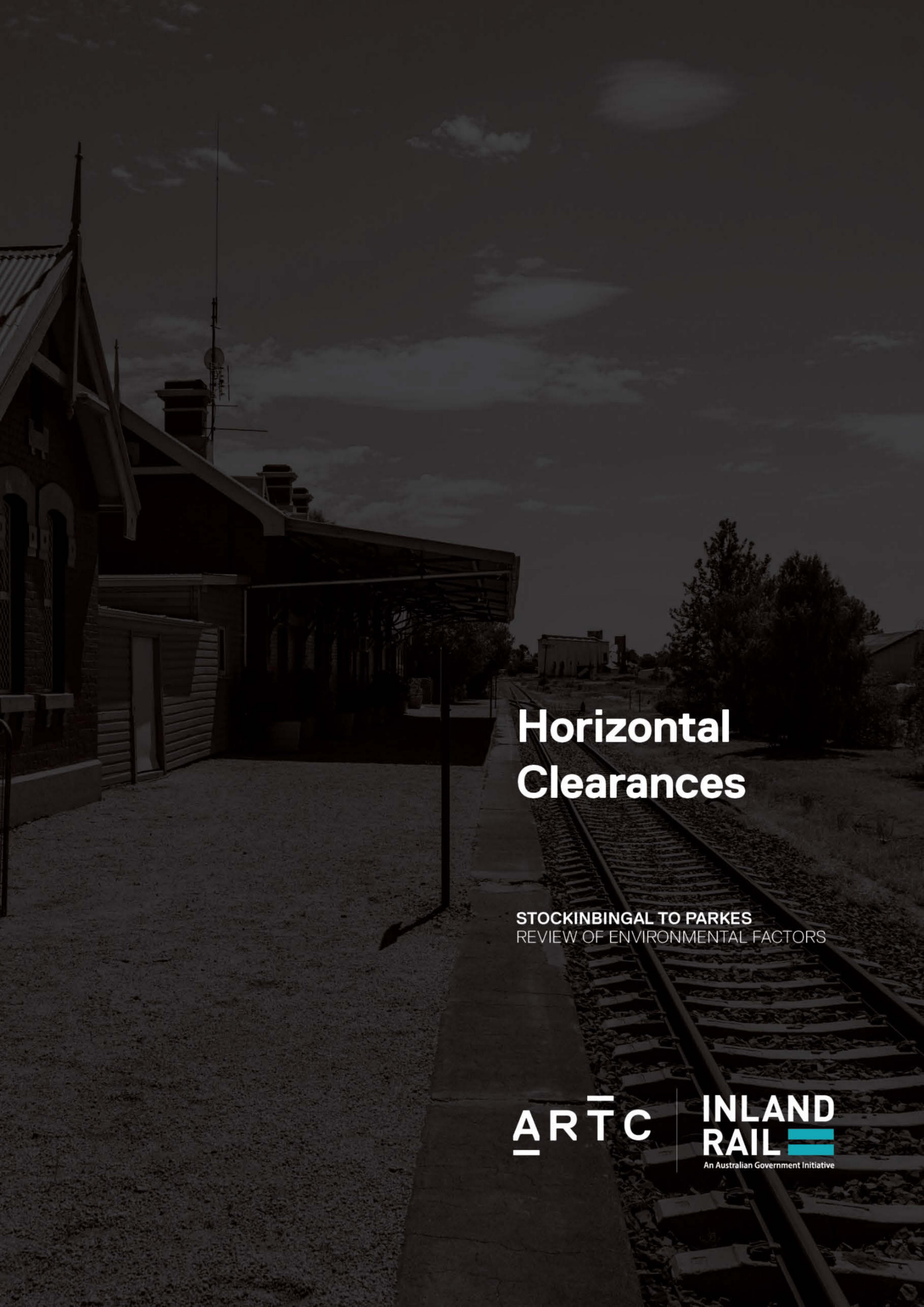

Horizontal Clearances

STOCKINBINGAL TO PARKES
REVIEW OF ENVIRONMENTAL FACTORS

ARTC | INLAND RAIL
An Australian Government Initiative

Contents

Figures

Tables

Appendices

Abbreviations

AEP	Annual exceedance probability
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
ARTC	Australian Rail Track Corporation
ASS	Acid sulfate soils
AVaTG	Assessing Vibration: A Technical Guideline
BAM	Biodiversity Assessment Method
BAR	Biodiversity Assessment Report
BC Act	*Biodiversity Conservation Act 2016* (NSW)
CEMP	Construction Environmental Management Plan
CIV	Capital investment value, as defined in the EP&A Regulation
CLM Act	*Contaminated Land Management Act 1997* (NSW)
COAG	Council of Australian Governments
DEES	NSW Department of Environment, Energy and Science
DPIE	NSW Department of Planning, Industry and Environment
DAWE	Commonwealth Department of Agriculture, Water and Environment
DECCW	Department of Environment, Climate Change and Water NSW
DITRDC	Department of Infrastructure, Transport, Regional Development and Communications
EAP	Inland Rail Program Environmental Assessment Procedure
EEC	Endangered ecological community
EIP	Engagement Implementation Plan
EPA	NSW Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	*Environment Planning and Assessment Regulation 2000* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPL	Environment Protection Licence
ESD	Ecologically sustainable development
GDE	Groundwater dependent ecosystems
IAP2	International Association for Public Participation
ICOMOS	Australia International Council on Monuments and Sites
ICNG	Interim Construction Noise Guideline
ILUA	Aboriginal Land Use Agreements
ISEPP	NSW State Environmental Planning Policy (Infrastructure) 2007
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local government area
MNES	Matters of national environmental significance
NCA	Noise Catchment Area
NEPM	National Environment Protection Measure
NHVR	National Heavy Vehicle Regulator
NML	Noise management level
NOA	Naturally occurring asbestos
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales

PCT	Plant Community Type
PFAS	Per- and poly-fluoroalkyl substances
PMST	Protected Matters Search Tool
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
RAMR	Rail access maintenance road
RBL	Background noise levels
REF	Review of Environmental Factors (this report)
RING	Rail Infrastructure Noise Guideline
S2P	Stockinbingal to Parkes section of Inland Rail
SEPP	NSW State Environmental Planning Policy
SES	State Emergency Services
SIS	Species Impact Statement
SoHI	Statement of Heritage Impact
SSI	State significant infrastructure
SWMP	Soil and Water Management Plan
TEC	Threatened ecological community
TSR	Travelling stock route
WaQI	Water quality index
WM Act	*Water Management Act 2000* (NSW)
WoNS	Weeds of National Significance
UXO	Unexploded ordnance

Certification

Certification by preparing officer

This Review of Environmental Factors (REF) provides a true and fair review of the activity in relation to its likely 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 proposed activity and provides sufficient information to determine that the activity as described in this REF will not significantly affect the environment. Accordingly, no Environmental Impact Statement (EIS) and/or Species Impact Statement (SIS) are required.

Name	Emma Dean, Principal Environmental Scientist		
Company	WSP Australia Pty Ltd		
Signature		**Date**	25 November 2021

Certification by ARTC Delivery Director

The project is titled: Stockinbingal to Parkes (S2P)—Horizontal Clearances Review of Environmental Factors

Subject to approval, proposal commencement is anticipated to be: Early 2024

I confirm that I have reviewed and accept the REF, including the scope of works as detailed, and will:

- construct and operate the project as described in the REF
- ensure all legislative requirements related to approvals, consultation and notification are fulfilled
- implement all listed environmental management measures
- seek advice from ARTC environment staff, as required, and report all non-conformances and incidents
- undertake audits and/or environmental site inspections
- appropriately communicate REF requirements to project personnel.

Name & Position	Melvyn Maylin, Delivery Director—T2N		
Signature		**Date**	May 5, 2022

Certification by ARTC Reviewing Environmental Advisor

I confirm that I have:

- reviewed the REF in accordance with legislative requirements and it meets the requirements of the REF Guidance Note (ENV-FM-021) and the Inland Rail Program Environmental Assessment Procedure (2-900-PEN-00-PR-1001)
- the management measures listed in the REF are suitable to mitigate the impact of works
- the activity, as described, is unlikely to significantly affect the environment.

Name & Position	Daniel Lumby, Senior Environmental Advisor		
Signature	Daniel Lumby Daniel Lumby (May 5, 2022 09:25 GMT+10)	**Date**	May 5, 2022

Executive Summary

The Australian Government has committed to delivering a significant piece of national transport infrastructure that will provide a safe, sustainable solution to the freight challenge that exists on Australia's east coast. The Inland Rail Program (Inland Rail) is a 1,700 kilometre (km) interstate freight rail corridor that will connect Melbourne and Brisbane, via central-west New South Wales (NSW) and Toowoomba in Queensland.

The Stockinbingal to Parkes (S2P) section, is an enhancement project within Inland Rail. It is a 170.3-km section of existing rail corridor located in regional NSW between the towns of Stockinbingal and Parkes. The proponent, ARTC, is proposing four separate packages of works to increase horizontal clearances within the rail corridor between Stockinbingal and Forbes, NSW (the proposal) to accommodate double-stacked freight trains up to 1,800 metres (m) long and 6.5 m high. The proposal is subject to assessment in accordance with Division 5.1 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act).

The purpose of this Review of Environmental Factors (REF) is to describe proposed works at six enhancement sites along the rail corridor, to document the likely impacts of the proposal on the environment, and to detail the safeguards and management measures that would be implemented during detailed design, construction and operation of the proposal.

The key features of the proposal (subject to detailed design) include:

- Forbes Station and Yard: realignment of approximately 640 m of the track by up to 540 millimetres (mm), and associated drainage works and trimming of the platform awning at Forbes Station
- Wirrinya Yard: realignment of approximately 520 m of track by up to 350 mm
- Caragabal Yard: realignment of approximately 250 m of track by up to 30 mm
- Quandialla Yard: removal of redundant pipework from a water tank adjacent to the track
- Bribbaree Yard: realignment of approximately 940 m of track by up to 250 mm
- Milvale Yard: removal of redundant wiring from a water tank adjacent to the track.

Consultation for the proposal has been completed, including statutory consultation required in accordance with the State Environmental Panning Policy (Infrastructure) 2007 (ISEPP). The outcomes of consultation undertaken are discussed further in Chapter 4 of this document.

The assessment in this REF has been carried out in accordance with ARTC's *Code of Practice for Environmental Impact Assessment of Development Proposals in NSW*. The environmental assessment of the proposal has identified the following:

- Noise and vibration (construction): The nature of the construction works means there would be periods when certain activities would generate excessive noise, requiring management measures to be introduced. While these measures would be broadly effective in reducing noise to acceptable levels, there are certain activities where it would only be safe to carry out the work at night when the trains are not operating. Noise impacts are not predicted at Milvale Yard or Quandialla Yard but noise management levels are predicted to be exceeded at Forbes Station and Yard, Wirrinya, Caragabal and Bribbaree Yards; with track works planned to occur out of standard construction hours during a 60-hour rail possession and track occupancy authorisation periods. The rail possession would occur once, and track occupancy authorisation periods would be required multiple times over a period of 6 to 11 weeks. Due to the night works, there is the potential for people's sleep to be disturbed at up to 2,053 residential receivers, with 1,956 of these around Forbes Station and Yard. For all other instances, the predicted noise levels would be perceptible and sufficient to have a short-term amenity impact. Implementation of noise management and mitigation measures, such as screening plant and respite periods during construction, would result in substantial reductions in the predicted noise levels. The proposed works would use equipment that generates ground vibration, with potential impacts to human comfort at two receivers in Forbes and five receivers in Bribbaree. The works would be monitored, and additional vibration management and damping controls could be adopted to avoid and minimise any impact to human comfort or cosmetic damage to nearby structures.
- Noise and vibration (operation): Noise levels would increase due to the increased frequency and length of freight trains through the proposal site. The S2P section of the rail corridor is, on average, trafficked by five freight trains, which would increase to an average of around 12 trains per day in 2027; further increasing to 18 trains per day in 2039. Noise management levels are predicted to be exceeded by 2039 at up to 13 residential receivers around Forbes Station and Yard, Wirrinya Yard, Caragabal Yard and Bribbaree Yard. No non-residential receivers are predicted to exceed noise trigger levels. Feasible and reasonable mitigation

measures would be identified where exceedances of operational noise and vibration criteria are confirmed. Measures would be identified in accordance with the outcome of the operational noise and vibration review, and the Inland Rail Noise and Vibration Strategy. Where at-property noise treatments are identified as the preferred mitigation option, these would be developed in consultation with individual property owners.

- Non-Aboriginal heritage: The proposal involves removal of redundant wiring on a locally heritage-listed water tank at Milvale Yard and modification to the awning of state and locally listed Forbes Station. The works at Milvale Yard would have an inconsequential impact on the heritage value of the water tank. The 300 mm trimming of the Forbes Station awning requires an application to Heritage NSW for a Section 60 heritage permit to complete the works. The proposed work to the platform awning at Forbes Station would result in a minor direct impact to the heritage values of the item, as original fabric would be removed. The proposed modification to the awning would be undertaken in a manner and using materials that are sympathetic to the heritage significance of the station. Through the implementation of mitigation measures the awning would maintain its aesthetic and technical heritage values.
- Biodiversity: During construction of the proposal, there is predicted to be the loss of up to approximately 3.3 hectares (ha) of native vegetation generally comprising of derived native grasslands; of which, 3.2 ha corresponds to threatened ecological communities (TECs) that are state and nationally listed. This vegetation also provides potential habitat for a number of threatened fauna species; however, assessments of significance for these species concluded that these impacts are not significant given the small percentage of suitable habitat within the proposal site compared to the local habitat. Other indirect risks to biodiversity through water quality, noise or biosecurity impacts would be appropriately managed through the mitigation and management measures identified in this REF. The biodiversity assessment identified that the proposal's impacts, both proportionally and ecologically, is not likely to have a significant impact on any threatened biodiversity. A Biodiversity Management Plan would be prepared prior to construction and implemented to manage biodiversity and minimise the potential for impacts during construction. The proposal site would be rehabilitated on completion of construction.
- Surface water (hydrology and flooding): The proposal was designed to prevent any significant impact to hydrology or flooding. Only the proposed works at Forbes Station Yard are located on flood-prone land. No change to flood behaviour would result from the proposal. Detailed construction planning would consider flood risk at this site and a flood and emergency response plan would be prepared for construction. Potential impacts from construction of the proposal include temporary blockage of drainage lines and changes in overland flow paths. Construction planning, and the layout of construction work sites and compounds, would be undertaken with consideration of flow paths and flood risk.
- Waste: Waste would primarily be generated by construction of the proposal. Approximately 4,010 cubic metres (m^3) of spoil and 2,500 m^3 of ballast would be generated by the proposal due to earthworks and track replacement. These materials would be stockpiled onsite and tested for beneficial reuse. Sleepers and rail would be reused during track works where they are in a suitable condition. Waste would be reused and recycled where practicable. All waste generated would be classified and disposed of in accordance with the relevant requirements. There are facilities within Forbes, Weddin and Young local government areas (LGAs) that are licensed to receive the types and potential class of wastes that would be generated under the proposal.
- Visual amenity: As the proposal is generally within an existing operational rail corridor, its landscape value and quality is limited; with the exception of Forbes Station and Yard, which has a moderate sensitivity due to the presence of the state heritage listed Forbes Station. Temporary visual amenity impacts are predicted during construction with the presence of large plant, earthworks and stockpiles. The permanent changes to rail corridor would result in minimal visual amenity changes. The operation of longer and more frequent freight trains along the rail corridor at each site would be visually more dominant. This change would alter the character of the views intermittently and would result in a noticeable change in the amenity of each view; however, it would be compatible with the existing operational rail corridor. Visual impacts during operation are anticipated to be moderate–low. Detailed design and construction planning would seek to minimise the construction and operation footprints and avoid impacts on mature native vegetation.
- Soil and contamination: Removal of vegetation and earthworks at Bribbaree Yard and Forbes Station Yard would temporarily expose the natural ground surface to runoff and wind, which would increase soil erosion potential, disturbance of unknown sources of contaminants related to the historical use of the rail corridor, or contamination migrating from nearby sites could potentially be released to the environment. There is a higher potential for contamination and hazardous materials to be present within the Forbes Station Yard due to the presence of registered contaminated sites in close proximity. The potential of encountering unknown contaminants would be minimised by implementing appropriate mitigation measures such as undertaking further investigations at the Forbes Station and Yard and implementing unexpected finds protocols. Erosion and sediment control would be in accordance the best practice and a Contamination and Hazardous Materials

Plan would be implemented during construction to mitigate soil impacts. With implementation of proposed mitigation measures, the potential impacts to soil and contamination would be adequately managed.

- Traffic and access: Construction of the proposal would result in approximately eight heavy vehicles per hour and 10 light vehicles per hour at peak times; however, there is sufficient capacity in the local road network to allow for these movements. Construction of the proposal would not result in any road closures or detours on surrounding roads and no works are proposed to level crossings. Despite the proposal needing the support of heavy vehicles during construction, they would be routed along roads that are designed for heavy vehicles; also, traffic management measures would be implemented, as required, at the site access points to allow all vehicles to safely enter and leave site. This would ensure there would be no impact on existing road user safety.
- Socio-economic: The proposal would result in potential economic benefits during both construction and operation, though the use of local labour and local businesses where available. The proposal is predicted to generate 80 jobs over the 11-week construction period. The local labour market has the capacity to supply a portion of the construction workforce, with the remaining temporarily relocating to the region. As part of Inland Rail, the proposal would facilitate an expansion of capacity on a key freight line linking Melbourne and Brisbane, while improving local road safety outcomes. Inland Rail would boost the Australian economy by creating jobs and providing better access to and from regional markets. Negative impacts would also be generated, including amenity impacts from impacts from visual, traffic, and noise and vibration. These impacts would be managed through the mitigation and management measures identified in relevant sections of this REF.
- Aboriginal heritage: No Aboriginal heritage sites were identified in the proposal site, which was disturbed to establish the current rail corridor; therefore, Aboriginal heritage objects or intact archaeological deposit are unlikely to be harmed due to the proposal.
- Air quality: The proposal has the potential to generate air quality impact, particularly during construction, with dust, and vehicle and plant emissions. The impact of the proposal on air quality and greenhouse gas (GHG) is not likely to be significant, and can be managed appropriately by the implementation of the mitigation and management measures described in this REF.
- Land use and property: Temporary occupation of grain terminal property would be required during construction at Wirrinya Yard, Caragabal Yard and Bribbaree Yard for up to 11 weeks, including occupation of an open area owned by Hilltops Council between Railway Street and the rail corridor at Bribbaree. Mitigation measures have been identified to minimise impact to land use. Where construction is located immediately adjacent to private properties and has the potential to affect operational arrangements, property-specific measures would be identified and implemented in consultation with landholders. Permanent property acquisition for operation of the proposal is not required, as the proposal would be located within the existing rail corridor.
- Hazard and risk: While the proposal would result in impacts from increased hazard and risk, including disturbance of potentially hazardous material at Forbes Station and Yard, these impacts are considered consistent with similar construction projects, including those within existing rail corridors. These impacts would be managed through implementation of mitigation and management measures detailed in this REF. Significant impacts from hazard and risk are not anticipated for the proposal.
- No significant cumulative impacts from construction or operation of the proposal concurrently with other projects in the region were identified. There are several other projects proposed within the Forbes, Weddin and Young region including other Inland Rail projects; however, due to the location, scale and distance of the proposal from other projects, the risk of cumulative impacts is generally low.

The proposal 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 impacts on threatened species, populations 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 (MNES) listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act).

Potential environmental impacts from the proposal have been avoided or reduced during the reference design development and options assessment. The safeguards management measures detailed in this REF would manage the impacts anticipated. The proposal is not likely to significantly affect the environment. In addition, the proposal is not likely to significantly affect any Commonwealth or NSW listed threatened species, populations or ecological communities, or their habitats. The residual impacts of the proposal are outweighed by the long-term benefits of the proposal; in particular, enabling Inland Rail. On balance, the proposal is considered justified.

1. Introduction

1.1 About Inland Rail

The Australian Government has committed to delivering a significant piece of national transport infrastructure by constructing a high-performance and direct interstate freight rail corridor between Melbourne and Brisbane, via central-west New South Wales (NSW) and Toowoomba in Queensland. Inland Rail is a major national program that will enhance Australia's existing national rail network and serve the interstate freight market.

The Inland Rail route, which is about 1,700 kilometres (km) long, involves:

- Using the existing interstate rail line through Victoria and southern NSW
- Upgrading about 400 kilometres (km) of existing track, mainly in western NSW
- Providing about 600 km of new track in northern NSW and South east QLD.

The Inland Rail Program has been divided into 13 sections, seven of which are located in NSW.

The objectives of Inland Rail are to:

- Provide a rail link between Melbourne and Brisbane that is interoperable with train operations to Perth, Adelaide, and other locations on the standard-gauge rail network, to serve future rail freight demand, and stimulate growth for inter-capital and regional/bull rail freight
- Provide an increase in productivity that would benefit consumers though lower freight transport costs
- Provide a step-change improvement in rail service quality in the Melbourne to Brisbane corridor and deliver a freight rail service that is competitive with road
- Improve road safety, ease congestion and reduce environmental impacts by moving freight from road to rail
- Bypass bottlenecks within the existing metropolitan rail networks and free up train paths for other services along the coastal route
- Act as an enabler for regional economic development along the Inland Rail corridor.

Further information on Australian Rail Track Corporation (ARTC) and Inland Rail can be found at **artc.com.au** and **inlandrail.com.au**.

1.2 The Proponent

ARTC is the proponent for the proposal and has a program to deliver Inland Rail. ARTC is an Australian Government owned statutory corporation that manages more than 8,500 km of rail track in NSW, Queensland, South Australia, Victoria and Western Australia. ARTC is responsible for:

- Selling access to the rail network to train operators
- Capital investment in the network
- Managing train operations across the network
- Maintaining the network
- Developing new business.

1.3 The proposal

The Stockinbingal to Parkes (S2P) section forms a key component of the Inland Rail Program. It is a 170.3-km section of existing rail corridor located in regional NSW between the towns of Stockinbingal and Parkes (Figure 1.1).

A number of enhancement works (which do not constitute a complete upgrade of the track alignment) are required to be undertaken in this section, to accommodate double-stacked freight trains up to 1,800 m long and 6.5 m high. These works include alterations to, construction or removal of, various structural and track assets along the alignment to provide the increased vertical and horizontal clearances required for double-stacked freight trains. The enhancement works required along the S2P section have been split into four Review of Environmental Factors (REF) packages:

- Horizontal clearances (Milvale (clearance works); Bribbaree (track realignment); Quandialla (clearance works); Caragabal (track realignment); Wirrinya (track realignment) and Forbes Station (clearance works and track realignment))

- Lachlan River bridge (clearance works)
- Wyndham Avenue bridge (track lowering)
- Daroobalgie crossing loop (new crossing loop).

This REF has been prepared for the Horizontal Clearances works (the proposal) which involve works to achieve horizontal clearances at six sites:

- Forbes Station and Yard
- Wirrinya Yard
- Caragabal Yard
- Quandialla Yard
- Bribbaree Yard
- Milvale Yard.

1.3.1 Proposal objectives

The objectives of the proposal are to:

- Enhance existing rail infrastructure to achieve the clearances required for Inland Rail, to enable trains using the corridor to travel between Stockinbingal and Parkes, connecting with other sections of Inland Rail to the north and south
- Minimise the potential for environmental and community impacts, by maximising use of the existing rail corridor.

FIGURE 1.1 OVERVIEW OF THE STOCKINBINMGAL TO PARKES ENHANCEMENT PROJECT

1.4 Purpose of the REF

The purpose of this REF is to:

- Describe the proposal
- Summarise the consultation work undertaken to date and proposed future consultation with key stakeholders and the community
- Assess the likely impacts of the proposal on the environment having regard to the provisions of Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act)
- Identify control measures to reduce the likely impacts of the proposal.

This REF has been prepared by WSP, on behalf of ARTC, in accordance with:

- Clause 228 of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation)
- Is an EIS Required? Best Practice Guidelines for Part 5 of *the Environmental Planning and Assessment Act 1979* (Department of Urban Affairs and Planning, 1995)
- ARTC's Code of Practice for Environmental Impact Assessment of Development projects in NSW, September 2005

For the purposes of this proposal, ARTC is the proponent and the determining authority under Part 5, Division 5.1 of the EP&A Act. The REF helps to fulfil the requirements of section 5.5 of the EP&A Act, that ARTC examine and consider, to the fullest extent possible, all matters affecting, or likely to affect, the environment by reason of the activity.

The REF considers if an Environmental Impact Statement (EIS) or species impact statement (SIS) is required for the proposal. The REF also considers the potential of the proposal to significantly impact a matter of national environmental significance (MNES) or the environment on Commonwealth land, in regard to the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act), and considers the need to make referral to the Commonwealth Department of Agriculture, Water and Environment (DAWE) for approval under the EPBC Act.

2. Proposal Description

2.1 Overview and location

The proponent is seeking to increase horizontal clearances within the rail corridor between Stockinbingal and Forbes, NSW (the proposal) to accommodate double-stacked freight trains up to 1,800 m long and 6.5 m high. The existing horizontal clearances of the six sites, shown in Figure 2.1, do not provide the nominated clearance requirements.

The proposed works to achieve the required horizontal clearances include realigning the track away from the adjacent track or structures and by modifying the adjacent structures. Ancillary works include establishing construction compounds and laydown, constructing associated drainage, and adjusting signaling and communications.

The key proposed works at each enhancement site (north to south) are described in Table 2.1 and the components of work is outlined in Section 2.2. These descriptions are subject to detailed design.

TABLE 2.1 KEY FEATURES AT EACH PROPOSAL SITE

Site	Key features
Forbes Station and Yard	Realignment of approximately 500 m of the main line by up to 540 mm and associated drainage works. Realignment of approximately 140 m of the goods siding track, including installation of a new catch point. Trimming of the platform awning at Forbes Station by 300 mm for the full length.
Wirrinya Yard	Realignment of approximately 520 m of track by up to 350 mm.
Caragabal Yard	Realignment of approximately 250 m of track by up to 30 mm.
Quandialla Yard	Removal of redundant pipework from a water tank adjacent to the track.
Bribbaree Yard	Realignment of approximately 940 m of track by up to 300 mm, including formation and associated drainage works.
Milvale Yard	Removal of redundant wiring from a water tank adjacent to the track.

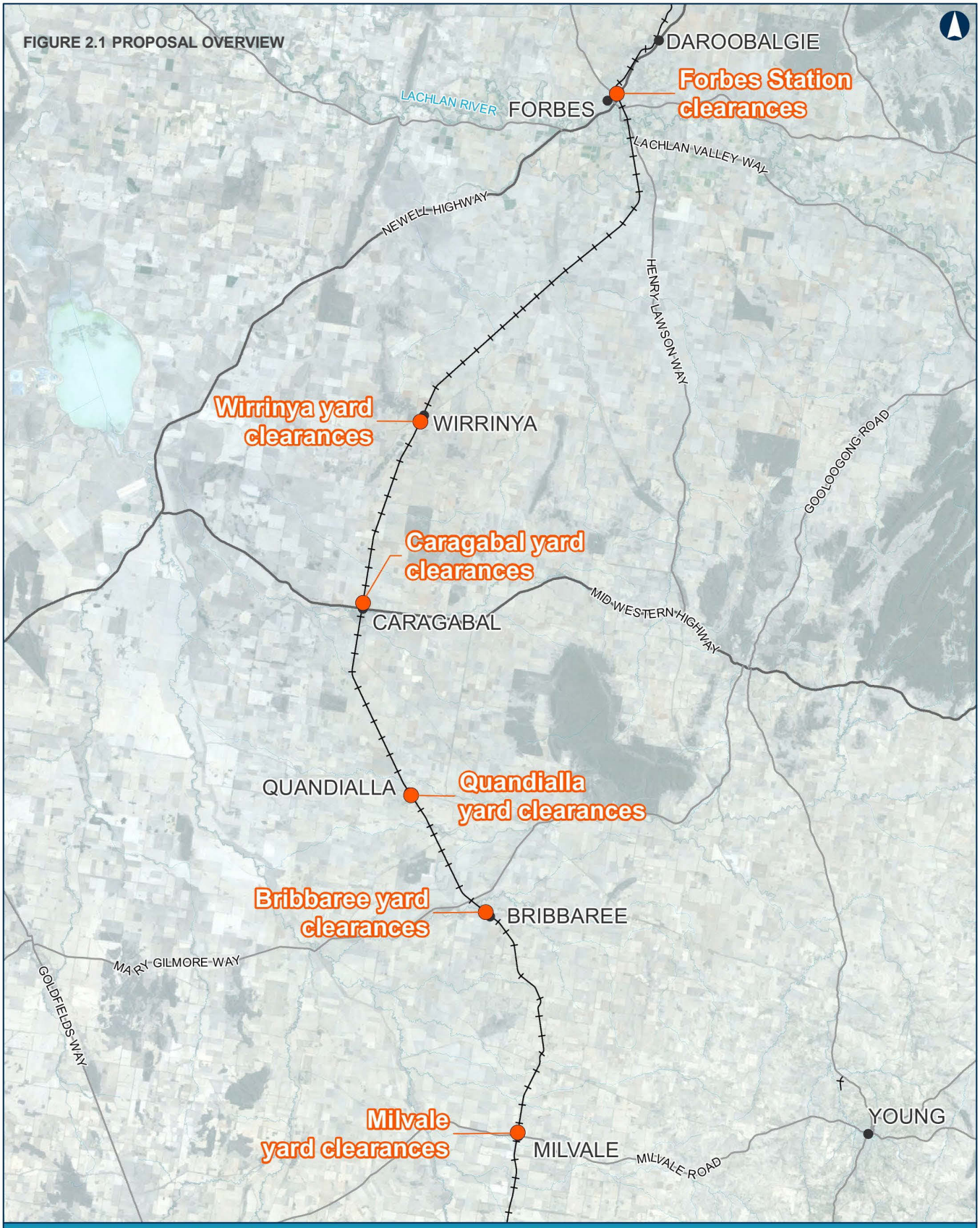
FIGURE 2.1 PROPOSAL OVERVIEW
DAROOBALGIE
Forbes Station clearances
LACHLAN RIVER
FORBES
LACHLAN VALLEY WAY
NEWELL HIGHWAY
HENRY LAWSON WAY
Wirrinya yard clearances
WIRRINYA
GOOLOOGONG ROAD
Caragabal yard clearances
CARAGABAL
MID WESTERN HIGHWAY
QUANDIALLA
Quandialla yard clearances
Bribbaree yard clearances
BRIBBAREE
MARY GILMORE WAY
GOLDFIELDS WAY
Milvale yard clearances
MILVALE
MILVALE ROAD
YOUNG
Stockinbingal to Parkes Horizontal Clearances
Figure 2.1 Proposal Overview
0 5 10 km
Coordinate System: GDA 1994 MGA Zone 55
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Date: 5/08/2021
Paper: A3
Author: WSP
Scale: 1:350,000
Data Sources: ARTC, NSWSS
Towns
Existing railway
Highway
Main road
Watercourse
Proposal site
INLAND RAIL
ARTC
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.
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2.2 Key components

Generally, the proposal requires the track to be realigned horizontally to provide compliant clearances from the double-stacked container freight trains proposed to be used on Inland Rail. The locations of these horizontal clearance works are shown in Figure 2.2, Figure 2.3 and Figure 2.4. The key components of each site are summarised in Table 2.2 and outlined in the following sections. The description of the proposal is based on the reference design and is subject to detailed design.

TABLE 2.2 SUMMARY OF KEY PROPOSAL COMPONENTS

Site	Track work	Water tank works	Station awning works	Drainage	Signalling	Temporary construction facilities
Forbes Station and Yard	Yes	–	Yes	Yes	Yes	Yes
Wirrinya Yard	Yes	–	–	–	–	Yes
Caragabal Yard	Yes	–	–	–	–	Yes
Quandialla Yard	–	Yes	–	–	–	–
Bribbaree Yard	Yes	–	–	Yes	Yes	Yes
Milvale Yard	–	Yes	–	–	–	–

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FIGURE 2.3 PROPOSAL SITES—CARAGABAL YARD AND BRIBBAREE YARD
CARAGABAL YARD CLEARANCES
536km
Track realignment
CARAGABAL
PULLABOOKA ROAD
MID WESTERN HIGHWAY
LITTLE CARAGABAL CREEK
LITTLE CREEK
QUANDIALLA-CARAGABAL ROAD
WAH WAY CREEK
QUANDIALLA ROAD
BLAND ROAD
BIMBI-QUANDIALLA ROAD
BLAND
QUANDIALLA
NOWLANS RO
BURRANGONG CREEK
GARELL ROAD
BRIBBAREE YARD CLEARANCES
BRIBBAREE
501km
Track realignment
NORTH STREET
SHORT STREET
Relocated derailer
WEEDALLION STREET
BALABLA STREET
RAILWAY STREET
EURABBA CREEK
BIMBI-THUDDUNGRA ROAD
RED CREEK
BRIBBAREE
BRIBBAREE ROAD
WIRRUP ROAD
BALABLA CREEK
PETERS CREEK
WEEDALLION
TUBBUL
Stockinbingal to Parkes Caragabal & Bribbaree Yard Clearances
Figure 2.3 Proposal Sites
0 2 4 km
Coordinate System: GDA 1994 MGA Zone 55
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Date: 16/11/2021
Paper: A3
Author: WSP
Scale: 1:125,000
Data Sources: ARTC, NSWSS
KM post
Existing railway
Main road
Local road
Track
Watercourse
Track realignment
Proposal site
PARKES
FORBES
DAROOBALGIE
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
INLAND RAIL
ARTC
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.
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FIGURE 2.4 PROPOSAL SITES—QUANDIALLA YARD CLEARANCES AND MILVALE YARD CLEARANCES
QUANDIALLA YARD CLEARANCES
MILVALE YARD CLEARANCES
Water tank works
Water tank works
515km
476km
BLAND ROAD
QUANDIALLA
BIMBI-QUANDIALLA-ROAD
DRIFTWAY ROAD
NOWLANS ROAD
MORANGARELL ROAD
WAH WAY CREEK
BURRANGONG CREEK
EURABBA CREEK
EUROKA ROAD
MILE POST CREEK
BRIBBAREE
MARY GILMORE WAY
BRIBBAREE CREEK
WIRRUP ROAD
PEIERS CREEK
WEEDALLION
WEEDALLION CREEK
TUBBUL
TUBBUL ROAD
MEMAGONG CREEK
MEMAGONG
RUSHY CREEK
MILVALE
SCHILLERS ROAD
MILVALE ROAD
MILVALE CREEK
BERTHONG
TUMBLETON CREEK
THUDDUNGRA
DUCKHOLE CREEK
MIDDLE STATION CREEK
LARLA CREEK
FIRST STREET
GLASSON STREET
PINEY RANGE
Stockinbingal to Parkes Quandialla & Milvale Yard Clearances
Figure 2.4 Proposal Sites
0 2 4 km
Coordinate System: GDA 1994 MGA Zone 55
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Date: 5/08/2021
Paper: A3
Author: WSP
Scale: 1:125,000
Data Sources: ARTC, NSWSS
KM post
Existing railway
Main road
Local road
Track
Watercourse
Proposal site
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
INLAND RAIL
ARTC
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.
D:\WSP O365\AU-WKG - Geospatial - AIS - Projects\PS122419_Albury_to_Illabo\Tasks\230_0004_EAP_REFReportFigures\Documents\04_HorizontalClearances\95pc\230_EAP_HorizontalClearances_REF_ProposalSites_QM_r1v2.mxd

2.2.1 Track works

The existing rail corridor includes the main line, loop lines and sidings. Loop lines briefly leave the main line and re-join to allow for train passing or access to rail-side infrastructure. Siding tracks, which are short sections of rail off the main line, can be used as temporary locations to park trains off the main line or access to loading or storage structures such as grain silos. The track arrangement generally consists of steel rails supported by sleepers (concrete, steel or timber) on ballast (the aggregate material laid between the formation and the rails and sleepers).

The proposal requires the track to be realigned horizontally to provide compliant clearances to existing structures and adjacent tracks at four of the proposal sites, shown in Figure 2.2, Figure 2.3 and Figure 2.4. As outlined in Table 2.3, the track will be realigned horizontally by up to 540 millimetres (mm).

At Wirrinya and Caragabal Yards, the existing track is proposed to be retained wherever practicable; however, additional ballast will be required in various areas to support the realignment and some replacement sleepers may also be required. Earthworks are not proposed for these track works, which are less than 350 mm.

At Bribbaree Yard, a section of the track formation has been assessed as inadequate and is proposed to be replaced. The section of replaced track would require a new geotextile fabric, a capping layer, ballast, sleepers and rail. An existing derailer (a track device enabling enforced derailment for safety purposes) would be relocated approximately 24 metres (m) north.

At Forbes Station and Yard, the track realignment is greater than 300 mm, which requires reconstruction of the track, including the rail, sleepers, and ballast along wider sections of the new alignment. Forbes Station is a state and local heritage item (refer to Section 5.2). The southern extent of the track realignment within the heritage curtilage does not require full track reconstruction, as realignment of up 100 mm is proposed in this location. A new catchpoint (a set of points on the track enabling enforced derailment for safety purposes) would be established approximately 17 m north of the existing inadequate catch point on the goods siding.

TABLE 2.3 SUMMARY OF PROPOSED HORIZONTAL TRACK REALIGNMENT WORKS

Site	Track	Horizontal realignment	Length of realignment
Forbes Station and Yard	Main line	Up to 540 mm	Approximately 500 m
	Goods siding	Up to 350 mm	Approximately 140 m
Wirrinya Yard	Loop line	Up to 350 mm	Approximately 400 m
	Grain line	Up to 250 mm	Approximately 120 m
Caragabal Yard	Main line	Up to 30 mm	Approximately 250 m
Bribbaree Yard	Main line	Up to 300 mm	Approximately 940 m

2.2.2 Water tank works

Water tank infrastructure adjacent to the track at Milvale Yard and Quandialla Yard would undergo minor works to allow for the appropriate horizontal clearance to the track.

The proposed works at Milvale Yard include removal of redundant wiring and the associated brackets (refer to Figure 2.5), while Quandialla Yard involves removal of a redundant pipe and associated wires (refer to Figure 2.6).

FIGURE 2.5 MILVALE YARD WATER TANK WITH WIRE ENCROACHMENT (SEE RED OUTLINE)

FIGURE 2.6 QUANDIALLA WATER TANK, SHOWING PIPEWORK EXTENDING FROM FRAME (SEE RED OUTLINE)

2.2.3 Forbes Station awning works

The proposal at Forbes Station and Yard includes trimming of the awning by 300 mm. Works to the full length of the awning would include removal of a section of cast support brackets, end beam and the corrugated iron roof (refer to Figure 2.7, Figure 2.8 and Figure 2.9). The existing, or a new, end beam would need to be installed at the end of the brackets and guttering would be removed and reinstalled, or replaced, depending on its condition.

As the station is a NSW state heritage listed item, the proposed works consider the building materials and methods to maintain the heritage value. Where original elements cannot be reused, 'like for like' elements would be sourced to ensure the aesthetic of the Forbes Station awning is not diminished.

FIGURE 2.7 PHOTO OF AWNING AT FORBES STATION

FIGURE 2.8 PHOTO OF FORBES STATION FROM THE NORTHERN END OF THE PLATFORM

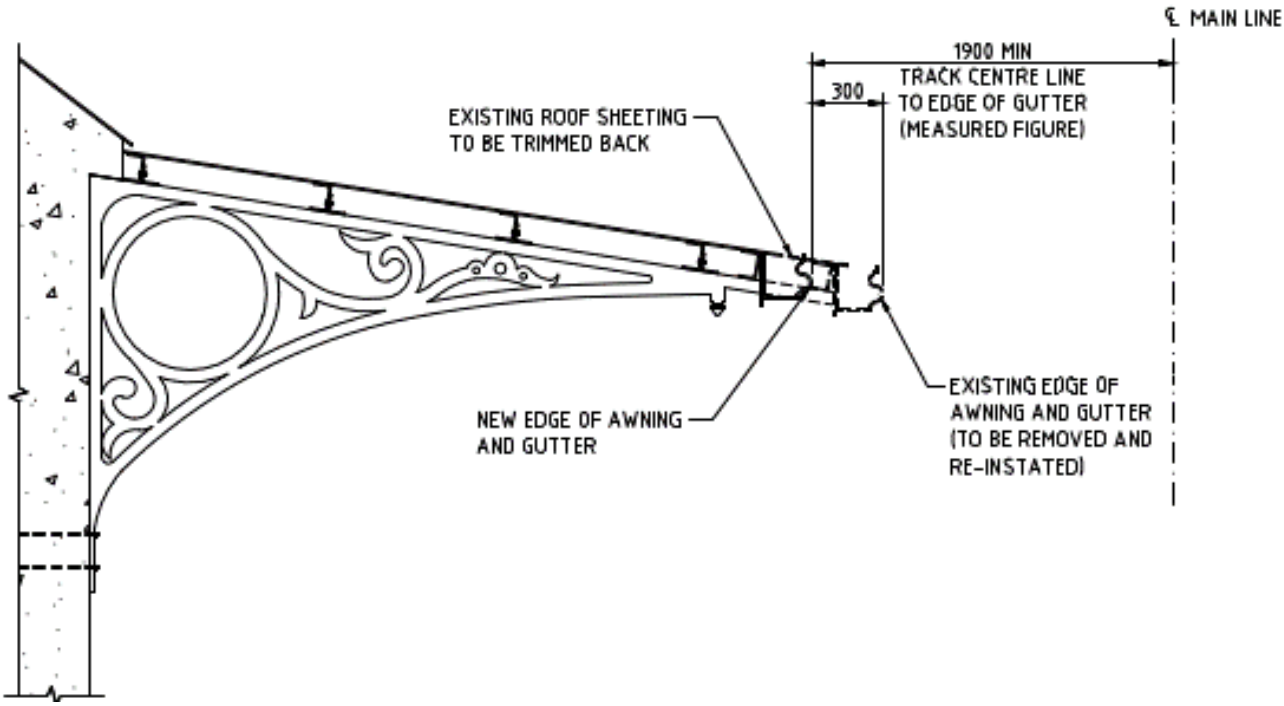


FIGURE 2.9 PROPOSED TRIMMING TO AWNING

2.2.4 Drainage

Formation of cess drains adjacent to the track is proposed at Bribbaree Yard and Forbes Station and Yard, as shown in Figure 2.10. Open drainage has been proposed at these sites to maintain flow paths.

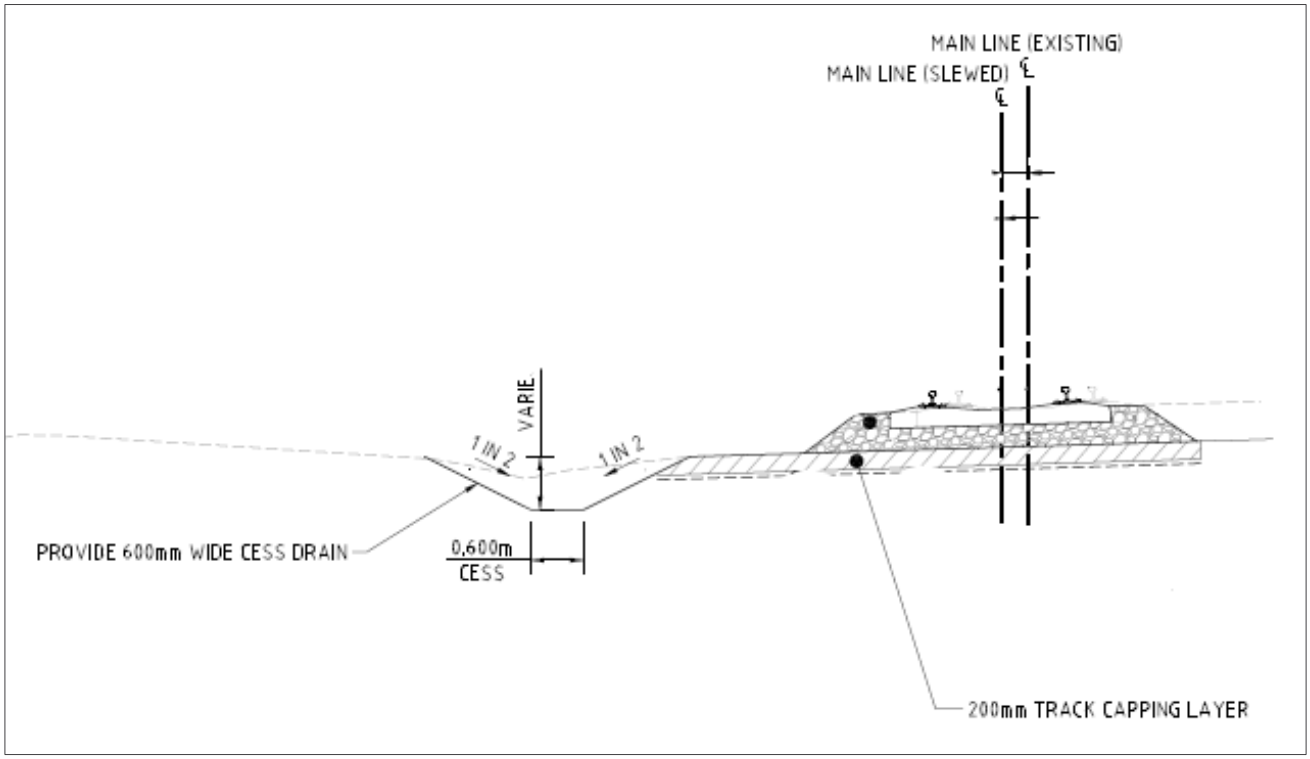


FIGURE 2.10 INDICATIVE DIAGRAM OF PROPOSED CESS DRAINAGE

2.2.5 Signalling

Minor adjustments to the rail signaling would be required due to track works. The signalling infrastructure would be adjusted to accommodate the new catch point at Forbes Station and Yard and the relocated derailer at Bribbaree Yard.

2.3 Construction methodology

The indicative construction methodology for the proposal is outlined below. The proposed timing, methodology, resources and access arrangements would be refined prior to construction. A final construction methodology and program will be developed by the construction contractor based on the mitigation and management measures provided in this document. Should the construction methodology change, ARTC would be consulted and determine if additional assessment and approvals are required.

The activities required for construction of the proposal are identified in Table 2.4 below:

TABLE 2.4 CONSTRUCTION ACTIVITIES AT EACH PROPOSAL SITE

Construction activity	Relevant proposal sites	Construction activities
Site establishment and access	All sites	▸ Implementation of all ARTC rail site protection requirements (including the provision of site protection officers) prior to accessing the rail corridor ▸ Establishment of environmental controls relevant to the site, including erosion and sediment control.
	Forbes Station and Yard Wirrinya Yard Caragabal Yard Bribbaree Yard	▸ Geotechnical investigations ▸ Installation of site fencing and temporary signage for restricted access and pedestrian traffic diversion (if necessary) ▸ Establishment of site access locations, compound sites and the location of stockpiles ▸ Undertake any baseline monitoring ▸ Undertaking vegetation clearing or grubbing as required ▸ Utility protection as required and service relocation at Bribbaree Yard.

Construction activity	Relevant proposal sites	Construction activities
Track work	Wirrinya Yard Caragabal Yard	▸ Inspection of adjacent track formation ▸ Undertake track widening, where required, including stripping topsoil and extending formation ▸ Top up of ballast, where required ▸ Running tamper machine along the track to horizontally shift track in 30–50 mm increments and level out ballast ▸ Running regulator machine along the track to ensure ballast is distributed and shaped to support the track ▸ Restressing of track and commissioning.
Track work with earthworks	Forbes Station and Yard Bribbaree Yard	▸ Disconnection and temporary removal of part of signalling infrastructure as required ▸ Reinstatement of signalling or relocation to ensure suitable horizontal clearance is maintained ▸ Undertaking earthworks to establish new cess drainage alongside track ▸ Stripping topsoil and excavation (up to approximately 500 mm in depth) to establish realigned track formation, as required ▸ Treating foundation for location of realigned track formation, as required ▸ Placing structural fill material as required at Bribbaree Yard ▸ Placing capping material ▸ Installation of ballast, concrete sleepers and rail ▸ Running of tamper machine to level out ballast ▸ Restressing of track and commissioning.
Water tank works	Milvale Yard Quandialla Yard	▸ Set up of environmental and safety controls ▸ Cutting/grinding the redundant wiring or pipe off the tank ▸ Implementation of corrosion protection at the cutting site ▸ Removal of all plant and equipment.
Forbes station awning work	Forbes Station and Yard	▸ Establishment of heritage controls to protect the fabric of the station ▸ Measurement and marking of work ▸ Removal of outer gutters, edge support beam and roof sheeting ▸ Removal of the required section of bracket extension ▸ Reinstallation of the joining angles and corrosion protection of the ends of the brackets ▸ Reinstallation of the guttering and roof sheeting.
Demobilisation and rehabilitation	Forbes Station and Yard Wirrinya Yard Caragabal Yard Bribbaree Yard	▸ Decommissioning of site compounds and rehabilitation of disturbed areas ▸ Decommissioning of site access roads that are no longer required ▸ Removal of environmental management controls.

2.4 Plant and equipment

An indicative list of construction plant and equipment is provided in Table 2.5. It is predicted that in addition to the list, light vehicles and general equipment, such as survey equipment and hand tools, would be used throughout the construction period.

TABLE 2.5 INDICATIVE LIST OF PLANT AND EQUIPMENT

Construction activity	Relevant sites	Plant and equipment
Track works	Forbes Station and Yard Wirrinya Yard Caragabal Yard Bribbaree Yard	▸ Hydrema ▸ Loaders ▸ Excavator ▸ Ballast box ▸ Tamper ▸ Regulator ▸ Flash butt welding unit
Earthworks	Forbes Station and Yard Bribbaree Yard	▸ Grader ▸ Padfoot roller ▸ Smooth drum roller ▸ Water carts (30 kilolitres (KL)) ▸ Truck and dog ▸ Articulated dump truck ▸ 30 t excavator ▸ 30 t excavator with hammer ▸ Posi track ▸ Backhoe
Water tank works	Quandialla Yard Milvale Yard	▸ Grinder ▸ Elevated work platform
Station awning work	Forbes Station	▸ Scaffolding ▸ Power tools

2.5 Site access and compounds

Temporary site compounds and stockpiles would be established at the Forbes Station and Yard, Wirrinya Yard, Caragabal Yard and Bribbaree Yard. The location of ancillary construction facilities and access points are shown in Figure 2.11 and Figure 2.12. The Bribbaree Yard compound was nominated outside the rail corridor to eliminate the need to cross the sidings and crossing loop tracks. Likely traffic numbers are similar at all locations, corresponding to approximately 10 heavy vehicles per hour and 8 light vehicles per hour at peak times.

Potential materials requiring safe storage within site compounds include:

- Fuel and mechanical fluids for plant and equipment (oils, degreaser, lubricants, coolants, etc.)
- Oxygen gas, acetylene (for welding activities) and liquid propane gas
- Safe-working rail detonators (for worksite protection)
- Rail weld kits (thermit igniters).

2.5.1 Traffic access

The primary road used by construction vehicles would be the Newell Highway. The roads identified to access each enhancement site are in Table 2.6.

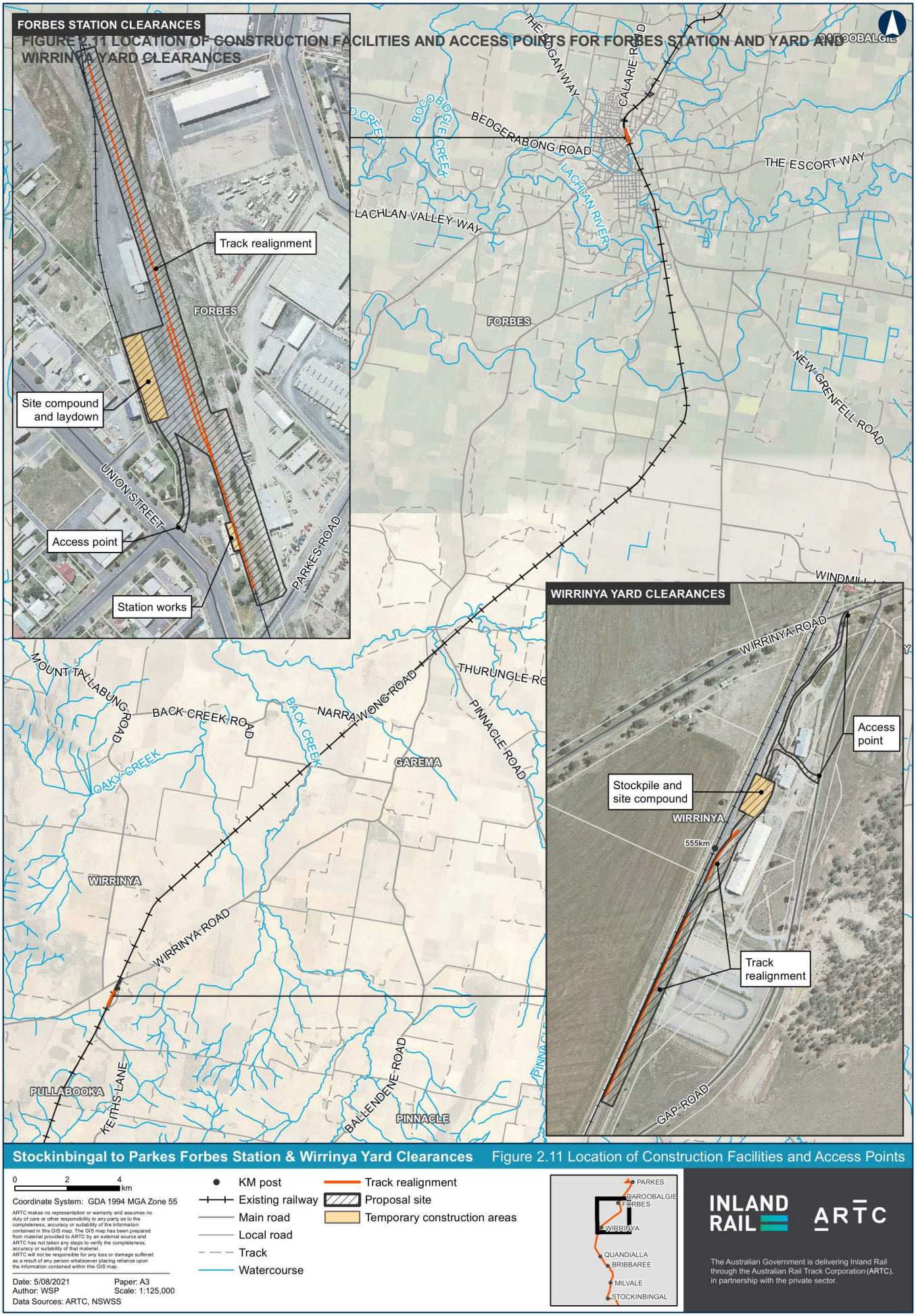
TABLE 2.6 TRAFFIC ACCESS TO THE PROPOSAL

Enhancement sites	Primary haulage route roads	Peak number of vehicles movements per hour
Forbes Station and Yard	Union Street Newell Highway	10 light vehicles 8 heavy vehicles
Wirrinya Yard	Wirrinya Road Gap Road	10 light vehicles 8 heavy vehicles
Caragabal Yard	Western Highway Caragabal Road	10 light vehicles 8 heavy vehicles
Quandialla Yard	Bimbi–Quandialla Road	3 light vehicles 1 heavy vehicle
Bribbaree Yard	Railway Street Bribbaree Road Mary Gilmore Way	10 light vehicles 8 heavy vehicles
Milvale Yard	Milvale Road	3 light vehicles 1 heavy vehicle

2.5.2 Water supply

Water would be required for earthworks and dust suppression at all sites except Quandialla Yard and Milvale Yard. Approximately 3.6 megalitres (ML) of water across the proposal would be required for these purposes, with three water carts a day potentially needed during construction at each track works site.

Local water suppliers, including councils and quarries, would be consulted to obtain the required water demand. Extraction from bores and surface water is not anticipated to be required for the proposal. All potable water will be from potable water deliveries to site compound water tanks.


FORBES STATION CLEARANCES
FIGURE 2.11 LOCATION OF CONSTRUCTION FACILITIES AND ACCESS POINTS FOR FORBES STATION AND YARD AND WIRRINYA YARD CLEARANCES
Track realignment
Site compound and laydown
Access point
Station works
FORBES
UNION STREET
PARKES ROAD
THE GANWAY
CALARIE ROAD
BEDGERABONG ROAD
BOBADIGLE CREEK
LACHLAN VALLEY WAY
LACHLAN RIVER
THE ESCORT WAY
NEW GRENFELL ROAD
WINDMILL
WIRRINYA YARD CLEARANCES
WIRRINYA ROAD
Access point
Stockpile and site compound
WIRRINYA
555km
Track realignment
GAP ROAD
MOUNT TALLABUNG ROAD
BACK CREEK ROAD
OAKY CREEK
NARRAWONG ROAD
THURUNGLE RD
PINNACLE ROAD
GAREMA
WIRRINYA
WIRRINYA ROAD
PULLABOOKA
KEITHS LANE
BALLENDENE ROAD
PINNACLE
Stockinbingal to Parkes Forbes Station & Wirrinya Yard Clearances
Figure 2.11 Location of Construction Facilities and Access Points
0 2 4 km
Coordinate System: GDA 1994 MGA Zone 55
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Main road
Local road
Track
Watercourse
Track realignment
Proposal site
Temporary construction areas
PARKES
BAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
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FIGURE 2.12 LOCATION OF CONSTRUCTION FACILITIES AT CARAGABAL YARD AND BRIBBAREE YARD
CARAGABAL YARD CLEARANCES
Access point
Track realignment
Stockpile area
536km
CARAGABAL
PULLABOOKA ROAD
MID WESTERN HIGHWAY
LITTLE CARAGABAL CREEK
LITTLE CREEK
QUANDIALLA-CARAGABAL ROAD
WAH WAY CREEK
QUANDIALLA ROAD
BLAND ROAD
BIMBI-QUANDIALLA ROAD
BLAND
BURRANGONG CREEK
NOWLANS RO
BRIBBAREE YARD CLEARANCES
501km
Track realignment
NORTH STREET
BRIBBAREE
SHORT STREET
WEEDALLION STREET
Stockpile area
Access point
Stockpile area
EURABBA CREEK
BIMBI-THUDDUNGRA ROAD
RED CREEK
BRIBBAREE
BRIBBAREE ROAD
WIRRUP ROAD
BALALA CREEK
PETERS CREEK
WEEDALLION
TUBBUL
Stockinbingal to Parkes Caragabal & Bribbaree Yard Clearances
2.12 Location of Construction Facilities and Access Points
0 2 4 km
Coordinate System: GDA 1994 MGA Zone 55
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2.6 Duration of works

Construction of the proposal is predicted to last for about 11 weeks, with commencement in early 2024 (subject to ARTC determination of this REF). Works at each site would be undertaken concurrently, where possible, to maximise use of rail possessions.

The duration of construction at each site would be:

- Forbes Station and Yard—approximately six weeks
- Caragabal Yard—approximately six weeks
- Wirrinya Yard—approximately seven weeks
- Quandialla Yard and Milvale Yard water tanks—approximately two days each
- Bribbaree Yard—approximately 11 weeks.

2.7 Working hours

All works (where possible) will be undertaken during standard working hours (as shown):

- 7:00 am to 6:00 pm Monday to Friday
- 8:00 am to 1:00 pm Saturday
- No work on Sundays or public holidays.

Due to the requirement for a safe working site, some works may be undertaken outside standard working hours and during scheduled track possessions. Any works required to be completed outside standard working hours, would be in accordance with ARTC's Environmental Protection License (EPL) 3142 (conditions O9.1 to O9.6) and the affected community would be advised in accordance with the Communication Management Plan.

2.7.1 Works during possessions

The proposal would require rail possessions or track occupancy authorisations where works would impact the operation of existing rail lines and/or the safety of construction workers as outlined in Table 2.7.

Work under rail possessions would be carried out during scheduled possession periods (that is, the times that the movement of trains along the rail corridor are stopped for maintenance). Rail possessions are typically for a 60-hour period, two times a year in March and September. During rail possessions, works may need to be carried out on a 24-hour basis.

Outside scheduled rail possessions, works would also occur within available five to 12-hour windows when train services are not scheduled and when authorised by ARTC (called a track occupancy authorisation). These periods are determined in consultation with operators of freight and passenger train services, and may occur outside the proposal construction hours.

TABLE 2.7 RAIL POSSESSION REQUIREMENTS

Construction activity	Possession requirements
Track work/track work with earthworks	Track realignments works at Bribbaree Yard, Caragabal Yard, Wirrinya Yard and Forbes Yard are planned around the use of one rail possession. Associated construction activities directly over or in close proximity to the track such as drainage works, or utility adjustments may be undertaken during track occupancy authorisations.
Water tank works	Water tank works at Milvale Yard and Quandialla Yard would be undertaken under track occupancy authorisation. A full rail possession is not required for these works.
Forbes station awning work	These works would be undertaken under track occupancy authorisation. A full rail possession is not required for these works.

2.8 Construction workforce

It is anticipated that construction of the proposal would require a peak workforce of approximately 80 across the proposal, subject to the works being undertaken concurrently at multiple sites. The estimated peak work force at each site, dependent on the proposed works, is:

- Forty-five personnel for track works and earthworks (Bribbaree Yard and Forbes Station and Yard)
- Thirty personnel for track works (Caragabal Yard and Wirrinya Yard)
- Six personnel for water tank works (Quandialla Yard and Milvale Yard)
- Eight personnel for Forbes Station awning works.

2.9 Land requirements

The proposal is predominantly located on land owned by the NSW Government, which is leased to ARTC. Temporary occupation of Hilltops Council and privately owned land would be required during construction, as described in Table 2.8. No land would be permanently acquired for the proposal.

TABLE 2.8 PROPOSED TEMPORARY LAND USE REQUIREMENTS

Site	Lot	Description of use
Wirrinya Yard	Lot 1 DP 819702	Partial occupation and access to the site through land owned and operated by GrainCorp.
	Lot 10/ DP 48617	
Caragabal Yard	Lot 11 DP883996	Access to the construction site via an access road on GrainCorp.
	Lot 1 DP819833	
Bribbaree Yard	N/A	Location of a stockpile on Hilltops Council land between Railway Street and the rail corridor.
	Lot 1 DP819709	Partial occupation of land owned and operated by GrainCorp.

2.10 Operation of the proposal

2.10.1 Train operation

The proposal would form part of the rail network managed and maintained by ARTC. Train services would be provided by a variety of operators. Inland Rail as a whole would be operational once all 13 sections are complete, which is estimated to be in 2027.

Inland Rail would operate 24 hours per day and would initially accommodate double-stacked freight trains (train outlines D, H and F2) of up to 1,800 m in length and up to 6.5 m high. Train speeds would vary according to axle loads and range from 80 to 115 kilometres per hour (km/hr).

It is estimated that S2P would be trafficked by an average of around 12 trains per day in 2027, increasing to 18 trains per day in 2039. This rail traffic would be in addition to the existing rail traffic using other lines that the proposal interacts with, as described in Section 3.3.

The Inland Rail trains would be a mix of bulk freight such as grain, non-bulk freight and other general transport trains. Total annual freight tonnages would be about 15 million t in 2027, increasing to about 20 million t in 2039 (ARTC, 2020).

Train timetabling would be the responsibility of operators.

2.10.2 Maintenance activities

Standard ARTC maintenance activities would continue to be undertaken during operations. Typically, these activities would involve minor maintenance works, such as culvert inspections, through to major maintenance, such as reconditioning of track and topping up of ballast, as required.

Works within the rail corridor would be undertaken in accordance with ARTC's standard operating procedures and Environment Protection Licence (EPL) 3142, thereby reducing the potential for impacts on the health and safety of workers, visitors and users.

Business-as-usual rail maintenance activities by ARTC, such as raising and/or replacement of existing signal gantries, are excluded from this proposal.

2.11 Justification and options

2.11.1 Background

In 2006, the North South Rail Corridor Study undertaken by the Australian Government identified the 'far western corridor' through Parkes as the optimum corridor for a future Melbourne–Brisbane inland railway. In 2010, the *Inland Rail Alignment Study* looked at the far western corridor in detail and considered an exhaustive range of alternatives to develop the best route for Inland Rail (ARTC, 2010). The study concluded that the existing Stockinbingal to Parkes alignment was suitable for Inland Rail due to its grade and generally good alignment.

In 2014, ARTC undertook consultation with freight forwarders, rail operators and customers to ascertain the key parameters necessary to achieve a shift from road to rail. As a result, ARTC developed the Inland Rail Service Offering, which provides for a transit time between Melbourne and Brisbane of less than 24 hours (around 10 hours less than the existing coastal route via Sydney) while achieving reliability, freight availability and cost that is competitive with road. The industry consultation process identified the Stockinbingal to Parkes route as an important component of the Inland Rail service offering.

The Inland Rail Business Case (ARTC, 2015) defined the scope of S2P as an 'enhancement project' utilising approximately 170 km of existing track. As an enhancement project, S2P optimised the use of existing rail infrastructure and required only minor clearance works to enable double-stacked freight trains and some capacity enhancement with new crossing loops.

2.11.2 Strategic need for Inland Rail

Inland Rail is needed to improve the efficiency of freight moving between Melbourne and Brisbane. Inland Rail would bypass the Sydney metropolitan area, it would substantially cut the overall journey time to less than 24 hours and increase the reliability of services between Melbourne and Brisbane (Infrastructure Australia, 2016). This is predicted to increase the competitiveness of rail transport relative to road transport (ARTC, 2015).

As noted by the *Australian Infrastructure Audit* (Infrastructure Australia, 2015), '*Rail offers an alternative to road transport and societal benefits in terms of lower emissions, reduced road congestion and increased safety per tonne kilometre, particularly over longer distances or when carrying heavy goods.*' Infrastructure Australia evaluated Inland Rail and identified it as having long-term benefits to potential users and the broader economy.

In summary, Inland Rail is needed to:

- Respond to the growth in demand for freight transport
- Address existing freight capacity and infrastructure issues
- Meet the demand for transport of non-bulk manufactured product.

2.11.2.1 Growth in freight demands

In 2011, the domestic rail freight task totaled 261.4 billion, accounting for approximately 46 per cent of total domestic freight. This represents an increase of 91 per cent since 2000–01 (Infrastructure Australia, 2015).

The *Australian Infrastructure Audit* (Infrastructure Australia, 2015) notes that:

- The national land freight task is expected to grow by 80 per cent between 2011 and 2031
- Demand for freight rail infrastructure is projected to grow; in particular, for resource bulk commodity haulage in WA, Queensland and NSW
- Freight rail would need to play a growing role in the movement of goods between ports and inland freight terminals, and in the movement of containerised and general freight over longer distances.

Demand for freight transport in the Melbourne to Brisbane corridor is expected to grow substantially over coming decades, from approximately 4.9 million t in 2016 to around 13 million t, or 1.1 million containers, by 2050 (Infrastructure Australia, 2016).

Australia's east coast comprises 79 per cent of the country's population, 78 per cent of Australia's national employment, and generates 75 per cent of the nation's gross domestic product (GDP). With the population estimated to grow by 60 per cent over the next 40 years, increasing pressure would be placed on freight infrastructure and services (ARTC, 2017).

Without the increased use of rail, the growth in freight demand is likely to result in increasing pressure on the road network and associated issues, increased freight costs, and a loss of economic opportunity.

2.11.2.2 Existing capacity and infrastructure issues

The current rail connection between Melbourne and Brisbane, via Sydney, cannot offer the transit times and reliability required by industry. This is largely a function of poor rail alignments and capacity constraints, particularly on the section between Sydney and Brisbane, and delays on freight transiting the Sydney metropolitan area (Infrastructure Australia, 2018). Travel-time reliability is poor as a result of the priority given to passenger services, freight transit curfews in the Sydney metropolitan area and substandard rail alignments elsewhere. Limited capacity during morning and afternoon passenger peaks restricts freight movements at these times (NSW Government, 2013).

The current road connection between Melbourne and Brisbane via inland NSW offers faster transit times than rail via Sydney (Infrastructure Australia, 2018); however, much of the road is two-lane single carriageway, with limited passing lanes. Without additional capacity, transit times on this corridor would increase as freight volumes rise. Infrastructure Australia (2016) notes that the demand for urban transport infrastructure is projected to increase significantly. Without action, the cost to the wider community of congestion on urban roads could rise to more than $50 billion each year by 2031. Demand for many key urban road and rail corridors is projected to significantly exceed current capacity by 2031.

The *Inquiry into National Freight and Supply Chain Priorities* (Department of Infrastructure, Regional Development and Cities, 2018) identifies a number of existing challenges facing road and rail freight, including:

- Road transport would experience increased congestion from increasing numbers of passenger vehicles, and the priority given to passenger vehicles over freight vehicles in urban transport, resulting in associated higher costs over the next 20 years
- The encroachment of urban development on freight routes and precincts as cities grow in size, and density leads to an increased potential for amenity, environmental and interface issues.

The *Melbourne–Brisbane Inland Rail Alignment Study* (ARTC, 2010) indicated that:

- The existing Sydney–Brisbane coastal route is anticipated to reach capacity by 2052
- Rail efficiency and service quality is inadequate and passing on higher costs to consumers
- Inadequate rail services are also encouraging a shift to road freight, causing increased congestion, maintenance, safety and environmental issues for roads and highway
- Priority is given to passenger modes over freight modes in urban transport.

2.11.2.3 Key benefits

Inland Rail would provide the following key benefits:

- Boost the Australian economy—Inland Rail is expected to boost Australia's GDP by $16 billion over the next 50 years.
- Create jobs—it is expected to create up to 16,000 new jobs at the peak of construction, and an average of 700 additional jobs per year over the entire period.
- Provide better access to and from our regional markets—it would make it easier to connect our farms, mines, cities and ports to domestic and international markets. Two million t of agricultural freight would switch from road to rail, with a total of 8.9 million t of agricultural freight more efficiently diverted to Inland Rail.
- Reduce costs—rail costs for intercapital freight travelling between Melbourne and Brisbane would be reduced by $10 per t.
- Offer better transit time and reliability—Inland Rail offers less than 24-hour transit time between Melbourne and Brisbane terminals and 98 per cent reliability matching current road levels.
- Improve road safety—up to 15 serious crashes, involving fatalities and serious injuries, would be avoided every year.
- Improve sustainability and amenity for the community—carbon emissions would be reduced by 750,000 t per year and truck volumes would be reduced in more than 20 of our regional towns (based on a 2050 estimate).
- Provide an alternative north–south freight link—Inland Rail would provide a second link between Queensland and the southern states, making Australia's national freight rail network less vulnerable to disruptions.

2.11.3 Consistency with Commonwealth, state and regional strategies and plans

The strategic context of Inland Rail has been influenced by the outcomes of a number of strategic plans for transport, development and freight that have been prepared at national, state and regional levels. The Inland Rail Program is consistent with elements of the following key strategies (note, this list is not exhaustive), as described in Table 2.9.

TABLE 2.9 CONSISTENCY WITH NATIONAL, STATE AND REGIONAL PLANNING POLICIES AND STRATEGIES

Policy	Relevance to the proposal
National	
Australian Infrastructure Plan (Infrastructure Australia, 2016)	This plan sets out a number of projects and initiatives identified as priority infrastructure investments that Australia needs over the next 15 years. The 2019 Priority List identifies Inland Rail as a 'Priority Project.' Priority Projects are potential infrastructure solutions that address a nationally significant problem or opportunity and have been positively assessed by the Infrastructure Australia Board. The plan identifies the connectivity benefits of Inland Rail for certain commodities and the need to take advantage of these benefits to support business and economic growth.
State of Australian Cities 2014–2015 (Department of Infrastructure and Regional Development, 2015)	The State of Australian Cities reports bring together current research and data to present a comprehensive picture of how Australia's cities are evolving, to strengthen the knowledge base used to develop policy. The 2014–2015 report observed that there is more demand for transport in Australia, including freight, than ever before. Inland Rail provides a response to some of the issues raised in this report, as it aims to: ▸ Provide a step-change improvement in rail service quality in the Melbourne to Brisbane corridor to deliver a freight rail service on the east coast that is competitive with road ▸ Improve road safety and ease congestion by moving the increased freight demand to the Inland Rail network ▸ Move freight to the Inland Rail network to bypass bottlenecks on the congested metropolitan rail networks on the east coast, and free up train paths for other services on the coastal route.
Urban Transport Strategy (Infrastructure Australia, 2013)	The *Urban Transport Strategy* (Infrastructure Australia, 2013), *National Land Freight Strategy* (Standing Council on Transport and Infrastructure, 2012), and the *National Ports Strategy* (Infrastructure Australia, 2011) form the key components of strategic planning for transport in Australia. The strategy acknowledges that road congestion has an impact on national productivity and economic activity, and that public transport systems do influence the performance of urban roads and the national freight systems. An aim of the strategy is to promote the best use of capacity on high-use roads. Inland Rail is consistent with this strategy, as it aims to: ▸ Improve road safety, ease congestion and reduce environmental impacts by moving freight from road to rail ▸ Bypass bottlenecks on congested metropolitan rail networks on the east coast, and free up train paths for other services on the coastal route.
National Freight and Supply Chain Strategy and *National Freight and Supply Chain Action Plan* (Transport and Infrastructure Council, 2019)	This strategy is a partnership between the Commonwealth, state, territory, local governments and industry to drive efficient and sustainable freight logistics, balancing the needs of a growing Australian economy with the quality of life aspirations of the Australian people. Inland Rail is included on the map of key freight routes developed by the strategy, based on the route provided in the *National Land Freight Strategy Update Paper* (Infrastructure Australia, 2012). The map shows a single new national network to reflect the emphasis on potential future freight flows, freight (vehicle) connectivity, ports and settlements. Inland Rail supports the strategy by providing regional and remote parts of Australia with infrastructure capable of connecting regions and communities to major gateway.
National Ports Strategy (Infrastructure Australia, 2011)	The Council of Australian Governments (COAG) endorsed the National Ports Strategy in July 2012 as part of a collaborative approach to the future development and planning of Australia's port and freight infrastructure. The strategy identifies future infrastructure requirements of Australia's ports, including road and rail links, to meet future demand, of which Inland Rail would form a part, by connecting key production areas in Queensland, NSW and Victoria with export ports in Brisbane and Melbourne.
Newell Highway Corridor Strategy (Department of Infrastructure Transport, Cities and Regional Development, 2019)	This strategy provides a 10-year roadmap of investment opportunities to ensure the Newell Highway Corridor continues to serve the needs of its users in the longer term. Of particular importance, is the interdependency of the corridor with the Inland Rail program, and how road and rail will work together to meet the growing freight demand and reduce costs for regional supply chains. The strategy identifies a holistic, multimodal view of freight transport that leverages the strengths of each mode (road and rail) as a key consideration for enhancing the overall efficiency of Australia's transport networks.

Policy	Relevance to the proposal
Regions 2030: Unlocking Opportunity (Department of Infrastructure, Transport, Regional Development and Communications, 2017).	This report sets out the Government's vision and future directions for regional Australia towards 2030, with activity to be focused across five key areas including infrastructure. The report identifies high-quality, safe and efficient transportation as a key to regional Australia's connectivity and productivity, and identifies Inland Rail as a key investment initiative to connect the region to major global and domestic markets.
State	
State Priorities: NSW Making it Happen (NSW Government, 2015)	The NSW State Priorities were announced to guide the ongoing actions of the NSW Government across the state, and guide resource allocation and investment in conjunction with the NSW Budget. Inland Rail particularly supports the priority of building a strong economy by creating jobs and increasing connectivity of regional markets.
NSW Road Safety Strategy 2012–2021 (Transport for NSW (TfNSW)`, 2012)	This strategy sets the direction for road safety in NSW for the next 10 years. The strategy notes that heavy trucks are often involved in serious road accidents in NSW. While they represent only 2.2 per cent of registered motor vehicles and 7 per cent of all motor vehicle travel, heavy trucks were involved in 17 per cent of fatalities on NSW roads. Nearly 30 per cent of fatal heavy vehicle crashes involved heavy vehicles from interstate. The proposal contributes to the strategy as it aims to improve road safety by moving freight from road to rail.
State Infrastructure Strategy 2018–2038 (NSW Government, 2018a)	This is a 20-year strategy that identifies and prioritises the delivery of critical public infrastructure to drive productivity and economic growth. The 2018 strategy switches the focus from preceding years of developing an infrastructure project pipeline to achieving sustainable growth in NSW. The strategy acknowledges that Inland Rail would benefit the state's primary industries by optimising the movement of freight in regional NSW to ports and gateways in NSW, Queensland and Victoria. Inland Rail would also reallocate road space in key corridors to more sustainable transport modes.
NSW Freight and Ports Plan 2018–2023 (NSW Government, 2018b)	This plan is a call to action for government and industry to work together to make our freight system more efficient, more accessible, safer and more sustainable for the benefit of producers, operators, customers and communities across NSW. One of the goals of the plan is to improve rail freight access and flows, with a key action to support the delivery of Inland Rail to ensure the project optimises the movement of freight in regional NSW, and to ports and gateways.
NSW Future Transport Strategy 2056 (TfNSW, 2018a)	This strategy is an update to the 2012 NSW Long Term Transport Master Plan, which guides NSW service and infrastructure investments. Inland Rail is identified in the Future Transport Strategy as a committed initiative for the next 10 years. The strategy identifies Inland Rail as an opportunity to provide for improved movements of freight to ports, and provide relief for the coastal road and rail networks.
Regional	
Central West and Orana Regional Plan (Department of Planning, Industry and Environment (DPIE), 2017)	The plan establishes a 20-year blueprint to grow the region's diverse and competitive economy and guide land-use planning priorities and decisions. The Inland Rail program contributes to achieving one of the goals of the plan, which is quality freight transport and infrastructure networks. Inland Rail would achieve this by improving freight connections to markets and global gateways of Melbourne and Brisbane, and through enhancing freight rail links.
Mid-Lachlan Regional Economic Development Strategy 2018–2022 (NSW Government, 2018d)	This strategy identifies economic development opportunities that capitalise on the existing competitive advantages of the region, in agriculture, mining and tourism. The Inland Rail program supports the improvement in access to markets for agriculture, mining and manufacturing by investing in intermodal network resilience and reliability. In addition, the Inland Rail program provides support to tourism opportunities by encouraging a shift from road to rail freight—improving congestion, safety and local amenity.
Forbes Community Strategic Plan 2018–2028 (Forbes Shire Council, 2018).	The Community Strategy Plan provides Council, the community and other stakeholders with priority issues to address and goals for achievement in the longer term in the Forbes Local Government Area (LGA). One of the strategies to improve the economy is to leverage the Parkes intermodal hub and Inland Rail projects to foster economic growth within the Shire.
Community Strategic Plan Weddin 2026 (Weddin Shire Council, 2017)	The plan sets out the priorities for the Weddin Shire Council area and identifies key projects and policies. One of the strategies of the plan is to develop a strong, diverse and resilient local economy, which involves ensuring essential infrastructure and services to support business activity are available. Investment in Inland Rail would support jobs and businesses in the region and would result in a freight rail network with increase capacity.
Hilltops Community Strategic Plan 2030 (Hilltops Shire Council, 2017)	This plan identifies the main priorities and aspirations for the future of the Hilltops community and identifies the strategies for achieving these. One of the pillars of the plan is to strengthen the region's connectivity, which includes improving and aligning key freight linkages towards growing industry demand. Inland Rail would support this goal by increasing freight capacity on the rail network in the region.

2.11.4 Need for the proposal

The proposal forms an integral part of the wider Inland Rail program, alongside other enhancement works, at discrete sites along the rail corridor between Stockinbingal and Parkes. The proposal improves horizontal clearances at six sites to enable trains with double-stacked containers to pass safely along the existing track.

2.11.5 Options considered

2.11.5.1 Alternative Inland Rail options

Alternative freight transport solutions with the potential to address Australia's current and future freight challenges were considered as part of a strategic options assessment set out in the *Inland Rail Program Business Case* (ARTC, 2015) and examined in the *Inland Rail Implementation Group Report* (2015).

The options assessed included:

- Reforms to delay or remove the need for infrastructure investment (relating to demand management, productivity enhancement or deregulation)
- Progressive road upgrades (continued investment in the national highway network in the north–south corridor to increase lane capacity)
- Upgrading the existing east coast railway, including investing in track duplication and passing loops to expand capacity
- Construction of an inland railway between Melbourne and Brisbane, bypassing Sydney.

Not developing Inland Rail would result in continued growth in the use of road for freight transport between Melbourne and Brisbane, particularly along the Newell Highway. In addition, road transport alone will be unlikely to meet the longer term needs of Australia's freight task unless substantial additional investment is made (ARTC, 2015).

2.11.5.2 Proposal options considered

An options assessment report was completed in February 2021 for the Stockinbingal to Forbes project. The report identified options to address the insufficient horizontal clearance of the six sites and meet the objectives of the proposal outlined in Section 1.3.1. A 'do nothing' option was considered but, as the proposal is needed to support the development of Inland Rail, this option was not progressed. The design options considered to meet the objectives of the proposal are outlined in Table 2.10.

TABLE 2.10 OPTIONS CONSIDERED FOR THE PROPOSAL

Site	Option ID	Description
Forbes Station and Yard	1 (selected)	Modify platform awning and realignment of the main line adjacent to the goods siding
	2	Realignment of the main line at the station and around the goods siding including relocation of a turnout
Wirrinya Yard	1 (selected)	Realignment of the loop and grain loop lines
	2	Realignment of the main line
Caragabal Yard	1 (selected)	Realignment of the main line
	2	Realignment of the loop line
Quandialla Yard	1 (selected)	Removal or minor work to the water tank
	2	Realignment of the main line at tank
Bribbaree Yard	1 (selected)	Realignment of the main line
	2	Realignment of the loop line
Milvale Yard	1 (selected)	Removal or minor work to the water tank
	2	Realignment of the main line around the existing water tank

Each of these options met the objectives of the proposal and were assessed using Inland Rail's program-wide multi-criteria analysis (MCA). The MCA process is a robust methodology recognised as an industry standard. It has been widely used in Australia and internationally, including being consistently applied across multiple Inland Rail projects. The purpose of the MCA is to assess each option against a set of cost- and non-cost criteria, including technical viability; safety; constructability and scheduling; environmental impacts; community and property impacts; operational approach; and stakeholder engagement.

The MCA process involves ARTC review and stakeholder engagement, including an options assessment workshop. The assessment and identification of the preferred option are presented in an options assessment report for the proposal (WSP, 2021a).

Forbes Station and Yard—preferred option

Option 1 to modify the platform awning and realign the main line was selected as the preferred option. Option 1 provided the following superior outcomes:

- No requirement for a larger curve into the mainline or relocation of the turnout (mechanical device to guide trains from one track to another), which would add complexity to the operation of the track in this location
- Shorter construction duration resulting in reduced construction impacts to the surrounding community (including traffic movements)
- Less materials and earthworks required as the track realignment is smaller
- The distance between the mainline and station platform would be maintained, preserving the potential for future passenger use of the station.

It was noted that while both options would require heritage approval (due to the location in the state heritage curtilage), the modification of the station awning (Option 1) presented a greater risk to the overall delivery program of the project, due to the heritage approvals required for the works, and this was considered as part of the MCA.

A cost comparison of the works, excluding realignment of the main line track alongside the siding, concluded that Option 2 (costed at around $1.8 million) would be significantly more expensive than Option 1 (costed at around $210,000).

Wirrinya Yard—preferred option

Option 1 was selected because the straight alignment of the main line is maintained, which avoids greater impacts to track operations.

Caragabal Yard—preferred option

Both options considered involved minor realignment of tracks and no earthworks. Option 1 was selected as it allows the track alignment of the mainline to be improved.

Bribbaree Yard—preferred option

Option 1 was selected as it only requires a small realignment of the track and provides the opportunity to improve sections of track formation that are currently inadequate.

Quandialla Yard and Milvale Yard—preferred options

Minor work to the water tank was selected as the preferred option at both Milvale Yard and Quandialla Yard. The water tanks were not in use and are not planned to be brought into use. By avoiding realignment of the track around these tanks, which would use more resources and require ground disturbance at each site, environmental, constructability and financial impacts are minimised. Though the Milvale Yard water tank is locally heritage listed, the impacts to the tank structure were considered minor (non-Aboriginal heritage assessment is provided in Section 5.2).

3. Statutory Requirements

3.1 Commonwealth legislation

3.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) is the primary Commonwealth environmental legislation and is administered by the Department of Agriculture, Water and the Environment (DAWE). It provides the legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places defined under the Act as matters of national environmental significance (MNES).

The EPBC Act requires that proposed 'actions' that the proponent believes will, or may be likely to, significantly impact MNES, the environment of Commonwealth land, or the environment generally, if they are being carried out by an Australian Government agency, that must be referred to the Australian Minister for the Environment for assessment. If the Minister determines that a referred project is likely to have such an impact, then the project is a 'controlled action' under the EPBC Act, and the approval of the Minister would be required.

The Protected Matters Search Tool (PMST) was used on 26 April 2021 to search for and identify the protected matters recorded under the EPBC Act within a 10-km radius of the proposal sites. This information, together with site inspections and surveys, was used to assess whether the proposal will have, or is likely to have, a significant impact on MNES or on Commonwealth land, as outlined in Section 6.3. No MNES are likely to be impacted by the proposal, nor is there likely to be a significant impact on the environment generally or the environment on Commonwealth land; however, the proposal will be referred to the Australian Minister for the Environment for assessment to confirm that approval under the EPC Act is not required.

3.1.2 Native Title Act 1993

The *Native Title Act 1993* (Cth) (Native Title Act) recognises that Aboriginal people have rights and interests to land and water, which derive from their traditional laws and customs. Native title may be recognised in places where Aboriginal people continue to follow their traditional laws and customs, and have maintained a link with their traditional Country.

Native title is managed though native title claims, Indigenous land use agreements (ILUA) or future Act agreements. An ILUA (once registered on the Register of Indigenous Land Use Agreements) is a formal, binding agreement, negotiated between native title groups and other parties who use or manage the land and waters resources.

The National Native Title Tribunal Register, Register of Native Title Claims, Unregistered Claimant Applications Register, and Register of ILUA were searched on 14 April 2021 for reported native title claimants in the Weddin, Hilltops or Forbes LGAs. No native titles, native title claims or ILUAs were identified for those LGAs.

3.2 New South Wales legislation

3.2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) provides the framework for assessment of environmental impacts, and development consent and approval of activities and infrastructure in NSW. Division 5.1 of the EP&A Act applies to activities that do not require development consent.

Clause 79 of the State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) (discussed further below) states that development for the purpose of a 'railway or rail infrastructure facilities', which would include the proposal, can be undertaken by, or on behalf of, a public authority without development consent.

ARTC is identified as a 'public authority' under Clause 5 of ISEPP. In addition, clause 277 of the EP&A Regulation prescribes ARTC as a 'public authority' so as to make it a 'determining authority' for specified development for rail infrastructure, which is permissible without development consent.

Notwithstanding, Section 5.5 of the EP&A Act requires ARTC as a determining authority to examine and take into account, to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

If an activity is 'likely to significantly affect the environment (including critical habitat) or threatened species, populations or ecological communities, or their habitats', as defined in Section 5.7 of the EP&A Act, further assessment such as a Species Impact Statement (SIS) or EIS may be required. If an EIS were to be required, then the proposal would become State significant infrastructure (SSI) and the approval of the NSW Minister for Planning and Public Spaces would be required under Division 5.2 of the EP&A Act.

An assessment of the proposal, having regard to Clause 228 factors under the EP&A Regulation, is included in Chapter 6. The assessment concludes that the proposal would not have a significant impact on the environment, threatened species, populations or ecological communities, or their habitats, and therefore should be assessed under Division 5.1 of the EP&A Act.

ARTC is required, under Part 14 Division 8 of the EP&A Regulation, to assess development that is subject to Division 5.1 of the EP&A Act, in accordance with the code of practice approved by the Planning Minister under that Division. ARTC's Code of Practice for Environmental Impact Assessment of Development Proposals in NSW was approved by the Minister in 2005. The proposal has been assessed in this REF in accordance with that Code.

3.2.2 Protection of the Environment Operations Act 1997

The underlying objective of the *Protection of the Environment Operations Act 1997* (NSW) (POEO Act) is to reduce pollution, and manage the storage, treatment and disposal of waste in NSW. The POEO Act establishes the procedures for issuing licences for environmental protection on aspects such as waste, air, water and noise pollution control, and outlines the required notification.

Section 48 of the POEO Act requires that the occupier of premises at which a 'scheduled activity' (i.e. an activity specified in Schedule 1 of the POEO Act) is being carried out must hold an environment protection licence (EPL) for that activity. Schedule 1 of the POEO Act specifies three rail infrastructure related scheduled activities:

- Railway infrastructure construction
- Railway infrastructure operations
- Rollingstock operations.

The existing rail corridor on which the proposal is to be carried out is owned by the NSW government and leased to ARTC. ARTC currently holds EPL3142 for 'railway infrastructure operations' for that rail corridor and other corridors in the ARTC NSW rail network. The proposal will not trigger the need for a separate EPL for 'railway infrastructure construction' as the proposal does not meet the definition under Clause 33 of Schedule 1 to the POEO Act. The proposal would be carried out as a railway maintenance activity in accordance with EPL 3142, where applicable.

3.2.3 Other key legislation

Table 3.1 provides a summary of other key NSW legislation that may be applicable to the proposal.

TABLE 3.1 OTHER KEY STATE LEGISLATION

Legislation	Objective of Legislation	Relevance to the proposal
Aboriginal Land Rights Act 1983 (NSW)	The purposes of this Act are to provide land rights for Aboriginal persons and representative Aboriginal Land Councils in NSW. Clause 36 of the Act identifies claimable Crown land on which a claim for land on its own behalf, or on behalf of one or more Local Aboriginal Land Council (LALC), can be made.	The proposal does not include permanent acquisition of any land (Section 5.10.4). The Act does not apply to the proposal.
Biodiversity Conservation Act 2016 (NSW) (BC Act)	The BC Act provides for a strategic approach to conservation in NSW, while supporting improved farm productivity and sustainable development. It includes provisions for a risk-based assessment of native plant and animal impacts, and a Biodiversity Assessment Method (BAM) to assess the impact of actions on threatened species, threatened ecological communities and their habitats, and the impact on biodiversity values. The BC Act sets out the assessment framework for threatened species and ecological communities for activities subject to assessment under the EP&A Act and, as part of this, provides a scheme for offsetting impacts of development, including via the acquisition of offset credits.	The provisions of the BC Act have been considered as part of the Biodiversity Assessment Report (Appendix D) and assessment of biodiversity impacts in Section 5.1. The assessment concludes that the proposal would not have a significant impact on biodiversity.

Legislation	Objective of Legislation	Relevance to the proposal
Biosecurity Act 2015 (NSW) (Biosecurity Act)	The Biosecurity Act aims to manage diseases and pests that may cause harm to human, animal or plant health, or the environment. The Act provides the regulatory controls and powers to manage noxious weeds in NSW and introduces the legally enforceable concept of a General Biosecurity Duty. A Regional Weed Committee has been established in each region in NSW, and each committee has developed a Regional Strategic Weed Management Plan, which provides the framework for weed management within the region.	The provisions of the Biosecurity Act have been considered as part of the assessment of biodiversity impacts in Section 5.1.
Contaminated Land Management Act 1997 (NSW) (CLM Act)	The CLM Act establishes the process for investigating and, where required, the remediation of contaminated lands that pose a risk to human health and the environment.	Considerations of the provisions and requirements of the CLM Act are provided in Section 5.7.
Dangerous Goods (Road and Rail Transport) Act 2008 (NSW)	The Act regulates to the transport of substances that can harm people, property and the environment. It provides the EPA with assessment control mechanisms for chemicals and chemical waste.	Dangerous goods would be transported via the rail corridor during operation of the rail corridor (Section 5.10.5). Inland Rail would be operated in accordance with this Act.
Heritage Act 1977 (NSW)	The purpose of this Act is to conserve environmental heritage, which includes places, buildings, work, relics, movable objects and precincts of state or local heritage significance. Natural, cultural and built heritage is protected under this Act and it is an offence to harm a protected item. Among other things, the Act provides the listing of state heritage places and items, requirements for approval to harm any listed places or items, requirements for a permit to harm any relics, and obligations for various government instrumentalities (including ARTC) to maintain their own heritage registers and manage items on those registers.	The proposal involves works to two heritage-listed items: ▸ Forbes station (state and locally listed) ▸ Milvale water tank (locally listed and ARTC s170 register). The impacts to these items are considered in Section 5.2 and assessed further in Appendix F and Appendix G. As works are proposed to a state heritage-listed item (Forbes Station), approval under Section 60 of this Act is required.
National Parks and Wildlife Act 1974 (NSW) (NPW Act)	The NPW Act provides for the control and management of all national parks, historic sites, nature reserves, wetlands and other state reserves. It also provides for the protection of 'Aboriginal objects' and 'Aboriginal places'. Under the NPW Act it is an offence to harm threatened species, damage critical habitat, or damage the habitat of a threatened species without the issuing of a section 120 licence. Section 86 of the Act lists offences relating to the harming or desecrating of Aboriginal objects. If any identified 'Aboriginal object' or 'Aboriginal place' may be harmed in the course of the proposal, an approval under sections 87(1) and 90(2) of the NPW Act will be required.	Considerations of the provisions and requirements of the NPW Act are provided in: ▸ The assessment of Aboriginal heritage in Section 5.10.2 ▸ The Aboriginal Due Diligence Report (Appendix H) ▸ The assessment of land use and property in Section 5.10.4.
Native Title Act 1994 (NSW)	This Act sets the obligations from the Commonwealth *Native Title Act* into state law. Part 3 of the Native Title Act conforms state ownership of all natural resources, rights to use, control and regulation of the flow of water, existing fishing access rights under state law; as well as existing public access to and enjoyment of waterways, coastal waters, beaches and areas that were public places.	The desktop assessment found there are currently no registered native title claims, current or proposed agreements, or ILUAs applicable to the proposal sites. Native title claims are further discussed in Section 5.10.4.
Roads Act 1993 (NSW) (Roads Act)	Section 138 of the Roads Act requires consent to be obtained prior to disturbing or undertaking work in, on or over a public road or connecting another road to a public road. Clause 5(1) of Schedule 2 of the Roads Act exempts public authorities for this requirement, except in relation to work on or over classified and Crown roads, but that exception does not apply to ARTC.	The proposal does not involve works on or over any roads as discussed in Section 5.8.

Legislation	Objective of Legislation	Relevance to the proposal
Water Management Act 2000 (NSW) (WM Act) and *Water Act 1912* (NSW) (Water Act)	The WM Act and Water Act control the extraction and use of water, the construction of works, such as dams and weirs, and the carrying out of activities in or near waterways in NSW. The provisions of the WM Act are being progressively implemented to replace the Water Act. Sections 89 and 91, respectively, of the WM Act require persons to obtain water use approvals for extraction of water from specified sources and to carry out specified controlled activity at a specified location in or under waterfront land. Waterfront land is defined as within 40 m of both sides of a river, lake or estuary. Works requiring approval under the Act include construction, vegetation removal, deposition of material or any other works that may affect the flow of the water within the watercourse.	As the proposal is not located in or within 40 m of a watercourse, and extraction from bores and waterways is not proposed, the proposal would not require approval under the WM Act and Water Act. Assessment of water impact is provided in Section 5.4.
Waste Avoidance and Recovery Act 2001 (WARR Act)	The WARR Act is aimed at minimising the consumption of waste resources and to control the management and disposal of any waste materials onsite. It promotes the waste hierarchy to avoid resource consumption and implement resource recovery in the form of material reuse and recycling in preference to waste disposal. The WARR Act acknowledges that certain material present either human or environmental risk; requiring classification, treatment and disposal in accordance with specific waste management provisions.	The proposal would generate waste during the construction phase, as discussed in Section 5.5. Requirements of this Act, including the waste management hierarchy, will therefore be applicable to the proposal. The principles of the waste management hierarchy and other relevant waste management requirements would be implemented onsite.

3.3 Environmental planning instruments

3.3.1 State Environmental Planning Policy (Infrastructure) 2007

The ISEPP guides the delivery of key infrastructure development across the state, including rail infrastructure facilities.

Clause 79(1) permits development for the purpose of a 'railway or rail infrastructure facilities' to be carried out on any land by or on behalf of a public authority without development consent.

Clause 78(1)(a) defines 'rail infrastructure facilities' to include 'railway tracks, associated track structures, cuttings, drainage systems, fences, tunnels, ventilation shafts, emergency access ways, bridges, embankments, level crossings and roads, pedestrian and cycleway facilities'.

As ARTC is a public authority for these provisions, and as the proposal falls under the definition of 'rail infrastructure facilities' and will be carried out by a public authority, development consent is not required.

Part 2 of the ISEPP contains provisions for public authorities to consult with local council and other NSW Government agencies prior to the commencement of certain types of development. Chapter 4 of the REF discusses the consultation undertaken with Forbes Shire Council, Weddin Council and Hilltops Council, and other relevant public authorities.

3.3.2 State Environmental Planning Policy (State and Regional Development) 2011

The *State Environmental Planning Policy (State and Regional Development) 2011* provides details of projects that will be considered State significant infrastructure (SSI) and critical SSI. Schedule 3 of the SEPP specifies that for development for the purpose of rail infrastructure to be considered SSI, it must have a Capital Investment Value (CIV) of more than $50 million.

ARTC projects that are above $50 million in value and are 'development without consent', for the purpose of Division 5.1 of the EP&A Act, would conform to the definition of SSI.

As the proposal has a CIV below $50 million and is unlikely to have a significant impact on the environment, it is not considered SSI; therefore, the proposal has been assessed under Division 5.1 of the EP&A Act.

3.3.3 Other applicable SEPPs

Table 3.2 provides a summary of other relevant SEPPs considered for the proposal.

TABLE 3.2 CONSIDERATION OF OTHER SEPPS

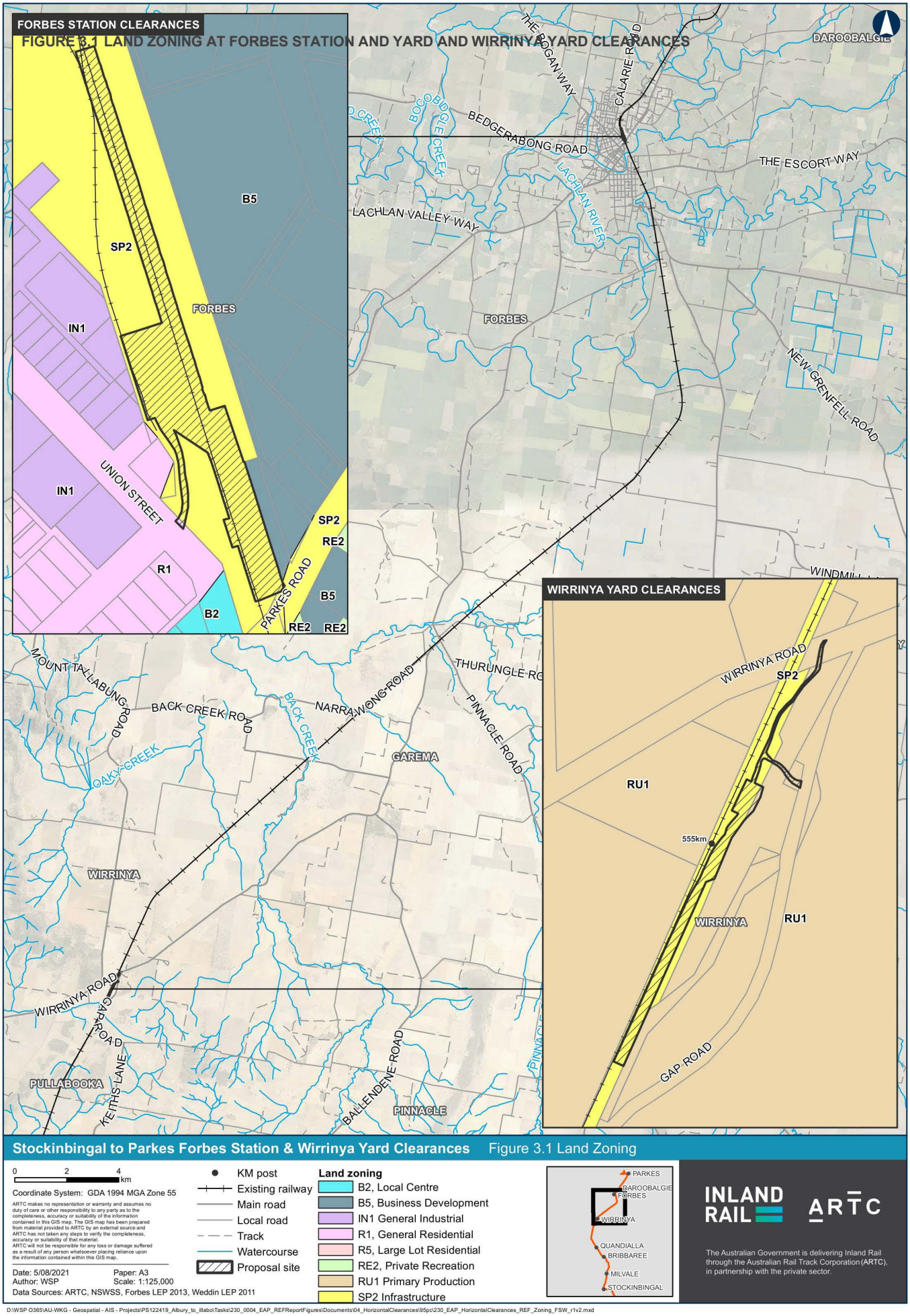
SEPP	Objective/Aims	Relevance to the Proposal
SEPP (Koala Habitat Protection) 2020 and 2021	The SEPP aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas, to support a permanent free-living population over their present range and reverse the current trend of koala population decline. The principles of the SEPP are to: ▸ Help reverse the decline of koala populations by ensuring koala habitat is properly considered during the development assessment process ▸ Provide a process for councils to strategically manage koala habitat through the development of koala management plans.	The Koala Habitat Protection SEPP reinstates the policy framework of SEPP Koala Habitat Protection 2020 to specific LGAs. For the Forbes, Weddin and Hilltops LGA, the Koala SEPP 2021 does not apply to land zoned RU1, RU2 or RU3; therefore, Koala SEPP 2020 continues to apply. In accordance with ISEPP, the proposal is permissible without consent and can be assessed under Division 5.1 of the EP&A Act. Subsequently, the Koala Habitat Protection SEPP 2020 and 2021 are not applicable to the proposal as they are relevant to development applications. Notwithstanding, an assessment of potential impacts to biodiversity from the proposal has been considered.
SEPP 55—Remediation of land	The objective of this policy is to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment.	Clause 7 requires authorities to consider whether land proposed for development is contaminated, and whether it is suitable (or can be made suitable) for development. Land contamination is assessed in Section 5.7.

3.3.4 Local Environmental Plans

The proposal is in the Forbes Shire, Weddin and Hilltops LGAs and on land zoned as shown in Table 3.3. In accordance with ISEPP, local planning provisions do not apply where they impose controls that are inconsistent with the ISEPP; however, the Local Environmental Plan (LEP) is still relevant in identifying land-use objectives, potential land-use impacts and planning policy conflicts. No changes to land use are proposed.

TABLE 3.3 LAND ZONING AT EACH SITE

Site	Land Zoning	Applicable LEP
Forbes Station and Yard	SP2—Infrastructure (Railway)	Forbes Local Environmental Plan 2013 (Forbes LEP)
Wirrinya Yard	SP2—Infrastructure (Railway) RU1—Primary Production	Forbes LEP
Caragabal Yard	SP2—Infrastructure (Railway) RU1—Primary Production	Weddin Local Environmental Plan 2011 (Weddin LEP)
Quandialla Yard	SP2—Infrastructure (Railway)	Weddin LEP
Bribbaree Yard	SP2—Infrastructure (Railway) RU5—Village	Weddin LEP Young Local Environmental Plan 2010 (Young LEP)
Milvale Yard	RU1—Primary Production	Young LEP


FORBES STATION CLEARANCES
FIGURE 3.1 LAND ZONING AT FORBES STATION AND YARD AND WIRRINYA YARD CLEARANCES
WIRRINYA YARD CLEARANCES
B5
SP2
FORBES
IN1
IN1
UNION STREET
SP2
RE2
R1
B2
PARKES ROAD
B5
RE2
RE2
THE BOGAN WAY
CALARIE ROAD
DAROOBALGIE
BEDGERABONG ROAD
BODGIE CREEK
LACHLAN RIVER
THE ESCORT WAY
LACHLAN VALLEY WAY
FORBES
NEW GRENFELL ROAD
MOUNT TALLABUNG ROAD
BACK CREEK ROAD
BACK CREEK
NARRAWONG ROAD
OAKY CREEK
GAREMA
PINNACLE ROAD
WIRRINYA
WIRRINYA ROAD
GAP ROAD
PULLABOOKA
KEITHS LANE
BALLENDENE ROAD
PINNACLE
WIRRINYA ROAD
SP2
RU1
555km
WIRRINYA
RU1
GAP ROAD
Stockinbingal to Parkes Forbes Station & Wirrinya Yard Clearances
Figure 3.1 Land Zoning
0 2 4 km
Coordinate System: GDA 1994 MGA Zone 55
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Date: 5/08/2021
Paper: A3
Author: WSP
Scale: 1:125,000
Data Sources: ARTC, NSWSS, Forbes LEP 2013, Weddin LEP 2011
KM post
Existing railway
Main road
Local road
Track
Watercourse
Proposal site
Land zoning
B2, Local Centre
B5, Business Development
IN1 General Industrial
R1, General Residential
R5, Large Lot Residential
RE2, Private Recreation
RU1 Primary Production
SP2 Infrastructure
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
INLAND RAIL
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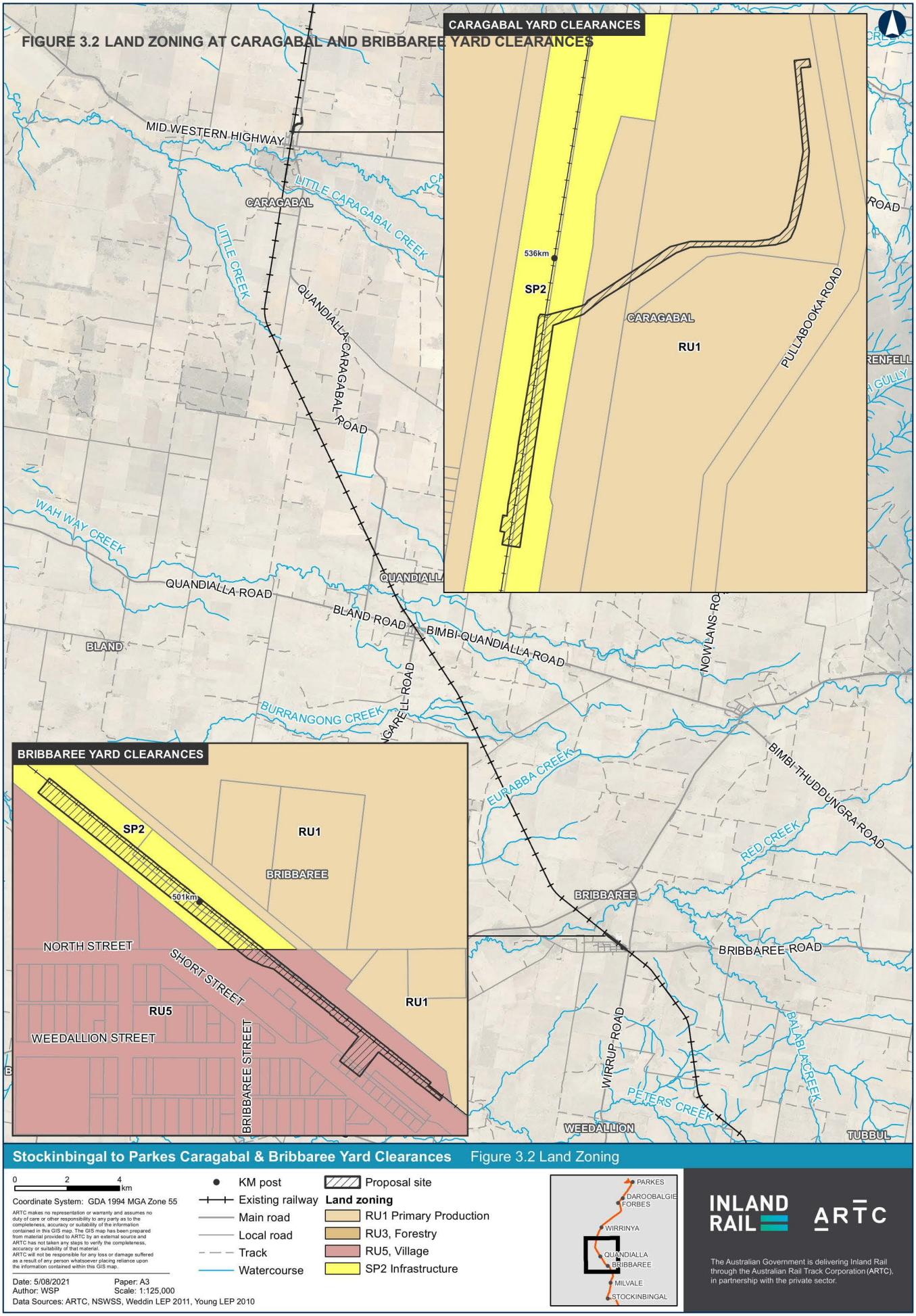
FIGURE 3.2 LAND ZONING AT CARAGABAL AND BRIBBAREE YARD CLEARANCES
CARAGABAL YARD CLEARANCES
BRIBBAREE YARD CLEARANCES
MID WESTERN HIGHWAY
CARAGABAL
LITTLE CARAGABAL CREEK
LITTLE CREEK
QUANDIALLA-CARAGABAL ROAD
536km
SP2
RU1
PULLABOOKA ROAD
WAH WAY CREEK
QUANDIALLA ROAD
BLAND ROAD
BIMBI-QUANDIALLA ROAD
BLAND
BURRANGONG CREEK
NOWLANS RO
EURABBA CREEK
BIMBI-THUDDUNGRA ROAD
RED CREEK
BRIBBAREE
BRIBBAREE ROAD
501km
NORTH STREET
SHORT STREET
RU5
WEEDALLION STREET
BRIBBAREE STREET
WIRRUP ROAD
BALABLA CREEK
PETERS CREEK
WEEDALLION
TUBBUL
Stockinbingal to Parkes Caragabal & Bribbaree Yard Clearances
Figure 3.2 Land Zoning
0 2 4 km
Coordinate System: GDA 1994 MGA Zone 55
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Date: 5/08/2021
Paper: A3
Author: WSP
Scale: 1:125,000
Data Sources: ARTC, NSWSS, Weddin LEP 2011, Young LEP 2010
KM post
Existing railway
Main road
Local road
Track
Watercourse
Proposal site
Land zoning
RU1 Primary Production
RU3, Forestry
RU5, Village
SP2 Infrastructure
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
INLAND RAIL
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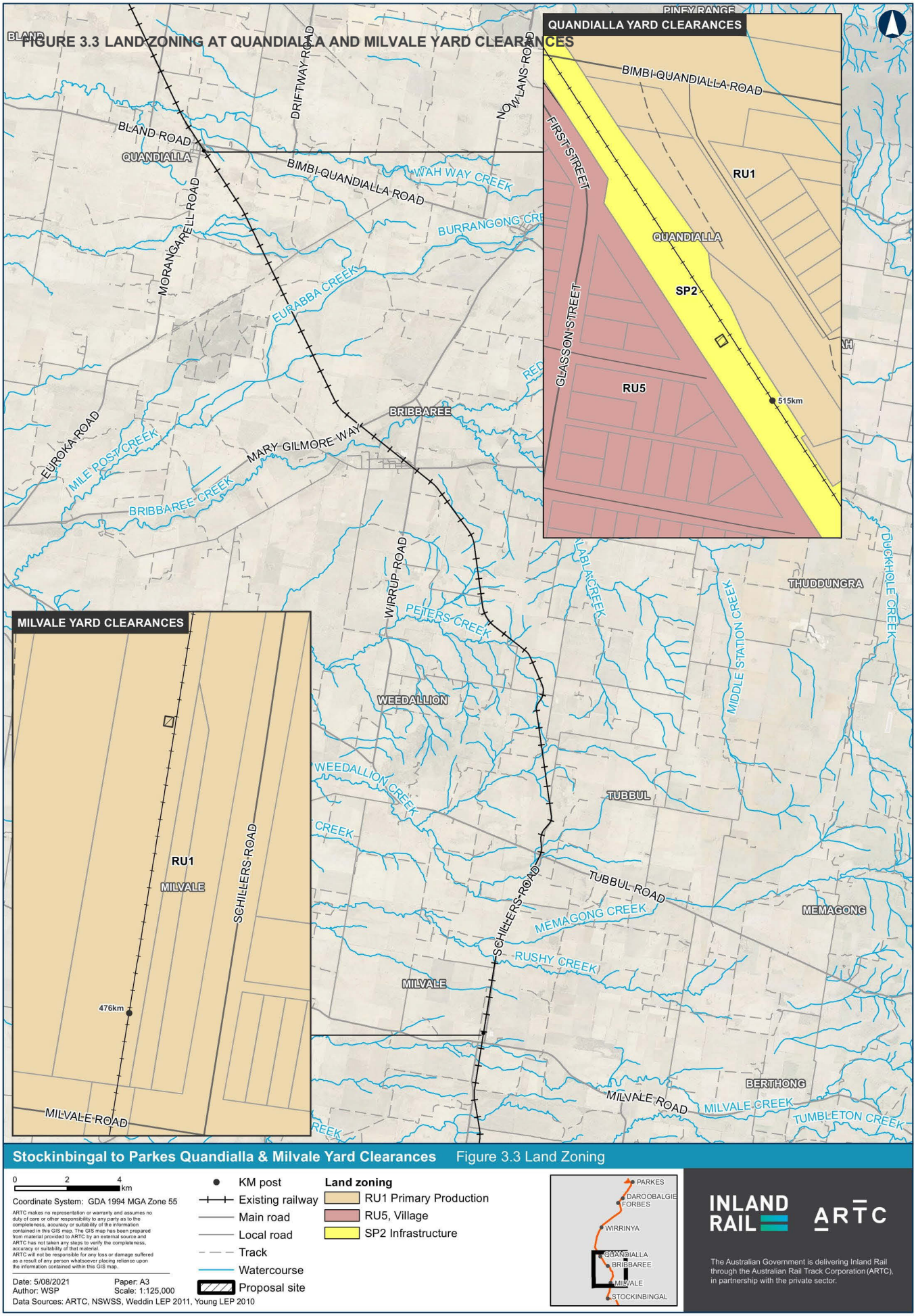
FIGURE 3.3 LAND ZONING AT QUANDIALLA AND MILVALE YARD CLEARANCES
QUANDIALLA YARD CLEARANCES
MILVALE YARD CLEARANCES
BLAND
BLAND ROAD
QUANDIALLA
DRIFTWAY ROAD
NOWLANS ROAD
BIMBI-QUANDIALLA ROAD
WAH WAY CREEK
BURRANGONG CRE
MORANGARELL ROAD
EURABBA CREEK
EUROKA ROAD
MILE POST CREEK
BRIBBAREE
MARY GILMORE WAY
BRIBBAREE CREEK
WIRRUP ROAD
PEIERS CREEK
WEEDALLION
WEEDALLION CREEK
CREEK
TUBBUL
TUBBUL ROAD
SCHILLERS ROAD
MEMAGONG CREEK
MEMAGONG
RUSHY CREEK
MILVALE
MILVALE ROAD
MILVALE CREEK
TUMBLETON CREEK
BERTHONG
THUDDUNGRA
DUCKHOLE CREEK
MIDDLE STATION CREEK
PINEY RANGE
BIMBI-QUANDIALLA ROAD
FIRST STREET
GLASSON STREET
RU1
QUANDIALLA
SP2
RU5
515km
476km
Stockinbingal to Parkes Quandialla & Milvale Yard Clearances
Figure 3.3 Land Zoning
0 2 4 km
Coordinate System: GDA 1994 MGA Zone 55
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Date: 5/08/2021
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KM post
Existing railway
Main road
Local road
Track
Watercourse
Proposal site
Land zoning
RU1 Primary Production
RU5, Village
SP2 Infrastructure
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
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3.4 Licences and permits

The proposal would require the following licences and permits prior to construction:

- EPL 3142
- Section 60 heritage approval under the Heritage Act for works on Forbes Station
- Rail possession authority issued by ARTC.

3.5 Confirmation of statutory position

Pursuant to the provisions of ISEPP, the proposal does not require development consent and is assessable under Division 5.1 of the EP&A Act. ARTC is the proponent and the determining authority for the proposal.

The proposal is not considered likely to significantly affect the environment; therefore, an EIS or SIS is not required.

This REF fulfils ARTC's obligation under Division 5.1 of the EP&A Act to 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 proposal is not likely to have a significant impact on MNES or Commonwealth land, nor is it likely to significantly affect any Commonwealth or NSW-listed threatened species, populations or ecological communities, or their habitats; however, the proposal will be referred to the Australian Minister for the Environment for assessment to confirm the proposal is not a 'controlled action'.

4. Community and Stakeholder Consultation

4.1 Introduction

This chapter is a summary of the community and stakeholder consultation undertaken for the proposal. It includes details of the approach and objectives, consultation processes and activities, as well as community and stakeholder consultation undertaken to date. It also outlines future consultation activities and details of complaints management procedures.

4.2 Objectives and approach

ARTC is committed to engaging with local communities in an open and collaborative manner, guided by International Association for Public Participation (IAP2) core principals.

ARTC's objectives for consultation aims to:

- Inform community members and key stakeholders of the project
- Provide a process for feedback to be considered within the project design
- Ensure a stringent record-keeping process for stakeholder and community interactions
- Strengthen proposal trust by being transparent around issues that may have the greatest impact
- Consider potential risks and issues, to ensure we work with the local community to achieve the best possible outcomes.

4.3 Stakeholder identification

A stakeholder is defined as any individual, group of individuals, organisation, or political entity with an interest in the outcome of a decision. They may be, or perceive that they may be, directly or indirectly affected by the outcome of a decision (IAP2, 2018). Using a desktop search and field visits, Inland Rail identified stakeholders directly impacted by, and adjacent to, the proposal as well as stakeholder groups in the wider community likely to have an interest in the construction and operation of the proposal. The key stakeholders for Inland Rail include:

- Elected members of the parliaments of NSW and Australia
- Local councils
- Local business and industry
- Government agencies

- Landholders, residents and communities with the potential to be directly or indirectly impacted by the proposal
- Community and environment groups
- Traditional Owners
- Utility providers
- Representatives of neighbouring and related projects
- Local heritage committees and historical societies.

4.4 Consultation process and activities

Stakeholder consultation and community engagement has been an important part of the planning process to date. Initial stakeholder and community engagement for the proposal commenced in 2016.

4.4.1 Engagement approach

An Engagement Implementation Plan (EIP) has been developed for the S2P section, which includes the proposal. The aim of the EIP is to identify key stakeholders and inform the engagement with these stakeholders, including local councils, state government agencies, Aboriginal communities and local communities. The EIP guides the timing of consultation and helps establish opportunities for stakeholders to provide feedback at timely junctures during planning and construction phases. Consultation will continue on a regular basis as guided by this plan and a summary of consultation activities to date is detailed in Section 4.4.4 and Section 4.5.1.

4.4.2 Infrastructure SEPP Consultation

The ISEPP contains provisions for public authorities, such as ARTC to consult with local councils and other government agencies prior to the commencement of development that would cause a disruption to relevant infrastructure. ARTC must take into consideration any responses received within 21 days of notification. Table 4.1 contains a checklist that details triggers for consultation in accordance with clauses 13–16 of ISEPP.

TABLE 4.1 SUMMARY OF INFRASTRUCTURE SEPP CONSULTATION

Infrastructure SEPP clauses 13–16	Accountable agency or council	Impacts of the proposal on Infrastructure SEPP clause
Are the works likely to have a substantial impact on the stormwater management services that are provided by council?	Forbes Shire Council Hilltops Council Weddin Council	No
Are the works likely to generate traffic to an extent that will strain the existing road system in a LGA?	Forbes Shire Council Hilltops Council Weddin Council	No
Will the works involve connection to a council-owned sewerage system? If so, will this connection have a substantial impact on the capacity of the system?	Forbes Shire Council Hilltops Council Weddin Council	No
Will the works involve connection to a council-owned water supply system? If so, will this require the use of a substantial volume of water?	Forbes Shire Council Hilltops Council Weddin Council	No
Will the works involve the installation of a temporary structure on, or the enclosing of, a public place that is under local council management or control? If so, will this cause more than a minor or inconsequential disruption to pedestrian or vehicular flow?	Forbes Shire Council Hilltops Council Weddin Council	No
Will the works involve more than a minor or inconsequential excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	Forbes Shire Council Hilltops Council Weddin Council	No
Are the works located on flood-liable land? If so, will the works change flooding patterns to a more than minor extent?	Forbes Shire Council Hilltops Council Weddin Council State Emergency Services (SES)	The proposed works at Forbes Station and Yard are located on flood-liable land; therefore, consultation with Forbes Shire Council and the SES was undertaken.

Infrastructure SEPP clauses 13–16	Accountable agency or council	Impacts of the proposal on Infrastructure SEPP clause
Is there a local heritage item (that is not also a state heritage item) or a heritage conservation item in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the item/area are more than minor or inconsequential?	Forbes Shire Council Hilltops Council Weddin Council	Minor works are proposed to a railway water tank at Milvale Yard that is locally heritage listed in the Hilltops LGA; however, the Statement of Heritage Impact prepared for the works identifies the impact as minor. Consultation with Hilltops Council was undertaken. Works are also proposed to Forbes Station; however, it is state heritage listed as well as locally listed. Therefore, consultation is not required with Forbes Shire Council under this clause.
Are the works adjacent to a national park, nature reserve or other area reserved under the *National Parks and Wildlife Act 1974* (NSW)?	NSW Department of Environment, Energy and Science (DEES)	No
Are the works adjacent to a declared aquatic reserve under the *Fisheries Management Act 1994* (NSW)?	NSW Department of Primary Industries (DPI)	No
Are the works adjacent to a declared marine park under the *Marine Parks Act 1997* (NSW)?	DPI	No
Are the works in the Sydney Harbour Foreshore Area as defined by the *Sydney Harbour Foreshore Authority Act 1998* (NSW)?	Sydney Harbour Foreshore Authority	No
Do the works involve the development of a fixed or floating structure in or over navigable waters?	TfNSW	No
Are the works for the purpose of residential development, as educational establishment, a health services facility, a correctional facility or group home in bushfire-prone land?	NSW Rural Fire Service (RFS)	No

4.4.3 General activities

During development of the proposal, ARTC have been engaging stakeholders, landowners, businesses and the community. To ensure stakeholders within the proposal area were kept informed, several communications tools were used, as outlined in Table 4.2.

TABLE 4.2 CONSULTATION AND COMMUNICATION TOOLS

Consultation and communication tools	Respond to enquiries	Raise awareness	Notify and inform	Seek feedback
Toll-free community information line	✓			
Program email	✓		✓	✓
Inland Rail website	✓	✓	✓	✓
Printed information distributed to people on a mailing list and at community info sessions: ▸ Fact sheets ▸ Program information packs ▸ Mail outs ▸ Program maps.		✓	✓	
Stakeholder electronic newsletter		✓	✓	
Workshops	✓	✓	✓	✓
Community information sessions and staffed displays	✓	✓	✓	✓
Online community information sessions	✓	✓	✓	✓
Landowner face-to-face meetings	✓	✓	✓	✓
Stakeholder meetings and briefings	✓	✓	✓	✓
Submissions	✓			✓
Briefing papers to state and federal agencies	✓	✓	✓	

Consultation and communication tools	Respond to enquiries	Raise awareness	Notify and inform	Seek feedback
Local media Advertisements Media releases		✓	✓	
Program database (Consultation Manager)	✓		✓	
ARTC community/local investment		✓		
Electronic email blast	✓	✓	✓	✓

4.4.4 Consultation to date

The following is a summary of consultation activities undertaken for the wider Stockinbingal to Parkes Project. The specifics of this proposal were discussed during each activity to support the development of the REF.

4.4.4.1 Community information sessions

- There have been 22 community information sessions and a regional supplier briefing held in and around Forbes since 2016. Overall feedback from the community is that they are supportive of the project.
- ARTC hosted a stall at the Forbes Show in September 2018 and 2019, the Parkes Elvis Festival in 2019 and the Forbes Council Contractor Information Night in 2021 to raise awareness and provide information on the Inland Rail project. Inland Rail staff met with over 800 people at these community events and provided details on the proposal and answered general enquiries. Attendees expressed interest in job opportunities, the scope of the work to be completed and timing of the works.
- In November 2019, February 2020 and December 2020, face-to-face community information sessions were held in Forbes to seek feedback on the early reference design of the proposal. During 2020, as a result of COVID-19 travel restrictions, online information sessions were also offered. Community information sessions were promoted via letterbox drop to adjacent landholders within 200 m of the proposal, local newspapers (Forbes Advocate, Grenfell Phoenix and Hilltops Chronicle) and via the Inland Rail website and social media channels. Forbes Shire Council, Weddin Council and Hilltops Council also promoted the sessions in their weekly e-newsletter and social media channels. Key feedback from these sessions related to construction timing, traffic impacts, job opportunities and understanding the overall benefits of Inland Rail.
- Between March and June 2021, nine face-to-face and one online community information session was held with a total of 262 attendees. The community information sessions were held in Forbes, Milvale, Bribbaree, Quandialla, Caragabal and Wirrinya. These information sessions were specifically focused on providing an overview of the proposal, an update on design progress, capturing community feedback and informing the community of the next stages of the proposal. The community generally supported the design for the proposal; however, had concerns about matters outside of the proposal scope relating to the operation of the Inland Rail trains.
- In July 2021, due to COVID-19 restrictions, an online community presentation was held, and a recording of the presentation uploaded to the ARTC website. This was supported by advertising Forbes Advocate, Grenfell Phoenix and Hilltops Chronicle and a letter of invitation with a project overview was sent to all residents within 500 m of the proposal. 16 people attended the online session, with key concerns raised in relation to construction impacts and timing, Aboriginal employment opportunities and finding out more detail on the approvals and public exhibition process.

4.4.4.2 Stakeholder consultation meetings and briefings

- Twenty-five face-to-face and online meetings have been held with Forbes Shire Council since July 2015. In October 2020, a monthly working group was formed with the council to collaborate on the proposal, including design, timing of construction works and employment benefits. Key concerns raised by Council include minimising the impacts to neighbouring landowners during construction of the proposal and minimising impacts to the state heritage listed Forbes Station.
- Twenty-five meetings have been held with representatives from TfNSW since 2016, including quarterly and monthly meetings, as well as design workshops to capture any feedback and concerns. TfNSW have not raised any concerns regarding this proposal.
- Regular briefings have been given to local Members of Parliament and the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications (DITRDC) since May 2018, providing information on the scope of works and inviting further feedback on proposed activities, including this proposal. No major concerns were raised regarding this proposal by local members or DITRDC.

- The ARTC Cultural Heritage team provided updates on the proposal at the Wiradjuri Elders committee meeting and separately with Peak Hill members of the Wiradjuri Elders in November 2018.
- Three meetings were held with the Peak Hill LALC between 2019 and 2021 to introduce the proposal, advise the upcoming activities and seek feedback on the proposal. Key feedback provided by the Peak Hill LALC was ensuring that they are kept informed of construction activities and any potential employment training or opportunities during construction.
- A meeting was held with Central West Local Land Services in Forbes in November 2018 and in March 2021. The main discussions focused on the potential impacts on biosecurity and travelling stock routes (TSRs) during construction activities and how Inland Rail would mitigate these impacts.
- A briefing on the proposal was given to councillors and the Mayor of Weddin Shire Council in August 2020 and April 2021. Key concerns raised by Weddin Council were regarding the safety of level crossings near the proposal during construction and operations, employment for local workforce during construction and the long-term economic benefits of the proposal to the region.
- A briefing on the proposal was given to councillors and the Mayor of Forbes Shire Council at their monthly council meeting in November 2020 and May 2021. No concerns were raised in relation to this proposal.
- Meetings were held with Heritage NSW in December 2020 and February 2021 to introduce the project and discuss expectations for the s60 permit application.
- The local Emergency Services Management Committee were briefed in December 2020, March 2021 and April 2021 on the latest designs for the proposal. Ambulance NSW requested advance notice of any construction activities and to be consulted on any proposed detour routes.
- In December 2020, March 2021 and July 2021, Hilltops Council were briefed on the proposed works. No comments were provided by Hilltops Council on the heritage impacts of the proposal. Key concerns included Inland Rail providing advance notice of construction activities and consultation regarding the impact to the local road network and local resources.
- In December 2020 and April 2021, Michael McCormack, Deputy Prime Minister (DPM) was briefed on the progress of the proposal. No concerns or comments were raised by the DPM on this proposal.
- An online community information session was offered to residents predicted to exceed operational noise trigger levels as detailed in section 5.1.5.3 of this REF. Two separate letters were sent to affected residents inviting attendance to the online session however no registrations of interest were received. A contact number for further enquiries outside of the information session was also provided.

4.5 Results of consultation

All issues and comments are captured in a Comments Register and in Consultation Manager. Comments are then considered in the design development and the approvals. Any ARTC program-wide issues outside of the scope of the proposal are passed onto ARTC for management consideration. Table 4.3 identifies key topics raised by the different stakeholder groups.

TABLE 4.3 SUMMARY OF CONSULTATION RESPONSES

Key topics raised	Government officials/agencies	Impacted landowners	Aboriginal stakeholders	Wider community
Proposal scope	✓	✓		✓
Proposal design and features	✓	✓		✓
Operation of the proposal	✓	✓		✓
Land use and property	✓	✓	✓	✓
Flooding	✓	✓		✓
Traffic and transport	✓	✓	✓	✓
Noise and vibration		✓		✓
Air quality	✓	✓		✓
Hazards and risks	✓	✓		✓
Visual amenity		✓		✓
Biodiversity				✓
Heritage	✓	✓	✓	✓

Key topics raised	Government officials/agencies	Impacted landowners	Aboriginal stakeholders	Wider community
Soils	✓			
Waste management	✓	✓		
Social and economic	✓	✓	✓	✓
Consultation	✓	✓	✓	✓

The stakeholder groups included in Table 4.3 shared many similar concerns regarding the proposal. Outlined below, in Table 4.4 is a summary of these issues grouped by topic and where they are addressed in the REF.

TABLE 4.4 SUMMARY OF TOPICS RAISED RELATING TO THE REF

Topic category	Issues raised in relation to potential impacts	Where addressed in the ref
Proposal scope	Understanding what the proposal involves.	Chapter 2
	Queries about scope, including upgrades to existing passive level crossings.	Chapter 2 (no works are proposed to level crossings
Proposal design and features	Understanding key features of the proposals design such as upgrades to formation of existing track.	Chapter 2
Operation of the Proposal	Concern regarding increased number of trains and resulting environmental impacts.	Chapter 5
	How many additional trains per day?	Section 2.10.1
Land use and property	Queries regarding temporary land use during construction and permanent land use during operation for immediate site neighbours.	Section 5.10.4
Hydrology	Queries about changes to local hydrology during construction and operation, particularly to adjacent landholders.	Section 5.4
Traffic and transport	Queries about travel routes during construction for school buses, local residents, emergency services and agricultural operations.	Section 5.8
	Construction traffic damage to roads.	Section 5.8
	Property access impacts.	Section 5.8 and 5.10.4
Noise and vibration	Construction noise and vibration.	Section 5.1
	Queries regarding extent of out-of-hours works.	Section 2.7 and 5.1
	Operation noise and vibration.	Section 5.1
Air quality	Construction air quality impacts.	Section 5.10.3
Hazards and risk	Concerns about road safety at road–rail interfaces due to increased number of trains during operation.	Section 5.10.5
	Concern about operation of heavy machinery and safety of nearby residents during construction.	Section 5.8 and 5.10.5
Visual amenity	Loss of visual amenity during construction.	Section 5.6
	Queries regarding aesthetic changes to Forbes Station heritage features.	Section 5.2 and 5.6
Biosecurity	Biosecurity impacts due to general construction activities and traffic movements.	Section 5.3
Heritage	Queries about impact to heritage value of Milvale water tank and Forbes Station as a result of proposed modifications.	Section 5.2
	Consideration for use of a heritage architect at Forbes Station.	Section 5.2
Waste management	Appropriate management of waste.	Section 5.5
Socio-economic	Loss of amenity to residential receivers near the proposal during construction.	Section 5.9
	Request for employment opportunities to be advertised to local businesses and contractors for construction.	Section 5.9
	Impact on water supply due to construction requirements and prolonged drought.	Section 5.4
	Impact to residents if utilities disrupted during construction—power, water, telecommunications, waste.	Section 5.10.4
	Timing of works with other construction activities within the Forbes LGA exacerbating labour and accommodation shortages.	Section 5.9 and 5.10

Topic category	Issues raised in relation to potential impacts	Where addressed in the ref
Consultation	Request for ongoing and timely consultation ahead of construction to local community, businesses and residents.	Section 4.7

4.5.1 ISEPP consultation results

As identified in Section 4.4.2, Forbes Shire Council, Hilltops Council and SES were consulted on 14 May 2021 as required under the ISEPP. Hilltops Council provided a response on 15 May 2021 and Forbes Shire Council provided a response on 15 July 2021. The comments are summarised in Table 4.5. No response has been received from SES.

TABLE 4.5 SUMMARY OF TOPICS RAISED BY FORBES SHIRE COUNCIL AND TRANSPORT FOR NSW

Accountable agency or council	Issues raised in relation to potential impacts	Where addressed in the ref
Forbes Shire Council	Forbes Railway Station is a locally and state heritage listed Item. As such, any works on the structure will require approval under Section 60 of the *Heritage Act 1977* (NSW).	Section 5.2 Appendix F
	Steps should be taken to ensure the Forbes Railway Station is not damaged in any way, outside of the amendment of the awning.	Section 5.2 Appendix F
Hilltops Council	No noted concerns regarding the proposed work to the locally heritage listed Milvale Yard water tank, other than the structural integrity with the increased movement and height of the trains.	Section 5.2 Appendix G

4.6 Aboriginal community consultation

Aboriginal consultation has been guided by the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010) and the need to consult with Aboriginal people about the cultural significance of objects and/or places within the proposal footprint. Despite there being no objects, places or archaeological potential as described in Section 5.10.2, ARTC contacted the Peak Hill LALC via formal letter correspondence on 18 June 2021 to invite feedback. This letter was followed up by phone and email on 27 July 2021. No formal response from the Peak Hill LALC was provided.

4.7 Ongoing consultation

Consultation with the community and key stakeholders would be ongoing in the lead up to, and during construction of, the proposal.

The objectives of the forward consultation program are the following:

- Ensure the community and stakeholders have a high-level awareness of all processes and activities associated with the proposal
- Accurate and accessible information is made available
- Timely responses are provided for issues and concerns raised by the community
- Feedback from the community is encouraged and captured
- Opportunities for input are provided.

The 1800 phone number and proposal email address would continue to be available during construction, along with a 24-hour construction response line.

Targeted consultation methods, such as letters, notifications, signage, and face-to-face communications, would continue. The Inland Rail website and social media platforms would also include updates on the progress of the proposal.

The following communication tools and activities used during the construction phase would include:

- Development of a Communication Management Plan detailing the complaints-handling process
- Proposal email address
- 1800 phone number
- Updates to the Inland Rail website

- Targeted consultation and notifications such as letters, notifications, and face-to-face communication
- Construction signage
- Complaints management system.

4.8 Complaints management

The construction contractor engaged to construct the proposal would be required to implement a complaints management procedure for the construction of the proposal. This must follow the requirements of ARTC's EPL 3142. This procedure would be defined within the Construction Environmental Management Plan, which the contractor would be required to prepare and have approved by ARTC prior to construction commencing. The process must also interface with ARTC Enviroline for reporting and EPL3142 compliance purposes.

The complaints management procedure would include the following, at a minimum:

- Contact details for a 24-hour program response line and email address for ongoing stakeholder contact throughout the proposal
- Provision of accurate public information signs while work is in progress
- Review construction staging and activities to identify opportunities to minimise disruptions and impacts to community activities and functions
- Management of complaints in accordance with ARTC's emergency management procedure, specifically:
  - Details of all complaints received will be recorded
  - Verbal and written responses describing what action will be taken will be provided to the complainant within time limits (or as otherwise agreed by the complainant).

The current ARTC enquiry management and response times are detailed in Table 4.6. These will also apply in construction.

TABLE 4.6 ENQUIRY MANAGEMENT

Nature of enquiry	Response time
All enquiries	Initial acknowledgement within 24 hours
General or information enquiries	48 hours
Technical enquiries	Up to five working days
24-hour project response line	Immediate acknowledgement and response including for emergencies

5. Environmental Assessment

This chapter outlines the environmental assessment methods, existing environment, potential impacts and mitigation and management measures of each technical specialty. Key impacts of the proposal are assessed in Sections 5.1 to 5.9 and other potential impacts are described in Section 5.10. Cumulative impacts are considered in Section 5.11.

An environmental risk assessment was completed for the construction and operation phase of the proposal and is included in Appendix A. The risk assessment was used to inform the assessment in this Chapter. A Construction Environmental Management Plan (CEMP) is proposed to be prepared and implemented to manage and mitigate environmental impacts during construction based on the safeguards identified in this Review of Environmental Factors (REF). A high-level outline of the CEMP has been included in Appendix B.

5.1 Noise and vibration

5.1.1 Introduction

This section provides a summary of the *Stockinbingal to Parkes Rail upgrade, Horizontal Clearances, noise and vibration impact assessment* prepared by WSP (2021b) (NVIA Report) for the proposal. A copy of the NVIA Report is included in Appendix B.

5.1.2 Legislation, policy, standards and guidelines

The assessment has been undertaken in accordance with the following NSW Government guidelines:

- *Rail Infrastructure Noise Guideline* (RING) (NSW Environment Protection Authority (EPA), 2013)
- *Interim Construction Noise Guideline* (ICNG) (Department of Environment and Climate Change (DECC), 2009)
- *Construction Noise and Vibration Guideline* (Roads and Maritime (RMS), 2016)
- *Noise Policy for Industry* (EPA, 2017)
- *Assessing Vibration: A Technical Guideline* (Department of Environment and Conservation (DEC), 2006)
- *German Standard DIN 4150-3:1999-02, Structural vibration Part 3: Effects of vibration on structures* (German Institute for Standardisation,1999)
- *NSW Road Noise Policy* (DECCW, 2011)
- *Inland Rail—Noise and Vibration Management Strategy* (01-9000-PE-P11-ST-003_5)
- *Inland Rail—Technical Specifications for Noise and Vibration Assessments* (0-9000-ENV-000-SP-0001).

5.1.3 Assessment methodology

5.1.3.1 Study area

The study area consists of noise catchment areas (NCA) that have been defined to classify groups of sensitive receivers that are likely to have a similar existing noise environment and experience similar impacts from the proposal (refer to Figure 5.1 to Figure 5.6).

5.1.3.2 Assessment tasks

The noise and vibration assessment involved:

- Reviewing the existing operational noise and vibration assessment previously completed for the proposal, and documented in the 2019 NVIA
- Identifying noise and vibration sensitive receivers
- Identifying existing (background) noise levels near the proposal, including the use of unattended and operator-attended noise monitoring, which was completed at nine locations considered to be representative of the existing background and ambient noise environment in the proposal study area (Figure 5.1 to Figure 5.6).
- Establishing noise and vibration goals, criteria and management levels to provide a basis for assessing the potential for impacts during construction and operation of the project
- Identifying the main potential noise and vibration sources during construction and operation

- Developing a noise and vibration model based on four representative construction scenarios to predict airborne noise generated during construction
- Assessing the potential for noise and vibration to exceed the applicable criteria and impact on the amenity of sensitive receivers
- Consideration of potential cumulative impacts with other projects proposed in the area
- Identifying management and mitigation measures to minimise construction and operation impacts of the proposal.
- A detailed description of the assessment methodology is provided in the NVIA report.

5.1.4 Existing environment

5.1.4.1 Noise environment

The proposal locations are situated in predominately rural areas in regional NSW, between the towns of Stockinbingal and Parkes. The existing noise environment at each site is generally influenced by local and highway noise in addition to train noise at the time of a passby. As of 2020 an average of five freight trains travelled the S2P section of the rail corridor. Natural noise sources, such as insects, birds and dogs, are commonly audible.

Unattended noise monitoring of background noise levels was completed in early March 2021. The locations of the deployed monitoring equipment associated NCAs are presented in Table 5.1 and shown in Figure 5.1 to Figure 5.6. Several noise monitoring locations were used to characterise the existing noise environment in the areas surrounding each proposal site and sensitive receivers potentially impacted by the works. The logger locations selected for the assessment were considered to be representative of the existing background and ambient noise environment in the proposal study area.

Where required, background noise levels (RBL) have been adjusted for evening and night periods in accordance with methodologies outlined in the *Noise Policy for Industry* (EPA, 2017) (NPfI).

TABLE 5.1 SUMMARY OF UNATTENDED NOISE MONITORING RESULTS

		Rating Background Level (RBL) dBA			Ambient noise level dBA $L_{eq,15min}$		
NCA	**Noise logger Location**	**Day[1]**	**Evening[1]**	**Night[1]**	**Day[1]**	**Evening[1]**	**Night[1]**
Forbes Station and Yard							
NCA06a	50 Sam Street, Forbes	41	39	34	50	47	46
NCA06b	1 Little Union Street, Forbes	38	38	33	51	45	44
NCA06c	1 Union Street, Forbes	39	39	36	56	54	55
Wirrinya Yard							
NCA05	The Glen, 3907 Wirrinya Rd, Wirrinya	35	30	30	45	47	47
Caragabal Yard							
NCA04b	13 Railway Street, Caragabal	35	35	34	53	53	47
NCA04a	1 Railway Street, Caragabal	35	30	30	55	58	53
Quandialla Yard							
NCA03	Quandialla Road, Quandialla	35	31	30	54	53	54
Bribbaree Yard							
NCA02a	2 North Street, Bribbaree	35	30	30	56	50	54
NCA02b	14 Railway Street, Bribbaree	35	35	30	60	60	56
Milvale Yard							
NCA01	18 Schillers Road, Milvale	35	30	30	50	53	48

1. Time periods defined as—Day: 7 am to 6 pm Monday to Saturday, 8 am to 6 pm Sunday; Evening: 6 pm to 10 pm; Night: 10 pm to 7 am Monday to Saturday, 10 pm to 8 am Sunday

5.1.4.2 Sensitive receivers

The nearest noise-sensitive receivers to each proposal site are outlined in Table 5.2 and shown in Figure 5.1 to Figure 5.6.

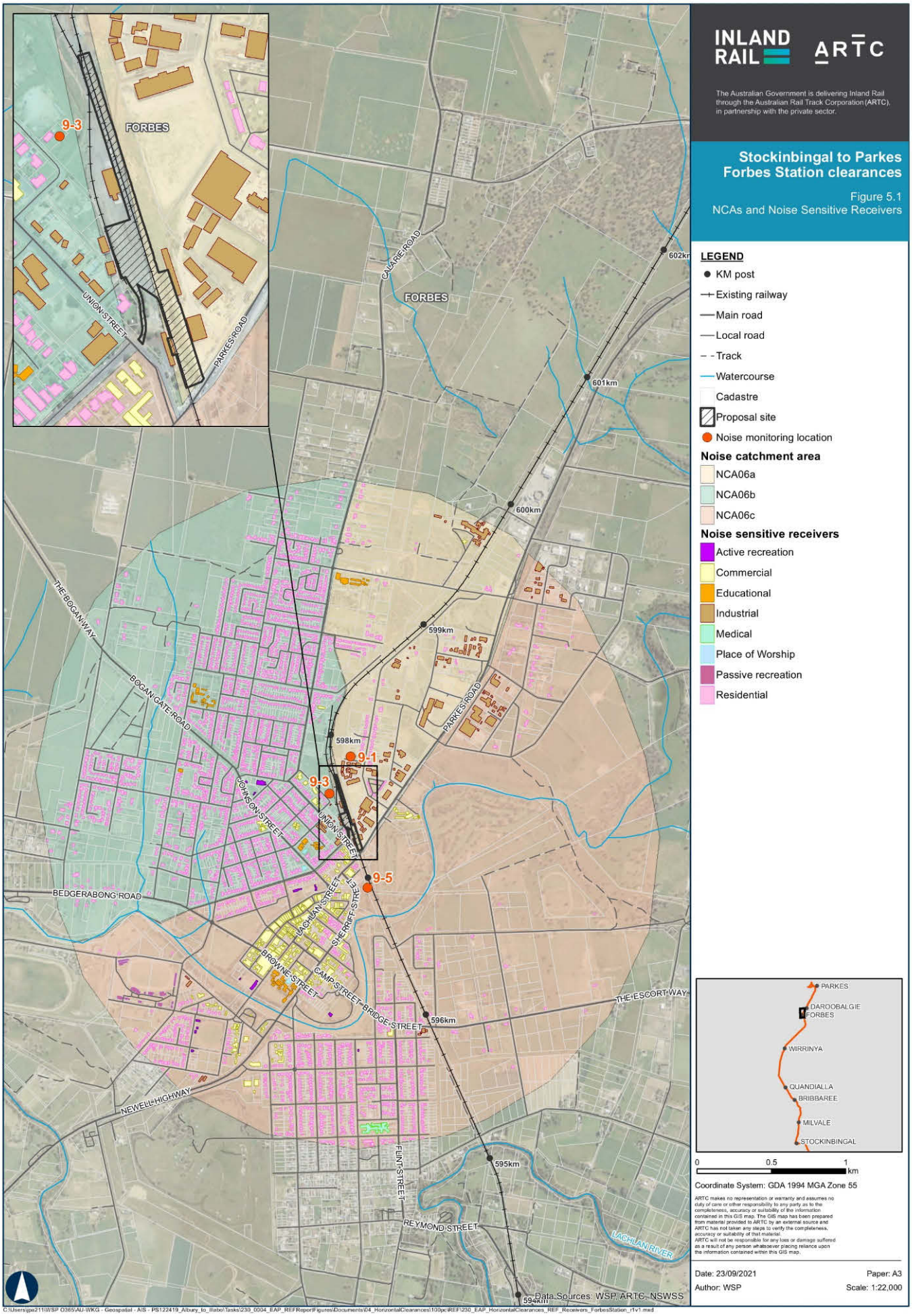
TABLE 5.2 IDENTIFIED NOISE-SENSITIVE RECEIVERS

Address	Receiver type	Direction from proposal	Distance from proposal (m)
Forbes Station and Yard			
2 Parkes Rd, Forbes	Industrial	East	35
8 Union, St, Forbes	Residential	West	90
17 Union St, Forbes	Industrial	West	115
4 Little Union St, Forbes	Residential	West	110
Little Union St, Forbes	Industrial	West	220
8 Calarie Rd, Forbes	Residential	West	295
27 Calarie Rd, Forbes	Residential	North	395
60 Patterson St, Forbes	Residential	North	510
50 Sam St, Forbes	Residential	East	220
42–46 Sam St, Forbes	Industrial	East	65
Forbes Golf Club, 17 Parkes Rd, Forbes	Active recreation	East	95
2 Parkes Rd, Forbes	Industrial	East	35
Wirrinya Yard			
3745 Wirrinya Rd, Wirrinya	Residential	East	230
The Glen, 3807 Wirrinya Rd, Wirrinya	Residential	West	185
3907 Wirrinya Rd, Wirrinya	Residential	West	635
Caragabal Yard			
17 Railway St, Caragabal	Residential	West	115
10 Gibson St, Caragabal	Residential	West	120
1 Railway St, Caragabal	Residential	South	280
23 Caragabal St, Caragabal	Residential	East	165
2 Wyalong St, Caragabal	Residential	South	440
Quandialla Yard			
6 Glasson St, Quandialla	Residential	West	85
4 Second St, Quandialla	Hotel	West	280
33 Margaret St, Quandialla	Residential	West	95
2 Glasson St, Quandialla	Residential	West	110
8 Talbot St, Quandialla	Residential	West	175
Bribbaree Yard			
2 North St, Bribbaree	Residential	South west	55
6 Short St, Bribbaree	Residential	South west	20
2 Short St, Bribbaree	Residential	South	95
21 Railway St, Bribbaree	Residential	South	50
Morans Rd, Bribbaree	Residential	East	400
Milvale Yard			
18 Schillers Rd, Milvale	Residential	South East	205
1698 Milvale Rd, Milvale	Residential	South	425

Noise catchment areas (NCA) have been defined to classify groups of sensitive receivers that are likely to have a similar existing noise environment and experience similar impacts from the proposal. Table 5.3 summarises the general noise environment of each NCA, which are shown in Figure 5.1 to Figure 5.6.

TABLE 5.3 NOISE CATCHMENT AREAS (NCAS)

NCA ID	Approximate number of receivers in NCA	Description
NCA06a	179	Predominantly industrial area comprising of auto-repair shops in the south segment of the NCA. Low-density residential housing scattered among the southern and western portions of the NCA area with educational buildings located toward the north. The background noise environment is characterised by insects, faint distant traffic from Patterson Street and machinery noise from auto repair shops.
NCA06b	1,937	Medium-density housing with St Laurence's Parish School to the south and Forbes Public School to the north. Some commercial businesses along Johnson and Union Streets. The background noise environment is characterised by insects traffic along Johnson Street and general urban hum.
NCA06c	1,099	Medium-density housing located on the south of the NCA boundary with mostly open farm area and some industrial land to the north east. The main shopping district for Forbes is enclosed around Lake Forbes. The background noise is characterised by insects, traffic along Newell Highway and general urban hum.
NCA05	11	Open farmland with small areas of dense vegetation. Low-density housing dotted along Wirrinya Road. The noise environment is characterised by insects, faint distant traffic and local wildlife.
NCA04a	50	Medium-density single-storey residential area parallel to Mid-Western Highway. Dense bush and forestry located south at Little Caragabal. The noise environment is characterised by insects, faint distant traffic and wind.
NCA04b	5	Open farmland with small pockets of low-density housing along Railway Street. The noise environment is dominated by wind and birds through vegetation.
NCA03	88	Open farmland with scattered patches vegetation and low-density housing adjacent to Quandialla railway yard. Noise environment characterised by insects, faint distant traffic and local wildlife.
NCA02a	51	Predominantly open farmland with some low-density single-storey residential receivers, educational and industrial buildings adjacent to Bribbaree railway yard. The noise environment is characterised by wind and birds through vegetation.
NCA02b	40	Sparse open bushland with low-density housing adjacent to Bribbaree railway yard. The noise environment is characterised by wind and birds through vegetation.
NCA01	11	Open farmland with scattered patches of vegetation. The noise environment is characterised by insects, faint distant traffic and wind.


INLAND RAIL
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The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.
Stockinbingal to Parkes
Forbes Station clearances
Figure 5.1
NCAs and Noise Sensitive Receivers
LEGEND
KM post
Existing railway
Main road
Local road
Track
Watercourse
Cadastre
Proposal site
Noise monitoring location
Noise catchment area
NCA06a
NCA06b
NCA06c
Noise sensitive receivers
Active recreation
Commercial
Educational
Industrial
Medical
Place of Worship
Passive recreation
Residential
FORBES
9-3
9-1
9-5
602km
601km
600km
599km
598km
596km
595km
594km
CALARIE ROAD
PARKES ROAD
THE BOGAN WAY
BOGAN GATE ROAD
JOHNSON STREET
UNION STREET
BEDGERABONG ROAD
LACHLAN STREET
SHERRIFF STREET
BROWNE STREET
CAMP STREET
BRIDGE STREET
THE ESCORT WAY
NEWELL HIGHWAY
FLINT STREET
REYMOND STREET
LACHLAN RIVER
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
0
0.5
1
km
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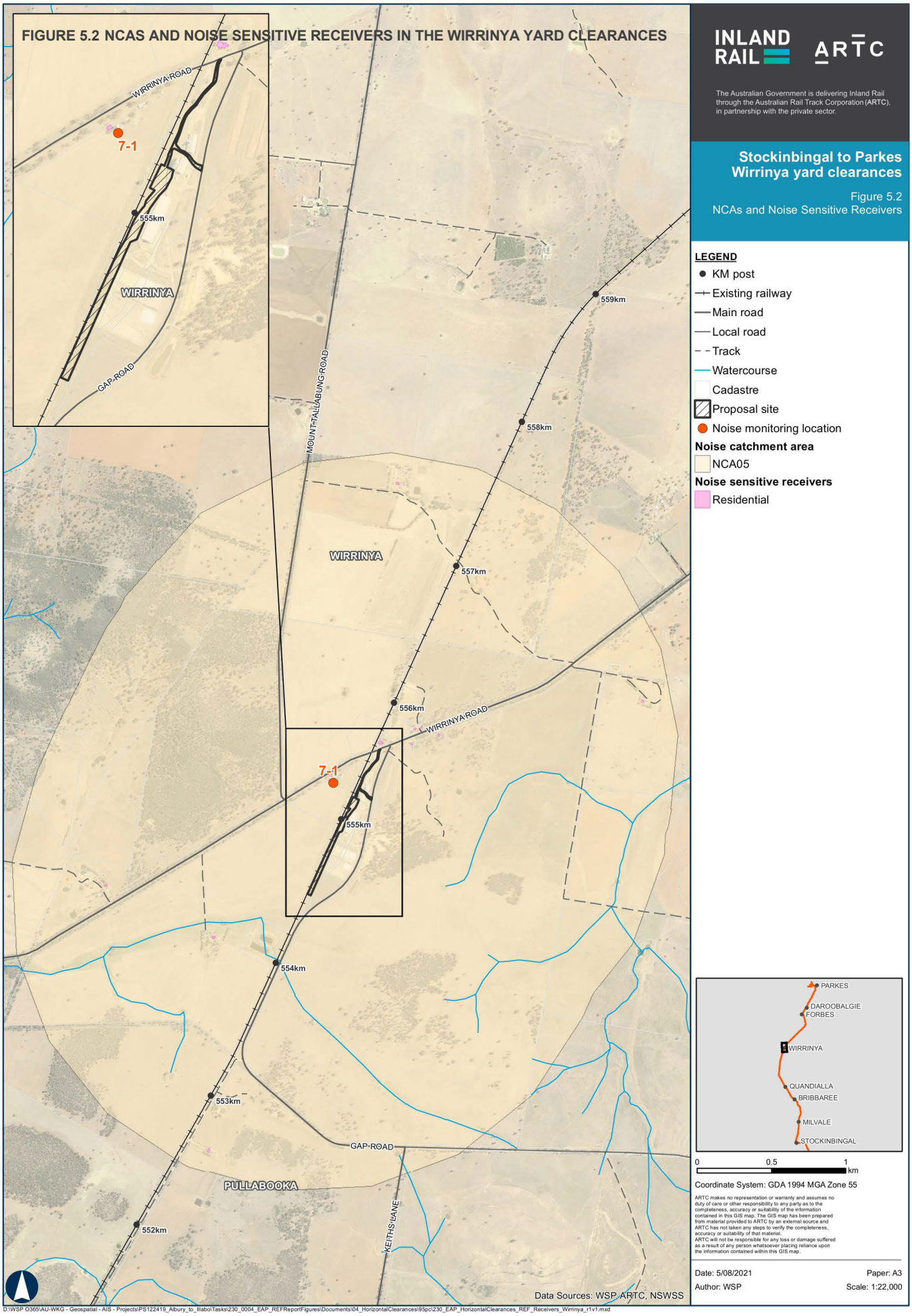
FIGURE 5.2 NCAS AND NOISE SENSITIVE RECEIVERS IN THE WIRRINYA YARD CLEARANCES
WIRRINYA ROAD
7-1
555km
WIRRINYA
GAP ROAD
MOUNT TALLABUNG ROAD
559km
558km
557km
556km
554km
553km
552km
PULLABOOKA
KEITHS LANE
Data Sources: WSP, ARTC, NSWSS
INLAND RAIL
ARTC
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Stockinbingal to Parkes
Wirrinya yard clearances
Figure 5.2
NCAs and Noise Sensitive Receivers
LEGEND
KM post
Existing railway
Main road
Local road
Track
Watercourse
Cadastre
Proposal site
Noise monitoring location
Noise catchment area
NCA05
Noise sensitive receivers
Residential
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
0
0.5
1
km
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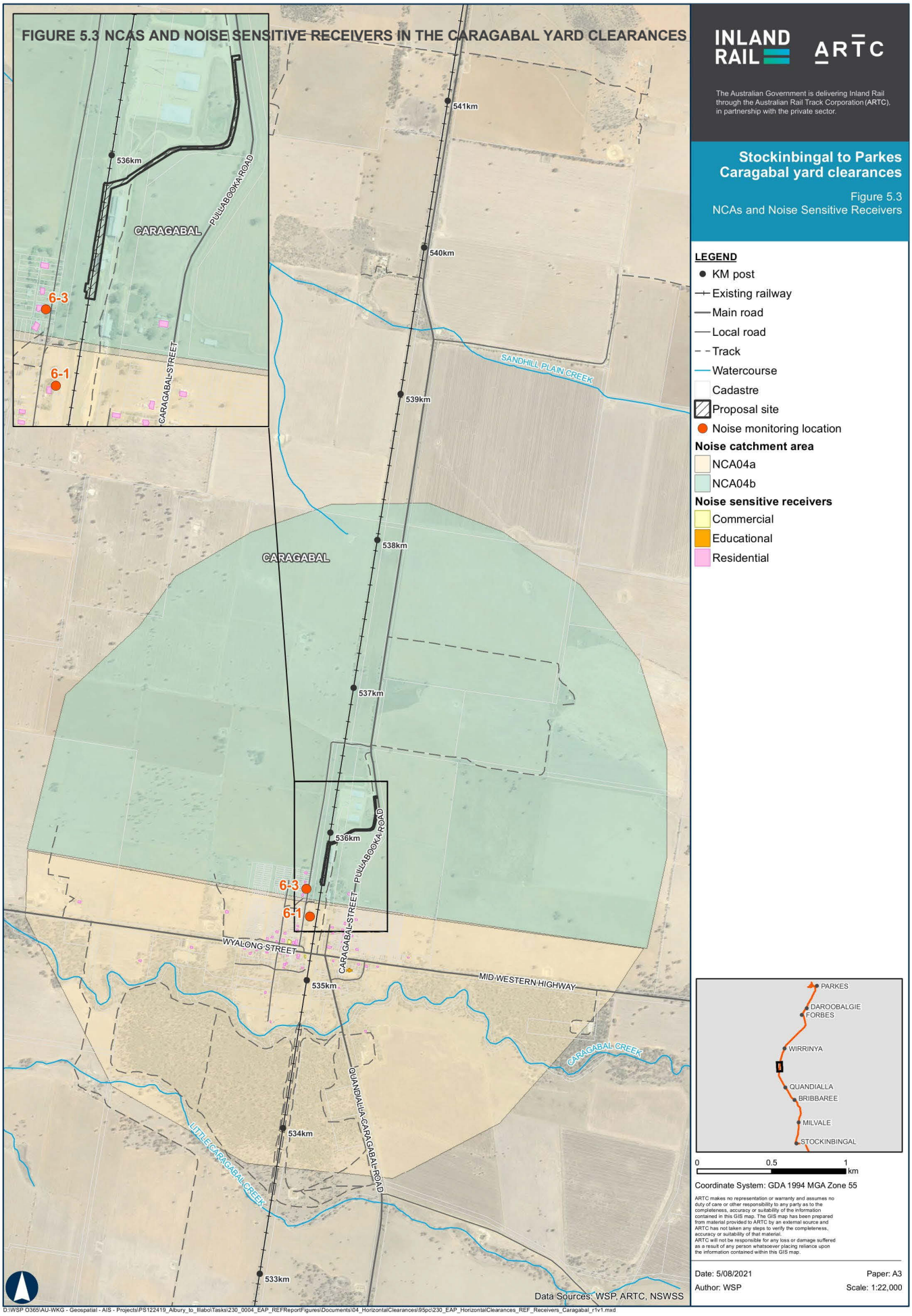
FIGURE 5.3 NCAS AND NOISE SENSITIVE RECEIVERS IN THE CARAGABAL YARD CLEARANCES
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ARTC
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Stockinbingal to Parkes
Caragabal yard clearances
Figure 5.3
NCAs and Noise Sensitive Receivers
LEGEND
KM post
Existing railway
Main road
Local road
Track
Watercourse
Cadastre
Proposal site
Noise monitoring location
Noise catchment area
NCA04a
NCA04b
Noise sensitive receivers
Commercial
Educational
Residential
541km
540km
539km
538km
537km
536km
535km
534km
533km
CARAGABAL
PUJLABOOKA ROAD
CARAGABAL STREET
SANDHILL PLAIN CREEK
WYALONG STREET
MID WESTERN HIGHWAY
CARAGABAL CREEK
LITTLE CARAGABAL CREEK
QUANDIALLA-CARAGABAL ROAD
6-3
6-1
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
0
0.5
1
km
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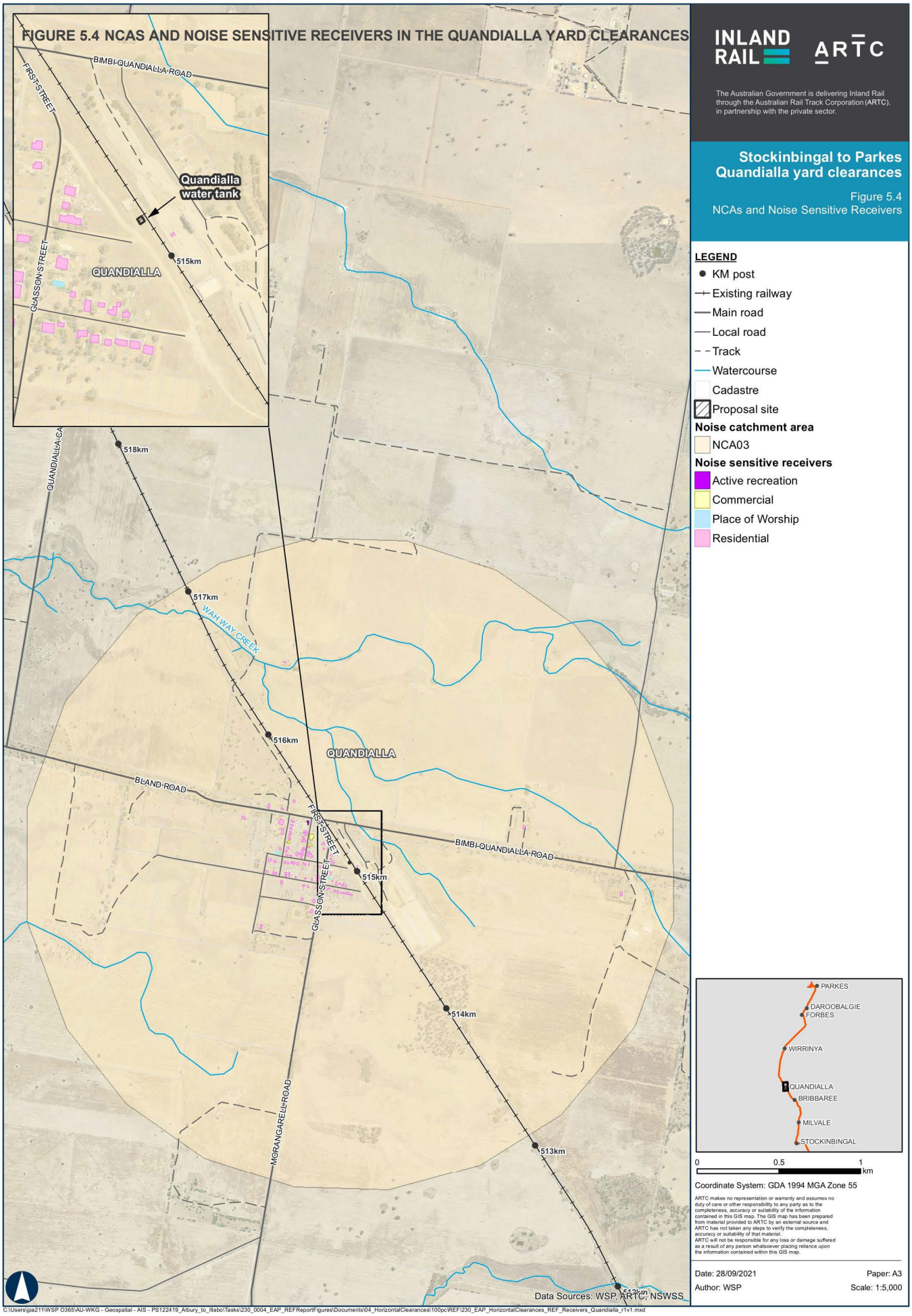
FIGURE 5.4 NCAS AND NOISE SENSITIVE RECEIVERS IN THE QUANDIALLA YARD CLEARANCES
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ARTC
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Stockinbingal to Parkes
Quandialla yard clearances
Figure 5.4
NCAs and Noise Sensitive Receivers
LEGEND
KM post
Existing railway
Main road
Local road
Track
Watercourse
Cadastre
Proposal site
Noise catchment area
NCA03
Noise sensitive receivers
Active recreation
Commercial
Place of Worship
Residential
Quandialla water tank
BIMBI-QUANDIALLA-ROAD
FIRST STREET
GLASSON STREET
QUANDIALLA
515km
518km
517km
516km
514km
513km
WAHWAY CREEK
BLAND ROAD
MORANGAREL ROAD
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
0
0.5
1
km
Coordinate System: GDA 1994 MGA Zone 55
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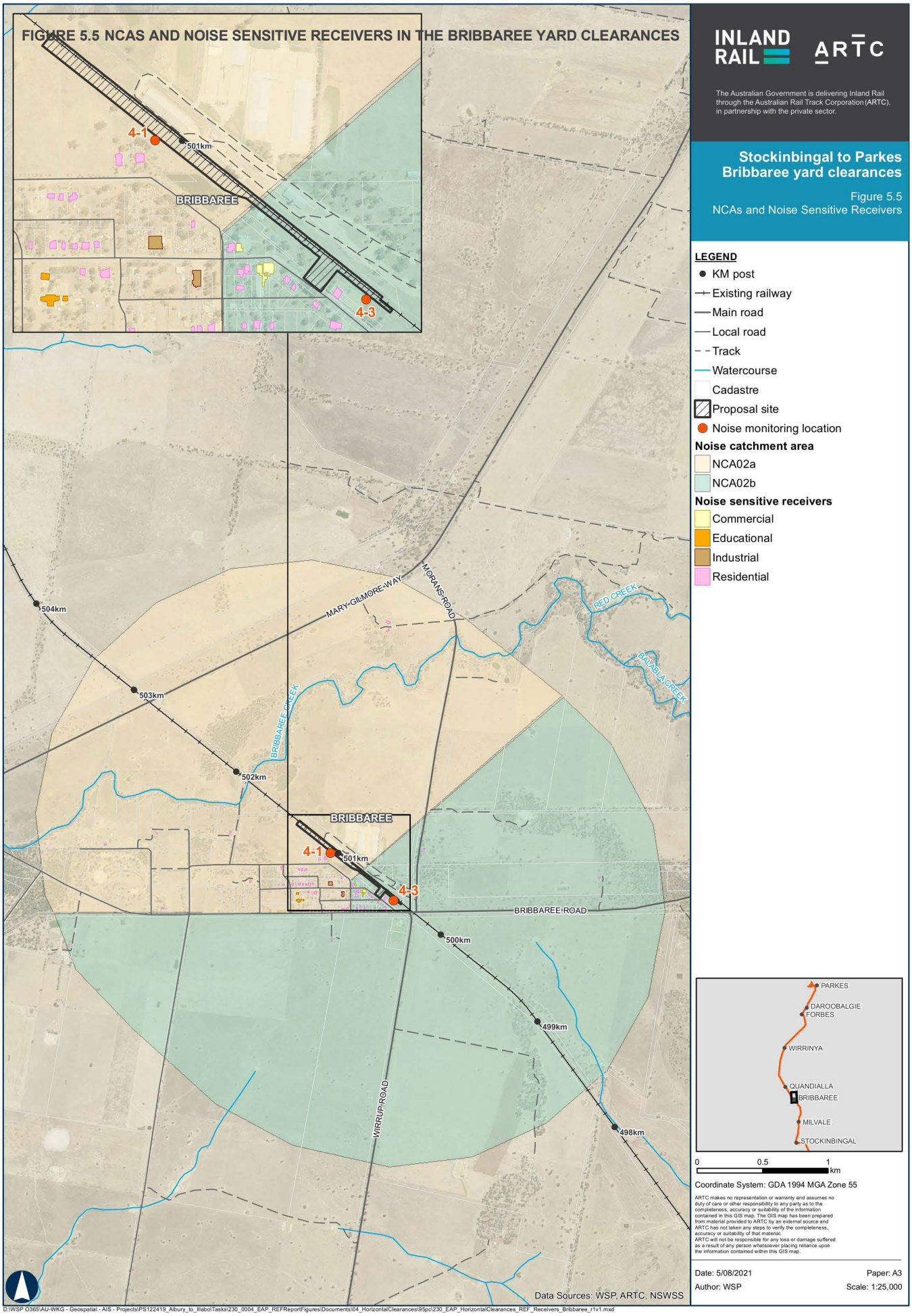
FIGURE 5.5 NCAS AND NOISE SENSITIVE RECEIVERS IN THE BRIBBAREE YARD CLEARANCES
INLAND RAIL
ARTC
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Stockinbingal to Parkes
Bribbaree yard clearances
Figure 5.5
NCAs and Noise Sensitive Receivers
LEGEND
KM post
Existing railway
Main road
Local road
Track
Watercourse
Cadastre
Proposal site
Noise monitoring location
Noise catchment area
NCA02a
NCA02b
Noise sensitive receivers
Commercial
Educational
Industrial
Residential
BRIBBAREE
4-1
4-3
501km
504km
503km
502km
500km
499km
498km
MARY GILMORE WAY
MORANS ROAD
BRIBBAREE ROAD
WIRRUP ROAD
BRIBBAREE CREEK
RED CREEK
BALALA CREEK
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
0
0.5
1
km
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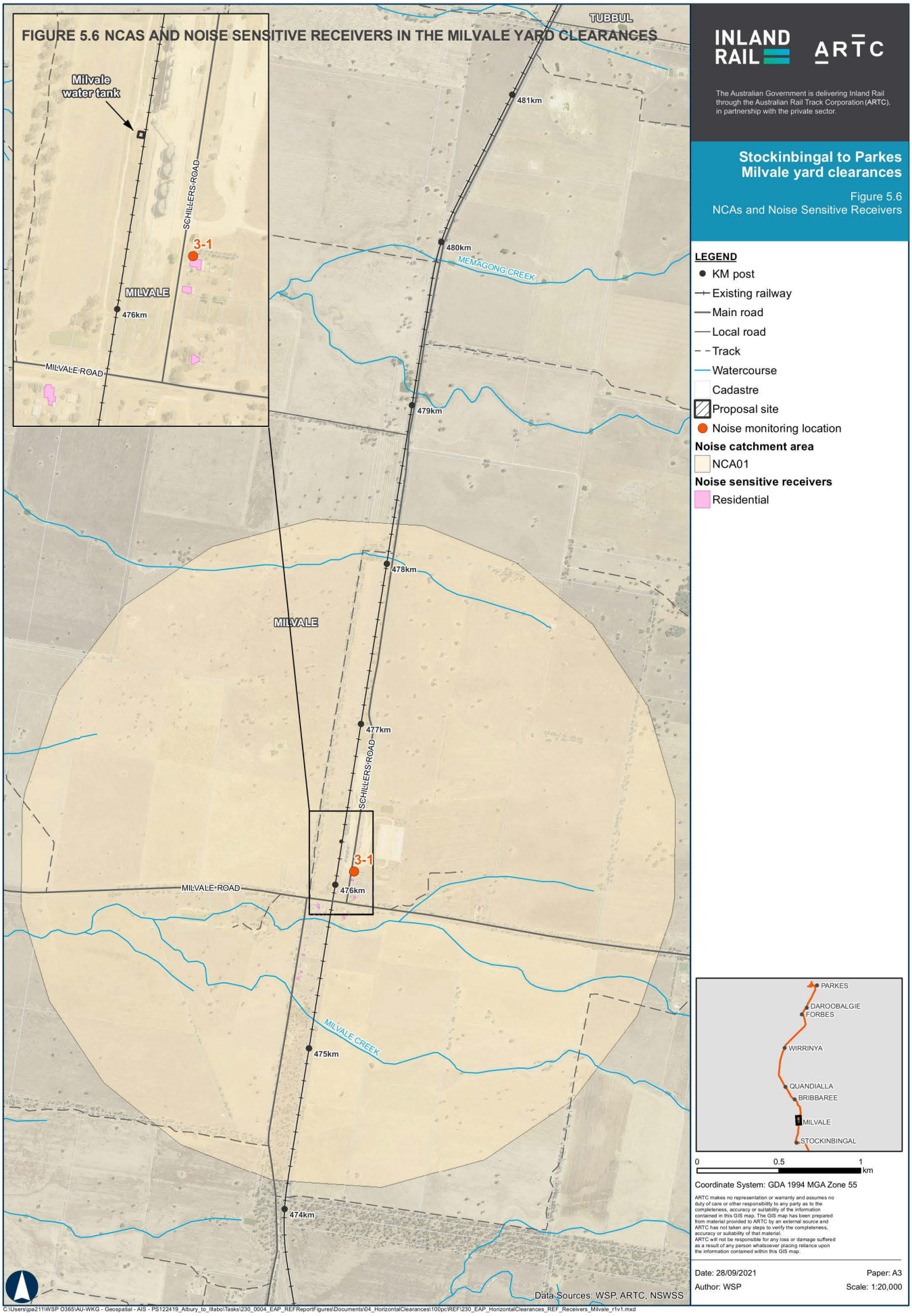
FIGURE 5.6 NCAS AND NOISE SENSITIVE RECEIVERS IN THE MILVALE YARD CLEARANCES
Milvale water tank
SCHILLERS ROAD
3-1
MILVALE
476km
MILVALE ROAD
TUBBUL
481km
480km
MEMAGONG CREEK
479km
478km
MILVALE
477km
SCHILLERS ROAD
3-1
476km
MILVALE ROAD
MILVALE CREEK
475km
474km
Data Sources: WSP, ARTC, NSWSS
INLAND RAIL
ARTC
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Stockinbingal to Parkes
Milvale yard clearances
Figure 5.6
NCAs and Noise Sensitive Receivers
LEGEND
KM post
Existing railway
Main road
Local road
Track
Watercourse
Cadastre
Proposal site
Noise monitoring location
Noise catchment area
NCA01
Noise sensitive receivers
Residential
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
0
0.5
1
km
Coordinate System: GDA 1994 MGA Zone 55
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5.1.4.3 Noise and vibration criteria

A summary of the applied noise and vibration assessment criteria (including construction and operation) is included in Chapter 3 of the NVIA, in Appendix E and summarised below.

Environment Protection Licence (EPL 3142)

ARTC operates its rail network in accordance with EPL 3142, which is administered by the NSW EPA under the POEO Act. As described in Section 3.2.2, the proposal would be carried out as a maintenance activity under this EPL.

Sections O9.1 to O9.6 of EPL 3142 outline conditions relating to noise and vibration management of a maintenance activity. These conditions inform the standard work hours for the proposal as a railway maintenance activity, and exceptions to these hours. They also provide guidance for the management of noise impacts for the proposal. Any works required to be completed outside standard working hours would need ARTC approval and would be in accordance with ARTC's EPL 3142.

EPL 3142 does not specify noise limits for operation of the rail corridor outside construction and maintenance activities. The EPL includes objectives for ARTC to progressively reduce noise impacts from railway systems through a series of measures designed to control noise emissions from freight trains.

Construction noise

In accordance with the ICNG, sensitive receivers are considered likely to be affected by construction noise where relevant Noise Management Levels (NMLs) are predicted to be exceeded.

For residential land uses, the NMLs are based on RBLs, which are identified for each NCA in Table 5.3. The NMLs for standard hours are the RBL +10 dBA for noise affect receivers and 75 dBA for highly noise-affected receivers. Where work is proposed outside of recommended standard hours, the NML is RBL +5 dBA and justification is required.

Construction noise during the night (10 pm to 7 am Monday to Saturday, 10 pm to 8 am Sunday) has the potential to awaken residential receivers from sleep. Sleep disturbance and awakening external noise level screening levels of RBL+15 dB and 65 dBA Lmax, whichever is most conservative (lowest), have been adopted for residential receivers within each NCA.

NMLS for other sensitive receivers are defined by the ICNG, as shown in Table 5.4. The NMLS apply to these other sensitive receivers when the properties are in use. The NMLS apply to these receivers when the properties are in use.

TABLE 5.4 NML FOR RECEIVERS OTHER THAN RESIDENTIAL RECEIVERS (ICNG)

Receiver	NML
Classrooms at schools and other education institutions	Internal noise level of 45 dB(A)
Hospital wards and operating theatres	Internal noise level of 45 dB(A)
Places of worship	Internal noise level of 45 dB(A)
Active recreation areas (e.g. parks and sports grounds)	External noise level of 65 dB(A)
Passive recreation areas (e.g. outdoor grounds used for teaching)	External noise level of 60 dB(A)
Commercial	External noise level of 70 dB(A)
Industrial	External noise level of 75 dB(A)

Operational rail noise

Trigger levels are presented in Table 5.5 for re-developments of existing rail lines in accordance with *NSW Rail infrastructure Noise Guidelines* (RING) (EPA, 2013). The redevelopment of existing rail lines generally applies to developments which are intended to increase rail traffic or alter the track alignment through design or engineering changes.

TABLE 5.5 AIRBORNE RESIDENTIAL NOISE TRIGGER LEVELS FOR REDEVELOPMENT OF EXISTING RAIL LINE (EPA, 2013)

	Noise trigger levels (external) dBA	
Type of development	**Day (7 am to 10 pm)**	**Night (10 pm to 7 am)**
Redevelopment of existing train line	Development increases existing $L_{eq(period)}$ rail noise levels by 2 dB or more, or existing L_{max} rail noise levels by 3 dB or more and predicted rail noise levels exceed:	
	65 $L_{eq\ 15hr}$	60 $L_{eq\ 9\ hr}$
	85 L_{max}	85 L_{max}

Construction vibration

Table 5.6 presents the indicative minimum working distances for the nominated construction plant to minimise the risk of cosmetic damage to residential buildings, vibration to sensitive heritage structures and human comfort for sensitive receivers. Vibration levels and minimum safe working distances have been sourced from the Roads and Maritime *Construction Noise and Vibration Guideline* (CNVG) (2016).

TABLE 5.6 RECOMMENDED MINIMUM WORKING DISTANCES FOR VIBRATION INTENSIVE PLANT (RMS CNVG)

	Minimum working distance		
Plant item	**Cosmetic damage**	**Human response**	**Vibration sensitive (heritage)**
Vibratory roller (7–13 t)	15 m	100 m	15 m
Large hydraulic hammer (18–34 t excavator)	22 m	73 m	20 m

Operational rail vibration

Ground vibration criteria have been determined in accordance with the *Assessing Vibration: A Technical Guideline* (AVaTG) (DEC, 2006), as summarised in Table 5.7. Rail traffic is generally classified as an intermittent vibration source.

TABLE 5.7 GROUND-BORNE VIBRATION ASSESSMENT VALUES FOR RESIDENTIAL RECEIVERS (DEC, 2006)

	Intermittent vibration dose level (VDV MS1.75)	
Time Period	**Preferred values**	**Maximum values**
Day (7 am to 10 pm)	0.20	0.40
Night (10 pm to 7 am)	0.13	0.26

Ground-borne noise

Ground-borne noise is generated by vibration transmitted through the ground into a building, which can be reradiated as an audible low-frequency rumble. Ground-borne noise criteria are provided by the ICNG for construction and by the RING for redevelopment of an existing rail line. The ground-borne noise criteria are generally implemented only where the ground-borne noise is a higher level than the airborne noise level and can be perceptible in habitable rooms.

Traffic noise

NSW *Road Noise Policy* (DECCW, 2011) outlines that an increase in road traffic noise during construction of less than 2 dB would generally be considered acceptable. This corresponds to an approximate increase in traffic of 60 per cent. Where increases are 2dBA or less then no further assessment is required. Where road traffic noise levels are anticipated to increase by more than 2dB, the noise assessment criteria outlined in Table 5.8 are applied.

TABLE 5.8 ROAD NOISE POLICY ASSESSMENT CRITERIA

Road category	Type of project/land use	Traffic noise assessment criteria (external)	
		Day (7 am to 10 pm)	Night (10 pm to 7 am)
Collector/sub-arterial/arterial/ freeway	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments.	60 dBA $L_{eq,15hr}$	55 dBA $L_{eq,9hr}$
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments.	55 dBA $L_{eq,1hr}$	50 dBA $L_{eq,1hr}$

5.1.5 Potential impacts

5.1.5.1 Construction noise

Construction work at each enhancement site is anticipated to generate noise, which may impact surrounding receivers except for those works proposed at Quandialla and Milvale Yards. The proposed activities at these locations are considered minor and the anticipated duration of the work is anticipated to be two days duration only. These two sites are therefore not considered further for the purposes of this noise assessment.

Table 5.9 presents a summary of the predicted noise levels compared against the relevant NMLs for residential receivers for each assessed construction scenario. Results have been presented in terms of number of receivers exceeding the construction NMLs for each work stage. Construction activities that do not result in predicted exceedances not presented.

Due to access constraints and the requirement for safe working sites, some works may be undertaken outside standard working hours and during scheduled track possessions. Track works would be planned around a 60-hour rail possession. Any out-of-hours work would be approved by ARTC and the affected community would be advised in accordance with the Communication Management Plan and EPL3142 (refer to Chapter 4).

The identified impacts during site establishment, Forbes station awning works, water tank works and demobilisation are short term and, as far as practicable, would be completed during standard hours; therefore, the impacts from these construction activities are considered minor.

Construction noise levels are predicted to exceed relevant construction NMLs at receivers around Forbes Station and Yard, Wirrinya Yard, Caragabal Yard and Bribbaree Yard, primarily during the track work activities. The majority of other exceedances are considered to be minor. Due to the location of works within a higher density urban area, the majority of impacted receivers have been identified in the vicinity of Forbes Station (NCA06). Where track works are undertaken during out of hours periods, these impacts will be substantially higher. Sleep disturbance impacts during construction are discussed in the following section.

Only one receiver near Forbes Station at NCA06b is predicted to exceed the highly noise affected level of 75 dBA $L_{eq\ 15\ min}$ during any work stage. This exceedance is predicted to occur during track work activities in both standard and out of hours.

All construction noise impacts are temporary and confined to discrete periods. Accordingly, the identified impacts are not considered to be significant.

TABLE 5.9 PREDICTED CONSTRUCTION NOISE LEVELS AT RESIDENTIAL RECEIVERS

Work Stage	NML $L_{eq,15\ min}$	Number of receivers exceeding NML, grouped by magnitude of exceedance					Highly noise effected
		<5 dBA	5 10 dBA	10 20 dBA	20 30 dBA	>30 dBA	> 75 dBA
Forbes Station—NCA06a (Total number of receivers—179)							
Standard hours							
Site establishment	51	20	6	0	0	0	0
Track works + earthworks	51	29	20	6	0	0	0
Awning work	51	20	6	0	0	0	0
Demobilisation + rehabilitation	51	15	0	0	0	0	0
Outside standard hours—Day time/Evening[1]							
Site establishment	44	25	15	3	0	0	0

Work Stage	NML $L_{eq,15\ min}$	Number of receivers exceeding NML, grouped by magnitude of exceedance					Highly noise effected
		<5 dBA	5 10 dBA	10 20 dBA	20 30 dBA	>30 dBA	> 75 dBA
Track works + earthworks	44	24	29	26	0	0	0
Awning work	44	22	15	0	0	0	0
Demobilisation + rehabilitation	44	12	0	0	0	0	0
Outside standard hours—Night[1]							
Site establishment	39	34	25	18	0	0	0
Track works + earthworks	39	5	24	49	6	0	0
Awning work	39	38	22	15	0	0	0
Signalling	39	3	0	0	0	0	0
Demobilisation + rehabilitation	39	20	12	0	0	0	0
Site compound	39	12	0	0	0	0	0
Forbes Station—NCA06b (Total number of receivers—1937)							
Standard hours							
Site establishment	48	364	54	9	1	0	0
Track works + earthworks	48	842	364	63	1	0	1
Awning work	48	364	54	9	1	0	0
Signalling	48	0	1	0	0	0	0
Demobilisation + rehabilitation	48	165	16	4	1	0	0
Site compound	48	4	0	1	0	0	0
Outside standard hours—Day time/Evening[1]							
Site establishment	43	630	110	16	1	0	0
Track works + earthworks	43	739	731	181	4	1	1
Awning work	43	493	83	12	1	0	0
Signalling	43	1	0	1	0	0	0
Demobilisation + rehabilitation	43	54	9	1	0	0	0
Site compound	43	9	0	1	0	0	0
Outside standard hours—Night[1]							
Site establishment	38	814	630	125	1	1	0
Track works + earthworks	38	168	739	896	20	1	1
Awning work	38	853	493	95	0	1	0
Signalling	38	15	1	1	0	0	0
Demobilisation + rehabilitation	38	365	54	9	1	0	0
Site compound	38	54	9	1	0	0	0
Forbes Station—NCA06c (Total number of receivers 1099)							
Standard hours							
Site establishment	49	31	3	3	0	0	0
Track works and earthworks	49	147	31	6	0	0	0
Awning work	49	31	3	3	0	0	0
Signalling	49	0	0	0	0	0	0
Demobilisation and rehabilitation	49	15	4	0	0	0	0
Outside standard hours—Day time/Evening[1]							
Site establishment	44	61	10	3	0	0	0

Work Stage	NML $L_{eq,15\ min}$	Number of receivers exceeding NML, grouped by magnitude of exceedance					Highly noise effected
		<5 dBA	5 10 dBA	10 20 dBA	20 30 dBA	>30 dBA	> 75 dBA
Track works and earthworks	44	291	83	18	0	0	0
Awning work	44	45	5	3	0	0	0
Demobilisation and rehabilitation	44	3	3	0	0	0	0
Site compound	44	3	0	0	0	0	0
Outside standard hours—Night[1]							
Site establishment	41	147	31	6	0	0	0
Track works and earthworks	41	385	175	50	3	0	0
Awning work	41	107	23	5	0	0	0
Signalling	41	3	0	0	0	0	0
Demobilisation and rehabilitation	41	14	4	0	0	0	0
Site compound	41	4	0	0	0	0	0
Wirrinya Yard—NCA05 (Total number of receivers—11)							
Standard hours							
Site establishment	45	3	2	2	0	0	0
Track works	45	1	4	2	0	0	0
Demobilisation and rehabilitation	45	4	1	2	0	0	0
Outside standard hours—Night[1]							
Site establishment	35	1	0	6	1	0	0
Track works	35	1	0	5	2	0	0
Demobilisation and rehabilitation	35	3	2	2	0	0	0
Caragabal Yard—NCA04a (Total number of receivers—50)							
Standard hours							
Site establishment	45	25	15	0	0	0	0
Track works	45	20	18	2	0	0	0
Demobilisation and rehabilitation	45	27	5	0	0	0	0
Outside standard hours—Night[1]							
Site establishment	35	1	18	24	0	0	0
Track works	35	1	3	38	2	0	0
Demobilisation and rehabilitation	35	25	15	0	0	0	0
Caragabal Yard—NCA04b (Total number of receivers—5)							
Standard hours							
Site establishment	45	0	1	4	0	0	0
Track works	45	0	0	5	0	0	0
Demobilisation and rehabilitation	45	0	1	4	0	0	0
Outside standard hours—Day time/Evening[1]							
Site establishment	40	0	0	5	0	0	0
Track works	40	0	0	2	3	0	0
Demobilisation + rehabilitation	40	1	2	2	0	0	0
Outside standard hours—Night[1]							
Site establishment	39	0	0	4	1	0	0

Work Stage	NML $L_{eq,15\ min}$	Number of receivers exceeding NML, grouped by magnitude of exceedance					Highly noise effected
		<5 dBA	5 10 dBA	10 20 dBA	20 30 dBA	>30 dBA	> 75 dBA
Track works	39	0	0	1	4	0	0
Demobilisation and rehabilitation	39	0	2	3	0	0	0
Bribbaree Yard—NCA02a (Total number of receivers—51)							
Standard hours							
Site establishment	45	0	21	12	3	0	0
Track works + earthworks	45	4	0	29	7	0	0
Signalling	45	5	0	0	0	0	0
Demobilisation + rehabilitation	45	7	19	8	2	0	0
Site compound	45	5	3	2	0	0	0
Outside standard hours							
Site establishment	35	2	3	28	8	0	0
Track works + earthworks	35	1	2	10	24	5	0
Signalling	35	17	3	5	0	0	0
Demobilisation + rehabilitation	35	0	21	12	3	0	0
Site compound	35	21	8	7	0	0	0

(1) Time periods defined as—Day: 7 am to 6 pm Monday to Saturday, 8 am to 6 pm Sunday; Evening: 6 pm to 10 pm; Night: 10 pm to 7 am Monday to Saturday, 10 pm to 8 am Sunday

Sleep disturbance

Table 5.10 presents a summary of the maximum noise level assessment noise levels compared against the sleep disturbance levels for residential receivers for each assessed scenario. Results have been presented in terms of number of receivers exceeding the sleep disturbance levels for each work stage.

Sleep disturbance may occur at residential receivers around Forbes Station and Yard, Wirrinya Yard, Caragabal Yard and Bribbaree Yard. Noise management and mitigation measures would be implemented during construction, to manage sleep disturbance impacts, including provision of respite periods and/or alternative accommodation in accordance with the out-of-hours work protocol for the proposal.

TABLE 5.10 MAXIMUM PREDICTED NOISE LEVELS (SLEEP DISTURBANCE)

Work Stage	Maximum noise level		Number of receivers exceeding sleep disturbance levels[1]
	RBL + 15 (dBA)	Lmax (dBA)	
Forbes Station and Yard—NCA06a (Total number of receivers—179)			
Site establishment	49	65	43
Track works and earthworks			79
Awning work			43
Demobilisation + rehabilitation			24
Site compound			10
Forbes Station and Yard—NCA06b (Total number of receivers—1937)			
Site establishment	48	65	870
Track works and earthworks			1,653
Awning work			870
Signalling			21
Demobilisation + rehabilitation			205
Site compound			62
Forbes Station and Yard—NCA06c (Total number of receivers 1099)			

Work Stage	Maximum noise level		Number of receivers exceeding sleep disturbance levels[1]
	RBL + 15 (dBA)	Lmax (dBA)	
Site establishment	51	65	47
Track works and earthworks			224
Awning work			47
Signalling			5
Demobilisation and rehabilitation			13
Site compound			8
Wirrinya Yard—NCA05 (Total number of receivers—11)			
Site establishment	45	65	7
Track works			7
Demobilisation and rehabilitation			6
Caragabal Yard—NCA04a (Total number of receivers—50)			
Site establishment	45	65	42
Track works			43
Demobilisation and rehabilitation			32
Caragabal Yard—NCA04b (Total number of receivers—5)			
Site establishment	49	65	5
Track works			5
Demobilisation and rehabilitation			5
Bribbaree Yard---NCA02 (Total number of receivers—51)			
Site establishment	45	65	39
Track works and earthworks			42
Signalling			27
Demobilisation and rehabilitation			36
Site compound			33

Construction traffic

During the construction phase of the proposal, heavy vehicles would be required for materials and equipment delivery, while light vehicles will transport workers to and from the site. This additional road traffic may impact receivers along the proposed transport routes.

Where existing traffic volumes were available (refer to Section 5.8.4), a quantitative prediction of the predicted road traffic noise increase has been provided. At all other sites, a qualitative discussion is presented, in the absence of site-specific information. The peak number of vehicles movements per hour generated by the proposal would comprise approximately 10 light vehicles and 8 heavy vehicles at each site.

With the exception of Union Street in Forbes and Railway Street in Bribbaree, all remaining locations are designated as approved B-double routes. Given the existing traffic numbers (including heavy vehicles) along the haulage routes, adverse road traffic noise impacts are not anticipated as a result of construction of the proposal during daytime hours. Noise impacts may be noted while heavy vehicles are moving along Railway Street at Bribbaree; however, as this route is short, impacts will be minor. Where heavy vehicle movements are required to be undertaken outside of standard hours and on routes away from the Newell Highway, impacts may occur. Overall, the increases in road traffic noise during construction would be less than 2 dB, which is considered acceptable under the Construction Noise and Vibration Guideline (RMS, 2016).

5.1.5.2 Construction vibration

Vibration-generating equipment is required for certain construction activities. Vibration from this construction plant has the potential to affect nearby sensitive receivers. The vibration-generating plant indicated to be required during construction are vibratory rollers and hydraulic rock-hammers.

Table 5.11 identifies the nearest vibration-sensitive receivers to each site and, where these locations are within minimum working distances, potential impacts to human comfort may occur. Potential impacts to human comfort may be experienced at two receivers in Forbes and five sites in Bribbaree. Where a large hydraulic hammer is used within 22 m of 6 Short Street, Bribbaree, there is the potential for cosmetic building damage and alternative less-intensive construction methods should be used.

A number of heritage items associated with the historic Forbes Station are also located within the vibration-sensitive distances (refer to Table 5.6). Given their current exposure to rail vibration, it is predicted that they are structurally sound and of low risk of vibration damage. Further evaluation of heritage sites would be carried out during detailed design and pre-construction, including condition assessments of heritage buildings prior to construction.

During construction, if vibration-generating activities are conducted within 15 m of a residence, attended vibration measurements would be undertaken at the commencement of vibration-generating activities to confirm that structural vibration limits are within the acceptable range.

TABLE 5.11 LOCATIONS OF POTENTIAL EXCEEDANCES OF MINIMUM WORKING DISTANCES

Address	Distance from the proposal (m)	Potential impact	
		Cosmetic damage	Human response
Forbes Station and Yard			
8 Union, St, Forbes	75	No	Yes
Forbes Station (state and locally heritage listed)	–	Yes	No
Bribbaree Yard			
2 North St, Bribbaree	55	No	Yes
6 Short St, Bribbaree	20	Yes	Yes
2 Short St, Bribbaree	95	No	Yes
21 Railway St, Bribbaree	50	No	Yes
St Columba's Catholic Church and Presbytery (locally heritage listed)	50[1]	No	Yes
Bribbaree War Memorial (locally heritage listed)	40	No	N/A

(1) It is noted that while the distance to the edge of the heritage curtilage for these items is approximately 20 m, the distance to any identified vibration-sensitive structure is approximately 50 m.

5.1.5.3 Operational noise

The proposed change in horizontal track alignment at the enhancement sites would, in isolation, have a minor influence on railway noise levels of less than 1 dB; however, the proposed future railway operations of Inland Rail would impact the existing noise environment.

Inland Rail would operate 24-hours per day and would initially accommodate double-stacked freight trains of up to 1,800 m in length and up to 6.5 m high. Train speeds would vary according to freight loads and range from 80 to 115 km per hour. It is estimated that Inland Rail would be trafficked by an average of around 12 trains per day in 2027, increasing to 18 trains per day in 2039.

Noise levels were modelled for an area 2 km either side of the proposal alignment, the exception being Forbes where an area 500 m either side of the track was adopted for the assessment of worst-case noise levels based on the high density of buildings on both sides of the railway corridor. Table 5.12 presents a summary of the operational noise assessment for future capacity operations at each enhancement site against the RING. Trigger levels are predicted to be exceeded at up to 13 residential receivers by 2039. No non-residential receivers are predicted to exceed noise trigger levels. The predicted railway noise levels within the immediate 1 km area would be at or above the ambient noise levels, with potential for train passby events to be clearly audible. There is also potential for ground-borne noise impacts at sensitive receivers located within 60 m of the rail line; however, airborne railway noise is predicted to mask ground-borne noise in most instances.

An operational noise and vibration review would be undertaken to review the potential for operational impacts and guide the approach to identifying feasible and reasonable mitigation measures to be incorporated in the detailed design. Feasible and reasonable mitigation measures would be identified where exceedances of operational noise and vibration criteria are confirmed.

TABLE 5.12 ASSESSMENT OF RAILWAY NOISE LEVELS AT RESIDENTIAL RECEIVERS

		Change (increase) in railway noise			
Site	Year	Daytime (dBA $L_{Aeq15hr}$)	Night time (dBA L_{Aeq9hr})	MAximum (dBA L_{Amax})	Receivers above noise trigger levels
Forbes Station and Yard	2027	6	5	1	1 (night-time)
	2039	7	7	1	1 (night-time)
Wirrinya Yard	2027	10	9	4	1 (night-time, daytime and maximum)
	2039	12	11	4	1 (night-time, daytime and maximum)
Caragabal Yard	2027	10	9	5	0
	2039	12	11	5	2 (night-time)
Bribbaree Yard	2027	9	8	5	1 (night-time)
	2039	12	11	5	9 (night-time)

5.1.5.4 Operational vibration

The proposed change in horizontal track alignment at the enhancement sites would not, in isolation, materially change the potential ground-borne vibration experienced at sensitive receivers. Table 5.13 presents the offset distances between sensitive receivers and the nearest rail required in accordance with *Assessing Vibration: A Technical Guideline* (AVaTG) (DEC, 2006) to minimise the risk of operational vibration impacts.

TABLE 5.13 GROUND-BORNE VIBRATION ASSESSMENT VALUES (DEC, 2006)

	Ground-borne vibration offset distance (AVaTG)	
Railway operations	Daytime	Night time
Proposal opening (2027)	9 m	11 m
Future capacity (2039)	10 m	12 m

One sensitive receiver at Wirrinya is located 14 m from the rail line. All other sensitive receivers are at least 35 m from the rail line. As such, there would be a relatively low risk of impact from operational vibration.

Heritage structure associated with the historic Forbes Station are also located within these distances. Given their current exposure to rail vibration, it is predicted that they are structurally sound and of low risk to vibration damage. Further evaluation of heritage sites would be carried out during detailed design and pre-construction where structures may be at risk of cosmetic damage from operational vibration.

5.1.6 Mitigation and management measures

A Construction Noise and Vibration Management Plan would be prepared and implemented as part of the CEMP, to manage the construction impacts identified in Sections 5.1.5.1 and 5.1.5.2. The following site-specific measures would be considered during preparation of the plan:

- Limitation of noisy works to ICNG standard hours (7 am to 6 pm weekdays, 8 am to 1 pm Saturday) as far as practicable
- Screening or enclosure of noisy stationary equipment
- Respite periods for noisy works
- Maximising the distance between noisy plant items and sensitive receivers
- Use of equipment noise controls, such as residential class mufflers, during trackwork and earthmoving activities.

Table 5.14 provides a summary of the project-specific mitigation and management measures that will be implemented during the construction and operation of the proposal to minimise noise and vibration impacts that are over and above contemporary standard practice for environmental management.

TABLE 5.14 NOISE AND VIBRATION SITE SPECIFIC CONTROL MEASURES

ID	Control measures	Stage
CNV1	Prior to the commencement of construction, noise and vibration impacts would be confirmed based on the final project design.	Detailed design/ pre-construction
CNV2	Where vibration levels are predicted to exceed the structural screening criteria for a particular structure as a result of detailed design, a more detailed assessment of the structure and vibration monitoring would be carried out in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework, to ensure appropriate mitigation and management plans are implemented. During construction, if vibration-generating activities are conducted within 15 m of a residence, attended vibration measurements would be undertaken at the commencement of vibration-generating activities to confirm that structural vibration limits are within the acceptable range. Where vibration levels are found to be unacceptable, alternative work methods would be implemented so the vibration impacts are reduced to acceptable levels.	Pre-construction/ construction
CNV3	A Construction Noise and Vibration Management Plan would be prepared and implemented as part of the CEMP in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework and ARTC's EPL3142. The plan would have measures, processes and responsibilities to manage and monitor noise and vibration and minimise the potential for impacts during construction. This plan will include: ▸ Construction noise and vibration criteria for the proposal ▸ Location of sensitive receivers in proximity to the construction area ▸ Specific management measures for activities that could exceed the construction noise and vibration criteria ▸ Notification of impacts would be undertaken in accordance with the Communication Management Plan for the proposal.	Pre-construction/ construction
CNV4	An out-of-hours work protocol would be developed to define the process for considering, approving and managing out-of-hours work, including implementation of feasible and reasonable measures, and communication requirements. Measures would be aimed at pro-active communication and engagement with potentially affected receivers, provision of respite periods and/or alternative accommodation for defined exceedance levels. All work outside the primary proposal construction hours would be undertaken in accordance with the *Inland Rail NSW Construction Noise and Vibration Management Framework* and in accordance with the out-of-hours work protocol. The protocol would provide guidance for the preparation of out-of-hours work plans for each construction work location and for key works. Out-of-hours work plans would be prepared in consultation with key stakeholders (including the NSW EPA) and the community, and incorporated into the Construction Noise and Vibration Management Plan.	Pre-construction/ construction
CNV5	Building condition surveys would be completed before and after construction works where buildings or structures are within the minimum vibration working distances for cosmetic damage.	Pre-construction/ construction
CNV6	Prior to the commencement of vibration intensive works within the minimum working distances for cosmetic damage for heritage items, the potential for damage to the item would be assessed. Where there is potential for damage to heritage items, alternative methods that generate less vibration would be investigated and substituted where practicable. Where residual cosmetic damage risks to heritage items remain, condition surveys would be carried out and vibration monitoring with real-time notification of exceedance would occur during the activity. Any identified vibration-related damage to the heritage items would be rectified.	Pre-construction/ construction
ONV1	An operational noise and vibration review would be undertaken to review the potential for operational impacts, and guide the approach to identifying feasible and reasonable mitigation measures to be incorporated in the detailed design. Operational noise and vibration compliance monitoring would be undertaken, once Inland Rail has commenced operation, at representative locations to compare actual noise performance against that predicted by the operational noise and vibration review.	Pre-construction/ Operation
ONV2	Feasible and reasonable mitigation measures would be identified where exceedances of operational noise and vibration criteria are confirmed. Measures would be identified in accordance with the outcome of the operational noise and vibration review and the *Inland Rail Noise and Vibration Strategy*. Where at-property noise treatments are identified as the preferred mitigation option, these would be developed in consultation with individual property owners.	Operation

ID	Control measures	Stage
ONV3	If the operational noise and vibration review indicates that vibration levels are predicted to exceed the screening criteria at sensitive receivers, a more detailed assessment of the structure would be carried out. For any heritage items with the potential to be affected, including Forbes Station and the three locally listed heritage items within 50 m of the Bribbaree Yard, the detailed assessment would determine any specific sensitivities, in consultation with a heritage specialist, to ensure risks are adequately managed. If a heritage structure is found to be structurally unsound following inspection, a more conservative cosmetic damage objective (e.g. 2.5 mm/s peak component particle velocity for long-term vibration) would be considered. Where impacts are identified, further mitigation may be required.	Operation

5.2 Non-Aboriginal heritage

5.2.1 Introduction

This section outlines the assessment undertaken to identify any potential impacts to non-Aboriginal cultural heritage from the proposal. It includes a summary of the *Statement of Heritage Impacts for Forbes Railway Group and Milvale Railway Water Tanks* (OzArk Environment & Heritage, 2021a/b) which is provided in Appendix F and Appendix G.

5.2.2 Legislation, policy, standards and guidelines

The assessment was undertaken in accordance with the relevant NSW legislation and guidelines, including:

- EPBC Act
- Heritage Act
- Forbes, Weddin and Young LEPs
- *Assessing Heritage Significance* (NSW Heritage Office, 2001)
- *Statements of Heritage Impact* (NSW Heritage Office, 2002)
- *Historical Archaeology Code of Practice* (Heritage Council of NSW, 2006a)
- *Australia ICOMOS Charter for Places of Cultural Significance, The Burra Charter* (Australia International Council on Monuments and Sites (ICOMOS), 2013)
- *How to prepare archival records of heritage items* (NSW Heritage Office, 1998).

5.2.3 Assessment methodology

The assessment involves:

- Reviewing the following heritage databases to identify whether any listed heritage items are located in, or within the vicinity of, the proposal site
  - Section 170 heritage registers (ARTC, RailCorp, and TfNSW)
  - Forbes LEP
  - State Heritage Register NSW
  - National and World Heritage lists
- Reviewing available literature and previous assessments to determine the historical context
- Completion of a site walkover in February 2021 to validate the results of the desktop assessment and identify previously unidentified or buried heritage items
- Identifying and assessing any direct and/or indirect impacts (including cumulative impacts) to the heritage significance of:
  - Environmental heritage, as defined under the *Heritage Act 1977* (NSW), as may be recorded during field assessments
  - Section 170 heritage-listed items
  - Local heritage items identified in the relevant Forbes LEP
  - Items listed on the National and World Heritage lists

- Identifying management and mitigation measures to minimise construction and operation impacts of the proposal
- Preparation of Statement of Heritage Impact.

As works are proposed to the state heritage listed Forbes Railway Station Group (no. 01145), approval under Section 60 of the *Heritage Act 1977* is required from Heritage NSW.

5.2.4 Existing environment

There are two heritage-listed items that would be directly impacted by the proposed works at Forbes Station and Yard and Milvale Yard. A Statement of Heritage Impact (SOHI) has been prepared for both of these heritage items Appendix F and Appendix G and further details are provided in the sections below. Bribbaree Yard has four locally listed heritage items in close proximity. The heritage sites in on and near the sites are outlined in Table 5.15 and shown in Figure 5.7, Figure 5.8 and Figure 5.9. No world or national heritage items were identified within 200 m of any of the sites.

TABLE 5.15 HERITAGE ITEMS WITHIN 200 M OF THE PROPOSAL SITES

Site	Proximity to Non-Aboriginal heritage Items
Forbes Station and Yard	State (no. 01145) and locally listed (I84) Forbes Railway Station Group is located within the site. This site is also on ARTC's Section 170 heritage register. Locally listed St Laurence O'Toole Catholic church group (I60) including former convent of Mercy and Dean McAuliffe memorial located approximately 160 m to the west on Johnson Street, Forbes.
Wirrinya Yard	None
Caragabal Yard	None
Quandialla Yard	None
Bribbaree Yard	Locally listed St Columba's Catholic Church (I12) located approximately 20 m south east on Short Street, Bribbaree Locally listed St Columba's Presbytery (I13) located approximately 20 m south east on Short Street, Bribbaree Locally listed Bribbaree War Memorial (I10) located approximately 40 m south east on Railway Street, Bribbaree Locally listed Railway Hotel (I15) located approximately 110 m south east on Railway Street, Bribbaree
Milvale Yard	Locally listed Milvale SO41 Grain Elevator located 30 m north within the rail corridor Locally listed Railway Water Tanks located 140 m north-east adjacent to the rail corridor (the mapping within the Young LEP may be inaccurate as this heritage listing may include the water tank subject to the works)

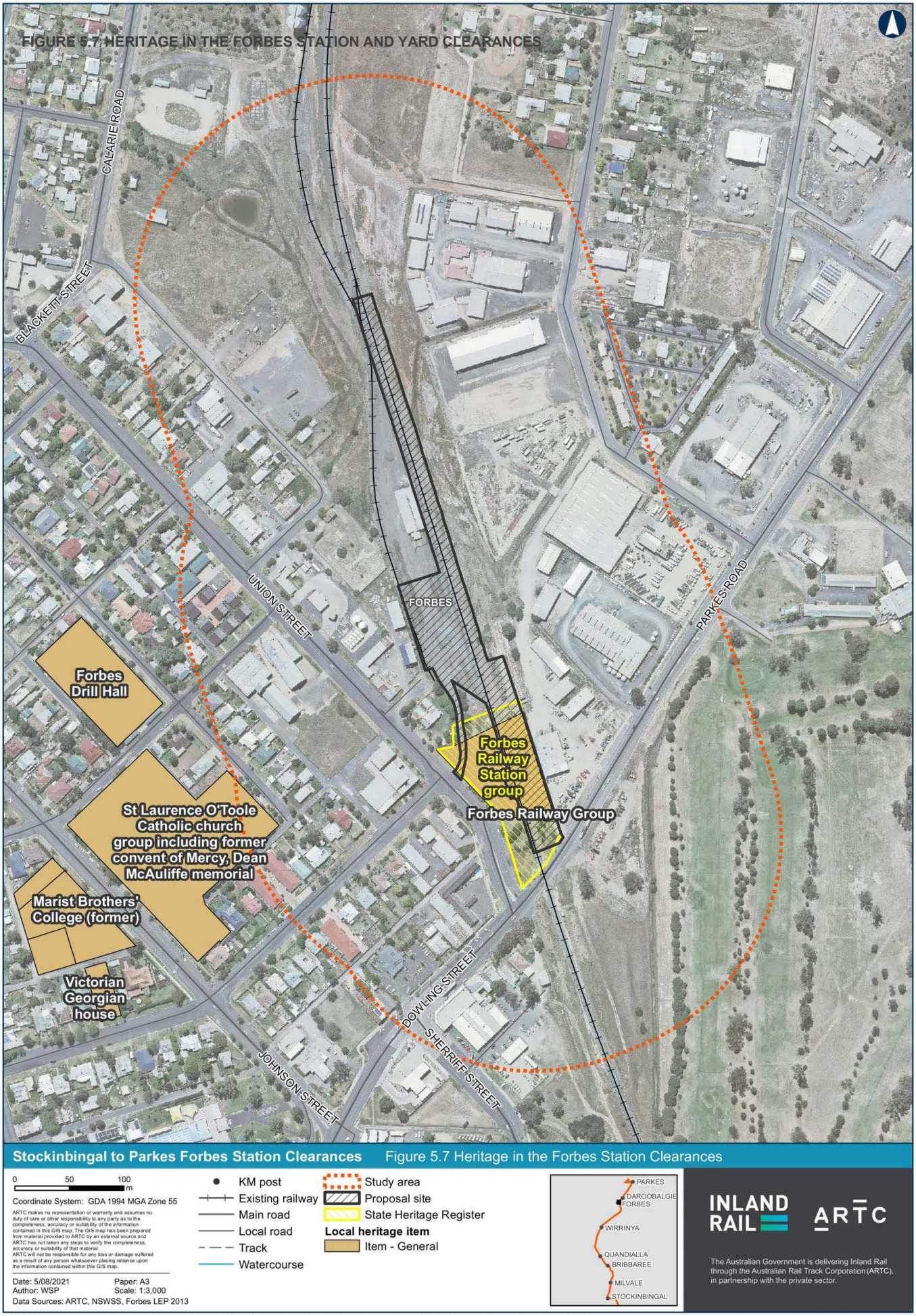
FIGURE 5.7 HERITAGE IN THE FORBES STATION AND YARD CLEARANCES
CALARIE ROAD
BLACKETT STREET
UNION STREET
FORBES
PARKES ROAD
Forbes Drill Hall
Forbes Railway Station group
Forbes Railway Group
St Laurence O'Toole Catholic church group including former convent of Mercy, Dean McAuliffe memorial
Marist Brothers' College (former)
Victorian Georgian house
DOWLING STREET
SHERRIFF STREET
JOHNSON STREET
Stockinbingal to Parkes Forbes Station Clearances
Figure 5.7 Heritage in the Forbes Station Clearances
0 50 100 m
Coordinate System: GDA 1994 MGA Zone 55
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Date: 5/08/2021
Paper: A3
Author: WSP
Scale: 1:3,000
Data Sources: ARTC, NSWSS, Forbes LEP 2013
KM post
Existing railway
Main road
Local road
Track
Watercourse
Study area
Proposal site
State Heritage Register
Local heritage item
Item - General
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
INLAND RAIL
ARTC
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.
D:\WSP O365\AU-WKG - Geospatial - AIS - Projects\PS122419_Albury_to_Illabo\Tasks\230_0004_EAP_REFReportFigures\Documents\04_HorizontalClearances\95pc\230_EAP_HorizontalClearances_REF_Heritage_FS_r1v2.mxd

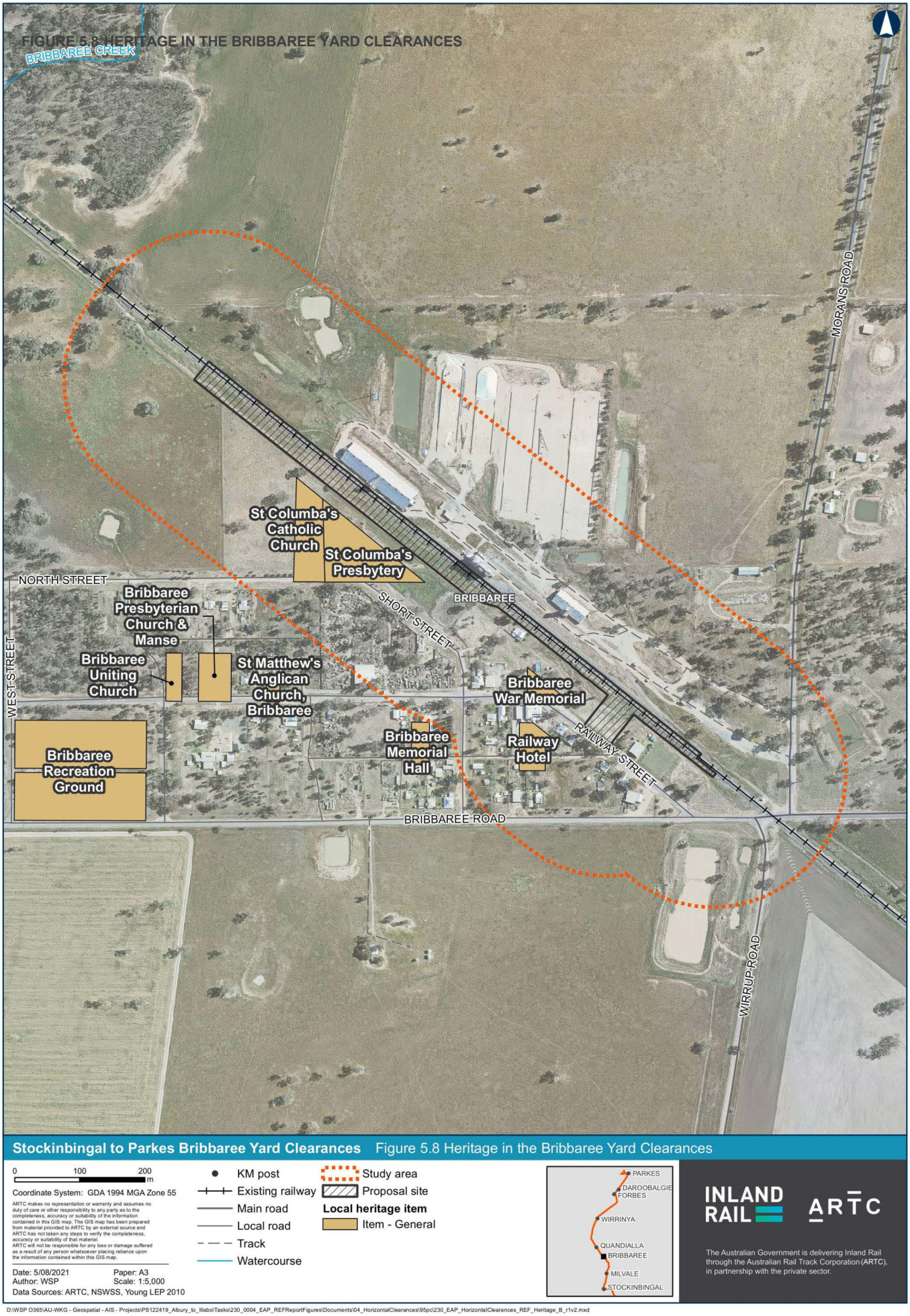
FIGURE 5.8 HERITAGE IN THE BRIBBAREE YARD CLEARANCES
BRIBBAREE CREEK
MORANS ROAD
St Columba's Catholic Church
St Columba's Presbytery
NORTH STREET
Bribbaree Presbyterian Church & Manse
SHORT STREET
BRIBBAREE
WEST STREET
Bribbaree Uniting Church
St Matthew's Anglican Church, Bribbaree
Bribbaree War Memorial
Bribbaree Memorial Hall
Railway Hotel
RAILWAY STREET
Bribbaree Recreation Ground
BRIBBAREE ROAD
WIRRUP ROAD
Stockinbingal to Parkes Bribbaree Yard Clearances
Figure 5.8 Heritage in the Bribbaree Yard Clearances
0
100
200
m
Coordinate System: GDA 1994 MGA Zone 55
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Date: 5/08/2021
Paper: A3
Author: WSP
Scale: 1:5,000
Data Sources: ARTC, NSWSS, Young LEP 2010
KM post
Existing railway
Main road
Local road
Track
Watercourse
Study area
Proposal site
Local heritage item
Item - General
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
INLAND RAIL
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FIGURE 5.9 HERITAGE IN THE MILVALE YARD CLEARANCES
Railway water tanks
Milvale SO41 Grain Elevator
Milvale water tank
SCHILLERS ROAD
MILVALE
MILVALE ROAD
Stockinbingal to Parkes Milvale Yard Clearances
Figure 5.9 Heritage in the Milvale Yard Clearances
0
50
100
m
Coordinate System: GDA 1994 MGA Zone 55
ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.
Date: 5/08/2021
Paper: A3
Author: WSP
Scale: 1:2,000
Data Sources: ARTC, NSWSS, Young LEP 2010
KM post
Existing railway
Main road
Track
Study area
Proposal site
Local heritage item
Item - General
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
INLAND RAIL
ARTC
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.
D:\WSP O365\AU-WKG - Geospatial - AIS - Projects\PS122419_Albury_to_Illabo\Tasks\230_0004_EAP_REFReportFigures\Documents\04_HorizontalClearances\95pc\230_EAP_HorizontalClearances_REF_Heritage_M_r1v2.mxd

5.2.4.1 Forbes Railway Station Group

The station has been assessed as having state heritage significance and is listed on the NSW State Heritage Register (SHR) as the 'Forbes Railway Station Group' (SHR 01145). It has also been listed as an item of state heritage significance on the ARTC's s170 Heritage and Conservation Register (s170 Register; SRA343); as well as on the Forbes LEP (I84) as an item of local heritage significance. The state heritage curtilage contains the Forbes Station building, a section of track adjacent to the station platform and a goods shed.

Forbes was an established regional town by the 1860s. Forbes Station opened on the 18 December 1893 and, at that time, was the terminus of the railway line from Molong. By 1918 the railway line had been extended south from Forbes to Caragabal. The Forbes railway line passenger service ended in 1974 and the station officially closed in 1990.

Forbes Station is one of the best surviving standard roadside stations. The design of Forbes Station varied from the standard design of stations at the time with the replacement of platform awning posts with cantilevered curved iron brackets to hold up the station awning. The building is in excellent condition and retains its traditional setting and original fabric. The station reflects the town's development from gold town to agricultural centre. The garden feature near the entrance to the station building from Union Street is also a rare item of heritage significance. The station building is currently used as a visitor information centre for tourists, and an arts and craft store.

During the site assessment, the overall physical condition of the station was assessed as excellent, although this was from a visual inspection alone. Particular attention was paid to the awning and platform as it is this area that works are proposed to impact the heritage values. Review of the original station design drawings and historical images indicate that the awning was constructed as originally intended and has been trimmed by approximately 406 mm to now be in alignment with the platform edge, as shown Figure 5.10. There was no record made of this modification, so the exact date is unknown, but based on the images available it has occurred between 1925 and 1952. As this modification included the removal of fabric, with the likely reinstatement of the end beam, the awning retains a high degree of integrity. Elements that contribute to the heritage value of the awning are largely intact and not compromised by the previous modification or other damage.

Multiple other roadside stations in NSW have similar features to Forbes Station, including Cobar, Parkes, Temora, and Corowa. This means that there are other examples, in addition to Forbes Station, of this type of station arrangement with cantilevered canopies that are reportedly in excellent condition and can represent this specific original station feature. The comparative review concluded that although Forbes Station is significant, it is not unique.

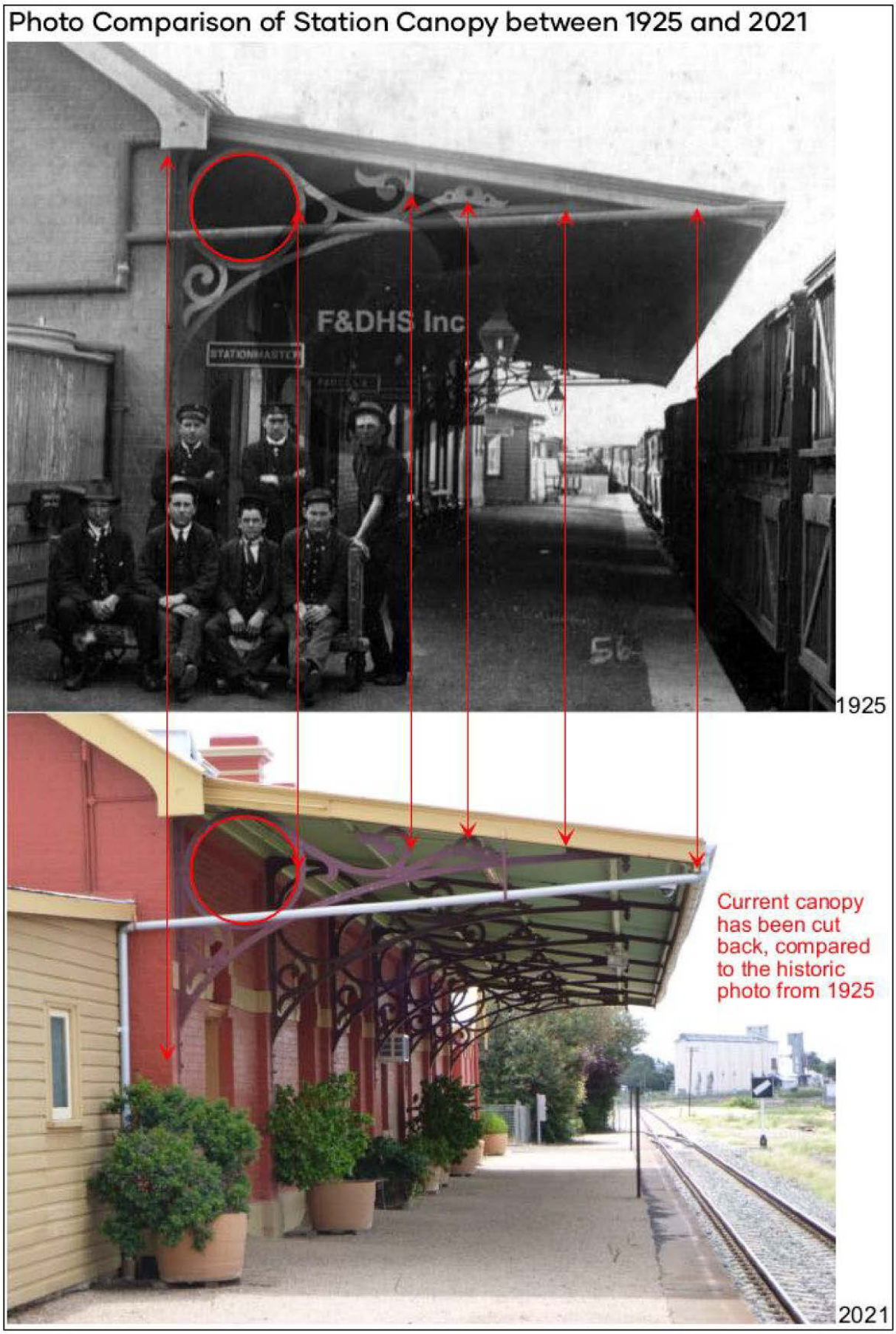


FIGURE 5.10 STATION AWNING AS SHOWN IN 1925 (TOP IMAGE), VERSUS 2021 (LOWER IMAGE)

5.2.4.2 Milvale Railway Water Tanks

The Milvale Railway Water Tanks (I41) are locally listed under the Young LEP. The Milvale railway station opened on 14 August 1916 and closed on 4 May 1975 due to a lack of use. Construction of the water tank began in 1925 as there were no watering facilities at Stockinbingal. The Milvale Railway Water Tank was developed as part of a system for providing water to steam locomotives during the early 1900s (Heritage NSW, 2011). It is one of three 20,000-gallon tanks along the railway line—the other two being located at Quandialla and Wirrinya.

The Milvale Railway Water Tank is located approximately 20 km north of Stockinbingal. The water tank is an identifiable feature of the railway infrastructure developed at Milvale and typical of early 20th century railway infrastructure. The tank is located immediately adjacent to the railway track in a position visible to the public from Milvale Road. A marker's mark that reads 'Per Way Shop Newcastle 1924' is present on one side, indicating the year the panels were cast. The water tank is representative of the 20th century railway infrastructure that contributed to the development of Milvale in its present form. The water tank is no longer a functioning piece of infrastructure. Grain silos are located to the north of the tank, adjacent to the rail corridor, and are still in use.

5.2.5 Potential impacts

No direct impact to heritage items is anticipated at any sites except Forbes Station and Yard and Milvale Yard. There is potential for vibration as a result on construction works to indirectly impact the locally listed heritage sites in close proximity to the proposal site including the Forbes Station (State no. 01145 and LEP I84) at Forbes Station and Yard and St Columba's Catholic Church (I12) and St Columba's Presbytery (I13) near Bribbaree Yard. The vibration impacts have been assessed in Section 5.1.5.2.

5.2.5.1 Forbes Station Railway Group

To achieve horizontal clearance, it is proposed that the platform awning at the station be trimmed by approximately 300 mm. This will include modification to the edge of the awning, including guttering. The platform would not be modified.

The impact of the awning trimming would be negligible to the overall heritage significance of Forbes Station. Although original fabric would be impacted, with the implementation of the mitigation measures identified in Table 5.16, the negative impacts to the awing would be minimised and it would maintain its aesthetic and technical heritage values. The proposed modification to the awning would be undertaken in a manner, and using materials, that are sympathetic to the heritage significance of the station. All the other more prominent and collectively significant elements of Forbes Station would be retained without any interference.

By modifying the awning, the mainline track can be maintained in close proximity to the platform and provides the nominated horizontal clearances for Inland Rail. The proposal would retain the direct relationship of the station with the adjacent railway line and further the potential benefit that the Inland Rail network may see renewed passenger interest in the future.

The mainline track would be realigned by up to 100 mm within the heritage curtilage, with no excavation proposed in this area. The proposed minor track works is not considered likely to impact the heritage values of the Forbes Railway Station Group, nor any archaeological deposits.

Due to the impacts to the State heritage listed station, application to Heritage NSW for a Section 60 heritage permit is required to complete the works.

5.2.5.2 Milvale Railway Water Tanks

In order to achieve the required horizontal clearance at the Milvale Yard, a wire and associated bracket would be removed from the railway water tank. The proposed works would allow the primary features of the tank to remain intact and preserve most of the original fabric and aesthetic value.

The fabric proposed for removal (wire and associated brackets) is minor and would not be noticeable from Milvale Road. Other good examples of the Milvale Railway Water Tank, such as at Quandialla, remain intact to allow for the continued interpretation of this aspect of early 20th century railways.

5.2.6 Mitigation and management measures

Table 5.16 provides a summary of the project-specific mitigation and management measures that will be implemented during the construction and operation of the proposal, to protect and minimise impacts to non-Aboriginal heritage values that are over and above contemporary standard practice for environmental management.

TABLE 5.16 NON-ABORIGINAL HERITAGE SITE SPECIFIC CONTROL MEASURES

ID	Control measures	Stage
H1	All proposed works at the Forbes Station to be completed in accordance with the Section 60 heritage permit (subject to approval by Heritage NSW).	Detailed design/ pre-construction
H2	Detailed design and construction planning would aim to further minimise direct impacts on Forbes Railway Station Group, as far as practicable.	Detailed design/ pre-construction
H3	A Heritage Interpretation Plan for Forbes Station will be prepared. This will provide a framework for interpreting the awning impacted, set out the key interpretative themes and identify communication strategies. The plan will be prepared with regard to Interpreting Heritage Places and Items: Guidelines (NSW Heritage Office, 2005), and the Heritage Interpretation Policy (Heritage Council of NSW, 2005).	Detailed design/ pre-construction
H4	Archival photographic recording of buildings and structures would be carried out prior to works, in accordance with Photographic Recording of Heritage Items Using Film or Digital Capture (Heritage Council of NSW, 2006) and How to prepare archival records of heritage items (NSW Heritage Office, 1998) at the following sites: Forbes Railway Station Milvale Railway water tank.	Pre-construction
H5	A Forbes Station Heritage Management Plan would be prepared and implemented as part of the CEMP. It would include measures to manage non-Aboriginal heritage and minimise the potential for impacts during construction. The plan would be prepared in consultation with the relevant heritage agencies (Heritage NSW and local councils) and take into account the outcomes of further investigations and surveys during detailed design. Specific management measures to be included are: ▸ As many original elements as feasible should be reused during the modification of the Forbes Station awning. This includes reusing the chamfered edge beam at the outer edge of the awning and ensuring that the decorative finials at the track end of the cantilevered bracket remain in place ▸ Where original elements cannot be reused, 'like for like' elements must be sourced to ensure the aesthetic of the Forbes Station awning is not diminished ▸ Repainting should be sympathetic to the current station colour palette of the Forbes Station awning ▸ The downpipe from the awning gutter should be relocated to reflect its position seen in the 1925 historical image ▸ Care should be taken to select a low-profile gutter close to that originally installed (refer to SoHI prepared by Ozark 2021) ▸ Unexpected finds procedure to provide a consistent method for managing any unexpected heritage or archaeological items and unexpected human skeletal remains.	Pre-construction/ construction
H6	The brackets attached to the Milvale Railway water tank would be removed in such a way so as not to damage the tank.	Construction

5.3 Biodiversity

5.3.1 Introduction

This section provides an assessment of potential impacts to biodiversity from the proposal. It includes a summary of the *Stockinbingal to Parkes (SP2), Horizontal Clearances, Biodiversity Assessment Report* prepared by WSP (2021c) (BAR) for the proposal. A copy of the BAR is included in Appendix D.

It is noted that an aquatic biodiversity assessment was not undertaken for the proposal, as no significant waterbodies are located within the proposal site or are likely to be affected by the proposal.

5.3.2 Legislation, policy, standards and guidelines

An indication of relevant legislation, policy and guidelines relating to biodiversity includes:

- BC Act
- EPBC Act
- Biosecurity Act
- *Biodiversity Assessment Method 2020* (DPIE, 2020b)
- *Threatened Species Test of Significance Guidelines* (Office of Environment and Heritage (OEH), 2018)
- *Significant Impact Guidelines 1.1—Matters of National Environmental Significance for EPBC Act listed biodiversity* (Department of the Environment, 2013)
- *Referral guidelines for species listed under the EPBC Act* (Department of the Environment and Energy, 2017).

5.3.3 Assessment methodology

The biodiversity assessment was undertaken in accordance, where applicable, with the Biodiversity Assessment Method (BAM) 2020. The BAM provides a consistent method to assess impacts on biodiversity values from a proposed development, activity, clearing or biodiversity certification as well as improvements in biodiversity values from management actions undertaken at a stewardship site.

5.3.3.1 Study area

The study area comprises of the proposal site and adjacent areas of vegetation and associated habitat surveyed as part of this investigation that may be subject to direct or indirect impacts as a result of a proposal (refer to Figure 5.11 and Figure 5.12).

5.3.3.2 Assessment

The BAR (Appendix D) addresses the requirements for assessment of significance under the NSW BC Act, and the Commonwealth EPBC Act. Mitigation measures to ameliorate ecological impacts arising from the proposal are also provided.

The biodiversity assessment involved:

- Describing the characteristics and ecological condition of the vegetation communities and habitats within the study area
- Determining the occurrence, or likelihood of occurrence of threatened species, populations and communities and their habitats listed under the BC Act, and EPBC Act within the study area
- Describing the potential impacts on biodiversity in the study area because of the proposal
- Undertaking a test of significance for threatened species and communities that are confirmed or considered likely to occur within the study area in accordance with Section 7.3 of the BC Act to determine whether the proposal is likely to significantly affect threatened species or communities, or their habitats
- Undertaking a test of significance for threatened species and communities that are confirmed or considered likely to occur within the study area in accordance with Division 12 of the FM Act
- Undertaking assessments in accordance with the *Matters of National Environmental Significance: Significant impact guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999* (Department of Environment, 2013) to consider impacts to nationally listed threatened species, ecological communities and migratory species
- Identifying management and mitigation measures to minimise construction and operation impacts of the proposal.

This report is used to determine if a species impact statement (SIS) or Biodiversity Development Assessment Report (refer Section 7.8 (3) of the BC Act) is required as part of this REF and whether the proposal is likely to result in a significant impact on a MNES that requires referral under the EPBC Act.

5.3.3.3 Desktop assessment

A desktop assessment of the state and Commonwealth published data that is listed in section 3.3 of Appendix D. A previous ecological investigation was completed for the proposal site and surrounding area; *Stockinbingal to Parkes Rail Upgrade—REF: Flora and Fauna Assessment Horizontal Track Clearances: Red Bend, Bribbaree and Wirrinya* (Narla Environmental, 2019). This report was reviewed as part of the desktop assessment to gain an understanding of biodiversity in and around the proposal site.

A desktop habitat assessment was also completed to assess the likelihood of occurrence of each threatened species, population and community identified with the potential to occur in or near the proposal site. The likelihood of occurrence assesses the likelihood of threatened species being found in a specific area as 'known, high, moderate, low or none'. Further details on the criteria is included in the BAR in Appendix D.

5.3.3.4 Field survey

Field surveys were completed to validate the results of the desktop assessment. The study area was inspected during daylight and nocturnal hours by qualified WSP ecologists on 29 and 30 January 2021. The study area was also inspected during daylight hours on 7 and 8 October 2021. The field survey sought primarily to identify key ecological constraints by assessing the type, extent and condition of vegetation and fauna habitat, especially as it pertained to threatened species and ecological communities.

Flora surveys were completed using the random meander survey, rapid point assessment techniques and vegetation integrity plots.

The fauna surveys involved habitat assessment, surveys for birds and opportunist fauna recordings.

Further details on the field survey methodologies are included in Section 3.4 of the BAR report in Appendix D.

5.3.4 Existing environment

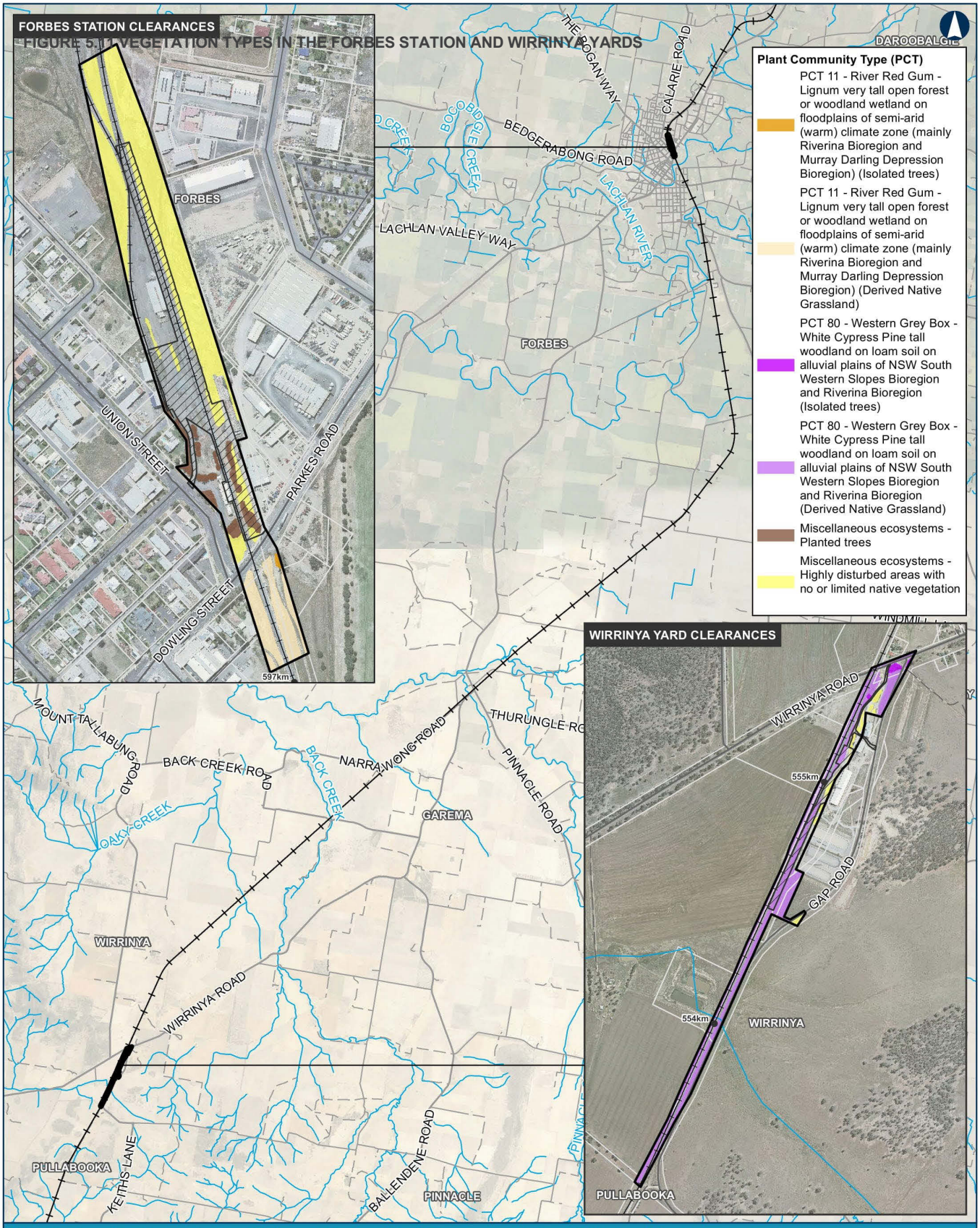
5.3.4.1 Vegetation

The study areas are in a heavily disturbed rail corridor and much of the original vegetation has been cleared. A summary of vegetation present within the study areas is provided in Table 5.17 and the mapped locations are shown in Figure 5.11 and Figure 5.12. As the proposed works at Quandialla Yard and Milvale Yard are minor and would not impact vegetation, these sites are not considered further.

Vegetation commensurate with threatened ecological communities (TEC) listed under the BC Act and the EPBC Act are present within the study areas as described in Table 5.17, including:

- PCT11: River red gum—lignum very tall open forest or woodland wetland on floodplains of semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (total of 0.6 hectares (ha) within the Forbes Station and Yard clearances study area)
- PCT26: Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion (total of 0.3 ha within the Caragabal Yard clearances study area)
- PCT76: Western grey box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (total of 3.7 ha within the Bribbaree Yard clearances study area)
- PCT80: Western grey box—white cypress pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion (total of 9.6 ha within the Wirrinya Yard clearances and Caragabal Yard clearances study areas).

The study area also contains areas that are attributed to miscellaneous ecosystems defined as highly disturbed areas with no or limited native vegetation. The vegetation at Forbes Station and Yard was disturbed with the site comprised mostly of miscellaneous ecosystems. The derived native grasslands at Wirrinya Yard, Bribbaree Yard and Caragabal Yard were in relatively good condition and were dominated by native species.


FORBES STATION CLEARANCES
FIGURE 5.11 VEGETATION TYPES IN THE FORBES STATION AND WIRRINYA YARDS
DAROOBALGIE
Plant Community Type (PCT)
PCT 11 - River Red Gum - Lignum very tall open forest or woodland wetland on floodplains of semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (Isolated trees)
PCT 11 - River Red Gum - Lignum very tall open forest or woodland wetland on floodplains of semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (Derived Native Grassland)
PCT 80 - Western Grey Box - White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion (Isolated trees)
PCT 80 - Western Grey Box - White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion (Derived Native Grassland)
Miscellaneous ecosystems - Planted trees
Miscellaneous ecosystems - Highly disturbed areas with no or limited native vegetation
THE BOGAN WAY
CALARIE ROAD
BEDGERABONG ROAD
BODGIE CREEK
LACHLAN RIVER
LACHLAN VALLEY WAY
FORBES
UNION STREET
PARKES ROAD
DOWLING STREET
597km
WIRRINYA YARD CLEARANCES
WIRRINYA ROAD
555km
GAP ROAD
554km
WIRRINYA
PULLABOOKA
MOUNT TALLABUNG ROAD
BACK CREEK ROAD
BACK CREEK
OAKY CREEK
NARRAWONG ROAD
THURUNGLE RD
PINNACLE ROAD
GAREMA
WIRRINYA
WIRRINYA ROAD
KEITHS LANE
BALLENDENE ROAD
PULLABOOKA
PINNACLE
Stockinbingal to Parkes Forbes Station & Wirrinya Yard Clearances
Figure 5.11 Vegetation Types in the Study Area
0 2 4 km
Coordinate System: GDA 1994 MGA Zone 55
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Date: 5/08/2021
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Scale: 1:125,000
Data Sources: ARTC, NSWSS
KM post
Existing railway
Main road
Local road
Track
Watercourse
Study area
Proposal site
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
INLAND RAIL
ARTC
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.
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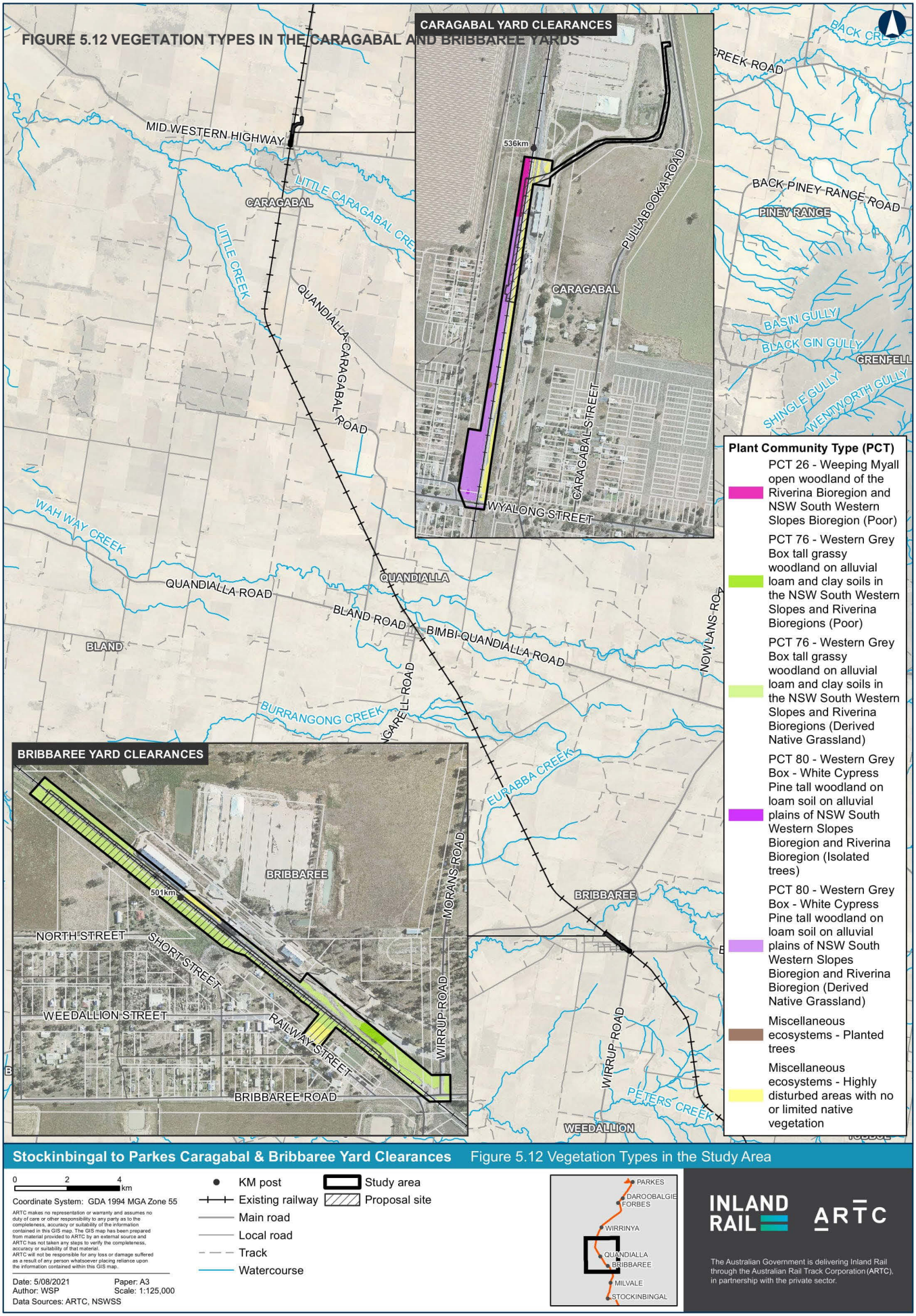
FIGURE 5.12 VEGETATION TYPES IN THE CARAGABAL AND BRIBBAREE YARDS
CARAGABAL YARD CLEARANCES
BRIBBAREE YARD CLEARANCES
MID WESTERN HIGHWAY
CARAGABAL
LITTLE CARAGABAL CREEK
LITTLE CREEK
QUANDIALLA-CARAGABAL ROAD
536km
PULLABOOKA ROAD
CARAGABAL STREET
WYALONG STREET
BACK CREEK ROAD
BACK PINEY RANGE ROAD
PINEY RANGE
BASIN GULLY
BLACK GIN GULLY
GRENFELL
SHINGLE GULLY
WENTWORTH GULLY
WAH WAY CREEK
QUANDIALLA ROAD
QUANDIALLA
BLAND ROAD
BIMBI-QUANDIALLA ROAD
BLAND
NOWLANS ROAD
GARELL ROAD
BURRANGONG CREEK
EURABBA CREEK
BRIBBAREE
501km
NORTH STREET
SHORT STREET
WEEDALLION STREET
RAILWAY STREET
BRIBBAREE ROAD
MORANS ROAD
WIRRUP ROAD
PETERS CREEK
WEEDALLION
Plant Community Type (PCT)
PCT 26 - Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion (Poor)
PCT 76 - Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Poor)
PCT 76 - Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Derived Native Grassland)
PCT 80 - Western Grey Box - White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion (Isolated trees)
PCT 80 - Western Grey Box - White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion (Derived Native Grassland)
Miscellaneous ecosystems - Planted trees
Miscellaneous ecosystems - Highly disturbed areas with no or limited native vegetation
Stockinbingal to Parkes Caragabal & Bribbaree Yard Clearances
Figure 5.12 Vegetation Types in the Study Area
0 2 4 km
Coordinate System: GDA 1994 MGA Zone 55
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Date: 5/08/2021
Author: WSP
Paper: A3
Scale: 1:125,000
Data Sources: ARTC, NSWSS
KM post
Existing railway
Main road
Local road
Track
Watercourse
Study area
Proposal site
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
INLAND RAIL
ARTC
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TABLE 5.17 PLANT COMMUNITY TYPES AND TECS RECORDED

Vegetation type	Condition	Vegetation formation	Vegetation class	NSW TEC listing	EPBC TEC listing	Area within Study area (ha)
Forbes Station and Yard clearances						
PCT11: River red gum—lignum very tall open forest or woodland wetland on floodplains of semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Isolated trees	Forested wetlands	Inland riverine forests	Not listed/ consistent with TEC listing.	Not listed/ consistent with TEC listing	<0.1
	Derived native grassland					0.5
Miscellaneous ecosystems	Highly disturbed areas with no or limited native vegetation	n/a	n/a	Not listed/ consistent with TEC listing	Not listed/ consistent with TEC listing	2.2
	Planted trees					0.3
Sub-total						**3.1**
Wirrinya Yard clearances						
PCT 80: Western grey box—white cypress pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion	Isolated trees	Grassy Woodlands	Floodplain transition woodlands	Inland grey box woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	Grey box (*Eucalyptus microcarpa*) Grassy woodlands and derived native grasslands of south-eastern Australia	0.2
	Derived native grassland					8.0
Miscellaneous ecosystems	Highly disturbed areas with no or limited native vegetation	n/a	n/a	Not listed/consistent with TEC listing	Not listed/consistent with TEC listing	1.0
Sub-total						**9.2**
Caragabal Yard clearances						
PCT 26: Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Poor	Semi-arid woodland (grassy sub-formation)	Riverine plain woodlands	Myall woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	Not consistent with TEC listing	0.2
PCT 80: Western grey box—white cypress pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion	Isolated trees	Grassy woodlands	Floodplain transition woodlands	Inland grey box woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	Grey box (*Eucalyptus microcarpa*) Grassy woodlands and derived native grasslands of south-eastern Australia	0.1
	Derived native grassland					1.4
Miscellaneous ecosystems	Highly disturbed areas with no or limited native vegetation	n/a	n/a	Not consistent with TEC listing	Not consistent with TEC listing	0.6
	Planted trees					0.1
Sub-total						**2.4**

Vegetation type	Condition	Vegetation formation	Vegetation class	NSW TEC listing	EPBC TEC listing	Area within Study area (ha)
Bribbaree Yard clearances						
PCT 76: Western grey box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	Poor	Grassy woodlands	Floodplain transition woodlands	Inland grey Box woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	Grey box (*Eucalyptus microcarpa*) Grassy woodlands and derived native grasslands of south-eastern Australia	0.1
	Derived native grassland					3.3
	Derived native grassland (not field verified)					0.3
Miscellaneous ecosystems	Highly disturbed areas with no or limited native vegetation	n/a	n/a	Not consistent with TEC listing	Not consistent with TEC listing	0.1
Sub-total						**3.8**
Total						**18.5**

Flora

Five threatened flora species are considered moderately likely to occur based on the presence of potential habitat associated with the PCTs identified in Table 5.17. PCT 76, 80 and 26 are known to provide habitat for many of the threatened flora species, including *Austrostipa metatoris*, *Austrostipa wakoolica*, *Diuris tricolor*, *Swainsona murrayana* and *Swainsona recta*. A survey was undertaken in October 2021 during the flowering period for these species and none were recorded; therefore, they are considered to have a low likelihood of occurring in the study area.

Priority and high-threat weeds

The study area is considerably disturbed and, consequently, weed species are common, particularly at roadside edges, along the edge of the rail line and along access tracks. The exotic species *Lactuca serriola, Paspalum dilatatum, Conyza bonariensis, Eragrostis cilianensis, Verbena bonariensis*, and *Polygonum aviculare* are common.

The study area contains a number of weed species that are identified as a high-threat weed, on the high-threat weeds list published in the BAM calculator, including *Heliotropium amplexicaule, Xanthium spinosum, Alternanthera pungens, Chloris gayana*, and *Paspalum dilatatum*. These species can be extremely difficult to effectively manage.

Heliotropium amplexicaule is the only weed species identified in the study area during the survey that is listed as a priority weed under the Biosecurity Act for the Central West region. No weeds of national significance (WoNS) listed under the National Weeds Strategy were noted during the survey.

No pests (fauna) were observed during the field survey; however, common pest species, such as rabbits, foxes and rats, are considered to commonly occur in rural areas and may be present within the study area.

5.3.4.2 Fauna

The desktop database searches and assessments identified 38 threatened species listed under the BC Act and/or the EPBC Act. A total of nine species were identified as having at least a moderate likelihood of occurring in the study area, and are summarised in Table 5.18.

Based on desktop database searches, 18 migratory species have been recorded or have potential habitat within the wider locality of the study area. No migratory species are considered to have a moderate or higher likelihood of occurrence based on the habitat available within the study areas.

One mammal species, the koala (*Phascolarctos cinereus*) was also considered to have a moderate or higher likelihood of occurrence. While terrestrial and marine migratory species of bird may potentially use the study area, the site would not be classed as 'important habitat' as defined by the *Significant Impact Guidelines 1.1—Matters of National Environmental Significance* (Department of the Environment, 2013).

A total of 32 fauna species were recorded during field surveys across all sites, including 31 birds and 1 mammal. No threatened species listed under the BC Act or EPBC Act were recorded in the study areas.

TABLE 5.18 THREATENED FAUNA SPECIES WITH A MODERATE OR HIGHER POTENTIAL TO OCCUR IN THE STUDY AREA

Fauna type	Listed under BC Act	Listed under EPBC Act
Woodland birds	Dusky woodswallow (*Artamus cyanopterus cyanopterus*) Grey-crowned babbler (*Pomatostomus temporalis temporalis*) Superb parrot (*Polytelis swainsonii*)	Superb parrot (*Polytelis swainsonii*)
Blossom nomad	Little lorikeet Swift parrot (*Lathamus discolor*)	Swift parrot (*Lathamus discolor*
Birds of prey	Spotted harrier (*Circus assimilis*) Black falcon (*Falco subniger*) Little eagle (*Hieraaetus morphnoides*)	
Mammals	Koala (*Phascolarctos cinereus*)	Koala (*Phascolarctos cinereus*)

Two fauna habitat types were recorded in the study area. A summary of these habitats and their corresponding PCTs are provided in Table 5.19. As no waterways intersect with the study areas, no aquatic habitat was identified, and further aquatic assessment has not been completed.

The study area is predominately disturbed; however, small areas PCTs associated with koala habitat and food tree species were present during field surveys. Based on the Koala Habitat Assessment Tool within the *EPBC Act referral guidelines for the vulnerable Koala* (Department of the Environment, 2014), habitat in the study area is not likely to constitute habitat critical to the survival of the species. No koalas were recorded in the study area during field surveys and only one record for this species was returned from the Atlas of NSW Wildlife database.

TABLE 5.19 FAUNA HABITAT TYPES

Fauna Habitat	Corresponding Vegetation Type	description
Open woodland	PCT 76, PCT 80, PCT 11 and PCT 26	Open woodland occurs in small disturbed patches along the rail corridor at Bribbaree Yard. The majority of open woodland occurrences were dominated by *Eucalyptus microcarpa* occurring as medium to larger remnant trees or as recruiting trees in heavily disturbed patches in the study area. Hollow-bearing trees were largely confined to those areas where large *Eucalyptus microcarpa* trees were present. Overall, the woodland habitat persists in a low-to-moderate condition due to the historic disturbance and removal of important microhabitats, causing a loss in microhabitat diversity, which usually corresponds to a greater diversity of fauna. The persistence of remnant *Eucalyptus microcarpa* and native grassy understorey does provide more substantial habitat for native fauna that utilise grassy open woodlands; however, open woodland patches within each of the study areas retained limited linkages with other remnant habitats in the landscape due to historical vegetation removal for agriculture. Consequently, each study area was highly fragmented from large intact habitat patches. Due to the degraded nature of the habitat and the predominately fragmented landscape, fauna species that are likely to use this habitat are those that are well adapted to disturbed habitat and are highly mobile.
Highly disturbed and exotic vegetation	Miscellaneous ecosystem—highly disturbed areas	Highly disturbed areas with exotic and planted vegetation was recorded predominantly within the rail corridor immediately adjacent to the existing rail. This habitat was largely limited to patchy infestations of exotic grasses, herbaceous weeds and planted trees/shrubs. These habitat patches were used predominately by open country bird species for foraging purposes during the field survey. These patches were heavily dominated with exotic species and, as a result, were in a low condition class as they lacked important microhabitat features, such as native tussocks, open rocky patches, fallen timber and old growth trees with hollows (see Figure 5.14).

FIGURE 5.13 OPEN WOODLAND—BRIBBAREE YARD

FIGURE 5.14 DISTURBED HABITAT WITH PLANTED TREES AND SHRUBS—FORBES STATION AND YARD

5.3.5 Potential impacts

The proposal has the potential for direct impacts on biodiversity during construction and operation, including:

- Removal of native vegetation
- Removal of threatened fauna habitat
- Injury and mortality.

Indirect impacts from the proposal include:

- Wildlife connectivity and habitat fragmentation
- Edge effects on adjacent native vegetation
- Weed dispersal
- Invasion and spread of pests and pathogens, and disease
- Noise and vibration
- Dust and light pollution.

While groundwater dependent ecosystems (GDEs) are present, the proposal does not involve interference with groundwater, so is considered unlikely to directly or indirectly interfere with subsurface or groundwater flows associated with any GDEs in or adjacent to the study area. Potential impacts to biodiversity relevant to each phase of the proposal are discussed in the following sections.

5.3.5.1 Construction impacts

Removal of native vegetation

The construction of the proposal would require the removal of approximately 3.3 ha of native vegetation from PCT 26, PCT 76 and PCT 80 across all of the sites. Approximately 0.8 ha of miscellaneous ecosystems would be impacted. Impacts to each site for native PCTs is provided in Table 5.20. The majority of impact to native vegetation would occur from disturbance to areas of derived native grassland adjacent to the rail line, including 2.1 ha of impact at Bribbaree Yard.

PCT 76 and PCT 80 correspond directly to the BC Act listed inland grey box woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions TEC and the EPBC listed Grey box (*Eucalyptus microcarpa*) Grassy woodlands and Derived native grasslands of the south-eastern Australia TEC. As such, the direct impact to this TEC is estimated to be approximately 3.2 ha.

PCT 26 corresponds directly to the BC Act listed Myall woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions TEC. As such, the direct impact to this TEC is estimated to be less than 0.1 ha. The vegetation present does not correspond to the EPBC Act TEC listing.

Based on the small extent of native vegetation to be removed and the presence of similar vegetation in the locality, potential impacts to native vegetation as a result of construction works are not likely to be significant.

TABLE 5.20 POTENTIAL DIRECT IMPACTS ON NATIVE VEGETATION

Vegetation type	Condition	Vegetation formation	Vegetation class	NSW TEC listing	EPBC TEC listing	Area within Study area (ha)	Potential impact (ha)
Forbes Station and Yard							
PCT 11	Isolated trees	Forested wetlands	Inland riverine forests	Not listed	Not listed	<0.1	No impact
	Derived native grassland					0.5	No impact
Sub-total						**0.6**	**No impact**
Wirrinya Yard							
PCT 80	Isolated trees	Grassy woodlands	Floodplain transition woodlands	Yes	Yes	0.2	No impact
	Derived native grassland					8.0	1.0
Sub-total						**8.2**	**1.0**
Caragabal Yard							
PCT 26	Poor	Semi-arid woodland (grassy sub-formation)	Riverine plain woodlands	Yes	Not listed	0.2	0.1
PCT 80	Isolated trees	Grassy woodlands	Floodplain transition woodlands	Yes	Yes	<0.1	No impact
	Derived native grassland					1.4	0.1
Sub-total						**1.7**	**0.2**
Bribbaree Yard							
PCT 76	Poor	Grassy woodlands	Floodplain transition woodlands	Yes	Yes	0.1	No impact
	Derived native grassland					3.3	1.8
	Derived native grassland (not field verified)					0.3	0.3
Sub-total						**3.7**	**2.1**
Total						**17.3**	**3.3**

Removal of threatened fauna habitat

The potential impacts to threatened fauna species from the proposal is estimated to include the removal of approximately 3.3 ha of potentially suitable habitat from PCT 26, PCT 76 and PCT 80 across the various study areas (refer to Table 5.20). This habitat is associated with four threatened fauna species with a moderate or higher potential to occur within the study area (refer to Section 5.3.4.2), including:

- Grey-crowned babbler (eastern subspecies) (*Pomatostomus temporalis temporalis*)
- Spotted harrier (*Circus assimilis*)
- Black falcon (*Falco subniger*)
- Little eagle (*Hieraaetus morphnoides*).

The proposal would not result in any impacts to hollow-bearing trees.

No fauna species are considered likely to be significantly impacted by the proposal due to the small extent of habitat impact and the presence of similar habitats in the locality.

Injury and mortality

Fauna injury or death has the greatest potential to occur during construction when vegetation clearing would occur. The extent of this impact would be proportionate to the extent of vegetation that is cleared. Less mobile species (e.g. ground dwelling reptiles and frogs), or those that are nocturnal and nest or roost in trees during the day, may find it difficult to rapidly move away from the clearing when disturbed.

Wildlife may also become trapped in open excavations or may choose to shelter in machinery that is stored in the study area overnight. If these animals were to remain inside the machinery, or under the wheels or tracks, they may be injured or may die once the machinery is in use.

Due to historic land-clearing practices, fauna habitats available in the study area were structurally simplified and consistent with derived native grassland, poor condition and isolated tree forms of PCT 76, PCT 80, PCT 11 and PCT 26. The lack of structural habitat complexity and the paucity of important microhabitat features restricted the study area's ability to support an otherwise diverse fauna. Accordingly, vehicle strike and injury and mortality during construction works is not likely to be significant.

Wildlife connectivity and habitat fragmentation

Habitat fragmentation relates to the physical dividing up of once-continuous habitats into separate smaller fragments. The habitats within the study area are fragments that have formed since the initial habitat clearing that has occurred. The current rail line and roads divide the habitats in the study area; however, functional habitat connectivity for more mobile species (e.g. birds, flying-foxes, insectivorous bats, insects, plants) is still present. The current rail line and roads do not totally prevent fauna movement between habitat fragments (fauna can and likely do cross the rail line) but the rail line does present a hazard to movement.

The proposal is unlikely to break apart continuous habitats into separate smaller fragments. The proposal may, however, result in an increase in isolation of habitats as the current habitat patches would potentially be made smaller, which would increase the physical distance between habitat fragments. The isolation that may be caused by the proposal is not likely to have an appreciable impact on nomadic or migratory species such as birds. The proposal would not limit the dispersal of species of frogs and reptiles. This impact would be of low magnitude and mitigation measures are not deemed necessary.

Edge effects on adjacent native vegetation

The development of linear infrastructure has the potential to reduce habitat quality in adjacent areas (known as 'edge effects'). The proposal would be built in an area that is currently subject to a high level of edge effects from the existing rail line, adjacent roads and agricultural land tenures. There is unlikely to be any further impacts from edge effects resulting from the proposal. This impact would be of low magnitude and mitigation measures are not deemed necessary.

Weed dispersal

The proposal has the potential to further disperse weeds into nearby areas of native vegetation. The greatest potential for weed dispersal and establishment associated with the proposal would include earthworks, movement of soil and attachment of seed (and other propagules) to vehicles and machinery where these are utilised within or adjacent to retained vegetation. The clearing of native vegetation for the proposal, including earthworks, would increase the potential for weed invasion into adjacent patches of native vegetation. Management measures would be required to minimise the risk of introduction and spread of weeds. With appropriate weed management, the overall impact of weed invasion on retained vegetation is likely to decrease in the medium to long term.

Invasion and spread of pests, pathogens and disease

Plant and animal pathogens can affect threatened biodiversity through direct mortality and modification to vegetation structure and composition. The following pathogens are considered to have potential to affect the biodiversity within the proposal impact area and are the subject of Key Threatening Process listings:

- Amphibian chytrid fungus (*Batrachochytrium dendrobatidis*)
- Exotic rust fungi (order Pucciniales, e.g. Myrtle rust fungus *Uredo rangelii*)
- Phytophthora root rot fungus (*Phytophthora cinnamomi*).

These three pathogens have all been recorded in the bioregion and have potential to occur within the proposal area at present or in the future. The main way in which exotic rust fungi and Phytophthora root rot fungus may be spread is through the movement of infected plant material and/or soil. The construction and operation of the proposal may increase the risk of disturbing and spreading these pathogens. With the implementation of hygiene procedures for the use of vehicles and the importation of materials to the impact area, the risk of introducing these pathogens would, however, be low. Amphibian chytrid fungus can be spread through the movement of infected animals or water (including mud or moist soil) from infected areas; however, the risk of introducing this pathogen to uninfected areas is low.

The proposal is not considered likely to result in impacts from pest species during construction.

Noise and vibration

Considering the existing levels of noise and vibration from the rail line it is unlikely there would be a significant increase in noise and vibration that would result in any increased impacts to biodiversity within the study area. There is, however, potential for impacts to locally common fauna from noise and vibration during construction, which may result in fauna temporarily avoiding habitats adjacent to construction. The magnitude of this impact would be low and mitigation measures are not deemed necessary.

Dust and light pollution

The proposal site generates minimal dust and air pollutants from the passing of freight trains. There would be dust generated from construction activities (refer to Section 5.10.3); however, deposition of dust on foliage is likely to be highly localised, intermittent and temporary (particularly during the wetter seasons) and is therefore not considered likely to be a major impact.

While the construction works would generally occur during day-time hours, some lighting may be required outside of standard working hours, including temporary spotlights in support of short-duration night works (when required) and headlights from staff and construction vehicles accessing the site. This would occur for a short duration each day and for a short time within the proposal construction program. Minor security lighting may also be required at the compound sites—at site access, storage and laydown ancillary areas. The potential impacts from lighting would be short term. The lighting may result in impacts to nocturnal fauna. Common nocturnal species, such as possums and microbats, may avoid the habitat in the proposal impact area during construction as temporary 'daylight' conditions would be created by the temporary spotlights. This impact is considered temporary and would not have long-lasting effects on biodiversity.

5.3.5.2 Operational impacts

There would be an increase in the frequency of freight trains within the study area during the operation of the proposal. As a result, there is potential for an increase to the following impacts:

- Fauna injury or death as a result of train strike
- Weed dispersal and/or invasion and spread of pathogens and disease attached to trains
- Avoidance of habitat by fauna as a result of light spill from train headlights and/or noise and vibration from train movements.

As the proposal would operate within an existing rail corridor, operational impacts have the potential to incrementally increase in frequency rather than impacting new areas. Operational impacts are not considered likely to increase considerably as a result of the proposal and the impacts are not likely to be significant.

The proposal would not result in further vegetation clearing. As such, additional impacts to native vegetation, threatened flora or fauna habitat, and other impacts associated with vegetation clearing (including wildlife connectivity, habitat fragmentation and edge effects) are not anticipated for operation of the proposal.

5.3.5.3 Assessment of significance

Although efforts have been made to avoid, minimise and mitigate potential ecological impacts from the proposal, some residual impacts would occur. This biodiversity assessment identified that the proposal's impacts, both proportionally and ecologically, are not likely to have a significant impact on any threatened biodiversity listed under the BC Act or EPBC Act. Accordingly, a SIS and EPBC Act referral are not considered a requirement for the proposal. The proposal will be referred to the Australian Minister for the Environment for assessment to confirm that approval under the EPBC Act is not required

5.3.6 Mitigation and management measures

Table 5.21 provides a summary of the project-specific mitigation and management measures that will be implemented to protected biodiversity values which are over and above contemporary standard practice for environmental management during the construction and operation of the proposal.

TABLE 5.21 BIODIVERSITY SITE-SPECIFIC CONTROL MEASURES

ID	Control measures	Stage
BD1	Detailed design and construction planning would avoid or minimise the need to remove and/or disturb native vegetation and fauna habitat.	Detailed design/ pre-construction
BD2	Vegetation clearing would be limited to the minimum necessary to construct the proposal and allow for its effective operation.	Detailed design/ pre-construction

ID	Control measures	Stage
BD3	A Biodiversity Management Plan would be prepared prior to construction and implemented as part of the CEMP. The plan would include measures to manage biodiversity and minimise the potential for impacts during construction. The plan would be prepared in accordance with relevant legislation, guidelines and standards. The plan would include but not be limited to: ▸ Locations and requirements for pre-clearing surveys, including terrestrial habitats, breeding habitats (including burrows, trees, logs, existing culverts and structures) ▸ The clearing extents/site boundary/limit of works is clearly defined with flagging or marking tape, signage or other suitable means to delineate no-go areas ▸ Establishing protocols for the staged clearing of vegetation and safe tree felling and log removal to reduce the risk of fauna mortality ▸ Establish daily checks in machinery and excavations for presence of fauna to reduce the risk of fauna mortality ▸ Animal-handling protocols, including relocation and emergency care ▸ An unexpected finds protocol ▸ Measures to manage biosecurity risks in accordance with the *Biosecurity Act 2015* (NSW) erosion and sediment control measures.	Construction
BD4	Exclusion areas would be established and maintained around native vegetation to be retained, particularly areas of biodiversity value adjoining the proposal site that are located in close proximity to work areas.	Construction
BD5	A rehabilitation strategy would be based on the Inland Rail Landscape and Rehabilitation Strategy, the Inland Rail Landscape and Rehabilitation Framework and property-specific reinstatement commitments. This would guide the approach to rehabilitation of disturbed areas following the completion of construction. The strategy would include: ▸ Clear objectives and timeframes for rehabilitation works (including the biodiversity outcomes to be achieved) ▸ Details of the actions and responsibilities to progressively rehabilitate, regenerate, and/or revegetate areas, consistent with the agreed objectives ▸ Identification of flora species and sources ▸ Procedures for monitoring the success of rehabilitation ▸ Corrective actions should the outcomes of rehabilitation not conform to the objectives adopted.	Construction

5.4 Surface water (hydrology and flooding)

5.4.1 Introduction

This section provides a summary of the *Stockinbingal to Parkes (S2P)—Horizontal Clearances, Surface water impact assessment* by WSP (2021) (Surface water assessment) for the proposal and describes the hydrology of the proposal, along with the potential impacts to and from surface water and flooding. A copy of the surface water assessment is included in Appendix I.

5.4.2 Legislation, policy, standards and guidelines

The surface water assessment would be undertaken in accordance with the following guidelines:

- WM Act
- Water Act
- *Australian Governments Climate Change Impacts and Risk Management—A Guide for Business and Government* (Department of Environment and Energy, 2006)
- *Australian Rainfall and Runoff Guidelines* (ARR2019) (Ball et al., 2019)
- *Forbes Development Control Plan 2013*
- *Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia* (Australian Institute for Disaster Resilience, 2013)
- *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004) *and Volume 2* (Department of Environment, Climate Change and Water (DECCW), 2008)
- *Murray Darling Basin Plan 2012* (Murray-Darling Basin Authority, 2012)

- *NSW Floodplain Development Manual and Flood Prone Land Policy* (Department of Infrastructure, Planning and Natural Resources (DIPNR), 2005).

5.4.3 Assessment methodology

5.4.3.1 Study area

The proposal site is located adjacent to and over the Lachlan River, within the Lachlan River catchment. Based on review of aerial photographs, topography and other relevant data sources, the study area was considered to be the proposal site with an initial buffer area of 200 m.

The technical study area for the hydrology, drainage and flooding, and water quality impact assessment is the area that may be directly or indirectly affected by the enhancement sites, including sensitive receiving environments downstream of the proposal sites.

5.4.3.2 Flooding and drainage assessment

The drainage and flood impact assessment involved:

- Review of flooding information available to identify the extent of the flood plain at the proposal sites (i.e. *Forbes Flood Study* (Lyall & Associates, 2018))
- Review of any historic information and other studies to inform flood behaviour, and also inform existing waterway health and flood risks/mechanisms across the study area
- Review of the proposed works to identify changes that might affect the existing waterways, drainage and flood conditions that may cause impacts (during construction and operation)
- Identifying management and mitigation measures to minimise construction and operation impacts of the proposal.

5.4.4 Existing environment

The proposal is located in the Lachlan River catchment of the Murray-Darling Basin. The major watercourse of this catchment is the Lachlan River, which runs in a general westerly direction from the Breadalbane Plain between Goulburn and Yass, to the Murrumbidgee River near Oxley (Murray Darling Basin Authority, 2021).

The Forbes Station and Yard site is located in the Lake Forbes and Back Yamma sub-catchments. Lake Forbes is a large body of water in Forbes that joins the Lachlan River to the west of Forbes.

The northern portion of the Wirrinya Yard is located in the Ooma Creek and tributaries sub-catchment. Ooma Creek rises near Weddin Gap and flows in a northerly then westerly direction until it reaches Culingatel Lagoon and Jemalong Creek north of the Newell Highway near Wirrinya.

The Caragabal Yard, Quandialla Yard, Bribbaree Yard, Milvale Yard and the southern portion of the Wirrinya Yard clearances are located within the Western Bland Creek sub-catchment. Bland Creek is a semi perennial creek that runs from west of Cootamundra to Lake Cowal. Bribbaree Creek and Wah Wah Creek, which are located nearby the Quandialla and Bribbaree Yard sites, are tributaries to Bland Creek.

5.4.4.1 Watercourses and bodies

Table 5.22 describes the waterways and farm dams within or near the sites.

TABLE 5.22 WATERWAYS AND FARM DAMS NEAR OR CROSSED BY THE SITES

Site	Water way	Farm dams
Forbes Station and Yard	Both Lake Forbes and Lachlan River are located about 250 m and 2 km, respectively, to the south downstream of the site.	One farm dam located 120 m to the north-west of the site. The site is not expected to drain to this farm dam.
Wirrinya Yard	A drainage channel crosses the rail corridor 470 m south of the site at chainage 554.02 km. The drainage collects surface water runoff from upstream (east of the site) catchment. Unnamed water course is located 7 km south of the site. The unnamed water course discharges to Sandhill Plain Creek.	One farm dam is located approximately 35 m to the east of the site. Two farms dams are located approximately 60 m to the south downstream of the site.
Caragabal Yard	Caragabal Creek is located 500 m to the south downstream of the site.	One farm dam located 100 m to the east, which the site would drain towards and one farm dam is located 150 m to the west, which are not expected to receive runoff from the site.

Site	Water way	Farm dams
Quandialla Yard	Unnamed tributary to Wah Wah Creek is located about 170 m to the east downstream of the site.	Three farm dams located on the tributary are over 160 m to the north east downstream of the site. One farm dam located 190 m to the south east upstream of the site.
Bribbaree Yard	Bribbaree Creek located 500 m to the north west downstream of the site.	One farm dam located adjacent to the site to the south and five farm dams located about 100 m to the north which the site would drain towards.
Milvale Yard	Unnamed tributary to Milvale Creek located about 500 m to the south downstream of the site.	One farm dam located 150 m to the south. One located 120 m east. Four dams located along the tributary to Milvale Creek downstream of the site.

5.4.4.2 Drainage

Table 5.23 describes the topography and general drainage patterns at each enhancement site.

TABLE 5.23 TOPOGRAPHY AND DRAINAGE OF THE ENHANCEMENT SITES

Site	Topography and drainage description
Forbes Station and Yard	The site is generally flat and there are no formal cess drains along the rail corridor. Surface water runoff flows according to the topography in a southern direction.
Wirrinya Yard	The site is located at 268 m Australian Height Datum (mAHD) elevation and slopes to the south west. Surface water runoff flows according to the topography in a south-west direction towards the farm dam located to the east of the site.
Caragabal Yard	The site is at about 226 mAHD elevation. The surrounding area is generally flat, at about 224 to 226 m elevation. Surface water runoff gently flows according to the local topography towards farm dam to the east.
Quandialla Yard	The site is located at about 247 mAHD elevation. The area is generally flat and there are no formal cess drains along the rail corridor. The land slopes away from the rail on both sides, towards the tributary on the northern side and in a north-west direction towards Wah Wah Creek on the southern side.
Bribbaree Yard	The site is located at about 258 m to 254 mAHD elevation. The surrounding land generally slopes to the north west towards Bribbaree Creek. There are localised low points around the farm dams present. Surface water runoff flows according to the topography.
Milvale Yard	The site is located at about 278 mAHD. The surrounding land slopes generally to the south and west towards the tributary to Milvale Creek. There is a localised low point at the farm dam located to the east.

5.4.4.3 Flooding

Forbes Station and Yard clearances site is located within flood-prone land under the Forbes LEP. All other sites are not mapped within flood-prone land.

The flood conditions at the Forbes Station and Yard clearances site and surrounding areas were defined using the hydraulic model developed in 2020 by Lyall & Associates as part of the *Forbes Flood Study*. Flooding is considered in terms of the annual exceedance probability (AEP), which is the probability that a given rainfall volume accumulated over a given duration will be exceeded in any one year.

The Forbes Station and Yard site is located at the edge of the flood extent, with varying across the site with flood depths up to 1.6 m, as shown in Figure 5.15.

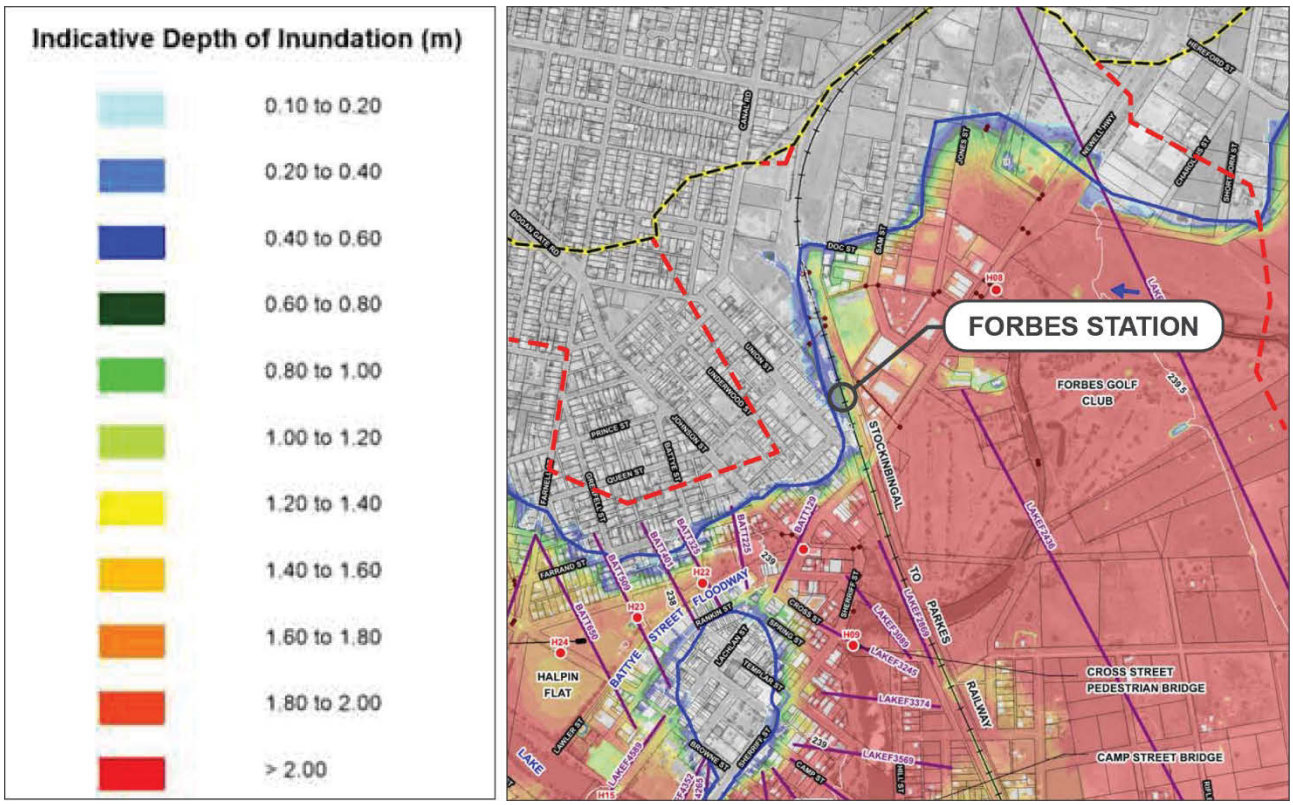


FIGURE 5.15 1% AEP FLOOD EXTENT AT FORBES STATION (LYALL & ASSOCIATES, 2020)

5.4.4.4 Sensitive receivers

The Lachlan River catchment features several significant wetlands that are considered of national significance, particularly for waterbird habitat; however, the closest of these features is Lake Cowal, which is located 29 km west of the Wirrinya Yard clearances enhancement site and downstream of the Bribbaree and Wah Wah Creeks. No Ramsar wetlands are located in close proximity to the proposal site.

5.4.5 Potential impacts

5.4.5.1 Construction

Flooding

The Forbes Station and Yard site is located in a flood-prone area. As such, the construction work is subject to impacts from flooding. A flood event during construction would present a risk to construction site staff and may cause damage and wash out of construction materials, machinery and equipment.

Presence of construction compounds, stockpiles and laydown area during construction may interrupt overland flow paths in the Forbes Station and Yard site. Stockpiles and construction compounds may result in changes to flood behaviour beyond the proposal site as it could redistribute and redirect floodwaters, and subsequently impact other land and infrastructure. During construction, the impacts to flood behaviour are likely to be temporary, localised and insignificant.

Drainage

Required earthworks, stockpiles and construction compounds at Forbes Station, Wirrinya, Caragabal and Bribbaree Yard clearances sites may interrupt or alter overland flow paths. This may cause short-term minor impacts to site drainage patterns, which may have impacts on construction activities or other nearby properties. Due to the short-term (two days) and minor natures of the work proposed at Milvale Yard and Quandialla Yard sites, impact to drainage would be negligible.

Water use

Water would be required for earthworks and dust suppression at every enhancement site except Quandialla Yard and Milvale Yard. It is anticipated that 3.6 megalitres (ML) of water would be required for the proposal. Forbes Station and Yard clearances and Bribbaree Yard clearance is anticipated to require the largest portion of water due to the larger extent of track works and earthworks proposed.

Local water suppliers, including councils and quarries, would be consulted to obtain the required water demand. Extraction from bores and surface water is not anticipated to be required for the proposal. All potable water would be from potable water deliveries to site compound water tanks. This is not considered to have an impact on local and regional surface water availability.

5.4.5.2 Operation

Drainage

The proposed works do not change the existing catchments and waterways. At Forbes Station and Yard, and Bribbaree Yard sites, cess drains are proposed to collect and convey surface water runoff from the rail formation towards drainage outlets. The new drainage infrastructure proposed has been designed to avoid diversion or disturbance of existing drainage and flooding patterns through and around the rail corridor.

Flooding

As a result of the track works at Forbes Station, the level of the realigned track would likely be raised by approximately 27 mm. This minimal change in rail level has negligible effects on flood impacts in terms of regional flooding, due to minimal loss of the flood storage capacity and long flood event durations. Water would flow through the ballast within the limited section of the proposed vertical alignment without creating flood impacts. Changes in flood hazard are negligible as there are no changes in water level, flood extent, flow and velocity.

Water use

The operation of the proposal would not change the existing water use.

5.4.6 Mitigation and management measures

Table 5.24 provides a summary of the project-specific mitigation and management measures that will be implemented during the construction and operation of the proposal to protect and minimise the impacts to surface water (hydrology and flooding) that are over and above contemporary standard practice for environmental management. A Flood and Emergency Response Plan as part of the CEMP is identified as a mitigation measure in Section 5.10.5.

TABLE 5.24 SURFACE WATER (HYDROLOGY AND FLOODING) SITE-SPECIFIC CONTROL MEASURES

ID	Control measures	Stage
SW1	Construction planning, and the layout of construction work sites and compounds, would be undertaken with consideration of overland flow paths and flood risk.	Detailed design/ pre-construction

5.5 Waste

5.5.1 Introduction

This section describes the waste streams associated with the proposal and provides mitigation measures for the minimisation and management of waste in accordance with relevant guidelines.

5.5.2 Legislation, policy, standards and guidelines

The relevant legislation, policy standards and guidelines include:

- POEO Act
- Protection of the Environment Operations (Waste) Regulation 2005
- *NSW Waste and Sustainable Materials Strategy 2041* (DPIE, 2021i)
- *Waste Avoidance and Resource Recovery Act 2001* (NSW)
- *NSW Waste Classification Guidelines—Part 1: Classification of Waste* (EPA, 2014b)
- ARTC's *Earthworks Materials Management Guideline*.

5.5.3 Assessment methodology

The assessment of waste generation from the proposal included:

- Review of regulatory frameworks for waste management requirements

- Review of relevant land and structure conditions
- Identification of potential waste-generating activities and types of wastes
- Classification of potential waste types identified, including consideration of assessment of land resources
- Estimation of quantities of each classification of waste
- Identification of risks associated with waste arising from the proposal
- Identification of waste-handling procedures, waste minimisation and reuse strategies
- Identifying management and mitigation measures to minimise construction and operation impacts of the proposal.

5.5.4 Existing environment

The existing land use at the proposal site, as a railway corridor, generates negligible waste quantities. Small amounts of waste may be generated during maintenance works on the railway corridor. When waste cannot be avoided, re-used or recycled from maintenance works, the following waste management facilities in the region are available for waste disposal:

- Daroobalgie Waste Management Facility (Calarie-Daroobalgie Rd, Calarie NSW)
- Bedgerabong Landfill (Darcys Lane, Bedgerabong NSW)
- Garema Landfill (Pinnacle Road, Garema NSW)
- Grenfell Waste Depot (Gooloogong Road, Grenfell, NSW)
- Victoria St Transfer Station and Material Recovery Facility Young (Victoria Street, Young NSW)
- Redhill Rd Landfill Facility (Redhill Road, Young NSW).

5.5.5 Potential impacts

Most of the waste generated by the proposal would be during construction. The classifications that apply to waste in NSW, and the descriptions of each, are provided by the POEO Act, and the Waste Regulation and supporting guidelines, including the *Waste Classification Guidelines—Part 1: Classification of Waste* (EPA, 2014b).

Construction waste would generally be managed according to the waste hierarchy:

1. Avoid and reduce waste
2. Re-use waste
3. Recycle waste
4. Dispose of waste.

Should reuse or recycling not be viable options, waste would be disposed of at a licensed landfill in accordance with *NSW Waste Classification Guidelines—Part 1: Classification of Waste* (EPA, 2014b).

The key waste-generating activities during construction, along with key potential waste streams and likely classification, is provided in Table 5.25.

TABLE 5.25 POTENTIAL WASTE GENERATION DURING CONSTRUCTION

Activity	Potential waste stream	Likely classification of waste streams
Clearing during site establishment	Vegetation/green waste	General solid waste (putrescible), only if contamination is not encountered
Demolition or removal of existing structures such as track, water tank components and awning material.	Metals, steel reinforcement, concrete and ballast (rock) Potential asbestos, lead-based paint and other hazardous materials from structures proposed to be removed	General solid waste (non-putrescible) Special waste Hazardous waste
Earthworks	Excavated soil, sediment and rock (spoil)	General solid waste (non-putrescible)
	Potential contaminated or unsuitable spoil materials	Hazardous waste

Activity	Potential waste stream	Likely classification of waste streams
General construction wastes	Metals, timbers, plastics and packaging associated with deliveries Waste oil, grease, lubricants, oily rags and filters from use of plant and equipment	General solid waste (non-putrescible)
Construction workers	Food, glass, plastic and paper in small volumes throughout construction related to number of workers on site at any time	General solid waste (non-putrescible)
Site amenities and washdown facilities	Wastewater	Liquid waste

Wastewater from compounds would be collected and disposed of offsite by a licensed contractor. Minor quantities of general waste (non-putrescible) from workers and construction materials would be separated and classified to facilitate re-use and recycling, where feasible.

Due to the earthworks and replacement of track formation proposed at Forbes Station and Yard, and Bribbaree Yard, moderate quantities of spoil would be generated and waste ballast from the replacement of track formation, as outlined in Table 5.26. Sleepers and rail would be reused during track works where they are in a suitable condition. Excavated earthworks materials (spoil and ballast) will be assessed in accordance with ARTC's *Earthworks Materials Management Framework ETC-08-03*. This excavated materials from earthworks would be stockpiled onsite and tested for beneficial reuse in accordance with an EPA administered Resources Recovery Order or Exemption.

Table 5.26 Estimation of spoil and unsuitable existing ballast to be removed from site

Site	Spoil from earthworks	Waste ballast
Forbes Station and Yard	1,290 m^3	800 m^3
Bribbaree Yard	2,720 m^3	1,700 m^3
Total	4,010 m^3	2,500 m^3

5.5.5.1 Operation

No changes to operational waste-generating practices within the proposal site are anticipated as a result of the proposal.

5.5.6 Mitigation and management measures

Table 5.27 provides a summary of the project specific mitigation and management measures that will be implemented during the construction and operation of the proposal to minimise the impacts of waste that are over and above contemporary standard practice for environmental management.

TABLE 5.27 WASTE MANAGEMENT SITE-SPECIFIC CONTROL MEASURES

ID	Control measures	Stage
W1	Detailed design would include measures to minimise spoil generation. This would include a focus on optimising the design to minimise spoil volumes and the reuse of material onsite.	Detailed design/ pre-construction
W2	A spoil management strategy would be developed to define the preferred approach to managing spoil. The strategy would include: ▸ Consideration of the approvals and land application of waste exemptions required, associated lead time and any associated sampling and reporting obligations ▸ Defining the preferred option for reusing and/or disposing of any spoil ▸ The outcomes of the strategy would inform the Construction Waste Management Plan.	Pre-construction/ construction
W3	A Construction Waste Management Plan would be prepared and implemented as part of the CEMP. The plan would adopt the waste hierarchy principles contained in the *Waste Avoidance and Resource Recovery Act 2001* (NSW), and detail processes, responsibilities and measures to manage waste and minimise the potential for impacts during construction. This plan would include: ▸ General protocols and performance objectives for keeping the worksite clean and tidy ▸ Processes for monitoring, documenting and reporting waste types, volumes and how these arisings compare to waste targets (e.g. describe waste streams and estimated volumes, temporary waste storage areas and disposal locations on and offsite) as well as waste disposal and National Environmental Protection Measures (NEPM) criteria for disposal sites ▸ Requirements for waste segregation	Pre-construction/ construction

ID	Control measures	Stage
	▸ Requirements for secure temporary storage, collection frequency and disposal/recycling requirements ▸ Effluent management for construction staff amenities ▸ Procedures and reporting/documentation requirements for ensuring waste transporters and receivers are appropriately licensed according to the type of waste ▸ Requirements for training, inspections, audits, corrective actions, notification and classification of environmental incidents, record keeping, monitoring and performance objectives for handover on completion of construction ▸ Any other regulatory requirements.	
W4	All waste generated would be classified in accordance with the *Waste Classification Guidelines—Part 1: Classification of Waste* (EPA, 2014b) and disposed of in accordance with the relevant requirements of the Protection of the Environment Operations (Waste) Regulation 2014.	Construction
W5	All earthworks materials would be assessed against ARTC's Earthworks Materials Management Guideline, Appendix B of ETC-08-03 Rev1.3, which would determine the classification and locating/disposal options for any excess materials.	Construction

5.6 Visual amenity

5.6.1 Introduction

This section outlines the impacts of the proposal on visual amenity.

5.6.2 Legislation, policy, standards and guidelines

The relevant legislation, policy standards and guidelines include:

- *Guideline for Landscape Character and Visual Impact Assessment EIA-N04* (TfNSW, 2020)
- *Central West and Orana Regional Plan 2036* (DPIE, 2017a)
- *Destination Country and Outback NSW: Destination Management Plan 2018–2020* (NSW Government, 2018c)
- *Forbes, Weddin and Young LEP*
- *Control of the obtrusive effects of outdoor lighting AS4282-2019* (Standards Australia, 2019).

5.6.3 Assessment methodology

5.6.3.1 Study area

The visual study areaincludes the potential visual catchment of the proposal.

5.6.3.2 Assessment process

The assessment methodology for visual impacts included:

- Determining the existing landscape character and views to the site based on a desktop review of aerial photographs and topographic maps
- Identifying potential views to the site and the sensitivity of the visual receivers (refer to Table 5.28)
- Identifying the night-time visual sensitivity by determining the environmental zone(s) (defined in AS/NZS 4282:2019 *Control of the obtrusive effects of outdoor lighting*)
- Qualitative assessment of the potential impacts on views, including the magnitude of change predicted (refer to Table 5.29), and assigning an impact level (refer to Table 5.30)
- Identifying management and mitigation measures to minimise construction and operation impacts of the proposal.

Due to the minor nature of the water tanks works at Milvale Yard and Quandialla Yard, involving removal of redundant wiring and pipework, a visual impact assessment was not completed on these sites.

TABLE 5.28 SENSITIVITY LEVELS

Sensitivity	Visual description	Night-time description[1]
High	Heavily experienced view to a feature or landscape that is iconic nationally or within the state. Views from World Heritage Listed Places. Views to areas with a scenic value recognised by the state or nationally. These views are generally unique or uncommon nationally or state-wide.	Environmental Zones A0: Intrinsically dark or A1: Dark. UNESCO Starlight Reserve, IDA Dark Sky Parks. Major optical observatories, no road lighting—unless specifically required by the road controlling authority. Relatively uninhabited rural areas. No road lighting—unless specifically required by the road controlling authority.
Moderate	Heavily experienced view to a feature or landscape that is iconic to a major portion of a city or a non-metropolitan region, an important view from an area of regional open space. Views to areas of regionally important scenic value or to landscape features of the region. These views are generally unique or uncommon within the region.	Environmental Zone A2: Low district brightness. Sparsely inhabited rural and semi-rural areas.
Low	High-quality view experienced by concentrations of residents and/or local recreational users, and/or large numbers of road or rail users Views to areas of local scenic value or to local landscape features, e.g. views from local conservation areas, railway stations and local parks These views are somewhat common within the landscape.	Environmental Zone A3: Medium district brightness Suburban areas in towns and cities.
Negligible	Views where visual amenity is not particularly important to the wider community, such as lower quality views briefly glimpsed from roads. These views are likely to be common within the landscape.	Environmental Zone A4: High district brightness areas. Town and city centres and other commercial areas, residential areas abutting commercial areas.

TABLE 5.29 MAGNITUDE OF CHANGE LEVELS

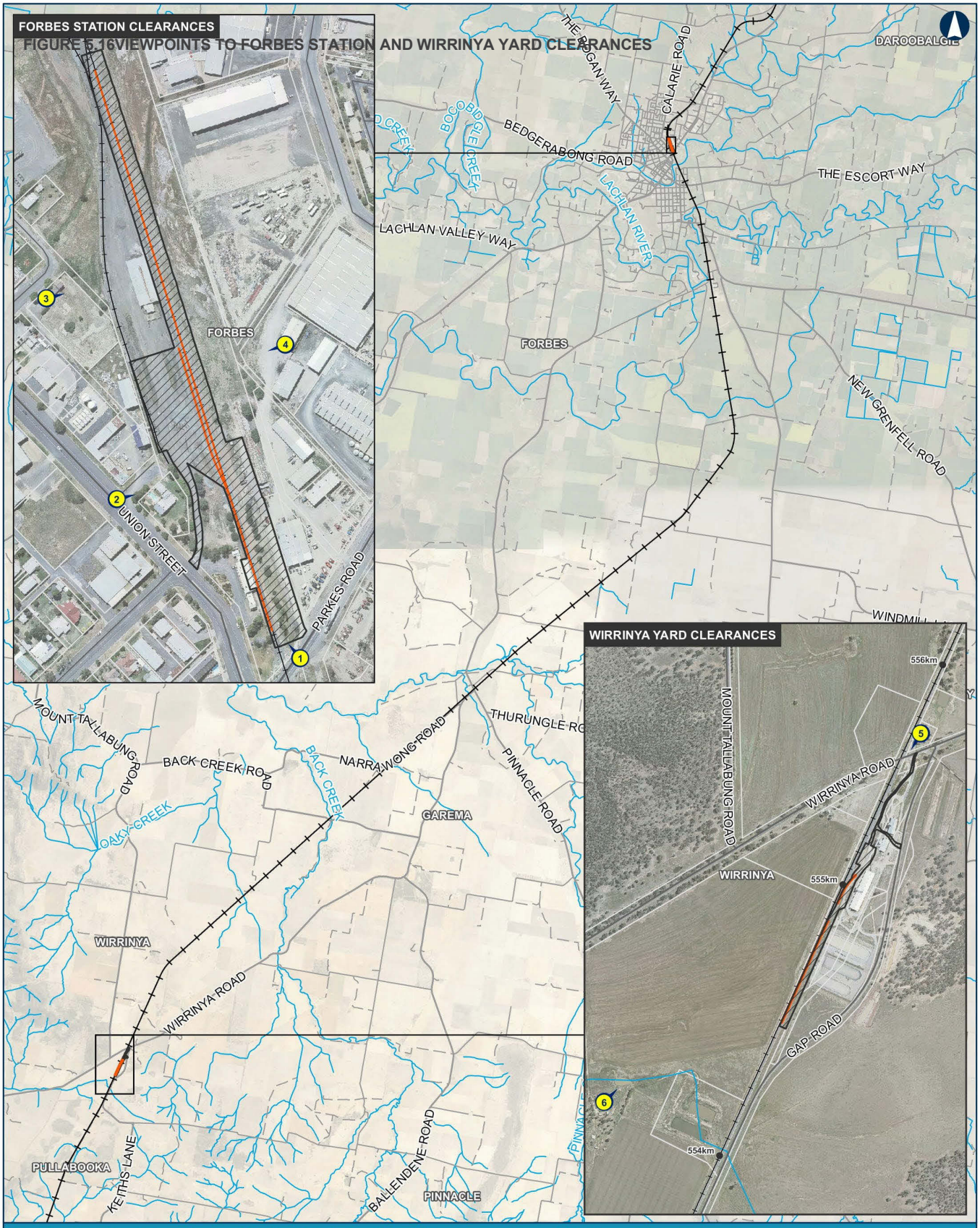
Magnitude of change	Daytime visual description	Night-time description
High	The view is altered such that the proposal visually dominates and transforms the character of the view. It would result in a substantial change in the amenity of the view.	Substantial change to the level of skyglow, glare or light spill predicted. The lighting of the proposal would transform the character of the surrounding setting at night. The effect of lighting would be experienced over a large area.
Moderate	The proposal is visually prominent, and/or contrasts with the character of the view. It would result in a considerable change in the amenity of the view.	Considerable change to the level of skyglow, glare or light spill. The lighting of the proposal would noticeably contrast with the surrounding landscape at night. The effect of lighting would be experienced across a medium portion of the landscape.
Low	The proposal is somewhat prominent and/or isnot compatible with the character of the view. It would result in a noticeable change in the amenity of the view.	Alteration to the level of skyglow, glare or light spill would be predicted. The lighting of the proposal would not contrast substantially with the surrounding landscape at night. The effect of lighting would be experienced across a small portion of the landscape.
Negligible	The proposal is not visible, is not visually prominent in the view and/or is compatible with the character of the view. It would result in no perceived change in the amenity of the view.	Either the level of skyglow, glare and light spill is unchanged. If it is altered, the change is generally unlikely to be perceived by viewers. Compatible with the existing or intended future use of the area.

TABLE 5.30 LANDSCAPE AND VISUAL IMPACT LEVELS

	Sensitivity			
Magnitude of change	**High**	**Moderate**	**Low**	**Negligible**
High	High	High–moderate	Moderate	Negligible
Moderate	High–moderate	Moderate	Moderate–low	Negligible
Low	Moderate	Moderate–low	Low	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

5.6.4 Existing environment

Most of the proposal sites are characterised by rural landscapes, small rural villages and rail corridor infrastructure, with the exception of Forbes Station and Yard site, which is characterised by a larger regional town. Viewpoints to each site are shown in Figure 5.16 and Figure 5.17 and outlined in Table 5.31.



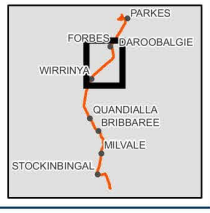
Stockinbingal to Parkes Forbes Station & Wirrinya Yard Clearances Figure 5-16 Viewpoints to Forbes Station and Wirrinya Yard clearances

0 2 4 km

Coordinate System: GDA 1994 MGA Zone 55

Date: 28/09/2021 Paper: A3
Author: WSP Scale: 1:12,477
Data Sources: ARTC, NSWSS

- KM post
- Existing railway
- Main road
- Local road
- Track
- Watercourse
- Track realignment
- Proposal site
- Viewpoint and orientation



INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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Stockinbingal to Parkes Caragabal & Bribbaree Yard Clearances Figure 5-17 Viewpoints to Caragabal Yard and Bribbaree Yard clearances

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TABLE 5.31 THE VIEWPOINTS TO EACH ENHANCEMENT SITE

ID	Viewpoints	Sensitivity
Forbes Station and Yard		
Viewpoint 1	View of the site from the Newell Highway to the south. The state heritage listed Forbes Station and the main line can been seen from this location (see Figure 5.18). The view would be from motorists on the Newell Highway and the one commercial business in that location.	Moderate
Viewpoint 2	The view of the site from Union Street to the west is generally screened by buildings and mature trees. A glimpse of the rail corridor is available from Lewis Street by businesses and road users.	Low
Viewpoint 3	There is an open view of the site from residential properties located on the corner of Little Union Street and Stephen Street to the north-east end of the site. The view is of an operation rail yard. The south of the site is partially screened by the goods shed.	Low
Viewpoint 4	Views are available from commercial properties to the west of the site. Views are partially screen by buildings and fencing.	Low
Wirrinya Yard		
Viewpoint 5	Partial views of the proposal site are available from residential properties to the north east along Wirrinya Road. The views are partially screened by the grain terminal infrastructure adjacent to the site.	Low
Viewpoint 6	The site can be seen from a residential property located 600 m to the south west. The view is partially screened by vegetation present on the property.	Low
Caragabal Yard		
Viewpoint 7	The residential properties located 80 m to the west have open views of the site, which are partially screened by trees.	Low
Viewpoint 8	The residential property on Caragabal Road located 150 m east has partial views of the site. The view is screened by grain terminal infrastructure and trees.	Low
Viewpoint 9	Residential properties located 200 m south-east and south-west of the site. The views of the site are partial due to the angle of the view.	Low
Bribbaree Yard		
Viewpoint 10	Views are available from residential and commercial properties to the south-west of the site along North Street, Short Street and Railway Street. The views include local heritage-listed items, including the war memorial and St Columba's Church, with the site in the background.	Low
Viewpoint 11	Recreational users of the Bribbaree Services and Citizens Bowling Club adjacent to the site, to the west, have views of the site.	Low

FIGURE 5.18 VIEWS OF THE FORBES STATION FROM THE NEWELL HIGH TO THE SOUTH (VIEWPOINT 1) (SOURCE: GOOGLE MAPS)

5.6.4.1 Night-time

At night, the landscapes around each proposal site would have low light levels from rural residences scattered across the landscape. There would be additional lights on within Forbes where there is denser residential development, 24-hour facilities such as the Forbes Hospital, and where there are streetlights and vehicles travelling along local roads and the Newell Highway. There would also be a headlight on the existing trains using the rail corridor. This lighting would contribute to the light levels and a sky glow above the landscape. Overall, each area is of low district brightness and has a moderate visual sensitivity at night.

5.6.5 Potential impacts

Visual impacts are anticipated during construction and operation of the proposal. The proposed works at Milvale Yard and Quandialla Yard are minor and impacts to the views would be negligible during construction and operation. These sites are not considered further in the assessment.

Daytime impacts from construction

The introduction of site compounds, plant, stockpiles and earthworks would temporarily impact the visual amenity of the areas around four of the sites. Disturbance of vegetation, predominantly consisting of derived native grasslands, would also impact visual amenity. The visual impacts to Forbes Station and Yard, Wirrinya Yard, Caragabal Yard and Bribbaree Yard are summarised in Table 5.32.

TABLE 5.32 VISUAL IMPACTS FROM CONSTRUCTION DURING THE DAY

ID	Sensitivity	Magnitude of change	Magnitude of change	Impact
Forbes Station and Yard clearances				
Viewpoint 1	Moderate	During construction, track works and works on the station awning would block views of the heritage-listed Forbes Station. These impacts would be temporary and restricted to road users and one business.	Low	Moderate–low
Viewpoint 2	Low	Close views of the site compound and construction plant would be available.	Moderate	Moderate–low

ID	Sensitivity	Magnitude of change	Magnitude of change	Impact
Viewpoint 3	Low	Close views of the track works would be available with partial views of the site compound to the south.	Moderate	Moderate–low
Viewpoint 4	Low	The commercial properties to the west of the site would have views of the construction, plant and site compound.	Moderate	Moderate–low
Wirrinya Yard clearances				
Viewpoint 5	Low	Partial views of the construction site are available from residential properties to the north east along Wirrinya Road. As the views are partially screened by the grain terminal infrastructure, the views of the plant and site compound would be restricted. Residential properties would get close views of construction vehicles using Wirrinya Road.	Moderate	Moderate–low
Viewpoint 6	Low	Due to the distance of the residential property and partial screening of the site, the view of the construction site would be restricted.	Low	Low
Caragabal Yard clearances				
Viewpoint 7	Low	The residential properties to the west would have open views of the track works and temporary stockpile.	Moderate	Moderate–low
Viewpoint 8	Low	The view of the construction would be mostly screened by grain terminal infrastructure.	Low	Low
Viewpoint 9	Low	Residential properties located 200 m south east and south west of the site. The views of the site are partial due to the angle of the view.	Low	Low
Bribbaree Yard clearances				
Viewpoint 10	Low	Close views of the construction works would occur for the duration of construction.	Moderate	Moderate–low
Viewpoint 11	Low	Close views of the construction works and stockpiles would occur for the duration of construction.	Moderate	Moderate–low

Night-time impacts

While the construction works would occur generally during day-time hours, some lighting may be required outside of standard working hours, including temporary spotlights in support of short-duration night works (when required) and headlights from staff and construction vehicles accessing the site. This would occur for a short duration each day and for a short time within the proposal construction program. Minor security lighting may also be required at the compound sites, at site access, storage and laydown ancillary areas. Overall, the magnitude of change would be low, resulting in a low level of impact.

5.6.5.1 Operation

Daytime operational impacts

The magnitude of change at each proposal site would be low as the works are predominantly moving the track horizontally a short (less than 540 mm) distance. Once operational, the rail corridor at each site would look generally the same. Signalling infrastructure would be slightly adjusted or relocated a short distance at Bribbaree Yard and Forbes Station and Yard; however, this would not result in a significant change in the aesthetic of the rail corridor. The areas impacted by construction would be revegetated and rehabilitated as appropriate once construction is completed.

The operation of longer and more frequent freight trains along the rail corridor at each site would be visually more dominant at each view. This change would alter the character of the views intermittently. It would result in a noticeable change in the amenity of each view; however, it would be compatible with the existing operational rail corridor.

Overall, the visual impact during operation is considered low at all viewpoints, except Viewpoint 1 at Forbes Station and Yard, which would have a moderate–low impact as described in Table 5.33.

TABLE 5.33 VISUAL IMPACTS FROM OPERATION DURING THE DAY

ID	Sensitivity	Magnitude of change	Magnitude of change	Impact
Forbes Station and Yard clearances				
Viewpoint 1	Moderate	The key visual change would be the increase in freight trains though the site, which would be seen by road users and commercial properties to the south. The trimming works on Forbes Station awning would not be noticeable from the Newell Highway. The guttering on the awning would be replaced with the original fabric removed or with a 'like for like' material. The impact to the heritage value of Forbes Station is assessed in Section 5.2.	Low	Moderate–low
Viewpoint 2	Low	The key visual change would be the increase in freight trains through the site, which would be glimpsed through Lewis Street by businesses and road users.	Low	Low
Viewpoint 3	Low	The key visual change would be the increase in freight trains though the site, which would be visible from the residential receivers on Union Street.	Low	Low
Viewpoint 4	Low	The key visual change would be the increase in freight trains though the site.	Low	Low
Wirrinya Yard clearances				
Viewpoint 5	Low	The key visual change would be the increase in freight trains through the site, which would be viewed from a distance of 600 m. The view is partially screened by vegetation present on the property.	Low	Low
Viewpoint 6	Low	The key visual change would be the increase in freight trains through the site. Due to the distance of the residential property and partial screening of the site, the view of trains site would be restricted.	Low	Low
Caragabal Yard clearances				
Viewpoint 7	Low	The key visual change would be the increase in freight trains through the site. Views of trains from residential properties would be partially screened by trees along Railway Street.	Low	Low
Viewpoint 8	Low	The key visual change would be the increase in freight trains through the site. The view is screened by grain terminal infrastructure and trees. There would be glimpses of the train from over 150 m.	Low	Low
Viewpoint 9	Low	The key visual change would be the increase in freight trains through the site. These views are experience from a distance which is partially screened due to buildings and trees.	Low	Low
Bribbaree Yard clearances				
Viewpoint 10	Low	The key visual change would be the increase in freight trains through the site. Close up views are available from residential and commercial properties on the north eastern side of North Street, Short Street and Railway Street.	Low	Low
Viewpoint 11	Low	The key visual change would be the increase in freight trains through the site. Recreational users of the Bribbaree Services and Citizens Bowling Club adjacent to the site, to the west, have views of the site.	Low	Low

Night-time impacts

As there would be an increase in the frequency of freight trains during the operation of Inland Rail, there would be an increase in frequency of headlights seen in the vicinity of the rail corridor. The alignment of the track would undergo a minimal change of up to 540 mm so that this would be an incremental increase in frequency, rather than there being any new areas where there is a potential for light spill or visual intrusion onto neighbouring properties. Overall, the magnitude of change would be low, resulting in a low level of impact.

5.6.6 Mitigation and management measures

Table 5.34 provides a summary of the project-specific mitigation and management measures that will be implemented during the construction and operation of the proposal to minimise impacts to visual amenity that are over and above contemporary standard practice for environmental management.

TABLE 5.34 VISUAL AMENITY SITE-SPECIFIC CONTROL MEASURES

ID	Control measures	Stage
LVA1	Detailed design and construction planning would seek to minimise the construction and operation footprints and avoid impacts on mature native vegetation.	Detailed design/ pre-construction
LVA2	Temporary lighting would be designed and sited in accordance with AS 4282-1997 *Control of the Obtrusive Effects of Outdoor Lighting* (Standards Australia, 1997).	Detailed design/ pre-construction
LVA3	Rehabilitation works completed in accordance with ARTC's Landscape Design Guideline and Landscape Rehabilitation Strategy.	Construction

5.7 Soil and contamination

5.7.1 Introduction

This section outlines the existing environment and potential impacts from and to soils, erosion potential and contamination due to the proposal.

5.7.2 Legislation, policy, standards and guidelines

The relevant legislation, policy standards and guidelines include:

- POEO Act
- *Contaminated Land Management Act 1997* (NSW) (CLM Act)
- *National Environment Protection Council (New South Wales) Act 1995* (NSW) (NEPC Act)
- National Environment Protection (Assessment of Site Contamination) Measure 1999 and Amendment Measure No.1 (National Environment Protection Council, 2013)
- *Guidelines for Consultants Reporting on Contaminated Sites* (EPA, 2000)
- *Waste Classification Guidelines—Part 1: Classification of waste* (EPA, 2014b)
- *Contaminated Land Management, Guidelines for the NSW Site Auditor Scheme (3rd edition)* (EPA, 2017b)
- *Australian Standard AS 4482.1—2005 Guide to the investigation and sampling of sites with potentially contaminated soil* (Standards Australia, 2005)
- ARTC Contaminated land database (accessed 8 November 2020)
- *Australian Rail Track Corporation Excavated Material Order 2020*
- *Australian Rail Track Corporation Excavated Material Exemption 2020*
- *Inland Rail Contamination Spoil and Waste Strategy* (0-0000-EEC-00-ST-0002)
- *ARTC Spoil Guideline* (ENV-GL-010).

5.7.3 Assessment methodology

5.7.3.1 Study area

The study area for the soils and contamination assessment is the proposal site. Desktop searches also include a 500 m buffer around the proposal site to identify any nearby sources of contamination that have the potential to migrate to the proposal site (see Figure 5.19 and Figure 5.20).

5.7.3.2 Assessment

The soil and contamination assessment involved:

- Desktop assessment, including:
  - Review of desktop information on soils and geology (including review of maps of acid sulfate soils (ASS), acid sulfate rock (ASR), naturally occurring asbestos (NOA), and saline soils)
  - Review of limited site investigation results, including geotechnical investigations for information relevant to the assessment
  - Review of historical reports relevant to soils and contamination prepared for the proposal (where relevant)
  - A review of current and historical aerial photographs to identify current and historical land uses
  - Assessment of current land use
  - Searches of relevant databases, including the ARTC Contamination Sites Register, the NSW EPA Contaminated Sites Register, a list of sites which have been notified to the EPA, and environmental protection licences (EPLs) held under the POEO Act
  - Online search of the Department of Defence unexploded ordnance (UXO) database and the per- and poly-fluoroalkyl substances (PFAS) investigation database
- General observations of the land from other site investigations, including geotechnical investigations.
- Assessment of potential risks from contamination during construction and operation of the proposal
- Identifying management and mitigation measures to minimise construction and operation impacts of the proposal.

As no ground disturbance is proposed at the Quandialla Yard and Milvale Yard, these sites were not assessed.

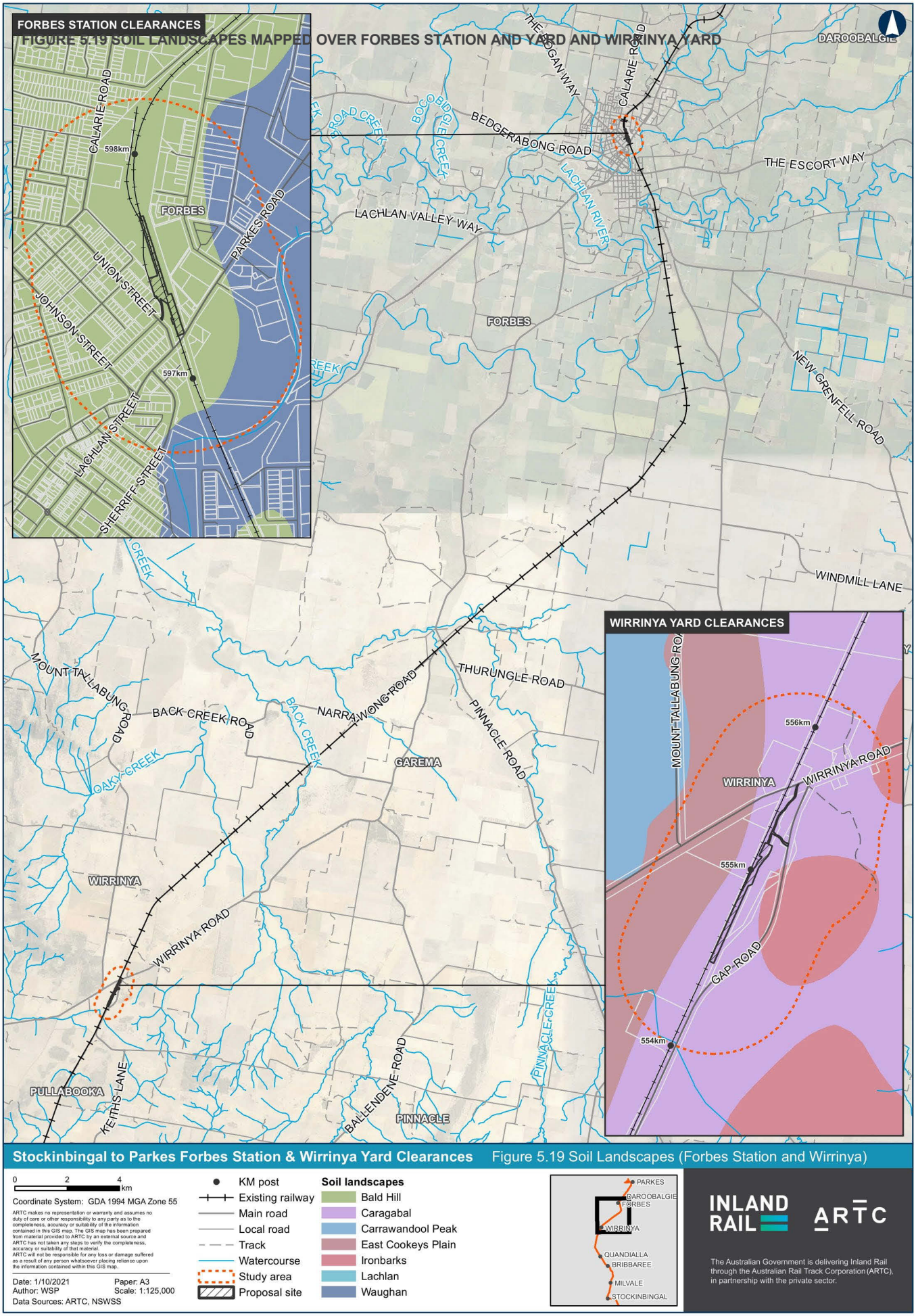
5.7.4 Existing environment

5.7.4.1 Landform, geology and soils

The soil landscapes and characteristics for the relevant sites are described in Table 5.35, and shown Figure 5.19 and Figure 5.20.

TABLE 5.35 SOIL LANDSCAPES AND CHARACTERISTIC IN THE STUDY AREA (DPIE, 2021A)

Site	Soil landscape	Description	Landform	Erosion Hazard
Forbes Station and Yard	Bald Hill	Narrow elongated crests, ridges and gently inclined side slopes at Forbes, and south and west of Forbes, on predominately sandstones.	Generally flat terrain with a slight decline away from the site to the east	Slight
Wirrinya Yard	Caragabal	Level to gently undulating plains and rises surrounding Caragabal. The dominant soils are deep, moderately well-drained red brown earths and red solodic soils.	Lightly undulating terrain with a decline from to west across the site	Slight to moderate
Caragabal Yard	Caragabal		Generally flat terrain	Moderate
Bribbaree Yard	Milvale	Alluvial plains of the Bland, Narraburra, Bribbaree, Weedallion and Rushy Creeks formed on recent Quaternary alluvium. Imperfect to poorly drained red, brown and grey clays dominate the landscape.	Generally flat terrain	Moderate to high


FORBES STATION CLEARANCES
FIGURE 5.19 SOIL LANDSCAPES MAPPED OVER FORBES STATION AND YARD AND WIRRINYA YARD
DAROOBALGIE
THE OGANWAY
CALARIE ROAD
BEDGERABONG ROAD
THE ESCORT WAY
LACHLAN VALLEY WAY
LACHLAN RIVER
FORBES
NEW GRENFELL ROAD
WINDMILL LANE
598km
597km
PARKES ROAD
UNION STREET
JOHNSON STREET
LACHLAN STREET
SHERRIFF STREET
WIRRINYA YARD CLEARANCES
556km
555km
554km
WIRRINYA
WIRRINYA ROAD
GAP ROAD
MOUNT TALLABUNG ROAD
BACK CREEK ROAD
NARRAWONG ROAD
THURUNGLE ROAD
PINNACLE ROAD
GAREMA
OAKY CREEK
PULLABOOKA
KEITHS LANE
BALLENDENE ROAD
PINNACLE
PINNACLE CREEK
Stockinbingal to Parkes Forbes Station & Wirrinya Yard Clearances
Figure 5.19 Soil Landscapes (Forbes Station and Wirrinya)
0 2 4 km
Coordinate System: GDA 1994 MGA Zone 55
ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.
Date: 1/10/2021
Paper: A3
Author: WSP
Scale: 1:125,000
Data Sources: ARTC, NSWSS
KM post
Existing railway
Main road
Local road
Track
Watercourse
Study area
Proposal site
Soil landscapes
Bald Hill
Caragabal
Carrawandool Peak
East Cookeys Plain
Ironbarks
Lachlan
Waughan
PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL
INLAND RAIL
ARTC
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.
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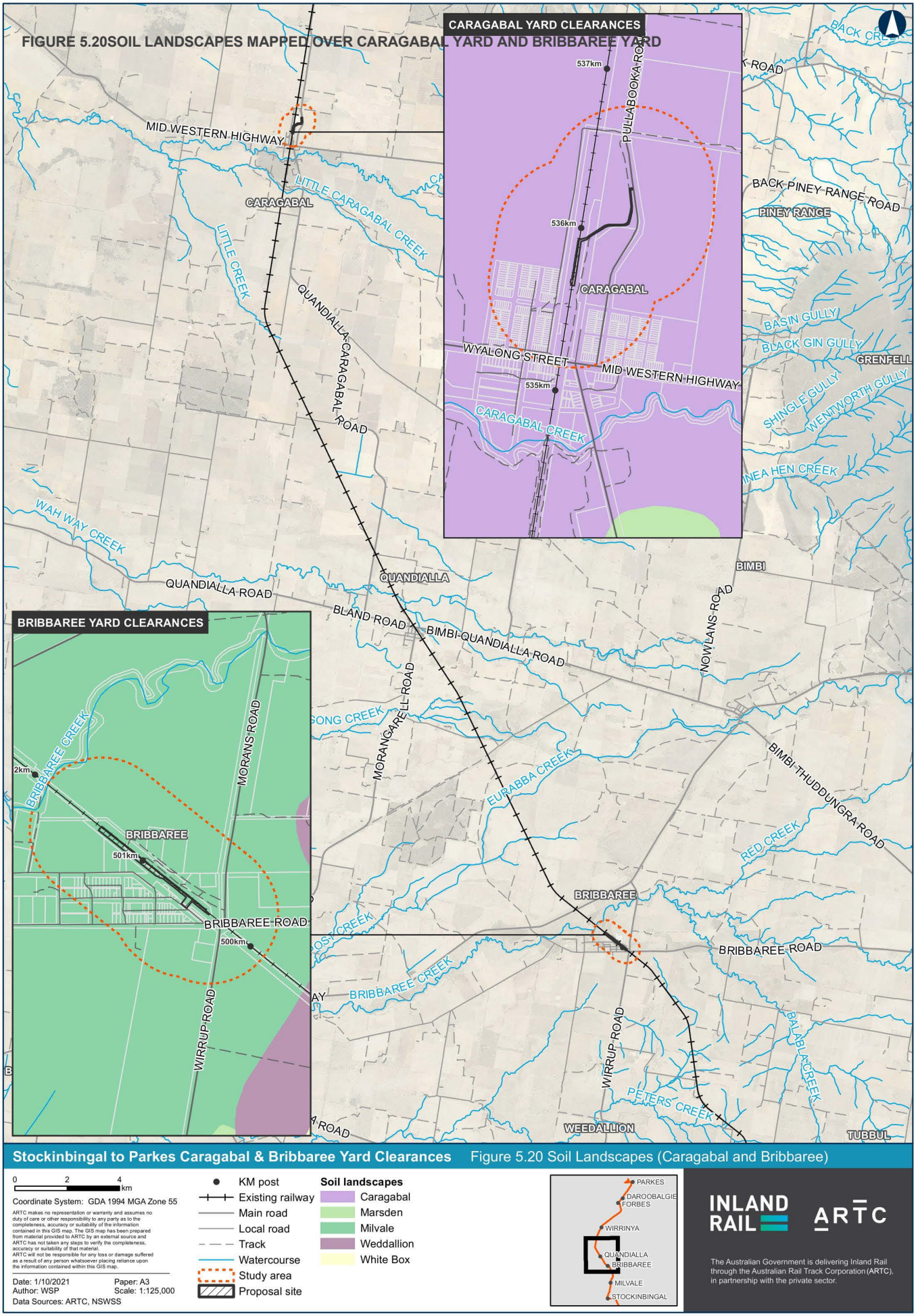

Stockinbingal to Parkes Caragabal & Bribbaree Yard Clearances Figure 5.20 Soil Landscapes (Caragabal and Bribbaree)

0 2 4 km

Coordinate System: GDA 1994 MGA Zone 55

Date: 1/10/2021 Paper: A3
Author: WSP Scale: 1:125,000
Data Sources: ARTC, NSWSS

KM post
Existing railway
Main road
Local road
Track
Watercourse
Study area
Proposal site

Soil landscapes
Caragabal
Marsden
Milvale
Weddallion
White Box

PARKES
DAROOBALGIE
FORBES
WIRRINYA
QUANDIALLA
BRIBBAREE
MILVALE
STOCKINBINGAL

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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Intrusive investigations within the proposal site were undertaken to define site geology, and aid the geotechnical and hydrogeological assessment (WSP, 2021). The geological observations from the investigations are summarised in Table 5.36.

TABLE 5.36 SUMMARY OF OBSERVED GEOLOGY FROM ITE INVESTIGATIONS

Site	Test pit number	Observed geology (mbGL[1])
Forbes Station and Yard clearances	230_2_TP257	Fill: sandy gravel up to 0.45 mBGL, associated with rail ballast Residual soil: clay from 0.45 to 1.30 mBGL Weathered rock: shale from 1.30 to 2.00 mBGL.
	230_2_TP258	Fill: gravel with fine sand and clayey sandy gravel up to 0.70 mBGL, associated with rail ballast and ash Residual soil: clay from 0.70 to 2.00 mBGL.
Wirrinya Yard clearances	230_2_TP253	Fill: gravel and sandy gravelly clay up to 0.80 mBGL, associated with rail ballast Residual soil: clay from 0.80 to 1.60 mBGL Weathered rock: shale from 1.60 to 2.00 mBGL.
	230_2_TP254	Fill: gravel and gravelly clay up to 0.80 mBGL, associated with rail ballast Residual soil: clay from 0.80 to 2.00 mBGL.
Bribbaree Yard clearances	230_2_TP249	Fill: gravel and sandy gravel up to 0.90 mBGL, associated with rail ballast and ash Alluvium: clay from 0.80 to 2.00 mBGL.
	230_2_TP250	Fill: gravel, sandy gravel and gravelly clayey sand up to 0.80 mBGL, associated with rail ballast Alluvium: clay from 0.80 to 2.00 mBGL.

1. Metres below ground level (mBGL)

Soil hazards

A summary of soil hazards is presented in Table 5.37.

TABLE 5.37 SOIL HAZARDS OF THE PROPOSAL

Hazard	Risk
Salinity	Salinity risk has not been identified in the study area (DPIE, 2021a).
ASS	A search of the Australian Soil Resource Information System (CSIRO, 2014) and ASS risk map (DLWC, 1997) indicated that the probability of occurrence of ASS is extremely low.
ASR	Sulfidic rock can occur across a wide range of geologies, both igneous and sedimentary, and they are not necessarily acidic in their undisturbed state. Sulfidic rock is not mapped for the study area and so the areas of risk cannot be identified.
NOA	NOA has not been identified in the study area (Department of Regional NSW, 2015).

5.7.4.2 Contamination and hazardous materials

A desktop assessment and site observations were used to identify the risk of contamination present within the proposal site. While a site walkover for contamination has not been completed as part of the assessment, general observations from other site investigations have been reviewed for potential relevance to contamination. Minor quantities of waste material were noted in the rail corridor (e.g. concrete sleepers, timber sleepers, etc.).

Site history

Historical aerial photography (Collaboration Portal, NSW Government, 2021) indicates the proposal site has been used as a rail corridor since at least 1965 (the earliest aerial photography available); however, the rail line is known to have been predominantly constructed in the early 1900s.

It is noted that the Albury to Illabo section of the rail line was constructed as part of the Great Southern Railway that extended from Sydney to Albury between 1877 and 1881; demonstrating that the historical use of the proposal site as a rail corridor extends earlier than 1965.

This section provides a summary of the proposal site history and potential for contamination based on aerial imagery, with a focus on the Forbes Station and Yard, and Bribbaree proposal sites, as these sites require excavations (refer to Section 2.3) and therefore have a higher risk of exposure pathways to, and mobilisation of, potential contaminants of concern.

Forbes Station and Yard

Figure 5.21 shows the existing Forbes Station and goods shed, which were constructed by 1965. The aerial also shows the presence of the existing grain infrastructure, which remains in place today, to the north of the proposal site. The town of Forbes is located to the west of the rail corridor, with some residential properties to the east (consistent with the existing residential land use). Land immediately to the east (where more recent commercial developments have occurred) consisted of open space, most likely used for agricultural purposes.

Between 1965 and 1983 (Figure 5.22) there appears to be no significant visible changes within the Forbes Station and Yard site; however, it is likely this area was intensively used as a rail yard due to its close proximity to the Forbes station, and township, and the presence of the goods shed, and other buildings to the north of the proposal site. In the surrounding area, the larger of the two buildings to the north has been removed (within the rail corridor), and development to the east of the rail corridor has commenced with the construction of a number of larger warehouses.

Between 1983 and 1997 (Figure 5.22 and Figure 5.23), there were no significant visible changes noted to the Forbes Station and Yard site. Development of the industrial/commercial area to the east of the rail corridor has continued; however, much of the infill developments that are present today are absent in 1997, as areas of open space remain. The remaining building within the rail corridor to the north of the proposal site has been removed by 1997.

FIGURE 5.21 HISTORICAL AERIAL PHOTOGRAPH—1965 (FORBES STATION AND YARD)

FIGURE 5.22 HISTORICAL AERIAL PHOTOGRAPH—1983 (FORBES STATION AND YARD)

FIGURE 5.23 HISTORICAL AERIAL PHOTOGRAPH—1997 (FORBES STATION AND YARD)

Since 1997, the proposal site has remained largely unchanged, some ground disturbance activities have taken place within the surrounding rail corridor at times, mainly to the north of the proposal site. In-fill developments have continued to the east, with most of the remaining open space located between the rail corridor and the Newell highway, developed by 2021.

Bribbaree Yard

Figure 5.24 shows the Bribbaree Yard proposal site in 1970. The aerial image shows the township of Bribbaree and the presence of the rail line running along the eastern side of the town, with some disturbance present where the existing grain infrastructure is located. It is unclear if grain infrastructure is present.

Between 1986 and 1998 (Figure 5.25 and Figure 5.26) there is no significant visible change to the proposal site; however, existing grain infrastructure has been constructed to the east of the proposal site. While construction took place prior to 1986, it appears it was underway in 1970 due to visible ground disturbance. East of the Bribbaree Yard, the surrounding areas have experienced no significant changes since 1970.

Between 1986 and 1998, a heavy vehicle wrecking business/storage yard was established on a portion of land around 100 m to the west of the proposal site, on Short Street. This storage yard was present until 2018, when most of the vehicles were removed from the property. Given the topography and distance from the site, any potential contaminants present on this land as a result of oil or fuel leaks/spills are likely to be localised, with a low risk of offsite migration.

FIGURE 5.24 HISTORICAL AERIAL PHOTOGRAPH—1970 (BRIBBAREE YARD)

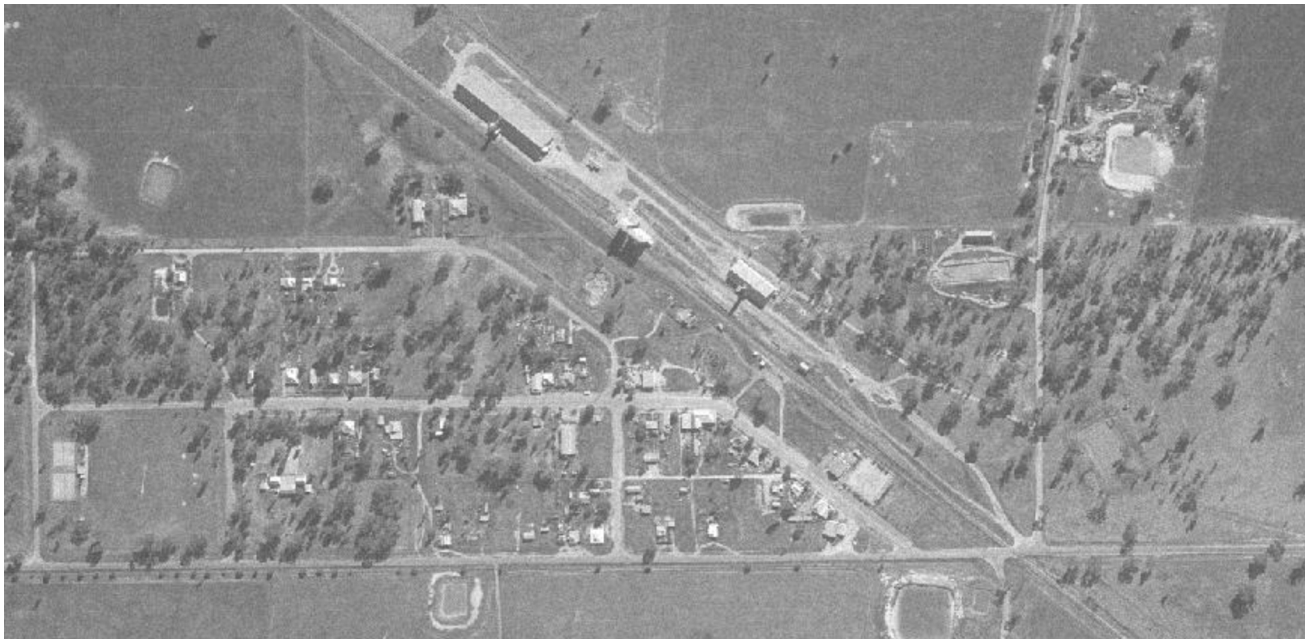

FIGURE 5.25 HISTORICAL AERIAL PHOTOGRAPH—1986 (BRIBBAREE YARD)

FIGURE 5.26 HISTORICAL AERIAL PHOTOGRAPH—1998 (BRIBBAREE YARD)

Other proposal sites

A review of historical aerial photography at other proposal sites provides conclusions consistent with those above. All sites have historical use as a rail corridor, with grain infrastructure adjacent to proposal sites present by the 1960s and the surrounding areas used for agricultural purposes. Changes at sites near small townships since the 1960s are generally minor in nature and related to expansion of rural residential properties, such as Quandialla Yard and Caragabal Yard.

Site history summary

No significant contamination risks have been identified by this review except for the presence of the operational rail corridor. Due to the historical use of proposal sites as a rail corridor, there is the potential for contaminants to be present. The risk of contaminants depends largely on specific activities undertaken within the rail corridor at each proposal site, and would generally be higher within rail yards, and maintenance facilities, which in this case includes the Forbes Station and Yard proposal site due to its more intensive historical use as a rail corridor.

The AS 4482.1-2005—*Guide to the investigation and sampling of sites with potentially contaminated soil—Non-volatile and semi-volatile compounds* lists the chemicals likely to be used by specific industries. AS 4482.1-2005 identifies the following chemicals as likely to be present in railway yards:

- Hydrocarbons
- Arsenic
- Phenolics
- Heavy metals
- Nitrates and ammonia.

In addition, given the long-term historical use of the surrounding lands for agricultural purposes, there is likely to be a history of fertiliser and pesticide use on surrounding lands; however, they are unlikely to be in a quantity to result in contamination of the proposal sites, or risk to site workers.

Contaminated sites

A review of the NSW EPA Contaminated Land Public Record and the POEO Act Public Register were undertaken on 20 April 2021. The review did not identify a registered or notified contaminated sites within 500 m of the proposal site, except the Forbes Station and Yard clearances site (EPA, 2021a).

The former Forbes Gasworks site at Union Street, approximately 170 m west of the Forbes Station and Yard site, was subject to notice in 1997 under the now repealed section 36 of the *Environmentally Hazardous Chemicals Act 1985* (NSW). The premises were contaminated by the manufacturing of town gas and the disposal of chemical wastes. Remediation activities have been undertaken at the site to the satisfaction of the EPA and the notice was revoked in 2010. This site is unlikely to impact the condition of soil at the Forbes Station and Yard clearances site.

Four sites within 500 m of the Forbes Station and Yard clearances site have been notified to the EPA as potentially contaminated but have not been regulated under the CLM Act. These sites may contribute to land contamination in the area through the use of underground petrol storage infrastructure. These include:

- Former Shell Depot on Stephen Street 20 m west of the proposal site
- The BP depot located at 3-15 Union Street. Around 40 m to the west of the proposal site (proposed site compound). Based on the aerial photography review, this depot has likely been in operation since it was constructed between 1983 and 1989.
- The BP and Woolworths service stations located at 26 and 29 Dowling Street, around 200–260 m south of the proposal site

The proposal site is not in or near a NSW EPA PFAS investigation site and therefore is unlikely to be subject to PFAS contamination (EPA, 2021b). The nearest PFAS investigation site is in Orange, NSW. A review of the Department of Defence Nationwide Unexploded Ordnance (UXO) Map did not identify any UXO relevant to the study area (Department of Defence, 2021). The closest potential UXO site located over 7 km north west of Forbes Station.

A review of the ARTC Contaminated Site Register identified four sites in the study area relevant to the Forbes Station and Yard and Quandialla Yard, as described in Table 5.38.

TABLE 5.38 SITES FROM THE ARTC CONTAMINATED SITE REGISTER NEAR FORBES STATION SITE (ARTC, 2021)

Contaminated site	Location	Comments
Forbes—Former Mobil and Shell siding	Stephen Street, Forbes (partially mapped under the location of the site compound and laydown area)	This site has been subject to historical potentially contaminating activities, primarily involving a former fuel depot siding used for transporting fuel. The site may contain underground fuel storage tanks but this is unknown. An assessment of the site was not available for review.
Forbes—Goods shed	Lewis Street, Forbes (adjacent to the Forbes Station and Yard site on the western boundary)	Site has been historically leased to a fertiliser company for pesticide storage, use and distribution. The site was assessed in 2020 by ADE Consulting, and soil results reported no contaminated impacts above commercial/industrial land use criteria. The results of soil investigations completed indicated no contamination impacts above commercial/industrial land use criteria. An Asbestos Management Plan (AMP) applies to the structure. The structure is also known to contain lead paint, which may have impacted underlying soils.
Forbes—Council depot (former swampland)	Little Union Street, Forbes (40 m west of the Forbes Station and Yard)	A preliminary site investigation was completed, including a site walkover, which did not identify significant risk of contamination, minor staining of the ground was noted.
Quandialla—GrainCorp Lease	Lots 1 & 2 Bimbi Road (adjacent to Quandialla Yard)	A preliminary site investigation was completed, including a site walkover, which did not identify significant risk of contamination.

Environmental Protection Licences

Most of the land within the proposal site is subject to ARTC's existing EPL3142. The EPL authorises the 'scheduled activity' of 'railway activities—railway infrastructure operations' and would regulate including the proposed construction activities and the continued operation of the proposal site as a rail corridor. EPL3142 will be varied to include the proposal.

Summary of contamination risk

As discussed above, all proposal sites are located within an existing rail corridor and, as such, would be considered to have a level of contamination risk associated with their historical use. Review of other sources of contamination risk relevant to each site are summarised in Table 5.39 below.

TABLE 5.39 SUMMARY OF CONTAMINATION RISK

Site	Summary of potential contamination risk
Forbes Station and Yard	Registered or notified contaminated sites have been identified within 500 m of the proposal site. Where off-site migration of contamination has occurred, this may have the potential to impact soils and/or groundwater within the proposal site. Two sites recorded on the ARTC contaminated land register (Former Mobil And Shell Siding and a goods shed) have been identified. The goods shed is identified as requiring further investigation. It is concluded that contamination is known to occur within and surrounding the proposal site.
Wirrinya Yard	No registered or notified contaminated sites, or sites listed on the ARTC contaminated land register. Contamination risk is not considered to be higher than that anticipated based on historical use of the site as a rail corridor. It is noted that the proposal site does not contain maintenance facilities or other sites which would be considered of higher risk.
Caragabal Yard	
Quandialla Yard	
Bribbaree Yard	
Milvale Yard	

5.7.5 Potential impacts

The construction of the proposal would result in excavation and ground disturbance during construction activities, including site establishment, trackwork and earthworks (as outlined in Section 2.3). Proposal sites with the greatest risk of potential for impacts associated with soils and contamination include Forbes Station and Yard, Wirrinya Yard, Caragabal Yard, and Bribbaree. Construction activities at these proposal sites would require some ground disturbance and earthworks, which, if not managed appropriately, may result in:

- Impact from disturbance and mobilisation of potentially contaminated soil during earthworks, including further spread of contamination, particularly at Forbes Station and Yard where there is an elevated risk of contaminates, as identified in Section 5.7.4.2. This has the potential to impact local receiving environments as well as result in exposure to site workers.
- Erosion of exposed surface soils, resulting in dust generation (refer to Section 5.10.3) and potential increased sediment load entering drainage and nearby waterways (refer to Section 5.4).

Based on the proposed construction activities at Milvale Yard and Quandialla Yard, there is a negligible risk of soil and contamination impacts at these proposal sites. Proposed construction activities at these sites involve only minor modifications to existing water tanks (refer to Section 2.2.2).

Soils

Construction would temporarily expose the natural ground surface and sub-surface though the removal of vegetation, and excavations at Forbes Station and Yard, Wirrinya Yard, Caragabal Yard and Bribbaree. The exposure of soil to runoff and wind can increase soil erosion potential. The potential for erosion impacts would be minimised by implementing standard best-practice soil erosion management measures during construction.

Contamination and hazardous materials

The potential risk of encountering contamination or hazardous materials during construction of the proposal is summarised in Table 5.40.

Potential impacts from the construction of the proposal include:

- Disturbance of unknown sources of contaminates related to the historical use of the rail corridor or contamination migrating from nearby sites, resulting in direct contact and/or inhalation by site workers, or release to the environment. With the exception of Forbes Station and Yard, it is considered unlikely that amounts of unknown contaminants would be encountered, which would result in impacts to site workers or the environment at proposal sites; however, due to the historic use and immediate surrounding area, there is a higher potential for contamination and hazardous materials to be present within the Forbes Station and Yard. The potential of encountering unknown contaminants would be minimised by implementing appropriate mitigation measures, such as undertaking further investigations at the Forbes Station and Yard and implementing unexpected finds protocols.

- Contamination of soils though spills and leaks resulting from inadequate storage of waste, fuels and chemicals, and during maintenance of vehicles, plant and equipment. These potential impacts would be minimised with the implementation of standard mitigation measures.
- Risk of encountering soil hazards (salinity, acidity) and/or UXO is low.

Due to the use of the proposal site as an operational rail corridor and associated railway yards, any spoil generated as a result of excavation activities would require testing to ensure it is suitable for beneficial reuse, meaning it should remain onsite, where it has been assessed as suitable for use in the rail corridor with a low risk of human health impacts, or classified (as general solid waste or other category) and disposed of at an appropriately licensed waste facility, licensed to the category of waste.

TABLE 5.40 SUMMARY OF POTENTIAL IMPACTS FROM RISK OF EXISTING CONTAMINATION AND HAZARDOUS MATERIALS

Site	Potential contamination and hazardous materials	Potential impacts from construction and risk from contamination
Forbes Station and Yard	General risk associated with historical use of the proposal site as a rail corridor. Known contamination based on registered or notified contaminated sites, and sites recorded on the ARTC contaminated land register. Asbestos and lead paint within the Forbes Good Shed.	Excavation to a depth of up to 500 mm is required for reconstruction and realignment of approximately 350 m of the existing rail line. The proposal site includes disturbance within the Forbes—Former Mobil and Shell Siding, a site listed on the ARTC contaminated land register. Excavation has the potential to encounter contaminated soils requiring management during construction. No impact to the Forbes goods shed structure is required for the proposal, and the proposal would not impact the ongoing management of hazardous materials within the structure. Impact to groundwater is not anticipated for the proposal (refer to Section 5.10.7); therefore, the risk of encountering contaminated groundwater is considered to be low.
Wirrinya Yard	General risk associated with historical use of the proposal site as a rail corridor.	Based on review of contamination status, ground disturbance has a low risk of encountering contaminated soils requiring management during construction.
Caragabal Yard	General risk associated with historical use of the proposal site as a rail corridor.	Based on review of contamination status, ground disturbance has a low risk of encountering contaminated soils requiring management during construction.
Quandialla Yard	General risk associated with historical use of the proposal site as a rail corridor.	No excavation or demolition proposed for removal of redundant pipework from a water tank adjacent to the track. Contamination risk considered to be negligible.
Bribbaree Yard	General risk associated with historical use of the proposal site as a rail corridor. This heavy vehicle wrecking business/storage yard that was present until 2018 around 100 m to the west of the site is considered a low risk, as the potential contaminants present from fuel leaks/spills are likely to be localised.	Excavation to a depth of up to 500 mm is required for reconstruction and realignment of approximately 900 m of the existing rail line. Based on review of contamination status, excavation has a low risk of encountering contaminated soils requiring management during construction.
Milvale Yard	General risk associated with historical use of the proposal site as a rail corridor.	No excavation or demolition proposed. Contamination risk considered to be negligible.

5.7.5.1 Operation

The operation of the proposal would have no material change to geology, soils, hazardous materials or contamination, as the proposal site would continue to operate as a rail corridor.

5.7.6 Mitigation and management measures

Table 5.41 provides a summary of the project-specific mitigation and management measures that will be implemented during the construction and operation of the proposal, to minimise impacts to and from the site from existing or potential contamination that are over and above contemporary standard practice for environmental management.

TABLE 5.41 CONTAMINATION SITE SPECIFIC CONTROL MEASURES

ID	Control measures	Stage
SC1	Detailed site investigations would be undertaken by a suitably qualified and experience consultant as defined in Schedule B9 of the *National* Environment Protection (Assessment of Site Contamination) Measure 1999 to assess exposure risks to site workers and other receptors as a result of ground disturbances at Forbes Station and Yard clearances, which are considered to be at a higher risk of being contaminated. The results of the site investigations would be assessed against the criteria contained within the *National Environment Protection (Assessment of Site Contamination) Measure 1999* to determine the need for any remediation or further management.	Pre-construction
SC2	A contamination and hazardous materials plan would be prepared and implemented as part of the CEMP. It would include measures, processes and responsibilities to minimise the potential for contamination impacts on the local community, workers and environment, and procedures for incident management and managing unexpected contamination finds (an unexpected finds protocol). The contamination and hazardous materials plan would include details of existing site contamination and hazardous materials for the Forbes Station and Yard clearances.	Pre-construction/ construction
SC3	An Erosion and Sediment Control Plan and a Soil and Water Management Plan (SWMP) would be prepared as part of the CEMP. The SWMP would comply with the existing EPL3142 and be in accordance with best onsite practice, reflected in *Managing Urban Stormwater—Soils and Construction, Volume 1* (Landcom 2004), and Volumes 2A and 2C (DECCW, 2008), commonly referred to as the 'Blue Book'. The SWMP and erosion and sediment control plan would include: ▸ Surface controls to promote ground stability, limit runoff lengths and reduce runoff velocities within the construction areas ▸ Sediment and erosion controls would be built to a design storm that will ensure non-erodible velocities ▸ Inspection and maintenance of erosion and sediment controls throughout the works to ensure they are operating effectively ▸ Rainfall monitoring requirements ▸ Management protocols of problem soils (e.g. erosive, dispersive, reactive, acidic, saline, sodic, alkaline soils) ▸ Management protocols for any contaminated soils ▸ Vehicle, machinery and imported fill hygiene protocols and documentation ▸ Measures to prevent/minimise mud and dirt being tracked onto public roadways by trucks and any equipment leaving the site ▸ Provision of a spill contaminant kit. Requirements for training, inspections, corrective actions, notification and classification of environmental incidents, record keeping, monitoring and performance objectives for handover on completion of construction.	Pre-construction/ construction

5.8 Traffic and access

5.8.1 Introduction

This section describes the potential traffic and access impacts of the proposal.

5.8.2 Legislation, policy, standards and guidelines

The relevant legislation, policy standards and guidelines include:

- *Guide to Traffic Management—Part 3 Transport Studies and Analysis* (Austroads, 2020)
- *Guide to Traffic Generating Developments Version 2.2* (Roads and Traffic Authority, 2002)
- *NSW Sustainable Design Guidelines Version 4* (TfNSW, 2017).

5.8.3 Assessment methodology

5.8.3.1 Study area

The study area for the assessment comprises the proposal site and roads, pedestrian, public transport and rail infrastructure that have the potential to be impacted by the proposal.

5.8.3.2 Assessment

The assessment methodology for the traffic and access assessment involved:

- A desktop review of surrounding road network and intersections, public transport services, pedestrian and cyclist access, property access and parking conditions, and other relevant features
- Sourcing and review of information relevant to background traffic volumes
- Assessment of construction impacts, including qualitative assessment of:
  - The number, frequency and size of construction-related vehicles (passenger, commercial and heavy vehicles, including spoil management movements)
  - Construction-worker parking
  - Access constraints and impacts on public transport, pedestrians and cyclists
  - The need to close, divert or otherwise reconfigure elements of the road and cycle network associated with construction of the project
- Assessment of operational impacts, including qualitative (or semi-quantitative where required) assessment of changes to access arrangements and delays
- Identifying management and mitigation measures to minimise construction and operation impacts of the proposal.

5.8.4 Existing environment

5.8.4.1 Rail corridor

The proposal site is within an existing operational freight rail corridor. The rail corridor consists of a standard-gauge single-track railway. The S2P railway corridor forms part of the rail network managed and maintained by ARTC.

As of 2020, an average of five freight trains travel along the rail corridor per day between Stockinbingal to Parkes. No passenger stations are still operating along this section of the rail corridor. Grain terminals used for loading to freight trains and storing grain are present at Wirrinya, Caragabal and Bribbaree.

5.8.4.2 Road network

The highways and local roads around each site would generally be characterised by local and regional traffic. Traffic would undergo an increase during the harvest seasons due to the agricultural land uses in the area. The harvest season in the Forbes region are:

- October to December for grain
- September and October for hay and silage
- January to April for stone fruit.

Newell Highway

The primary access route to the proposal would be the Newell Highway, which is classified as a state highway in the *RMS, Schedule of Classified Roads and Unclassified Regional Roads, Version 11 April 2017*. The Newell Highway is located to the east of all sites except Forbes Station and Yard, where is it located south east. The Newell Highway is a key highway connecting regional centres in NSW and is identified by the National Heavy Vehicle Regulator (NHVR) as a 25/26 m B-double suitable route. It is a two lane (one per direction) highway with speed limits up to 110 km/hr.

Traffic demands on the Newell Highway have been provided by Forbes Shire Council from an 11-day count undertaken in January 2020 at the level crossing near Union Street, Forbes. TfNSW also provides average traffic counts for Newell Highway 160 m south of the Mid-Western Highway in Caragabal, NSW. The observed traffic demands are shown in Table 5.42. A slight increase in traffic volumes may be experienced on the Newell Highway during the harvest season, which is around November to March.

Based on these volumes, the Newell Highway is operating below capacity during the peak hour, as per Table 5.5 of the *Guide to Traffic Management Part 3* (Austroads, 2020). The Newell Highway is predicted to operate at a Level of Service (LOS) B or better near the Forbes Station and Yard site and near the Mid-Western Highway, which leads to the Caragabal Yard site.

TABLE 5.42 NEWELL HIGHWAY TRAFFIC VOLUMES

Location on Newell highway	Date	Average Annual Daily Traffic (AADT) (2 way) totals	Percentage heavy vehicle	Average peak hour (2 way)	Average peak hour (1 way)
Near the intersection with Union Street in Forbes	9 to 20 January 2020	8,278 vehicles	14.2%	828 vehicles	414 vehicles
160 m south of the Mid-Western Highway in Caragabal	January to May 2021	1,861 vehicles	44.4%	453 vehicles	232 vehicles

Union Street (Forbes Station)

Union Street is a two-lane street with on-street parking available on both sides of the street. A concrete island is in the middle of the street, across from Forbes Station, to separate the two lanes. The Forbes Station and Yard site would be accessed off Union Street via the existing access to the Forbes Station. Union Street connects with the Newell Highway to the south and local road to the north and west.

There were no crashes recorded on Union Street between 2015 and 2019 from the Newell Highway to the site access point (TfNSW, 2019). Traffic demands on Union Street have been provided by Forbes Shire Council from an eight-day count undertaken near the Forbes Station and Yard site accessed in April 2021. Based on the findings of the traffic count provided in Table 5.43, the road is currently operating under its design capacity.

TABLE 5.43 SUMMARY OF TRAFFIC COUNT FINDINGS ON UNION STREET

Location of count	AADT (approx.)	Percentage heavy vehicles	Average speed
110 m west of the Newell Highway (west bound Lane)	1,560 vehicles	4.45%	40–50 km/hour
110 m west of the Newell Highway (east bound lane)	1,242 vehicles	12.4%	40–50 km/hour

Wirrinya Road (Wirrinya Yard)

Wirrinya Road is partially identified by the National Heavy Vehicle Regulator (NHVR) as a 25/26 m B-double suitable route from the Newell Highway to the west of the Wirrinya Yard site; however, in the vicinity the proposal, the road is heavy vehicle suitable but with the condition that these vehicles must have a maximum speed limit of 80 km/h, as it is a school bus route.

Two crashes were recorded on Wirrinya, between 2015 and 2019, between the Wirrinya Yard site and Newell Highway to the west; one serious injury and one non-casualty (towaway). Traffic demands on Wirrinya Road have been provided by Forbes Shire Council from an eight-day count undertaken approximately 100 m to the east of the Wirrinya Yard site in April 2021. Based on the findings of the traffic count provided in Table 5.44, the road is currently operating under its design capacity.

TABLE 5.44 SUMMARY OF TRAFFIC COUNT FINDINGS ON WIRRINYA ROAD

AADT (approx.)	Average daily vehicles no. per lane	Per cent of heavy vehicles	Average speed
81 vehicles	40 vehicles	42%	60–70 km/hour

Gap road (Wirrinya Road)

Gap Road is a two-way road predominantly used to access the grain terminal at Wirrinya Yard. This road allows heavy vehicle access to the grain terminal. No formal on-street parking is provided on the road. There were no crashes recorded on Gap Road between 2015 and 2019 (TfNSW, 2019).

Traffic demands on Gap Road have been provided by Forbes Shire Council from a seven-day count undertaken, approximately 100 m south of Wirrinya Road, in August 2020. Based on the findings of the traffic count provided in Table 5.45, the road is currently operating under its design capacity.

TABLE 5.45 SUMMARY OF TRAFFIC COUNT FINDINGS ON GAP ROAD

Annual average daily traffic (both ways)	Average vehicle per lane per day	Per cent of heavy vehicles	Average speed
64 vehicles	32 vehicles	16%	70–80 km/hour

Mid Western Highway (Caragabal Yard)

The Mid Western Highway is a state highway that passes through Caragabal and is identified by the NHVR as a 25/26 m B-double suitable route. The Mid-Western Highway is a key highway connecting Sydney to the central west region of NSW. No formal on-street parking is provided on the road.

Caragabal Road (Caragabal Yard)

Caragabal Road connects the grain terminal at the Caragabal Yard to the Mid-Western Highway. It is identified by the NHVR as a 25/26 m B-double suitable route. This road would provide access to the site. No formal on-street parking is provided on the road.

Bimbi–Quandialla Road (Caragabal Yard)

Bimbi–Quandialla Road is a rural highway, which is identified by the NHVR as a 25/26 m B-double suitable route. No formal on-street parking is provided on the road.

Bribbaree Road (Bribbaree Yard)

Bribbaree Road is identified by the NHVR as a 25/26 m B-double suitable route. One minor-injury crash near the level crossing south of the site. No formal on-street parking is provided on the road.

Railway Street (Bribbaree Yard)

Railway Street is a two-way local road with informal parking on both sides.

Mary Gilmore Way (Bribbaree Yard)

Mary Gilmore Way is a rural highway that is identified by the NHVR as a 25/26 m B-double suitable route. From Mary Gilmore Way, the Bribbaree Yard site would be accessed by an unsealed single-way track along the rail corridor.

Milvale Road (Milvale Yard)

Milvale Road is a rural highway that is identified by the NHVR as a 25/26 m B-double suitable route. The Milvale Yard site would be accessed via Schillers Road from Milvale Road. Schillers Road is also identified by the NHVR as a 25/26 m B-double suitable route.

5.8.4.3 Public transport

A school bus route operates on the following roads:

- Newell Highway
- Wirrinya Road
- Bribbaree Road
- Mid-Western Highway
- Bimbi–Quandialla Road
- Milvale Road.

No bus stops are located on Union Street between the Newell Highway and Forbes Station and Yard site access. The town bus route, 557, operates five times a day on Union Street to the north of the site access; three times in the morning and twice in the afternoon (Forbes Bus Lines, 2021).

No passenger trains operate within the rail corridor.

5.8.4.4 Access

Each of the roads listed above have private roads and driveways that provide access to residential and commercial properties. The following roads also provide access:

- Union Street—access to Forbes Visitor Information Centre (formerly Forbes Railway Station) including onsite parking
- Gap Road—access to the grain terminal at Wirrinya Yard
- Caragabal Road—access to the gain terminal at Caragabal Yard.

5.8.4.5 Pedestrian and cyclist infrastructure

Pedestrian infrastructure is only present near the Forbes Station and Yard site. Footpaths are present on the western side of Union Street across from the site. Informal pedestrian access may be used around the other sites. None of the areas around the sites are highly trafficked by pedestrians due to the smaller populations.

No cyclist infrastructure is present near any of the sites, though a small number of cyclists may still use local and rural highways.

5.8.5 Potential impacts

5.8.5.1 Construction

Traffic and transport impacts during construction would generally be a result of heavy and light vehicle movements generated by the proposal. No works are proposed to the road network.

Road network

Peak traffic movement would occur during the morning and afternoon when construction personnel are arriving and leaving the site. Delivery of plant would generally be towards the beginning of works and traffic movements would peak during delivery of materials, particularly for earthworks. A summary of traffic generation and access roads are provided in Table 5.46. B-double suitable roads would primarily be used for the haulage routes.

It is noted that there are relatively low background volumes on the roads used to access each site. As the roads are generally not at full capacity and the proposed construction activities would be for a short period of time, there would be a low risk that construction activities would exceed the design capacity of the road network as described in Section 5.8.4. No road closures or detours are anticipated to be required. Traffic management would be required on local roads, particularly at Forbes Station and Yard and Bribbaree Yard during the peak material delivery times. During material deliveries, minor delays may be experienced around Union Street Forbes by buses, locals and, potentially, emergency service vehicles.

Due to the distance between enhancement sites, cumulative impacts from traffic generation would be minimal and limited to the Newell Highway. Construction parking would generally be confined to the proposal site and rail corridor with minimal impact on parking in the area.

TABLE 5.46 ESTIMATED TRAFFIC GENERATION FROM THE CONSTRUCTION PHASE

Construction activity	Construction duration	Peak number of vehicles movements per hour	Site	Primary Haulage route roads around the site
Track works	Approximately six to 11 weeks	10 light vehicles 8 heavy vehicles	Forbes Station and Yard	Union Street Newell Highway
			Wirrinya Yard	Wirrinya Road Gap Road Mid-
			Caragabal Yard	Western Highway Caragabal Road
			Bribbaree Yard	Railway Street Bribbaree Road Mary Gilmore Way
Water tank works	Approximately two days	3 light vehicles 1 heavy vehicle	Milvale Yard	Milvale Road
			Quandialla Yard	Bimbi–Quandialla Road
Forbes station awning works	Approximately a week	2 light vehicles 1 heavy vehicle	Forbes Station and Yard	Union Street Newell Highway

Due to the low number of vehicles generated by the works at Milvale Yard and Quandialla Yard sites, and the short duration of works, the impact to the local road network would be minimal. These sites are not considered further.

Public transport

There is potential for the haulage routes to overlap with local and state bus routes between towns, particularly on the Newell Highway. The haulage route for the Bribbaree Yard route would likely overlap with the school bus route associated with Bribbaree Public School on Railway Street and Bribbaree Road.

Access

The northern vehicle access to the Forbes Information Centre off Union Street would be temporarily impacted as it is the same as the vehicle access to the Forbes Station and Yard site. The southern access to the Forbes Information Centre would not be used for construction access, therefore would not be directly impacted. Access to Wirrinya Yard and Caragabal Yard would be through adjacent grain terminal properties. Construction traffic may overlap with other vehicles accessing the grain terminals. These access tracks would be used in consultation with the landholders to minimise interference with the operation of these properties.

5.8.5.2 Pedestrian and cyclist infrastructure

No changes to pedestrian or cyclist infrastructure are proposed. Impacts to informal pedestrian and cyclist routes would be minimal.

5.8.5.3 Operation

Once operational, the proposal would be operated by ARTC as part of Inland Rail. The proposal would provide an increase in the capacity of the rail corridor between Stockinbingal and Parkes. It is estimated that Inland Rail would be trafficked by an average of around 12 trains per day in 2027, increasing to 18 trains per day in 2039. This increase in rail traffic would occur at each site.

The operation of Inland Rail would not have an impact to general traffic (including heavy vehicle and public transport services) or active transport movements on adjacent roads.

No changes are proposed to the local road network, level crossings or access during operation of the proposal.

5.8.6 Mitigation and management measures

Table 5.47 provides a summary of the project-specific mitigation and management measures that will be implemented during the construction and operation of the proposal to minimise the impacts to and from traffic and access that are over and above contemporary standard practice for environmental management..

TABLE 5.47 TRAFFIC AND ACCESS SITE-SPECIFIC CONTROL MEASURES

ID	Control measures	Stage
TA1	Detailed design and construction planning would avoid or minimise the potential for impacts on the surrounding road and transport network, and property accesses, as far as reasonably practicable.	Detailed design/ pre-construction
TA2	A Traffic, Transport and Access Management Plan would be prepared and implemented as part of the CEMP. It would include measures to minimise the potential for impacts on the community and the operation of the surrounding road and transport environment. It would address all the aspects of construction relating to the movement of vehicles and the operation of the surrounding road network, including: ▸ Construction site traffic control, parking and access arrangements away from property access points and driveways ▸ Construction material, equipment and spoil haulage, including arrangements for heavy vehicles ▸ Road pavement and access road condition management ▸ Management of impacts on public transport, including school bus, pedestrian and cyclist access, and safety ▸ Scheduling deliveries to minimise impact to grain terminals, Forbes Information Centre and school bus movements ▸ Traffic controls to manage deliveries ▸ Ensure adequate sight lines to allow for safe entry and exit from the site ▸ Road and driver safety. The plan would be developed in consultation with local council and public transport/bus operators. As appropriate, additional reasonable and feasible measures identified as an outcome of consultation would be detailed in the plan.	Pre-construction/ construction

ID	Control measures	Stage
TA3	The community would be notified in advance of any proposed road and pedestrian access changes through signage, the local media and other appropriate forms of communication.	Pre-construction/ construction
TA4	A dilapidation survey would be undertaken of the roads to access each site, except Milvale Yard and Quandialla Yard, prior to and following completion of construction and provided to relevant roads authority. Pavement condition monitoring would be carried out during works, as required. Rectification measures would be implemented as needed during, and/or following, completion of construction to address any damage caused by construction.	Construction/ post-construction

5.9 Socio-economic

5.9.1 Introduction

This section provides a description of relevant socio-economic characteristics of the potentially affected community, a summary of potential impacts associated with the proposal and how they may be mitigated or managed. This section includes information outlined in the *Inland Rail: Project level economic impact assessment* (KPMG, 2021).

5.9.2 Legislation, policy, standards and guidelines

The relevant legislation and guidelines considered by this assessment includes:

- EP&A Act
- *Social Impact Assessment Guideline for State Significant Projects* (DPIE, 2021j).

Although the proposal is not a state significant project, the social impact assessment for the proposal had regard to this guide.

5.9.3 Assessment methodology

5.9.3.1 Study area

To assess the potential community and socio-economic impacts associated with the proposal, the assessment has considered a study area as the boundary of the Forbes, Weddin and Hilltops LGAs. While most direct community impacts are likely to be experienced immediately surrounding the proposal site in Forbes, this study area reflects a local economic catchment for workers and economic activity, and potential for wider impacts to the local community.

5.9.3.2 Assessment tasks

The community and socio-economic assessment methodology included:

- A review of the *Inland Rail: Project level economic impact assessment* (KPMG, 2020), which included a review of the socio-economic characteristics of the Forbes LGA with reference to the local demographics, labour markets and business and industry characteristics
- A desktop review of secondary-source quantitative data such as a review of the Australian Bureau of Statistics (ABS)—Census Quick Stats, (ABS, 2016) and publicly available information on local community structure and patterns. In addition to a search of relevant public websites and council documentation to consider the existing availability of housing supply in the LGA
- Completion of limited phone interviews with five key stakeholders to gather a snapshot in time of select community views relevant to the proposal. These key stakeholders were interviewed between 17 March and 8 April 2021 and asked a series of questions aimed at understanding the characteristics, values, opportunities and challenges of the community in relation to Inland Rail.
- A review of the overarching stakeholder engagement tasks undertaken by ARTC to help identify key community concerns
- A review of the outcome of other assessments containing relevant community and socio-economic themes including but not limited to noise and vibration (Section 5.1), air quality (Section 5.10.3) and traffic and access (Section 5.8)
- Consideration of land use and property information, including any land requirements for the proposal
- Consideration of construction and operational phase impacts including:

- Amenity related issues (e.g. noise, dust, visual)
- Community values and social infrastructure
- Changes in travel patterns/access/behaviours (i.e. construction traffic management requirements)
- Impacts/benefits to industry/business in the study area
- Cumulative impacts with other Inland Rail projects.

- Identifying management and mitigation measures to minimise construction and operation impacts of the proposal.

5.9.4 Existing environment

The proposal is located in the Forbes, Weddin and Hilltops LGAs, which are located in the south of the Central West region of NSW.

- The Forbes LGA covers an area of 4,718 square kilometres (km²) and has a population of 9,906 people, of which 8,432 (ABS, 2016) are residents of the town of Forbes.
- The Weddin LGA covers an area of 3,410 km² and has a population of 3,664 people, of which 2,573 (ABS, 2016) are residents of the town of Grenfell.
- The Hilltops LGA covers an area of 7,139 km², and has a population of 18,498 people, of which 10,295 (ABS, 2016) are residents of Young.

Two proposal sites are located in the Forbes LGA (Forbes Station and Yard and Wirrinya Yard). Two proposal sites are located in the Weddin LGA (Caragabal Yard, and Quandialla Yard). One proposal site is located in the Hilltops LGA (Milvale Yard). One proposal site (Bribbaree) extends over both Hilltops and Weddin LGAs in the town of Bribbaree.

While the town of Young is the largest in the LGAs, the township of Forbes is considered the main focal point of this assessment due to its location on the Inland Rail route and the distance to, and construction requirements (refer to Section 2.3) of, proposal sites. This focus is reflected in this section.

5.9.4.1 Labour market and employment

In the December quarter 2020, the unemployment rate was 3.7 per cent in Weddin, 4.3 per cent in Forbes and the highest in Hilltops at 5.7 per cent. The unemployment rate across the study area LGAs was substantially lower than NSW at 6.2 per cent.

Across the study area, there are a total of 803 unemployed persons with close to 64 per cent of these living in Hilltops. Labour market conditions across the study area LGAs have improved over the 24 months to December 2020, with the unemployment rate having decreased across the three LGAs.

Notably, however, the labour force participation in Hilltops, Weddin and Forbes was relatively low at 53.8 per cent, 49.6 per cent and 54.7 per cent, respectively, all materially below the NSW average of 59.2 per cent.

The youth unemployment rate (persons aged 15 to 24 years) is higher than the general unemployment rate in each of the LGAs. The rate is approximately double the total average rate in Hilltops (11.3 per cent) and Forbes (10.7 per cent), and more than three times the general rate in Weddin (16.0 per cent).

There is a high Indigenous population across the study area, particularly in Forbes where 11.0 per cent of the population identify as Indigenous and/or Torres Strait Islander. This is compared to 4.4 percent in Hilltops, 3.1 per cent in Weddin and 2.9 per cent across NSW. Importantly, Indigenous Australians are inadequately represented in the workforce, reflected in the study area's Indigenous unemployment rate of 14.8 per cent, which is nearly three times the total unemployment rate for the study area (5 per cent).

The major employment industry for those living in the catchment is Agriculture, Forestry and Fishing, employing 21.8 per cent of the total local workforce. The significance of this industry is consistent across all three LGAs, accounting for 20.7 per cent in Hilltops, 37.6 per cent of the workforce in Weddin and 18.1 per cent in Forbes. The top 10 industries of employment for those living in the study area is shown in Figure 5.27.

Within the study area, there is employment in directly relevant industry sectors and occupations to support the construction of the proposal. Of the total workforce, 5.7 per cent were employed in the construction industry (690 workers), with the largest proportion employed in construction services (398 workers), followed by building construction (196 workers), and heavy and civil engineering construction (83 workers).

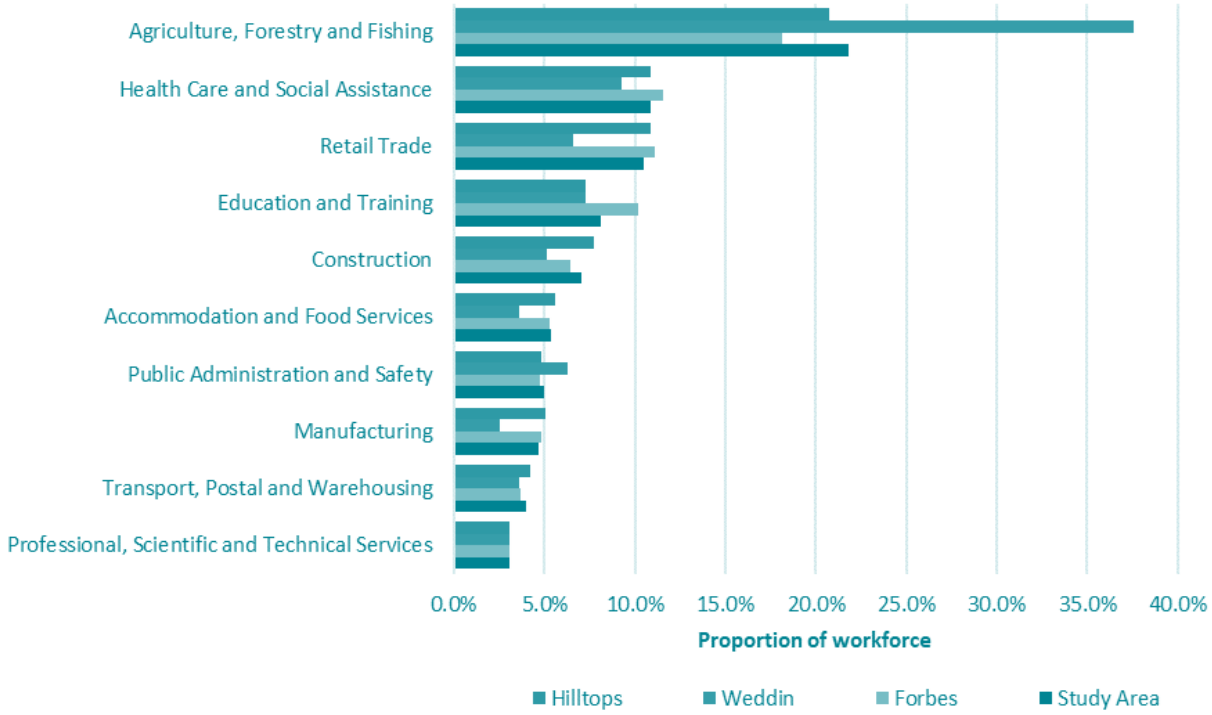

FIGURE 5.27 TOP 10 INDUSTRIES BY EMPLOYMENT, PLACE OF RESIDENCE (ABS, 2016)

5.9.4.2 Business and industry

The area surrounding each proposal site is generally characterised by rural land uses and primary agricultural production, except for the Forbes Station and Yard site where the surrounding land uses include residential and commercial land uses.

This land use is reflected in the area's sectorial strength in the agriculture, forestry and fishing industry. Across the study area it employs the largest number of local residents (2,791 workers), representing 23.2 per cent of the total workforce (compared to the NSW average of 2.1 per cent). Within agriculture, forestry and fishing, the primary source of employment is in sheep, beef cattle and grain farming (1,798 workers).

Following agriculture, forestry and fishing, the largest industry sectors by employment include healthcare and social assistance (11.3 per cent), retail trade (11.1 per cent), education and training (8.7 per cent) and construction (5.7 per cent).

Construction labour availability

In June 2021, construction industry reports outlined that COVID-19 has disrupted labour supply chains and is continuing to cause fluctuating labour availability and conditions, particularly due to changing government restrictions. Despite this, the reports forecast strong rail construction industry activity over the next five years, underpinned by several landmark projects, especially in capital cities. Revenue and employment are predicted to peak in 2023–24 during the core stages of many of these projects, then subsequently decrease to below current levels upon their staged completion. In line with this, the average rail construction wage is predicted to increase until 2024 then fall (Kelly, 2021a; Kelly, 2021b).

These labour supply constraints are a contributing factor to the rising input costs for rail projects that is exerting ongoing pressure on profit margins and increasing the total cost of project delivery. Over the past 15 years, labour has become a proportionally larger cost for rail projects compared to capital. Currently, for every dollar invested in capital, $14.82 is spent on labour, which is higher than the construction sector average of $13.69 (Kelly, 2021a; Kelly, 2021b). Railway track construction wage costs represent 25.2 per cent of project revenue, whereas the broader industry spend only accounts for 17.8 per cent (Kelly, 2021a; Kelly, 2021b). With workforce demand predicted to peak in 2023–24, labour sourcing difficulties are predicted to remain. Shortages in labour availability are most likely for specific trades requiring specialist skills.

5.9.4.3 Housing

A review of real estate website Domain (**domain.com.au**) indicated 18 properties for rent in Forbes (accessed 28 April 2021). A review of vacancy rates for the Central West of NSW (REINS NSW Vacancy Rate Survey Results March 2021) indicates a residential vacancy rate of 0.6 per cent.

The housing shortage is supported by the *Forbes Local Strategic Planning Statement 2040* (Forbes Shire Council, 2021c), which has identified the development of a housing strategy to address future housing needs in the region, and specifically identify best-practice methods of housing temporary workers that are required for seasonal activities in the region. Temporary housing demand is predicted to be greatest during harvest seasons, which includes grain (October to December), hay and silage (September and October) and stone fruit (January to April) (NSW Government, 2021).

5.9.4.4 Stakeholder engagement

This assessment has been directly informed by feedback generated through the community and stakeholder engagement. ARTC has undertaken an extensive engagement with stakeholders including landholders, business and surrounding communities. The results of this community and stakeholder engagement is included in Chapter 4 of this REF. Chapter 4 outlines the key matters of concern of the community and key stakeholders. The range of community concerns was identified by impacted landholders, the wider community and Indigenous stakeholders, and included impacts associated with construction activities, flooding, transport and transportation, noise and vibration, and impacts to social and economic factors.

In addition to the consultation outlined in Chapter 4, five key stakeholders along the S2P rail corridor were interviewed between 17 March and 8 April 2021 to understand the characteristics, values, opportunities and challenges of the community in relation to Inland Rail. Key stakeholders included: education and emergency services, the Forbes Business Chamber, Forbes Shire Council, and a local resident.

In summary:

- The Forbes community is generally described as a resilient and welcoming regional community with strong agricultural ties that support the town and local industries
- The Forbes Lake was identified as a key focal point of recreational activities, including sporting facilities, and as being important to the history of sport in the region
- Current community challenges were identified as: the provision of opportunities for young people, the availability of skilled workers, a lack of medical professionals, crime, climate (drought), general community health and wellbeing and the availability of housing, including short-term accommodation, to facilitate the developments proposed in the local area.
- The general perception of Inland Rail included:
  - The benefits of Inland Rail would outweigh the construction impacts
  - It has the potential to provide increased employment opportunities and services that may encourage migration to the area
  - There is a high level of interest in the business community; however, there is some apprehension on how they would be affected in the future once Inland Rail is operational and how to maximise the benefits
  - It is a good short-term economic stimulus to the local area and would improve transport infrastructure and take demand off the roads in the long term.
- Program benefits and impacts were identified as:
  - An influx of workers, integration into the local community and local spending
  - Jobs for local workers, and demand for local resources, including the supply of materials
  - Impacts to emergency services and other minor impacts during construction
  - Operational impacts such as changes to property values, noise, and vibrations

Potential impacts to property values due to increasing demand and limited short-term accommodation opportunities.

5.9.4.5 Community facilities

A review of community facilities (including schools, hospitals, recreational facilities) in towns near the proposal sites identified a number of key community locations.

These locations are predominantly located within the township of Forbes as it is a key regional centre. These locations in Forbes include:

- Education—Five schools, one pre-school, two early childhood centres and a TAFE NSW campus. The nearest educational facility is the St Laurence Parish School located around 260 m to the west of the Forbes Station and Yard proposal site.
- Health—The Forbes Hospital is in South Forbes. There are a number of aged care and disability services in Forbes, including Forbes Council Home and Community Care Centre. Most of the medical services in the area are in the town centre or South Forbes.
- Recreation—Forbes contains a number of recreational and sporting facilities. Most of these facilities are located to the south of the town centre adjacent to Lake Forbes and would not be impacted by the proposal. They include a rugby union club, netball facilities, Forbes Sports and Recreational Club and Forbes Dragon Boat Club, as well as a showground and trotting track. The nearest facility is the Forbes Golf Club, which is located around 100 m to the east of the Forbes Station and Yard proposal site.
- Outside the township of Forbes, key facilities near the proposal sites include the:
  - Caragabal public school, located around 600 m to the south of the Caragabal Yard clearances proposal site
  - Bribbaree public school and bowling club located around 500 m and 30 m to the west of the Bribbaree Yard clearances proposal site.

Residents of these smaller towns are likely to travel to nearby regional towns where community facilities are available. This would include towns such as West Wylong, and Cowra and Young.

There are no community facilities located near the Wirrinya Yard clearances proposal site and, due to the scale of works proposed at the Quandialla Yard and Millvale Yard clearance proposal sites, community facilities have not been considered further.

5.9.5 Potential impacts

5.9.5.1 Construction

Workforce impacts

The Inland Rail program schedule has a 13-month construction window for the S2P proposal, from 2022 to 2024. Within that period, construction works for the proposal are predicted to take up to 11 weeks, commencing in early 2024, inclusive of all mobilisation and demobilisation activities.

Over the construction period, the workforce will vary across each proposal site, depending on the scope and complexity of work. At the proposal's peak, it is anticipated that up to 35 personnel are required for construction (refer to Section 2.8).

The proposal would require a variety of skill and roles during construction, including labourers, tradespeople, machinery operators, engineers, surveyors, and site supervisors. ARTC is committed to creating opportunities for the development of skilled local workers through Inland Rail; ARTC will require its contractors to have regard to the NSW Infrastructure Skills Legacy Program.

Assuming there is no material negative change in labour market conditions (as described in Section 5.9.4) between now and the commencement of construction (early 2024), it seems reasonable to estimate that the Hilltops LGA will have the capacity to supply a significant portion of the workforce requirements of the proposal without major disruption to the local labour market, which may be sensitive to labour draw. Given the low unemployment rate in both Forbes LGA and Weddin LGA, it is likely only a small portion of the proposal's workforce requirements will be sourced locally. Where specialist or expert skills are required, some workers may be required to travel from the surrounding regions.

The requirement for the temporary relocation of some workers may result in an increase in pressure on the availability of short-term or temporary accommodation; however, given the workforce requirements for the proposal (refer to Section 2.8), any employees temporarily relocated could be housed within the existing supply of short- and long-term accommodation in Forbes and surrounding regional towns such as Young and West Wyalong. In consideration of community facilities, it is not predicted that the temporary relocation of workers to the local region would put significant pressure on existing community facilities.

There is the potential for the workforce to be employed on other similar construction projects within the S2P section of Inland Rail or on adjacent Inland Rail projects (e.g. Illabo to Stockinbingal). This has the potential to increase the longevity of local employment opportunities or result in the temporary relocation of proposal employees to the study area, which may result in a marginal increase in local economic activity due to spending in local businesses by employees and their families.

Business and industry impacts

The land requirement for the proposal is predominantly confined to the existing rail corridor at each proposal site. The proposal does not propose to change the land use of the rail corridor, nor will other adjoining land uses be altered during the operation of the proposal.

For local businesses, any temporary changes in amenity, or access disruptions due to construction traffic, will be minimised, as far as practical, by the implementation of appropriate consultation and mitigation measures proposed in this REF.

Accordingly, the proposal is not anticipated to result in adverse or long-term impacts on local businesses or industry due to changes in land use, the viability of rural land, access or amenity.

Local construction business

ARTC has developed the Inland Rail Sustainable Procurement Policy, which will ensure that local, regional and Indigenous businesses have opportunities to supply the proposal. There is a small representation of construction businesses located in the study area, with a total of 228 employing businesses and a further 258 non-employing businesses across the study area.

There are a number of operations in the extractive industries sector, in close proximity to the proposal, that have been confirmed to have capability to engage with the proposal's construction. These local quarries include:

- Regional Quarries (Forbes)
- Millers Metals (Wyalong)
- Tegra (Young).

The proposal will require a range of construction supplies for the track-slewing works. This includes structural fill, capping, ballast, sleepers, rail and jewelry (noting some sleepers and rail may be reused).

In addition to supply materials, there are a number of services that could potentially be sourced from within local or regional communities, including electrical installation (excluding rail systems) and instrumentation, rehabilitation and landscaping, waste disposal services, trades services, professional services (e.g. human resources) and community adaptation to the rail corridor (e.g. community and economic development services).

Community impacts

Table 5.48 provides a summary of the potential amenity impacts as a result of construction of the proposal.

TABLE 5.48 POTENTIAL COMMUNITY IMPACTS

Impact theme	Impact
Amenity	Construction of the proposal would result in some nearby residents experiencing temporary increase in noise during standard and out of hours periods due to the operation of plant and equipment, and general construction works (refer to Section 5.1). Construction activities are not predicted to generate significant dust at Milvale Yard, Quandialla Yard, Caragabal Yard and Wirrinya Yard as earthworks are not proposed and the land disturbance areas will be small. The proposed works at Bribbaree Yard and Forbes Station and Yard are anticipated to generate the most dust, as the work involves earthworks. The residential and commercial properties adjacent to these sites may be exposed to dust as a result of the proposal; however, this air quality impact would be short term and minor (refer to Section 5.10.3). General construction traffic may also result in elevated noise and dust during the construction period (refer to Section 5.1 and 5.10.3).

Impact theme	Impact
Accessibility	Construction of the proposal would require the partial occupation and access to the Wirrinya Yard and Caragabal Yard proposal sites though land owned and operated by NSW GrainCorp Operations Limited (refer to Section 2.8). Any impacts to accessibility would be managed though ongoing consultation with the landowner and would be unlikely to impact the community. Construction of the proposal would require the use of land owned by Hilltops Shire Council (refer to Section 2.8) on Railway Street as part of the Bribbaree Yard proposal site. The use of this site would be managed with ongoing consultation with Hilltops Shire Council and would be unlikely to impact the community. Construction of the proposal is unlikely to result in any impacts to the accessibility of nearby properties as the proposal is mainly located within the existing rail corridor and site access would be provided through existing rail maintenance access roads. No other impacts on community accessibility are predicted. The proposal would be unlikely to result in impacts to local public transport (refer to Section 5.8.5.1). Vehicle access to the Forbes Station and Yard site would be impacted as it is the same as the vehicle access to the Forbes Information Centre. Vehicle access to this centre would be temporarily impacted during construction. Access to Wirrinya Yard and Caragabal Yard would be through adjacent grain terminal properties. Construction traffic may overlap with other vehicles accessing the grain terminals. These access tracks would be used in consultation with the landholders to minimise interference with the operation of these properties.
Build environment	Construction of the proposal is mostly limited to the existing rail corridor, except for temporary, partial use of adjacent land as outlined in Section 2.8.
Heritage and culture	Construction of the proposal would not result in any direct impacts to heritage items except for Forbes Station and Milvale Yard (refer to Section 5.2). To achieve horizontal clearance at Forbes Station, it is proposed that the platform awning at the station be trimmed by approximately 300 mm. This will include work to the edge of the awning, including guttering. The platform would not be modified. Due to these impacts to the state heritage listed station, application to Heritage NSW for a Section 60 heritage permit is required to complete the works. The Statement of Heritage Impact (SoHI) Appendix F has identified that there is unlikely to be a significant impact as a result of the proposal. Minor work of the Milvale Railway Water Tank through removal of the wire and associated brackets to achieve horizontal clearance. The proposed works would allow the primary features of the tank to remain intact and preserving most of the original fabric and aesthetic value. The fabric proposed for removal (wire and associated brackets) is minor and would not be noticeable from Milvale Road. Other good examples of the Milvale Railway Water Tank, such as at Quandialla, remain intact to allow for the continued interpretation of this aspect of early 20th century railways. There is potential for vibration, as a result of construction works, to indirectly impact the locally listed heritage sites in close proximity to the Forbes Station and Yard site and Bribbaree Yard clearances (refer to Section 5.1.5.2). Construction of the proposal would not result in any impacts to Aboriginal heritage (refer to Section 5.10.2).
Health and wellbeing	Construction of the proposal is not predicted to result in a significant impact to the health and wellbeing of the community. There may be some temporary disruption and nuisance as a result of noise, dust and traffic impacts; however, these are predicted to be minor and temporary in nature and would be mitigated to minimise their impact.

5.9.5.2 Operational

Economic development impacts

The proposal is part of the broader Inland Rail program, which will have a strong contribution to regional economic development. As detailed in the *Inland Rail Program Business Case* (2015), Inland Rail would:

- Improve linkages and reduce distances travelled within the national freight network
- Improve access to and from regional markets
- Reduce rail costs, improve reliability and provide greater certainty for freight travelling between Melbourne and Brisbane.

The business case further notes that Inland Rail will be a catalyst for complementary supply chain investments, including fleet upgrades, new metropolitan and regional terminals, and integrated freight precincts, as well as the potential for creation of new and expanded regional industries, including rail-based warehousing and associated freight precincts.

Community

When operational, the proposal is not likely to result in any material changes to the land use and landscape character that would impact the community. Due to the planned increase in rail corridor usage once operational, some residents near the rail corridor would experience operational noise.

As outlined in Section 5.1.5.3, the operational noise levels are predicted to be exceed trigger levels at up to 13 sensitive receivers by 2039. The predicted railway noise levels within the immediate 1 km area would be at or above the ambient noise levels, with potential for train passby events to be clearly audible. There is also potential for ground-borne noise impacts at sensitive receivers located within 60 m of the rail line.

Noise management and mitigation measures (refer to Section 5.1.6) would be implemented to reduce the level and character of both airborne and ground-borne noise for impacted sensitive receivers, including but not limited to at-property treatments.

5.9.6 Mitigation and management measures

Table 5.49 provides a summary of the project-specific mitigation and management measures that will be implemented during the construction and operation of the proposal to minimise the impacts on the local community that are over and above contemporary standard practice for environmental management.

Where specific mitigation measures associated with other assessments are required, they have been included in the mitigation and management measures in the relevant chapter:

- A Traffic, Transport and Access Management Plan as part of the CEMP (mitigation measures in Section 5.8.6) to manage the risks associated with construction transport, and risk to the public
- Noise and air quality plans as part of the CEMP (mitigation measures in Section 5.1.6 and Section 5.10.3 to manage the construction risks associated with noise and air quality risks to the community)
- Non-Aboriginal heritage management and mitigation measures as outlined in Section 5.2.6, including the requirement of a Heritage Management Plan for Forbes Station, prepared and implemented as part of the CEMP.

TABLE 5.49 COMMUNITY AND SOCIO-ECONOMIC SITE-SPECIFIC CONTROL MEASURES

ID	Control measures	Stage
CS1	ARTC would continue to manage and deliver program-wide community and stakeholder engagement for Inland Rail in accordance with the Inland Rail Communications and Engagement Strategy. A proposal-specific Communication Management Plan would be developed, in accordance with the Inland Rail Communications and Engagement Strategy, and implemented prior to and during construction, to ensure: ▸ The community and key stakeholders are provided opportunities for input to the design and construction planning, where appropriate ▸ Landholders and community members with the potential to be affected by construction activities are notified in a timely manner about the timing of activities and potential for impacts, and the measures that would be implemented to minimise the potential for impacts on individual properties ▸ Enquiries and complaints are managed, and a timely response is provided for concerns raised ▸ Accurate and accessible information is made available ▸ Feedback from the community is encouraged. The Communication Management Plan would define the requirements for the complaints management system to be implemented during construction.	Pre-construction/ construction
CS2	ARTC would continue to support local employment in accordance with the *Australian Jobs Act 2013* (Cth) and Australian Industry Participation National Framework, and through the Inland Rail Skills Academy, to leverage training programs; upskill local residents and young people; and connect businesses with Inland Rail opportunities and key regional industries.	Pre-construction/ construction
CS3	A project-specific industry participation plan would be developed that: ▸ Complies with the IR AIPP, Australian Government *Indigenous Procurement Policy* and Inland Rail *Sustainable Procurement Policy* ▸ Proposes targets for procurement with local and Indigenous businesses and social enterprises ▸ Reports to ARTC on local and Indigenous business and social enterprise participation, including achievements against targets The local industry participation plan would be provided to Forbes Shire Council.	Pre-construction/ construction

ID	Control measures	Stage
CS4	A Workforce Management Plan would be developed and implemented during construction to manage: ▸ Potential impacts of the non-resident construction workforce ▸ Local business and employment opportunities (including Indigenous employment opportunities) ▸ Health and wellbeing needs of the temporary construction workforce, including medical, allied health and wellbeing services. The plan would include measures to manage potential impacts of the non-resident construction workforce on local and regional communities, including: ▸ A code of conduct for workers, including a zero-tolerance policy relating to anti-social behaviour ▸ Strategies to promote wellbeing of the workforce ▸ A monitoring mechanism for use of local tourist accommodation and rental housing by workers ▸ Consultation with local health and emergency services to establish processes for managing potential increased demands due to the non-resident workforce. The Workforce Management Plan would be developed in consultation with local councils and service providers, including local and regional health and emergency services providers.	Pre-construction/ Construction
CS5	Complaints during construction would be managed in accordance with the complaints management system defined by the Communication Management Plan. The complaints management system would be maintained throughout the construction period and for a minimum of 12 months after construction finishes.	Construction/ Operation

5.10 Other issues

Other potential impacts from the proposal considered to have a lower risk are outlined in this section.

5.10.1 Climate change

ARTC has developed a Climate Change Risk Assessment Framework to guide a standard approach to climate change risk assessment and mitigation across the whole Inland Rail program. The framework provides background on climate change projections and the assessment process. It includes an example climate change risk assessment template that each project is required to tailor to their own specific context.

Accordingly, climate change was considered across the S2P project through the completion of a climate change risk assessment in May 2021 (refer to Appendix C). The results of the risk assessment demonstrated that the scale and nature of the works, essentially carrying out minor modifications to an existing rail line, would result in a negligible outcome in terms of needing to include project-specific climate adaptation measures in the design; however, consistent with the Inland Rail program climate change adaption measures considered in the S2P project include:

- Incorporating sufficient flood immunity within the design to account for future climate change impacts to 2090
- Drainage and flooding velocities at rail embankments to be considered, and appropriate protection provided to avoid erosion and scour.

These mitigations have been considered in the design and assessed in Section 5.4.

5.10.2 Aboriginal heritage

The assessment of potential impacts to Aboriginal heritage from the proposal are outlined in this section. An *Aboriginal Due Diligence Assessment Report* (OzArk, 2021c) was prepared for the proposal (refer to Appendix H). A desktop assessment including a search of the Aboriginal Heritage Information System (AHIMS) was completed and a site inspection by a qualified archaeologist was conducted on 2 and 3 February 2021.

The AHIMS searches completed on 25 January 2021 did not identify any Aboriginal sites within the proposal site and no Aboriginal places have been declared. No Aboriginal sites were recorded during the inspection of the horizontal clearance sites. The lack of Aboriginal sites is most likely due to the highly disturbed nature of the proposal site, which has been subject to impacts from railway construction and agriculture.

Construction would require ground disturbance at all sites, except Milvale Yard and Quandialla Yard, for the purpose of undertaking track works. The assessment identified low risk of Aboriginal objects being present within the proposal site due to the history of disturbance and no known objects were identified within the proposal site during the site inspection; therefore, it is considered unlikely that any Aboriginal heritage items would be harmed during construction and operation of the proposal.

Table 5.50 provides a summary of the project-specific mitigation and management measures that will be implemented during the construction and operation of the proposal to protect and minimise impacts to Aboriginal heritage values that are over and above contemporary standard practice for environmental management.

TABLE 5.50 ABORIGINAL HERITAGE SITE-SPECIFIC CONTROL MEASURES

ID	Control measures	Stage
AH1	Work crews would undergo cultural heritage induction to ensure they recognise Aboriginal artefacts and are aware of the legislative protection of Aboriginal objects under the *National Parks and Wildlife Act* (NPW Act) and the contents of the Unanticipated Finds Protocol.	Construction
AH2	An Unexpected Finds Protocol would be developed and included in the CEMP to provide a consistent method for managing any unexpected Aboriginal heritage items discovered during construction, including potential heritage items or objects, and human skeletal remains.	Pre-construction/ construction

5.10.3 Air quality

The assessment of potential impacts to air quality from the proposal are outlined in this section. At a regional level, the air quality is largely influenced by agricultural land use and natural events, including bushfires and dust storms. At a local level for each site (except Forbes Station and Yard site) the air quality of the area is influenced by:

- Dust from land disturbance for agricultural purposes
- Operation of the rail corridor, including emissions from freight train movements
- Particulate matter from movement of grain at grain terminals operating along the rail corridor.

The air quality around Forbes Station and Yard site is influenced by emissions associated with Forbes township, including vehicles, and from general industrial and commercial land use activities. The nearest air quality monitoring station is located in Orange, around 98 km to the east of the proposal, which provides monitoring and data for PM_{10} and $PM_{2.5}$, visibility and wind. The particulate matter and visibility monitoring data indicated that bushfires have historically impacted air quality in the region. The wind data shows that wind speeds are greatest during the spring and summer months, with strong winds from the north frequent in the summer, and strong southerly winds frequent in winter months. This is more likely to cause dust and emissions spread in summer and spring months (DPIE, 2021e).

5.10.3.1 Dust emissions

During construction, potential air quality impacts would be associated with the generation of dust and emissions from on-site machinery and vehicular traffic. Particulate emissions would be primarily from movement of plant and vehicles and potential wind erosion of exposed soil. Anticipated dust-generating activities include:

- Loading and transfer of materials from trucks
- Vehicles and plant using unsealed access
- Earthworks at Bribbaree Yard and Forbes Station and Yard
- General construction works.

Minimal dust is anticipated to be generated at Milvale Yard, Quandialla Yard, Caragabal Yard and Wirrinya Yard as earthworks are not proposed and the land disturbance areas will be small. The proposed work at Bribbaree Yard and Forbes Station and Yard are anticipated to generate the most dust as the work involves earthworks. The residential and commercial properties adjacent to these sites may be exposed to dust as a result of the proposal. Measures would be implemented to mitigate these potential impacts.

5.10.3.2 Vehicle and plant exhaust emissions

The operation of plant, machinery and trucks during construction may also lead to increases in exhaust emissions in the local area. Emissions such as Nitrogen Oxides (NO_x) and $PM_{2.5}$ emissions from diesel combustion vehicles would be generated during construction. As only 16 vehicles are anticipated to be generated daily over a period of three months, these impacts would be minor and short term. No changes to maintenance activities during operation are proposed; therefore, exhaust emissions from plant and vehicles would not change.

5.10.3.3 Train movement emissions

The proposal would enable an increase in the number of freight trains travelling the rail corridor. It is estimated that the operation of Inland Rail would involve an annual average of around 12 trains per day in 2027, increasing to around 18 trains per day in 2039. The primary source of air quality emissions from the operation of the proposal is from combustion-related gaseous emissions and particulate matter (PM_{10} and $PM_{2.5}$) from freight train movements.

Air quality impacts from busy rail corridors are generally only an issue in densely populated areas with poor outdoor air circulation. *Development near rail corridors and busy roads—interim guideline* (Department of Planning, 2008), suggests that air quality should be a design consideration within 20 m of a freeway or main road with moderate congestion levels. There are several sensitive receivers within 50 m of the rail corridor at the enhancement sites, comprising three receivers at Bribbaree Yard and two at Forbes Station and Yard. The nearest sensitive receiver to the proposal site is a residential property (6 Short Street) approximately 20 m south east of the railway track at Bribbaree Yard. The guideline provides no specific reference to a distance from rail corridors; however, air pollution from transport corridors decreases significantly with distance.

The results of the *Northern Sydney Freight Corridor Strathfield Rail Underpass Air Quality Assessment* (Parsons Brinckerhoff, 2012) were reviewed with respect to the potential impacts of the operation of freight trains. The assessment included air quality modelling of 81 class diesel locomotives undertaking a minimum of 32 movements per day (16 in each direction) at 75 km/hr. The results of modelling indicated that for all assessed pollutants (NO_2, SO^2, CO, PM_{10}, $PM_{2.5}$ and benzene) the predicted levels were significantly below the impact assessment criteria, at a distance of 50 m from the track.

The predicted increment of PM_{10} as a 24-hour average was 0.06 µg/m^3, and the increment of $PM_{2.5}$ was 2 µg/m^3, which complied with the assessment criteria at all sensitive receivers. The frequency of train movements in the assessment was substantially greater than those involved in the proposal and the 81 class diesel locomotives have higher emissions than those proposed here. Additionally, the annual average background concentrations of particulate matter in Orange (the nearest DPIE air monitoring station) are lower than the background levels of the highly urbanised environment referred to in the 2012 reference study. As such, the findings apply to the proposal as a conservative overestimate. As the levels of operational rail traffic along the proposal site would be much lower than for the Northern Sydney Freight Corridor, the operational emissions within 50 m as a result of the proposal are predicted to be much lower. Overall, while the emissions associated with using existing rail line would increase as a result of the proposal, the concentrations are still predicted to be low and below the relevant criteria.

5.10.3.4 Greenhouse gas emissions

An increase in greenhouse gas (GHG) emissions, primarily carbon dioxide, would occur during construction of the proposal. Much of this would be from embedded energy within construction materials, followed by plant and equipment use. Due to the short-term and minor nature of the proposed work, generation of GHG is not anticipated to be significant.

Table 5.51 provides a summary of the project-specific mitigation measure that will be implemented during the construction of the proposal to minimise impacts to air quality from the proposal that are over and above contemporary standard practice for environmental management.

TABLE 5.51 AIR QUALITY SITE-SPECIFIC CONTROL MEASURES

ID	Control measures	Stage
AQ1	An Air Quality Management Plan would be prepared and implemented as part of the CEMP. It would include measures to minimise the potential for air quality impacts on the local community and environment, and would address all aspects of construction, including: ▸ Spoil handling ▸ Machinery operating procedures ▸ Soil treatments ▸ Stockpile management ▸ Haulage ▸ Dust suppression ▸ Monitoring.	Pre-construction/ Construction

5.10.4 Land use and property

The assessment of potential impacts to land use from the proposal are outlined in this section. All the sites are located along an operational rail corridor in rural agricultural areas, with a small number of residential and commercial properties; with the exception of the Forbes Station and Yard site, which is located within the Forbes township. The sites are predominantly zoned SP2—Infrastructure (railway) as shown in Figure 3.1.

Travelling stock routes and Crown land have not been identified over or near each site. A search of native title claims found there are currently no registered native title claims or proposed agreements applicable to the proposal sites. Exploration licences are mapped over the Wirrinya Yard site (EL8774) and the Caragabal Yard site (EL8804); however, no mining titles or mining applications have been identified over any of the sites (NSW Government, 2019).

The land use of the proposal site would temporarily be for construction purposes. Impacts to land use during construction would be associated with site compounds, stockpiles and laydown areas. Temporary occupation of council and privately owned land would be required at the following sites during construction:

- Wirrinya Yard—partial occupation and access to the construction site through land owned and operated by GrainCorp
- Caragabal Yard—access to the construction site via an access road on GrainCorp owned land
- Bribbaree Yard— partial occupation and access to the site through land owned and operated by GrainCorp and location of stockpile to the south of the rail corridor on Hilltops Council land off Railway Street.

Temporary occupation of land and use of access tracks during construction would be organised in consultation with the landholders. No land would be permanently acquired for the proposal.

The proposal would not change the land use of the proposal site during operation and no impacts to land use and property are anticipated during operation.

Table 5.52 provides a summary of the project-specific mitigation and management measures that will be implemented during the construction and operation of the proposal, to minimise impacts to land use and property that are over and above contemporary standard practice for environmental management.

TABLE 5.52 LAND USE AND PROPERTY SITE-SPECIFIC CONTROL MEASURES

ID	Control measures	Stage
LU1	Detailed design and construction planning would continue to be refined to minimise potential impacts on land uses and adjacent properties, as far as reasonably practicable. Consultation with landholders would be ongoing to identify feasible and reasonable measures to minimise impacts on their operations/properties.	Detailed design/ pre-construction
LU2	Where construction is located immediately adjacent to private properties or has the potential to affect farm or grain terminal operations, property-specific measures would be identified and implemented in consultation with landholders.	Detailed design/ pre-construction

5.10.5 Hazard and risk

The assessment of potential hazards and risks from the proposal are outlined in this section. The proposal site is along an operational rail corridor on land that is not mapped as bushfire-prone land (NSW Rural Fire Service, 2021). Each enhancement site has a similar hazard profile based on the infrastructure present, regular freight train movements and maintenance activities undertaken. Each site has old rail infrastructure, which may contain hazardous material, such as lead-based paint, asbestos or hazardous contaminant, as discussed in Section 5.7.

Utilities are present in and adjacent to the proposal site, including water mains, gas mains and overhead power lines. An overhead powerline is present over the Bribbaree Yard site.

Hazards and risks associated with the construction of the proposal are similar for each site except for Milvale Yard and Quandialla Yard due to the minor and short-term (two days at each site) of the proposed works. The potential hazard and risks present during construction include:

- Storage and handling of a small volume of dangerous goods and hazardous materials such as fuels or rail weld kits
- Risk of fire due to hot works associated with construction such as rail welding
- Increase in construction traffic on the local road networks due to an increase in heavy and light vehicle movements
- As Forbes Station and Yard is located on flood-prone land, as identified in Section 5.4.4.3, there is a risk the site could become inundated during a high rainfall event, which could put personnel at risk
- Contaminants of potential concern within the rail corridor that could potentially be exposed during excavation include hydrocarbons, lead-based paint, asbestos or other hazardous materials on old assets within the rail corridor (refer to Section 5.7.4.2)
- Potential for conflict with both underground and overhead services resulting from excavation or earthworks, and the use of plant close to services. The rupture or contact with services poses a risk to the safety of workers, the public, and could result in short-term outages.

It is noted that the assessment does not provide a detailed account of potential health and safety risks to onsite workers for the proposal. Potential risks to onsite workers are regulated by workplace health and safety legislation (including the *Work Health and Safety Act 2011* (NSW)) and are not relevant to approval of the proposal. Site management would be the responsibility of the construction contractor, who would be required to manage the site in accordance with relevant regulatory requirements.

The frequency and size of freight trains travelling within the proposal site during operation would increase, which would result in an increase in the hazard profile. Potential operational hazards and risks associated with the rail corridor in the proposal site don't significantly increase from current operations including train accidents (including derailment, collision or impact), spills from train and equipment (such as oil and cleaning chemicals), and accidents involving hazardous cargo. These potential impacts would be managed by undertaking the design with an appropriate emphasis on safety according to relevant design standards and requirements. The operational maintenance activities would not change as a result of the proposal and therefore the risks and hazards associated with those works would not change.

Table 5.53 provides a summary of the project-specific mitigation and management measures that will be implemented during the construction and operation of the proposal, to minimise the impacts to and from hazard and risk. Mitigation measures for risks associated with contamination and hazardous materials are provided in Section 5.7.6.

TABLE 5.53 HAZARD AND RISK SITE-SPECIFIC CONTROL MEASURES

ID	Control measures	Stage
HR1	Utility and service providers would continue to be consulted during detailed design to identify possible interactions and develop procedures to minimise the potential for service interruptions and impacts on existing land uses.	Detailed design/ Pre-construction
HR2	Any work or protection of gas pipelines will be completed by an authorised service provider as part of the early works stage.	Pre-construction/ construction
HR3	A Flood and Emergency Response Plan would be prepared and implemented as part of the CEMP. The plan would include measures, processes and responsibilities to minimise the potential impacts of construction activities on flood behaviour at Forbes Station and Yards, as far as practicable. It would also include measures to manage emergencies during construction, including the evacuation protocol for personnel and monitoring of weather forecasts.	Pre-construction/ construction
HR3	Dangerous goods and hazardous materials will be stored in accordance with supplier's instructions and relevant legislation, Australian Standards, and applicable guidelines and may include chemical storage cabinets/containers or impervious bunds.	Construction

5.10.6 Water quality

The assessment of potential impacts to water quality from the proposal are outlined in this section. The proposal site does not intersect any waterways, as described in Section 5.4.4.

The *Lachlan River Water Quality Management Plan* (WQMP) (DPI, 2018) reviewed water quality data along the Lachlan River for the periods 2010–2011 and 2014–2015.The monitoring site nearest to an enhancement site (Forbes (site 412004)) is located about 4 km south west of the Forbes Station and Yard clearance site, upstream of the point at which Lake Forbes joins the Lachlan River. This site recorded an overall 'poor' score for water quality. Poor water quality is defined in this plan as elevated levels of nutrients, turbidity, blue-green algae, salinity, toxicants and pathogens or temperature, pH and dissolved oxygen outside specified ranges in Appendix A of the WQMP (DPI, 2018).

Based on the 2018 State of the Environment, the Lachlan River was not achieving the water quality criteria for nutrients, as laid out in the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC 2000/ANZG 2018) and *Murray Darling Basin Plan 2012*. The sources of the high nutrient levels are likely to be diffuse and related to current and historical agricultural activities within the study area. Given the ephemeral nature of the waterways, it is unlikely that the waterways near the enhancement sites would achieve the water quality criteria of ANZECC 2000/ANZG 2018, particularly for nutrients.

The proposal site does not intersect with any waterways; however, there are waterways and farms dams in the surrounding areas, as described in Section 5.4.4. Impacts to water quality through release of pollutants from the proposal site to nearby properties, waterways and waterbodies are most likely to occur during the construction phase and predominately during flood conditions. The construction activities with the potential to impact water quality include:

- Vegetation clearing exposes and may destabilise soils increasing potential for erosion and runoff of materials to waterways
- Earthworks and track works will be required at Forbes Station and Yard, Wirrinya Yard, Caragabal Yard and at Bribbaree Yard sites, increasing potential for erosion and runoff of materials to waterways
- Disturbance of potentially contaminated soils results is potential for exposed contaminants, such as heavy metals or excess nutrients to enter to waterways from stormwater runoff
- Use of water onsite for dust suppression, which may increase erosion and runoff volumes (though this is anticipated to be minimal)
- Potential for spills of fuels and chemicals onsite, which may reach receiving waterways via stormwater runoff
- Gross pollutants and litter from construction or operational personnel entering receiving waterways via stormwater runoff.

Provided the project specific mitigations measures are implemented including those in Table 5.54, the residual likelihood of water quality impacts would be low. Contamination and erosion control mitigation measures are provided in Section 5.7.6.

TABLE 5.54 WATER QUALITY SITE-SPECIFIC CONTROL MEASURES

ID	Control measures	Stage
WQ1	Disturbed areas would be rehabilitated following construction in accordance with the rehabilitation strategy.	Construction
WQ2	Clearing extents would be limited to that required to construct the works, and clearing is scheduled to minimise the exposure time of unprotected earth.	Construction

5.10.7 Hydrogeology

The assessment of potential impacts to ground water from the proposal are outlined in this section. The proposal does not require dewatering for excavation nor are the earthworks (up to approximately 500 mm in depth at Bribbaree Yard and Forbes Station and Yard) predicted to intersect groundwater at any of the horizontal clearance sites. The existing hydrogeological conditions underlying the proposal indicate that groundwater is not predicted to be intersected during the construction and operation of the proposal. As such, the potential for the proposal to impact groundwater is considered low. Given the low chance of impacting groundwater, there are no specific mitigation measures required however groundwater management will be covered in the CEMP.

5.11 Cumulative impacts

5.11.1 Introduction

This section will identify and describe the potential for cumulative impacts associated with the proposal and other projects nearby.

5.11.2 Legislation, policy, standards and guidelines

In accordance with Clause 228 of the EP&A Regulation, any cumulative environmental effects of the proposal associated with other existing or likely future activities must be taken into account in determining the potential impacts of the proposal on the environment.

5.11.3 Assessment methodology

5.11.3.1 Study area

For this assessment, the cumulative impact study area is defined as the spatial area of influence, which is determined by each environmental and social issue being assessed for the proposal. The area of influence types considered by this assessment were determine by:

- Environmental values identified in impact assessments
- Recognised administrative boundaries
- Recognised physical construction and operation of the proposal.

Specific study areas for each impact theme have been included in the relevant sections of Chapter 5.

5.11.3.2 Assessment tasks

The methodology used to assess the proposal's cumulative impacts included:

- A review of the residual impacts of the proposal
- Identification of projects to be included in the cumulative impact assessment, considering:
  - 'State significant' or 'strategic' projects that are being planned, constructed or operated at time of this REF, which are publicly listed on:
    - The NSW major projects website (DPIE, 2021h)
    - Regionally significant projects (DPIE, 2021c)
    - Large-scale projects in the LGA (Forbes Shire Council, 2021d)
    - EPBC public notices list (Australian Government, 2021)

Any other adjacent Inland Rail projects (including the three other Inland Rail S2P enhancement proposals)

- Identification of the temporal boundaries for the projects
- Identification of the special boundaries of each issue being considered
- Consideration of the significance of potential cumulative impacts
- Identify suitable mitigation measures for significant cumulative impacts.

5.11.4 Major projects in the vicinity of the proposal

Projects with the potential for cumulative impacts with the proposal are listed in Table 5.55, the location of these projects is shown in Figure 5.28. There is potential for new developments to be approved and commence construction during the planning and construction timeframe for the proposal.

Stockinbingal to Parkes Horizontal Clearances Figure 5.28 Major Projects Potentially in the Vicinity of the Proposal

0 10 20 km

Coordinate System: GDA 1994 MGA Zone 55

ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.

Date: 1/10/2021 Paper: A3
Author: WSP Scale: 1:500,000
Data Sources: ARTC, NSWSS

Existing railway
Proposal site
Major project

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

D:\WSP O365\AU-WKG - Geospatial - AIS - Projects\PS122419_Albury_to_Illabo\Tasks\230_0004_EAP_REFReportFigures\Documents\04_HorizontalClearances\100pc\REP\230_EAP_HorizontalClearances_REF_CumulativeImpacts_r1v2.mxd

TABLE 5.55 PROJECTS WITH THE POTENTIAL FOR CUMULATIVE IMPACTS

Project	Description	Indicative status	Location in relation to proposal site
Inland Rail Projects			
Lachlan River Bridge	The project involves works on the Lachlan River Bridge. The project would require up to approximately 15 construction staff.	Construction to start and finish 2024. Operation of Inland Rail to commence operations in 2027.	2 km south east of the Forbes Station and Yard site.
Wyndham Avenue Bridge	The project involves lowering of the existing track beneath Wyndham Avenue Bridge. It would allow for the standing and passing of larger freight trains using the Inland Rail line. The project would require around 30 personnel with a peak of up to 60 during a two to three-day period towards the completion of construction works.	Construction to start 2022 and finish 2023. Operation of Inland Rail to commence operations in 2027.	The main works are located 1.1 km north east of Forbes Station and Yard site. A proposed optic fibre alignment links the site to the Forbes Station and Yard site.
Daroobalgie Crossing Loop	The project involves construction of a crossing loop and associated works including drainage and level crossing upgrades. It would allow for the standing and passing of larger freight trains using the Inland Rail line. The project would require between 20 and 50 personnel, with a peak period of up to 90.	Construction to start 2022 and finish 2023. Operation of Inland Rail to commence operations in 2027.	9 km north east of Forbes Station and Yard site.
Illabo to Stockinbingal (I2S)	The project involves construction and operation of around 37 km of single-track railway from Illabo to Stockinbingal, including one crossing loop, to accommodate double-stacked freight trains. The construction workforce peak would be around 450 people with construction planned to start in mid-2023 and finish late 2024.	Subject to approval, construction to expected to start mid 2023 and be completed in mid-late 2024.	19 km south of the southernmost site—Milvale Yard
Other projects			
Daroobalgie Solar Farm	Development of a 100 MW solar farm and associated infrastructure. Approximately 160 construction jobs and 4–6 operational jobs are estimated to be generated by the project.	Consultation with Pacific Hydro (5 May 2021) indicated a likely construction period of early 2023 for 12–18 months, with early works extending for 6 months.	9 km north east of Forbes Station.
Edward Street Masterplan—Residential Subdivision	The subdivision includes: ▸ 223 new residential lots ▸ One proposed park/public recreation area ▸ Two residual lots ▸ A number of new roads, streets and laneways ▸ Associated civil works.	Approved in December 2020. No publicly committed construction timeframe.	2.3 km north west
Cowan Gold Operations Underground Development	The project is the expansion of the existing mining operation to include a new underground mine, and an extension of the mine life from 2032 to 2039. The proposed project is located 38 km north east of West Wyalong, 60 km to the south west of Forbes and 68 km to the south west of the proposal.	Approved September 2021.	35 km west of the Wirrinya Yard site

5.11.5 Construction cumulative impacts

Cumulative impacts may occur as a result of construction activities occurring simultaneously with the projects listed in Table 5.55. Developments proposed in proximity to the proposal site have the potential to increase the number of construction vehicles on local roads, increase noise due to construction have an impact on local visual amenity and increase demand on the local workforce and accommodation. Multiple projects undertaken at a similar time and location may also lead to construction fatigue, particularly around noise, traffic and biodiversity impacts.

Should construction stages overlap, there is the potential for increased traffic on the surrounding roads and associated delays for road users from the use of similar roads by construction vehicles within Forbes. There is also potential for an increased demand on the local workforce, and local short-term rental properties and accommodation; however, due to the distance of the proposal from other proposed developments, and the small scale of the works, air quality and visual amenity impacts are considered unlikely at this stage.

Table 5.56 provides a summary of the potential for construction cumulative impacts as a result of the proposal and the projects listed in Table 5.55.

TABLE 5.56 SUMMARY OF POTENTIAL CUMULATIVE IMPACTS OF THE PROPOSAL

Impact	Potential cumulative impacts
Noise (Section 5.1)	Where works at Forbes Station coincide with works at Wyndham Avenue, some cumulative noise impacts may occur for receivers in the north of Forbes. Where construction works at Forbes Station coincide with works at the Lachlan River Bridge, some cumulative noise impacts may occur at receivers in the south of Forbes. In most cases, the cumulative noise impact experienced at the identified sensitive receivers would be equivalent to the highest construction noise level or, in worst case scenarios, up to 3 dBA higher than the highest noise level. These cumulative impacts would be experienced for limited periods of time if the highest noise-generating construction activities in each area are occurring simultaneously.
Traffic and access (Section 5.8)	The proposal would result in the generation of additional construction traffic. Given the distance of other projects in the area, only minor cumulative impacts are anticipated on the Newell Highway anaround Forbes township. This would be subject to the construction schedule overlapping. Given the existing capacity on the Newell Highway, cumulative traffic impacts are unlikely.
Biodiversity (Section 5.3)	The cumulative impacts of multiple projects occurring in the vicinity of the proposal will likely include the cumulative impacts on biodiversity in the region depending on the nature and extent of the impacts of the individual projects. The projects have the potential to contribute to the cumulative loss of habitat and will place further pressure on the local threatened ecological communities. The cumulative impact due to the Inland Rail projects would be the loss of 12.5 ha of native vegetation, with a total removal of 9.7 ha of PCT 76 derived native grassland. While the cumulative impacts of these projects result in an increase in the loss of the PCT 76, the proportional impact remains small when the extent within the locality is taken into account. The cumulative totals represent around 0.09 per cent of locally occurring mapped PCT 76, which is not considered significant.
Non-Aboriginal heritage (Section 5.2)	The proposal would have a minor impact on the state and locally heritage listed Forbes Station and the locally listed Milvale Yard Railway Water tanks. The Lachlan River Bridge clearance works would have an impact on a locally listed heritage railway bridge—Lachlan River Bridge. The projects together would result in cumulative impacts to railway heritage values. As no heritage structures would be demolished and the railway corridor would continue to be used and maintained, these cumulative impacts to non-Aboriginal railway heritage, due to the construction and operation of the proposal, would be minor.
Socio-economic (Section 5.9)	The proposal would result in cumulative community and socioeconomic impacts with other projects in the area. In general, there are a number of economic benefits as a result of projects, including employment, business for local contractors, and increases in demand for local resources and materials. The concurrent construction of interacting projects such as I2S, Daroobalgie Solar Farm or Cowan Gold Operation Expansion has the potential to increase the demand for labour in the local and regional economy, particularly for workers with trade and construction skills/knowledge. If the demand for construction workers occurs within a similar timeframe this will lead to cumulative demands on construction labour, not only within the local and regional economy but also across NSW and, potentially, nationally. The subsequent labour market impact of this cumulative demand to the local and regional economy will be dependent on the workforce profile and construction schedule of the interacting projects and the state of the labour market at any point in time. It is noted that there may also be benefits from having additional infrastructure projects in the adjacent and surrounding areas around the same time as the proposal. These benefits come in the form of lowered mobilisation costs and transfer of labour experience and skills to projects, particularly those constructed in the period leading up to and the period following the proposal's construction phase.

Impact	Potential cumulative impacts
	Due to the dynamic nature of local and regional labour markets, ARTC has identified that an analysis of the likely availability of construction labour from the region will be undertaken prior to construction, to enable the refinement of local and regional recruitment and training strategies to maximise employment opportunities within local economies. The proposal would require a peak workforce of about 80 personnel for a short period of time. If all projects were to be completed concurrently, the proposal represents around 6 per cent of the total need (based on the peak workforce requirements).
Waste and resources (Section 5.5)	Should the S2P Inland Rail projects overlap they would require similar types of resources associated with rail infrastructure, such as ballast. This proposal requires predominantly similar resources to I2S, Wyndham Avenue track lowering works and Daroobalgie crossing loop, including fill, ballast, sleepers and track for track works. These additive impacts would place more pressure on local suppliers, such as quarries. Existing track materials would be re-used for the projects, where possible, to minimise these impacts. The proposal would contribute to the overall volume of construction waste generated by these projects. This would place pressure on the local landfills, particularly should the construction schedules overlap. The significance of the potential cumulative waste impacts during construction is considered low because waste resulting from the construction activities will be managed in accordance with ARTC standard mitigation measures. Mitigation measures will be implemented during construction to encourage diversion from landfill and avoid impacts on environmental values. Avoiding, reducing, reusing or recycling waste is preferred to treating and disposing of waste.

5.11.6 Operational cumulative impacts

Operation of the proposal is unlikely to contribute to cumulative operational impacts with projects listed in Table 5.55, which are not associated with the Inland Rail Program.

The operation of the proposal in conjunction with the operation of other Inland Rail S2P enhancement proposals would enable an increase in the capacity of the rail corridor between Stockinbingal and Parkes to transport freight. This increase in capacity would provide a number of socio-economic benefits to regional NSW (refer to Section 5.9.5).

5.11.7 Mitigation and management measures

Due to the low likelihood of cumulative impacts, the project-specific mitigation and management measures that are summarised in Table 7.1 are considered sufficient to address the impacts.

6. Consideration of Environmental Factors

6.1 Ecologically sustainable development

Ecologically sustainable development (ESD) entails using, conserving and enhancing the community's environmental resources in a manner that sustains and improves ecological processes and, therefore, the quality of life for present and future generations.

ARTC is committed to the principles of ESD and understands that the social, economic and environmental matters are interdependent.

Table 6.1 outlines how the principles of ecologically sustainable development have been applied to the proposal.

TABLE 6.1 APPLICATION OF ESD PRINCIPLES TO THE PROPOSAL

ESD principle	Definition	Application to the proposal
Precautionary principle	If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by: i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment ii) an assessment of the risk-weighted consequences of various options.	A range of specialist assessments have been completed for the proposal, which are consistent with accepted scientific and assessment methodologies, and have taken into account relevant statutory and agency requirements. The assessments have applied a conservative approach with regard to construction and operational arrangements, and the modelling used to determine potential impacts. No potential threats of serious or irreversible environmental damage have been identified. The proposal has been designed to avoid impacts, as far as practicable, and to reflect the findings of the assessments undertaken. Lack of scientific certainty has not been used as a reason to postpone mitigation measures. The proposal has taken the approach of minimising environmental impacts, through the development of a range of mitigation measures (summarised in Chapter 7). These measures would be implemented during the construction and operation of the proposal.
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.	It is acknowledged that the proposal may have some minor temporary construction impacts on the current generation (such as dust and noise impacts); however, these impacts will be managed during construction and will not adversely impact future generations. Furthermore, the proposal would benefit future generations by providing an expansion of capacity on a key freight line linking Melbourne and Brisbane and improving local road safety outcomes. Inland Rail would boost the Australian economy by creating jobs and providing better access to and from regional markets.
Conservation of biological diversity and ecological integrity	Conservation of biological diversity and ecological integrity should be a fundamental consideration.	Potential impacts on species and vegetation communities of local, regional, state, and national significance were assessed in Section 5.3. The proposal has been selected and designed to minimise impacts to biodiversity. As identified, the proposal is unlikely to impact any threatened communities, species or ecosystem listed under the BC Act or EPBC Act. An assessment of this impact concluded the proposal is not likely to have a significant impact on biodiversity values. Impacts to native vegetation would be minimised and disturbed communities would be restored in accordance with a rehabilitation strategy.

ESD principle	Definition	Application to the proposal
Improved valuation and pricing of environmental resources	Environmental factors should be included in the valuation of assets and services, such as: i) polluter pays, i.e. those who generate pollution and waste should bear the cost of containment, avoidance or abatement ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste iii) environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.	The assessment has identified the environmental and other consequences of the proposal, and identified mitigation measures, where appropriate, to manage potential impacts. If approved, the construction and operation of the proposal would be in accordance with relevant legislation, and any construction and operational management plans. These requirements would result in an economic cost to the proponent. The implementation of mitigation measures would increase both the capital and operating costs of the proposal. This signifies that environmental resources have been included in the valuation of assets and services in the design and assessment of the proposal. The value of environmental resources is also inherently considered in the development of a design that avoids and minimises impacts.

6.2 Clause 228 checklist

Table 6.2 considers the factors listed under clause 228 of the EP&A regulations.

TABLE 6.2 CLAUSE 228 CHECKLIST

Clause 228 factor	Impact
(a) Any environmental impact on a community?	The proposal would result in some minor temporary construction impacts to the local community, particularly in relation to construction noise and dust generation. These impacts would mainly affect nearby residents. Some construction activities are also planned to take place outside of standard working hours, during track possessions. These impacts would be managed though the implementation of mitigation measures outlined in Chapter 5 of the REF. The proposal would not result in any significant environmental impacts during operations. Once complete, the proposal would continue to operate as an active rail corridor.
(b) Any transformation of a locality?	The proposal would result in works to the rail infrastructure in the existing active rail corridor. These works are commensurate with the existing locality and rail use and would not transform the locality.
(c) Any environmental impact on the ecosystems of the locality?	The proposal will require the removal of approximately 3.3 ha of native vegetation from PCT 26, 76 and 80. PCT 26, 76 and 80 corresponds directly to the BC Act listed TEC and PCT 76 and 80 also correspond to the EPBC Act listed TEC. Biodiversity impacts associated with the proposal are further discussed in Section 5.1 and would be managed though mitigation measures. An assessment of this impact concluded the proposal is not likely to have a significant impact on this TEC, and no Species Impact Statement or EPBC Referral is required; however, the proposal will be referred to the Australian Minister for the Environment for assessment to confirm that approval under the EPBC Act is not required.

Clause 228 factor		Impact
(d)	Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	There would be a minor reduction in aesthetic values of the local area due to the anticipated noise and air quality during construction. The proposal is located mainly in a disturbed active rail corridor, therefore the risk of a reduction in recreational and scientific values are low.
(e)	Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	The proposal is not anticipated to have a substantial effect on the aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance of the locality. There are no Aboriginal heritage sites in or near the proposal. The proposal site has a history of disturbance associated with its use as an operational rail corridor. There are non-Aboriginal heritage sites located in and near the proposal site. The proposal would have a minor direct impact on one state heritage listed item, Forbes Railway Station Group.
(f)	Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974* (NSW))?	The proposal will require the removal of approximately 3.3 ha of TECs. The proposal will actively mitigate any potential risk of fauna injury or death during the construction period. Other potential impacts include habitat fragmentation, increased edge effects, noise and vibration and pathogens. Measures to mitigate the impacts of construction of the proposal are described in Chapter 5.3.6.
(g)	Any endangering of any species of animal, plant or other form of life whether living on land, in water or in the air?	As discussed in (c) and (f) there would be a requirement for the clearing of native vegetation for the proposal. Parts of this vegetation are consistent with threatened ecological communities and potential fauna species. Mitigation measures to mitigate the impacts of construction and operation of the proposal are described in Chapter 5.
(h)	Any long-term effects on the environment?	The proposal would not have any long-term risk to the environment.
(i)	Any degradation of the quality of the environment?	During construction, there is a risk to the environment due to accidental spills and sedimentation. Any potential risk of contamination is predicted to be manageable through the implementation of the safeguards and management measures outlined in Section 5.7 this REF.
(j)	Any risk to the safety of the environment?	During construction, there is a risk to the environment due to accidental spills and sedimentation. These risks would be managed through the implementation of proposed control measures outlined in this REF.
(k)	Any reduction in the range of beneficial uses of the environment?	The proposal site is located in an existing rail corridor and, therefore, is not likely to reduce the beneficial use of the environment.
(l)	Any pollution of the environment?	During construction, there is a risk of noise, water and air pollution. These risks would be managed through the implementation of proposed control measures outlined in this REF.
(m)	Any problems associated with the disposal of waste?	Waste generated by the proposal would be managed through the waste hierarchy established under the *Waste Avoidance and Recovery Act 2001* (NSW). All waste requiring offsite disposal would be classified in accordance with the *Waste Classification Guidelines 2009* (OEH, 2009) prior to disposal.
(n)	Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?	Materials required for the construction of the proposal are readily available and would be sourced from local contractors where possible.
(o)	Any cumulative environmental effects with other existing or likely future activities?	The distance, timing and magnitude of other major projects in the region is such that cumulative impacts are not predicted. Other Inland Rail projects currently proposed for the Forbes area may result in minor cumulative impacts when construction schedules align during periods of track possessions.
(p)	Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?	The proposal would not have any impacts to coastal processes or coastal hazards.

6.3 Matter of national environmental significance

Under the environmental assessment provisions of the EPBC Act, the following MNES and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Department of Agriculture, Water and the Environment (DAWE). Table 6.3 addresses the MNES for the proposal. The proposal would not impact MNES to the extent that a referral is required; however, it will be referred to the Australian Minister for the Environment for assessment to confirm that approval under the EPC Act is not required.

TABLE 6.3 MNES

MNES	Impact
Any environmental impact on a World Heritage property?	No
Any environmental impact on national heritage places	No
Any environmental impact on RAMSAR wetlands?	No
Any environmental impact on Commonwealth-listed threatened species or ecological communities?	Yes, the proposal is likely to impact the EPBC Act listed: ▸ PCT76: Western grey box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions ▸ PCT80: Western grey box—white cypress pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion. An assessment of this impact (refer to Appendix D) concluded the proposal would not have a significant impact on these TECs or any threatened species habitat within these TECs.
Any environmental impact on Commonwealth-listed migratory species?	No
Does any part of the project involve nuclear action?	No
Any environmental impact on a Commonwealth marine area?	No
Any impact on Commonwealth land?	No

7. Environmental Management Measures

7.1 Environmental management plan

An overarching CEMP would be developed for the construction of the proposal. The CEMP would include a number of plans as outlined in relevant mitigation and management measures in this REF.

An outline of the CEMP has been prepared (refer Appendix B).

7.2 Summary of control measures

Table 7.1 provides a summary of project-specific control measures that have either been identified thought the assessment undertaken by this REF or are standard best-practice environmental management controls that are over and above contemporary standard practice for environmental management (refer to Chapter 5). They will be incorporated into the detailed design phase of the proposal and during the construction and operation of the proposal, should it proceed.

TABLE 7.1 SUMMARY OF SITE-SPECIFIC CONTROL MEASURES

ID	Control measures	Stage
Noise and vibration		
CNV1	Prior to the commencement of construction, noise and vibration impacts would be confirmed based on the final project design.	Detailed design/ pre-construction
CNV2	Where vibration levels are predicted to exceed the structural screening criteria for a particular structure as a result of detailed design, a more detailed assessment of the structure and vibration monitoring would be carried out in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework, to ensure appropriate mitigation and management plans are implemented. During construction, if vibration-generating activities are conducted within 15 m of a residence, attended vibration measurements would be undertaken at the commencement of vibration-generating activities to confirm that structural vibration limits are within the acceptable range. Where vibration levels are found to be unacceptable, alternative work methods would be implemented so the vibration impacts are reduced to acceptable levels.	Pre-construction/ construction
CNV3	A Construction Noise and Vibration Management Plan would be prepared and implemented as part of the CEMP, in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework and ARTC's EPL3142. The plan would have measures, processes and responsibilities to manage and monitor noise and vibration, and minimise the potential for impacts during construction. This plan will include: ▸ Construction noise and vibration criteria for the proposal ▸ Location of sensitive receivers in proximity to the construction area ▸ Specific management measures for activities that could exceed the construction noise and vibration criteria. ▸ Notification of impacts would be undertaken in accordance with the communication management plan for the proposal.	Pre-construction/ construction
CNV4	An out-of-hours work protocol would be developed to define the process for considering, approving and managing out-of-hours work, including implementation of feasible and reasonable measures and communication requirements. Measures would be aimed at pro-active communication and engagement with potentially affected receivers, provision of respite periods and/or alternative accommodation for defined exceedance levels. All work outside the primary proposal construction hours would be undertaken in accordance with the *Inland Rail NSW Construction Noise and Vibration Management Framework* and in accordance with the out-of-hours work protocol. The protocol would provide guidance for the preparation of out-of-hours work plans for each construction work location and for key works. Out-of-hours work plans would be prepared in consultation with key stakeholders (including the NSW EPA) and the community and incorporated into the construction noise and vibration management plan.	Pre-construction/ construction
CNV5	Building condition surveys would be completed before and after construction works where buildings or structures are within the minimum vibration working distances for cosmetic damage.	Pre-construction/ construction

ID	Control measures	Stage
CNV6	Prior to the commencement of vibration-intensive works within the minimum working distances for cosmetic damage for heritage items, the potential for damage to the item would be assessed. Where there is potential for damage to heritage items, alternative methods that generate less vibration would be investigated and substituted where practicable. Where residual cosmetic damage risks to heritage items remain, condition surveys would be carried out and vibration monitoring with real-time notification of exceedance would occur during the activity. Any identified vibration-related damage to the heritage items would be rectified.	Pre-construction/ construction
ONV1	An operational noise and vibration review would be undertaken to review the potential for operational impacts and guide the approach to identifying feasible and reasonable mitigation measures to be incorporated in the detailed design. Operational noise and vibration compliance monitoring would be undertaken, once Inland Rail has commenced operation, at representative locations to compare actual noise performance against that predicted by the operational noise and vibration review.	Pre- construction / Operation
ONV2	Feasible and reasonable mitigation measures would be identified where exceedances of operational noise and vibration criteria are confirmed. Measures would be identified in accordance with the outcome of the operational noise and vibration review and the *Inland Rail Noise and Vibration Strategy*. Where at-property noise treatments are identified as the preferred mitigation option, these would be developed in consultation with individual property owners.	Operation
ONV3	If the operational noise and vibration review indicates that vibration levels are predicted to exceed the screening criteria at sensitive receivers, a more detailed assessment of the structure would be carried out. For any heritage items with the potential to be affected including Forbes Station and the three locally listed heritage items within 50 m of the Bribbaree Yard, the detailed assessment would determine any specific sensitivities in consultation with a heritage specialist to ensure risks are adequately managed. If a heritage structure is found to be structurally unsound following inspection, a more conservative cosmetic damage objective (for example 2.5 mm/s peak component particle velocity for long-term vibration) would be considered. Where impacts are identified, further mitigation may be required.	Operation
Non Aboriginal heritage		
H1	All proposed works at the Forbes Station to be completed in accordance with the Section 60 heritage permit (subject to approval by Heritage NSW).	Detailed design/ pre-construction
H2	Detailed design and construction planning would aim to further minimise direct impacts on Forbes Railway Station Group, as far as practicable.	Detailed design/ pre-construction
H3	A Heritage Interpretation Plan for Forbes Station will be prepared. This will provide a framework for interpreting the awning impacted, set out the key interpretative themes and identify communication strategies. The plan will be prepared with regard to *Interpreting Heritage Places and Items: Guidelines* (NSW Heritage Office, 2005a), and the NSW Heritage Council's *Heritage Interpretation Policy* (NSW Heritage Office, 2005).	Detailed design/ pre-construction
H4	Archival photographic recording of buildings and structures would be carried out prior to works, in accordance with *Photographic Recording of Heritage Items Using Film or Digital Capture* (Heritage Council of NSW, 2006b) and *How to prepare archival records of heritage items* (NSW Heritage Office, 1998) at the following sites: ▸ Forbes Railway Station ▸ Milvale Railway water tank.	Pre-construction

ID	Control measures	Stage
H5	A Forbes Station heritage management plan would be prepared and implemented as part of the CEMP. It would include measures to manage non-Aboriginal heritage and minimise the potential for impacts during construction. The plan would be prepared in consultation with the relevant heritage agencies (Heritage NSW and local councils) and take into account the outcomes of further investigations and surveys during detailed design. Specific management measures to be included are: ▸ As many original elements as feasible should be reused during the modification of the Forbes Station awning. This includes reusing the chamfered edge beam at the outer edge of the awning and ensuring that the decorative finials at the track end of the cantilevered bracket remain in place ▸ Where original elements cannot be reused, 'like for like' elements must be sourced to ensure the aesthetic of the Forbes Station awning is not diminished ▸ Repainting should be sympathetic to the current station colour palette of the Forbes Station awning ▸ The downpipe from the awning gutter should be relocated to reflect its position seen in the 1925 historical image ▸ Care should be taken to select a low-profile gutter close to that originally installed (refer to SoHI prepared by Ozark 2021). ▸ Unexpected finds procedure to provide a consistent method for managing any unexpected heritage or archaeological items and unexpected human skeletal remains.	Pre-construction/ construction
H6	The brackets attached to the Milvale Railway water tank would be removed in such a way so as not to damage the tank.	Construction
Biodiversity		
BD1	Detailed design and construction planning would avoid or minimise the need to remove and/or disturb native vegetation and fauna habitat.	Detailed design/ pre-construction
BD2	Vegetation clearing would be limited to the minimum necessary to construct the proposal and allow for its effective operation.	Detailed design/ pre-construction
BD3	A biodiversity management plan would be prepared prior to construction and implemented as part of the CEMP. The plan would include measures to manage biodiversity and minimise the potential for impacts during construction. The plan would be prepared in accordance with relevant legislation, guidelines and standards. The plan would include, but not be limited to: ▸ Locations and requirements for pre-clearing surveys, including terrestrial habitats, breeding habitats (including burrows, trees, logs, existing culverts and structures) ▸ The clearing extents/site boundary/limit of works is clearly defined with flagging or marking tape, signage or other suitable means to delineate no go areas ▸ Establishing protocols for the staged clearing of vegetation and safe tree felling and log removal to reduce the risk of fauna mortality ▸ Establish daily checks in machinery and excavations for presence of fauna to reduce the risk of fauna mortality ▸ Animal handling protocols, including relocation and emergency care ▸ An unexpected finds protocol ▸ Measures to manage biosecurity risks in accordance with the *Biosecurity Act 2015* (NSW) erosion and sediment control measures.	Construction
BD4	Exclusion areas would be established and maintained around native vegetation to be retained, particularly areas of biodiversity value adjoining the proposal site that are located in close proximity to work areas.	Construction
BD5	A rehabilitation strategy would be based on the Inland Rail Landscape and Rehabilitation Strategy, the Inland Rail Landscape and Rehabilitation Framework and property-specific reinstatement commitments. This would guide the approach to rehabilitation of disturbed areas following the completion of construction. The strategy would include: ▸ Clear objectives and timeframes for rehabilitation works (including the biodiversity outcomes to be achieved) ▸ Details of the actions and responsibilities to progressively rehabilitate, regenerate, and/or revegetate areas, consistent with the agreed objectives ▸ Identification of flora species and sources ▸ Procedures for monitoring the success of rehabilitation. ▸ Corrective actions should the outcomes of rehabilitation not conform to the objectives adopted.	Construction

ID	Control measures	Stage
Surface water (Hydrology, flooding and water quality)		
SW1	Construction planning, and the layout of construction work sites and compounds, would be undertaken with consideration of overland flow paths and flood risk.	Detailed design/ pre-construction
Waste		
W1	Detailed design would include measures to minimise spoil generation. This would include a focus on optimising the design to minimise spoil volumes and the reuse of material onsite.	Detailed design/ pre-construction
W2	A spoil management strategy would be developed to define the preferred approach to managing spoil. The strategy would include: ▸ Consideration of the approvals and land application of waste exemptions required, associated lead time and any associated sampling and reporting obligations ▸ Defining the preferred option for reusing and/or disposing of any spoil The outcomes of the strategy would inform the Construction Waste Management Plan.	Pre-construction/ construction
W3	A Construction Waste Management Plan would be prepared and implemented as part of the CEMP. The plan would adopt the waste hierarchy principles contained in the *Waste Avoidance and Resource Recovery Act 2001* (NSW), and detail processes, responsibilities and measures to manage waste and minimise the potential for impacts during construction. This plan would include: ▸ General protocols and performance objectives for keeping the worksite clean and tidy ▸ Processes for monitoring, documenting and reporting waste types, volumes and how these arisings compare to waste targets (e.g. describe waste streams and estimated volumes, temporary waste storage areas and disposal locations on and offsite) as well as waste disposal and National Environmental Protection Measures (NEPM) criteria for disposal sites ▸ Requirements for waste segregation ▸ Requirements for secure temporary storage, collection frequency and disposal/recycling requirements ▸ Effluent management for construction staff amenities ▸ Procedures and reporting/documentation requirements for ensuring waste transporters and receivers are appropriately licensed according to the type of waste ▸ Requirements for training, inspections, audits, corrective actions, notification and classification of environmental incidents, record keeping, monitoring and performance objectives for handover on completion of construction ▸ Any other regulatory requirements.	Pre-construction/ construction
W4	All waste generated would be classified in accordance with the *Waste Classification Guidelines—Part 1: Classification of Waste* (EPA, 2014b) and disposed of in accordance with the relevant requirements of the Protection of the Environment Operations (Waste) Regulation 2014.	Construction
W5	All earthworks materials would be assessed against ARTC's Earthworks Materials Management Guideline, Appendix B of ETC-08-03 Rev1.3, which would determine the classification and locating/disposal options for any excess materials.	Construction
Landscape character and visual amenity		
LVA1	Detailed design and construction planning would seek to minimise the construction and operation footprints, and avoid impacts on mature native vegetation.	Detailed design/ pre-construction
LVA2	Temporary lighting would be designed and sited in accordance with AS 4282-1997 *Control of the Obtrusive Effects of Outdoor Lighting* (Standards Australia, 1997).	Detailed design/ pre-construction
LVA3	Rehabilitation works completed in accordance with ARTC's Landscape Design Guideline and Landscape Rehabilitation Strategy.	Construction
Soil and contamination		
SC1	Detailed site investigations would be undertaken by a suitably qualified and experience consultant as defined in Schedule B9 of the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPC, 2013) to assess exposure risks to site workers and other receptors as a result of ground disturbances at Forbes Station and Yard, which are considered to be at a higher risk of being contaminated. The results of the site investigations would be assessed against the criteria contained within the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPC, 2013) to determine the need for any remediation or further management.	Pre-construction

ID	Control measures	Stage
SC2	A contamination and hazardous materials plan would be prepared and implemented as part of the CEMP. It would include measures, processes and responsibilities to minimise the potential for contamination impacts on the local community, workers and environment, and procedures for incident management and managing unexpected contamination finds (an unexpected finds protocol). The contamination and hazardous materials plan would include details of existing site contamination and hazardous materials for the Forbes Station and Yard.	Pre-construction/ construction
SC3	An Erosion and Sediment Control Plan and a Soil and Water Management Plan (SWMP) would be prepared as part of the CEMP. The SWMP would comply with the existing EPL3142 and be in accordance with best onsite practice, reflected in *Managing Urban Stormwater—Soils and Construction, Volume 1* (Landcom, 2004), and Volumes 2A and 2C (DECCW, 2008), commonly referred to as the 'Blue Book'. The SWMP and erosion and sediment control plan would include: ▸ Surface controls to promote ground stability, limit runoff lengths and reduce runoff velocities within the construction areas ▸ Sediment and erosion controls would be built to a design storm that will ensure non-erodible velocities ▸ Inspection and maintenance of erosion and sediment controls throughout the works to ensure they are operating effectively ▸ Rainfall monitoring requirements ▸ Management protocols of problem soils (e.g. erosive, dispersive, reactive, acidic, saline, sodic, alkaline soils) ▸ Management protocols for any contaminated soils ▸ Vehicle, machinery and imported fill hygiene protocols and documentation ▸ Measures to prevent/minimise mud and dirt being tracked onto public roadways by trucks and any equipment leaving the site ▸ Provision of a spill contaminant kit. Requirements for training, inspections, corrective actions, notification and classification of environmental incidents, record keeping, monitoring and performance objectives for handover on completion of construction.	Pre-construction/ construction
Traffic and access		
TA1	Detailed design and construction planning would avoid or minimise the potential for impacts on the surrounding road and transport network, and property accesses, as far as reasonably practicable.	Detailed design/ pre-construction
TA2	A Traffic, Transport and Access Management Plan would be prepared and implemented as part of the CEMP. It would include measures to minimise the potential for impacts on the community and the operation of the surrounding road and transport environment. It would address all the aspects of construction relating to the movement of vehicles and the operation of the surrounding road network, including: ▸ Construction site traffic control, parking and access arrangements away from property access points and driveways ▸ Construction material, equipment and spoil haulage, including arrangements for heavy vehicles ▸ Road pavement and access road condition management ▸ Management of impacts on public transport, including school bus, pedestrian and cyclist access, and safety ▸ Scheduling deliveries to minimise impact to grain terminals, Forbes Information Centre and school bus movements ▸ Traffic controls to manage deliveries ▸ Ensure adequate sight lines to allow for safe entry and exit from the site ▸ Road and driver safety. The plan would be developed in consultation with local council and public transport/bus operators. As appropriate, additional reasonable and feasible measures identified as an outcome of consultation would be detailed in the plan.	Pre-construction/ construction
TA3	The community would be notified in advance of any proposed road and pedestrian access changes through signage, the local media, and other appropriate forms of communication.	Pre-construction/ construction
TA4	A dilapidation survey would be undertaken of the roads to access each site, except Milvale Yard and Quandialla Yard, prior to and following completion of construction and provided to relevant roads authority. Pavement condition monitoring would be carried out during works, as required. Rectification measures would be implemented as needed during, and/or following, completion of construction to address any damage caused by construction.	Construction/ post-construction

ID	Control measures	Stage
Community and socioeconomic		
CS1	ARTC would continue to manage and deliver program-wide community and stakeholder engagement for Inland Rail in accordance with the Inland Rail Communications and Engagement Strategy. ▸ A proposal-specific communication management plan would be developed, in accordance with the Inland Rail Communications and Engagement Strategy, and implemented prior to and during construction to ensure: ▸ The community and key stakeholders are provided opportunities for input to the design and construction planning, where appropriate ▸ Landholders and community members with the potential to be affected by construction activities are notified in a timely manner about the timing of activities and potential for impacts, and the measures that would be implemented to minimise the potential for impacts on individual properties ▸ Enquiries and complaints are managed, and a timely response is provided for concerns raised ▸ Accurate and accessible information is made available ▸ Feedback from the community is encouraged. The communication management plan would define the requirements for the complaints management system to be implemented during construction.	Pre-construction/ construction
CS2	ARTC would continue to support local employment in accordance with the *Australian Jobs Act 2013* (Cth) and Australian Industry Participation National Framework, and through the Inland Rail Skills Academy, to leverage training programs, upskill local residents and young people, and connect businesses with Inland Rail opportunities and key regional industries.	Pre-construction/ construction
CS3	A project-specific industry participation plan would be developed which: ▸ Complies with the IR AIPP, Australian Government Aboriginal Procurement Policy and Inland Rail Sustainable Procurement Policy ▸ Proposes targets for procurement with local and Indigenous Businesses and Social Enterprises ▸ Reports to ARTC on local and Indigenous business and Social Enterprise participation, including achievements against targets. The local industry participation plan would be provided to Forbes Shire Council.	Pre-construction/ construction
CS4	A workforce management plan would be developed and implemented during construction to manage: ▸ Potential impacts of the non-resident construction workforce ▸ Local business and employment opportunities (including Indigenous employment opportunities) ▸ Health and wellbeing needs of the temporary construction workforce, including medical, allied health and wellbeing services The plan would include measures to manage potential impacts of the non-resident construction workforce on local and regional communities, including: ▸ A code of conduct for workers, including a zero-tolerance policy relating to anti-social behaviour ▸ Strategies to promote wellbeing of the workforce ▸ A monitoring mechanism for use of local tourist accommodation and rental housing by workers ▸ Consultation with local health and emergency services to establish processes for managing potential increased demands due to the non-resident workforce. The workforce management plan would be developed in consultation with local councils and service providers, including local and regional health and emergency services providers.	Pre-construction/ Construction
CS5	Complaints during construction would be managed in accordance with the complaints management system defined by the Communication Management Plan. The complaints management system would be maintained throughout the construction period and for a minimum of 12 months after construction finishes.	Construction/ Operation
Aboriginal heritage		
AH1	Work crews would undergo cultural heritage induction to ensure they recognise Aboriginal artefacts and are aware of the legislative protection of Aboriginal objects under the NPW Act and the contents of the Unanticipated Finds Protocol.	Construction

ID	Control measures	Stage
AH2	An unexpected finds protocol would be developed and included in the CEMP to provide a consistent method for managing any unexpected Aboriginal heritage items discovered during construction, including potential heritage items or objects and human skeletal remains.	Pre-construction and Construction
Air quality		
AQ1	An Air Quality Management Plan would be prepared and implemented as part of the CEMP. It would include measures to minimise the potential for air quality impacts on the local community and environment, and would address all aspects of construction, including: ▸ Spoil handling ▸ Machinery operating procedures ▸ Soil treatments ▸ Stockpile management ▸ Haulage ▸ Dust suppression ▸ Monitoring.	Pre-construction/ Construction
Land use and property		
LU1	Detailed design and construction planning would continue to be refined to minimise potential impacts on land uses and adjacent properties, as far as reasonably practicable. Consultation with landholders would be ongoing to identify feasible and reasonable measures to minimise impacts on their operations/properties.	Detailed design/ pre-construction
LU2	Where construction is located immediately adjacent to private properties or has the potential to affect farm or grain terminal operations, property-specific measures would be identified and implemented in consultation with landholders.	Detailed design/ pre-construction
Hazard and risk		
HR1	Utility and service providers would continue to be consulted during detailed design to identify possible interactions and develop procedures to minimise the potential for service interruptions and impacts on existing land uses.	Detailed design/ Pre-construction
HR2	Any work or protection of gas pipelines will be completed by an authorised service provider as part of the early works stage.	Pre-construction/ construction
HR3	A flood and emergency response plan would be prepared and implemented as part of the CEMP. The plan would include measures, processes and responsibilities to minimise the potential impacts of construction activities on flood behaviour at Forbes Station and Yard, as far as practicable. It would also include measures to manage emergencies during construction, including the evacuation protocol for personnel and monitoring of weather forecasts.	Pre-construction/ construction
HR4	Dangerous goods and hazardous materials will be stored in accordance with supplier's instructions and relevant legislation, Australian Standards, and applicable guidelines and may include chemical storage cabinets/containers or impervious bunds.	Construction
Water quality		
WQ1	Disturbed areas would be rehabilitated following construction in accordance with the rehabilitation strategy.	Construction
WQ2	Clearing extents would be limited to that required to construct the works, and clearing is scheduled to minimise the exposure time of unprotected earth.	Construction

8. Finalisation

8.1 Justification and conclusions

The proposal is needed to support the development of Inland Rail. The proposal, as part of Inland Rail, is needed to respond to the growth in demand for freight transport and address existing freight capacity and infrastructure issues. The proposal is a critical component of Inland Rail and is required to enable Inland Rail to operate.

Inland Rail would provide the following key benefits:

- Boost the Australian economy
- Job creation
- Provide better access to and from our regional markets
- Offer better transit time and reliability for freight transport
- Improve road safety by removing more trucks from the road network.

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

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

- Loss of native vegetation within four of the six enhancement sites
- A minor increase in local traffic movements during construction with potential for minor delays on the local road network during material delivery
- Temporary visual, noise and vibration impacts during the construction period
- Increase in trains along the rail corridor during operation, which would have minor noise, air quality and visual impacts.

Mitigation and management measures have been identified to address these and other potential impacts. This REF has assessed the potential impacts of the proposal in accordance with clause 228 of the EP&A Regulation and the requirements of the EPBC Act. Based on the assessment, it is considered that the proposal is not likely to have a significant impact on the environment or any threatened species, populations or communities. Accordingly, an EIS or SIS is not required.

Potential environmental impacts from the proposal have been avoided or reduced during the reference design development and options assessment. The safeguards management measures detailed in this REF would manage the impacts anticipated. On balance, the proposal is considered justified. This assessment concludes that it would be appropriate for the proposal to proceed.

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APPENDIX A

Horizontal Clearances

Environmental Risk Assessment

Contents

Tables

Appendix A Environmental risk assessment

A.1 Purpose

The purpose of this environmental risk analysis is to:

- Describe the potential environmental risks and issues to be considered in this report with input from the REF
- Identify and rank environmental risks based on the risk or significance rating.

A.2 Methodology

The environmental risk analysis was undertaken in accordance with the principles of the Australian and New Zealand standard AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines (Standards Australia, 2009).

This involved categorising each of the environmental values by identifying the consequence of the impact and the likelihood of the impact occurring.

For both the risk and significance assessment methods a pre-mitigation and post-mitigation scenario was be assessed and a risk/significance ranking determined. The initial assessment of potential impact was be undertaken on a pre-mitigation scenario. Following the assessment of the level of risk/significance, the application of mitigation measures was then applied to determine a new risk or significance ranking.

The risk assessment and significance assessment are discussed in the following sections.

A.3 Risk assessment

For those environmental values where an impact may occur, a qualitative risk assessment method based on AS/NZS 31000:2009 Risk Management – Principles and Guidelines is considered appropriate.

The definitions of the likelihood used are provided in Table A. 1 and the consequence criteria in Table A. 2. The resulting risk matrix in

TABLE A. 1 DEFINITION OF LIKELIHOOD

Likelihood	Definition	Frequency of occurrence	Percentile
Almost certain	Is expected to occur in most circumstances	Once per month	>90%
Likely	Will probably occur in most circumstances	Between once a month and once a year	60–90%
Possible	Might occur at some time	Between once a year and once in five years	30–<60%
Unlikely	Could occur at some time	Between once in 5 years and once in 20 years	10–<30%
Rare	May occur in exceptional circumstances	Once in more than 20 years	<10%

TABLE A. 2 CONSEQUENCE CRITERIA

	Consequence				
Risk category	Not significant	Minor	Moderate	Major	Extreme
Safety—Impact to people	No medical treatment required	Lost Time Injury (LTI) results OR medical treatment required	Serious injury occurs	Single fatality occurs	Multiple but localised fatalities occur
Assets—Engineering impacts and satisfying objectives	Up to 6 hrs track closure	>6 hrs to 24 hrs track closure	>24 hrs to 48 hrs track closure	>48 hrs to 5 days track closure	>5 days track closure
Financial—Total outturn cost impact	Up to 0.05% of program budget (i.e. to $5m in $10b)	>0.05% to 0.5% of program budget (i.e.>$5m to $50m in $10b)	>0.5% to 1.5% of program budget (i.e.>$50m to $150m in $10b)	>1.5% to 5% of program budget (i.e.>$150m to $500m in $10b)	>5% of program budget (i.e.>$500m in $10b)

Risk category	Consequence				
	Not significant	Minor	Moderate	Major	Extreme
	Up to 0.1% of project budget (e.g. to $100k in $100m)	>0.1% to 0.5% of project budget (e.g. >$100k–$500k in $100m)	>0.5% to 2.5% of project budget (e.g. >$500k–$2.5m in $100m)	>2.5% to 10% of project budget (e.g. >$2.5m–$10m in $100m)	>10% of project budget (e.g. >$10m in $100m)
Environment—Environment impact, heritage, flora and fauna, archaeology and Aboriginal impacts, pollution and amenity (public)	Contained environmental damage—fully recoverable (no cost or ARTC action required)	Isolated environmental damage—minimal ARTC remediation required	Localised/clustered environmental damage—requiring remediation	Considerable environmental damage —requiring remediation	Widespread, long-term or permanent environmental damage—remediation required
Regulatory—regulatory/legislation exposure Non-compliance and our licence to operate	Minimal or no regulatory involvement	Notice to produce information	Improvement notice or threatened action	Prohibition notice or fines	Prosecution of the Company and/or its Office Holders
Reputation—reputational exposure, customer dissatisfaction, shareholder support, service quality and reliability, public image and stakeholder attitudes	Isolated event able to be resolved (up to 7 days)	Management intervention required (>7 days to 3 months)	Tactical (Business Unit/ Divisional) intervention required (>3 months to 18 months)	Strategic intervention required (>18 months to 3 years)	Corporate loss of Shareholder and/or Customer support (tangible business impact >3 years)
Schedule—time-based impacts	Influences schedule up to 1% of program-approved schedule period	Influences schedule >1% to 2.5% of program-approved schedule period	Influences schedule >2.5% to 5% of program-approved schedule period	Influences schedule>5% to 10% of program-approved schedule period	Influences schedule >10% of program-approved schedule period
	Influences schedule up to 2% of project-approved schedule period	Influences schedule >2% to 5% of project-approved schedule period	Influences schedule >5% to 10% of project-approved schedule period	Influences schedule >10% to 20% of project-approved schedule period	Influences schedule >20% of project approved-schedule period

TABLE A. 3 RISK ASSESSMENT MATRIX

Likelihood	Consequence				
	Not significant	Minor	Moderate	Major	Extreme
Almost certain	Medium	Medium	High	Very high	Very high
Likely	Low	Medium	High	Very high	Very high
Possible	Low	Low	Medium	High	High
Unlikely	Low	Low	Low	Medium	Medium
Rare	Low	Low	Low	Low	Medium

A.4 Environmental risk analysis

Using the framework described above, the risk assessment for the proposal in Table A.4.

TABLE A.4 ASSESSMENT

	Pre-mitigated risk				Residual risk		
Potential impact	**Consequence**	**Likelihood**	**Risk**	**Proposed mitigation**	**Consequence**	**Likelihood**	**Risk**
Biodiversity							
Impacts on endangered terrestrial populations, threatened species and threatened ecological communities during construction	Moderate	Likely	High	Refer to mitigation in Section 5.3 of the REF	Moderate	Possible	Medium
Noise and vibration							
Construction noise impacts on residential receivers Impacts from additional construction traffic noise	Moderate	Almost certain	High	Refer to mitigation in Section 5.1	Minor	Almost certain	Medium
Potential impacts of vibration	Moderate	Unlikely	Medium	Refer to mitigation in Section 5.1	Minor	Possible	Low
Potential impacts from increase in train operation on the rail	Moderate	Likely	High	Refer to mitigation in Section 5.1	Minor	Likely	Medium
Aboriginal heritage							
Direct impacts on known Aboriginal heritage items Direct impacts to archaeologically sensitive landscapes and potential unidentified Aboriginal heritage items	Moderate	Unlikely	Low	Refer to mitigation in Section 5.10.2	Moderate	Rare	Low
Non Aboriginal heritage							
Impacts on known heritage items	Moderate	Almost certain	High	Refer to mitigation in Section 5.2	Minor	Almost certain	Medium
Impact on unidentified heritage items	Moderate	Possible	Medium	Refer to mitigation in Section 5.2	Minor	Possible	Low
Surface water							
Impacts on flood-prone areas from construction	Minor	Unlikely	Low	Refer to mitigation in Section 5.4	Minor	Rare	Low

Potential impact	Pre-mitigated risk			Proposed mitigation	Residual risk		
	Consequence	Likelihood	Risk		Consequence	Likelihood	Risk
Landscape character and visual amenity							
Visual impacts of machinery, site compounds and traffic during construction	Minor	Likely	Medium	Refer to mitigation in Section 5.6	Minor	Likely	Medium
Potential amenity impacts to receivers from lighting during construction	Minor	Likely	Medium	Refer to mitigation in Section 5.6	Minor	Possible	Low
Potential impacts due to the slightly altered track design, awning works at Forbes Station and train operations	Minor	Likely	Medium	Refer to mitigation in Section 5.6	Minor	Possible	Low
Waste							
Increased waste generation Impacts associated with the management of waste	Moderate	Almost certain	High	Refer to mitigation in Section 5.5	Moderate	Possible	Medium
Air quality							
Impacts to local air quality due to the following: ▸ Dust generation during earthworks ▸ Operation of construction plant and equipment ▸ Increased vehicle movements associated with transport of construction materials	Moderate	Likely	High	Refer to mitigation in Section 5.10.3	Minor	Likely	Medium
Land use and property							
Impacts on other infrastructure during construction including utilities and existing rail lines	Minor	Likely	Medium	Refer to mitigation in Section 5.10.4	Minor	Possible	Low
Soil and contamination							
Disturbance of contaminated land and hazardous materials during construction	Moderate	Likely	High	Refer to mitigation in Section 5.7	Minor	Likely	Medium
Contamination of land due to leaks and spills	Moderate	Likely	High	Refer to mitigation in Section 5.7.6	Minor	Likely	Medium
Traffic and access							
Construction vehicle movements associated with earthworks and materials with potential impacts to road safety, road dilapidation and traffic delays	Moderate	Almost certain	High	Refer to mitigation in Section 5.8	Minor	Likely	Medium
Socio economic							
Amenity impacts on residential receivers during construction	Moderate	Likely	High	Refer to mitigation in Section 5.9.5.2	Minor	Likely	Medium
Amenity impacts on residential receivers during operation	Minor	Likely	Medium	Refer to mitigation in Section 5.9	Minor	Likely	Medium

Potential impact	Pre-mitigated risk			Proposed mitigation	Residual risk		
	Consequence	Likelihood	Risk		Consequence	Likelihood	Risk
Hazard and risk							
Rupture of, or interference with, utilities and services during construction	Moderate	Possible	Medium	Refer to mitigation in Section 5.10.5	Moderate	Rare	Low
Spill or leak from transport and storage of hazardous substances and dangerous goods during construction	Moderate	Possible	Medium	Refer to mitigation in Section 5.10.5	Moderate	Unlikely	Low
Cumulative impacts							
Cumulative impacts from the construction of other major projects in the vicinity of the proposal	Minor	Possible	Low	Refer to mitigation in Section 5.11.6	Moderate	Unlikely	Low

APPENDIX B

Horizontal Clearances

Outline Environmental Management Plan

STOCKINBINGAL TO PARKES REVIEW OF ENVIRONMENTAL FACTORS

Contents

Tables

Appendix B Environmental Risk Assessment

B.1 Context

Inland Rail operates within the broader ARTC Environmental Management System. ARTC manages its environmental responsibilities and environmental performance by implementing an Environmental Management System that is consistent with the principles contained within the ISO 14000 series and standards. The *Inland Rail Environment and Sustainability Policy* guides the planning, design and implementation of the Inland Rail Program. It outlines the organisation's commitment to effectively manage any risks that may lead to an impact on the environment during construction and operation of Inland Rail. Consistent with this policy, ARTC has developed a Construction Environmental Management Framework to provide for a high standard of environmental performance during construction of all Inland Rail projects. In accordance with the framework, contractors will be required to develop, implement and maintain a Construction Environmental Management Plan (CEMP) that meets the requirements of the respective contract, the Construction Environmental Management Framework and the REF. Construction is required to be completed in accordance with the most recent version of the CEMP approved by the relevant administrating authority (where required). The relationship between the Construction Environmental Management Framework, ARTC's and Inland Rail's corporate and Program-level environmental documentation, and the CEMP is shown in Figure B.1.

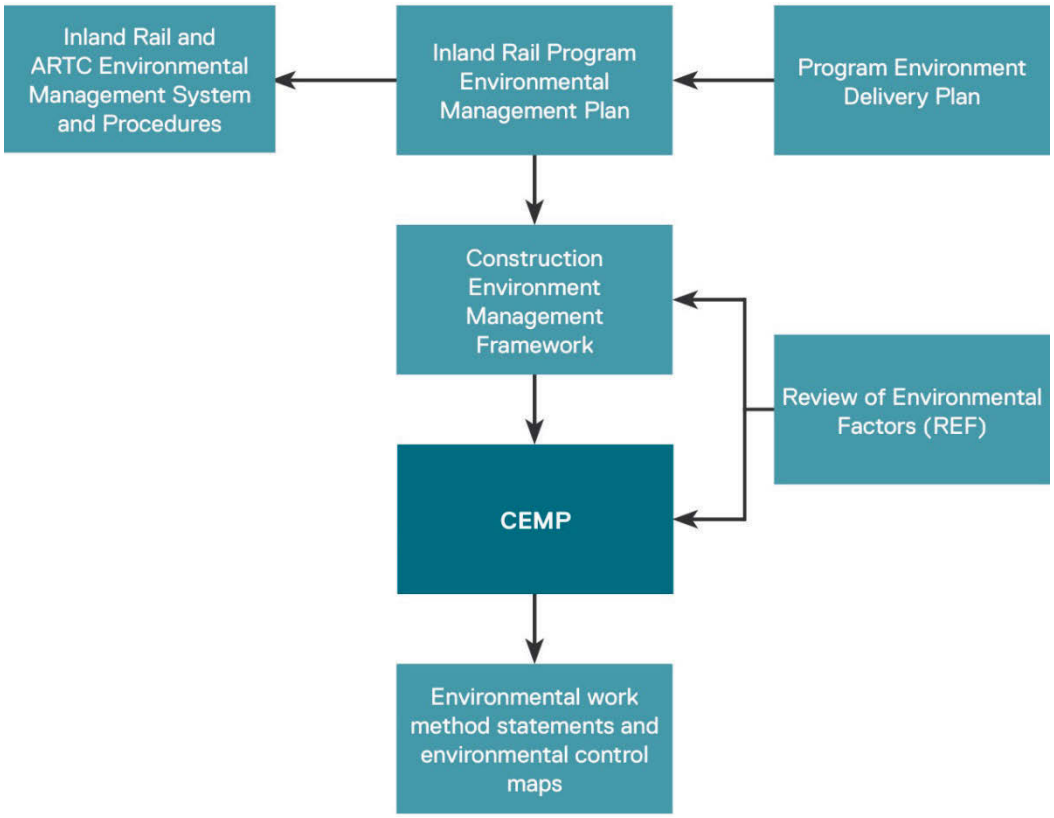

FIGURE B.1 ENVIRONMENTAL MANAGEMENT HIERARCHY

B.2 Outline of Environmental Management Plan

The management of environmental impacts during construction would be documented in the CEMP, to be prepared by the construction contractor(s). The CEMP would provide a centralised mechanism through which all potential construction-related environmental impacts will be managed. It would also provide the overall framework for the system and procedures to ensure that environmental impacts are minimised, and that legislative and approval requirements are fulfilled.

The CEMP would include detailed management plans that would detail how specific environmental issues are to be managed during construction in accordance with the mitigation measures in the REF. It would be prepared in accordance with the Inland Rail Construction Environmental Management Framework and all relevant approvals for the proposal, and include:

- Environmental obligations
- Required licences and permits
- All applicable environmental assessment mitigation measures
- Environmental aspects and impacts associated with project scope of works
- Allocation and statement of ARTC and contractor obligations
- Environmental management roles and responsibilities
- Coverage of identified risks by environmental controls and mitigations
- Environmental training needs
- Obligations of reporting to ARTC
- Emergency response incident management and non-compliance processes
- Hold point list, as supplied by ARTC
- Complaints and enquiries procedure
- Incident and emergencies procedure
- Document change/version control for the CEMP.

Contractors would develop and document a process of periodically reviewing the CEMP. The process would focus on identifying opportunities for continual improvement of processes and practices to ensure that the CEMP is relevant to contractors' activities. The process would address how legislative changes and environmental incident corrective actions will be addressed via an update to the CEMP. Any changes to the CEMP would be reported as part of contractors' monthly environmental reports.

B.3 Environmental performance

The management measures detailed in the CEMP would be monitored during construction to confirm their effectiveness and whether any additional measures are required. Site inspections would be regularly undertaken to check and update erosion and sediment control measures as necessary. Environmental site monitoring would also be undertaken to confirm project impacts and existing environmental values in accordance with monitoring commitments made in this document. The CEMP would provide for an internal compliance monitoring program where the construction contractor(s) would periodically monitor and report on project performance against the mitigation measures of the REF. Independent external audits would also be carried out in accordance with *ISO 19011:2003 – Guidelines for Quality and/or Environmental Management Systems Auditing* every six months.

B.4 Non-conformance and corrective action

For any environmental issues that arise, corrective and preventative actions must be implemented. Corrective and preventative actions might be developed to address issues or initiate environmental management improvement opportunities identified as a result of incidents, inspections and monitoring, and audit findings and other reviews.

The CEMP would document the corrective and preventative action procedures that will be implemented during construction of the project.

B.5 Outline of CEMP plans

The CEMP would comprise a main CEMP document, issue-specific plans, activity-specific procedures and strategies, and site-based control maps. The CEMP, issue-specific plans and strategies/plans proposed to manage the impacts identified in the REF (in accordance with the mitigation measures) are shown in Figure B.2.

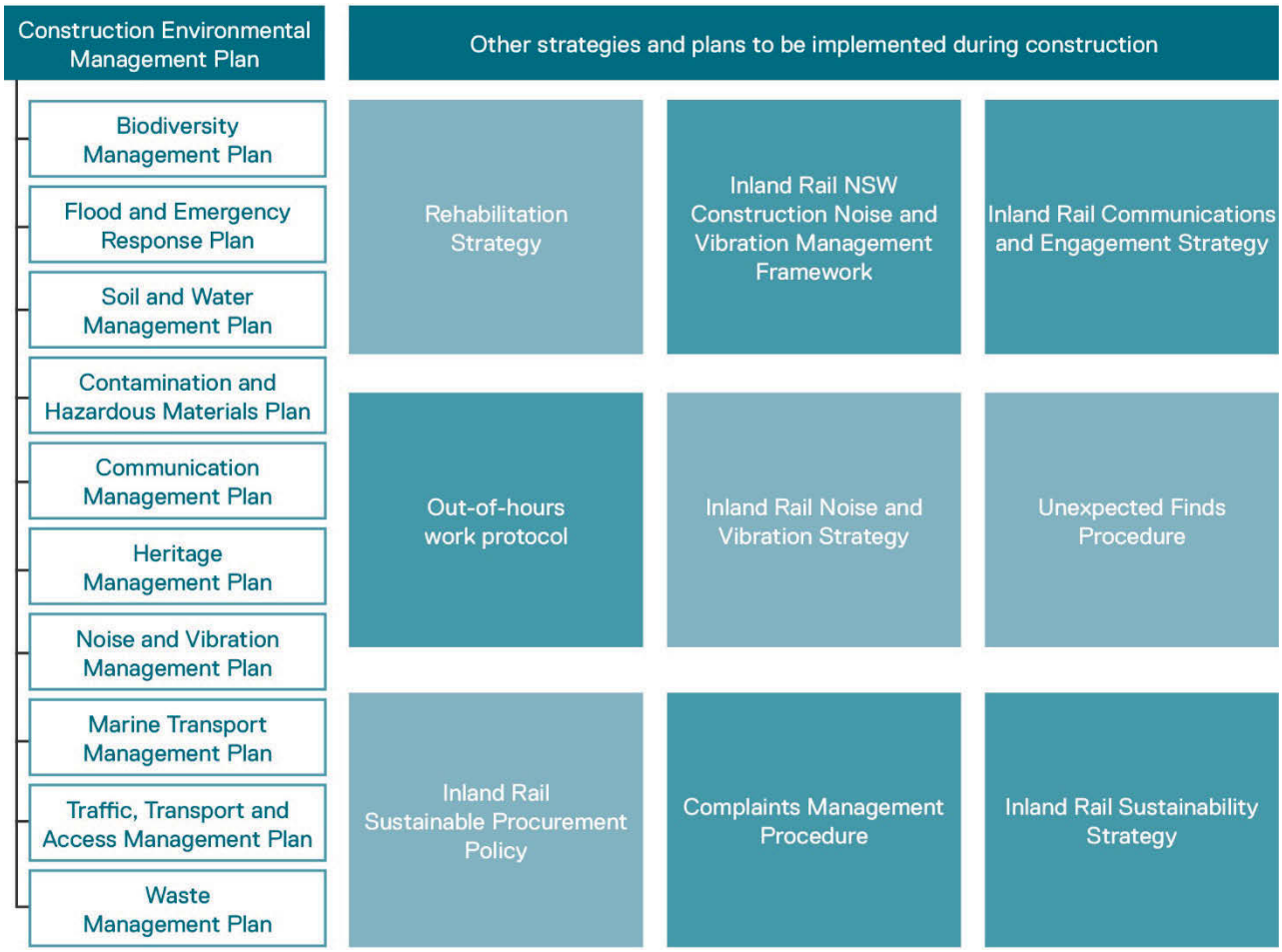

FIGURE B.2 CONSTRUCTION PLANS AND STRATEGIES

An outline of the required plans, and a guide to the general construction management measures required in each, is in Table B.1. The requirement to prepare these plans is specified by the mitigation measures in relevant REF chapters.

TABLE B.1 OUTLINE OF CEMP PLANS

Item	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
Biodiversity management	The Biodiversity Management Plan would detail how construction impacts on terrestrial flora and fauna would be mitigated, managed and monitored.	Vegetation management	Employee education and training including inductions for staff, contractors and visitors to the site would include the biodiversity issues present at the site and so they know their role and responsibilities in relation to the protection and/or minimisation of impacts to native biodiversity. The CEMP and construction plans would clearly document the location and full extent of clearing required.
		Management of trees to be retained	The management of trees in the vicinity of the construction zone would be consistent with the *AS 4970-2009 Protection of trees on development sites* (Standards Australia, 2009).
		Pre-clearance surveys – native vegetation	Pre-clearance surveys would be implemented within areas of native vegetation that are to be cleared. Pre-clearance surveys will be undertaken by suitably qualified and experienced ecologists and involve the following: ▸ The demarcation of areas approved for clearing to reduce risk of accidental clearing/disturbance of surrounding native vegetation ▸ The likely habitat resources and habitat trees would be identified and marked. Habitat trees are those containing hollows, cracks or fissures and spouts, active nests, dreys or other signs of recent fauna usage. Other habitat features to be identified include fallen timber/hollow logs and burrows. ▸ The potential presence of threatened flora and fauna species, endangered populations and threatened ecological communities would be identified ▸ The identification of species or habitat features that are suitable for translocation or salvage in areas of koala habitat, visual inspection of trees for koalas prior to clearing.
		Weed management	Weeds would be managed and disposed of in accordance with the requirements of the *Biosecurity Act 2015* (NSW). Weed control mitigation and management strategies would be documented and implemented as follows: ▸ Vehicles or equipment being brought onto the proposal site and/or travelling around the site must be inspected and cleaned prior to commencing work to limit the spread of seeds and plant material ▸ Regular inspections to monitor the spread of weed species ▸ Training of environmental personnel on the identification of target weed species. Weed control and eradication techniques may include: ▸ Spraying with herbicides ▸ Physical removal, e.g. chipping ▸ Minimisation of area available for weed infestation, through prompt revegetation of bare areas ▸ Site hygiene and waste management protocol to deter pest species.

Item	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
Noise and vibration	The Noise and Vibration Management Plan would detail how potential noise and vibration impacts would be mitigated and managed during construction. The plan would include the listed management measures. Where the noise and vibration levels are predicted to exceed the criteria after implementation of the general work practices, the additional mitigation measures detailed in the Construction Noise Strategy would be implemented. The requirements of relevant standards and guidelines, including AS 2436-2010 and *the Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009) would be addressed. The plan would also include reference to the working hours protocol and the complaints management procedures specified in the Communication Management Plan.	Notification and behaviour	Notification undertaken during construction would inform relevant stakeholders of the work locations and timing, and the potential for noise impacts. Construction sites and compounds located within 200 m of sensitive receivers would be managed to minimise noise-generating activities, including unnecessary shouting, loud stereos/radios, dropping of materials from height, throwing of metal items, and slamming of doors, particularly at the start and finish of shifts.
		Construction hours and scheduling	The relevant noise and vibration criteria would be defined and reference the obligations to EPL3142.
		Equipment and plant	Quieter and less vibration emitting construction methods would be used where reasonable and feasible. The noise levels of plant and equipment would have operating sound power or sound pressure levels that comply with the required criteria. Simultaneous operation of noisy plant within range of sensitive receivers would be avoided. The offset distance between noisy plant and adjacent sensitive receivers would be maximised. Plant used intermittently would be throttled down or shut down. Noise-emitting plant would be directed away from sensitive receivers. Stationary noise sources would be enclosed or shielded while ensuring that the health and safety of workers is maintained. Consider site topography when situating plant and use structures (such as site shed placement, earth bunds, fencing, noise barriers) to shield receivers from noise.
		Traffic flow and deliveries	Loading and unloading of materials/deliveries would occur as far as possible from sensitive receivers, and preferably during standard construction hours. Site access points and roads would be selected to minimise impacts on sensitive receivers. Where practicable, delivery vehicles would be fitted with straps rather than chains for unloading.
		Measuring and monitoring	Vibration and noise monitoring may be required in response to complaints.

Item	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
Non-Aboriginal heritage	A Heritage Management Plan would be prepared and implemented as part of the CEMP. It would include measures to manage non-Aboriginal heritage and minimise the potential for impacts during construction. The plan would be prepared in consultation with Heritage NSW and Forbes Shire Council and take into account the outcomes of further investigations and surveys during detailed design.	Impacts to state heritage listed Forbes Station	Specific management measures to be included are: ▸ As many original elements as feasible should be reused during the modification of the Forbes Station awning. This includes reusing the chamfered edge beam at the outer edge of the awning and ensuring that the decorative finials at the track end of the cantilevered bracket remain in place. ▸ Where original elements cannot be reused, 'like for like' elements must be sourced to ensure the aesthetic of the Forbes Station awning is not diminished. ▸ Repainting should be sympathetic to the current station colour palette of the Forbes Station awning. ▸ The downpipe from the awning gutter should be relocated to reflect its position seen in the 1925 historical image shown on Figure 5.10. Care should be taken to select a low-profile gutter close to that originally installed (refer to the *Statement of Heritage Impact* (SoHI) prepared by Ozark, 2021). ▸ Unexpected finds procedure to provide a consistent method for managing any unexpected heritage or archaeological items and unexpected human skeletal remains.
Aboriginal heritage	The potential impacts on heritage would be mitigated and managed during construction. The CEMP would incorporate the results of the Due Diligence Assessment and an unexpected finds procedure.	General	Heritage requirements would be included in the site induction.
		Unexpected finds	An unexpected finds procedure would be developed and included in the CEMP to provide a consistent method for managing any unexpected heritage items (both Aboriginal and non-Aboriginal heritage items) discovered during construction, including potential heritage items or objects, and human skeletal remains. Procedures and notification requirements for potential human remains in accordance with relevant guidelines.
Traffic and access	A Traffic, Transport and Access Management Plan would be prepared. The plan would include measures, processes and responsibilities to minimise the potential for impacts on the community, and the operation of the surrounding road and transport environment during construction. The plan would be developed in consultation with local council and public transport/bus operators.	Impacts to local road network	As appropriate, additional reasonable and feasible measures identified as an outcome of consultation would be detailed in the plan. The plan would include: ▸ Ensuring adequate road signage to inform motorists, cyclists and pedestrians of the work site ahead ▸ Scheduling deliveries to minimise impact to grain terminals, Forbes Information Centre and school bus movements ▸ Traffic controls to manage deliveries, if required ▸ Ensuring adequate sight lines to allow for safe entry and exit from the site ▸ Haulage routes.
Flood and emergency response plan	Potential impact from flooding at Forbes Station and other emergencies would be addressed here	Emergency incident	The plan would include measures, process and responsibilities to minimise the potential impacts of construction activities on flood behaviour as far as practicable. It would also include measures to manage flood risks during construction and address flood recovery during construction. Evacuation protocols and monitoring for emergency events in the region would be detailed.

Item	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
Soil and water	The Soil and Water Management Plan would detail how potential impacts on soils, erosion, sedimentation, watercourses and water quality (surface and groundwater) would be mitigated and managed during construction. The plan would consider site-specific conditions including dispersive soils and potential treatment options during construction. The plan would provide for incident management in relation to potential water quality contamination incidents. The plan would include procedures to manage the impact of the proposal on flooding, and would take into account the requirements of relevant guidelines, including: ▸ *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004) ▸ *Managing Urban Stormwater: Soils and Construction Volume 2A: Installation of Services*	Erosion of exposed soils and sediment management	Sediment and erosion control devices would be installed to minimise mobilisation and transport of sediment in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004). Maintenance and checking of the erosion and sedimentation controls would be undertaken on a regular basis and any subsequent records retained. Sediment would be cleared from behind barriers/sand bags on a regular basis, as required, and all controls would be managed to ensure they work effectively at all times. The area of exposed surfaces would be minimised. Disturbed areas would be stabilised progressively to ensure that no areas remain unstable for any extended length of time. Soil and sediment that accumulates in erosion and sediment control structures would be reused, where practicable, during site reinstatement, unless it is contaminated or otherwise inappropriate for reuse. Work would cease, where practicable, during heavy rainfall events when there is a risk of sediment loss offsite or ground disturbance due to waterlogged conditions. Equipment, plant and materials would be placed in designated lay-down areas where they are least likely to cause erosion. Erosion control devices would be removed as part of the final site clean-up. This would include removing any sediment in drainage lines that has been trapped by erosion control devices and restoring disturbed areas. Exposed surfaces would be stabilised, and final landscaping implemented, as soon as practicable.
		Stockpile management	Stockpiles would be managed by implementing sediment and erosion control devices in accordance with *Managing Urban Stormwater, Soils and Construction*. No stockpiles of materials or storage of fuels or chemicals would be located within high/medium flood risk areas or flow paths.

Item	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
	(Department of Environment, Climate Change and Water (DECCW), 2008) ▸ *Managing Urban Stormwater: Soils and Construction Volume 2C: Unsealed roads* (DECCW, 2008) ▸ *Erosion and sediment control on unsealed roads* (Office of Environment and Heritage (OEH), 2012) ▸ *Technical Guideline: Temporary stormwater drainage for road construction* (Roads and Maritime Services (RMS), 2011) ▸ *Waste Classification Guidelines – Part 1: Classification of Waste* (NSW Environment Protection Authority (EPA), 2014b).	Spill/incident management	Spill kits would be maintained onsite at all times. Machinery would be checked daily to ensure that no oil, fuel or other liquids are leaking. Refuelling of plant and equipment would be undertaken within designated areas with appropriate controls. Visual monitoring of local water quality (such as turbidity, hydrocarbon spills/slicks) would be undertaken on a regular basis to identify any potential spills. Vehicle wash down and/or cement truck washout would occur in a designated bunded area or offsite.
Waste	The Waste Management Plan would detail how waste would be managed during construction to minimise the potential for significant impacts. The plan would include disposal requirements, measures to reduce, re-use or recycle wastes where possible. It would set targets for waste diversion, demonstrate how targets can be achieved, and outline how waste diversion would be tracked and reported. The plan would be prepared in accordance with the *Waste Classification Guidelines - Part 1: Classification of Waste* (EPA, 2014b).	Waste management	Resource management hierarchy principles would be followed: ▸ Avoid unnecessary resource consumption as a priority ▸ Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery) ▸ Disposal is undertaken as a last resort. Waste material, including soil and spoil to be taken offsite, would be classified and managed in accordance with the *Waste Classification Guidelines - Part 1: Classification of Waste* (EPA, 2014b). and would be disposed of in accordance with the *Protection of the Environment Operations Act 1997* (NSW) (POEO Act). All waste documentation would be collated and maintained on file in accordance with these guidelines. Waste material would not to be left onsite once the works have been completed. Working areas would be maintained, kept free of rubbish and cleaned up at the end of each working day. Any waste material identified as being contaminated would be managed in accordance with the *Contaminated Land Management Act 1997* (NSW) and other relevant legislation and guidelines. The removal, handling and disposal of any asbestos-containing materials would be undertaken by an appropriately licensed contractor, and in accordance with: ▸ *Code of Practice for the Safe Removal of Asbestos 2005* ▸ *Code of Practice for the Management and Control of Asbestos in Workplaces 2005.*

Item	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
Air quality and dust	The air quality management plan would detail how potential impacts on air quality would be mitigated and managed during construction.	Dust suppression-construction works	Dust generation would be monitored visually and, where required, dust-control measures such as water spraying would be implemented to control the generation of dust. Access points would be inspected to determine whether sediment is being transferred to the surrounding road network. If required, sediment would be promptly removed from roads to minimise dust generation. Works would be suspended during strong winds or in weather conditions where high levels of dust or airborne particulates are likely. Any exposed surfaces would be stabilised as soon as practicable. In locations where nearby sensitive receivers may be affected, adopt a site 'shut down and cover up' policy during periods of extreme weather conditions, e.g. high winds.
		Dust suppression-vehicle movements	Vehicle movements would be limited to designated entries and exits, haulage routes and parking areas. Materials transported to and from the site would be covered to reduce dust generation in transit.
		Vehicle emissions	All plant and machinery would be fitted with emission control devices complying with relevant Australian Standards. Machinery would be turned off when not in use and not left to idle for prolonged periods. Surveillance would be undertaken to identify any vehicle, plant or equipment that is causing visible emissions. If any defective vehicles, plant or equipment are identified, operation of this machinery would cease and service/maintenance would be undertaken.
		Communication	Advance warning would be provided to sensitive receivers in relation to any significant dust-generating activities undertaken in close proximity to sensitive receivers.
Contamination and hazardous materials	A contamination and hazardous materials plan would be prepared and implemented as part of the CEMP. It would include measures, processes and responsibilities to minimise the potential for contamination impacts on the local community, workers and environment, and procedures for incident management and managing unexpected contamination finds (an unexpected finds protocol).	Handling or disturbance of contaminants and hazardous materials	The plan will include a detailed list of measures that will be implemented during construction to minimise the potential for contamination impacts, including: ▸ Allocation of general site practices and responsibilities ▸ Hazardous materials and dangerous goods management practices ▸ Procedures to be undertaken during demolition of structures ▸ Spill/incident management procedures.

Item	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
Communication management plan	The communication management plan would provide guidance for the management of communication and consultation during the construction period, including objectives of consultation, stakeholders, contact mechanisms, and protocols. The plan would be consistent with the consultation plan developed by ARTC, as described in Chapter 4. The plan would also include implementation and maintenance of a complaints register and complaints handling and escalation procedures, consistent with ARTC requirements.	Communication and complaints	Contact details for a 24-hour project response line and email address would be provided for ongoing stakeholder contact throughout the construction period. Provision of accurate public information signs while work is in progress. Staging of works would be undertaken to minimise disruption, in consultation with relevant stakeholder groups, to minimise impacts to community activities and functions. Relevant stakeholders would be notified regarding service disruptions in accordance with the communication management plan. Complaints would be managed according to the following procedure: ▸ Details of all complaints received would be recorded ▸ A detailed written response would be provided to the complainant within 14 calendar days.

APPENDIX C

Horizontal Clearances

Climate Change Risk Register

Inland Rail Climate Change Risk Register - Albury to Illabo and Stockinbingal to Parkes Project

Albury to Illabo and Stockinbingal to Forbes Packages

Revision Date: 12-05-21 Document: 2-0008-210-ESS-00-RG-0001

Risk Ref	Climate Hazard	Risk impact description	Direct/ Indirect Risks	Adaptation inherent in design / operations (inc. ARTC Operational Procedures)	2030 Initial Risk Assessment										2090 Initial Risk Assessment										Applicability					Additional Adaptation Actions (Inland Rail Climate Change Risk Assessment Framework)	A2I Design Adaptation Actions	2030 Reassessed Risk Assessment										2090 Reassessed Risk Assessment									
					Likelihood	Consequence								Initial Risk	Likelihood	Consequence								Initial Risk	Stockinbingal to Forbes	Albury	Lockhart / Greater Hume	Wagga Wagga	Junee			Likelihood	Consequence								Reassessed Risk	Likelihood	Consequence								Reassessed Risk
						Safety	Assets	F nanc a	Env ronmenta	Regu story	Reputat ona	Schedu e	Max Consequence			Safety	Assets	F nanc a	Env ronmenta	Regu story	Reputat ona	Schedu e	Max Consequence										Safety	Assets	F nanc a	Env ronmenta	Regu story	Reputat ona	Schedu e	Max Consequence			Safety	Assets	F nanc a	Env ronmenta	Regu story	Reputat ona	Schedu e	Max Consequence	
IR CCR 1	Temperature increase - More hot days and warm spells	Risk to health and safety of staff or visitors working along the rail corridor through heat stress or heat related illness	Direct	Pre work brief Monitoring and responding to extreme weather events Access to corridor Night working across the Nullarbor Heat stress training Hazards and new miss reporting First aid training	C	2					1		2	LOW - 2C	C	2					1		2	LOW - 2C	X	X	X	X	X	Learning from other locations to ensure a consistent approach across the Australian Network (e.g. expanding night works) Apply learnings from hazard and near miss reporting	Not applicable to design	C	2					1		2	LOW - 2C	C	2					1		2	LOW - 2C
IR CCR 2	Temperature increase - More hot days and warm spells	Risk to business continuity as a result of heat event (e.g. increased incidence of delayed services	Direct	Monitoring and responding to extreme weather events Business continuity plans for each site ETM-06-08 Managing Track Stability ETM-06-08F-01 Misalignment/Buckle Report ETI-06-07 Responding to Buckles Put speed restrictions in place (more cautious in Jan and Feb due to uncertainty of how work upgrades will perform)	B		1	2					2	MED - 2B	A		1	2					2	MED - 2A	X	X	X	X	X	In future consider impacts on contracting and reliability criteria, adjusting level of service offering	Not applicable to design	B		1	2					2	MED - 2B	A		1	2					2	MED - 2A
IR CCR 3	Temperature increase - More hot days and warm spells	Increase in hot days resulting in track twisting (buckling) which could lead to derailment of trains along the rail line	Direct	Monitoring and responding to extreme weather events ETM-06-08 Managing Track Stability ETM-06-08F-01 Misalignment/Buckle Report ETI-06-07 Responding to Buckles Put speed restrictions in place (more cautious in Jan and Feb due to uncertainty of how work upgrades will perform)	D	3	3	1					3	LOW - 3D	C	3	3	1					3	MED - 3C	X	X	X	X	X	Ensure stress free temperature is monitored and issues are identified early. Recognising trigger points for speed restrictions when temp reached in the rail Designing for future extreme temperatures (e.g. turn outs and grade separations). Instrument the track. Ensure and enforce high quality of the build/ welds and track adjustment Stress Free Temperature monitoring instrumentation to the rails	Where track slewing or track re-construction is being undertaken, - Ensure stress free temperature is monitored and issues are identified early. - Recognising trigger points for speed restrictions when temp reached in the rail - Ensure and enforce high quality of the build/ welds and track adjustment - Stress Free Temperature monitoring instrumentation to the rails - Inspection and maintenance proceedure to observe and action throughout operation.	E	3	3	1					3	LOW - 3E	D	3	3	1					3	LOW - 3D
IR CCR 4	Temperature increase - More hot days and warm spells	Decreased efficiency and more frequent outages of electrical (track switches, signalling, etc.) and communication systems	Direct	Standards and type approvals Redundancies and continuity plans Run under degraded conditions as per ARTC standards	C		1	1					1	LOW - 1C	B		1	1					1	LOW - 1B	X	X	X	X	X		N/A to Design scope. Signalling scope of works by ARTC	C		1	1					1	LOW - 1C	B		1	1					1	LOW - 1B
IR CCR 5	Temperature increase - More hot days and warm spells	Increased extreme temperature and solar exposure may lead accelerated degradation of materials and reduced life of structures (bridges, crossings, track) and specialist equipment (communications towers, signalling) resulting in increased capital cost due to the need for more frequent repairs and maintenance	Direct	Type approval process General standards	C			1					1	LOW - 1C	B			1					1	LOW - 1B	X	X	X	X	X		AS5100 Bridge Design standards incorporates maximum temperature. Recommend in Detailed Design stage that temperatures be reassessed for sensitivty to account for climate change projections. Protective coatings to account for higher UV ratings expected, and may have implications on reapplication schedule.	C			1					1	LOW - 1C	B			1					1	LOW - 1B
IR CCR 6	Temperature increase - More hot days and warm spells	Extreme heat leading to increased power demand and/or failure of power infrastructure (I.e. substations, LV/HV switchboards) resulting in interruptions to power mains supply with increased frequency and duration of power outages	Indirect	Redundancies and continuity plans Business continuity plans Remote sensing and remote monitoring Run under degraded conditions as per ARTC standards	C		2						2	LOW - 2C	B		2						2	MED - 2B	X	X	X	X	X	Review and retrofit for new technologies and improvements (ongoing), future proof to ensure alternative power sources are possible. Keep up to date. Consider asset replacement time horizons to ensure appropriateness and suitability for service. Forward maintenance strategy (trial, test and approval) and non-mandated review periods.	Not applicable to design	D		2						2	LOW - 2D	C		2						2	LOW - 2C
IR CCR 7	Temperature increase - More hot days and warm spells	Increased incidence of extreme heat limiting the ability for ARTC to attract workers due to undesirable conditions	Indirect	Staff survey and feedback process	C			2					2	LOW - 2C	B			2					2	MED - 2B	X	X	X	X	X	Attractive salary and workforce reward systems (competition with other industries i.e. mining companies in parts of the country) Common issue for many companies in response to heat so will be an industry wide response.	No design adaptation actions.	C			2					2	LOW - 2C	B			2					2	MED - 2B
IR CCR 8	Temperature increase - More hot days and warm spells	Rolling stock or hot works igniting fire due to hot, dry and windy conditions	Direct	Hot works procedure during extreme temperature (total fire ban, hot works application to go through) Welders qualified for managing heat and hot works (with rural fire brigade) Monitoring of noise and temperature of wheels and brake assembly. If temperature reaches a certain limit it will alert operating staff.	C	2	2				2		2	LOW - 2C	B	2	2				2		2	MED - 2B	X	X	X	X	X	In future stipulating requirements around rolling stock in customer contracts (however don't want to exclude those who can't afford new stock). Review wayside device placement and strategy for the future to include more at certain key points in the network.	No design adaptation actions, only operational adaptation actions.	B	2	2				2		2	MED - 2B	B	2	2				2		2	MED - 2B

Inland Rail Climate Change Risk Register - Albury to Illabo and Stockinbingal to Parkes Project

Albury to Illabo and Stockinbingal to Forbes Packages

Revision Date: 12-05-21 Document: 2-0008-210-ESS-00-RG-0001

Risk Ref	Climate Hazard	Risk impact description	Direct/ Indirect Risks	Adaptation inherent in design / operations (inc. ARTC Operational Procedures)	2030 Initial Risk Assessment										2090 Initial Risk Assessment										Applicability					Additional Adaptation Actions (Inland Rail Climate Change Risk Assessment Framework)	A2I Design Adaptation Actions	2030 Reassessed Risk Assessment										2090 Reassessed Risk Assessment									
					Likelihood	Consequence								Initial Risk	Likelihood	Consequence								Initial Risk	Stockinbingal to Forbes	Albury	Lockhart / Greater Hume	Wagga Wagga	Junee			Likelihood	Consequence								Reassessed Risk	Likelihood	Consequence								Reassessed Risk
						Safety	Assets	F inanc a	Env ironmenta	Regu story	Reputat ona	Schedu e	Max Consequence			Safety	Assets	F inanc a	Env ironmenta	Regu story	Reputat ona	Schedu e	Max Consequence										Safety	Assets	F inanc a	Env ironmenta	Regu story	Reputat ona	Schedu e	Max Consequence		Safety	Assets	F inanc a	Env ironmenta	Regu story	Reputat ona	Schedu e	Max Consequence	
IR CCR 9	Solar radiation	Increase in solar radiation, resulting from decrease in cloud cover may result in potential increase in periods of direct sunshine - potential glare issues during rail operation, reducing safety	Direct		C	1						1	LOW - 1C	B	1						1	LOW - 1B	X	X	X	X	X		No design adaptation actions.	B	1						1	LOW - 1B	B	1						1	LOW - 1B
IR CCR 10	Increased intensity of extreme rainfall events	Risk to health and safety of staff (e.g. conductor, emergency crews) working along the rail corridor due to velocity and flow of flooding (e.g. flash flooding events)	Direct	Monitoring and responding to extreme weather events procedure (code red, amber and black procedure)	C	2						2	LOW - 2C	B	2						2	MED - 2B	X	X	X	X	X	Connect with and learn from emergency services, establish communications channels and procedures. More training on emergency event response	Not applicable to design	C	2						2	LOW - 2C	B	2						2	MED - 2B
IR CCR 11	Increased intensity of extreme rainfall events	More intense rainfall (and increased runoff volume from catchment) could lead to flooding of tracks and assets, inundation of drainage infrastructure and damage due to scour	Direct	Monitoring and responding to extreme weather events procedure Inland Rail hydrological risk assessment framework inclusive of climate change impacts AAR16 Sensitivity analysis as part of the hydrological risk assessment framework Modelling verification in areas requiring flood works permits. Greenfield projects undertaking sensitivity analysis and risk modelling so design can be adjusted for climate change (if deemed necessary)	C	2	3	1			1	3	MED - 3C	B	3	3	1			1	3	HIGH - 3B	X	X	X	X	X		**S2F:** The exisitng flooding at the Lachlan River Bridge is unchanged as a bridge modification works only. Works do not imapact the bridge waterway area. Existing immunity is therefore maintained. The exisitng flooding at the Forbes yard clearances is unchanged as local track works are minor track slew works only. Existing immunity is therefore maintained. All other Horizontal Clearance sites are not impacted by flooding and therefore existing immunity is unchanged.	C	2	3	1			1	3	MED - 3C	B	3	3	1			1	3	HIGH - 3B
IR CCR 12	Increased intensity of extreme rainfall events	More intense rainfall could lead to flooding of tracks and assets, inundation of drainage infrastructure reducing the safety of running conditions with resulting service disruption.	Direct	Monitoring and responding to extreme weather events procedure Inland Rail hydrological risk assessment framework inclusive of climate change impacts	C	2	3					3	MED - 3C	B	3	3					3	HIGH - 3B	X	X	X	X	X	Design for retrofit upgrade (e.g. raising track, glued ballast) - in 30 years time there will be additional rainfall and runoff data to assess climate change impacts. Review risks in line with updates to the ARR guideline (about every 30 years)/or in line with an extreme flooding event (e.g. overtopping, 1% event becomes a 5% event). Then multi-criteria analysis to determine what actions to take to reduce risk.	Qualitative flooding assessment completed as part of the options assessment phase. Further consideration of flooding is to be undertaken in detailed design phase, including flood modelling at some sites to determine impacts of RCP8.5 scenario in accordance with ARTC Climate Change Framework. Where identified, opportunities for improvements/adaptations is included in the design documention.	C	2	3					3	MED - 3C	B	3	3					3	HIGH - 3B
IR CCR 13	Increased intensity of extreme rainfall events	Increase in intense rainfall could result in overtopping leading to damaged infrastructure	Direct		C		3	3				3	MED - 3C	B		4	3				4	V HIGH - 4B	X	X	X	X	X	Climate change should be looked at upfront to inform designs (RCP8.5) rather than analysis at end. Non-greenfield projects should also consider RCP8.5.	Qualitative flooding assessment completed as part of the options assessment phase. Further consideration of flooding is to be undertaken in detailed design phase, including flood modelling at some sites to determine impacts of RCP8.5 scenario in accordance with ARTC Climate Change Framework. Where identified, opportunities for improvements/adaptations is included in the design documention.	D		3	3				3	LOW - 3D	C		4	3				4	HIGH - 4C
IR CCR 14	Increased intensity of extreme rainfall events	Longitudinal scour through water running along embankment, impacting on embankment.	Direct		C	2	2	2				2	LOW - 2C	B	3	3	3				3	HIGH - 3B	X	X	X	X	X		Drainage and flooding velocities at rail embankment considered in assessment, and appropriate protection provided. RipRap or other matress type erosion controlling systems used.	C	2	2	2				2	LOW - 2C	B	3	3	3				3	HIGH - 3B
IR CCR 15	Increased intensity of extreme rainfall events	Inundation of adjacent road network and signalling equipment causing potential isolation of assets due to flooding	Direct	Run under degraded conditions as per ARTC standards	C	2	2					2	LOW - 2C	B	2	2					2	MED - 2B	X	X	X	X	X	Similar to above Plus solar back-up on most level crossings and minimisation of number of level crossings	Qualitative flooding assessment completed as part of the options assessment phase. Further consideration of flooding is to be undertaken in detailed design phase, including flood modelling at some sites to determine impacts of RCP8.5 scenario in accordance with ARTC Climate Change Framework. Where identified, opportunities for improvements/adaptations is included in the design documention.	C	2	2					2	LOW - 2C	B	2	2					2	MED - 2B
IR CCR 16	Increased intensity of extreme rainfall events	More intense rainfall could lead to flooding of tracks and assets, inundation of drainage infrastructure, increasing maintenance and insurance premiums costs.	Direct	Monitoring and responding to extreme weather events procedure Inland Rail hydrological risk assessment framework inclusive of climate change impacts	B			1				1	LOW - 1B	A			2				2	MED - 2A	X	X	X	X	X		Qualitative flooding assessment completed as part of the options assessment phase. Further consideration of flooding is to be undertaken in detailed design phase, including flood modelling at some sites to determine impacts of RCP8.5 scenario in accordance with ARTC Climate Change Framework. Where identified, opportunities for	B			1				1	LOW - 1B	A			2				2	MED - 2A
IR CCR 17	Increased intensity of extreme rainfall events	Inundation of adjacent road network impacting on ability of emergency response to reach the corridor	Direct	Out of inland rail control	C						2	2	LOW - 2C	B						2	2	MED - 2B	X	X	X	X	X		Qualitative flooding assessment completed as part of the options assessment phase. Further consideration of flooding is to be undertaken in detailed design phase, including flood modelling at some sites to determine impacts of RCP8.5 scenario in accordance with ARTC Climate Change Framework. Where identified, opportunities for	C						2	2	LOW - 2C	B						2	2	MED - 2B
IR CCR 18	Increased intensity of extreme rainfall events	Water damage to signalling, substations and electrical circuitry may result in disruption to electricity supply thereby impacting the functionality of level crossings, signals and utility supply	Direct/ Indirect	All signalling equipment installed above 1%AEP Monitoring and responding to extreme weather events Operational procedures when level crossings fail Redundancy through two power supplies, solar / batteries, with up to 48hrs power.	D		2	1				2	LOW - 2D	C		2	1				2	LOW - 2C	X	X	X	X	X		Not applicable to design	D		2	1				2	LOW - 2D	C		2	1				2	LOW - 2C

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Risk Ref	Climate Hazard	Risk impact description	Direct/ Indirect Risks	Adaptation inherent in design / operations (inc. ARTC Operational Procedures)	Likelihood	Safety	Assets	F nanc a	Env ronmenta	Regu story	Reputat ona	Schedu e	Max Consequence	Initial Risk	Likelihood	Safety	Assets	F nanc a	Env ronmenta	Regu story	Reputat ona	Schedu e	Max Consequence	Initial Risk	Stockinbingal to Forbes	Albury	Lockhart / Greater Hume	Wagga Wagga	Junee	Additional Adaptation Actions (Inland Rail Climate Change Risk Assessment Framework)	A2I Design Adaptation Actions	Likelihood	Safety	Assets	F nanc a	Env ronmenta	Regu story	Reputat ona	Schedu e	Max Consequence	Reassessed Risk	Likelihood	Safety	Assets	F nanc a	Env ronmenta	Regu story	Reputat ona	Schedu e	Max Consequence	Reassessed Risk
IR CCR 19	Increased intensity of extreme rainfall events	Extreme rainfall leading to flooding/standing water resulting in the increased presence/risk of disease and water-borne pathogens impacting the health and safety of employees	Direct	Pre work brief Work method statements	E	2							2	LOW - 2E	D	2							2	LOW - 2D	X	X	X	X	X		Not applicable to design	E	2							2	LOW - 2E	D	2							2	LOW - 2D
IR CCR 20	Increased intensity of extreme rainfall events	Extreme rainfall and flooding resulting in delays to construction schedule and cost impacts	Direct	Project planning for maintenance activities consider seasonal variables	C			3				4	4	HIGH - 4C	C			3				4	4	HIGH - 4C	X	X	X	X	X	Ensure planning for maintenance activities reflect seasonal variables. Ensure maintenance planning activities are reviewed and procedures modified over time to account for seasonal variables.	Not applicable to design	C			3				4	4	HIGH - 4C	C			3			4	4	4	HIGH - 4C
IR CCR 21	Increased intensity of extreme rainfall events	Uncertainty of extreme rainfall events/flooding behaviour impacting on design conditions/requirements. [Over or under design risks]	Indirect	Sensitivity analysis as part of the hydrological risk assessment framework	E			4					4	LOW - 4E	E			4					4	LOW - 4E	X	X	X	X	X		A blockage factor of 20% has been considered in design and no change to existing or proposed track immunity is predicted.	E			4					4	LOW - 4E	E			4				4	4	LOW - 4E
IR CCR 22	Increased intensity of extreme rainfall events	Extreme rainfall and flooding causing damage to non-rail structures potentially impacting operations	Direct	Ability to comment on land developments on adjacent properties	D		3						3	LOW - 3D	C		3						3	MED - 3C	X	X	X	X	X	Ensure that the ability to comment on land developments is maintained through the asset design life.	Not applicable to design	D		3						3	LOW - 3D	C		3						3	MED - 3C
IR CCR 23	Increased intensity of extreme rainfall events	Increase in intense rainfall could result in regional isolation and/or service interruption due to flooding along the 1,700-km route	Direct	Inland Rail hydrological risk assessment framework inclusive of climate change impacts Property strategy to deal with severance issues	C			2					2	LOW - 2C	C			2					2	LOW - 2C	X	X	X	X	X		Qualitative flooding assessment completed as part of the options assessment phase. Further consideration of flooding is to be undertaken in detailed design phase, including flood modelling at some sites to determine impacts of RCP8.5 scenario in accordance with ARTC Climate Change Framework. Where identified, opportunities for	C			2					2	LOW - 2C	C			2					2	LOW - 2C
IR CCR 24	Increased intensity of extreme rainfall events	The projected periodic extreme dry and wet periods may increase the potential for erosion of substrate and ballast materials, causing increase washout. This could cause infrastructure instability, train derailment and disruption in the event of collapse.	Direct	Track inspection procedure Review and update in accordance with any updates to standards	D		3	3			3		3	LOW - 3D	C		3	3			3		3	MED - 3C	X	X	X	X	X	Routine LIDAR runs to determine mass/soil changes/movements. Install track inspections and monitoring stations to check in on these changes especially in vulnerable areas. Proximity sensors.	Routine inspections to be undertaken throughout operation in accordance with ARTC standards.	D		3	3			3		3	LOW - 3D	C		3	3			3		3	MED - 3C
IR CCR 25	Increased intensity of extreme rainfall events	Increased intense rainfall and flooding resulting in scour damage to adjacent properties	Direct	Agronomy assessment in hydrology design Consultation as part of EIS	C			2			3		3	MED - 3C	B			2			3		3	HIGH - 3B	X	X	X	X	X	Collect baseline photographic evidence of current conditions (visual monitoring/ dilapidation survey). Especially useful for new greenfield sites. Cameras on monitoring vehicles/trains (AK cars – three monthly). Updating commissions and operational monitoring. – Go-Pro on drones and GPS spot checks.	Flood assessment completed to demonstrate afflux, velocity and hazard are compliant against the impact criteria to minimise site risks where possible.	D			2			3		3	LOW - 3D	C			2			3		3	MED - 3C
IR CCR 26	Increased intensity of extreme rainfall events	Potential blockages of drainage infrastructure caused by the movement of debris during flood.	Direct		C		2						2	LOW - 2C	B		2						2	MED - 2B	X	X	X	X	X		A blockage factor of 20% has been considered in design and no change to existing or proposed track immunity is predicted.	D		2						2	LOW - 2D	C		2						2	LOW - 2C
IR CCR 27	Increased intensity of extreme rainfall events	Increased rainfall leading to rise of groundwater, increase in salinity and reduced durability of materials.	Direct	No inherent design or operational adaptation	D			2					2	LOW - 2D	D			2					2	LOW - 2D	X	X	X	X	X		Potential for coatings systems or increased cover of reinforced in concrete structures if evidence of increased salinity is protable and assessment of strucutres durbability iis instructed. TBC at detailed design.	D			2					2	LOW - 2D	D			2					2	LOW - 2D
IR CCR 28	Increased intensity of extreme rainfall events	Increased rainfall intensities leading to greater discharges, which leads to increased hydraulic impacts (e.g. afflux) on adjacent properties	Direct		C				2	2	2		2	LOW - 2C	B				3	3	3		3	HIGH - 3B	X	X	X	X	X	Insurance only valid if not foreseeable so premiums will likely then go up, may need to renegotiate. Reassess rainfall data and re-run models to check what impacts are now likely to affect adjacent properties (number of properties in the 1% AEP floodplain may change).	Flood assessment completed to demonstrate afflux, velocity and hazard are compliant against the impact criteria to minimise site risks where possible.	D				2	2	2		2	LOW - 2D	C				3	3	3		3	MED - 3C
IR CCR 29	Decrease in average rainfall	Structural deterioration, soil subsidence, erosion, movement and cracking as a result of increased variability of periods of wetting and drying, reducing integrity of tracks, bridges, embankments and signalling infrastructure with potential structural failure	Direct	Basis of design Real time monitoring of track conditions	E		4	3					4	LOW - 4E	D		4	3					4	MED - 4D	X	X	X	X	X	Ensure real-time monitoring of track conditions is maintained and future monitoring technology is considered to mitigate this risk.	ARTC to carry out asset maintenance regime.	E		4	3					4	LOW - 4E	D		4	3					4	MED - 4D

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						Safety	Assets	Financial	Environmental	Regulatory	Reputational	Schedule	Max Consequence			Safety	Assets	Financial	Environmental	Regulatory	Reputational	Schedule	Max Consequence										Safety	Assets	Financial	Environmental	Regulatory	Reputational	Schedule	Max Consequence		Safety	Assets	Financial	Environmental	Regulatory	Reputational	Schedule	Max Consequence	
IR CCR 30	Decrease in average rainfall	Structural deterioration, soil subsidence, erosion, movement and cracking as a result of increased variability of periods of wetting and drying causing increases in monitoring and maintenance programs	Direct	Basis of design Real time monitoring of track conditions	C			2				2	LOW - 2C	B			2				2	MED - 2B	X	X	X	X	X	Ensure real-time monitoring of track conditions is maintained and future monitoring technology is considered to mitigate this risk.	Routine inspections to be undertaken throughout operation in accordance with ARTC standards.	C			2				2	LOW - 2C	B			2				2	MED - 2B
IR CCR 31	Increase in extreme weather events and storms	Damage to tracks/siding, electrical, communications infrastructure and other structures due to higher wind speeds and falling debris requiring repair and/or replacement and an increase in capital costs	Direct	Vegetation management Extreme weather redundancies	C			2				2	LOW - 2C	C			3				3	MED - 3C	X	X	X	X	X		Assets to be in protective enclosures where necessary. Wind loading (AS1170) standard incorporated in design and sesnsitivty assessment to be undertaken with provided climate change projections. Landscape/civil scope to limit extent of objects that have potential to become falling debris (detailed design to consider).	D			2				2	LOW - 2D	C			3				3	MED - 3C
IR CCR 32	Increase in extreme weather events and storms	Storm events resulting in closure of rail line (due to damage to communications equipment., for safety purposes or loss of power supply/increased frequency and duration of power outages) with subsequent delays	Direct/Indirect	Monitoring and responding to extreme weather events procedure Land form procedure Run under degraded conditions as per ARTC standards	D		3					3	LOW - 3D	C		3					3	MED - 3C	X	X	X	X	X		Not applicable to design	D		3					3	LOW - 3D	C		3					3	MED - 3C
IR CCR 33	Increase in extreme weather events and storms	Storm events and subsequent higher winds resulting in derailment (loss of freight, rolling stock, cessation of operation) including damage to infrastructure	Direct/Indirect	Monitoring and responding to extreme weather events procedure Run under degraded conditions as per ARTC standards	D		3	3			2	3	LOW - 3D	C		3	3			2	3	MED - 3C	X	X	X	X	X		Not applicable to design	D		3	3			2	3	LOW - 3D	C		3	3			2	3	MED - 3C
IR CCR 34	Increase in extreme weather events and storms	Structural integrity of construction materials may be affected by extreme wind speeds.	Direct		D		2	2				2	LOW - 2D	D		2	2				2	LOW - 2D	X	X	X	X	X		TBC with structural engineer for wind loading and inclusion of climate change conditions in standards applied at detailed design stage. Wind loading (AS1170) standard incorporated in design and sesnsitivty assessment to be undertaken with provided climate change	D		2	2				2	LOW - 2D	D		2	2				2	LOW - 2D
IR CCR 35	Harsher fire-weather conditions	Smoke from bushfires limiting visibility resulting in increased risk of freight disruptions and/or cancellations	Direct	Monitoring and responding to extreme weather events procedure Run under degraded conditions as per ARTC standards	D		2					2	LOW - 2D	C		2					2	LOW - 2C	X	X	X	X	X		Not applicable to design	D		2					2	LOW - 2D	C		2					2	LOW - 2C
IR CCR 36	Harsher fire-weather conditions	Bushfire damaging rail infrastructure including trackside infrastructure (e.g. signals, communications equipment requiring increased operational costs)	Direct	Material durability Standards and type approvals (e.g. bury pipes not above ground) Vegetation management	D			3				3	LOW - 3D	C			3				3	MED - 3C	X	X	X	X	X		Designed in protective enclosures where necessary. Landscape/civil scope to limit extent of objects that have potential to increase bushfire danger for assets (detailed design phase to confirm).	E			3				3	LOW - 3E	D			3				3	LOW - 3D
IR CCR 37	Harsher fire-weather conditions	Risk to health and safety of staff working along the rail corridor due to inhalation of bushfire smoke and proximity to flames	Direct	Pre work brief Monitoring and responding to extreme weather events procedure	D	2						2	LOW - 2D	C	2						2	LOW - 2C	X	X	X	X	X		N/A to Design scope. Operational procedure to cover	D	2						2	LOW - 2D	C	2						2	LOW - 2C
IR CCR 38	Harsher fire-weather conditions	Bushfire events leading to damage to power supply infrastructure or a need to cut supply resulting in interruptions to power supply (particularly signalling and communications equipment) with increased frequency and duration of power outages	Indirect	Redundancies built in	D		3					3	LOW - 3D	C		3					3	MED - 3C	X	X	X	X	X		N/A to Design scope, ARTC in control of signalling and comms controls. Operational procedure to cover	E		3					3	LOW - 3E	D		3					3	LOW - 3D
IR CCR 39	Harsher fire-weather conditions	Bushfire event resulting in surrounding community using the rail corridor as access/egress	Indirect	Under direction of EMS	D		2				2	2	LOW - 2D	C		2				2	2	LOW - 2C	X	X	X	X	X		Not applicable to design	D		2				2	2	LOW - 2D	C	2				2	2	LOW - 2C
IR CCR 40	Harsher fire-weather conditions	Bushfire events resulting in closure of surrounding road network, impacting emergency access, rescue, community evacuation or maintenance	Indirect	Existing risk	E	4					4	4	LOW - 4E	E	4					4	4	LOW - 4E	X	X	X	X	X		Not applicable to design	E	4					4	4	LOW - 4E	E	4				4	4	LOW - 4E

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IR CCR 41	Harsher fire-weather conditions	Bushfire event along the Inland Rail corridor resulting in stoppage of freight along the rail and subsequent severing of community evacuation and CFA access/egress points	Indirect	Existing risk Monitoring and responding to extreme weather events procedure Under direction of EMS (signalling equipment is fire resistant) Reducing severance in considered in basis of design	D		4						4	MED - 4D	C		4						4	HIGH - 4C	X	X	X	X	X	Expand early warning network for fire (currently mainly used for flood). Trains advised to not leave major centres and if no assessment is possible then the network is shut down (more difficult in fire due to uncertainty of fire behaviour, this should improve with time with real-time data collection). Grade separations in high risk areas (over bridge).	Not applicable to design	D		4						4	MED - 4D	C		4						4	HIGH - 4C
IR CCR 42	Harsher fire-weather conditions	Bushfire event along the Inland Rail corridor resulting in stoppage of freight along the rail and subsequent impacts on customers good not being delivered	Indirect	Monitoring and responding to extreme weather events procedure Under direction of EMS (signalling equipment is fire resistant)	C						2		2	LOW - 2C	B						2		2	MED - 2B	X	X	X	X	X		Not applicable to design	C						2		2	LOW - 2C	B							2	2	MED - 2B
IR CCR 43	Multi-hazard (flooding and warmer days)	Changing climatic conditions leading to the spread of weeds and water-bourne pathogens, reducing the productivity of farms and subsequently the demand for ARTCs services	Indirect	Agronomist assessment	C			1					1	LOW - 1C	B			1					1	LOW - 1B	X	X	X	X	X		Not applicable to design	C			1					1	LOW - 1C	B			1					1	LOW - 1B