitoring of the trials will be carried out in order to assess and mitigate vibration impacts.</p> <p>Vibration resulting from construction and received at any structure outside of the proposal shall be limited to:</p> <ul style="list-style-type: none"> a) for structural damage vibration –British Standard BS 7385-2:1993 <i>Evaluation and measurement for vibration in buildings Part 2</i> and/or German Standard DIN 4150: Part 3 – 1999: <i>Structural Vibration in Buildings: Effects on Structures</i> b) for human exposure to vibration – the acceptable vibration values set out in the <i>Environmental Noise Management Assessing Vibration: A Technical Guideline</i> (Department of Environment and Conservation, 2006) which includes British Standard BS 6472-2:1992 <i>Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)</i>. <p>These limits apply unless otherwise approved by the DES through the CEMP.</p>	Contractor	Construction
N5	<p>If vibration intensive equipment is to be used within the minimum working distances for cosmetic damage then attended vibration measurements will be carried out when work commences, to determine “site specific minimum working distances”.</p> <p>Alternative construction methodology with smaller minimum working distances will be adopted if feasible and reasonable, including consideration of avoiding use of vibration generating equipment (e.g. use of hand tools).</p> <p>In addition, vibration intensive work will not proceed within the site-specific minimum working distances unless a permanent vibration monitoring system is installed approximately one metre from the building footprint, to warn operators (e.g. via flashing light, audible alarm, SMS) when vibration levels are approaching the peak particle velocity objective.</p> <p>It is also advisable to carry out building condition surveys of sensitive historical structures before construction work begins.</p> <p>Further mitigation measures related to heritage structures are provided in Section 6.1 of the REF (non-Aboriginal heritage).</p>	Contractor	Construction
N6	<p>Periodic notification (monthly letterbox drop and website notification) detailing all upcoming construction activities, will be delivered to sensitive receivers at least seven days before starting relevant work or other period as approved to by the relevant Community and Place Director.</p>	Contractor	Pre-construction, construction
N7	<p>All employees, contractors and subcontractors will receive an environmental induction.</p>	Contractor	Pre-construction
N8	<p>A noise monitoring program will be implemented to assist in confirming and controlling the site-specific potential for disturbance at particularly sensitive localities at the start of activities and periodically during the construction program as work progresses. The program will be developed in accordance with the Construction Noise and Vibration Management Plan (CNVMP) for the proposal and any approval/licence conditions.</p> <p>The results will be reviewed to determine if additional mitigation measures are required. All measurements will be carried out in accordance with Australian Standard 1055.2018 – <i>Acoustics – Description and measurement of environmental noise</i>.</p>	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
N9	The noise levels of plant and equipment will not exceed the maximum sound power and pressure levels outlined in <i>EMF-NV-GD-0060 Construction Noise and Vibration Guideline (Public Transport Infrastructure)</i> (Transport for NSW, 2023a).	Contractor	Construction
N10	Loading and unloading of materials/deliveries will occur as far as possible from sensitive receivers. Site access points and roads will be selected as far as possible away from sensitive receivers. Dedicated loading/unloading areas will be shielded if close to sensitive receivers. Delivery vehicles will be fitted with straps rather than chains for unloading, wherever possible.	Contractor	Construction
N11	Vehicle movements will be routed away from sensitive receivers and scheduled during less sensitive times. The speed of vehicles will be limited and the use of engine compression brakes would be minimised. On-site storage capacity will be maximised to reduce the need for truck movements during sensitive times.	Contractor	Construction
N12	Stationary noise sources will be enclosed or shielded to the greatest extent possible while ensuring the occupational health and safety of workers is maintained.	Contractor	Construction
N13	Structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers will be used (where practicable).	Contractor	Construction
N14	Operational mitigation measures will consider: <ul style="list-style-type: none"> control noise at the source (e.g. use of track lubrication, soft rail pads, and welding to smooth discontinuities) control noise in transmission (e.g. consideration of new continuous noise barrier about 5.5 metres high and 250 metres long, to replace the existing barrier (subject to detailed design)) control noise at the receiver (e.g. an Operational Noise and Vibration management Plan will be developed and implemented, including consideration of architectural treatments for affected receivers and installation for Automatic Warning Systems (AWSs) and train-based warning systems instead or horn use. 	Contractor	Construction and operation
N15	Where construction noise management levels are exceeded after implementation of the standard mitigation and management measures, Transport's <i>Construction Noise and Vibration Guideline</i> (Public Transport Infrastructure) recommends further measures such as project and specific notifications, verification monitoring and respite periods, based on receiver perception of the noise. Mitigation measures that could be considered include the following: <ul style="list-style-type: none"> operational measures such as horn testing in other locations such as the Main Line, as well as horn testing restricted to day-time period only temporary noise barriers in and around the temporary stabling locations temporary relocation for the most affected residential receivers. 	Contractor	Construction, operation
N16	Transport will confirm the application of additional mitigation measures (refer Table 6-18) at each receiver and implement the measures during detailed design/construction planning and construction as relevant.	Transport, Contractor	Detailed design, construction, operation

The CNVG – PTI provides practical guidance on how to minimise, to the fullest extent practicable, the impacts on the community from airborne noise, ground-borne noise and vibration generated during the construction of Transport projects. This is managed through the application of all feasible and reasonable mitigation measures. Where exceedances are still expected to occur after standard mitigation measures have been applied, the CNVG – PTI recommends implementing additional mitigation measures. These mitigation measures are specified within the CNVG – PTI and presented in Table 6-18.

The provision of additional mitigation is based on the predicted exceedances above RBLs and when the exceedances occur. The construction noise contours in Appendix D indicate where these additional mitigation measures should be applied in accordance with the CNVG – PTI. Transport would confirm the application of these at each receiver and implement the measures during detailed design/construction planning and construction as relevant.

Table 6-18 Additional mitigation measures during construction

Time period	dB(A) above RBL				
	0 – 10 Noticeable	>10 – 20 Clearly audible	20 – 30 Moderately intrusive	>30 Highly intrusive	≥75
Standard hours: Weekday (7am - 6pm) Saturday (8am - 1pm) Sunday/public holiday (nil)	-	-	PN, V	PN, V	PN, V SN
Out-of-hours work period 1: Weekday (6pm - 10pm) Saturday (7am - 8am, 1pm - 10pm) Sunday/public holiday (8am - 6pm)	-	PN, RP ³ , DR ³	PN, V, SN, RO, RP ³ , DR ³	PN, V, SN, RO, RP ³ , DR ³	-
Out-of-hours work period 2: Monday - Saturday (midnight - 7am, 10pm – midnight) Sunday/public holiday (midnight – 8am, 6pm - midnight)	PN	PN, V, SN, RO ⁴ , RP ³ DR ³	PN, V, SN, RO ⁴ , RP ³ DR ³	PN, V, SN, RO ⁴ , RP ³ DR ³ , AA	-

Notes:

- Action level is $L_{Aeq(15\text{ minute})}$ noise level above background (RBL) - qualitative assessment of noise levels
- The following abbreviations have been used (refer to Appendix D for further details):
 - PN: Project notification
 - V: Verification monitoring
 - SN: Specific notification
 - RP: Respite period
 - DR: Duration respite
 - RO: Project specific respite offer
 - AA: Alternative accommodation
- Respite periods and duration reduction are not applicable when work is carried out during OOHW Period 1 Day only (ie, Saturday 7am-8am and 1pm-6pm, Sundays/public holidays 8am-6pm)
- Respite offers during OOHW Period 2 are only applicable for evening periods (ie, Sundays/public holidays 6pm-10pm), and may not be required if a respite offer has already been made for the immediately preceding OOHW Period 1.

6.3 Traffic and transport

6.3.1 Methodology

This chapter provides an assessment of the potential traffic and transport impacts as a result of the proposal. The assessment methodology included:

- a desktop assessment of the existing traffic and transport conditions in and around Moss Vale Station, including review of a Traffic, Transport and Access Impact Assessment prepared for the proposal by SMEC in August 2023 (SMEC, 2023).
- a high-level assessment of the impacts associated with construction and operation of the proposal
- identification of mitigation measures to manage impacts.

6.3.2 Existing environment

Moss Vale Station and Stabling Yard

Moss Vale Station is located on the ARTC North - South Corridor serviced by rolling stock and coaches operated by NSW TrainLink. The station is also currently serviced by a local taxi stand, commuter parking and informal 'kiss and ride' interchange functions. The next stations on the rail network from Moss Vale are Burradoo Station (to the north) and Exeter Station (to the south).

The station consists of two platforms, in a double side formation and has a distinctive wide island platform, which is connected to the station entrance and the street by a pedestrian overpass. Platform 1 on the western side of the station provides services to Campbelltown and Central Station in Sydney City. Platform 2 provides services travelling to Stations on the southern corridor in NSW and into the Australian Capital Territory and Victoria. Both platforms have hourly services running over weekday peak periods (ie, Monday to Thursday 6am to 10am and 3pm to 7pm). Regional and goods train services travel through Moss Vale Station during these peak periods.

The stabling yard provides facilities to perform operational activities for the current fleet of six (two-car) Endeavour trains and is not open to the public. The stabling yard is accessible by rail staff via the rail corridor and from Lackey Road via a driveway access for various activities.

Pedestrian facilities

Accessibility to the station precinct including platforms 1 and 2 and coach stop is via Dalys Way is currently restricted for people with limited mobility, primarily due to stair access to the footbridges. The station is accessed by pedestrians via the footbridges from Argyle Street and Lackey Road, as well as the footpath along Dalys Way. The Argyle Street footbridge is accessed by a ramp (on the Argyle Street side) and a staircase (on the station side). The Lackey Road footbridge is accessed by a staircase on Lackey Road and connects to Dalys Way. Dalys Way also connects to a commuter car park north of the station (via a pedestrian crossing), and connects with Argyle Street. The walking distance to the station from the northern commuter car park is about 250 metres, and from the Argyle Street and Lackey Road entrances is about 90 metres and 180 metres respectively.

Pedestrians can cross from one side of the rail corridor to the other via the footpath on Dalys Way and the Lackey Road footbridge, or by using the Argyle Street footbridge and Lackey Road footbridge.

NSW TrainLink employees access the stabling yard by crossing the main line from the northern end of platform 1. Staff operating rolling stock into the yard from the main line (ARTC network), exit the train within the yard and walk past the refuelling point to cross the track adjacent to the platform 1 ramp (northern end).

Sydney Trains (Rail Infrastructure Manager) and/or approved contractors may access the yard in the same manner or through access gates located at the northern end of the yard and refuelling point (southern end).

Bicycle network and facilities

Bicycle facilities at Moss Vale Station include an undercover bicycle parking area with six bicycle parking spaces. Wingecarribee Shire Council's Bicycle Strategy maps shows existing bicycle routes to the eastern side of the station adjacent to Argyle Street.

Public transport

In addition to train services, NSW TrainLink operates various coach services from the entrance to the station on Dalys Way. There are a number of bus stops within walking distance from Moss Vale Station, including at the station forecourt which includes a bus turnaround area and is serviced by the SH100 bus route. Bus stops are also located east of the station on Argyle Street, with the closest one being about 60 meters from the proposal area and about 200 metres northwest of the station on Garret Street.

Road network

The key roads in the vicinity of the proposal include Argyle Street (east of the station), Lackey Road (west of station and the stabling yard) and Dalys Way (north of the station) as shown in Figure 1-2. Argyle Street is a two-way state highway (A48) which runs in a north-south direction and forms Moss Vale Road to the north of Moss Vale town centre and the Illawarra Highway to the south. Argyle Street joins Dalys Way to provide traffic access to Moss Vale Station and two commuter car parks.

Dalys Way is a two-way, single lane local road which provides public access to the station and has a speed limit of 10 kilometres per hour. Lackey Road is a two-way, single lane local road which generally runs north-south alongside the rail line with unrestricted parking on the western side of the road. Lackey Road primarily provides access to nearby residential and industrial areas. Both Argyle Street and Lackey Road have a posted speed limit of 50km/h.

Parking

Interchange facilities include dedicated off-street commuter car parks including:

- a commuter car park in the station forecourt (37 car spaces including three accessible spaces, plus three motorcycle parking spaces and two Coach)
- an off-street commuter car parking facility off Dalys Way, north of Moss Vale Station (56 car spaces)
- an off-street car park off Argyle Street, south of Moss Vale Station (15 car spaces).

Within the station forecourt car park, there is a signposted 10-minute drop-off point for one car which is currently used as a 'kiss and ride' facility.

Four one-hour restricted parking spaces are located at Diamond Jubilee Park off Argyle Street next to the station. There are a limited number of other short term on-street parking spaces provided to the east of the station along Argyle Street. This parking is time restricted to one-hour between 8.30am and 6pm on weekdays and between 8.30am and 12.30pm on Saturdays. Further restricted and unrestricted street parking is available throughout the Moss Vale town centre. Unrestricted, unmarked on-street parking spaces are also available along Lackey Road and other local streets in the vicinity of the station.

6.3.3 Potential impacts

Construction

Pedestrian facilities

Construction of the proposal would require temporary disruptions to the existing pedestrian accesses surrounding the station and stabling yard, particularly during construction of the lifts, footbridge and footpaths. The Argyle Street footbridge would be required to be closed for most of the construction period, which would require pedestrians to access the station via Dalys Way. This work would require diversion routes to safely access the station, which would increase overall travel time for pedestrians. Cross-corridor access across the station would also be maintained for pedestrians where possible. Work in and around the station buildings

would also require diversions and may increase congestion on the platform when areas are under construction. Diversions would also be in place at times for staff working in the stabling yard.

Bicycle network and facilities

The undercover bicycle racks would be accessible during construction. However, diversion routes would be in place around the station which would impact overall travel times.

Public transport

Train, coach and bus services would remain operational during construction of the proposal. The proposal would not affect scheduling of public transport servicing the station or the surrounding area. Certain construction activities would need to occur outside standard hours and would include work during weekend rail possession periods (eg Saturday to Sunday 7am to 6pm). Rail possession periods are scheduled closures that occur regardless of the proposal when part of the rail network is temporarily closed and trains are not operating.

Minor travel delays may be experienced for coach and bus- operations travelling on the surrounding road network and accessing the station. The commuter car park in the station forecourt would be used as a temporary construction ancillary facility, however provision for coaches, buses and taxis to access the station would be maintained.

The proposed upgrade to the bus stop on Argyle Street would require the bus stop to be temporarily relocated a short distance away while work is carried out at the bus stop. This is not expected to affect commuters and the temporary arrangement would be signposted.

During construction in the stabling yard, a temporary stabling yard would be established adjacent to Platform 1 and within the ARTC Yard. Access would be provided via Lackey Road and Argyle Street enabling NSW TrainLink operations and train stabling activities to proceed. The temporary stabling yard would not affect existing train services.

Road network

The proposal would generate an increase in traffic volumes on the local road network, including about 45 light vehicles per day and 12 heavy vehicles per day. Of these, about 15 light vehicles and 10 heavy vehicles per day would enter and exit the site off Lackey Road for construction at the stabling yard. Heavy vehicle traffic in particular may contribute to minor traffic delays as they enter and exit the site, however the traffic volumes would be a minor increase compared to existing road network volumes. Further, it is anticipated construction staff would access the site before 7am and leave the site after 6pm. As such, most light vehicle movements would occur outside surrounding road network peak hours, lessening the impact to existing road network volumes.

A lane closure would be required along Lackey Road for intermittent periods for the majority of the construction period to accommodate construction activities (eg noise barrier construction). While the single lane closure aims to minimise disruptions to traffic flow, Lackey Road would experience traffic delays near the lane closure. Private property access would be maintained.

Other minor traffic delays may be experienced at times on Dalys Way and Argyle Street, associated with all other construction vehicles entering and exiting the proposal area including ancillary facilities.

Parking

The use of the commuter car park in the station forecourt for a construction ancillary facility would require temporarily removing the majority of parking spaces in the forecourt. Provision for accessible parking spaces and a small number of other parking spots would be maintained for station/train staff, as well as space for the 'kiss and ride' drop-off area. Vehicular access would be subject to traffic management measures to manage public and construction vehicles entering and exiting the forecourt, which would result in minor travel delays. The use of this car park for an ancillary facility and a construction area would impact the public's ability to access the station, increasing demand in the commuter car park north of the station (off Dalys Way) and in the

streets surrounding the station. This would also increase walking distances required leading to longer overall travel times. Access to the commuter car park off Dalys Way (north of the station) would be maintained during construction, however there may be temporary delays in accessing the car park at times due to construction of the mobile train simulator.

The commuter car park south of the station off Argyle Street would also be used as an ancillary facility, which would impact commuter parking for the duration of the construction period.

The implementation of a lane closure along Lackey Road would also temporarily remove capacity in the unmarked street parking in the vicinity of the lane closure. Although existing demand along Lackey Road is not high, this may contribute to an increased demand in street parking in the surrounding area at times.

Construction would also require the temporary removal of the four one-hour restricted parking spaces at Diamond Jubilee Park off Argyle Street. This would affect the public's ability to access the park, station and nearby shops and businesses, requiring them to find other parking spaces in the area.

During construction of the stabling yard, there is the potential that construction staff may use existing on-street parking. This impact would be negligible during rail possession periods where commuter services would not be running and public demand for street parking is dramatically reduced.

A construction Traffic Management Plan (TMP) would be prepared to mitigate the impacts of construction traffic parking where possible. Prior notice would be provided to customers where a temporary loss to existing car parking is required during construction, and signage erected to advise of temporary arrangements. Construction workers would be required to park around the proposal area (avoiding the commuter car parks) and be encouraged to car-pool or use public transport services.

Operation

Pedestrian facilities

The proposal would improve accessibility and pedestrian features at the station, including the installation of lifts, removing the requirement to use stairs to access the footbridges. Accessibility upgrades to the footbridges, ramps/grades, footpaths, station buildings, platforms and interchange facilities (including pedestrian crossings at Lackey Road and Dalys Way, seating, signage, and upgrades to the existing bus stop and taxi drop-off at Argyle Street) would also improve the user experience around the station.

Accessibility at the stabling yard would also be improved, including installing new footpath areas and safer egress for rail staff.

The proposal is expected to increase demand by customers, and proposed upgrades to pathways and platforms were designed to accommodate predicted customer volumes forecast for the year 2036 plus 15 per cent (SMEC, 2023).

Bicycle network and facilities

New bicycle parking facilities would be provided within the station forecourt area as part of the proposal. Improvements to accessibility such as regrading ramps/slopes and levels and constructing new footpaths would assist cyclists moving through the station precinct.

Public transport

The proposal does not include changes to bus, coach or rail services and would not impact the operation (service operation or timetabling) of public transport in the vicinity of Moss Vale Station. The proposal would improve accessibility and active transport access to Moss Vale Station which may increase rail patronage. The existing bus parking area in the station forecourt would be relocated slightly north to provide adequate space for manoeuvring for buses. The upgraded footpath along Dalys Way would provide pedestrian access between the bus parking area and the station.

The upgraded stabling area would accommodate and service the new regional intercity trains which would service the network and provide an improved experience for customers. The new trains would be fuelled by the

new diesel exhaust fluid system which would result in cleaner emissions (refer Section 6.11 for air quality impacts).

Road network

Operation of the proposal would not generate additional traffic on the surrounding road network, except for the periodic mobilisation of the Mobile Train Simulator to the compound site via semi-trailer. Minor delays to commuters may be experienced along Dalys Way when the semi-trailer is arriving and departing. The formalised vehicle entrance to the stabling yard off Lackey Road would create a safer entry and exit point to the stabling yard.

Parking

The formalisation of the commuter carpark in the station forecourt would provide 22 car parking spaces in total (ten less than the current situation), including three accessible spaces and one loading space. The re-configured car park would also provide more adequate space for turnaround of coaches and buses. The current ‘kiss and ride’ feature would be retained. The overall loss of parking spaces in this car park would increase demand in the other commuter car parks and surrounding parking at times. However the parking provided is expected to be sufficient to service the demand at the station for the majority of the time, while accessibility would be improved from Dalys Way to the station.

A staff car park would also be constructed at the new stabling yard with access from Lackey Road. The car park would provide four new parking spaces for rail staff. This would reduce demand for street parking in the vicinity where staff may currently park at times.

6.3.4 Mitigation measures

The mitigation measures in Table 6-19 are recommended to address the traffic, transport and access impacts identified.

Table 6-19 Site specific traffic, transport and access mitigation measures

No.	Mitigation measure	Responsibility	Timing
T1	Prior to commencement of construction, road condition surveys and reports on the condition of roads and footpaths to be affected by construction shall be prepared and provided to Transport for information. Any damage resulting from the construction of the proposal, aside from that resulting from normal wear and tear, shall be repaired at the contractor’s expense.	Contractor	Pre-construction and post-construction

No.	Mitigation measure	Responsibility	Timing
T2	<p>Before the start of construction, a Traffic Management Plan (TMP) will be prepared as part of the CEMP and will include (but not be limited to) the following measures:</p> <ul style="list-style-type: none"> installing adequate road signage at construction work sites to inform motorists, pedestrians and cyclists of the work site to minimise the risk of road accidents and disruption to surrounding land uses maximising safety and accessibility for pedestrians and cyclists allowing for adequate vehicle sight lines for safe entry and exit from the site maintaining access to the station and surrounding businesses and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made) managing impacts and changes to on and off-street parking, and requirements for any temporary replacement provision selecting heavy vehicle haulage routes to minimise impacts on sensitive land uses and businesses managing traffic flows around the area affected by the proposal, including as required regulatory and direction signposting, line marking and variable message signs and other traffic control devices necessary for the implementation of the TMP. <p>Consultation with the relevant roads authorities will be carried out during preparation of the construction TMP. The performance of traffic arrangements must be monitored during construction.</p>	Contractor	Pre-construction, construction
T3	Communication will be provided to the community and local residents to inform them of changes to parking, pedestrian/cyclist access and traffic conditions, including vehicle movements and anticipated effects on the local road network relating to site work.	Contractor	Pre-construction, construction
T4	Road Occupancy Licences for temporary road closures will be obtained, where required.	Contractor	Pre-construction, construction
T5	Pedestrian access will be maintained throughout construction as much as possible so pedestrian connectivity impact is minimised as a part of the work. Suitable and safe diversion routes are to provided where required.	Contractor	Construction
T6	Consultation will be carried out with local and regional bus companies before and during construction.	Contractor	Pre-construction, construction
T7	Consultation will be carried out with emergency services before and during construction to confirm any diversions during construction and any operational road network changes.	Contractor	Pre-construction, construction
T8	Consultation will be carried out with property owners and occupiers regarding changes to access arrangements and temporary removal of on-street parking.	Contractor	Pre-construction, construction
T9	Consultation will be carried out with council regarding potential impacts to parking during the construction period.	Contractor	Pre-construction, construction

6.4 Urban design, landscape and visual amenity

6.4.1 Methodology

A Landscape Character and Visual Assessment (LCVIA) was completed for the proposal (AECOM, 2023) (refer Appendix E). The LCVIA provides a high-level assessment of visual impacts during construction and assesses landscape character and visual impacts at operation.

The landscape character component of the assessment was carried out in accordance with *Environmental Impacts Assessment Practice Note – Guideline for Landscape Character and Visual Impact Assessment EIA-N04* (Transport, 2023), with more detailed guidance taken from *Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3)* published in 2013, developed by the Landscape Institute and Institute for Environmental Management, UK (GLVIA3). The visual impact component of the assessment was completed in accordance with GLVIA3.

A study area comprising a 750 metre radius from the proposal area was selected for the assessment. An impact grading matrix for sensitivity and magnitude was used to assess landscape and visual impacts at operation. Sensitivity relates to the ability of the landscape or view to accept a change (such as the introduction of lifts) without adverse impact on its character/view. Magnitude relates to the degree of change affecting a landscape or viewpoint. The matrix is used to combine the ratings for sensitivity and magnitude to provide an overall rating. Ratings of high and high-moderate are considered to be significant. This matrix is presented in Table 6-20. A qualitative assessment further assigns a rating of Adverse, Neutral or Positive to the impact.

Table 6-20 Landscape character and visual impact grading matrix

Sensitivity	Magnitude			
	High	Moderate	Low	Negligible
High	High	High to Moderate	Moderate	Negligible
Moderate	High to Moderate	Moderate	Moderate to Low	Negligible
Low	Moderate	Moderate to Low	Low	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

6.4.2 Existing environment

Most of the proposal area is located within the existing rail corridor and surrounding land uses are primarily related to urban development, including low density residential development to the west of the station and the Moss Vale town centre to the east. The topography within the proposal area includes a slight slope towards the south. There are no creeks or rivers within the proposal area, although Whites Creek is about 160 metres south of Moss Vale Station (refer Section 6.6).

Landscape character

Landscape character considers the way different components of the environment - both natural (the influences of topography, geology, soils, climate, flora and fauna), and cultural (the historical and current impact of land use, settlement, enclosure and other human interventions) - interact together and are perceived to form a distinct pattern, which gives its sense of place.

Distinct parts of the landscape have been separately defined and mapped as Landscape Character Zones (LCZs) to provide a framework to describe the proposal area and surrounds. Six LCZs have been identified within the study area (refer to Figure 6-2):

- LCZ 1: Rail Corridor
- LCZ 2: Open Space
- LCZ 3: Residential

- LCZ 4: Town Centre
- LCZ 5: General Industrial
- LCZ 6: Education.

Visual environment

Visual receivers are individuals and/or groups of people whose views may be affected by the proposal. Potential visual receivers of the proposal include:

- rail commuters accessing or passing through the station
- commuters and passers-by on nearby roads (pedestrians, cyclists, motorists)
- workers or visitors to the nearby business enterprises and community facilities
- residents in adjacent streets to the east and west of the station.

Ten representative viewpoints were identified based on factors such as proximity to the proposed changes, number of visual receivers at each location, and the type of visual receivers. Viewpoints were chosen to assess the changes from publicly accessible locations, although some viewpoints were used to estimate the changes seen from private locations such as residences. The viewpoints assessed are described in Table 6-21 and shown in Figure 6-3.

Table 6-21 Representative viewpoints

Viewpoint and location	Viewpoint rationale	Distance
1: Leighton Gardens	Viewpoint selected to assess changes to the view from the upper portion within Leighton Gardens, next to Diamond Jubilee Park. It is taken from the picnic bench within the park, looking north towards the proposal.	25m
2: Moss Vale Hotel	Viewpoint selected to assess changes to the view from the Moss Vale Hotel, which is across the road from the proposal on Argyle Street and about 90 metres from the lifts over the tracks on the eastern edge of Moss Vale Station.	15m
3: Diamond Jubilee Park	Viewpoint selected to assess changes to the view from the Moss Vale Station entrance at a bench within Diamond Jubilee Park. This park is a small pocket park with a water fountain, near a small parking area to the south of the former station master’s residence.	0m
4: Moss Vale Station Platform 2	Viewpoint selected to assess changes to the view from the station platform at Moss Vale Station, looking north east towards the pedestrian overpass.	25m
5: Moss Vale Station Dalys Way	Viewpoint selected to assess changes to the view from the station entry at Moss Vale Station, looking north towards the station forecourt.	5m
6: Moss Vale Station Platform 1	Viewpoint selected to assess changes to the view from the station platform at Moss Vale Station, looking north west towards Lackey Road and the western pedestrian overpass.	85m
7: Dalys Way	Viewpoint selected to assess changes to the view from Dalys Way, looking west toward the western existing footbridge and to Lackey Road.	5m
8: Lackey Road at Garrett Street Intersection	Viewpoint selected to assess changes to the view at the intersection between Lackey Road and Garrett Street looking toward north-north east.	10m
9: Lackey Road at Commercial Car Park	Viewpoint selected to assess changes to the view on Lackey Road from the entrance to a commercial car park, looking toward the south east.	25m
10: Lackey Road North	Viewpoint selected to assess changes to the view at Lackey Road, looking south-east toward the southern portion of the stabling yard.	10m

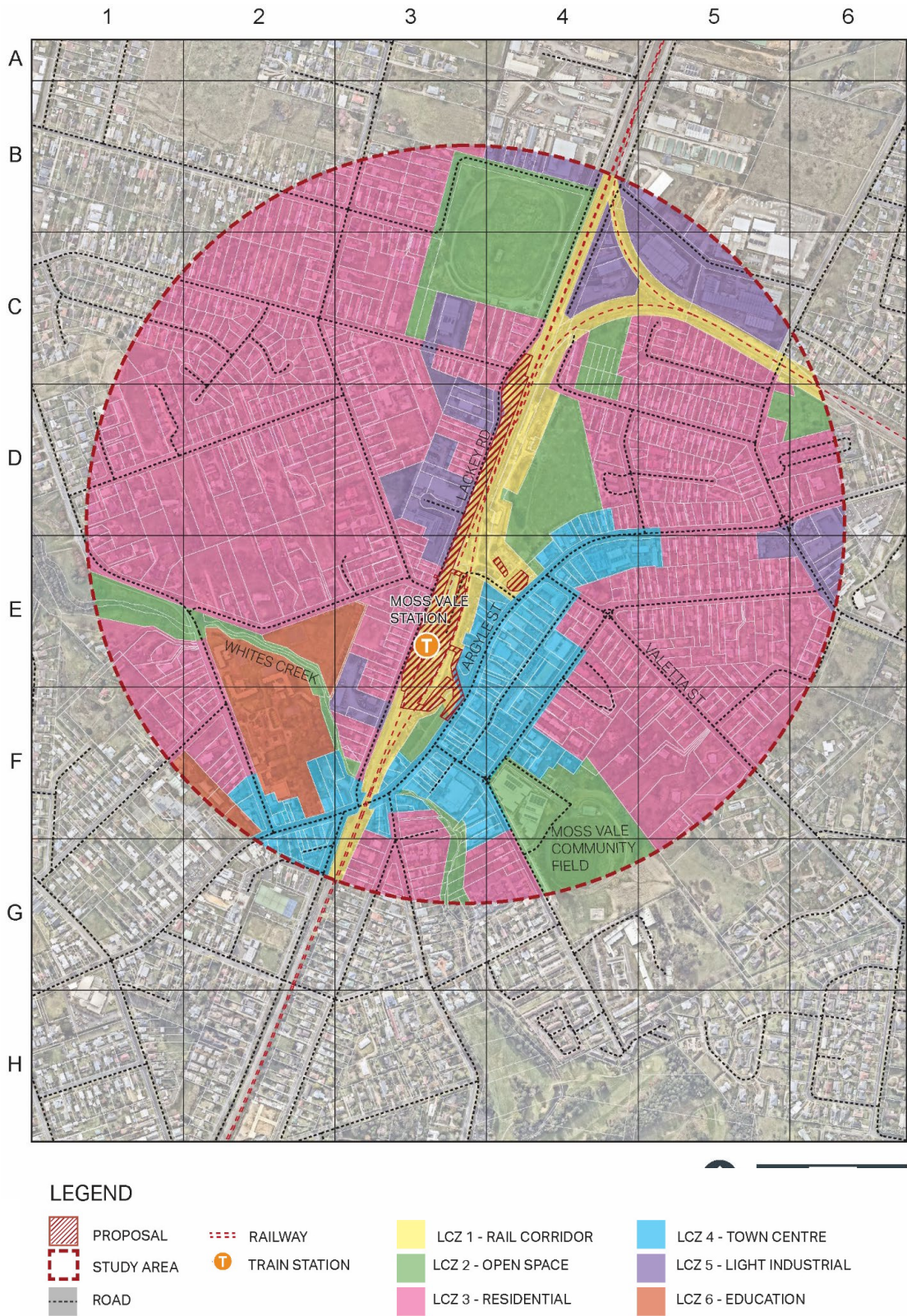


Figure 6-2 Landscape Character Zones within the study area (Source: AECOM, 2023)

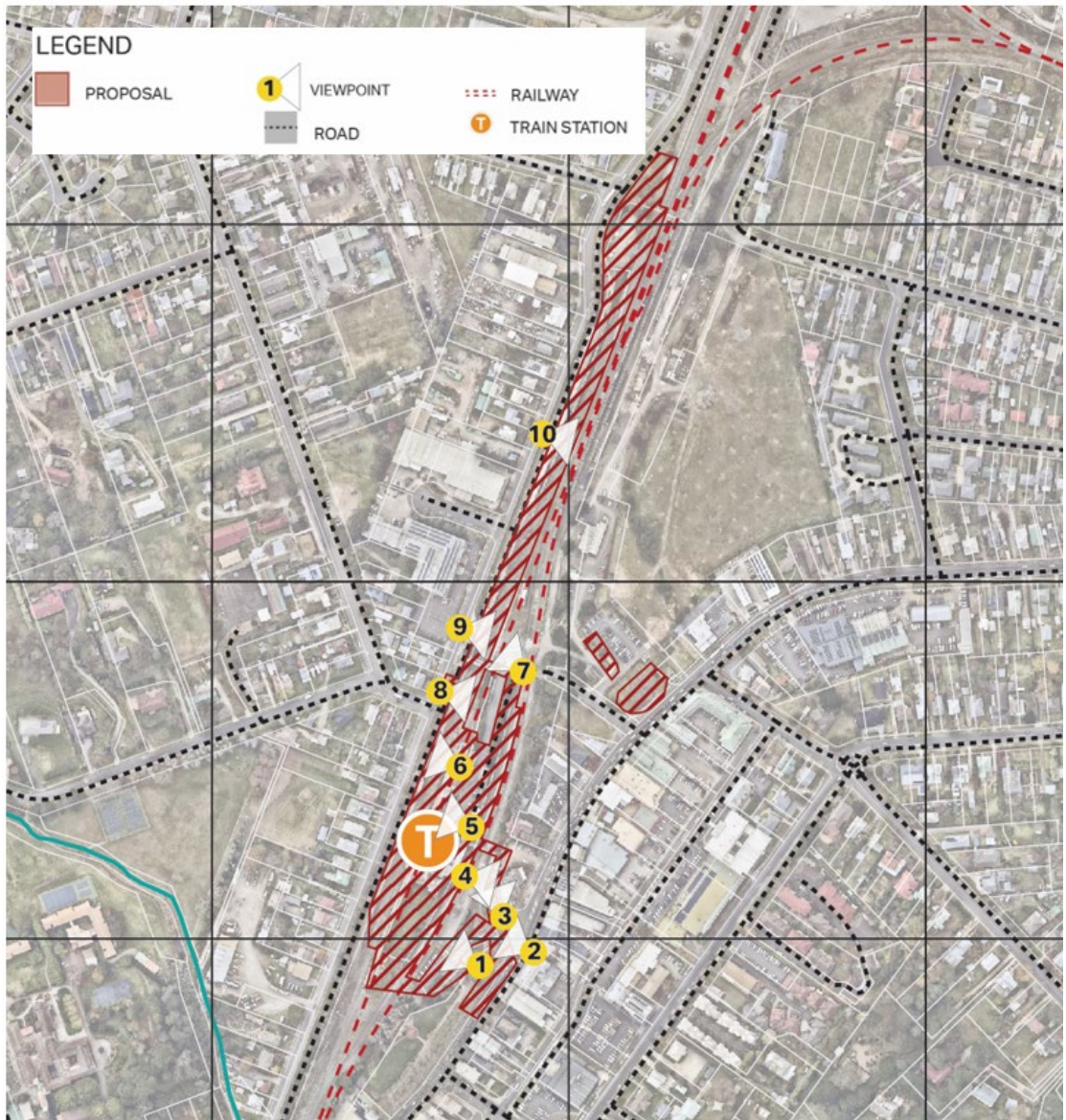


Figure 6-3 Representative viewpoints for visual impact assessment (Source: AECOM, 2023)

6.4.3 Potential impacts

Construction

Construction of the proposal would have visual impacts for several receivers, including commuters, nearby residents and people accessing the Moss Vale town centre. Construction activities would involve several visual elements, with the most visually prominent being the construction of the three lifts, upgrade of the footbridges, upgrade work to the station entrances, traffic control (including a single lane closure along Lackey Road at intermittent periods for about 40 weeks), and installation of the noise barrier along the western side of the stabling yard. Construction work on the platform and station buildings would be difficult to see from outside of the rail corridor and would therefore only impact users of the station/rail facilities rather than the general public outside of the station.

The most sensitive visual receivers would be residential receivers viewing the changes from their homes. These receivers would see the changes from close proximity and potentially from within living areas of their homes, particularly residents on Lackey Road, noting vegetation screening and/or fencing would provide screening for several residents. Other groups who would view the construction activity include rail commuters, passers-by on Argyle Street and Lackey Road and workers or visitors to the nearby industrial and commercial precincts.

Most receivers would have a low sensitivity to the changes (being passers-by and rail commuters), with only a limited number having higher sensitivity (eg residents along Lackey Road). Overall, views to the construction activity and ancillary facilities due to the proposal would be relatively minor. They would be consistent with similar temporary construction work sites and activities at rail stations, and transitory over the construction period of the proposal. Mitigation measures have been identified and would be put in place to assist in minimising visual impacts.

Operation

Visual impact assessment

An assessment of the visual sensitivity and magnitude of change at the 10 representative viewpoints was carried out for the operational phase of the proposal. The results of this assessment are provided in Table 6-22.

Table 6-22 Summary of visual impact assessment ratings

Viewpoint	Sensitivity	Magnitude	Overall rating
1: Leighton Gardens	Moderate	Low	Moderate – Low (neutral)
2: Moss Vale Hotel	Moderate	Low	Moderate – Low (neutral)
3: Diamond Jubilee Park	Moderate	Moderate	Moderate (neutral)
4: Moss Vale Station Platform 1	Moderate	Moderate	Moderate (adverse)
5: Moss Vale Station Dalys Way	Low	Moderate	Moderate – Low (neutral)
6: Moss Vale Station Platform 2	Low	Moderate	Moderate – Low (neutral)
7: Dalys Way	Low	Moderate	Moderate – Low (neutral)
8: Lackey Road at Garrett Street Intersection	Moderate	Moderate	Moderate (neutral)
9: Lackey Road at Commercial Car Park	Moderate	Moderate	Moderate (neutral)
10: Lackey Road North	Low	Moderate	Moderate – Low (neutral)

Photomontages were produced to illustrate the proposed changes from key viewpoints. These are shown in Figure 6-4 to Figure 6-13.



Figure 6-4 Viewpoint 3: Existing view from the park bench within Diamond Jubilee Park looking north west towards Moss Vale Station entry (Source: AECOM)



Figure 6-5 Viewpoint 3: View after proposal from the park bench within Diamond Jubilee Park looking north west toward Moss Vale Station entry (Source: AECOM)



Figure 6-6 Viewpoint 4: Existing view looking northeast from Platform 2 at Moss Vale Station (Source: AECOM)



Figure 6-7 Viewpoint 4: View after proposal looking north east from Platform 2 at Moss Vale Station (Source: AECOM)



Figure 6-8 Viewpoint 5: Existing view from Moss Vale Station looking north along Dalys Way (Source: AECOM)



Figure 6-9 Viewpoint 5: View after proposal from Moss Vale Station looking north along Dalys Way (Source: AECOM)



Figure 6-10 Viewpoint 8: The existing view from the intersection of Lackey Road and Garrett Street, looking north along Lackey Road towards the station entrance (Source: AECOM)



Figure 6-11 The view after proposal from the intersection of Lackey Road and Garrett Street, looking north along Lackey Road towards the station entrance (Source: AECOM)



Figure 6-12 The existing view from Lackey Road looking south-east toward the southern portion of the stabling yard (Source: AECOM)



Figure 6-13 Viewpoint 10: The view after proposal from Lackey Road looking south-east toward the southern portion of the stabling yard (Source: AECOM)

The station precinct, while elevated above the landscape to the west, is visually shielded by buildings within the town centre. Views to the station are primarily seen by visual receivers directly surrounding the station, including receivers passing the station in vehicles and trains.

The most visually prominent changes resulting from the proposal include installation of three lifts, changes to the footbridges, removal of vegetation and changes to the footpaths and station entrances, noise barrier installation and stabling yard infrastructure.

Overall, the visual impact to receivers has been assessed between Low (neutral) to Moderate (adverse), with no viewpoints assessed as having a significant change in views (ie overall ratings of High to Moderate or High). The proposed changes include an upgrade to an existing rail precinct with modern additions to the rail concourse (such as the lifts). These changes are considered appropriate given the benefit of the proposal in comparison to the low number of sensitive visual receivers that would see the changes.

The visual sensitivity of the receivers surrounding the station (particularly from the more sensitive residential receivers to the west of the rail corridor) to the operational elements of the proposal is generally low given views are largely obscured by screening vegetation along the rail corridor edge and private residences.

The assessment resulted in a 'neutral' qualitative rating from nine out of the 10 viewpoints. This is due to:

- the visually recessive nature of most of the changes within the greater view from most viewpoints
- the addition or upgrade of rail infrastructure within an existing rail corridor.

One 'adverse' qualitative rating was due to the change to the suburban station setting with the addition of the proposed lift structures, which would raise the visual prominence of the station within the suburban setting. Overall, the design and materiality of the proposed elements would fit within the greater suite of architectural elements within the wider rail corridor.

Shadow analysis

A shadow analysis was undertaken to assess the potential visual impact of the up to 5.5-metre-high noise barrier along the boundary of the stabling yard on Lackey Road given the proximity of the proposed noise barrier to residential visual receptors on Lackey Road. The analysis considered the shadows that would be generated by the noise barrier during Spring, Summer, Autumn and Winter at 9am, 12pm and 3pm. The shadow diagrams were referred to when assessing the visual impact at Viewpoint 10 on Lackey Road.

The analysis concluded there would be minimal overshadowing of residential properties at this viewpoint and as such, the magnitude of change due to the proposal at Viewpoint 10 would not be affected by potential overshadowing impacts.

Mitigation measures included in Section 6.4 include consideration of articulation of the noise barrier to provide opportunities for planting to reduce the visual prominence of the noise barrier and increase the visual amenity along the street, as shown in Figure 6-14.



Figure 6-14 Example of articulation of the proposed noise barrier and planting along Lackey Road to reduce the visual prominence of the noise barrier and provide increased visual amenity within the residential streetscape

Landscape character assessment

A summary of the potential impacts to landscape character is provided in Table 6-23. The proposal would be located within LCZ 1: Rail Corridor, and adjacent to LCZ 2: Open Space, LCZ 3: Residential, LCZ 4: Town Centre and LCZ 5: General Industrial (refer Figure 6-2). Due to the physical separation of LCZ 6: Education from the proposal and the relatively flat topography and considerable vegetative screening around the station precinct, LCZ 6 would not be affected by the proposal and has therefore not been assessed in detail.

The proposal would result in a moderate change to landscape character for three LCZs (LCZ 1: Rail Corridor, LCZ 2: Open Spaces and LCZ 3: Residential), and Low or no change to three LCZs (LCZ 4: Town Centre, LCZ 5: General Industrial and LCZ 6: Education). No LCZ was considered to have a significant level of change to landscape character (ie, a rating of High to Moderate or High). The heritage items and conservation areas associated with the stations and its surrounds have resulted in raised sensitivity within LCZs 1: Rail Corridor, LCZ 2: Open Space and LCZ 3: Residential.

While the upgrade of existing rail infrastructure would not result in a change to the character of the greater LCZ 3: Residential, the addition of three larger structures (the lifts) would result in the modernisation of rail infrastructure within the rail corridor. This would result in a change in the existing suburban character of the station precinct, elements of which are heritage-listed.

Visual changes within the landscape surrounding the station (primarily LCZ 3: Residential and LCZ 4: Town Centre) vary between no changes to moderate, however, the sensitivity of both the LCZs lies predominantly in the heritage setting of the local suburb. Changes to the road verge and station entrance within this context were considered to have a moderate impact.

Mitigations and management measures are included in Section 6.9.

Table 6-23 Summary of landscape character impact assessment ratings

LCZ	Anticipated change	Sensitivity to change	Magnitude of change	Significance of impact
LCZ 1: Rail Corridor	Most of the proposal elements in the station and stabling yard would be visible from within this LCZ.	The sensitivity of LCZ 1 is considered Moderate. The susceptibility to change to LCZ 1 is influenced by the utilitarian character of the rail corridor, and vegetation surrounding the station which assists in visual screening and softening. The value of landscape is influenced by the heritage importance of items within the LCZ, and vegetation within the rail corridor, which is typically valued in urban areas. Unusually at Moss Vale vegetation is included within the station platforms, and the level of care with which the station precinct is well maintained.	The magnitude of change is considered moderate. The magnitude of change for LCZ 1 is influenced by the largest elements of the proposal which would be visually prominent in this LCZ (eg lifts, footbridges). The lifts would comprise larger pieces of infrastructure on either side of the station. Other upgrade elements within the station would be of a more modest scale, similar in size and visual prominence to existing elements. Within the stabling yard, the addition of built structures and a 5.5-metre-high noise barrier along Lackey Road would be of a larger scale than existing. Tree removal and trimming would comprise a considerable change to the rail corridor. The materials proposed would differ from those existing within the station, however would be similar to other upgraded stations. The duration of the proposal would be long-term, with low potential for reversibility.	Moderate (adverse)
LCZ 2: Open Space	Key visible changes within or adjacent to Leighton Gardens and Diamond Jubilee Park would include installation of two new lifts, upgrades to the existing footbridge stairs and walkway, and upgrades at the Argyle Street entrance (including accessibility upgrades to the existing bus stop and taxi drop-off near Diamond Jubilee Park, seats, signage and landscaping).	The sensitivity of LCZ 2 is considered moderate. The susceptibility to change of Leighton Gardens and Diamond Jubilee Park is influenced by its location at the station entrance, and the recreational and environmental value of the open space, which contains heritage items. The open space to the north adjacent to the stabling yard is undeveloped land which is also used to provide access to the stabling yard and has a more utilitarian aesthetic.	The size of anticipated change in LCZ 2 is considered Low. The magnitude of change is influenced by the following: <ul style="list-style-type: none"> proposal elements introduced directly within this LCZ would be of small scale and characteristically 'fit' within their landscape setting, eg the provision of seating, signage or lighting within a park used as an entry point for the station proposal elements introduced next to this LCZ, while substantial in scale in some instances, would also be characteristic of the LCZ they occur within (LCZ 1: Rail Corridor) and as such, would not affect LCZ 2 the geographical extent of effects of the visible changes would be very small considering the size of the overall LCZ the duration of the visible change would be long term, with little chance of reversibility. However, the changes would 'bed down' into the LCZ as the landscape matures around the new elements providing further screening and reducing visibility to the changes. 	Moderate to Low (Neutral)

LCZ	Anticipated change	Sensitivity to change	Magnitude of change	Significance of impact
LCZ 3: Residential	<p>Key visible changes from the proposal within residential areas adjacent to Lackey Road would include upgrades to the interchange facilities including:</p> <ul style="list-style-type: none"> installation of a new lift and upgrade to the existing footbridge and stairs installation of a pedestrian crossing at Lackey Road a 5.5-metre-high noise barrier within the stabling yard along the boundary with Lackey Road removal or trimming of trees along the boundary of the rail corridor. 	<p>The sensitivity of LCZ 3 is considered moderate. The sensitivity to change is influenced by:</p> <ul style="list-style-type: none"> its proximity to the adjacent rail corridor the topography, built form and existing vegetation within the road verges and within private properties lowers the susceptibility of the overall LCZ to change by limiting the visual prominence of the changes. <p>The value of landscape is influenced by:</p> <ul style="list-style-type: none"> the heritage importance of items within and adjacent to the LCZ vegetation along the edge of the rail corridor, which is typically valued in urban areas, but especially when the vegetation provides a visual buffer between the more utilitarian rail corridor and the residential landscape permanent outlooks of residents from their houses. 	<p>The size of anticipated change in this LCZ is considered Moderate. The size of change is influenced by:</p> <ul style="list-style-type: none"> the size and scale of the proposal within the LCZ (ie, footpath and pedestrian crossing) would be similar to that of the existing road infrastructure, noting the proposed lifts and noise barrier would be positioned in the adjacent LCZ1: Rail Corridor. The quality of the design of the lifts would be in keeping with that of a station entrance at the boundary of a residential neighbourhood, however, the utilitarian character of a noise barrier, designed for function rather than aesthetics, would be at odds with the adjacent character of the residential street removal and trimming of vegetation at the boundary between the rail corridor and the residential street would visually expose the station slightly to the street the proposed pedestrian footpath and crossing would be in keeping with the existing character of the footpath and road corridor within the LCZ the geographical extent of the changes would be small, limited to the boundary of the rail corridor directly adjacent to the station and stabling yards. A majority of the LCZ would be unaffected by the changes. 	Moderate (adverse)
LCZ 4: Town Centre	<p>As the key visible changes from the town centre would include the upgrade of a bus shelter and potential pavement upgrades, a full assessment of impact within this LCZ has not been carried out. These outcomes are considered similar to routine maintenance within a commercial setting in a central main road.</p>	N/A	There would be no change to the LCZ due to the proposal.	No change

LCZ	Anticipated change	Sensitivity to change	Magnitude of change	Significance of impact
<p>LCZ 5: General Industrial</p>	<p>There would be no proposal elements introduced directly within this LCZ. Key visible changes to this LCZ would include:</p> <ul style="list-style-type: none"> installation of the lift and upgrade to the existing footbridge between Lackey Road and Dalys Way, upgrades to the interchange facilities, installation of a raised pedestrian crossing across Lackey Road and landscaping. <p>Visible changes at the stabling yard would include:</p> <ul style="list-style-type: none"> extension of around 130 metres of stabling track upgrade of about 280 metres of CSR (above ground infrastructure only) installation of a new asphalt pathway provision of new amenities and structures a 5.5-metre-high noise barrier along the boundary with Lackey Road. 	<p>The sensitivity of LCZ 5 is considered low. The sensitivity to change of this LCZ is influenced by:</p> <ul style="list-style-type: none"> its proximity to the rail corridor and the proposed changes small pockets of light industrial development, rather than larger areas of land, which makes the LCZ more susceptible to changes at the perimeter of the LCZ the utilitarian, industrial character of the LCZ, with function a key driver of design over aesthetic appeal. <p>The value of landscape is low, it has no heritage value, minimal recreational or ecological value, and comprises industrial lots with limited landscaping surrounding each block.</p>	<p>The magnitude of anticipated change in this LCZ is considered to be low. The size of change is influenced by the following:</p> <ul style="list-style-type: none"> the scale of the visible changes would be predominantly on par with existing infrastructure within the rail corridor, with the exception of the noise barrier and lifts the geographical extent of effects would be very small, with the changes proposed to occur near the boundary of the western side of the rail corridor along Lackey Road the duration of the effects would be long term. 	<p>Low (Neutral)</p>
<p>LCZ 6: Education</p>	<p>Due to the relative distance of this LCZ from the proposal, combined with the relatively flat topography and abundant tree canopy and surrounding built forms, there would be no visible changes from this LCZ. A full assessment of impact within this LCZ has therefore not been carried out.</p>	<p>N/A</p>	<p>There would be no change to the LCZ due to the proposal.</p>	<p>No change</p>

6.4.4 Mitigation measures

This section describes the mitigation measures that would be in place to address the visual impacts identified during the design development, construction and operation phase of the proposal.

Table 6-24 Site specific urban design, landscape and visual amenity mitigation measures

No.	Mitigation Measure	Responsibility	Timing
L1	<p>An Urban Design and Landscape Plan (UDLP) will be prepared by the Contractor, in consultation with Council and other asset/land owners, and submitted to Transport for written approval by the Urban Design Public Transport and Precincts team, prior to finalisation of the detailed design. The UDLP shall:</p> <ul style="list-style-type: none"> • demonstrate a robust understanding of the precinct through a comprehensive site analysis, including connectivity with street networks, mode change locations, active transport, and pedestrian movement • identify opportunities and constraints • establish precinct specific principles to guide and test design options • consider Crime Prevention Through Environmental Design (CPTED) principles, including night-time safety of customers and the community, and the safety of Station staff. • be aligned with the “TAP Urban Design Plan Guidelines (Draft 2018)” and “Around the Tracks - urban design for heavy and light rail (Dec 2016 Interim Issue)”. • consider opportunities for: <ul style="list-style-type: none"> a) Connecting with Country b) integrated heritage interpretation and adaptive reuse c) public art d) safety improvements • address Transport <i>Sustainable Design Guidelines</i> evidence requirements • be prepared by a suitably qualified and experienced urban design professional. <p>The UDLP is to include a Public Domain Plan for the preferred design option and will provide analysis of the:</p> <ul style="list-style-type: none"> • landscape design approach including design of pedestrian and bicycle pathways, street furniture, interchange facilities, new planting and integration of any artwork • materials Schedule including materials and finishes for proposed built works, colour schemes, paving and lighting types for public domain, fencing and landscaping • an Artist’s Impression or Photomontage to communicate the proposed changes to the precinct. <p>The following design guidelines are available to assist and inform the UDLP:</p> <ul style="list-style-type: none"> • <i>TAP Urban Design Plan, Guidelines, Transport, Draft 2018</i> • <i>Commuter Car Parks, Urban Design Guidelines, Transport, Interim 2017</i> • <i>Managing Heritage Issues in Rail Projects Guidelines, Transport, Interim 2016</i> • <i>Creativity Guidelines for Transport Systems, Transport, Interim 2016</i> • <i>Water Sensitive Urban Design Guidelines for Transport Projects, 2016.</i> 	Contractor	Pre-construction / prior to design finalisation
L2	<p>Consider tree planting along Lackey Road to reduce the appearance of the potential noise barrier along the residential street.</p> <p>Consider articulation of the potential noise barrier along Lackey Road to facilitate opportunities for planting.</p>	Contractor	Pre-construction, construction

No.	Mitigation Measure	Responsibility	Timing
L3	Consider the installation of landscaping within the road verges and along the rail corridor edges (including potential planting of street trees or shrubs, where possible).	Contractor	Pre-construction, construction
L4	Use heritage design elements to highlight the character of the station and surrounding landscape, however, maintain the visual quality of a 'new' piece of infrastructure rather than replicating heritage items.	Contractor	Pre-construction
L5	Limit disturbance of vegetation to the minimum necessary to construct the proposal, especially along the rail corridor boundaries to maintain visual screening to the surrounding landscape.	Contractor	Pre-construction, construction
L6	<p>Hoardings, site sheds, fencing, acoustic walls around the perimeter of the site, and any structures built as part of the proposal shall be maintained free of graffiti, or any advertising not authorised by Transport, during the construction period. Graffiti and unauthorised advertising shall be removed or covered within the following timeframes unless otherwise approved with Transport:</p> <ul style="list-style-type: none"> offensive graffiti will be removed or concealed within 24 hours highly visible (yet inoffensive) graffiti will be removed or concealed within a week graffiti that is neither offensive or highly visible will be removed or concealed within a month any unauthorised advertising material will be removed or concealed within 24 hours. 	Contractor	Pre-construction
L7	Provide well-presented and maintained construction hoarding and site fencing with shade cloth or similar material (where necessary) to minimise visual impacts during construction. Hoardings and site fencing would be removed following construction completion.	Contractor	Construction
L8	<p>A lighting scheme for the construction and operation of the proposal is to be developed by a suitably qualified lighting designer and prepared in accordance with relevant standards. The lighting scheme shall address the following as relevant, but will not be limited to:</p> <ul style="list-style-type: none"> consideration of lighting demands of different areas strategic placement of lighting fixtures to maximise ground coverage use of LED lighting demonstrate that light spill and glare has been minimised to sensitive receivers by directing lighting into the station/car park/other infrastructure type control systems for lighting that dim or switch-off lights settings according to the amount of daylight the zone is receiving motion sensors to control low traffic areas allowing the lighting system to use low light or switch off light settings while meeting relevant lighting Standards requirements, and ensuring security and warning lighting is not directed at neighbouring properties. <p>The proposed lighting scheme is to be submitted to Transport's technical team for acceptance prior to design finalisation.</p>	Contractor	Construction
L9	Construction areas will be kept clean and tidy and refuse will be disposed of in appropriate receptacles.	Contractor	Construction
L10	Constructed elements will be maintained and repaired as required.	Transport	Operation

6.5 Biodiversity

6.5.1 Methodology

This section provides an assessment of the potential biodiversity and tree impacts arising from the construction and operation of the proposal. This assessment has been prepared based on:

- direct site inspection and assessment carried out by AECOM
- an Arboricultural Impact Assessment prepared by Ecological (2021), and Addendum Report prepared by Urban Tree Management (2023) (refer Appendix F)
- a Preliminary Biodiversity Memorandum prepared by Aurecon (2021) for the stabling yard upgrade work component of the proposal.

The results of these assessments are summarised in this section.

The methodology employed by AECOM for the biodiversity assessment included:

- review of the Regional Rail Moss Vale Enabling Works – Preliminary Biodiversity Memorandum, prepared by Aurecon (2021)
- review of the Moss Vale Regional Rail Enabling Works Arboricultural Impact Assessment, prepared by Ecological (2021)
- desktop review of biodiversity values for the proposal area, including:
 - aerial photography and street view (where available)
 - BioNet records for threatened species and ecological communities for BC Act matters
 - Protected Matters Search Tool results for EPBC Act matters
 - vegetation mapping (The State Vegetation Type Map)
 - NSW Department of Primary Industries – Fisheries NSW Spatial Data Portal for Key Fish Habitat mapping
 - Bureau of Meteorology Groundwater Dependent Ecosystem Atlas
- site inspection of the proposal area by a qualified and experienced ecologist
- assessment of potential direct and indirect biodiversity impacts of the proposal
- identification of mitigation measures to avoid, manage or mitigate potential biodiversity impacts of the proposal.

The full extent of the proposal area was inspected directly on foot. The terrain was generally flat, though areas of rail embankments and cuttings were steep and not directly accessible. Despite this, all potential impact areas were able to be inspected directly from the top or bottom of the embankments.

The site inspection was carried out as a ground truthing exercise to confirm desktop results. No detailed surveys, including biometric vegetation survey or fauna trapping, were carried out.

6.5.2 Existing environment

Landscape context

Moss Vale Station and Stabling Yard are located within a highly modified and urbanised environment. The area is generally characterised by the station itself, the rail yards and associated operational land, roads, car parking, landscaping and other open space areas. The Moss Vale town centre (centred on Argyle Street) and surrounding residential areas are located next to the proposal area in each direction.

The proposal area and its surrounds have been subject to urbanisation since the mid to late 19th century, with the vast majority of original vegetation being removed during the intervening period and replaced with exotic and native landscaping species.

The nearest waterway is Whites Creek, which runs beneath Lackey Road, about 160 metres south of the proposal area. Review of the Fisheries NSW Spatial Data Portal indicates that Whites Creek is mapped as Key Fish Habitat in the area beneath and to the west of Lackey Road.

The stabling yard and station are completely cleared of remnant native vegetation, with no mapped plant community types (PCTs) present within the Moss Vale Railway corridor (see Figure 6-15 to Figure 6-18).



Figure 6-15 Vegetation on the track embankment looking south from the Lackey Road bridge



Figure 6-16 Vegetation on the track embankment looking north from the Lackey Road bridge

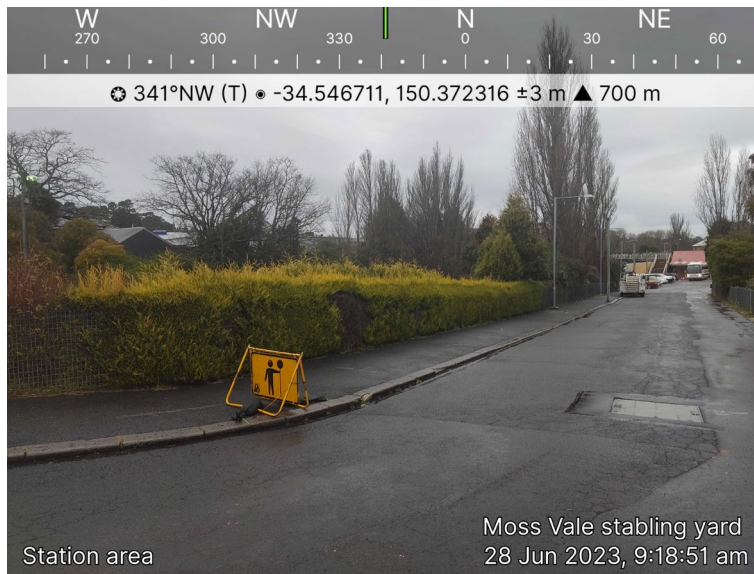


Figure 6-17 Vegetation next to Lackey Road looking south towards the platform buildings



Figure 6-18 Vegetation on the track embankment looking south from the pedestrian overbridge

Database searches

Key ecological sensitivities, as informed by the desktop searches including the Protected Matters Search Tool (PMST), review of Bionet and vegetation mapping, are outlined in Table 6-25 below.

Table 6-25 Database search results with respect to key ecological sensitivities

Environmental considerations	In the study area?
Is the proposal located within a National Park?	No
Is the proposal located within land reserved or dedicated for preservation of other environmental protection purposes?	No
Is the proposal located within a World Heritage Area?	No
Is the proposal located within an Environmental Protection Zone under an environmental planning instrument?	No
Is the proposal located within land identified as a wilderness area?	No
Is the proposal located within a wetland area dedicated under the Ramsar Wetlands Convention?	No
Does the site contain critical habitat?	No
Is the area mapped as Key Fish habitat?	No
Is the area mapped on the Biodiversity Values map?	No
Is the area mapped on the Native Vegetation Regulatory Map?	No

The State Vegetation Type Map (release C1.1.M1) was reviewed for the presence of native vegetation within or around the proposal area. Based on this mapping, the nearest recognised PCT is a patch of *Southern Highlands Shale-Basalt Dry Forest* (PCT 3302) located 300 metres to the southeast of the proposal area. As such, no State or Commonwealth listed threatened ecological communities (TECs) occur within or near the proposal area.

Bionet searches were carried out for the proposal area as part of the Aurecon (2021) assessment. These searches were carried out again in August 2023 to support this assessment. It should be noted that these searches return only previous records that have been provided for the area and are not a definitive indication of the species actually present. These records are however useful for predicting species that are likely to be present, based upon previous sightings, which reflected their favoured habitats and behaviours at the time of recording.

The updated Bionet search returned records for 18 threatened species within a 10-kilometre x 10-kilometre area centred on the proposal area. The search identified one threatened flora species record within the proposal area – a single *Eucalyptus macarthurii* (Paddy’s River Box), listed as endangered under the BC Act. It is located behind the northern existing commuter car park (off Dalys Way, to the north-east of Moss Vale Station).

Other nearby records within two kilometres included:

- *Hieraetus morphnoides* (Little Eagle)
- *Gallinago hardwickii* (Latham's Snipe)
- *Callocephalon fimbriatum* (Gang-gang Cockatoo)
- *Phascolarctos cinereus* (Koala)
- *Pteropus poliocephalus* (Grey-headed Flying-fox).

A search of the EPBC Act Protected Matters Search Tool in August 2023 indicated the potential presence of up to 50 threatened species, four TEC, and 14 listed migratory species within a one-kilometre radius of the proposal area.

Previous site inspections

An ecological site inspection focusing on the stabling yard upgrade work was conducted by Aurecon on 27 October 2020. The purpose of this assessment was to assess the type and quality of vegetation within the stabling yard upgrade area. The temperature at the time of the site inspection was 10°C, with moderate cloud cover.

The site inspection identified three threatened species with the potential to occur within the proposal area:

- *Eucalyptus macarthurii* (Paddy's River Box)
- *Grevillea parviflora* subsp *parviflora* (Small-flower grevillea)
- *Thelymitra kangaloonica* (Kangaloon Sun Orchid).

The report arising from this inspection identified four TECs, 33 threatened species and 14 migratory species from the Protected Matters Search Tool search.

The site inspection found no native flora species or hollow trees on site, with vegetation consisting of exotic or planted species. No native fauna species were identified through chance sightings.

Aurecon (2020) also found the following:

- up refuge siding: no native vegetation present, with impacts limited to the removal of non-native vegetation, potential for weed infestations and off-site erosion and sedimentation impacts
- stabling yard: no native vegetation present, with impacts limited to the removal of non-native vegetation, potential for weed infestations and noise and light disturbance. Construction impacts considered to be minor and temporary and non-significant.

Aurecon (2020) proposed several mitigation measures, including:

- managing weed infestation, and erosion and sedimentation during construction
- minimising the clearing of any native vegetation as far as possible
- avoiding trees of high retention value as identified by the arborist assessment (Ecological Australia, 2021)
- incorporating outcomes of the arborist report into the CEMP and Flora and Fauna Management subplan.

Arborist inspections

Arborist inspections were undertaken of trees within the proposal area. Trees within the stabling yard were inspected on 9 December 2020 and documented in an Arborist Impact Assessment report (Ecological, 2021) (refer Appendix F). Trees within the remaining portion of the proposal area (station upgrade area) were inspected on 11 August 2023 and documented in an Arborist Impact Assessment - Addendum Report (refer Appendix F).

The arborist assessments were carried out based on the principles of a visual tree assessment documented by Mattheck and Breloer (1994) and practices consistent with modern arboriculture. This included assessing:

- tree health and stability
- tree retention value and significance
- hazard potential to people and property
- amenity values
- habitat values.

Additional biodiversity site inspection

A further inspection was carried out by a suitably qualified ecologist from AECOM on 28 June 2023. Conditions during the site inspection were cold, about 6°C, with heavy cloud cover and intermittent light rain.

The inspection covered the full proposal area, including roads and public areas. The rail corridor was inspected from the bridge and platform only, though this provided suitable view of all areas.

The proposal area was characterised by exotic and landscaping vegetation throughout. Very few native plant species were identified on site, with those that were identified limited to planted or self-seeded common species. No threatened flora was identified, nor were any areas of TEC.

No fauna was observed during the inspection, though it is noted that the conditions were unfavourable at the time. No substantial habitat for threatened fauna was identified. It is possible that microbats use some of the station structures, (including the station platform buildings and foot and road bridges) though these would not be substantially affected by the proposal. Habitat for non-threatened fauna was limited to the landscaping and self-seeded native and exotic vegetation within and around the proposal area.

No waterways were identified within or near the proposal area.

6.5.3 Potential impacts

Construction

Direct impacts

A summary table of direct impacts for all trees within the proposal area is provided in the Appendix A of the Arborist Impact Assessment - Addendum Report (Appendix F to this REF) (Note that this table effectively supersedes some of the tree impacts identified in the Arborist Impact Assessment report (Ecological, 2021)).

The proposal would result in the removal of 47 trees as follows:

- 31 x Wych Elm (*Ulmus glabra*) individuals
- 2 x English Oak (*Quercus robur*) individuals
- 8 x White Poplar (*Populus alba*) individuals
- 1 x Monterey Cypress (*Cupressus macrocarpa*) individual
- 1 x Water Gum (*Tristaniopsis laurina*) individual
- 1 x Silver Birch (*Betula pendula*) individual
- 1 x Crab Apple (*Malus floribunda* cv) individual
- 1 x unknown deciduous and exotic tree
- 1 x Wallangara White Gum (*Eucalyptus scoparia*).

The remaining trees in the proposal area have been identified for retention and/or pruning only. None of the trees identified for removal are listed threatened species, except for the Wallangara White Gum ('Tree 49') which is listed as endangered under the BC Act and vulnerable under the EPBC Act. This individual is planted however, and is located about 550 metres south of the southern limit of its natural distribution. Given this individual is planted, its removal would not compromise a significant impact to the natural occurrence of this species.

As indicated above, construction of the proposal would result in the removal of native and non-native vegetation. This would be largely limited to common urban native and non-native planted species, as well as self-seeded individuals (weeds). None of the vegetation was identified as a TEC and as such there would be no impact in this regard.

The removal of this vegetation would also include the loss of local habitat connectivity. Noting the highly patchy and modified nature of the vegetation within the context of the station area and the surrounding highly urbanised environment, the biodiversity impact of the loss of this vegetation and habitat connectivity would be very low.

Construction of the proposal has the potential to aid the spread of weeds into and out of the proposal area during construction (both the rail corridor and adjacent areas). This impact would be readily managed through the application of suitable hygiene protocols outlined in the biodiversity mitigation measures in section 6.5.4, and as such this impact is considered to be minor.

The proposal would not remove any habitat critical to threatened species or ecological communities. Impacts to fauna would be limited to direct disturbance from the additional noise, light and presence of people in the area, as well as off-site sedimentation impacts. These impacts would be effectively managed through the implementation of mitigation measures in section 6.5.4..

The impacts associated with construction are not considered part of a key threatening process.

Mitigation measures to address potential biodiversity and arboreal impacts are included in Section 6.5.4.

Operation

The operation of the proposal would not result in any ongoing impacts to vegetation within or around the station. Lighting at the station is planned to be upgraded as part of the proposal, though providing the lighting is sympathetically designed to avoid spill into surrounding areas, this is not expected to result in any substantial impacts upon native fauna.

Operation of the proposal is likely to include an increased level of activity within the station precinct, particularly for the stabling of trains. This impact would be consistent with the current use of the area and is not expected to lead to any substantial additional direct disturbance to threatened or non-threatened fauna.

The incursion of weeds into the proposal area would continue to be managed by the proponent as per the current protocols.

Conclusion on significance of impacts

The proposal is not likely to result in a significant impact to threatened species or ecological communities or their habitats, within the meaning of the BC Act 2016 or FM Act 1994. As such, neither a Species Impact Statement or Biodiversity Development Assessment Report is required.

The proposal is not likely to result in a significant impact to threatened species, ecological communities or migratory species, within the meaning of the EPBC Act.

On this basis, the proposal is deemed acceptable to proceed in its current form, subject to the application of the mitigation measures outlined below.

6.5.4 Mitigation measures

A number of mitigation measures are proposed to minimise the biodiversity impact of the proposal as listed below in Table 6-26.

Table 6-26 Site specific biodiversity mitigation measures

No.	Mitigation measure	Responsibility	Timing
B1	All workers will be provided with an environmental induction before starting work onsite. This induction will include information on the protection measures to be put in place to protect vegetation, penalties for breaches and locations of areas of sensitivity.	Contractor	Pre-construction / construction

No.	Mitigation measure	Responsibility	Timing
B2	<p>The proposal would be designed and constructed to retain as much existing vegetation as possible and disturbance of vegetation would be limited to the minimum amount necessary to construct the proposal. Trees nominated to be removed in the Moss Vale Regional Rail Enabling Works Arboricultural Impact Assessment (Ecological 2021) and the Moss Vale Station and Stabling Yard Upgrade Arboricultural Impact Assessment Addendum Report (Urban Tree Management, 2023) will be clearly demarcated onsite before construction, to avoid unnecessary vegetation removal. Trees to be retained will be protected through temporary protection measures. Landowners consent would be obtained prior to vegetation removal, should TAHE not be the landowner.</p> <p>Separate approval, in accordance with Transport’s EMF-EM-TT-0144 <i>Removal or trimming of vegetation application</i>, is required for the trimming, cutting, pruning or removal of all trees or vegetation where the impact has not already been identified in the REF or Determination Report for the proposal. The trimming, cutting, pruning or removal of trees or vegetation shall be carried out in accordance with the mitigation measures.</p>	Contractor	Pre-construction / construction
B3	<p>Construction of the proposal must be carried out in accordance with Transport’s <i>Biodiversity Policy</i> (Transport for NSW, 2022c), which includes the Transport’s <i>Biodiversity Assessment Guideline</i>, <i>Transport’s No net loss guidelines and Transport’s Tree and Hollow Replacement Guidelines</i> (Transport for NSW, 2022c), Transport’s <i>Vegetation Management (Protection and Removal) Guideline</i> (Transport for NSW, 2022d), and Transport’s <i>Fauna Management Guideline</i> (Transport for NSW, 2022e).</p>	Contractor	Construction
B4	<p>Recommendations made in the Arboricultural Impact Assessment (Ecological 2021) and the Arboricultural Impact Assessment Addendum Report (Urban Tree Management, 2023) will be adhered to, including establishment of Tree Protection Zones (TPZs) around trees to be retained. Tree protection will be carried out in line with <i>AS 4970-2009 Protection of Trees on Development Sites</i> and will include exclusion fencing of TPZs. The tree dripline may be used as a guide for protecting trees where an exclusion zone is not established by an arborist/ecologist. Should the approved development be altered by a post-approval assessment, consideration of any additional TPZs beyond those identified in the Arborist Assessments (Ecological 2021), (Urban Tree Management, 2023) will be required and may need to be supported by additional or addendum arboricultural/ecological advice.</p>	Contractor	Pre-construction / construction
B5	<p>In the event of any tree to be retained becoming damaged during construction, the contractor will immediately notify the Transport Project Manager and Transport Environment and Sustainability Representative (TESR) to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.</p> <p>Where arborist advice indicates that a tree or vegetation may be at risk of failure due to proposal works the priority should be to retain and protect the tree or vegetation. Following completion of construction, the arborist should reassess the tree and their advice should be followed. Where tree or vegetation removal is required, replacement must be in accordance with Transport’s <i>Biodiversity Policy</i> (Transport for NSW, 2022c).</p>	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
B6	Weed control measures, consistent with Transport’s <i>Weed Management and Disposal Guideline</i> (Transport for NSW, 2020c)), and the Pesticides Regulation 2017 will 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 will include the management and disposal of weeds in accordance with the <i>Biosecurity Act 2015</i> .	Contractor	Pre-construction / construction
B7	Any vegetation removal shall be offset in accordance with Transport’s <i>Biodiversity Policy</i> (Transport for NSW, 2022c). All vegetation planted on-site is to consist of locally native species, unless otherwise approved by the DES or as required by a heritage approval/recommendation, following consultation with Council, where relevant, and/or the owner of the land upon which the vegetation is to be planted. A replanting strategy and maintenance schedule of offsetting on and offsite is to be provided to the TESR for review and approval at least four weeks prior to the commencement of replanting. All vegetation will be maintained for at least 12 months following completion of construction or following planting (whichever ends last) (unless approved by the TESR).	Contractor	Construction and operation

Other standard mitigation measures to address biodiversity impacts are identified in section 7.2. These include the management of fuels and fluids to prevent spills and subsequent impacts to local aquatic systems.

6.6 Hydrology and water quality

6.6.1 Existing environment

Surface water and run-off

The majority of the proposal area consists of impervious surfaces, except for the train tracks, some areas of the stabling yard and vegetated areas around the station (including the station courtyard).

The topography of the proposal area gently slopes towards the south. Run-off from the rail corridor, station area and stabling yard is generally captured in track drainage and into local council-maintained infrastructure. Stormwater from the proposal area discharges into Whites Creek, about 160 metres south of the station (either directly or via drainage infrastructure), and ultimately into the Wingecarribee River about two kilometres northeast of the proposal area.

Whites Creek is a second-order stream within the Moss Vale sub-region of the Hawkesbury-Nepean catchment. The creek is channelised in a concrete/brick channel through the Moss Vale town centre, with a riparian zone on either side of the creek bank. Whites Creek flows through Moss Vale in a north-west direction. The catchment includes parkland and rural areas in its upper reaches, followed by the town centre and then rural land in the lower reaches of the catchment. Water quality is generally good, however would be affected by urban run-off, particularly after heavy rains.

Flooding

Whites Creek is mapped as a flood planning area under the Wingecarribee LEP. The proposal area is located outside of the mapped flood planning area.

The *Review of Whites Creek Floodplain Risk Management Study and Plan* assessed potential flood behaviour in the Whites Creek catchment area (Catchment Simulation Solutions, 2020). Flood behaviour across the Whites Creek catchment is typically characterised by relatively shallow depths of inundation (ie, less than 0.5 metres across most flood events). However, more significant depths are predicted along and next to designated waterways where flood depths are predicted to reach up to two metres during peak flood events. The most

significant flooding impacts are predicted to occur across low-lying land near Whites Creek, including in the areas of Argyle Street and Lackey Road (where the creek crosses south of the proposal area) in events as frequent as the 20% AEP flood. Flooding in this area also arises when floodwaters overtop a culvert at Argyle Street and combine with flows that drain along either side of the railway embankment. Access to the station may therefore be impeded during peak flood events, however flood waters are not expected to impact the proposal area directly. The *Review of Whites Creek Floodplain Risk Management Study and Plan* shows that the proposal area is outside of the 1 per cent AEP mapped flood extent.

Under the Probable Maximum Flood extent, a small portion of the proposal area closest to Whites Creek would be impacted by flood waters (up to and over two metre depths). This includes areas outside of the rail corridor only, including Argyle Street, Leightons Gardens and the southern car park off Argyle street. Most of the proposal area, including all areas within the rail corridor, would not be affected.

Groundwater

The Australian Government Bureau of Meteorology Groundwater Explorer mapping system was used to identify groundwater bores in the vicinity of the proposal area. Within a one-kilometre radius, five bores were identified, one about 400 metres east, three about 200 metres east and one about 900 metres south-east. The bore records show that standing water levels range from 18 metres to 70 metres across the bores.

Geotechnical investigations carried out in the proposal area found groundwater in two boreholes (out of a total of 10 boreholes) at the stabling yard at depths between 0.3 metres and 1.0 metres (Aurecon, 2020). Groundwater inflow was recorded as being localised to a particular soil layer and found in locations close to the existing track. In a separate investigation at the station, groundwater was encountered in one borehole (out of a total of five) at a depth of 0.95 metres. The borehole was in the Diamond Jubilee Park near the base of the ramp at the Argyle Street entrance to the station (Transport, 2022). Groundwater depths are expected to fluctuate with variations in climatic conditions and changes in regional groundwater regimes and vary across the proposal area.

Previous activities in the rail corridor and historic agricultural land uses in the surrounding area indicate potential for residual contamination in groundwater (and soils). Groundwater contaminant testing carried out as part of the geotechnical investigation at the station (Transport, 2022) showed low levels of several heavy metals which were below laboratory testing limits for hydrocarbons, BTEXN (Benzene, Toluene, Ethylbenzene, Total Xylenes), phenols, organophosphorus pesticides, organochlorine pesticides and polychlorinated biphenyls. A detailed site investigation carried out at the stabling yard also found a low to moderate potential for significant groundwater (or soil) contamination (Aurecon, 2020a).

6.6.2 Potential impacts

Construction

The construction phase of the proposal has the potential to impact on hydrology and water quality. The proposal has the potential to increase pollutant loads within local waterways through the release of sediment and debris from excavation during construction, including excavation associated with the new lifts, CSR, track extensions, noise barrier, vegetation removal and other civil work. This risk would be somewhat naturally mitigated by the separation between the proposal area and nearby waterways, including Whites Creek about 160 metres south. However, it is recommended that suitable sediment control measures are put in place and maintained during construction to avoid contaminants such as sediment escaping from the proposal area. Control measures would include those for sediment and run-off control, avoiding work during periods of heavy rainfall, and storing fuel/chemicals in dedicated, contained locations. With adequate controls implemented, it is expected that the overall impact upon local waterways and their water quality would be negligible to minor.

Construction of the proposal would not affect flood regimes within or surrounding the station. The proposal would include upgrades to drainage infrastructure around the station and stabling yard. Appropriate controls would be included in the CEMP to protect drainage inlets during construction activities. The proposal area would not be directly impacted by flood waters in a 1 per cent AEP flood event, however access to construction sites may be impeded due to flood waters affecting Argyle Street and Lackey Road near Whites Creek. The

southern portion of the proposal area outside of the rail corridor may also be affected under the Probably Maximum Flood event. Mitigation measures would include monitoring and contingency planning for large flood events.

Excavations required for the proposal may intercept groundwater, which may require dewatering (depending on the volume of inflow) and may also be contaminated from previous rail activities. The maximum depth of excavation required for the lift installations would be about 4.5 metres and piling for the proposed noise barrier would require excavations to about 7.5 metres. Excavations for underground services/utilities would range in depth. A dewatering procedure would be put in place to manage dewatering operations including avoiding releasing water that may impact soil or water quality values in the receiving environment. The proposal is unlikely to affect the deeper standing water levels recorded in the groundwater bores in the surrounding area.

Operation

Operation of the proposal is not expected to generate any additional pollutants (including sediments or contaminants) that could impact water quality.

The proposal does not change the elevation or topography of the area in a way that would modify the current flood storage capacity and as such, it is unlikely that the proposal would pose any risk of changing flood patterns. A minor increase in impervious surfaces (eg from installation of the lifts, mobile train simulator pad and footpaths) would have a negligible effect on flood patterns, with run-off captured in existing and upgraded drainage infrastructure.

New drainage infrastructure installed, including outlets near the new lift areas, would connect to existing stormwater pits and pipes. Run-off from the reconfigured station entrances would continue to drain to council’s existing street stormwater system.

6.6.3 Mitigation measures

Mitigation measures for surface water, flooding and groundwater are described in Table 6-27. Other mitigation measures that would assist in addressing impacts to surface water and groundwater are found in Section 7.2.

Table 6-27 Site specific hydrology and water quality mitigation measures

No.	Mitigation measure	Responsibility	Timing
H1	Vehicles and machinery will be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment will also be refuelled offsite, or in a designated refuelling area.	Contractor	Construction
H2	In the event of a pollution incident, work will cease in the vicinity and the contractor will immediately notify Transport’s Project Manager TSER. The EPA will be notified by Transport if required, in accordance with Part 5.7 of the POEO Act.	Contractor	Construction
H3	The existing drainage systems will remain operational throughout the construction phase.	Contractor	Construction
H4	A dewatering procedure will be implemented in accordance with Transport’s <i>Water Discharge and Reuse Guideline</i> (Transport for NSW, 2020b).	Contractor	Construction
H5	Construction scheduling, site accesses and layout of the ancillary facility in the southern car park off Argyle Street will take into account the possibility of being affected by large flood events (i.e. 1% AEP and Probable Maximum flood events). Weather forecasts for the region will be monitored for significant rain events (including upstream areas in the catchment), and fuel/chemical storage will be avoided in the ancillary facility on the southern car park off Argyle Street.	Contractor	Construction

Other standard mitigation measures to address hydrology impacts are identified in section 7.2.

6.7 Contamination, landform, geology and soils

6.7.1 Methodology

This section provides an assessment of potential contamination, landform, geology and soil impacts as a result of the proposal. The assessment methodology included:

- a desktop review to analyse existing information and to characterise the existing environment using the following sources:
 - CSIRO - Australian Soil Resource Information System: Atlas of Australian Acid Sulfate Soils (2013)
 - NSW EPA public registers (2021)
 - NSW Spatial Services historical, aerial and satellite imagery via Historical Imagery Viewer (2021)
 - review of geotechnical/soil/contamination investigations conducted at the station and stabling yard for the proposal
- assessment of potential construction and operational impacts related to contamination, landforms, geology and soils
- identifying appropriate measures to mitigate potential impacts.

6.7.2 Existing environment

Geology

Reference to the Seamless Geology dataset (Department of Regional NSW) and the 1:100,000 Moss Vale Geological Sheet (8928), indicates the proposal area is underlain by Quaternary Residual deposits, predominantly comprising saprolite of fluvial origin. These residual deposits are underlain by Wianamatta Group Shales, with several igneous basalt outcrops surrounding the proposal area. Refer Section 6.6 for further information on hydrogeology.

The Geotechnical Factual Report (Aurecon, 2020) reported findings of investigations at six boreholes to a depth of 6.0 metres and three test pits to 3.0 metres before refusal at the Moss Vale Stabling Yard. The geological units relevant to the proposal area are summarised in Table 6-28.

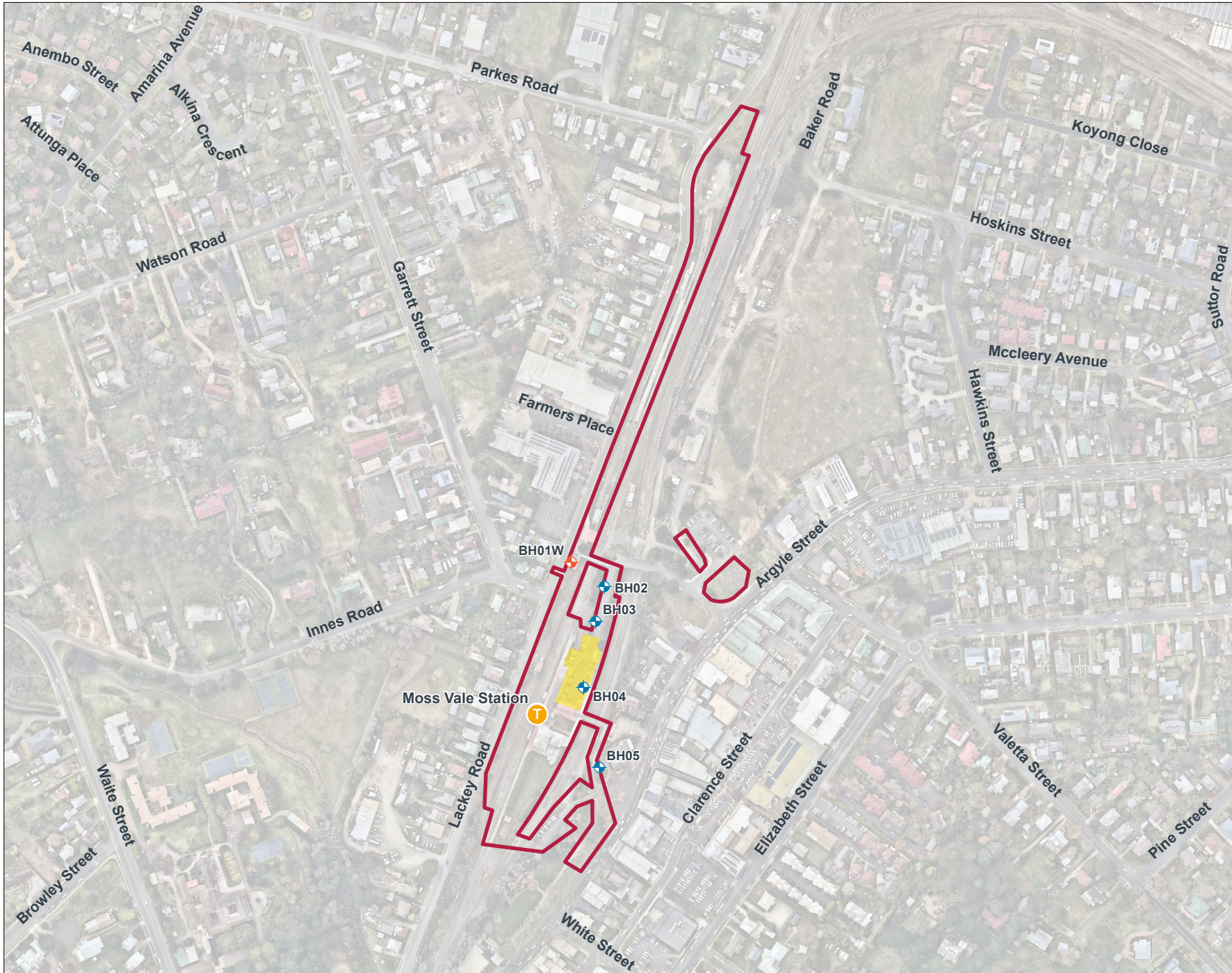
Table 6-28 Summary of Geological Units (Source: Aurecon, 2020)

Abbreviation	Feature name	Material description
Q_r	Residual deposits	Cenozoic Residual Deposits of unnamed regolith. This area is dominated by Saprolite, formed by in-situ chemical weathering of rock.
Twia	Ashfield Shale	A Wianamatta Group sedimentary unit comprising black to light grey shale and laminite.
Twib	Bringelly Shale	A Wianamatta Group sedimentary unit comprising shale, carbonaceous claystone, laminite, lithic sandstone and rare coal.
Jul_b	Basalt/Dolerite	Dark, medium grained tholeiite dolerite.

The proposal area's subsurface conditions encountered by Aurecon were variable granular and cohesive fill overlying cohesive residual/extremely weathered rock. The granular material encountered included wood, construction rubble, concrete, plastic and cobble content.

A total of five boreholes were drilled by Transport between May and June 2022 for Moss Vale Station, using mechanical techniques (Hanjin DB8 tracked drill rig, operated by Rockwell Drilling Pty Ltd) during the investigation to depths between 10.00 and 15.18 metres below existing ground levels (BGL), refer to Figure 6-19.

FIGURE 6-19:
GEOTECHNICAL
INVESTIGATION LOCATIONS



Legend

- Proposal location
- Ancillary facility
- T Railway station
- ◆ Borehole
- ◆ Borehole + Standpipe

Geotechnical Investigations

- ◆ Borehole
- ◆ Borehole + Standpipe

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A summary of strata encountered during the geotechnical investigation by Transport is summarised in Table 6-29.

Table 6-29 Summary of Geotechnical Investigation results (Source: Transport, 2022)

Investigation ID	Depth of inferred material encountered during site investigations (m BGL)			
	Pavement	Fill	Residual soil	Bedrock
BH01W	-	0.00 – 0.60	0.60 – 2.05	2.05 – 15.05 (EOH)
BH02	0.00 – 0.50	0.50 – 4.05	4.05 – 4.90	4.90 – 10.00 (EOH)
BH03	0.00 – 0.40	0.40 – 2.60	2.60 – 2.80	2.80 – 10.200 (EOH)
BH04	0.00 – 0.05	0.05 – 0.30	-	0.30 – 10.40 (EOH)
BH05	-	0.00 – 0.95	-	0.95 – 15.18 (EOH)

The geology of the proposal area was further described in the Moss Vale Geotechnical Report (Degnan June 2023). Degnan found very loose to loose Silty Gravel/Gravel (ballast) in the railway corridor which has the potential to liquefy if any significant vibrations are induced. However, this risk was considered by Degnan to be remote.

Soils

According to the Moss Vale 1:100,000 Geological Map, the soil landscape within the proposal area consists predominantly of residual deposits of unconsolidated clayey coarse to fine grain sands to weakly consolidated sandy clay layers and poor to extensive soil development.

The Soil and Land Resources of the Hawkesbury-Nepean Catchment Map (NSW Government, 2008) indicates the area is underlain by the Kangaloon soil landscape, with Moss Vale soil landscape surrounding the site from the south, east and west.

A summary of the soil landscapes across the proposal area is provided in Table 6-30.

Table 6-30 Summary of Soil Landscapes (Source: Aurecon, 2020)

Abbreviation	Feature name	Material description
Klz	Kangaloon	A transferral soil landscape found on footslopes overlying Wianamatta Group Shales. This landscape mainly comprises brown Kurosols. Local relief ranges from 0 – 9 m with slopes from 0 - 3%.
mvz	Moss Vale	An erosional soil landscape on Wianamatta Group shales dominated by yellow, red, and brown kurosols. Local relief varies from 5 - 30m with slopes between 0 - 5%

A review of the Australian Soil Resource Information System (ASRIS), indicates the proposal area has been categorised as a low probability of acid sulfate soil occurrence.

Contamination

Based on the land zoning and aerial maps for areas surrounding the proposal, potential sources of contamination for the proposal area include:

- rail activities, which may discharge polycyclic aromatic hydrocarbons, heavy metals and hydrocarbons

- agricultural activities leading to soil and groundwater contamination from the discharge of agrochemicals and organic matter
- unknown and/or imported fill material along the rail corridor, which may contain asbestos material, hydrocarbons, heavy metals, agrichemicals and other contaminants
- nearby industrial activities, which may contain hazardous materials (including chemical storage, agrochemicals, heavy metals, polycyclic aromatic hydrocarbons and asbestos).

Potential contaminants of concern relating to the activities identified above include total recoverable hydrocarbons, benzene, toluene, ethylbenzene and xylene, polycyclic aromatic hydrocarbons, organochlorine pesticides, organophosphate pesticides, polychlorinated biphenyls, phenols, volatile organic compounds and asbestos containing materials.

An online search for the NSW EPA contaminated land record of notices database, NSW EPA list of notified sites and the NSW EPA POEO public register database found no records of contaminated sites within the proposal area.

A Detailed Site Investigation was prepared by Aurecon in December 2020 for the stabling yard. The investigation covered around 3.4 metres of fill material beneath extremely weathered rock. Concentrations of all contaminants of potential concern in samples collected were either below the adopted human health investigation levels or did not exceed the laboratory limit of reporting, with the exception of two samples from fill layers at BH05. These exceeded the relevant National Environment Protection Measure (NEPM) Health Investigation Level for commercial/industrial land use (i.e. 'HIL D') for lead. While the exceedances are within the same order of magnitude as the investigation levels, the chemical hazards to human health posed by fill material in this area are moderate and require management when the fill material is disturbed or excavated. Asbestos cement fragments were observed at the ground surface around BH04, as well as within fill layers in BH04 (refer to Figure 6-19).

A visual assessment and chemical analysis of stockpiled material that was generated from site excavation work at Moss Vale Station was carried out by Coleman Adams Environmental (Coleman Adams Environmental, 2022). The stockpiles were located about 215 metres south west of the proposal area, at 233 Argyle Street, Moss Vale. The Preliminary Waste Classification Report (Coleman Adams Environmental, 2022) found both stockpiles were classified as Hazardous Soil Waste (non-putrescible) for land fill disposal as the specified contaminant concentrations exceeded the NSW classification criteria.

Future Rail in its Contamination Assessment Report for Moss Vale Station (Future Rail, 2021) found that while there is a low potential to encounter acid sulfate soils, there is potential for contaminated materials (historical and operational) to occur within the rail corridor. Possible sources of contamination may include fill materials, hazardous materials from structures, leaks and spills of fuels or chemicals, historical use of pesticides and asbestos dust from train brake pads.

6.7.3 Potential impacts

Construction

Geology and soils

Excavation, tree removal, earthworks and associated stockpiling, if not adequately managed, could result in:

- erosion of exposed soil and stockpiled material
- dust generation from excavation and vehicle movements over exposed soil
- an increase in sediment loads and/or contaminated spoil in the stormwater system and/or local run-off, with associated water quality impacts.

These risks have implications for other environmental factors, including biodiversity, water quality and air quality. For example, where sediment loads in waterways are increased, existing water quality conditions would be altered which may negatively impact aquatic flora and fauna. Appropriate erosion and sediment controls measures would be put in place to minimise soil erosion risks as described in section 6.7.4.

Contamination

Excavation and other earthworks have the potential to expose contaminants, which, if not appropriately managed, can present a health risk to construction workers and the community. Contaminants can also pose an environmental risk if they are released to soils or nearby waterways.

Contamination can migrate off site during construction via a number of transport mechanisms or pathways. These pathways include:

- vertical and/or lateral migration of gas/vapours (eg associated with fuel)
- migration via surface water through surface run-off or contact with potential contaminants (eg stockpiled fill material in the vicinity of waterways)
- airborne migration of contaminated soil or material (eg asbestos or dust from exposed contaminated fill).

Contaminants may come into contact with human or ecological receivers via the following exposure pathways:

- direct contact with contaminated soils, materials, or surface water. Direct contact may include dermal contact, dust inhalation and incidental ingestion
- indirect contact with contaminated materials that have been exposed to the contaminant source, via dermal contact (eg contaminated clothing) or indirect ingestion of contaminants through use of surface water (eg recreational use).

There are potential contamination risks to the following human receptors:

- construction and maintenance workers
- general public.

Potential aquatic and terrestrial ecological receptors nearby and downstream of the proposal area includes the riparian area of Whites Creek.

Asbestos cement fragments were observed at the ground surface around BH04, as well as within fill layers in BH04 which caused termination of the borehole. These fragments were found to contain asbestos materials. Given asbestos was found within a fill layer that was observed throughout BH04, there is a potential hazard to construction workers during excavation and construction within this area at the site to uncover further asbestos containing materials (ACM) fragments and creating respirable fibres if not managed appropriately.

As discussed above, Transport during its drilling program in May and June 2022 identified two samples from fill layers at BH05 which exceeded the NEPM Health Investigation Levels for commercial/industrial land use for lead. The elevated lead results are currently subsurface meaning no immediate controls were necessary. However, this fill would require management before construction of the proposal starts (refer Table 6-8).

The chemical hazards to human health posed by fill, subsurface and deeper natural materials at all other investigation locations were identified to be low and acceptable.

Operation

No landform, geology, soil or contamination impacts are expected to occur from the proposal during operation. The new diesel exhaust fluid system would include a 10,000-litre capacity self-bunded tank, which would capture any spills. Other areas exposed during construction would be stabilised with planting, concrete, asphalt and structures.

6.7.4 Mitigation measures

Measures to manage potential impacts associated with contamination, landform, geology and soil during construction and operation of the proposal are outlined in Table 6-31.

Table 6-31 Site specific contamination, landform, geology and soils mitigation measures

No.	Mitigation measure	Responsibility	Timing
C1	<p>Prior to construction, an investigation of the proposal site shall be undertaken by a suitably qualified Environmental Consultant, in accordance with the level of assessment and requirements stipulated by the <i>National Environment Protection (Assessment of Site Contamination) Amendment Measure (NEPM) 2013</i>. The assessment shall also be generally undertaken in accordance with:</p> <ul style="list-style-type: none"> • <i>Contaminated Sites - Sampling Design Guidelines (EPA, 1995)</i> • <i>AS 4482 (2005) Guide to the investigation and sampling of sites with potentially contaminated soil.</i> <p>The investigation report shall be prepared in accordance with the <i>Guidelines for Consultants Reporting on Contaminated Sites</i> (Office of Environment and Heritage, 2011) and shall also include a preliminary waste classification in accordance with the <i>Waste Classification Guidelines</i> (NSW EPA, 2014).</p> <p>Specific requirements for further investigation (including requirements for a Site Auditor), remediation or management of any contamination shall be included in the CEMP (or supporting Contamination Management Plan) as appropriate.</p> <p>Note: Nothing in this condition removes any obligation to adhere to the requirements under the NSW Contaminated Land Management Act 1997 (or other legislation).</p>	Contractor	Pre-construction, construction
C2	<p>A Contaminated Land Management Plan will be prepared and implemented as part of the CEMP. The plan will include, but not be limited to:</p> <ul style="list-style-type: none"> • capture and management of any surface run-off contaminated by exposure to the contaminated land • further investigations required to determine the extent, concentration and type of contamination, as identified in the detailed site investigation • management of the remediation and subsequent validation of the contaminated land, including any certification required (if applicable) • measures to ensure the safety of site personnel and local communities during construction. 	Contractor	Pre-construction
C3	<p>An appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, will 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 will be carried out in accordance with SafeWork NSW requirements.</p> <p>If contaminated areas are encountered during construction, appropriate control measures should be put in place to manage the immediate risks of contamination.</p> <p>All other work that may impact the contaminated area will stop until the nature and extent of the contamination has been confirmed and necessary site-specific controls or further actions identified in consultation with the TESR and/or EPA.</p>	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
C4	<p>An Asbestos Management Plan will be developed to manage asbestos and asbestos-containing material if encountered during the construction. The plan will include:</p> <ul style="list-style-type: none"> • identification of potential asbestos on site • procedures to manage and handle any asbestos • mitigation measures if asbestos is encountered during construction • procedures for disposal of asbestos in accordance with the NSW EPA guidelines, Australian Standards and relevant industry codes of practice. 	Contractor	Pre-construction
C5	<p>Spill management measures will be included in the CEMP. The measures will be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (EPA officers).</p>	Contractor	Pre-construction, construction
C6	<p>Excess spoil not required or able to be used for backfilling will be stockpiled in a suitable location before being reused or removed from the site and disposed of appropriately in accordance with the NSW EPA <i>Waste Classification Guidelines</i> (2014).</p>	Contractor	Construction
C7	<p>Soil and water management measures shall be prepared, implemented and maintained for the mitigation of water quality impacts during construction of the proposal in accordance with <i>Managing Urban Stormwater: Soils and Construction Volume 14th Edition</i> (Landcom, 2004). The following are required, based on the amount of disturbance proposed:</p> <ul style="list-style-type: none"> • soil and water management measures included on the ECM and in the CEMP for less than 250m² of disturbance • erosion and sediment control plan (ESCP) for between 250-2,500 m² of disturbance • soil and water management plan (SWMP) for over 2,500 m² of disturbance. <p>Management measures will be established prior to any clearing, grubbing or site establishment activities and will be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. At a minimum, inspection will occur monthly and will be reported in the inspection report. Management measures will be maintained until the work is complete and areas are stabilised. The management measures shall be reviewed and updated throughout construction so they remain relevant to the activities being undertaken.</p>	Contractor	Pre-construction, Construction
C8	<p>The rehabilitation of disturbed areas will be carried out progressively as construction stages are completed, in accordance with:</p> <ul style="list-style-type: none"> • the <i>NSW Soils and Construction – Managing Urban Stormwater Volume 1 “the Blue Book”</i> (Landcom, 2004) and Volume 2 (Department of Environment and Climate Change, 2008). 	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
C9	<p>In the event that construction requires excavation in the area where lead contamination has been identified within the proposal area, lead impacted fill will be managed in one of the following ways:</p> <ul style="list-style-type: none"> the lead-impacted fill within this area could be excavated and be taken offsite for disposal to minimise the risk of exposure to construction workers or the general public additional fill characterisation risk assessment could be carried out to potentially reduce the need for offsite disposal. 	Contractor	Construction

6.8 Aboriginal cultural heritage

6.8.1 Methodology

The Aboriginal assessment included:

- searching the Aboriginal Heritage Information Management System (AHIMS) database (on 30 August 2023) and desktop assessment of landscape features for archaeological potential
- assessing the potential for construction and operational activities to impact Aboriginal heritage
- identifying mitigation measures to address potential impacts identified.

6.8.2 Existing environment

The proposal area is in an area that has been highly modified for a range of land uses. Previous construction and use of the area for the existing rail corridor and Moss Vale Station precinct, car parks, road reserves and other infrastructure have resulted in significant disturbance.

The search of the AHIMS database showed that no Aboriginal sites or declared Aboriginal places are recorded within 200 metres of the proposal area.

Certain landscape features, such as waterways, sand dune systems, ridge tops, ridge lines, headlands, cliff faces and rock caves/shelters, can indicate the likely presence of Aboriginal sites. None of these features are present within the proposal area. Whites Creek is located about 160 metres south of the station and would not be impacted by the proposal.

The proposal is not considered to be located within a high-risk landscape for Aboriginal heritage potential. The extensive landscape modification and high level of disturbance that has occurred due to development of the rail corridor across the proposal area suggests that the presence of culturally sensitive buried items is unlikely within the boundaries of the proposal.

6.8.3 Potential impacts

Construction

Construction of the proposal would involve excavation and other ground disturbance activities, including:

- building foundations and pits for the new lift shafts, which would require excavation to depths of about 4.5 metres
- building foundations for new stairs, which would require excavation to depths of about 0.6 metres
- installing concrete pads/hardstand, roadways, car park, footpaths and paved areas
- installing the CSR, utilities and drainage
- installing the noise barrier, which would require piles up to about 7.5 metres in depth

- installing retaining walls and fencing
- landscaping, installing signage, seats and lighting.

Ground disturbing activities have the potential to impact Aboriginal sites if present. However as no known Aboriginal heritage items or high-risk landscape features are located in the vicinity of the proposal area, the potential for unknown Aboriginal heritage items to be present is considered low. As such, the proposal is unlikely to affect Aboriginal heritage during construction. An unexpected finds procedure would be carried out in the unlikely event that potential heritage items are found.

Operation

Operation of the proposal would not involve ground disturbance. There would be no risks to Aboriginal heritage from the operation of the proposal.

6.8.4 Mitigation measures

The mitigation measures in Table 6-32 are proposed to manage impacts to Aboriginal heritage.

Table 6-32 Site specific Aboriginal cultural heritage mitigation measures

No.	Mitigation Measure	Responsibility	Timing
ACH1	All construction staff will undergo an induction in the recognition of Aboriginal cultural heritage material. This training will include information such as the importance of Aboriginal cultural heritage material and places to both the Aboriginal and Non-Aboriginal community, as well as the legal implications of removal, disturbance and damage to any Aboriginal cultural heritage material and sites.	Contractor	Pre-construction, construction
ACH2	If previously unidentified Aboriginal sites or objects are uncovered during construction, work will cease near the find in accordance with Transport’s <i>Unexpected Heritage Finds Guideline</i> (Transport, 2019d). Transport’s Project Manager and TESR will be notified immediately to assist in coordinating the next steps, which are likely to involve consultation with an archaeologist, Heritage NSW and the Local Aboriginal Land Council/s. If human remains are found, work will cease, the site will be secured and the NSW Police and Heritage NSW will be notified.	Contractor	Construction

6.9 Socio-economic

6.9.1 Methodology

A socio-economic impact assessment has been prepared for a ‘moderate’ level assessment in accordance with Transport’s *Environmental Impact Assessment Practice Note – Socio-economic Assessment (EIA-N05)* (Transport, 2020a). The suburb of Moss Vale has been used as the study area for the assessment. The methodology for the assessment included:

- visiting site on Friday 14 July 2023 to examine the existing setting of the station and stabling yard
- identifying the existing socio-economic environment of the study area, including:
 - data on land use and development, population, demographics, local businesses and industry, employment, income and dwelling characteristics in the study area
 - access, connectivity, existing social infrastructure and community features
- identifying and assessing the potential socio-economic impacts of the construction and operation of the proposal
- recommending measures to avoid, minimise and manage potential impacts on the socio-economic environment.

6.9.2 Existing environment

The proposal is at Moss Vale, a suburb within the Wingecarribee Shire Local Government Area in the Southern Highlands, about 123 kilometres south of Sydney's CBD. The area surrounding Moss Vale Station has a variety of mixed land uses which include commercial, retail, cafes, a post office and other services. There are two nearby parks including Leighton Gardens and the Diamond Jubilee Park and Foundation adjacent to the station.

On the western side of the station and stabling yard along Lackey Road lies low to medium density residential development and light industrial premises. Other features within the residential zone include churches, schools and an indoor basketball centre.

Churches, schools and other facilities in the vicinity of the proposal are:

- Saint Paul's Parish Catholic Church (200 metres to the west)
- St John's Anglican Church (370 metres to the south west)
- Moss Vale Presbyterian Church (470 metres to the west)
- St Paul's Catholic Parish primary School (15 metres to the west)
- St Paul's International College (240 metres to the south west)
- Moss Vale and District Basketball (140 metres to the west).

The closest residential properties to the proposal area are located about 20 metres away on Lackey Road and comprise of single storey residential dwellings. The closest non-residential land use to the east is the Diamond Jubilee Park and Fountain located about 10 metres east of the station on Argyle Street. The closest non-residential land use to the west is a large retail department store which is opposite the proposal on Lackey Road.

A review of the Australian Bureau of Statistics 2021 census data provides a brief demographic overview for the suburb of Moss Vale, including:

- a population of 9310 people with a median age of 45
- 77.4% of the population born in Australia
- 54.9% of people (who are over the age of 15) in full-time employment
- 68.8% of all households as family households, 29% as single person households and 2.2% as group households
- 24.8% of the population aged over 65
- about 1.4% of the population using the train as their primary method of travel to work
- 11.7% of people requiring help or assistance due to a disability, a long-term injury or old age.

The 2023 Census data was not available at the time of preparation of this REF. According to the Scoping Design Report prepared by Degnan for Transport in 2023, the average AM peak hour patronage of the station was recorded between 8am and 9am and represents 42% of entries during this peak hour period.

6.9.3 Potential impacts

Construction

Construction of the proposal may temporarily impact passengers, pedestrians, residents, motorists, local businesses and other receivers due to:

- temporary disruptions to the existing pedestrian facilities in and surrounding the station, particularly for pedestrians accessing the station when construction work for the lifts, footbridges and footpaths is being completed
- temporary disruptions to traffic flow near the station

- temporary loss of parking availability in commuter car parks to accommodate ancillary facilities, construction working areas and access to the site for construction workers
- temporary loss of available parking spaces on the surrounding street network for residents and visitors from the lane closure required along Lackey Road and construction vehicle parking, including construction worker vehicles
- increased truck and vehicle movements delivering materials and equipment and the transportation of waste
- construction noise and vibration impacts
- air quality (dust) and visual impacts.

Station access would be maintained at all times, except when construction work occurs during a rail possession period. Rail possession periods are standard practice for work in the rail corridor that cannot be carried out while there are regular train movements. The rail possession would occur regardless of the proposal being completed.

Temporary pedestrian detours would be placed around the station and stabling yard where necessary. Detours would mostly be required due to upgrading station entrances, footbridges and footpaths, lift construction and the temporary closure of commuter parking in the station forecourt. Argyle Street footbridge would be required to close for most of upgrade, which would require pedestrians to access the station via Dalys Way. Cross-corridor access across the station would be maintained for pedestrians where possible, and detours would be in place at times for staff working in the stabling yard. Detours would impact travel times and distances and affect the community's ability to move freely around the station precinct.

Construction would cause minor traffic disruptions around the station from an increase in traffic volumes on surrounding roads, vehicle movements (eg in and out of the ancillary facilities) and traffic flow (eg a lane closure for intermittent periods on Lackey Road). There would also be temporary loss of commuter parking at the station and off-street parking around the station. The loss of parking would impact accessibility to the station, as well as to the parks on Argyle Street and nearby businesses. Traffic disruptions would be mostly minor but would also affect movement of the local community, businesses and people passing through Moss Vale. Private property access would be maintained throughout construction.

Noise emissions generated during construction would impact the local community, particularly during night-time work which would occur over rail possession periods (ie, two nights in a row). Under the worst-case 15-minute period of construction activity assessed, construction noise levels are predicted to exceed applicable Noise Management Levels during standard hours and out-of-hours for all construction stages. These results are conservative (overestimate the impact), and impacts would vary at each receiver depending on the of construction, distance to equipment, presence of physical obstructions and intensity of the construction noise. Noise emissions may impact on people's wellbeing, particularly for nearby residents. Noise mitigation would be required to address the assessed noise impacts. Residential receivers that are predicted to be 'highly affected' would be eligible for additional mitigation measures (refer to Section 7.2).

Air quality and impacts such as dust generation if unmitigated can impact on the health and wellbeing of nearby people, particularly residents (refer to Section 6.11 for further information).

Temporary visual impacts would be experienced by sensitive receivers including commuters, nearby residents and people accessing the Moss Vale town centre. Visual impacts can impact people's wellbeing particularly for those with higher sensitivity such as residents with views from their houses. Most receivers would have a low sensitivity to the changes (being passers-by and rail commuters), with only a limited number having higher sensitivity (eg residents along Lackey Road).

In general, businesses in the area are unlikely to be adversely affected by the proposed work. There is potential for a minor temporary positive impact to local businesses through increased spending from construction workers, which would benefit local services such as cafes and takeaways, service stations, trades and services suppliers. There may also be positive impacts to employment in the region through

recruitment of the construction workforce, as well as positive impacts to construction supply companies.

Operation

Operation of the proposal would likely result in socio-economic benefits to the Moss Vale community and the wider Wingecarribee Shire LGA including:

- improving accessibility for customers at Moss Vale Station by providing two new lifts to access the station
- improving pedestrian and wheelchair access safely through provision of a new pedestrian crossing, upgrades to both footbridges and upgrades to the existing footpath along Dalys Way
- improving access to the station by other modes of access including:
 - ‘kiss and ride’ and accessible parking
 - cycling
 - bus travel
- adding CCTV cameras contributing to positive Crime Prevention Through Environmental Design (CPTED) outcomes for the station
- improving toilet facilities including replacing the existing unisex toilet with a family-accessible bathroom potentially improving the economy of surrounding businesses because of increased patronage to the station due to improved access
- improving staff safety and the customer experience through upgrades to the stabling yard and servicing of NSW TrainLink rolling stock.

6.9.4 Mitigation measures

A number of mitigation measures are recommended in Table 6-33 to minimise potential impacts on the community with a particular focus on keeping the community informed.

Table 6-33 Site specific socio-economic mitigation measures

No.	Mitigation measure	Responsibility	Timing
S1	Feedback through the public display process will be used to facilitate opportunities for the community and stakeholders to have input into the proposal, where practicable. Community and stakeholder feedback is welcomed throughout the project’s design and construction stages, via the project website, email address or project Infoline.	Transport	Pre-construction
S2	A 24 hour construction response line number will be in place throughout construction. Details of all complaints received during construction, including complaints received in person and via email, are to be recorded on a complaints register. A verbal response to phone enquiries on what action is proposed to be carried out is to be provided to the complainant within two hours during standard construction hours and within 24 hours during all other times (unless the complainant agrees otherwise). A verbal response to written complaints (email/letter) should be provided to Transport within 48 hours of receipt of the complaint and provided to the complainant within seven calendar days. Information on all complaints received during the previous 24 hours shall be forwarded to the TESR each working day.	Contractor	Construction
S3	Sustainability criteria for the proposal will be established to encourage the contractor to purchase goods and services locally, helping ensure the local community benefits from the construction of the proposal.	Contractor	Pre-construction

No.	Mitigation measure	Responsibility	Timing
S4	<p>A Community Liaison Management Plan (CLMP) will be developed prior to construction, which will identify potential stakeholders and methods for consultation with these groups during construction. The plan will also encourage feedback and facilitate opportunities for the community and stakeholders to have input where possible.</p> <p>The CLMP shall comply with the obligations of these conditions and should include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> • a comprehensive, project-specific analysis of stakeholders, issues and proposed strategies to manage issues through the duration of the proposal • details of the communication tools (traditional and digital) and activities that will be used to inform and engage with the community and stakeholders • a program for the implementation of community liaison activities relating to key construction tasks and milestones with strategies for minimising impacts and informing the community • policies and procedures for handling community complaints and enquiries, including the contractor’s nominated 24 hour contact for management of complaints and enquiries • analysis of other major projects/influences in the area with the potential to result in cumulative impacts to the community and strategies for managing these. <p>The CLMP shall be prepared to the satisfaction of the relevant Community and Place Director (or nominated delegate) prior to the commencement of construction and implemented, reviewed and revised every six months during the construction of the proposal.</p>	Contractor	Pre-construction
S5	The community will be informed of construction progress, activities and impacts in accordance with the Community Liaison Management Plan.	Transport	Pre-construction
S6	Construction workers will be sourced from the local area where possible.	Contractor / Transport	Construction
S7	Access to businesses and private properties will be maintained throughout construction.	Contractor	Construction

Other standard mitigation measures to address socio-economic impacts are identified in Section 7.2

6.10 Climate resilience/sustainability

6.10.1 Methodology

The dynamic nature of our climate system shows 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 Southern Highlands region can be assessed in terms of weather changes, storm intensity, flooding and increased risk of fire.

The impact of the proposal on climate change and sustainability has been considered in a Climate Change Risk Assessment (CCRA) (SMEC, 2023). The CCRA was developed in alignment with Transport’s *Climate Risk Assessment Guidelines, Version 4.0* (Transport for NSW, 2022f), which includes:

- assessing current exposure to weather extremes, impacts and consequences
- assessing vulnerability and resilience for aspects, people, operations and services
- general pre-screening to identify future risk exposure for different locations and detailed analysis of climate projections

- detailed pre-screening including selection of relevant climate variables and assets at risk
- developing a preliminary risk table and risk statements
- carrying out a workshop with participants from relevant project disciplines
- reassessing developed risk statements, likelihood, consequence and risks
- assessing and developing adaptation pathways
- identifying residual risk levels after adaptation
- reporting, monitoring and reviewing implementation of adaptation measures.

The CCRA focussed on activities or outcomes that the proponent has ownership, direct control or influence over. Secondary impacts, under the control or influence of others were included only when deemed relevant and necessary. The following risk management terminology was used in the CCRA:

- risk: the chance of something happening that will have an impact on objectives of the project. The risk is measured in terms of likelihood and consequence
- likelihood: a general description of the probability or frequency that an event would occur
- consequence: the outcome or impact of an event expressed qualitatively or quantitatively.

The CCRA analysed relevant climate risks by assigning a likelihood and consequence rating as per the Transport Enterprise Risk Management (TERM) consequence/likelihood criteria framework.

Ecologically sustainable development

As referenced in the EP&A Act, the issue of sustainability spans the principles of the precautionary principle; intergenerational equity; biological diversity and ecological integrity; and improved valuation, pricing and incentive mechanisms. The assessment of sustainability issues and opportunities for the proposal against these principles is provided in Section 8.2.

Sustainability rating

Transport has also identified sustainability initiatives and opportunities which will be considered in the proposal. The design of the proposal would be based on the principles of sustainability, including aiming for a Silver rating as a project under the *Sustainable Design Guidelines 4.0* and Transport’s Environmental Management System (EMS). These guidelines require a number of mandatory and discretionary initiatives to be applied. Refer to Section 3.3 for more information regarding sustainability in design.

6.10.2 Existing environment

Historical data and climate change projections for the proposal area were established from the Bureau of Meteorology (BOM) weather observations and using Transport’s *Climate Risk Assessment Tool*. This data is presented in Table 6-34 and Table 6-35 and has been used in the CCRA.

Table 6-34 Long-term weather and climate averages (Moss Vale 2001-2023 (BOM, 2023))

Climate variable	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Ann.
Mean maximum temp (C)	26.2	24.4	21.8	19.2	15.5	12.5	11.9	13.4	16.7	19.5	22.0	24.1	18.9
Mean days more than or equal to 35 C	2.4	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.7	4.3
Mean rainfall (mm)	65.0	101.4	96.6	55.9	48.3	76.5	63.7	54.7	41.9	52.8	72.3	60.1	784.5
Mean rainy days	8.4	8.7	8.9	6.5	5.5	7.3	5.6	5.6	6.1	7.3	8.8	7.8	86.5

Climate variable	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Ann.
Maximum wind gust speed (km/h)	91	106	102	94	102	94	104	106	109	106	106	102	109

Table 6-35 NARClIM climate projections

Variable type	Climate variable	Established value	Near Future (2021-2050)	Far future (2051-2080)	Very far future (2071-2100)
Heat related	Max temperature	35.7°C	+3.9°C	+5.9°C	+7.1°C
	No. of days over 35°C	2 days	+6 days	+14 days	+21 days
	No. of days over 40°C	0	+/- 0 days	+2 days	+4 days
	Highest fire index	39	+5	+10	+16
Precipitation related	Number of heavy rain periods	3	+/- 0	-1	-1
	Rainfall amount per max rainfall period	227mm	-37mm	+17mm	+9mm
	No. of days with moisture below 20%	141 days	+57 days	+137 days	+100 days
	Daily precipitation	130mm/day	+12mm/day	+47mm/day	+40mm/day
	Drought duration	59 days	-8 days	+23 days	+5 days
	No. of drought periods	5	+/- 0	+1	+2
Storms and strong winds	Wind speed	76 km/h	+1 km/h	+2 km/h	+4 km/h
	No. of days with wind speed over 65 km/h	5 days	-1 day	+3 days	+2 days
	Lightning events	-	-	+30%	+30%

Globally average air temperature has warmed by over 1.2 ± 0.1 °C since records began in 1850 (based on 2020 data). Despite La Niña cooling conditions, 2020 was one of the three warmest years on record and the last decade is the warmest on record.

Increasing global mean temperatures and changes to the average climate system, driven primarily by higher carbon dioxide levels due to human influence, lead to higher frequency and intensity of extreme weather events globally and in Australia. Significantly, the projected recurrence and intensity of extreme weather events can occur much faster and have a more significant impact than changes to the average climate system state.

Climate change has impacted Australia and NSW by increasing the severity and frequency of heatwaves, bushfires, extreme rainfall, flooding and landslides, drought, and extreme winds and cyclones.

The Southern Highlands region climate projections for the future include an increase in mean temperature of 0.65 °C which is expected to rise 1.34 °C by 2079. Projections also included an increase in the number of hot days with a maximum temperature of over 35 °C and increased annual rainfall.

Climate change risks to the proposal are based on projected weather conditions, the proposal scope items and feedback on similar proposals. It is based on:

- the proposal not being situated on land mapped as bushfire prone land
- the proposal not being situated on flood-prone land and is outside of the probable maximum flood extent

- lifts and other station infrastructure being subject to an increased frequency of extreme heat days which:
 - may pose threat to human health if there are power outages due to extreme heat
 - may make it uncomfortable for passengers waiting to board the train.

6.10.3 Potential impacts

Construction

Construction of the proposal would involve activities that may contribute to climate change through:

- removing vegetation which would reduce the carbon sequestration capacity of the local environment
- increasing direct emissions of carbon dioxide, methane and nitrous oxide from the use plant and equipment emitting exhaust fumes
- using electricity from fossil fuels
- producing and using materials with high embodied energy content such as concrete.

The CCRA identified several standard design and construction measures, that would be incorporated into the proposal. Transport standard risk management controls carried out during construction would be sufficient to manage the risk associated with current climatic conditions.

Operation

The proposal would provide improved access for commuters to public transport which would minimise private vehicle usage, a significant contributor to anthropogenic heating. A small amount of vegetation would be removed to facilitate the proposal, but this loss would be offset through vegetation planting in accordance with Transport’s Vegetation Offset Guide (TfNSW, 2016). A number of sustainability measures are also being considered during detailed design to maximise energy efficiency of the proposal.

The CCRA identified 22 climate-related risks with two risks relating to extreme heat. These two extreme heat risks were considered to have a medium inherent risk for the far (2051-2080) and very far future (2071-2100) climate change projections, as shown in Table 6-36. The other 20 risks had a low inherent risk, so mitigation measures have not been included.

In alignment with Transport’s *Sustainable Design Guidelines*, the CCRA demonstrates the proposal has exceeded the requirement to achieve ‘Performance Level 3’ which involves effectively treating all very high and high risks as well as treating 10 per cent of all medium risks. This proposal has effectively treated all medium risks (achieving ‘performance level 5’).

Table 6-36 Medium inherent risk statements

Risk ID	Climate Variable	Direct / indirect	Risk statement	Near future 2020-2051	Far future 2051-2080	Very far future 2070-2100
CR1	Extreme temperatures	Direct	An increase in the number of extreme heat days/heatwaves caused by climate change could result in heat stress of passengers and staff, reduced capacity of staff due to increased illness and/or dehydration leading to disruptions to services. This applies to both Moss Vale Station and Stabling Yard.	Low	Medium	Medium

Risk ID	Climate Variable	Direct / indirect	Risk statement	Near future 2020-2051	Far future 2051-2080	Very far future 2070-2100
CR2	Extreme temperatures	Direct	An increase in the number of extreme heat days/heatwaves caused by climate change may lead to a decrease in network capacity and increased power outages causing signal and transport systems interruptions/failures at the asset location. This applies to both Moss Vale Station and Stabling Yard.	Low	Medium	Medium

Adaptation measures for these two medium inherent risks have been identified and would be incorporated into the proposal.

6.10.4 Mitigation measures

Adaption measures to reduce the risk of extreme heat are provided in Table 6-37.

Table 6-37 Site specific climate resilience mitigation measures

No.	Mitigation measure	Responsibility	Timing
CR1	<p>The following measures will be implemented to address the risk of extreme heat impacts to staff and customers:</p> <ul style="list-style-type: none"> incorporating design elements into station glazing and footbridge façade to mitigate extreme heat impacts. This can be achieved by selecting materials for shelters, facades, outdoor furniture that reduce heat load impacts providing hydration stations (eg water bubblers) for passengers incorporating vertical safety mitigations such as mechanical ventilation of lift shafts and temperature sensors in lift shaft, with automatic return of lift car to entry level at a certain threshold the design life of new air conditioning systems would be about 20 years, with performance of equipment reviewed as per Transport’s maintenance/replacement regime avoiding or minimising the removal of existing trees/shading vegetation where possible. 	Contractor	Detailed design/pre-construction
CR2	<p>The following measures will be implemented to address the risk of extreme heat impacts to network and systems performance:</p> <ul style="list-style-type: none"> incorporating design elements into station glazing and footbridge façade to mitigate impacts. This can be achieved by selecting materials for shelters, facades, outdoor furniture that reduce heat load impacts incorporating energy generation redundancy measures into the design of the asset (eg uninterruptible power supply for communications equipment (eg CCTV) incorporating vertical safety mitigations into the design eg default for lifts is to go to ground and open when there is a power failure or when a temperature threshold is exceeded). 	Contractor	Detailed design, pre-construction, construction
CR3	Detailed design of the proposal would be undertaken in accordance with the <i>NSW Sustainable Design Guidelines – Version 4.0</i> (Transport for NSW, 2020) and is to target a gold rating and achieve a minimum silver rating.	Contractor	Detailed design

No.	Mitigation measure	Responsibility	Timing
CR4	The detailed design process would undertake a compliant carbon footprinting exercise in accordance with Transport's <i>Carbon Estimate and Reporting Tool Manual</i> (Transport for NSW, 2019) or other approved modelling tools. The carbon footprint would be used to inform decision making in design and construction.	Contractor	Detailed design
CR5	A suitably qualified and experienced Sustainability Officer shall be appointed who is responsible for implementing the sustainability objectives for the Proposal, in line with the Proposal's overarching Project Sustainability Plan. Details of the Sustainability Officer including defined responsibilities, duration and resource allocation throughout the appointment are to be submitted to the satisfaction of the Director of Sustainability prior to the preparation of the Sustainability Management Plan.	Contractor	Pre-construction
CR6	A Sustainability Management Plan (SMP) which details the approach to managing sustainability requirements and opportunities during design and construction shall be prepared. The SMP shall include the following as a minimum: <ul style="list-style-type: none"> • a completed electronic checklist demonstrating compliance with the Transport <i>Sustainable Design Guidelines Version 4.0 (ST-114)</i> • a statement outlining the Construction Contactor's own corporate sustainability policies, obligations, goals, targets and commitments • a description of the processes and methodologies for encouraging and identifying innovative sustainability outcomes on the proposal, and the areas targeted for innovative sustainable solutions to be explored and/or implemented on the proposal. • the approach to the identification of opportunities to reduce carbon emissions, energy use and embodied lifecycle impacts of the proposal. This should include a summary of initiatives proposed for implementation to meet energy and carbon management objectives and targets • the approach to sustainable procurement including how procurement processes have taken in to account for the principles of <i>ISO 20400: 2017 – Sustainable Procurement</i> in the selection of all materials, products and services • a description of the processes, standards and procedures for undertaking climate change risk assessments and strategies for mitigation of risks associated with climate change and extreme weather events. <p>A copy of the SMP shall be submitted to Transport's Director of Sustainability at least 30 days prior to the commencement of construction, for written approval (or such time as is otherwise approved by the Director).</p>	Contractor	Pre-construction

6.11 Air quality

6.11.1 Methodology

A qualitative assessment was completed to determine the impact of the proposal on local air quality. This was considered an appropriate level of assessment as generation of air emissions is expected to be limited to the construction period. The assessment methodology included:

- a desktop review of:
 - background air quality and the existing climatic environment based on local meteorological data
 - a search of the National Pollutant Inventory database (on 6 September 2023)

- identification of nearby sensitive receivers
- assessment of potential construction and operation air quality impacts
- identification of appropriate measures to mitigate potential impacts.

6.11.2 Existing environment

The existing air quality of the surrounding environment is considered characteristic of a suburban environment including commercial, retail, residential and industrial land uses. Sensitive receivers in the vicinity of the proposal include staff and customers at Moss Vale Station, residential properties along Lackey Road, and the Moss Vale town centre along Argyle Street. Other contributors to air quality within the local area include emissions from motor vehicles on the surrounding road network, particularly from heavy vehicles along Lackey Road and Argyle Street.

The search of the National Pollutant Inventory identified four air polluting sources within three kilometres of the proposal area. The closest source is the refuelling station at Moss Vale Station.

6.11.3 Potential impacts

Construction

Construction of the proposal could cause air quality impacts through the generation of dust and emissions from construction plant and equipment, including carbon monoxide, sulfur dioxide, particulate matter, nitrous oxides, volatile organic compounds and other substances.

Anticipated sources of dust and dust-generating activities include:

- excavating the new lift shafts and footbridge modifications, noise barrier and retaining walls, establishing pads/foundations, reconfiguring the stabling yard and other stabling yard features (e.g. new car park)
- trenching and excavating for relocation and installation of services, drainage and footpaths
- loading and transferring material from trucks and temporary stockpiling activities, and vehicle/machinery movements in the construction ancillary facilities
- demolishing within the station building.

The activities listed above are small in scale and would be temporary and localised to specific areas within the proposal area. With the implementation of standard construction mitigation measures, air quality impacts to sensitive receivers from dust generation would be minimal.

The generation of exhaust emissions in the local area would be minor and short-term due to the limited number of plant, machinery and vehicles required for construction. Standard construction mitigation measures would be implemented to reduce exhaust emissions.

Operation

Operation of the proposal would not introduce any new sources of air emissions or result in a change in land use that might otherwise impact upon air quality. The introduction of Diesel Exhaust Fluid (or AdBlue) at the existing refuelling facility for use in the new trains would help reduce particulate matter in air emissions from diesel rolling stock. Diesel Exhaust Fluid is a non-toxic and non-flammable solution that helps to reduce the harmful emissions that diesel engines create and release into the environment. Diesel Exhaust Fluid reduces harmful emissions when injected into engines by reacting with and reducing nitrogen oxide emissions to create ammonia, carbon dioxide and water.

As the proposal would improve access to public transport, the use of public transport is expected to increase leading to less private vehicle emissions in the long-term and contribute to an improvement in local air quality.

6.11.4 Mitigation measures

Mitigation measures for air quality are outlined in Table 6-38.

Table 6-38 Site specific Air quality mitigation measures

No.	Mitigation measure	Responsibility	Timing
AQ1	<p>Air quality management and monitoring for the proposal will be carried out in accordance with Transport’s <i>Air Quality Management Guideline</i> (Transport for NSW, 2022g).</p> <p>To minimise air quality impacts, the following measures will be implemented and incorporated into the CEMP:</p> <ul style="list-style-type: none"> • plant and machinery will be switched off when not in use, and not left idling • plant and machinery will be regularly checked and maintained in a proper and efficient condition • vehicle and machinery movements during construction will be restricted to designated areas and sealed/compacted surfaces where practicable • water will be applied to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces), or alternative measures implemented to mitigate dust generation • stockpiles will be covered when not in use and trucks transporting material will be covered • tracking mud and dirt onto sealed road surfaces will be avoided and entry/exit points to the site monitored • air quality mitigation measure requirements will be included into project inductions, training and pre-start/toolbox talks. 	Contractor	Construction

6.12 Other impacts

6.12.1 Existing environment and potential impacts

Table 6-39 Other potential impacts

Environmental factor	Existing environment	Potential impacts
Waste	<p>NSW TrainLink has operational control of the station and stabling yard.</p> <p>NSW TrainLink performs station cleaning activities which includes the collection of waste from platform waste infrastructure and disposal using the back of house arrangements located on Dalys Way serviced by a joint Waste Management Contract managed by Sydney Trains.</p> <p>NSW TrainLink engages Sydney Trains to provide presentation services to NSW TrainLink rolling stock stabled in the Moss Vale Yard. Using the Joint Waste Management Contract, arrangements have been made for the collection of general waste resulting from presentation services near the Lackey Road Access Gate, northern end of the stabling yard.</p> <p>Current back of house services provided include:</p> <ul style="list-style-type: none"> • one fortnightly collection by NSW TrainLink 	<p>Construction of the proposal has the potential to generate the following materials:</p> <ul style="list-style-type: none"> • excavated spoil • asphalt and concrete • surplus building materials (metal, timber, plastics, etc.) • green waste • general waste, including food scraps generated by construction workers.

Environmental factor	Existing environment	Potential impacts
	<ul style="list-style-type: none"> two collections per week by NSW TrainLink two collections per week by Sydney Trains. 	
Greenhouse gas emissions	<p>The transport sector accounts for 24 percent of NSW’s greenhouse gas emissions (Transport for NSW, 2022h). Although 90 per cent of the transport sector emissions are associated with users of the road network, Transport’s direct operations account for only three per cent of the sector emissions (Transport for NSW, 2022h).</p> <p>The existing greenhouse gas emissions from the local environment are characteristic of a suburban environment including commercial, residential and industrial land uses. Key contributors to greenhouse gasses in the area include emissions from motor vehicles on the road network, particularly from heavy vehicles along Lackey Road and Argyle Street and the operation of the freight and passenger rail network.</p> <p>NSW TrainLink Stations and Stabling Yards are already powered by 100 per cent renewable electricity. This would not change with the upgrades of both the station precinct and stabling yard.</p>	<p>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.</p> <p>The detailed design process for the proposal would include completing a compliant carbon foot-printing exercise in accordance with the <i>Carbon Estimate and Reporting Tool Manual</i> (Transport, 2019) (or other approved modelling tool). The carbon footprint would be used to inform decision making in design and construction. Greenhouse gas emissions would also be assessed in accordance with the <i>Sustainable Design Guidelines</i> (Transport, 2020).</p> <p>As the proposal is small scale and given the short-term temporary nature of the individual construction activities, greenhouse gas emissions from construction activities would be minimal. Greenhouse gas emissions would be kept to a minimum through the implementation of standard mitigation measures.</p> <p>As the proposed work is to upgrade the yard and station, additional sources of greenhouse gas emissions would be minimal and include:</p> <ul style="list-style-type: none"> electricity use for the new mobile train simulator electricity use for new security features introduced at the station. <p>This would be connected to the NSW TrainLink Supply Arrangement of 100 per cent renewable energy.</p> <p>NSW TrainLink with Transport would continue to identify practices, innovation, and technology to reduce greenhouse gas emissions resulting from the operation of rolling stock on the rail network.</p> <p>It is also anticipated that, once operational, the proposal may result in an increase in public transport use and relative decrease in use of private motor vehicles by commuters who travel to and from the station. A modal shift in transport usage would reduce the amount of greenhouse gas emissions created by private motor vehicles.</p>

6.12.2 Mitigation measures

Management measures for other impacts are outlined in Table 6-40.

Table 6-40 Site specific other impact mitigation measures

Impact	Mitigation measure	Responsibility	Timing
Waste	A Waste Management Plan (WMP) will be prepared and put in place as part of the CEMP. The WMP will include but not be limited to: <ul style="list-style-type: none"> measures to avoid and minimise waste associated with the project classification of wastes and management options (re-use, recycle, stockpile, disposal) statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions procedures for storage, transport and disposal of spoil and waste monitoring, record keeping and reporting. 	Contractor	Detailed design / pre-construction, construction
Waste	A concrete washout will be established and maintained in accordance with Transport's <i>Concrete Washout Guideline</i> (Transport for NSW, 2023b).	Contractor	Construction
Waste	Waste management targets in accordance with the <i>Sustainable Design Guidelines</i> requirements will be developed for the proposal and will include reuse and recycling.	Contractor	Construction
Waste	If vegetation is to be mulched and transported off site for beneficial reuse, it is to be assessed for the presence of weeds, pest, and other disease and a Mulch Management Plan prepared in accordance with Transport's <i>Technical Procedure: Mulch Management</i> .	Contractor	Construction
Greenhouse gas emissions	Construction planning will be carried out to reduce material requirements and select recycled materials or materials with low -embodied energies where practicable and possible.	Contractor	Pre-construction / construction
Greenhouse gas emissions	Construction equipment, plant and vehicles will be appropriately sized for the task, serviced frequently and would not be left idling when not in use.	Contractor	Construction
Greenhouse gas emissions	Construction site layouts will be designed to reduce travel distances and double handling of materials to reduce fuel usage and emission generation.	Contractor	Construction

Other standard mitigation measures to address these impacts are identified in Section 7.2.

6.13 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. Cumulative impacts may also arise from the simultaneous construction of elements of the proposal within the proposal area.

6.13.1 Study area

A search of the Department of Planning and Environment’s Major Projects Register, and Wingecarribee Shire Council Development Application Register on 3 October 2023 identified a number of projects with the potential to contribute to cumulative impacts with the proposal. These are identified in Table 6-41. Where there is limited information on the impacts of projects, these impacts have been considered at a high level.

6.13.2 Potential impacts

Potential cumulative impacts with the nearby projects are identified in Table 6-41. There are anticipated to be negligible to minimal negative cumulative impacts associated with the construction of the proposal and the majority of projects listed in Table 6-41. There is not expected to be cumulative impacts during operation.

Potential cumulative impacts would be temporary and environmental safeguards and management measures would be implemented as appropriate.

Table 6-41 Projects with the potential to contribute to cumulative impacts with the proposal

Project details	Construction impacts	Operational impacts
<p>Moss Vale Resource Recovery Facility</p> <ul style="list-style-type: none"> • construction and operation of a resource recovery facility receiving up to 200,000 tonnes per annum of construction and industrial, construction and demolition, municipal and tyre waste • 2 Bowman Road, Moss Vale • 2km north-west of the proposal • status: EIS being prepared. 	<p>The potential for this project to contribute cumulative impacts during overlapping construction activities with the proposal are anticipated to be negligible given details provided in the Scoping Report for this project, including low traffic volumes and different haulage routes, and negligible noise impacts on residential receivers.</p>	<p>The Scoping Report for the EIS states trucks would use Berrima Road and would bypass the Moss Vale township, and so there would be no potential cumulative operational impacts with the proposal.</p>
<p>Moss Vale Plastics Recycling Facility</p> <ul style="list-style-type: none"> • construction and operation of a plastics sorting and reprocessing facility with the capacity to process up to 150,000 tonnes of mixed plastic waste per annum into pellets, flakes or plastic derived products. • 74-76 Beaconsfield Road, Moss Vale • 2km north of the proposal area • status: EIS on exhibition. 	<p>The potential for this project to contribute cumulative impacts during overlapping construction activities with the proposal is anticipated to be low given low traffic volumes and different haulage routes, and the distance between the projects which would minimise potential cumulative noise impacts.</p>	<p>There are no anticipated impacts that could contribute to associated with the operation of this project.</p>
<p>Interim Wastewater Treatment System</p> <ul style="list-style-type: none"> • 32 Lovelle Street, Moss Vale • status: approved. 	<p>Given the negligible construction traffic volumes expected relative to existing traffic volumes, it is unlikely that the project will contribute to cumulative traffic impacts during standard construction hours.</p>	<p>There are no anticipated impacts that could contribute to cumulative impacts associated with the concurrent operation of the proposal and this project.</p>
<p>Water supply, sewerage, stormwater drainage work</p> <ul style="list-style-type: none"> • 2 Meehan Place, Moss Vale • 1.9km east of the proposal area • status: approved. 	<p>Due to the scale and distance of this project cumulative impacts associated with this project are anticipated to be negligible.</p>	<p>There are no anticipated cumulative impacts associated with the concurrent operation of the proposal and this project.</p>

Project details	Construction impacts	Operational impacts
<p>Water supply, stormwater drainage work, installation of waste treatment device and operation of sewage management</p> <ul style="list-style-type: none"> • 18 Hazelton Drive Moss Vale • 2.6km east of the proposal area • status: approved. 	<p>Due to the scale and distance of this project cumulative impacts with this project are anticipated to be negligible.</p>	<p>There are no anticipated cumulative impacts associated with the concurrent operation of the proposal and this project.</p>
<p>Argyle Street traffic and pedestrian improvement works.</p> <ul style="list-style-type: none"> • construction of signals at Waite Street, and decommission existing pedestrian signalised crossing at 508 Argyle Street • four right turn lanes from Argyle Street (Valetta Street, Kirkham Street, Lackey Road and Arthur Street) • restricted right-turn onto Argyle Street from Arthur Street • restricted right-turn onto Argyle Street from Railway Street • restricted right turn onto Railway Street from Argyle Street • two pedestrian refuges on Argyle Street (between Lackey Road/Railway Street, and near Dalys Way) • status: planning stage/not approved. Subject to approval, works are expected to commence mid-2024. 	<p>This project would overlap with the construction period of the proposal, however no environmental impact assessment is currently available for the project. From details available, construction of this project would be staged to avoid peak traffic periods, minimising impact to the public. Works would consist of both day and night works, with traffic control in place for the safety of workers and the public. Pedestrians would be provided detour routes during staging of works.</p> <p>It is anticipated that these impacts would be managed through a Construction Traffic Management Plan.</p> <p>There would be potential for cumulative traffic and transport impacts on Argyle Street and the surrounding road network, and potentially cumulative noise impacts.</p>	<p>There would be no negative cumulative operational impacts with the proposal. Restricted right turns would be offset by improved safety and travel efficiency through the wider area, providing overall benefit to all road users.</p>
<p>Moss Vale Station heritage restoration works</p> <ul style="list-style-type: none"> • undertaken by Sydney Trains, works would include repairs to water damaged areas of station building B, including cellars and former kitchen area. 	<p>Investigation and condition assessment is underway at the time of writing. Works may commence mid-2024. Plant and machinery required would depend on the repair scope. Due to the small scale of the works, it is anticipated the cumulative construction impacts associated with this project would be minimal.</p>	<p>There are no anticipated cumulative impacts associated with the concurrent operation of the proposal and this project.</p>
<p>New supermarket and car park</p> <ul style="list-style-type: none"> • 233 Argyle Street • 20 metres east of proposal area • status: Development approval application made to Council (not available online). 	<p>If construction of this project overlaps with the proposal there would be potential for cumulative traffic and noise impacts in the vicinity. Potential cumulative impacts with this project would be considered further during detailed design of the proposal.</p>	<p>There are no anticipated negative cumulative impacts associated with the concurrent operation of the proposal and this project.</p>

6.13.3 Mitigation measures

Based on this assessment, it is anticipated that cumulative impacts would be minimal.

The majority of cumulative impacts would be mitigated and managed by the safeguards and management measures outlined throughout Section 6 of this REF and summarised in Section 7.2.

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 mitigation measures would be developed in the CEMP and implemented as appropriate. The Community Liaison Management Plan (CLMP) would capture how the known cumulative impacts would be managed with the community and key stakeholders.

7. Environmental management

This chapter describes how the proposal will be managed to reduce potential environmental impacts during detailed design, construction and operation. A framework for managing potential impacts is provided. A summary of site-specific environmental mitigations is provided and the licence and/or approval requirements required prior to construction are listed.

7.1 Environmental management plans (or system)

Mitigations measures have been identified in the REF in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these mitigations measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

A CEMP would be prepared to describe the mitigations measures identified. The CEMP would provide a framework for establishing how these measures would be implemented and who would be responsible for their implementation.

The CEMP would be prepared prior to construction of the proposal and must be reviewed and certified by the Transport Environment and Sustainability Representative, prior to the commencement of any on-site works. The CEMP would be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP would be developed in accordance with the specifications set out in the QA Specification G36 – *Environmental Protection (Management System)*, QA Specification G38 – *Soil and Water Management (Soil and Water Plan)*, QA Specification G40 – *Clearing and Grubbing*, QA Specification G10 – *Traffic Management*.

7.2 List of mitigation measures

Mitigation measures outlined in this REF will be incorporated into the detailed design phase of the proposal and during construction and operation of the proposal, should it proceed. These mitigation measures will minimise any potential adverse impacts arising from the proposed works on the surrounding environment. The mitigation measures are listed in Table 7-1.

Table 7-1 Mitigation measures

No.	Mitigation measure	Responsibility	Timing
General			
1.	<p>Construction Environmental Management Plan</p> <p>A Construction Environmental Management Plan (CEMP) shall be prepared and implemented prior to the commencement of construction which addresses the following matters, as a minimum:</p> <ul style="list-style-type: none"> • project risk assessment including environmental aspects and impacts • high level traffic and pedestrian management (noting a separate Traffic Management Plan (TMP) may be required subject to other Transport requirements) • urban design, landscape character and visual amenity • noise and vibration management, including traffic noise generated by the proposal • water and soil management • air quality management (including dust suppression) • Aboriginal and non-Aboriginal heritage management • biodiversity management • storage and use of hazardous materials • contaminated land management (including acid sulfate soils) • weed management • waste management • bushfire risk • environmental incident reporting and management procedures • non-compliance and corrective/preventative action procedures • details of approvals, licences and permits required to be obtained under any other legislation for the proposal. 	Contractor	Pre-construction

No.	Mitigation measure	Responsibility	Timing
	<p>The CEMP shall:</p> <ul style="list-style-type: none"> detail how the Contractor shall comply with the conditions of approval, mitigation measures, conditions of any licences, permits or other approvals issued by government authorities for the proposal, all relevant legislation and regulations, and accepted best practice management comply with the relevant requirements of <i>Environmental Management Plan Guideline – Guideline for Construction (edition 4)</i> (NSW Department of Planning and Environment, 2020) include an environmental compliance matrix for the proposal (or such stages of the proposal as approved by the Transport Environment and Sustainability Representative (TESR)) that details compliance with all relevant conditions and mitigation measures include an Environmental Policy. <p>The CEMP shall be reviewed and updated at six monthly intervals (unless otherwise approved with the TERS) and in response to any actions identified as part of the TERS’s review of the document or in response to scope changes or modifications. Updates to the CEMP shall be made within seven days of the completion of the review or receipt of actions identified in the Transport review of the document.</p> <p>The CEMP must be approved by the DES or delegate prior to the commencement of construction and following review, and be implemented for the construction.</p>		
2.	<p>Environmental Controls Map</p> <p>An Environmental Controls Map (ECM) shall be prepared in accordance with Transport’s Environmental Controls Map Guideline (Transport for NSW, 2021b) prior to the commencement of construction for implementation for the construction. The ECM is to be approved by the TERS and may be prepared in stages, as set out in the CEMP.</p> <p>A copy of the ECM shall be submitted to the TERS for review and written approval in accordance with Mitigation Measure 4.</p> <p>The ECM shall be prepared as a map – suitably enlarged in both A0 and A3 sizes and mounted on the wall of a site office and included in site inductions, supported by relevant written information.</p> <p>Updates to the ECM shall be made within seven days of the completion of the review or receipt of actions identified by any TERS audit of the document and submitted to the TERS for written approval.</p>	Contractor	Pre-construction
3.	<p>Site Induction</p> <p>Prior to the commencement of construction, all contractors will be inducted on the project’s key environmental and sustainability risks, procedures, mitigation measures and conditions of approval. The induction shall be given by the Environmental Personnel and as a minimum will include:</p> <ul style="list-style-type: none"> details of the approved ECM as required by Mitigation Measure 2 and where the ECM is located on site, and a briefing on the CEMP as required by Mitigation Measure 1 information on the protection measures to be implemented to protect vegetation, penalties for breaches and location of areas of sensitivity 	Contractor	Pre-construction

No.	Mitigation measure	Responsibility	Timing
	<ul style="list-style-type: none"> preliminary identification of Aboriginal cultural heritage material. This training will include information such as the importance of Aboriginal cultural heritage material and places to the Aboriginal community, as well as the legal implications of removal, disturbance and damage to any Aboriginal cultural heritage material and sites. <p>A heritage induction informing contractors of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction.</p>		
4.	<p>Transport Environmental Management Approvals</p> <p>Requirements for documents, plans or programs which must be reviewed and approved by the TESR (including the CEMP) are outlined in the Mitigation Measures. All reviews and approvals associated with these Mitigation Measures shall meet the following requirements (unless otherwise approved by the TESR or DES or if specifically noted in a Mitigation Measure):</p> <ul style="list-style-type: none"> completed consultation with government agencies and relevant service/utility providers and evidence of consultation submitted with the plan a copy of the plan submitted to the TESR for review at least 21 days prior to commencement of Construction or the related works being commenced any comments made by the TESR in accordance with b) must be adequately addressed prior to submission for approval a copy of the plan submitted to the TESR to obtain written approval from the DES at least five days prior periodic review and update of the plan submitted to the TESR for written approval. <p>Construction must not commence until the DES has provided written approval of the plan/s.</p>	Contractor	Pre-construction
5.	<p>Environment Personnel</p> <p>Suitably qualified and experienced environmental management personnel shall be available and be responsible for implementing the environmental objectives for the proposal, including undertaking regular site inspections, preparation and implementation of environmental documentation and ensuring the proposal meets the requirements of the Environmental Management System (EMS).</p> <p>Details of the environmental personnel, including relevant experience, defined responsibilities and resource allocation throughout the proposal (including time to be spent on-site/off-site) are to be submitted for the written approval of the DES, at least 21 days prior to commencement of construction of the proposal (or such time as otherwise approved by the DES).</p> <p>Any adjustments to environmental resource allocations (on-site or off-site) are to be approved by the DES.</p>	Contractor	Pre-construction and construction
6.	<p>Service Relocation</p> <p>Service relocation will be carried out in consultation with the relevant authority. Existing services and exclusion zones shall be identified on the ECM and on site to avoid direct impacts during construction.</p>	Contractor	Pre- construction and construction
7.	<p>Detailed Design Validation</p> <p>A detailed design validation report (DDVR) for the proposal shall be prepared and submitted at each design stage to detail how compliance is achieved against:</p>	Contractor	Pre-construction and following each design phase

No.	Mitigation measure	Responsibility	Timing
	<ul style="list-style-type: none"> the final proposal description all design mitigation measures detailed in the REF any conditions of approval in the determination report for the proposal. <p>A final DDVR will accompany the Approval for Construction (or equivalent) submission.</p> <p>The Proponent shall:</p> <ul style="list-style-type: none"> submit a copy of the DDVR to the TESR for review update and submit a DDVR revision at each design stage or as required, including as the design progresses the TESR is to be given a minimum period of seven days to review and provide any comments to the Proponent in relation to the DDVR. <p>Upon completion of the final TESR review period, a copy of the DDVR will be submitted to the DES (or nominated delegate) for written approval. The DDVR will be submitted to Transport for review and Confirmation that the design achieves compliance.</p>		
8.	<p>Environmental Incident Procedure</p> <p>Where non-compliances or incidents arise, an event report must be completed in the Transport incident management system and returned to the Principal's Representative in accordance with 'EMF-EM-PR-0001 Environmental Incident Procedure'.</p>	Contractor	Construction
9.	<p>Proposal Modifications</p> <p>Any modifications to the proposal (as defined in this REF and/or future Determination Report), requiring an amendment REF (as determined by the TESR), will be subject to further assessment and approval by Transport. This assessment will need to demonstrate that any environmental impacts resulting from the modifications have been mitigated. The further assessment must be submitted and approved prior to commencement of works relating to the modification.</p>	Contractor	As required
10.	<p>Proposal Changes</p> <p>Any modifications to the proposal (as defined in this REF and/or future Determination Report), which may be amended by a consistency assessment (as determined by the TESR), if approved, will be subject to further assessment and approval by Transport. This assessment will need to demonstrate that any environmental impacts resulting from the change have been minimised. The further assessment must be submitted to Transport six weeks prior to commencement of works relating to the modification.</p>	Contractor	As required
11.	<p>Modification/Change Register</p> <p>A project modification/change register shall be created and maintained throughout the proposal to identify proposal changes or modifications. The register will be updated and submitted at each design stage or as required, including as the design progresses. The register will be submitted to TESR for review of changes and direction on the approval pathway these changes or modifications should apply.</p>	Contractor	As required

No.	Mitigation measure	Responsibility	Timing
	Biodiversity		
12.	<p>Biodiversity Induction</p> <p>All workers will be provided with an environmental induction before starting work onsite. This induction will include information on the protection measures to be put in place to protect vegetation, penalties for breaches and locations of areas of sensitivity.</p>	Contractor	Pre-construction / construction
13.	<p>Removal of Trees or Vegetation</p> <p>The proposal would be designed and constructed to retain as much existing vegetation as possible and disturbance of vegetation would be limited to the minimum amount necessary to construct the proposal. Trees nominated to be removed in the Moss Vale Regional Rail Enabling Works Arboricultural Impact Assessment (Ecological 2021) and the Moss Vale Station and Stabling Yard Upgrade Arboricultural Impact Assessment Addendum Report (Urban Tree Management, 2023) will be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal. Trees to be retained will be protected through temporary protection measures. Landowners consent would be obtained prior to vegetation removal, should TAHE not be the landowner.</p> <p>Separate approval, in accordance with Transport's EMF-EM-TT-0144 Removal or trimming of vegetation application, is required for the trimming, cutting, pruning or removal of all trees or vegetation where the impact has not already been identified in the REF or Determination Report for the proposal. The trimming, cutting, pruning or removal of trees or vegetation shall be carried out in accordance with the mitigation measures.</p>	Contractor	Pre-construction / construction
14.	<p>Biodiversity Management</p> <p>Construction of the proposal must be carried out in accordance with Transport's <i>Biodiversity Policy</i> (Transport for NSW, 2022c) which includes Transport's <i>Biodiversity Assessment Guideline</i>, <i>Transport's No Net Loss Guidelines</i> and <i>Transport's Tree and Hollow Replacement guidelines</i> (Transport for NSW, 2022c), <i>Transport's Vegetation Management (Protection and Removal) Guideline</i> (Transport for NSW, 2022d), and <i>Transport's Fauna Management Guideline</i> (Transport for NSW, 2022e).</p>	Contractor	Construction
15.	<p>Tree Protection Zones</p> <p>Recommendations made in the Arboricultural Impact Assessment (Ecological 2021) and the Arboricultural Impact Assessment Addendum Report (Urban Tree Management, 2023) will be adhered to, including establishment of Tree Protection Zones (TPZs) around trees to be retained. Tree protection will be carried out in line with <i>AS 4970-2009 Protection of Trees on Development Sites</i> and will include exclusion fencing of TPZs. The tree dripline may be used as a guide for protecting trees where an exclusion zone is not established by an arborist/ecologist. Should the approved development be altered by a post-approval assessment, consideration of any additional TPZs beyond those identified in the Arborist Assessments (Ecological 2021, Urban Tree Management 2023) will be required and may need to be supported by additional or addendum arboricultural/ecological advice.</p>	Contractor	Pre-construction / Construction

No.	Mitigation measure	Responsibility	Timing
16.	<p>Vegetation Damage</p> <p>In the event of any tree or vegetation to be retained becoming damaged during construction, the contractor will immediately notify the Transport Project Manager and TESR to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.</p> <p>Where arborist advice indicates that a tree or vegetation may be at risk of failure due to proposal works the priority should be to retain and protect the tree or vegetation. Following completion of construction, the arborist should reassess the tree and their advice should be followed. Where tree or vegetation removal is required, replacement must be in accordance with Transport's <i>Biodiversity Policy</i> (Transport for NSW, 2022c).</p>	Contractor	Construction
17.	<p>Weed Control</p> <p>Weed control measures, consistent with Transport's <i>Weed Management and Disposal Guideline</i> (Transport for NSW, 2020c), will be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the proposal. This will include the management and disposal of weeds in accordance with the <i>Biosecurity Act 2015</i>.</p>	Contractor	Pre-construction / Construction
18.	<p>Replanting Program</p> <p>Any vegetation removal shall be offset in accordance with Transport's <i>Biodiversity Policy</i> (Transport for NSW, 2022c). All vegetation planted on-site is to consist of locally native species, unless otherwise approved by the DES or as required by a heritage approval/recommendation, following consultation with the relevant Council, where relevant, and/or the owner of the land upon which the vegetation is to be planted.</p> <p>A replanting strategy and maintenance schedule of offsetting on and offsite is to be provided to the TESR for review and approval at least four weeks prior to the commencement of replanting.</p> <p>All vegetation will be maintained for at least 12 months following completion of construction or following planting (whichever ends last) (unless approved by the TESR).</p>	Contractor	Construction and operation
Hydrology and water quality			
19.	<p>Vehicle Maintenance</p> <p>Vehicles and machinery will be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment will also be refuelled offsite, or in a designated refuelling area.</p>	Contractor	Construction
20.	<p>Pollution Incident</p> <p>In the event of a pollution incident, work will cease in the vicinity and the contractor will immediately notify Transport's Project Manager and TSER. The EPA will be notified by Transport if required, in accordance with Part 5.7 of the POEO Act.</p>	Contractor	Construction
21.	<p>Existing Drainage</p> <p>The existing drainage systems will remain operational throughout the construction phase.</p>	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
22.	<p>Dewatering</p> <p>A dewatering procedure will be implemented in accordance with Transport's <i>Water Discharge and Reuse Guideline</i> (Transport for NSW, 2020b).</p>	Contractor	Construction
23.	<p>Heavy Rainfall Management</p> <p>Construction scheduling, site accesses and layout of the ancillary facility in the southern car park off Argyle Street will take into account the possibility of being affected by large flood events (i.e. 1per cent AEP and Probable Maximum flood events).</p> <p>Weather forecasts for the region will be monitored for significant rain events (including upstream areas in the catchment), and fuel/chemical storage will be avoided in the ancillary facility on the southern car park off Argyle Street.</p>	Contractor	Construction
Contamination, landform, geology and soils			
24.	<p>Contamination Investigation</p> <p>Prior to construction, an investigation of the proposal site shall be undertaken by a suitably qualified Environmental Consultant, in accordance with the level of assessment and requirements stipulated by the <i>National Environment Protection (Assessment of Site Contamination) Amendment Measure (NEPM) 2013</i>. The assessment shall also be generally undertaken in accordance with:</p> <ul style="list-style-type: none"> • <i>Contaminated Sites - Sampling Design Guidelines (EPA, 1995)</i> • <i>AS 4482 (2005) Guide to the investigation and sampling of sites with potentially contaminated soil.</i> <p>The investigation report shall be prepared in accordance with the <i>Guidelines for Consultants Reporting on Contaminated Sites</i> (Office of Environment and Heritage, 2011) and shall also include a preliminary waste classification in accordance with the <i>Waste Classification Guidelines</i> (NSW EPA, 2014).</p> <p>Specific requirements for further investigation (including requirements for a Site Auditor), remediation or management of any contamination shall be included in the CEMP (or supporting Contamination Management Plan) as appropriate.</p> <p>Note: Nothing in this condition removes any obligation to adhere to the requirements under the NSW <i>Contaminated Land Management Act 1997</i> (or other legislation).</p>	Contractor	Pre-construction, construction
25.	<p>Contaminated Land Management Plan</p> <p>A Contaminated Land Management Plan will be prepared and implemented as part of the CEMP. The plan will include, but not be limited to:</p> <ul style="list-style-type: none"> • capture and management of any surface runoff contaminated by exposure to the contaminated land • further investigations required to determine the extent, concentration and type of contamination, as identified in the detailed site investigation (Phase 1) • management of the remediation and subsequent validation of the contaminated land, including any certification required (if applicable) measures to ensure the safety of site personnel and local communities during construction. 	Contractor	Pre-construction
26.	<p>Unexpected finds – Contamination</p> <p>An appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, will 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 will be carried out in accordance with SafeWork NSW requirements.</p>	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
	<p>If contaminated areas are encountered during construction, appropriate control measures should be put in place to manage the immediate risks of contamination.</p> <p>All other work that may impact the contaminated area will stop until the nature and extent of the contamination has been confirmed and necessary site-specific controls or further actions identified in consultation with the TESR and/or EPA.</p>		
27.	<p>Asbestos Management Plan An Asbestos Management Plan will be developed to manage asbestos and asbestos containing material if encountered during the construction. The plan will include:</p> <ul style="list-style-type: none"> • identification of potential asbestos on site • procedures to manage and handle any asbestos • mitigation measures if asbestos is encountered during construction • procedures for disposal of asbestos in accordance with the NSW EPA guidelines, Australian Standards and relevant industry codes of practice. 	Contractor	Pre-construction
28.	<p>Spill management Spill management measures will be included in the CEMP. The measures will be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (EPA officers).</p>	Contractor	Pre-construction, Construction
29.	<p>Spoil management Excess spoil not required or able to be used for backfilling will be stockpiled in a suitable location before being reused or removed from the site and disposed of appropriately in accordance with the NSW EPA Waste Classification Guidelines (NSW EPA, 2014).</p>	Contractor	Construction
30.	<p>Erosion and sediment control Soil and water management measures shall be prepared, implemented and maintained for the mitigation of water quality impacts during construction of the proposal in accordance with Managing Urban Stormwater: Soils and Construction Volume 14th Edition (Landcom, 2004). The following are required, based on the amount of disturbance proposed:</p> <ul style="list-style-type: none"> • soil and water management measures included on the ECM and in the CEMP for less than 250m² of disturbance • erosion and sediment control plan (ESCP) for between 250-2,500m² of disturbance • soil and water management plan (SWMP) for over 2,500m² of disturbance. <p>Management measures will be established prior to any clearing, grubbing or site establishment activities and will be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. At a minimum, inspection will occur monthly and will be reported in the inspection report. Management measures will be maintained until the work is complete and areas are stabilised. The management measures shall be reviewed and updated throughout construction so they remain relevant to the activities being carried out.</p>	Contractor	Pre-construction, Construction
31.	<p>Rehabilitation The rehabilitation of disturbed areas will be carried out progressively as construction stages are completed, in accordance with:</p> <ul style="list-style-type: none"> • the NSW Soils and Construction – Managing Urban Stormwater Volume 1 “the Blue Book” (Landcom, 2004) and Volume 2 (Department of Environment and Climate Change, 2008). 	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
32.	<p>Lead contamination</p> <p>In the event that construction requires excavation in the area where lead contamination has been identified within the proposal area, lead impacted fill will be managed in one of the following ways:</p> <ul style="list-style-type: none"> the lead-impacted fill could be excavated and be taken offsite for disposal to minimise the risk of exposure to construction workers or the general public additional fill characterisation risk assessment could be carried out to potentially reduce the need for offsite disposal. 	Contractor	Construction
Traffic and transport			
33.	<p>Road Condition Reports</p> <p>Prior to construction commencement, road condition surveys and reports on the condition of roads and footpaths to be affected by construction shall be prepared and provided to Transport for information. Any damage resulting from the construction of the proposal, aside from that resulting from normal wear and tear, shall be repaired at the contractor's expense.</p>	Contractor	Pre-construction and post-construction
34.	<p>Traffic Management Plan</p> <p>Before the start of construction, a Traffic Management Plan (TMP) will be prepared as part of the CEMP and will include (but not be limited to) the following measures:</p> <ul style="list-style-type: none"> installing adequate road signage at construction work sites to inform motorists, pedestrians and cyclists of the work site to minimise the risk of road accidents and disruption to surrounding land uses maximising safety and accessibility for pedestrians and cyclists allowing for adequate vehicle sight lines for safe entry and exit from the site maintaining access to the station, and surrounding businesses and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made) managing impacts and changes to on and off street parking, and requirements for any temporary replacement provision selecting heavy vehicle haulage routes to minimise impacts on sensitive land uses and businesses managing traffic flows around the area affected by the proposal, including as required regulatory and direction signposting, line marking and variable message signs and other traffic control devices necessary for the implementation of the TMP. <p>Consultation with the relevant roads authorities will be carried out during preparation of the construction TMP. The performance of traffic arrangements must be monitored during construction.</p>	Contractor	Pre-construction, construction
35.	<p>Community notification</p> <p>Communication will be provided to the community and local residents to inform them of changes to parking, pedestrian/cyclist access and traffic conditions, including vehicle movements and anticipated effects on the local road network relating to site work.</p>	Contractor	Pre-construction, construction

No.	Mitigation measure	Responsibility	Timing
36.	<p>Road Occupancy Licences Road Occupancy Licences for temporary road closures will be obtained, where required.</p>	Contractor	Pre-construction, construction
37.	<p>Pedestrian access Pedestrian access will be maintained throughout construction as much as possible so pedestrian connectivity impact is minimised as a part of the work. Suitable and safe diversion routes are to provide where required.</p>	Contractor	Construction
38.	<p>Consultation – Bus companies Consultation will be carried out with local and regional bus companies before and during construction.</p>	Contractor	Pre-construction, construction
39.	<p>Consultation – Emergency services Consultation will be carried out with emergency services before and during construction to confirm any diversions during construction and any operational road network changes.</p>	Contractor	Pre-construction, construction
40.	<p>Consultation – Property owners/occupiers Consultation will be carried out with property owners and occupiers regarding changes to access arrangements and temporary removal of on-street parking.</p>	Contractor	Pre-construction, construction
41.	<p>Consultation – Council Consultation will be carried out with council regarding potential impacts to parking during the construction period.</p>	Contractor	Pre-construction, construction
Noise and vibration			
42.	<p>Construction Noise and Vibration Before the start of construction, a Construction Noise and Vibration Management Plan (CNVMP) will be developed and implemented in accordance with the requirements of the EPA’s <i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2009), Transport’s <i>Construction Noise and Vibration Guideline (Public Transport Infrastructure)</i> (Transport for NSW, 2023) and the Noise and Vibration Impact Assessment for the proposal (AECOM, 2023b). The CNVMP shall include, but not be limited to:</p> <ul style="list-style-type: none"> • details of construction activities and an indicative schedule for construction • identification of construction activities that have the potential to generate noise and/or vibration impacts on surrounding land uses, particularly sensitive noise receivers • detail what reasonable and feasible actions and measures shall be implemented to minimise noise impacts (including those identified in the REF) • procedures for notifying sensitive receivers of construction activities that are likely to affect their noise and vibration amenity, as well as procedures for dealing with and responding to noise and vibration complaints 	Contractor	Pre-construction, Construction

No.	Mitigation measure	Responsibility	Timing
	<ul style="list-style-type: none"> • an Out of Hours Work Protocol (OOHWP) for the assessment, management and approval of works outside the standard construction hours is to be developed. This will include a risk assessment process which deems the out of hours activities to be of low, medium or high environmental risk. All out of hours works are subject to written approval by the DES or as approved by EPA (where relevant to the issuing of an EPL). The OOHWP should be consistent with Transport’sEMF-NV-GD-0060 <i>Construction Noise and Vibration Guideline (Public Transport Infrastructure)</i> (Transport for NSW, 2023) • a description of how the effectiveness of actions and measures shall be monitored during the proposed works, identification of the frequency of monitoring, the locations at which monitoring shall take place, recording and reporting of monitoring results and if any exceedance is detected, the manner in which any non-compliance shall be rectified. <p>The CNVMP shall consider and outline measures to reduce the noise and vibration impacts from construction activities. Where practicable at-source measures (including by construction planning/staging and equipment selection) shall be prioritised over at-receiver measures. Reasonable and feasible mitigation measures include:</p> <ul style="list-style-type: none"> • regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising emissions and how to use equipment in ways to minimise noise and vibration • scheduling high noise and/or vibration generating work during less sensitive time periods as far as practicable (e.g. use of demolition saws, grinders, impact drills and jackhammers) • avoiding any unnecessary emissions when carrying out manual operations and when operating plant • ensuring spoil is placed and not dropped into awaiting trucks or other plant/vehicles • avoiding/limiting simultaneous operation of noisy or vibratory plant and equipment within the discernible range of a sensitive receiver where practicable • switching off any equipment not in use for extended periods e.g. heavy vehicles engines will be switched off whilst being unloaded • considering noise emissions as part of the selection process of rental plant and equipment • using quieter and less vibration emitting construction methods where feasible and reasonable (e.g. using rubber-wheeled instead of steel-tracked plant) • avoiding deliveries at night/evenings or other sensitive times wherever practicable • no idling of delivery trucks • planning traffic flow, parking and loading/unloading areas to minimise reversing movements within the site • ensuring truck drivers are 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 • maximising the offset distance between noisy or vibratory plant and sensitive receivers and maintaining safe working distances for workers • directing noise-emitting plant away from sensitive receivers • regularly inspecting and maintaining plant to check that it is in good working order and avoid increased noise levels from rattling hatches, loose fittings etc • where possible, noise from mobile plant will be reduced through additional fittings including: 		

No.	Mitigation measure	Responsibility	Timing
	<ul style="list-style-type: none"> - residential grade mufflers - silencing air parking brake engagement • using quieter and less vibration emitting construction methods where feasible and reasonable • using non-tonal movement alarms (or an equivalent mechanism) on all construction vehicles and mobile plant regularly used on-site (i.e. greater than one day) and for any out of hours work. 		
43.	<p>Standard Construction Hours</p> <p>Construction activities shall be restricted to the hours of 7:00 am to 6:00 pm (Monday to Friday); 8:00 am to 1:00 pm (Saturday) and at no time on Sundays and public holidays except for the following works which are permitted outside these standard hours:</p> <ul style="list-style-type: none"> • any works which do not cause noise emissions to be more than 5dBA higher than the rating background level (RBL) at any nearby residential property and/or other noise sensitive receivers (subject to approval from Transport) • out of hours work identified and assessed in the REF or the approved OOHWP • the delivery of plant, equipment and materials which is required outside these hours as requested by police or other authorities for safety reasons and with suitable notification to the community as approved by the DES • emergency work to avoid the loss of lives, property and/or to prevent environmental harm • any other work as approved by the DES and considered essential to the proposal, or as approved by EPA (where an EPL is in effect). 	Contractor	Construction
44.	<p>Special Audible Characteristics Activities</p> <p>As per the <i>Construction Noise and Vibration Guideline (Public Transport Infrastructure)</i> (Transport for NSW, 2023), construction activities with special audible characteristics will be limited to standard hours and start no earlier than 8am unless otherwise approved by the DES in accordance with <i>Construction Noise and Vibration Guideline (Public Transport Infrastructure)</i> (Transport for NSW, 2023).</p> <p>Rock breaking or hammering, jack hammering, pile driving, vibratory rolling, cutting of pavement, concrete or steel and any other activities which result in impulsive or tonal noise generation shall not be carried out for more than three continuous hours, followed by a minimum one hour respite period, unless otherwise approved by the DES, or as approved by EPA (where relevant to the issuing of an EPL).</p> <p>‘Continuous’ includes any period during which there is less than a one hour respite between stopping and re-starting work.</p> <p>No more than two consecutive nights of noise with special audible characteristics and/or vibration generating work will be carried out in the same NCA over any seven-day period, unless otherwise approved by the relevant authority.</p> <p>Note. <i>Special audible characteristics</i> refers to noise with characteristics that can cause annoyance and disturbance, containing noticeable factors such as tonality, low frequency noise, impulsive or intermittent noise events. These characteristics may not be considered noisy in a quantitative sense.</p>	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
45.	<p>Vibration Criteria</p> <p>To avoid structural impacts as a result of vibration or direct contact with structures, the proposed work will be carried out in accordance with the safe work distances outlined in the Noise and Vibration Impact Assessment (refer Appendix D). Where these distances cannot be met, vibration trials and attended vibration monitoring of the trials will be carried out in order to assess and mitigate vibration impacts.</p> <p>Vibration resulting from construction and received at any structure outside of the proposal shall be limited to:</p> <ul style="list-style-type: none"> for structural damage vibration –British Standard BS 7385-2:1993 <i>Evaluation and measurement for vibration in buildings Part 2</i> and/or German Standard DIN 4150: Part 3 – 1999: <i>Structural Vibration in Buildings: Effects on Structures</i> for human exposure to vibration – the acceptable vibration values set out in the <i>Environmental Noise Management Assessing Vibration: A Technical Guideline</i> (Department of Environment and Conservation, 2006) which includes British Standard BS 6472-2:1992 <i>Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)</i>. <p>These limits apply unless otherwise approved by the DES through the CEMP.</p>	Contractor	Construction
46.	<p>Vibration Intensive Equipment</p> <p>If vibration intensive equipment is to be used within the minimum working distances for cosmetic damage then attended vibration measurements will be carried out when work commences, to determine “site specific minimum working distances”.</p> <p>Alternative construction methodology with smaller minimum working distances will be adopted if feasible and reasonable, including consideration of avoiding use of vibration generating equipment (e.g. use of hand tools).</p> <p>In addition, vibration intensive work will not proceed within the site-specific minimum working distances unless a permanent vibration monitoring system is installed approximately one metre from the building footprint, to warn operators (e.g. via flashing light, audible alarm, SMS) when vibration levels are approaching the peak particle velocity objective.</p> <p>It is also advisable to carry out building condition surveys of sensitive historical structures before construction work begins.</p> <p>Further mitigation measures related to heritage structures are provided in Section 6.1 of the REF (non-Aboriginal heritage).</p>	Contractor	Construction
47.	<p>Periodic Notification</p> <p>Periodic notification (monthly letterbox drop and website notification) detailing all upcoming construction activities, will be delivered to sensitive receivers at least seven days prior to commencement of before starting relevant work or other period as approved to by the relevant Community and Place Director.</p>	Contractor	Pre-construction, construction
48.	<p>Noise Monitoring Program</p> <p>A noise monitoring program will be implemented to assist in confirming and controlling the site-specific potential for disturbance at particularly sensitive localities at the start of activities and periodically during the construction program as work progresses. The program will be developed in accordance with the CNVMP and any approval/licence conditions.</p> <p>The results will be reviewed to determine if additional mitigation measures are required. All measurements will be carried out in accordance with Australian Standard 1055.2018 – <i>Acoustics – Description and measurement of environmental noise</i>.</p>	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
49.	<p>Maximum Noise Levels</p> <p>The noise levels of plant and equipment will not exceed the maximum sound power and pressure levels outlined in <i>EMF-NV-GD-0060 Construction Noise and Vibration Guideline (Public Transport Infrastructure)</i> (Transport for NSW, 2023a).</p>	Contractor	Construction
50.	<p>Deliveries and Sensitive Receivers</p> <p>Loading and unloading of materials/deliveries will occur as far as possible from sensitive receivers. Site access points and roads will be selected as far as possible away from sensitive receivers. Dedicated loading/unloading areas will be shielded if close to sensitive receivers. Delivery vehicles will be fitted with straps rather than chains for unloading, wherever possible.</p>	Contractor	Construction
51.	<p>Vehicle movements</p> <p>Vehicle movements will be routed away from sensitive receivers and scheduled during less sensitive times. The speed of vehicles will be limited and the use of engine compression brakes will be minimised. On-site storage capacity will be maximised to reduce the need for truck movements during sensitive times.</p>	Contractor	Construction
52.	<p>Stationary Noise Sources</p> <p>Stationary noise sources will be enclosed or shielded to the greatest extent possible whilst ensuring that the occupational health and safety of workers is maintained.</p>	Contractor	Construction
53.	<p>Noise Attenuation</p> <p>Structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers will be used (where practicable).</p>	Contractor	Construction
54.	<p>Operational Noise Mitigation</p> <p>Operational mitigation measures will consider:</p> <ul style="list-style-type: none"> control noise at the source (e.g. use of track lubrication, soft rail pads, and welding to smooth discontinuities) control noise in transmission (e.g. consideration of new continuous noise barrier about 5.5 metres high and 250 metres long, to replace the existing barrier (subject to detailed design)) control noise at the receiver (e.g. an Operational Noise and Vibration management Plan will be developed and implemented, including consideration of architectural treatments for affected receivers and installation for Automatic Warning Systems (AWSs) and train-based warning systems instead or horn use). 	Contractor	Construction and operation

No.	Mitigation measure	Responsibility	Timing
55.	<p>Noise Management Levels</p> <p>Where construction noise management levels are exceeded after implementation of the standard mitigation and management measures, the Transport's <i>Construction Noise and Vibration Guideline</i> (Public Transport Infrastructure recommends further measures such as project and specific notifications, verification monitoring and respite periods, based on receiver perception of the noise.</p> <p>Impacts of the temporary use of Car Siding Road 3 may require additional mitigation as the impact of the horn testing and brake release scenarios are considerable to residential properties. Mitigation measures that could be considered include the following:</p> <ul style="list-style-type: none"> operational measures such as horn testing in other locations such as the Main Line, as well as horn testing restricted to only daytime period only temporary noise barriers in and around the temporary stabling locations temporary relocation for the most affected residential receivers. 	Contractor	Construction, operation
56.	Transport will confirm the application of additional mitigation measures (refer Section 6.2)) at each receiver and implement the measures during detailed design/construction planning and construction as relevant.	Transport / contractor	Detailed design, construction, operation
Aboriginal cultural heritage			
57.	<p>Aboriginal Cultural Heritage Induction</p> <p>All construction staff will undergo an induction in the recognition of Aboriginal cultural heritage material. This training will include information such as the importance of Aboriginal cultural heritage material and places to both the Aboriginal and Non-Aboriginal community, as well as the legal implications of removal, disturbance and damage to any Aboriginal cultural heritage material and sites.</p>	Contractor	Pre-construction, construction
58.	<p>Unexpected Heritage Finds</p> <p>If previously unidentified Aboriginal sites or objects are uncovered during construction, work will cease near the find in accordance with Transport's <i>Unexpected Heritage Finds Guideline</i> (Transport for NSW, 2022i). Transport's Project Manager and TESR will be notified immediately to assist in coordinating the next steps, which are likely to involve consultation with an archaeologist, Heritage NSW and the Local Aboriginal Land Council/s. If human remains are found, work will cease, the site will be secured and the NSW Police and Heritage NSW will be notified.</p>	Contractor	Construction
Non-Aboriginal heritage			
59.	<p>Design Response</p> <p>The proposed works will comply with Article 22 of the Burra Charter, specifically Practice note article 22 — new work.</p> <p>New work is to be readily identifiable and not distort or obscure the cultural significance of the place or detract from its interpretation.</p>	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
	New work will also be designed with a consideration of the architectural style and heritage elements of the station or precinct. The proposed elements will be sympathetic to the original design and seek to emphasise key details whilst not overwhelming or detracting from the heritage significance of the place.		
60.	<p>Service Routes</p> <p>Where service routes are proposed in areas of high significance, the design and detailing will be carefully considered to ensure they are not intrusive elements.</p>	Contractor	Construction
61.	<p>Heritage Vibration Management</p> <p>The Construction Noise and Vibration Management Plan will be implemented during construction works. A survey of the historic structures should be carried out at the beginning and end of the main works to identify damage to structures. Construction noise and vibration resulting from the proposal will be closely monitored to ensure that they do not have physical impact to heritage elements at the station.</p> <p>Vibration intensive work will not proceed within the site-specific minimum working distances unless a permanent vibration monitoring system is installed about one metre from the building footprint, to warn operators (eg via flashing light, audible alarm, SMS) when vibration levels are approaching the peak particle velocity objective.</p> <p>Any damage to buildings will be avoided and if necessary repaired under the guidance of a Heritage Architect.</p>	Contractor	Construction
62.	<p>Heritage Induction</p> <p>As part of the site induction, a heritage induction will be provided to workers prior to construction, informing them of the location of known heritage items and guidelines to follow if unexpected heritage items or deposits are located during construction.</p>	Contractor	Pre-construction / Construction
63.	<p>Heritage Architect</p> <p>A suitably qualified and experienced Heritage Architect who is independent of the design and construction team's personnel will be engaged. The Heritage Architect will provide ongoing heritage, design and conservation advice throughout detailed design and any subsequent relevant design modifications to ensure that the final design adheres to the recommendations of this SoHI (Appendix C), and the approval issued by NSW Heritage under Section 60 of the NSW <i>Heritage Act 1977</i>.</p>	Contractor	Pre-construction / Construction
64.	<p>Heritage Interpretation</p> <p>Heritage interpretation will be planned and integrated into the detailed design of the proposal. The heritage interpretation planning will be prepared by the Heritage Architect (and sub-consultants as required i.e. graphics) with reference to Sydney Trains <i>Heritage Interpretation Guidelines</i>. The heritage interpretation planning will be captured in a Heritage Interpretation Plan (HIP) that is to be issued as a progress report at each stage of detailed design. The final HIP will include all details necessary to proceed to fabrication and installation, and include general historic information as well specific information the significance of the station courtyard.</p>	Contractor	Pre-construction / Construction

No.	Mitigation measure	Responsibility	Timing
65.	<p>Photographic Archival Recording</p> <p>Archival recording of the station will be carried out in accordance with the Heritage NSW guidelines prior to main works commencing. The archival recording shall be reviewed and approved by Transport prior to submission to Heritage NSW or other government body.</p>	Contractor	Pre-construction / Construction
66.	<p>Heritage Opportunities</p> <p>During the detailed design phase, opportunities will be investigated to offset assessed heritage impacts from the proposal. Examples of potential offsets include, but are not limited to:</p> <ul style="list-style-type: none"> • providing all relevant information to Sydney Trains for any future updates to the current Conservation Management Plan (CMP), including the amended significance gradings • identification of other redundant or current intrusive elements that can be investigated to be removed/relocated from the station • review of the hard and soft landscaping in the courtyard to reduce the visual clutter of the area to create a more visually pleasant aesthetic. This should include the review of the memorials • opportunity works listed in Section 10.3 of the Heritage Design Report (GML Heritage Pty Ltd, 2023) (Appendix A of Appendix C). 	Transport	Pre-construction
67.	<p>Lighting</p> <p>An appropriate lighting type will be selected for new lighting within the SHR curtilage, along the signal box siding, subject to heritage design advice. Lighting selection should give consideration to the relevant conservation policy (Policy 14.4) contained within the CMP available for the precinct.</p>	Contractor	Pre-construction
68.	<p>Heritage Advice</p> <p>Ongoing heritage advice and input into the design will also be sought so the detailed design of other newly introduced elements (for example fencing, retaining walls and new structures) are designed sensitively to the heritage context of the SHR listing.</p>	Contractor	Pre-construction / Construction
69.	<p>Heritage Awareness</p> <p>All heritage curtilages and structures will be shown on the ECMs and design drawings so contractors are aware of when they are working in heritage areas, and can take extra precautions whilst onsite.</p>	Contractor	Pre-construction / Construction
70.	<p>Unexpected Heritage Finds</p> <p>The Standard Management Procedure - Unexpected Heritage Items (Transport for NSW, 2022i) will be followed in the event that any unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered. Work will only re-commence once the requirements of that Procedure have been satisfied.</p>	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
Urban design, landscape and visual amenity			
71.	<p>Urban Design and Landscape Plan</p> <p>An Urban Design and Landscape Plan (UDLP) will be prepared by the contractor, in consultation with Council and other asset/land owners, and submitted to Transport for written approval by the Urban Design Public Transport and Precincts team, prior to finalisation of the detailed design. The UDLP shall:</p> <ul style="list-style-type: none"> • demonstrate a robust understanding of the precinct through a comprehensive site analysis, including connectivity with street networks, mode change locations, active transport, and pedestrian movement • identify opportunities and constraints • establish precinct specific principles to guide and test design options • consider Crime Prevention Through Environmental Design (CPTED) principles, including night-time safety of customers and the community, and the safety of Station staff. • be aligned with the “TAP Urban Design Plan Guidelines (Draft 2018)” and “Around the Tracks - urban design for heavy and light rail (Dec 2016 Interim Issue)”. • consider opportunities for: <ul style="list-style-type: none"> – Connecting with Country – integrated heritage interpretation and adaptive reuse – public art – safety improvements • address Transport <i>Sustainable Design Guidelines</i> evidence requirements • be prepared by a suitably qualified and experienced urban design professional. <p>The UDLP is to include a Public Domain Plan for the preferred design option and will provide analysis of the:</p> <ul style="list-style-type: none"> • landscape design approach including design of pedestrian and bicycle pathways, street furniture, interchange facilities, new planting and integration of any artwork • materials Schedule including materials and finishes for proposed built works, colour schemes, paving and lighting types for public domain, fencing and landscaping • an Artist’s Impression or Photomontage to communicate the proposed changes to the precinct. <p>The following design guidelines are available to assist and inform the UDLP:</p> <ul style="list-style-type: none"> • TAP Urban Design Plan, Guidelines, TfNSW, Draft 2018 • Commuter Car Parks, Urban Design Guidelines, TfNSW, Interim 2017 • Managing Heritage Issues in Rail Projects Guidelines, TfNSW, Interim 2016 • Creativity Guidelines for Transport Systems, TfNSW, Interim 2016 • Water Sensitive Urban Design Guidelines for TfNSW Projects, 2016. 	Contractor	Prior to design finalisation

No.	Mitigation measure	Responsibility	Timing
72.	<p>Noise barrier visual impact</p> <p>Consider tree planting along Lackey Road to reduce the appearance of the potential noise barrier along the residential street.</p> <p>Consider articulation of the potential noise barrier along Lackey Road to facilitate opportunities for planting.</p>	Contractor	Pre-construction, construction
73.	<p>Landscaping Opportunities</p> <p>Consider the installation of landscaping within the road verges and along the rail corridor edges (including potential planting of street trees or shrubs, where possible).</p>	Contractor	Pre-construction, construction
74.	<p>Visual elements</p> <p>Use heritage design elements to highlight the character of the station and surrounding landscape, however, maintain the visual quality of a 'new' piece of infrastructure rather than replicating heritage items.</p>	Contractor	Pre-construction
75.	<p>Visual Screening</p> <p>Limit disturbance of vegetation to the minimum necessary to construct the proposal, especially along the rail corridor boundaries to maintain visual screening to the surrounding landscape.</p>	Contractor	Pre-construction, construction
76.	<p>Graffiti and Advertising</p> <p>Hoardings, site sheds, fencing, acoustic walls around the perimeter of the site, and any structures built as part of the proposal shall be maintained free of graffiti, or any advertising not authorised by Transport, during the construction period. Graffiti and unauthorised advertising shall be removed or covered within the following timeframes unless otherwise approved with Transport for NSW:</p> <ul style="list-style-type: none"> offensive graffiti will be removed or concealed within 24 hours highly visible (yet inoffensive) graffiti will be removed or concealed within a week graffiti that is neither offensive or highly visible will be removed or concealed within a month any unauthorised advertising material will be removed or concealed within 24 hours. 	Contractor	Pre-construction
77.	<p>Worksite Hoardings</p> <p>Provide well-presented and maintained construction hoarding and site fencing with shade cloth or similar material (where necessary) to minimise visual impacts during construction. Hoardings and site fencing will be removed following construction completion.</p>	Contractor	Construction
78.	<p>Lighting Scheme</p> <p>A lighting scheme for the construction and operation of the proposal is to be developed by a suitably qualified lighting designer and prepared in accordance with relevant standards. The lighting scheme shall address the following as relevant, but will not be limited to:</p> <ul style="list-style-type: none"> consideration of lighting demands of different areas strategic placement of lighting fixtures to maximise ground coverage 	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
	<ul style="list-style-type: none"> • use of LED lighting • demonstrate that light spill and glare has been minimised to sensitive receivers by directing lighting into the station/car park/other infrastructure type • control systems for lighting that dim or switch-off lights settings according to the amount of daylight the zone is receiving • motion sensors to control low traffic areas • allowing the lighting system to use low light or switch off light settings while meeting relevant lighting Standards requirements, and • ensuring security and warning lighting is not directed at neighbouring properties. <p>The proposed lighting scheme is to be submitted to Transport’s technical team for acceptance prior to design finalisation.</p>		
79.	<p>Worksite Maintenance</p> <p>Construction areas will be kept clean and tidy and refuse will be disposed of in appropriate receptacles.</p>	Contractor	Construction
80.	<p>Operational Maintenance</p> <p>Constructed elements will be maintained and repaired as required.</p>	Transport	Operation
	<p>Socio-economic</p>		
81.	<p>Public Feedback</p> <p>Feedback through the public display process will be used to facilitate opportunities for the community and stakeholders to have input into the proposal, where practicable. Community and stakeholder feedback is welcomed throughout the project’s design and construction stages, via the project website, email address or project Infoline.</p>	Transport	Pre-construction
82.	<p>Complaints Management</p> <p>A 24 hour construction response line number will be in place throughout construction.</p> <p>Details of all complaints received during construction, including complaints received in person and via email, are to be recorded on a complaints register. A verbal response to phone enquiries on what action is proposed to be carried out is to be provided to the complainant within two hours during standard construction hours and within 24 hours during all other times (unless the complainant agrees otherwise). A verbal response to written complaints (email/letter) should be provided to Transport within 48 hours of receipt of the complaint and provided to the complainant within seven calendar days.</p> <p>Information on all complaints received during the previous 24 hours shall be forwarded to the TESR each working day.</p>	Contractor	Construction
83.	<p>Local Goods and Services</p> <p>Sustainability criteria for the proposal will be established to encourage the contractor to purchase goods and services locally, helping ensure the local community benefits from the construction of the proposal.</p>	Contractor	Pre-construction

No.	Mitigation measure	Responsibility	Timing
84.	<p>Community Liaison Management Plan</p> <p>A Community Liaison Management Plan (CLMP) will be developed prior to construction, which will identify potential stakeholders and methods for consultation with these groups during construction. The plan will also encourage feedback and facilitate opportunities for the community and stakeholders to have input where possible.</p> <p>The CLMP shall comply with the obligations of these conditions and should include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> • a comprehensive, project-specific analysis of stakeholders, issues and proposed strategies to manage issues through the duration of the proposal • details of the communication tools (traditional and digital) and activities that will be used to inform and engage with the community and stakeholders • a program for the implementation of community liaison activities relating to key construction tasks and milestones with strategies for minimising impacts and informing the community • policies and procedures for handling community complaints and enquiries, including the contractor’s nominated 24 hour contact for management of complaints and enquiries • analysis of other major projects/influences in the area with the potential to result in cumulative impacts to the community and strategies for managing these. <p>The CLMP shall be prepared to the satisfaction of the relevant Community and Place Director (or nominated delegate) prior to the commencement of construction and implemented, reviewed and revised every six months during the construction of the proposal.</p>	Contractor	Pre-construction
85.	<p>Local workforce</p> <p>Construction workers will be sourced from the local area where feasible.</p>	Contractor / Transport	Construction
86.	<p>Property Access</p> <p>Access to businesses and private properties will be maintained throughout construction.</p>	Contractor	Construction
Climate resilience / sustainability			
87.	<p>The following measures will be implemented to address the risk of extreme heat impacts to staff and customers:</p> <ul style="list-style-type: none"> • incorporating design elements into station glazing and footbridge façade to mitigate extreme heat impacts. This can be achieved by selecting materials for shelters, facades, outdoor furniture that reduce heat load impacts • providing hydration stations (e.g. water bubblers) for passengers • incorporating vertical safety mitigations such as mechanical ventilation of lift shafts and temperature sensors in lift shaft, with automatic return of lift car to entry level at a certain threshold • the design life of new air conditioning systems will be about 20 years, with performance of equipment reviewed as per Transport’s maintenance/replacement regime • avoiding or minimising the removal of existing trees/shading vegetation where possible. 	Contractor	Detailed design/pre-construction

No.	Mitigation measure	Responsibility	Timing
88.	<p>Extreme heat risk</p> <p>The following measures will be implemented to address the risk of extreme heat impacts to network and systems performance:</p> <ul style="list-style-type: none"> incorporating design elements into station glazing and footbridge façade to mitigate impacts. This can be achieved by selecting materials for shelters, facades, outdoor furniture that reduce heat load impacts incorporating energy generation redundancy measures into the design of the asset (e.g. uninterruptible power supply for communications equipment (e.g. CCTV) incorporating vertical safety mitigations into the design (e.g. default for lifts is to go to ground and open when there is a power failure or when a temperature threshold is exceeded). 	Contractor	Detailed design, pre-construction, construction
89.	<p>Sustainable Design Guidelines</p> <p>Detailed design of the proposal would be undertaken in accordance with the <i>NSW Sustainable Design Guidelines – Version 4.0</i> (Transport for NSW, 2020) and is to target a gold rating and achieve a minimum silver rating.</p>	Contractor	Detailed design
90.	<p>Carbon Footprint Exercise</p> <p>The detailed design process would undertake a compliant carbon footprinting exercise in accordance with Transport's <i>Carbon Estimate and Reporting Tool Manual</i> (Transport for NSW, 2019) or other approved modelling tools. The carbon footprint would be used to inform decision making in design and construction.</p>	Contractor	Detailed design
91.	<p>Sustainability Officer</p> <p>A suitably qualified and experienced Sustainability Officer shall be appointed who is responsible for implementing the sustainability objectives for the Proposal, in line with the Proposal's overarching Project Sustainability Plan.</p> <p>Details of the Sustainability Officer including defined responsibilities, duration and resource allocation throughout the appointment are to be submitted to the satisfaction of the Director of Sustainability prior to the preparation of the Sustainability Management Plan.</p>	Contractor	Pre-construction
92.	<p>Sustainability Management Plan</p> <p>A Sustainability Management Plan (SMP) which details the approach to managing sustainability requirements and opportunities during design and construction shall be prepared. The SMP shall include the following as a minimum:</p> <ul style="list-style-type: none"> a completed electronic checklist demonstrating compliance with the Transport <i>Sustainable Design Guidelines Version 4.0 (ST-114)</i> a statement outlining the Construction Contactor's own corporate sustainability policies, obligations, goals, targets and commitments a description of the processes and methodologies for encouraging and identifying innovative sustainability outcomes on the proposal, and the areas targeted for innovative sustainable solutions to be explored and/or implemented on the proposal. the approach to the identification of opportunities to reduce carbon emissions, energy use and embodied lifecycle impacts of the proposal. This should include a summary of initiatives proposed for implementation to meet energy and carbon management objectives and targets the approach to sustainable procurement including how procurement processes have taken in to account for the principles of <i>ISO 20400</i>: 	Contractor	Pre-construction

No.	Mitigation measure	Responsibility	Timing
	<p><i>2017 – Sustainable Procurement</i> in the selection of all materials, products and services</p> <ul style="list-style-type: none"> a description of the processes, standards and procedures for undertaking climate change risk assessments and strategies for mitigation of risks associated with climate change and extreme weather events. <p>A copy of the SMP shall be submitted to Transport’s Director of Sustainability at least 30 days prior to the commencement of construction, for written approval (or such time as is otherwise approved by the Director).</p>		
	Air quality		
93.	<p>Air Quality Management Air quality management and monitoring for the proposal will be carried out in accordance with Transport’s <i>Air Quality Management Guideline</i> (Transport for NSW, 2022g).</p> <p>To minimise air quality impacts, the following measures will be implemented and incorporated into the CEMP:</p> <ul style="list-style-type: none"> plant and machinery will be switched off when not in use, and not left idling plant and machinery will be regularly checked and maintained in a proper and efficient condition vehicle and machinery movements during construction will be restricted to designated areas and sealed/compacted surfaces where practicable water will be applied to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces), or alternative measures implemented to mitigate dust generation stockpiles will be covered when not in use and trucks transporting material will be covered tracking mud and dirt onto sealed road surfaces will be avoided and entry/exit points to the site monitored air quality mitigation measure requirements will be included into project inductions, training and pre-start/toolbox talks. 	Contractor	Construction
	Waste and contamination		
94.	<p>Waste Management Plan A Waste Management Plan (WMP) will be prepared and put in place as part of the CEMP. The WMP will include but not be limited to:</p> <ul style="list-style-type: none"> measures to avoid and minimise waste associated with the project classification of wastes and management options (re-use, recycle, stockpile, disposal) statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions procedures for storage, transport and disposal of spoil and waste monitoring, record keeping and reporting. 	Contractor	Detailed design / pre-construction, construction
95.	<p>Concrete Washout A concrete washout will be established and maintained in accordance with Transport’s <i>Concrete Washout Guideline</i> (Transport for NSW, 2023b).</p>	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
96.	Waste management targets in accordance with the <i>Sustainable Design Guidelines</i> requirements will be developed for the proposal and will include reuse and recycling.	Contractor	Construction
97.	Vegetation Beneficial Reuse If vegetation is to be mulched and transported off site for beneficial reuse, it will be assessed for the presence of weeds, pest, and other disease and a Mulch Management Plan prepared in accordance with Transport's <i>Technical Procedure: Mulch Management</i> .	Contractor	Construction
Greenhouse gas emissions			
98.	Material selection Construction planning will be carried out to reduce material requirements and select recycled materials or materials with low -embodied energies where practicable and possible.	Contractor	Pre-construction / Construction
99.	Construction Equipment Construction equipment, plant and vehicles will be appropriately sized for the task, serviced frequently and will not be left idling when not in use.	Contractor	Construction
100.	Construction Site Efficiency Construction site layouts will be designed to reduce travel distances and double handling of materials to reduce fuel usage and emission generation.	Contractor	Construction
Cumulative impacts			
101.	Ongoing Cumulative Impacts The potential cumulative impacts associated with the proposal will be further considered as the design develops and as further information regarding the location and timing of potential developments is released. Environmental management measures will be developed in the CEMP and implemented as appropriate. The CLMP would capture how the known cumulative impacts would be managed with the community and key stakeholders.	Contractor	Pre-construction

7.3 Licensing and approvals

Table 7-2 provides a summary of the licensing and approvals required for the proposal.

Table 7-2 Summary of licensing and approvals required

Instrument	Requirement	Timing
<i>Heritage Act 1977 (s60)</i>	Permit to carry out activities to an item listed on the State Heritage Register from the Heritage Council of NSW.	Prior to start of the activity.
<i>Roads Act 1993 (s138)</i>	A Road Occupancy Licence (ROL) for road work and temporary lane closures on Lackey Road.	Prior to start of the activity.

8. Conclusion

This chapter provides the justification for the proposal taking into account its biophysical, social and economic impacts, the suitability of the site and whether or not the proposal is in the public interest. The proposal is also considered in the context of the objectives of the EP&A Act, including the principles of ESD as defined in Section 193 of the *Environmental Planning and Assessment Regulation 2021*.

8.1 Justification

8.1.1 Social factors

As outlined in Section 6.9, the proposal would have some negative social impacts during the construction phase of the proposal. These would include:

- temporary disruptions to the existing pedestrian facilities in and surrounding the station, particularly for pedestrians accessing the station when construction work for the lifts, footbridges and footpaths is being undertaken
- temporary disruptions to local traffic movements near the station
- temporary loss of parking availability in commuter car parks off Dalys Way to accommodate ancillary facilities, construction working areas and access to the site for construction workers
- temporary loss of available parking spaces on the surrounding street network for residents and visitors from the lane closure required along Lackey Road and construction vehicle parking, including construction worker vehicles
- increased truck and vehicle movements for the delivery of materials and equipment and the transportation of waste
- construction noise and vibration impacts
- air quality (dust) and visual impacts.

Station access would be maintained at all times, except when construction work occurs during a rail shutdown.

The proposal has been designed to reduce social impacts on the community as far as possible, and the remaining impacts would be managed by the safeguards identified in Section 7.2.

Once operational, the proposal would have long term positive impacts on access and connectivity for the local community, businesses and industry. Specifically, the proposal would improve customer experience as it aims to deliver seamless travel to and between modes and encourage greater public transport use. The proposal would create a more pedestrian friendly environment and reinforce a sense of community identity and community wellbeing while enhancing the existing connection between the eastern and western sides of the station.

8.1.2 Ecological factors

Potential impacts to a range of biophysical factors have been assessed in Section 6.5 and mitigation measures proposed to manage identified residual impacts.

The key impact on biodiversity associated with construction works in the vicinity of the station is the removal of native and non-native vegetation. This would be largely limited to common urban native and non-native planted species, as well as self-seeded individuals (weeds). Although this vegetation was not identified as a TEC, its removal would result in the loss of local habitat connectivity.

A site inspection of the Stabling Yard by AECOM in 2023 identified no threatened flora or fauna species or TECs with the potential to occur within this area.

The proposal would not remove any habitat critical to threatened species or ecological communities. Impacts to fauna would be limited to direct disturbance from the additional noise, light and presence of people in the area.

An Urban and Landscape Design Plan (ULDP) would be prepared by the Contractor, in consultation with Council and other asset/land owners, and submitted to Transport for written approval by the Urban Design Public Transport and Precincts team, prior to finalisation of the detailed design. The ULDP would include a Public Domain Plan addressing the landscape design approach, new planting and materials selection for the proposal.

8.1.3 Economic factors

The construction phase of the proposal would cause minor traffic disruptions around the station from an increase in traffic volumes on surrounding roads, vehicle movements (e.g. in and out of the ancillary facilities) and traffic management (e.g. a lane closure on Lackey Road). There would also be a temporary loss of commuter parking at the station and of street parking around the station. The loss of parking would impact access to the station, as well as to the parks on Argyle Street, and nearby businesses. Traffic disruptions would be mostly minor but could impact movement of the local community, freight movement to and from the town centre and through traffic.

Private property access would be maintained throughout construction.

In general, businesses in the surrounding area are unlikely to be adversely affected by the proposed work. There is potential for a minor temporary increase in retail and other purchase from construction workers during the work.

Once operational, the proposal would improve access to the station for those with a disability, limited mobility, parents/carers with prams and customers with luggage, while also improving stabling capacity to accommodate the new Regional Rail fleet. This would support economic growth and activity for Moss Vale’s community and businesses. There would also be improved access to the station via other modes of transport which may provide economic improvements to surrounding businesses due to an increase of station patronage as a result of improved access.

8.1.4 Public interest

The proposal is considered to be in the public interest as it would improve accessibility to the station and town centre of Moss Vale and accommodate the stabling of the new Regional Rail fleet. The proposal represents long term social and economic benefits. While the community would experience some negative impacts, most would be temporary and would be minimised with the safeguards provided in Section 7.

8.2 Objects of the EP&A Act

Table 8-1 Objects of the Environmental Planning and Assessment Act 1979

Instrument	Requirement
1.3(a) To promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State’s natural and other resources.	Development of the proposal has considered potential impacts to all environmental resources, including air, water, land and biodiversity, that may be affected by the development of the proposal. The proposal would, where feasible, limit its use of natural and artificial resources and would source materials and product locally where possible. Socio-economic impacts are assessed in Section 6.9. The assessment includes management measures to avoid and/or minimise impacts.
1.3(b) To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.	The proposal has considered relevant economic, environmental and social considerations. ESD is considered in Section 8.2.1 below. Potential impacts have been minimised through design and would be further mitigated using the mitigation measures in Section 7.

Instrument	Requirement
1.3(c) To promote the orderly and economic use and development of land.	The proposal is needed to improve the accessibility to Moss Vale Station and to upgrade the stabling yard to accommodate the new Regional Rail fleet. The proposal would provide for orderly economic use and development of land for the Moss Vale community and station customers.
1.3(d) To promote the delivery and maintenance of affordable housing.	Not relevant to the project.
1.3(e) To protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats.	The proposal would not remove any habitat critical to threatened species or ecological communities. Impacts to fauna would be limited to direct disturbance from the additional noise, light and presence of people in the area. These impacts would be effectively managed through the implementation of safeguards outlined in Section 6.5.
1.3(f) To promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).	An assessment of potential impacts to Aboriginal heritage and non-Aboriginal heritage is provided in Section 6.8 and Section 6.1 respectively. Considerable effort has been taken to minimise potential heritage impacts during the design development for the proposal and as a result the proposal would result in moderate adverse impacts to non-Aboriginal heritage. The proposal is unlikely to disturb items of Aboriginal cultural heritage. Management measures to avoid or mitigate impacts due to the proposal are included in Section 7.2.
1.3(g) To promote good design and amenity of the built environment.	An urban design, landscape character and visual impact assessment has been prepared for the proposal which outlines the urban design and landscape strategy for the proposal. The strategy aims to facilitate an integrated urban design and engineering design outcome for the proposal.
1.3(h) To promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants.	Not relevant to the proposal.
1.3(i) To promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State.	Not relevant to the proposal.
1.3(j) To provide increased opportunity for community participation in environmental planning and assessment.	Consultation with the community and relevant government agencies was carried out during the development of the proposal. There would be further opportunities for the public to comment on the proposal during the exhibition of the REF. Details on this consultation can be found in Section 5.

8.2.1 Ecologically sustainable development

ESD is development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. The principles of ESD have been an integral consideration throughout the development of the project.

ESD requires the effective integration of economic and environmental considerations in decision-making processes. The four main principles supporting the achievement of ESD as per the EP&A Act are discussed below.

The precautionary principle

The precautionary principle deals with reconciling scientific uncertainty about environmental impacts with certainty in decision-making. It provides that where there is a threat of serious or irreversible environmental damage, the absence of full scientific certainty should not be used as a reason to postpone measures to prevent environmental degradation.

This principle was considered during options development (refer to Chapter 2). The precautionary principle has guided the assessment of environmental impacts for this REF and the development of mitigation measures.

The precautionary principle was applied to the proposal in the following ways:

- issues that may cause serious or irreversible environmental damage as a result of the proposal and where there is scientific uncertainty as to the nature of the damage have been identified
- the best-available technical information, environmental standards and measures have been used to minimise environmental risks
- conservative 'worst case' scenarios were considered while assessing environmental impact
- specialist studies were incorporated to gain a detailed understanding of the existing environment.

Safeguards and management measures would be applied throughout detailed design and construction of the proposal. The selected construction contractor would be required to prepare a CEMP before commencing construction, to provide a framework for establishing how these measures would be implemented.

Intergenerational equity

Social equity is concerned with the distribution of economic, social and environmental costs and benefits. Intergenerational equity introduces a temporal element with a focus on minimising the distribution of costs to future generations.

Intergenerational equity was considered in the proposal in the following ways:

- The proposal has integrated both short and long-term economic, social and environmental considerations so that any likely impacts are not left to be addressed by future generations
- The proposal would provide long-term transport and socio-economic benefits for future generations
- The proposal design has ensured that the station would be accessible to all addressing the future needs of customers
- Any trees removed for the proposal would be offset in accordance with the requirements of Transport 'Biodiversity Policy (2022)
- The proposed works would have a major positive impact on the social values of the station
- The design has undergone extensive optioneering which has resulted in a proposal which considers its context and provides the best possible outcome to allow the station to be accessible and operable into the future. Issues that have potential long-term implications were minimised or avoided, for example consumption of non-renewable resources, waste disposal, greenhouse emissions, removal of vegetation and impacts on water quality, through route/concept selection and application of mitigation measures (see Section 7.2)

Conservation of biological diversity and ecological integrity

Preserving biological diversity and ecological integrity requires that ecosystems, species, and biological diversity are maintained to ensure their survival. The conservation of biological diversity and ecological integrity was applied to the proposal in the following ways:

- site selection criteria were established for construction-phase facilities to minimise native vegetation clearance
- upgrades to lighting would be sympathetically designed to avoid spill into surrounding areas and avoid impact to native fauna
- the incursion of weeds into the proposal area would continue to be managed by the proponent as per the current protocols.

Improved valuation, pricing and incentive mechanisms

The principle of internalising environmental costs into decision making requires consideration of all environmental resources that may be affected by the carrying out of a project, including air, water, land and living things.

Improved valuation, pricing and incentive mechanisms was applied to the proposal in the following ways:

- environmental issues were considered as key matters in the initial design process and in the economic and financial feasibility assessments for the project
- the value of the proposal to the community in terms of improved accessibility was recognised
- mitigation measures for the avoidance, reuse, recycling and management of waste during construction and operation are to be implemented.

The value placed on environmental resources is demonstrated in the extent of the planning and environmental investigations, and in the design of the safeguards and management measures described in Section 7.2. Implementation of these safeguards and management measures would result in an economic cost to Transport, which would be included in both the capital and operating cost of the proposal.

8.3 Conclusion

The proposed Moss Vale Station and Stabling Yard upgrade at Moss Vale is subject to assessment under Division 5.1 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

This has included consideration (where relevant) of conservation agreements and plans of management under the NPW Act, biodiversity stewardship sites under the BC Act, wilderness areas, areas of outstanding value, impacts on threatened species and ecological communities and their habitats, and other protected fauna and native plants. It has also considered potential impacts to matters of national environmental significance listed under the EPBC Act.

A number of potential environmental impacts from the proposal have been avoided or reduced during the concept design development and options assessment. The proposal, as described in the REF, best meets the project objectives but would still result in some impacts on:

- Non-Aboriginal heritage
- Traffic and transport
- Noise and air emissions
- Community (socio-economic).

Mitigation measures as detailed in this REF would minimise these expected impacts. The proposal would also result in long-term beneficial impacts including improved access to the station, improved freight efficiency and improved connections between Moss Vale Station and the Moss Vale town centre. It would also improve amenity within Moss Vale. On balance, the proposal is considered justified and the following conclusions are made.

8.3.1 Significance of impact under NSW legislation

The proposal would be unlikely to cause a significant impact on the environment. Therefore, it is not necessary for an environmental impact statement to be prepared nor approval to be sought from the Minister for Planning and Public Spaces under Division 5.2 of the EP&A Act. A Biodiversity Development Assessment Report or Species Impact Statement is not required. The proposal is subject to assessment under Division 5.1 of the EP&A Act. Consent from Council is not required.

8.3.2 Significance of impact under Australian legislation

The proposal is not likely to have a significant impact on matters of national environmental significance nor the environment of Commonwealth land within the meaning of the *EPBC Act 1999* (Commonwealth). A referral to the Australian Department of Climate Change, Energy, the Environment and Water is not required.

9. Certification

This review of environmental factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.

Name: Vivian Tse
Position: Senior Environment and Sustainability Officer
Company name: Transport for NSW
Date: 14/11/2023

I certify that I have reviewed and endorsed the contents of this REF and, to the best of my knowledge, it is in accordance with the EP&A Act, the EP&A Regulation and the Guidelines approved under Section 170 of the EP&A Regulation, and the information is neither false nor misleading. I accept it on behalf of Transport.

Name: Laura Marin Toro
Position: Project Manager
Transport region/program: Infrastructure and Place
Date: 14/11/2023

10. EP&A Regulation publication requirement

Table 10-1 EP&A Regulation publication requirement

Requirement	Yes/No
Does this REF need to be published under section 171(4) of the EP&A Regulation?	Yes

11. References

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Terms and acronyms used in this REF

Abbreviations

Term	Meaning
ACM	Asbestos containing materials
AEP	Annual Exceedance Probability
AFILS	Audio Frequency Induction Loop System
AHIMS	Aboriginal Heritage Information Management System
ARTC	Australian Rail Track Corporation
ASRIS	Australian Soil Resource Information System
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
BGL	Below existing ground levels
BH	Bore hole
BTEXN	Benzene, Toluene, Ethylbenzene, Total Xylenes
CCTV	Closed Circuit TV
CEMP	Construction Environmental Management Plan
CLM Act	<i>Contaminated Land Management Act 1997 (NSW)</i>
CPTED	Crime Prevention Through Environmental Design
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSR	Combined Service Route
DDA	<i>Disability Discrimination Act 1992 (Commonwealth)</i>
DES	Director of Environment and Sustainability
DIAP	<i>Disability Inclusion Action Plan 2018-2022</i>
DPE	Department of Planning and Environment
DSAPT	<i>Disability Standards for Accessible Public Transport, 2002</i>
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2021 (NSW)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i>
ESD	Ecological Sustainable Development (refer to Definitions)
FM Act	<i>Fisheries Management Act 1994</i>
GST	Galvanised Steel Trough
HDR	Heritage Design Report
Heritage Act	<i>Heritage Act 1977</i>

Term	Meaning
ICNG	Interim Construction Noise Guideline
LEP	Local Environment Plan
LGA	Local Government Area
MCA	Multi-criteria Analysis
MTS	Mobile Train Simulator
NCA	Noise catchment areas
NEPM	National Environment Protection Measure
NES	National Environmental Significance
NML	Noise management levels
NPfi	Noise Policy for Industry
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NSW	New South Wales
PA system	Public Address system
PCT	Plant Community Type
PMST	Protected Matters Search Tool
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
RBL	Rating Background Level
REF	Review of Environmental Factors (this document)
Resilience and Hazards SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021
RNP	Road Noise Policy
Roads Act	<i>Roads Act 1993</i>
ROL	Road Occupancy Licence
S170 Register	Section 170 Heritage and Conservation Register
SDG	Sustainable Design Guidelines
SEPP	State Environmental Planning Policy
SoHI	Statement of Heritage Impact
TAHE	Transport Asset Holding Entity
TECs	Threatened Ecological Communities
TESR	Transport Environment and Sustainability Representative
TGSIs	Tactile Ground Surface Indicators (“tactiles”)
TMP	Traffic Management Plan
TPZ	Tree Protection Zones
Transport	Transport for NSW
VDV	Vibration Dose Values
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001</i>

Definitions

Term	Meaning
Detailed design	Detailed design broadly refers to the process that the Contractor undertakes (should the Proposal proceed) to refine the scoping design to a design suitable for construction (subject to Transport for NSW acceptance)
Determining Authority	A Minister or public authority on whose behalf an activity is to be carried out or public authority whose approval is required to carry out an activity (under the EP&A Act).
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.
Kiss and ride interchange	A kiss and ride interchange allows for quick entry and exit by vehicles, which helps minimise congestion and risk when used properly. These types of bays operate under the same conditions as no parking zones, which means a customer may stop to drop off or pick up others for a maximum of two minutes. They are required to remain in, or within three metres of their vehicle (Service NSW, 2016).
Noise sensitive receivers	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 TrainLink	NSW TrainLink operates services between Sydney and the Hunter, Central Coast, Blue Mountains, Southern Highlands and Illawarra and South Coast regions.
Out of hours work	Defined as work 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.
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.
Scoping design	The scoping 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).
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.
Tactile	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 Moss Vale Station and Stabling Yard upgrade



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