Summary

ILLABO TO STOCKINBINGAL
ENVIRONMENTAL IMPACT STATEMENT

ARTC | INLAND RAIL
An Australian Government Initiative

COVER IMAGE
The level crossing where the existing Stockinbingal to Forbes rail line meets Burley Griffin Way.

ACKNOWLEDGEMENT OF COUNTRY

Inland Rail acknowledges the Traditional Custodians of the land on which we work, and pay our respect to their Elders past, present and emerging.

Certification

This Environmental Impact Statement has been prepared under Part 5, Division 5.2 of the Planning and Assessment Act 1979 (NSW) and in accordance with Part 8, Division 5 of the Environmental Planning and Assessment Regulation 2021.

Environmental Impact Statememnt prepared by:

Project	**Inland Rail (Illabo and Stockinbingal)**
Name	Paul Greenhalgh on behalf of WSP Australia Pty Ltd
Qualifications	Bachelor of Science, Agricultural and Environmental Science Masters of Science, Town and Country Planning
Address	Level 27, Ernst & Young Centre 680 George Street Sydney NSW 2000
Proponent Name and address (the proponent)	Melvyn Maylin Project Director, Inland Rail Australian Rail Track Corporation Level 16, 180 Ann Street, Brisbane QLD 4000
Proposed development	A single-track standard-gauge railway between the towns of Illabo and Stockinbingal in NSW with an extent of about 42.5 km, including a 39 km of new, greenfield section. The new rail line and associated facilities are to accommodate double-stacked freight trains up to 1,800 metres (m) long and 6.5 m high. Includes tie-in points at Illabo and Stockinbingal, a crossing loop and maintenance siding of around 2.2 km long and track turn-outs at eight locations.
Land to be developed	Land within the Junee and Cootamundra–Gundagai Regional Local Government Areas, as described within this Environmental Impact Statement.
Environmental impact statement	This Environmental Impact Statement addresses all matters specified in accordance with Division 5.2 of the (NSW) Environmental Planning and Assessment Act 1979 and Part 8, Division 5 of the (NSW) Environmental Planning and Assessment Regulation 2021.
Declaration	I certify that I have prepared this Environmental Impact Statement in accordance with the Secretary's Environmental Assessment Requirements (SSI 9406) dated 30 April 2021 and the relevant provisions of Schedule 2 of the (NSW) Environmental Planning and Assessment Regulation 2021. This Environmental Impact Statement contains all available information that is relevant to the environmental assessment of the infrastructure to which the statement relates. To the best of my knowledge, the information contained in the Environmental Impact Statement is neither false nor misleading.
Signature(s)	
Name	Paul Greenhalgh
Date	29 August 2022

Summary

Introduction

The Australian Government has committed to building 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 km of existing track, mainly in western NSW
- providing about 600 km of new track in northern NSW and south-east Queensland.

Australian Rail Track Corporation (ARTC) manages the existing freight rail network in NSW and is responsible for the delivery of the Inland Rail program. Inland Rail has been divided into 13 projects, one of which is the construction of a greenfield section of rail between Illabo and Stockinbingal, and connection to the existing rail network at Illabo and Stockinbingal, in order to accommodate the requirements of Inland Rail ('the proposal') (see Figure S-1). This Environmental Impact Statement (EIS) addresses the potential impacts of the construction and operation of the proposal.

This EIS has been prepared to support ARTC's application for approval of the proposal in accordance with the requirements of Division 5.2 of the Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act). The EIS addresses the environmental assessment requirements of the Secretary of the (then) NSW Department of Planning, Industry and Environment (DPIE) (now the Department of Planning and Environment (DPE)) (the SEARs) issued on 30 April 2021.

The proposal was declared to be Critical State Significant Infrastructure (CSSI) in 2021. The proposal is listed in Schedule 5, Clause 7 (1C) of the State Environmental Planning Policy (Planning Systems) 2021 and is subject to approval by the NSW Minister for Planning. The proposal was determined to be a controlled action under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (EPBC Referral 2018/8233) and requires approval from the Australian Government Minister for the Environment. The EIS focuses on the key assessment requirements specified by the SEARs and addresses matters required by the EPBC Act. It is supported by specialist technical assessment reports.

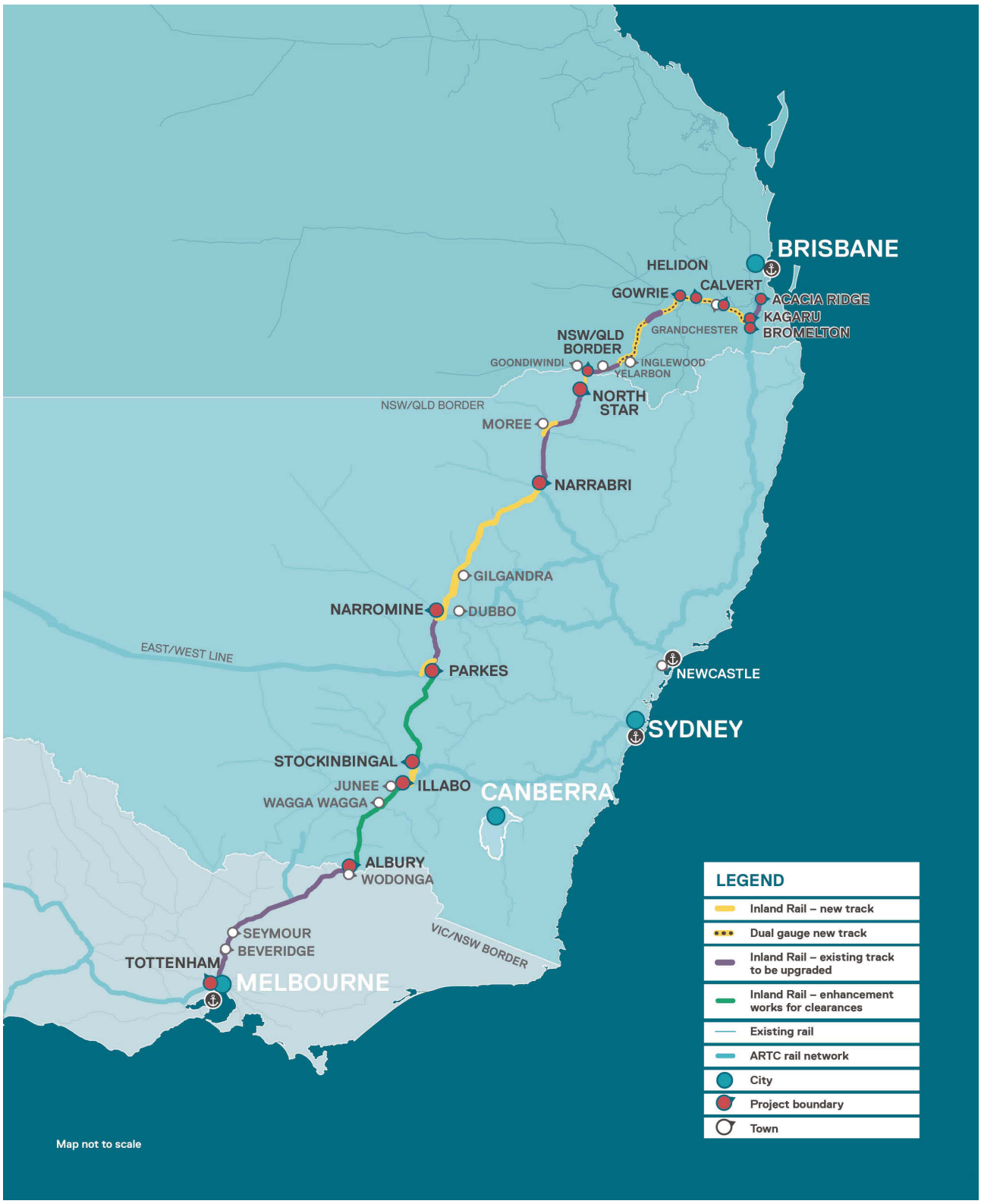


FIGURE S-1: PROPOSED ALIGNMENT FOR INLAND RAIL

Objectives

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/bulk rail freight
- increase productivity that will benefit consumers through 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.

The objectives of the proposal are to:

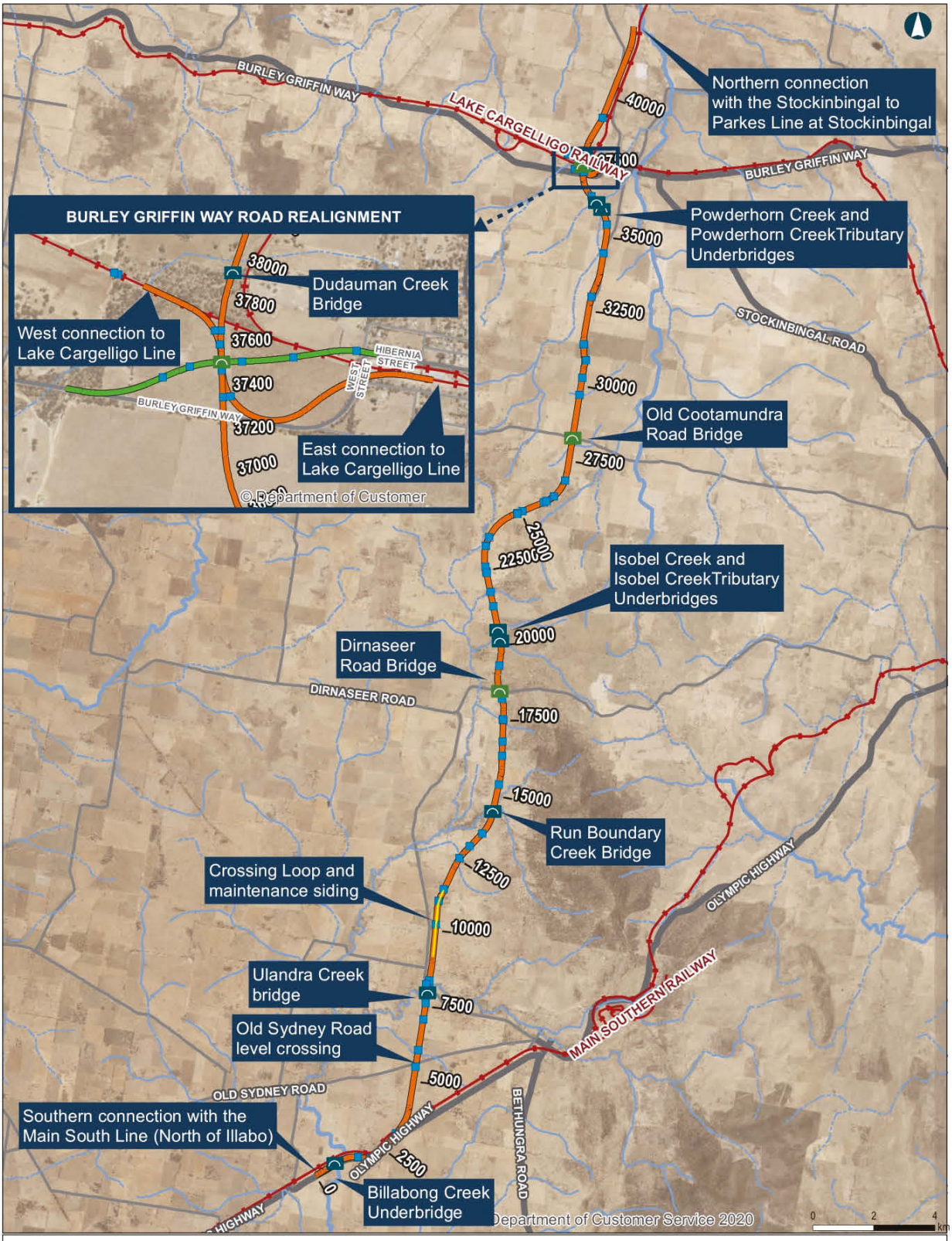
- provide a direct route from the Main South Line east of Illabo, to Stockinbingal and then to the existing Stockinbingal to Parkes Line
- improve reliability and travel times, by reducing the total distance travelled by 23 km and avoiding the Bethungra Spiral.

Proposal overview

The key features of the proposal, which would be confirmed during detailed design, include:

- a total extent of about 42.5 km, including about 39 km of new, greenfield railway between Illabo and Stockinbingal, including:
  - single track standard gauge on a combination of existing ground level, embankments and in cuttings
  - eight new bridges at watercourses, two road overbridges and one grade separated (road-over-rail) at Burley Griffin Way
  - one crossing loop and associated maintenance siding
  - construction of new level crossings and alterations of existing level crossings (at public roads and private accesses)
  - stock crossings to allow for the movement of livestock and vehicles across the rail line
  - one major drainage diversion to collect and transport stormwater away from the rail line
  - installation and upgrade of about 88 cross drainage culverts below the rail formation and 27 longitudinal drainage culverts below level crossings
- upgrades to about 3 km of existing track for the tie-in works to the existing Main South Line at Illabo, and the Stockinbingal to Parkes Line at Stockinbingal
- construction of about 1.7 km of new track to maintain the existing connection of the Lake Cargelligo rail line either side of the proposal
- realignment of a 1.4 km section of the Burley Griffin Way to provide a road-over-rail bridge at Stockinbingal.
- realignment of Ironbong Road to allow for safe sight lines at the new active level crossing.
- one workforce accommodation camp.

Key features of the proposal are shown in Figure S-2.



Key features of proposal

- New track/track upgrade
- 40950 Chainage (distance in metres from southern limit of the proposal)
- Burley Griffin Way Road realignment
- Crossing Loop & Maintenance Siding
- Bridge (watercourse crossing)
- Bridge (road crossing)
- Culvert

Existing features

- Sub-arterial road
- Arterial road
- Existing rail
- Major watercourse
- Minor watercourse

S.2 Key features of the proposal

Coordinate System: GDA 1994 MGA Zone 55
Date: 5/13/2022 Paper size: A4 Scale: 1:25,000

Illabo to Stockinbingal Data Sources: LPI, IRDJV, ARTC

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Timing

Subject to approval, further design, and procurement, construction of the proposal is planned to start in mid-2024 and is expected to take about 24 months, with completion in mid–late 2026. The stages of the proposal's timeline are presented in Figure S-3.

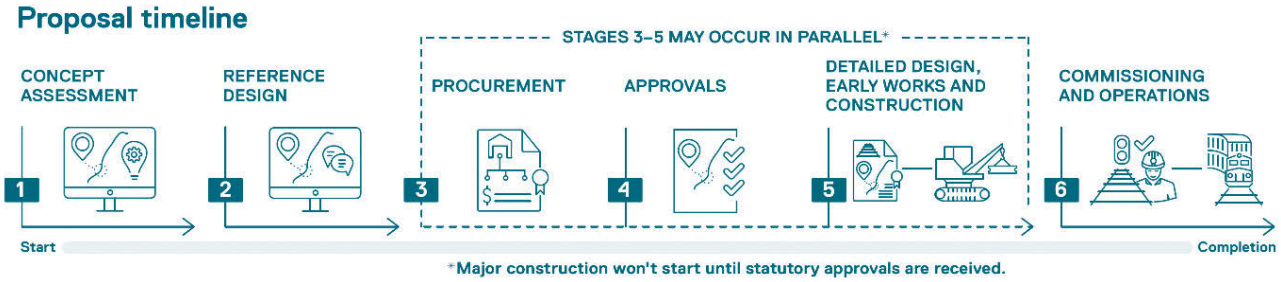

FIGURE S-3: PROPOSAL TIMELINE

Construction hours

The proposed construction hours have been developed to accommodate the remote location of worksites and to provide for efficient use of the workforce, as follows:

- general construction hours of 6.00 am to 600 pm, Monday to Sunday.

However, some works may also be undertaken outside the Interim Construction Noise Guideline (ICNG) standard construction hours. Works outside of the ICNG standard hours would be minimised in the vicinity of sensitive receivers, where practicable.

The proposal would require 60-hour rail possessions where works would impact the operation of existing rail lines, at the southern and northern connections. ARTC is currently planning these works for March 2025 and March 2026 respectively.

Operation

The proposal would form part of the rail network managed and maintained by ARTC. Freight rail services would be provided by a variety of operators and would run 24 hours per day on this part of the rail network, with trains up to 1,800 metres (m) long.

Based on demand forecasting, it is estimated the Illabo to Stockinbingal section of Inland Rail would be trafficked by an average of 6 trains per day (in both directions) from commencement of operations in late 2026 increasing to about 11 trains per day (in both directions) by 2040. The new rail line would be a faster, more efficient route that bypasses the Sydney rail network and would enable the use of double-stacked trains (up to 6.5 m high) along its entire length.

Standard ARTC maintenance activities would be undertaken during operations. Typically, these activities include minor maintenance works, such as bridge and culvert inspections, rail grinding and track tamping, through to major maintenance, such as reconditioning of track and topping up of ballast as required. Maintenance activities would continue in accordance with the existing environment protection licence (EPL) that applies to the rail corridor (EPL 3142).

Need for Inland Rail

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 products.

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 for Inland Rail, including a 'do nothing' alternative. Without action, key transport links would continue to experience increasing capacity constraints and congestion as a result of inadequate infrastructure.

The key overall benefits of Inland Rail, as illustrated in Figure S-4 are:

- **boost the Australian economy**—Inland Rail is expected to boost Australia's gross domestic product (GDP) by $16 billion over the next 50 years
- **create jobs**—Inland Rail 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 its entire construction period
- **improve connections within the national freight network**—Inland Rail would enhance the National Land Transport Network by creating a rail linkage between Parkes in NSW and Brisbane, providing a connection between Queensland and the southern and western states
- **provide better access to and from our regional markets**—Inland Rail would make it easier to connect farms, mines, cities and ports to domestic and international markets. Two million tonnes (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 inter-capital freight travelling between Melbourne and Brisbane would be reduced by $10 per t
- **offer better transit time and reliability**—Inland Rail would offer transit time of less than 24 hours between Melbourne and Brisbane terminals and 98 per cent reliability matching current road levels
- **increase the capacity of the transport network**—Inland Rail would increase capacity for freight and passenger services by reducing congestion along the busy coastal rail route and allowing for growth in passenger services. There would be additional train paths for freight (160 round train paths per week)—a 105 per cent increase on current freight paths on the coastal route alone. It would particularly free up capacity on Sydney's rail network for more passenger and freight services and would remove 200,000 truck movements (5.4 billion net tonne kilometres of freight) from roads each year from 2049–50
- **reduce distances travelled**—with Inland Rail, the rail distance for freight between Melbourne and Brisbane would be reduced by 200 km and the distance between Brisbane and Perth, and Brisbane and Adelaide would be reduced by 500 km
- **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 regional towns (based on a 2050 estimate)
- **provide an alternative north–south freight link**—Inland Rail would provide an alternative north–south freight path to counter weather, climactic or other disaster disruption to the transport network
- **promote complementary supply chain investments**—Inland Rail would be a catalyst for complementary private sector investments, such as fleet upgrades, new metropolitan and regional terminals, and integrated freight precincts.

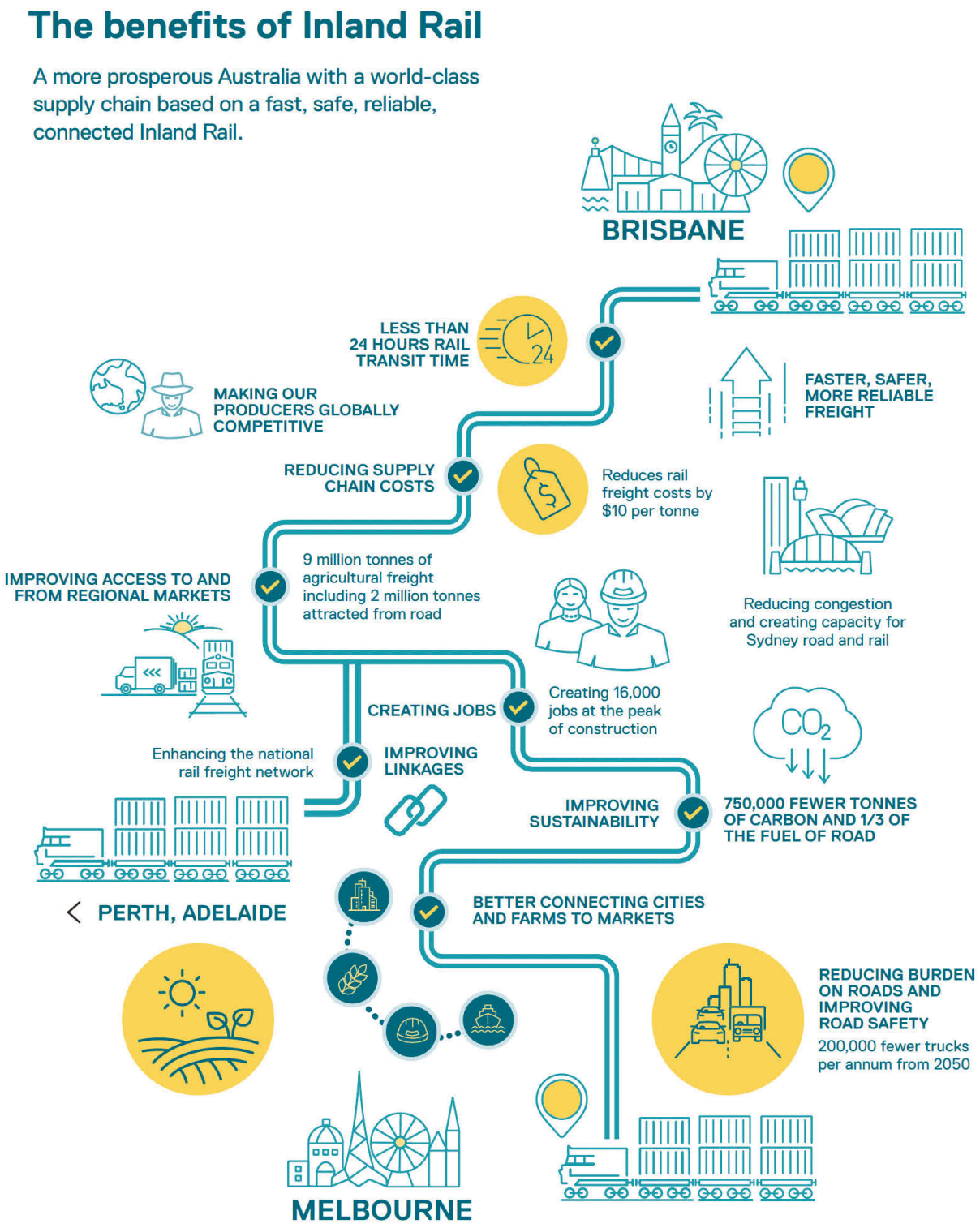

FIGURE S-4 KEY BENEFITS OF INLAND RAIL

Need for the proposal

The Illabo to Stockinbingal section of the Inland Rail route reduces the total route distance by 23 km with a direct link from the Main South Line at Illabo to the Stockinbingal to Parkes Line at Stockinbingal, bypassing Cootamundra. This new route creates a shorter travel time between these two points, which contributes to Inland Rail achieving a Melbourne to Brisbane transit time (terminal-to-terminal) of less than 24 hours.

The proposal avoids the Bethungra Spiral, which imposes height and grade constraints and, as a result, the proposal:

- avoids significant grades and height clearance constraints
- accommodates a train length of 1,800 m and double stacking, which is a key requirement of the Inland Rail train specifications.

Furthermore, the 2015 Inland Rail Implementation Group report named the Illabo to Stockinbingal alignment as one of the key missing-link projects in NSW for the successful implementation of Inland Rail.

Alternatives considered

Alternative routes for Inland Rail as a whole were initially considered in the North–South Rail Corridor Study Executive Report (Department of Transport and Regional Services, 2006). Four potential corridor options were identified within a 'north–south rail corridor'.

The far western corridor option was preferred as it provides the shortest transit distance from north to south of the sub-options considered, while also avoiding the congested Sydney metropolitan area. The far western sub-corridor has the least amount of developed land and has generally fewer environmental limitations compared to the other sub-corridor options.

Further options analysis was completed as outlined in the *Melbourne–Brisbane Inland Rail Alignment Study* (ARTC, 2010) (IRAS). The purpose of this study was to determine the optimum alignment, economic benefits and likely commercial success of a new inland railway between Melbourne and Brisbane. The shortlisted options in this study for the Melbourne to Parkes section of the alignment were:

- via Albury, using existing track from Melbourne to Parkes (with a possible new direct line from Junee or Illabo to Stockinbingal, bypassing Cootamundra)
- via Shepparton, using the existing broad-gauge Mangalore–Tocumwal line via Shepparton, the disused standard-gauge line to Narrandera, and a new direct connection through to near Caragabal, before re-joining the existing line to Parkes.

The shortlist of route options was subjected to more detailed technical, financial and economic assessment. Evaluation of the options involved consideration of environmental and land issues, railway operations, engineering assessments and capital cost estimates. The final preferred alignment between Melbourne and Parkes included 670 km of existing track and 37 km of new track on a greenfield alignment from Illabo to Stockinbingal, bypassing Cootamundra and the Bethungra spiral.

ARTC investigated a number of options were identified, broadly between Junee and Stockinbingal and Illabo to Stockinbingal. The 'base case' option considered included using the existing rail corridor between Junee and Stockinbingal (via Cootamundra), with no upgrades. This option was discounted because it would not provide for double-stacked container operations, a key service objective for Inland Rail. Constraints between Illabo and Cootamundra, including the Bethungra Spiral, the rail grade and structure clearance constraints also resulted in significant impacts to travel time.

The other options considered comprised:

- a greenfield route directly from Junee to Stockinbingal (Option A)
- utilisation of existing rail from Junee to Illabo, and a greenfield route from Illabo to Stockinbingal (Option B)
- utilisation of the existing rail corridor from Junee to Stockinbingal (via Cootamundra), including upgrade of the existing rail to achieve Inland Rail standards (Option C).

Option C was determined to be the poorest performing option as it shared many of the disadvantages of the base case. Option B (utilisation of existing rail from Junee to Illabo, and a greenfield route from Illabo to Stockinbingal) was favoured because it reduced the extent of greenfield development and associated environmental and property impacts relative to Option A. Therefore, Option A was discounted due to potential environmental and property impacts associated with the extended length of greenfield alignment, and Option B alignment was therefore progressed for further option assessment.

The Junee to Stockinbingal options are summarised in Figure S-5.

	BASE CASE Junee-Cootamundra-Stockinbingal existing corridor		OPTION A Junee-Stockinbingal Direct Greenfield		OPTION B Junee-Illabo-Stockinbingal (Brownfield and Greenfield)		OPTION C Junee-Cootamundra-Stockinbingal existing corridor with extensive deviations	
Distance	95km		60km 35km shorter		67km 28km shorter		87km 8km shorter	
Transit Time	79 min		39 min 40 min saving		45 min 34 min saving		62 min 17 min saving	
Double stack	No		Yes		Yes		Yes	
Construction Cost	$0m (for relativity)		+$150m		+$140m		+$680m	
Environmental and Land impact	Base Case		Major – 60km of greenfield		Moderate – 39km of greenfield		Moderate – 32km of deviations	
Overall								
Recommended					✓			

Favourable
Neutral
Unfavourable
Highly unfavourable

FIGURE S-5 JUNEE TO STOCKINBINGAL OPTIONS (INLAND RAIL ROUTE HISTORY SUMMARY 2016–2020)

Engagement

ARTC approached consultation with the purpose to raise awareness about Inland Rail and the proposal, understand community and stakeholder issues, and obtain important feedback to help shape the proposal's route, design, and environmental assessment. A range of tools were used including a website, emails, phone calls, local media, social media channels and a mix of online and in-person sessions.

Community information sessions have been held since 2018 to provide information and collect feedback on the proposal. A Community Consultative Committee for Illabo to Stockinbingal was established in February 2019 to provide a forum for the discussion between the ARTC and representatives of the community, stakeholder groups and the local council on issues directly relating to the proposal. Meetings with landowners potentially directly impacted by the proposal started in 2016 to discuss land access, property requirements, and temporary land occupation.

ARTC is committed to identifying and preserving Aboriginal cultural heritage during all stages of the proposal's delivery cycle. ARTC is working collaboratively with Aboriginal parties in proposal areas where there is the potential to identify cultural heritage items.

Consultation to date has contributed to the project team's understanding of the potential impacts of the proposal and influenced the design to respond to and minimise potential impacts, where practicable. The reference design process is iterative and dependent on rigorous engineering and ongoing stakeholder engagement and has involved iterations and refinements at each stage.

Examples of how the proposal has incorporated community feedback include, but are not limited to:

- areas of existing vegetation were avoided as far as practicable
- during design refinement, the alignment adjacent to the Olympic Highway at Illabo was updated to use the existing rail corridor, which significantly reduces earthworks by removing the need to cut through the hill. This approach improves outcomes for previously impacted landowners by reducing land severance, upgrading the current level crossing, and removing the need for an additional level crossing
- the alignment was changed to preserve and protect a scar tree identified during investigations and planning
- the alignment was changed at Stockinbingal Junction to reduce a large cutting through the hill, but still provides the 140,000 cubic metres necessary to construct the Burley Griffin Way Overpass. Using this locally sourced material improves environmental outcomes by removing long distance haulage
- the design at Stockinbingal Junction removes significant impacts to existing waterways and reduces the number of culverts and bridges required.
- at Stockinbingal, the alignment approaching from the south takes account of feedback resulting in a reduced number of irregular shaped severances to farming lots and reducing the impact on farming operations

- clearances of rail bridges over public roads have been designed to be a minimum of 5.5 m vertical clearance to allow agricultural machinery to pass under the bridges safely, following consultation with Junee Shire Council and NSW Farmers
- bridge abutments on private property have been shortened (where reasonable and practicable) to minimise impacts on farming operations at the request of landowners to provide increased access
- during detailed refinement the alignment changed from a rail bridge over the existing Burley Griffin Way to a road-over-rail bridge, which significantly reduces visual amenity impacts to the town of Stockinbingal. The new proposed Burley Griffin Way over the rail also removes an existing level crossing in Stockinbingal
- the reference design modifies sections of the alignment vertically and horizontally, significantly reducing bulk earthworks across the proposal
- the design of the public level crossing at the Ironbong Road road–rail interface was improved to significantly reduce the rail embankment on either side of the road, decreasing necessary earthworks and reducing the visual impact on the natural landscape
- based on landowner feedback during early consultation (2016–18) the alignment was placed to minimise noise and property impacts (including severance)—examples include the alignment being placed at the base of the Bethungra Range and adjacent Ironbong Road
- across the Illabo and Stockinbingal alignment, the reference design reduces the impact on established vegetation, including threatened ecological communities north of Illabo and alongside Isobel Creek
- reduction of earthworks equates to shorter construction duration, fewer environmental impacts, improved visual amenity, a smaller footprint and better budget outcomes
- to minimise impacts on properties, construction areas would be accessed via existing roads, together with the proposed haul roads within the proposal site
- the crossing loop and Rail Maintenance Access Road (RMAR) was changed from west side of the alignment at request of the Rural Fire Service (RFS) and Junee Shire Council to improve emergency fire access to the Bethungra ranges
- to minimise operational impacts on landowners, stock underpasses were added where reasonable and practicable.

The EIS will be placed on public exhibition by DPE and submissions will be invited from the community and stakeholders. When the exhibition period for the EIS has closed, ARTC will prepare a Submissions Report to provide a response to the submission received. If required, an Amendment Report or Preferred Infrastructure Report may also be prepared.

ARTC would continue to engage with stakeholders and the community in the lead up to, and during, construction.

Key findings of the EIS

Biodiversity

The potential for biodiversity impacts has been avoided or minimised during design development by providing bridges to preserve habitat with high biodiversity value, siting bridges to avoid riparian habitat, and avoiding areas that provide connectivity, where possible. The suitability and compliance of the proposed bridge designs with ARTC standards and fish-friendly crossing designs would be considered during detailed design, as far as practicable.

The landscape of the proposal site is predominately cleared and is already heavily fragmented due to agricultural practices, with existing habitat connectivity to remnant vegetation to the east and west limited to creek lines and road reserves.

To mitigate the potential impacts to biodiversity, a comprehensive Biodiversity Offset Strategy has been prepared in accordance with the *NSW Biodiversity Conservation Act 2016* (BC Act) and is set out in Technical Paper 1: Biodiversity Development Assessment Report. This strategy considers potential offset sites and opportunities to purchase biodiversity credits to offset the impacts of the proposal, according to the requirements for major projects under the BC Act, and to offset impacts on *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) matters.

During construction, the key potential impacts and proposed measures to address them are:

- The proposal would remove and/or disturb about 73 hectares (ha) of native vegetation, including 23.5 ha of Inland Grey Box Woodland threatened ecological community (TEC) and about 20 ha of White Box Yellow Box Blakely's Red Gum Woodland TEC. Both TECs are listed under the BC Act and the EPBC Act. White Box Yellow Box Blakely's Red Gum Woodland TEC is identified as a candidate serious and irreversible impact (SAII) entity, but the proposal would not result in SAII because the overall biodiversity value of this SAII entity has already been reduced through agricultural practices, fragmentation would not be significantly increased, direct impacts would be avoided further through detailed design, and indirect impacts would be managed through mitigation measures such as weed management protocols.
- The impact to TECs would affect areas used as foraging and breeding habitat for fauna species, including the loss of approximately 42 hollow-bearing trees and 58 scattered trees. In addition, a species credit obligation is required to offset the loss of about 60 ha of habitat for two of the threatened fauna species recorded and listed under the BC Act: the Superb Parrot and Squirrel Glider. A credit species obligation is also required for two more species, the Southern Myotis and Key's Matchstick Grasshopper, which have been assumed as present based on the presence of potential habitat, to offset the loss of about 8 ha and 31 ha of habitat, respectively. These impacts would be offset under the Biodiversity Offset Strategy.
- The construction of new watercourse crossing structures would be the main impact on aquatic ecological systems, including through the removal of about five hectares of riparian corridor (on sensitive waterfront land). Where possible, practices would be implemented to minimise disturbance of the banks. Bank stabilisation would also be undertaken after installation of water crossing structures as part of the rehabilitation strategy.

During operation, the key potential impacts and proposed measures to address them are:

- The proposal is likely to result in minor increases in localised fragmentation of regional wildlife patches along the watercourses and road reserves. This impact is considered unlikely to result in fragmentation on a regional or landscape scale. To mitigate these impacts, the proposal includes implementation of a fauna connectivity strategy, which would define fauna connectivity measures, including drainage structures, glider poles and barrier poles, and outline appropriate monitoring and reporting requirements.
- There would be risk of vehicle strike to fauna species such as the Squirrel Glider due to the presence of road and rail infrastructure and associated movement of trains and vehicles. Measures to enhance connectivity would also assist in minimising the potential for train-strike impacts.
- There is potential for debris during flooding to cause blockages to rail infrastructure and disrupt fish passage. To mitigate this impact, inspection and maintenance of rail infrastructure would occur in accordance with ARTC's standard operating procedures. The spread of exotic aquatic weeds such the recorded Spiny Rush (*J. acutus*) is potentially accelerated by constant passing of trains and maintenance vehicles. This would be mitigated through the implementation of standard weed management protocols for the operational rail corridor and other ARTC facilities.

ARTC is committed to minimising the impacts to biodiversity and opportunities to minimise these impacts would be investigated through further design development.

Traffic, transport and access

Potential traffic, transport and access impacts, including those raised during stakeholder and community consultation, were considered during design development. These related to road user safety on the road network and at level crossings, the need for access points to cross the rail corridor, traffic impacts to the surrounding road network and property impacts associated with land fragmentation and access.

Design has avoided/minimised potential impacts during construction, by:

- using the proposal site (construction corridor) to transport materials (primarily bulk earthworks) as far as possible and by minimising the amount of material transported on the public road network.
- winning material within the construction site to minimise need to import material
- minimising temporary road closures and diversionary routes.

Design has avoided or minimised potential impacts during operation, by:

- maintaining public road network through a combination of level crossings and grade separated crossings at road–rail interfaces
- minimising severance of private land through the installation of private level crossings and stock underpasses in consultation with landowners
- improving road safety with the removal of a level crossing by providing a road-over-rail grade separation for the interface of the proposal with Burley Griffin Way, an important state highway.

The proposal is located between sections of existing rail line, which carry freight and passenger trains. Existing traffic activity in proximity to the proposal site is low.

During construction, the key potential impacts and proposed measures to address them are:

- The proposal has the potential to impact road safety from increased road use and turning movements at intersections and construction site access gates. There would be no significant traffic impacts associated with the proposal as the road network and intersections are sufficient to cater for the estimated construction traffic without an unacceptable impact on level of service. To mitigate impacts, as part of pre-construction, Road Safety Audits (RSAs) and a risk assessment would be undertaken by the construction contractor to ensure the safety of all road users. Local Land Services would be notified of increased heavy vehicle movements along livestock highways during the construction phase, as well as periods of changed traffic operations.
- There may be temporary delays to local and regional traffic due to road closures and diversions in the vicinity of the proposal site, with temporary diversionary routes for proposed level crossings and bridges. This work would impact local roads with low traffic volumes; however, to realign Burley Griffin Way at Stockinbingal, the proposal would require the western end of Hibernia Street (which is Burley Griffin Way at this point) to be closed temporarily, with traffic diverted onto Dudauman Street and Troy Street. Input would be sought from affected residents and relevant stakeholders prior to this alternative route being established in accordance with the project-specific communication management plan. Consultation with relevant stakeholders would also be undertaken about the need to temporarily relocate the Stockinbingal bus stop during the temporary closure of Hibernia Street. Appropriate traffic control measures would be implemented where appropriate.
- Construction activities would require possessions where works may disrupt the operation of the existing rail lines. To mitigate any disruptions, the timing and duration of the possessions would be agreed with affected train operators, track stakeholders, and relevant government departments. It is assumed these activities would occur during existing scheduled track possession periods.

During operation, the key potential impacts are:

- There would be a permanent modification to the traffic and road network through the new Burley Griffin Way road bridge over the proposed rail alignment and the requirement for the existing Burley Griffin Way/Hibernia Street and Troy Street to be realigned. The realignment of Burley Griffin Way would have a positive impact on road safety by eliminating the existing level crossing in Stockinbingal and reducing travel times for residents and other road users.
- There is potential for an increase in travel times due to new public level crossings at Ironbong Road, Old Sydney Road and Corbys Lane, as well as at three unnamed roads, resulting in wait times associated with length and frequency of trains. It was found the introduction of level crossings would result in a vehicle delay by a maximum of 131 seconds (common to all crossings), considered negligible.
- Maintenance and repair vehicles accessing the proposal would generate minimal traffic and are not expected to impact the surrounding road network.

To address any impacts, measures including further consideration of the proposed road-rail interfaces, including consultation with the road asset owners and broader stakeholders, would be undertaken during design development.

Hydrology and flooding

The proposal is located within the upper reaches of the Lachlan and Murrumbidgee catchments and is not subject to regional flooding, with flooding only occurring within local catchments. The proposal intersects six named watercourses in addition to a number of unnamed tributaries: Billabong Creek, Ulandra Creek, Run Boundary Creek, Isobel Creek, Powder Horn Creek and Dudauman Creek. All watercourses intersected by the proposal are ephemeral, flowing only during significant rainfall events. Existing flooding from Dudauman Creek does impact the township of Stockinbingal, and flood levees have been constructed to mitigate these impacts.

During construction, there is potential for impacts to hydrology and flooding from general construction activities, and these would be considered typical for linear infrastructure projects. This includes the potential for construction activities, plant or equipment, and staging to obstruct or block the flow of water or surface water flow paths if not managed appropriately. Construction management measures, including further review staging of the construction works in the Dudauman Creek floodplain, will be completed during detailed design of the proposal.

Flood modelling has been undertaken to assess potential impacts during operation of the proposal in accordance with relevant guidelines and flood management planning documents. The modelling was used to understand the extent of impact and recommend appropriate mitigation measures. Once operational, the proposal has been designed to mimic the existing drainage and surface water flow conditions, including directing flows to topographic low points and existing watercourses. The proposal includes one minor drainage diversion within the Ironbong Creek catch, which diverts surface water flows about 600 m to the south.

Overall, the proposal is predicted to have only localised impacts to hydrology, flooding and geomorphic conditions. Where exceedances of the adopted criteria or quantitative design limits (QDL) are predicted to occur, they have been considered in the context of their impact on surrounding land uses and receivers, compared to existing conditions. The proposal is predominantly surrounded by agricultural land and impacts from QDL exceedances, including flood height (afflux), hazard and duration are minor and do not impact the use of this land, as impacts from flooding generally already occur in these locations. Further design and flood modelling would be undertaken during detailed design and further consideration would be given to mitigation of flooding impacts, including in consultation with affected landholders. Minor increases in velocity (for the speed of surface water flows) are also predicted to occur in areas outside the rail corridor within agricultural land, and measures such as erosion and scour protection will be implemented to mitigate these impacts, subject to further investigation. Consideration of the approach for managing these impacts is required during detailed design. The proposal does not worsen impacts from flooding to buildings, roads or existing rail lines, beyond impacts that occur in existing conditions, and predominantly results in an improvement in flood immunity.

Water quality

The proposal takes into consideration the need to minimise impacts on watercourses. Culverts and bridges for the proposal have been designed to maintain existing flow paths and prevent the formation of new flow paths, thereby reducing the potential for erosion and scour. There were no specific issues raised in relation to water quality during stakeholder and community consultation.

The watercourses crossed by the proposal are ephemeral and only have flow after large rainfall events. There are also 14 farm dams located within the proposal site.

During construction, the key potential impacts relate to the erosion and the generation of sediment. These impacts and the proposed measures to address them are:

- Excavation, earthworks and other construction activities could potentially lead to changed bed and bank conditions in watercourses and increased erosion, leading to greater volumes of sediment and pollutants entering watercourses. Mitigation for construction impacts would focus on erosion and sediment control measures, including specific measures and procedures for works within main watercourses, such as silt barriers and temporary creek diversions. These measures would be implemented in accordance with the Construction Environmental Management Plan (CEMP).
- Dewatering of farm dams that require relocation and/or decommissioning has the potential to input mobilised sediments into receiving waters. Dewatering of the farm dams would occur in accordance with a dedicated dam dewatering protocol, which would consider aspects such as the quality and quantity of water to be released, where relevant.

Implementation of the mitigation measures would ensure that construction of the proposal does not further degrade the water quality environment within and downstream of the proposal site, having regard for the NSW Water Quality Objectives.

During operation, the key potential impacts and proposed measures to address them are:

- New culverts and bridges have the potential to impact flow regimes within waterways and may lead to long-term changes in levels of dissolved oxygen, electrical conductivity, turbidity, nitrogen and phosphorus, with potential impacts to aquatic ecosystems. In addition to minimising impacts through design, culverts and bridges would be inspected to ARTC standards and maintained to address any issues that may contribute to the blockage of fish passage.

- The new road overpass over Burley Griffin Way has the potential to create pollutant runoff from the road and there is potential to release pollutants to watercourses, including sediment, chemicals and petroleum hydrocarbons from the maintenance and operation of trains and vehicles. Pollutant loading would be low as all exposed surfaces would be revegetated and maintenance would meet ARTC's standard operating procedures. A surface water monitoring framework would also be prepared to guide monitoring of water quality, including monitoring locations and frequency.

Consideration would continue to be given during detailed design to opportunities to mitigate changes to flow regimes and potential operational scour and erosion at culvert and bridge locations.

Groundwater

The proposal considers groundwater conditions to identify and avoid areas of high ecological importance, such as groundwater dependent ecosystems (GDEs), where possible.

Groundwater levels recorded in the groundwater study area ranged from 1.72 m below ground level (mBGL) to 20.47 mBGL. The groundwater sources are less productive alluvial and fractured rock aquifers based on the *NSW Aquifer Interference Policy* (DPI, 2012c) (AIP). There were also 55 registered groundwater bores (beneficial use mainly listed as monitoring) and eight GDEs identified within the study area. The impact to private bores was raised as an issue during stakeholder and community consultation and considered as part of the groundwater assessment.

During construction, the key potential impacts and proposed measures to address them are:

- Construction dewatering could result in an unacceptable impact to sensitive receptors. No groundwater 'take' is proposed for use as construction water supply; however, groundwater dewatering may occur during construction if excavations (cuts) or piling for bridge foundations intersect with the groundwater table. Construction works are not anticipated to intersect and/or penetrate the groundwater table; however, due to the localised topographic influences on the shallow fractured rock hydrostratigraphic units (groundwater systems), a low risk is still present. If there is unforeseen water table penetration by earthworks, potential impacts would be assessed by a hydrogeologist and adaptive management measures implemented, as required. The construction contractor would apply for a water access licence exemption prior to commencing any dewatering activity.
- Changes to soil moisture content may cause compression or settlement, including through groundwater take. The risk to settlement is low as cuts are not anticipated to intersect the regional groundwater table; however, appropriate drainage measures would be installed at the base of cuts and along high-walls to manage groundwater seepage in the unlikely event that the groundwater table is encountered.
- If contaminants infiltrate the groundwater, the impacts would be managed in accordance with a groundwater mitigation and management sub-plan, which would be implemented as part of the CEMP. This sub-plan would include a groundwater monitoring program.

During operation, the key potential impacts and proposed measures to address them are:

- Mobilisation of salts may cause an increase in groundwater salinity, which could affect sensitive receptors such as registered bores and GDEs. The risk of this impact remains low through avoidance by design as no additional drainage works or piling following construction is proposed and groundwater take is not proposed during operation.
- There could be impacts to groundwater recharge due to the presence of additional infrastructure and sealed surfaces and through seepage dewatering of cuts. To mitigate this impact, drainage measures would be maintained, where required, to manage ongoing groundwater seepage during operation. Any change would be negligible over the catchment area.

The assessment of the proposal's impacts on aquifers and GDEs according to the minimal impact considerations of the NSW Aquifer Interference Policy indicates the proposal complies with Level 1 criteria, which considers the potential impacts as acceptable.

Cultural heritage

The potential for cultural heritage impacts has been avoided or minimised during design development by avoiding known heritage items, such as scar trees, and including bridges to protect riparian areas with potential Aboriginal heritage sensitivity, as far as practicable.

Aboriginal cultural heritage

The proposal falls within the traditional lands of the Wiradjuri people. Consultation has been undertaken for the proposal in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010a). This consultation included participation by Registered Aboriginal Parties (RAPs) in the site

survey and the review of the proposal's draft Aboriginal cultural heritage assessment report. Consultation with other Indigenous stakeholders included Wagga Wagga and Young Local Aboriginal Land Councils (LALCs) (most recently Wagga Wagga LALC in December 2021) and Mawang Galway Elders Group (most recently in April 2022).

Results of desktop assessments, field surveys and test excavations identified 22 separate locations with Aboriginal heritage sensitivity, including four scar trees, in the study area (a corridor generally 250 m wide (with some variations) within which the proposal is generally located). No Aboriginal places are declared under section 84 of the *National Parks and Wildlife Act 1974* (NPW Act) in the vicinity of the proposal site.

Archaeological potential was determined to mainly coincide with the presence of watercourses—Billabong Creek, Ulandra Creek, Run Boundary Creek, Isobel Creek, Powder Horn Creek and Dudauman Creek—and is most likely to occur on low-gradient, well-drained landforms in close proximity to these water sources.

During construction, activities would result in direct impacts to 7 of the 22 Aboriginal sites from the disturbance of part, or all, of a heritage item or place, or changes to its setting.

Proposed measures to address these impacts include:

- Additional archaeological surveys and test excavation (if required) would be performed prior to the commencement of impact works at Zone 5 and 6 (which were unable to be surveyed physically) to confirm the precise nature and extent of the archaeological resource and appropriate mitigations. Parts of these zones were considered to have archaeological potential, that is, where watercourses and low-gradient, well-drained landforms intersect near Run Boundary Creek and Isobel Creek. Should work occur in these parts, further surveys would be required.
- An Aboriginal cultural heritage management plan would be prepared in consultation with RAPs and implemented as part of the CEMP. This plan would include:
  - a salvage methodology prepared by a suitably qualified archaeologist in consultation with RAPs
  - an unexpected finds procedure to provide a consistent method for managing any unexpected heritage or archaeological items.

During operation, no impacts to Aboriginal heritage are anticipated.

The proposal's development would continue to be informed by the consultation that has been undertaken for the proposal.

Non-Aboriginal heritage

Two non-Aboriginal heritage-listed items were identified within the proposal site: the Stockinbingal Railway Station and Stockinbingal Heritage Conservation Area. A significance assessment was not conducted as these items were deemed unlikely to be directly impacted by the proposal during construction or operation.

During construction, activities at these locations would be minimal and no direct impacts would occur to non-Aboriginal heritage listed items. Detailed design and construction planning would avoid direct impacts to these items/sites, as far as reasonably practicable.

During operation, the key potential impacts and proposed measures to address them are:

- The proposal could have indirect impacts (visual amenity, landscape and vistas) on listed heritage items as a result of a permanent change in their setting, from the presence of new infrastructure and the movement of trains. However, the permanent project works within the vicinity of the listed heritage items are limited to the upgrading of the level crossing at Dudauman Street, and no significant impacts to views to and from these heritage-listed items are anticipated, due to existing railway infrastructure.
- The proposal could have indirect vibration impacts on heritage structures, including Cohen's Trade Palace (CWA Rooms), Billabong Creek rail underbridge and the Stockinbingal Railway Station. Measures as considered in Chapter 16: Noise and vibration would minimise the potential for indirect impacts as a result of the proposal.

Noise and vibration

During construction, the key potential noise impacts along the greater portion of the alignment are transient (short term) and associated with equipment used during construction phase activities, such as dozers used during earthworks, a rail saw during track works, and piling rigs during road overbridges, underbridges and pavement works.

In the study area for the proposal, there are 152 residential, 8 non-residential (for example churches and schools), and 16 commercial and industrial receivers, all considered to be sensitive receivers. Most residential receivers are in Stockinbingal, east of the proposal site, including low-density residential dwellings.

Potential noise impacts include impacts on sensitive receivers from construction activities, particularly during work outside recommended standard working hours and from construction traffic.

For the anticipated levels of noise:

- Maximum noise level exceedances are predicted at residential receivers across all sections of the construction footprint, during the worst-case 15-minute periods when works are carried out during standard and out-of-hours work for most stages of the proposal. No exceedances of noise management levels are predicted for commercial, educational, active and passive recreation receivers.
- Residential receivers located along the western extent of Hibernia Street in Stockinbingal are expected to experience the greatest maximum noise level exceedances during construction, predicted to be around 45 dB above the sleep disturbance criteria during site establishment.
- Construction traffic on all public roads, except for Troy Street, would not cause adverse road noise impacts at sensitive receivers as traffic volumes were assessed to comply with relevant criteria for construction traffic noise levels. Troy Street is predicted to exceed trigger levels by 3 dB during the day period (7 am to 10 pm), where the closest residential receiver is located 25 m from the proposal site.

Proposed measures to address these impacts include:

- An alteration to working hours beyond the *Interim Construction Noise Guideline* (NSW Department of Environment, Climate Change and Water (DECCW), 2009) (ICNG) recommended standard hours to reduce the construction duration as far as practicable, minimising the overall time of associated disruptions to the community. An out-of-hours work protocol (OOWP) would be developed to define the process for considering, approving and managing OOHW. Implementation of feasible and reasonable 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 and communication requirements.
- The preparation of location and activity-specific construction noise and vibration impact statements during detailed design, based on more detailed understanding of construction methods and construction traffic, and detailed reviews of receivers as required.
- Implementing noise control measures, identified as part of a construction noise and vibration management plan in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework.

During operation, the key potential noise impacts are associated with the noise impacts on sensitive receivers from the movement of trains along the new rail line and from traffic on realigned sections of road.

For the anticipated levels of noise:

- For opening year 2026 and design year 2040, predicted rail noise levels would comply with relevant criteria, except for five residential receivers located at the northern and southern ends of the alignment where noise levels from locomotive passes exceed the night-time criteria by up to 3 dB in 2026 and 2040.
- Two non-residential receivers located in Stockinbingal (Stockinbingal Public School and St. Joseph's Catholic Church) would experience an exceedance of 1 dB and 2 dB above the internal noise criteria for these receivers, respectively (noting this was a conservative assessment as an external survey was applied to estimate internal noise levels).
- One residential receiver would be eligible for consideration of noise mitigation under the NSW Road Noise Policy (RNP) due to road noise impacts from the realignment of Burley Griffin Way being greater than 2dB(A) and exceeding the Noise Criteria Guidelines (NCG).

Proposed measures to address these impacts include:

- For residential receivers with predicted exceedances of noise levels, fair and reasonable options would be applied in accordance with the outcome of the operational noise and vibration review and the Inland Rail Noise and Vibration Strategy. These options could include at-property treatments, in consultation with the property owner.
- For non-residential receivers with predicted exceedance of internal noise criteria, further detailed investigations will be undertaken during detailed design to determine compliance at these locations and subsequent clarification and application of suitable measures, if there are still exceedances.
- The proposal would be operated with the aim of achieving the operational noise and vibration criteria identified by the operational noise and vibration review, the requirements of the conditions of approval, and the environment protection licence for Inland Rail.

Vibration

During construction, certain construction activities would require the use of vibration-intensive equipment, such as smooth and pad-foot vibratory rollers, which may affect the nearest sensitive receivers, including residential, Aboriginal heritage and non-Aboriginal heritage receivers..

Rail vibration levels at sensitive receivers external to the rail corridor would comply with criteria for human amenity and buildings (structural integrity and cosmetic damage). Vibration levels at heritage-listed structures are not predicted to significantly change from the existing levels currently experienced.

During operation, there may be human-comfort vibration (amenity) impacts on sensitive receivers due to the movement of trains along the new rail line. The assessment confirmed that beyond 13 m from the outer rail line track, the vibration criteria would be expected to be achieved at sensitive receivers. As no receivers are located within 13 m from the proposal, they would not be significantly affected by vibration due to train operation.

To address impact further, 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.

Blasting

During construction, blasting is proposed at multiple locations along the proposal site to remove rock in cuttings. Blasting would result in ground vibration and airblast overpressure leading to potential impacts on human comfort and annoyance and potential damage to structures.

A preliminary blasting assessment calculated the highest mass of explosive that would be able to be used and still meet the blasting overpressure or vibration limits at different ranges to the nearest sensitive receiver. To minimise the impacts from blasting:

- further blast design and assessment, including refinement of site conditions is to be carried out during detailed design when parameters relevant to the blasting program are understood
- blasting would be undertaken during the recommended standard hours for blasting
- monitoring would also be conducted at the nearest sensitive receiver and non-sensitive receiver as part of a blast management strategy.

With the implementation of mitigation measures, potential impacts from blasting would be within the blasting overpressure limits and would not significantly impact sensitive receivers.

Social and economic

Design development has avoided or minimised potential social and economic impacts, where practicable, by undertaking extensive consultation with all relevant stakeholders and designing the alignment to minimise the potential for amenity other social impacts.

Engagement with key stakeholders identified concerns regarding the potential impact of the proposal on community cohesion, severance between properties, disruption to movements across the rail corridor, disruption to families' links to land and local communities. Landowners potentially subject to property acquisition raised concerns about impacts on their wellbeing.

During construction, the key positive (benefits) and negative impacts are:

- Local social benefits would include employment (an estimated peak workforce of 425 people), training opportunities, and flow-on local and regional economic benefits.
- Local economic benefits would result from indirect employment, including stimulation of business along the supply chain during planning and construction for consulting services and procurement of construction materials.
- The proposal may negatively impact the amenity of the local community, and the inflow of the construction workforce would cause an increased demand in services, including for accommodation (one workforce accommodation camp would be required during construction).
- The proposal involves acquisition of private properties, which may cause adverse mental health impacts. There would also be amenity impacts, from increased levels of noise and visual impacts; and impacts to existing agricultural activities.

Proposed measures would seek to address the potential social impacts of the proposal and to maximise social benefits:

- a workforce accommodation camp (refer to Appendix I: Workforce accommodation camp assessment (Appendix I)) to avoid negative impacts on the local housing market
- f a proposal-specific local industry participation plan (including Indigenous participation), workforce management plan and a community wellbeing plan
- tracking performance of mitigation measures through a Social Impact Management Plan
- ARTC reporting on the delivery of mitigation measures to mitigate and enhance community benefits to impacted communities.

During operation, the key positive (benefits) and negative impacts are:

- Benefits on a national, state and regional level from the Inland Rail Program as a whole, include:
  - an expected boost to Australia's GDP by $18 billion over the next 50 years
  - improved national freight availability, freight time savings, operating cost savings, and improved reliability
  - improved state benefits in NSW including economic benefits engaging 587 contracts committed at a value more than $400 million
  - an increased workforce in NSW employing up to 980 full-time jobs
  - an increased gross regional product in NSW by up to $5.5 billion in the first 50 years of the rail line's operation
  - improved regional supply chain efficiencies in the Southern NSW region through reduced transport costs, greater access to suppliers and increased reliability
  - enhanced investment opportunities and supporting formation of industry hubs, including freight, logistics, operations and businesses in the Southern NSW region.
- Local benefits include:
  - a small number of maintenance employment positions
  - improved road safety from the realignment of Burley Griffin Way and removal of a level crossing
  - a legacy of upskilled workers from the construction phase who would be able to transfer their skills to other projects and contribute to economic development in the region.
- Negative impacts during the operation of the proposal would include changes to traffic movements and access, permanent change to the rural sense of place, changes to the existing visual amenity, and changes to existing levels of noise and vibration due to train activity.

Proposed measures would seek to address the potential social impacts of the proposal and to maximise social benefits as follows:

- a Community Investment Program would be implemented to explore with the local community ways to enhance aesthetic value, cultural heritage and community identity and cohesion across the social locality.
- a communication and engagement plan would be implemented to build community awareness of the rail corridor's operational characteristics, including information on level crossing operations, likely daily train movements and ARTC's ongoing role after construction.

The proposed implementation of a comprehensive approach to consultation, communication and environmental management during construction and operation, together with a rigorous monitoring program, would assist in minimising the potential for social and economic impacts.

Land use and property

Land use and property information has been considered in design development to inform the proposal location and construction methodology to minimise potential impacts. This has included undertaking consultation with potentially affected landholders and other stakeholders that influenced alignment decisions, and the location of level crossings and underpasses for stock and vehicles on private land to retain connectivity where practicable.

The proposal site consists primarily of agricultural properties between the residential townships of Illabo and Stockinbingal. Publicly available land use mapping (OEH, 2017) in conjunction with landowner consultation and investigations indicates land use within the study area is dominated by cropping and grazing modified pastures.

During construction, the proposal would require both permanent and temporary land requirements. The total land (permanent and temporary) required for construction of the proposal is 612 hectares with approximately 458 hectares comprising the permanent land requirement and around 154 hectares comprising the temporary land requirements for construction.

The removal of about 458 hectares of land from agricultural production would result in highly localised agricultural land use impacts. This scale of impact is not considered significant at a regional scale as the area temporarily affected is relatively small in the context of the regional agricultural industry.

Construction works and associated land requirements would have a range of potential impacts including:

- Impacts on agricultural land and land capability, depending on the different stages of construction.
- Farm severance where the new rail corridor or the realignment of Burley Griffin Way results in part of an overall farm being physically separated from the remainder of the farm (either temporarily or permanently). Subsequent realignment of paddocks could also affect the sustainability, productivity and profitability of individual paddocks that have previously been set up under specific farming systems.
- Temporary disruption to land use and property access along the construction corridor for construction areas, compounds, and haulage routes.
- Additional risks for the transport of livestock along the livestock highway as a result of construction traffic volumes on these roads and associated intersections.
- The permanent possession of land during construction would contribute to the permanent footprint of the new rail corridor.

Proposed measures would seek to address these impacts, where reasonable and practicable, as follows:

- Design and construction planning would continue to be refined to minimise potential impacts on land uses and properties, including measures to manage severance.
- Individual property agreements would be developed in consultation with landowners/occupants, with respect to the management of construction on or immediately adjacent to private properties.
- Access to individual residences, services and businesses, and for livestock across the rail corridor would be maintained during construction.

During operation, the proposal would require the permanent acquisition of private land. This is approximately 476.4 hectares acquired from 26 private landholders. Total permanent acquisition of public land (Crown land, Crown roads, Council roads and Transport for NSW roads) is approximately 12.6 ha. The total land requirement for permanent acquisition (489 hectares) is greater than the permanent land requirement (458 hectares) for the proposal as the land acquired involves whole lots that may be only partially required.

Operation would have a range of potential impacts including:

- Direct impacts on land use from the permanent land requirements and the presence of operational rail and road infrastructure within the operational footprint.
- Ongoing impacts on farm infrastructure and farming operations, due to fragmentation or property severance.
- Permanent restriction of movement across the rail corridor to designated locations, which may result in delays to landowners

Proposed measures would seek to address these impacts as follows:

- Design development would include ongoing consultation with landholders to identify opportunities to minimise operational impacts on property operations and farm infrastructure. This includes maintaining permanent access to properties, where feasible and practicable.
- Interface agreements would be required for all private crossings on Inland Rail and would be put in place to assist in the safe movement of stock and non-standard machinery across the rail corridor.

Mitigation measures to manage the potential for traffic and access, air quality, noise, social and economic, waste, and health and safety impacts would also assist in minimising the potential for land use and property impacts.

Landscape and visual

Minimising visual impact on sensitive receivers was taken into consideration during design development by maximising distances between the alignment and sensitive receivers. Urban design objectives have been incorporated into the concept design and would be further refined during detailed design.

The number of private residences that have visual access to the proposal is limited because the proposal is generally located on agricultural land. However, visual impacts during operation, and the need to consider mitigation strategies such as tree screening was raised as an issue during stakeholder and community consultation.

During construction, there would result be temporary changes to the visual amenity of the surrounding area due to views of general construction activities, earthworks, lighting for night works and the presence of large machinery and workers. These impacts on visual amenity would depend on the nature and intensity of the construction activity at a given point during construction. Several viewpoints would experience lighting and vegetation clearance impacts, either temporarily during construction or permanently, which would be carried through to operation.

To address these impacts, standard measures would be applied through the CEMP. Rehabilitation of disturbed areas would be undertaken progressively in accordance with the landscape and rehabilitation strategy implemented through detailed design, construction and rehabilitation stages of the proposal.

During operation, there would be permanent landscape and visual amenity impacts as a result of the introduction of new structures in the landscape, mainly associated with new rail infrastructure, embankments, signage at passive crossings and fencing along the rail corridor. These include new rail bridges and structures, including at Burley Griffin Way, Corbys Lane, Dudauman Road, Old Cootamundra Road and Dirnaseer Road.

To address these impacts, site-specific mitigation measures are proposed for 14 viewpoints during the operation phase of the proposal. These measures include the use of planting along the realigned road at viewpoint 3 (84 West Street) and at strategic locations along viewpoint 6 (Dudauman Road) and the appropriate use and positioning of signage at viewpoint 5 (Corbys Lane). In addition, an urban design and landscape plan would consider the use of materials and treatments to minimise potential operational impacts with consideration of the surrounding landscape and context.

Soils and contamination

Soils across the proposal site were not identified as comprising a significant erosion risk and the presence of acid sulfate soils (ASS) and saline soils were not identified at the proposal site.

There were no specific issues raised in relation to soils and contamination during stakeholder and community consultation.

During construction, the proposal would require significant excavation and ground disturbance and the movement of plant and equipment within unsealed areas, including light vehicles. If not managed correctly, impacts to soils could include erosion of exposed soil and stockpiled materials, dust generation, increased sediment loads entering the surrounding waterways and/or soil compaction resulting in reduced productivity or impacts to drainage.

To address impacts, vegetation clearing and ground-disturbing works would be staged sequentially across the project where practical and a progressive erosion and sediment control plan, decommissioning and rehabilitation requirements for local roads and water quality monitoring would be implemented under the CEMP.

In relation to contamination:

- the potential for contamination within the proposal site is generally low, with some areas of medium risk identified
- field surveys identified potential areas of environmental concern related to the existing railway connections, roadway and agricultural land uses
- there is potential for contamination impacts associated with the presence of building structures along the proposal site requiring demolition.

To address these impacts, for these areas and building structures, a contaminated land and hazardous materials management plan would be prepared and implemented as part of the CEMP to identify mitigation measures and any further investigations to be carried out during detailed design and to further develop appropriate treatment measures, as required.

During operation, the key impacts in relation to soils and contamination would be:

- The proposal is not likely to result in any significant impacts on soils, topography or geology.
- The risk of soil erosion would be minimal, as all areas impacted during construction would be reinstated or revegetated and landscaped to prevent soil erosion.
- Maintenance activities involving ground disturbance and those with potential to contaminate soil or groundwater from spillage of hazardous materials would be undertaken in accordance with proposed operational measures, including the review of existing spill response procedures.

Waste

Potential impacts from waste have been minimised by designing the proposal so that excavated material generated (a total of around 1.5 million cubic metres (m^3)) would be reused within the track formation or construction as far as practicable.

During construction, waste would be generated would include packaging waste such as pallets, plastic film wrap, cable reels, and metal straps/bands and by-products of the construction process such as concrete, wood, metal and unusable ballast. There are a range of potential impacts if waste is not managed appropriately, including:

- sediment and erosion from waste excavation and handling
- odours and dust from improper stockpiling/storage of spoil and other wastes
- traffic due to haulage of spoil to reuse locations (such as use for fill) and/or disposal locations.

To address these impacts, waste measures would be implemented under the CEMP, which would include the implementation of waste targets for the proposal, requirements for waste segregation and waste mitigation and management measures for the waste types and quantities including contingencies for any unexpected waste volumes.

During operation, minimal waste would be generated during maintenance activities, including green waste, spoil, and other waste streams (for example, concrete sleepers and rails) and potential impacts (for example from inappropriate waste transport) could arise from inappropriate management.

To address these impacts, general waste streams and waste generated from track maintenance procedures would be managed in accordance with ARTC's existing operational maintenance requirements and waste hierarchy principles and the impact is expected to be minimal.

Climate change risk

The ongoing change in global climate presents a diverse range of challenges to modern society with the predicted increase in temperatures, sea level rise, altered climatic patterns, and increase in the occurrence and severity of extreme weather events. Projected climatic changes have the potential to impact the construction and operation of rail infrastructure and, given the long design life of the proposal, this is important to consider these potential impacts.

The *Inland Rail Climate Change Risk Assessment Framework* (ARTC, 2018b) provides a standard approach to climate change risk assessment and mitigation across all Inland Rail projects. It provides a foundation for how each project should undertake a climate change risk assessment and assign adaptation measures. It provides an agreed list of climate hazards, pre-determined list of impact descriptions, and assessment of likelihood and consequence for both 2030 and 2090, adopting an emissions scenario aligned with Representative Concentration Pathway (RCP) 8.5, which global emissions are currently tracking against. It also provides identified adaptation measures and categories of potential additional measures.

A preliminary climate change assessment was undertaken to consider climate change risks, opportunities and adaptations to inform the design process. The key findings were:

- During construction, extreme rainfall and flooding resulting in delays to the construction schedule and cost impacts present the highest risk.
- During operation, extreme rainfall events, flooding and extreme heat will present the highest risk in both the near future (2030) and far future (2090).

Further consideration of the potential for climate change risks would be undertaken to support detailed design. This would include a review of climate adaptation measures identified for the proposal and incorporation into design as far as practicable; conduct of sensitivity testing for increases in rainfall (in accordance with *the Inland Rail Climate Change Risk Assessment Framework);* and consideration of RCP 8.5 in modelling used to inform design of drainage and waterways.

Sustainability

Sustainability principles have been incorporated throughout the design development process. A Sustainability Management Plan would be prepared for the proposal to achieve the target of an 'Excellent' rating for the proposal against the Infrastructure Sustainability (IS) rating scheme administered by the Infrastructure Sustainability Council of Australia (ISCA). This would require implementing identified sustainability initiatives specific to the proposal and program-wide opportunities during the detailed design, construction and operation phases of the proposal.

Air quality

Potential air quality impacts have been avoided by locating the alignment to avoid being close to residential receivers, where practicable and minimising the extent of earthworks (a primary source of dust emissions) through avoiding areas of steep topography and minimising cuts and embankments. No specific issues relating to air quality were raised during stakeholder and community consultation.

Most of the proposal traverses a rural area with only five permanent sensitive receptors located within 100 m of the proposal, all of which are located in Stockinbingal and no other permanent sensitive receptors are located within 100 m of other parts of the proposal.

During construction, the key potential impacts are:

- generation of dust from construction works and the movement of equipment and machinery
- generation of particulate matter (PM) from stockpiles and exposed surfaces under certain meteorological conditions, for example, during dry and high winds.

Proposed measures to minimise these impacts on surrounding sensitive receivers include:

- implementing road watering and/or other stabilising approaches, as required
- not undertaking blasting if prevailing wind conditions are likely to transport dust emissions towards the nearest sensitive receivers
- implementing specific measures for spoil handling, stockpile management, haulage dust suppression and dust monitoring under an air quality management sub-plan under the CEMP.

During operation, the key potential impacts are from diesel-operated freight trains using the corridor and generating pollutants, including particulate matter and other gaseous pollutants, such as nitrogen dioxide (NO_2) and sulfur dioxide (SO_2). The level of train activity for the proposal would be lower than several reference rail projects in NSW and the proposal would traverse a rural area (with better air quality) compared to the urban area of the reference rail projects. As these reference rail projects demonstrated compliance with relevant impact assessment criteria for all assessed air pollutants, air quality impacts from the proposal are expected to be below impact assessment criteria. Therefore, air quality impacts from pollutants at the nearest sensitive receptors, including at Stockingbinal, are not anticipated to be of significance.

To address any impacts, the proposal would be managed in accordance with the air quality management requirements specified in the rolling stock operator environment protection licences and through diesel fuel standards, locomotive maintenance and emissions standards.

Health and safety

The potential for health and safety impacts have been avoided and/or minimised during the design development process by designing the proposal to minimise impacts to construction safety, operational safety, public safety, road safety interfaces and emergency response, by reducing the bridge structure length to improve both operational and construction safety.

A hazard analysis would be undertaken during detailed design to identify risks to public safety from the proposal (during construction and operation) and how these can be mitigated.

During construction, the main potential impacts would be temporary and associated with:

- use of low volumes of dangerous goods and hazardous substances
- increased risk of bushfire during clearing activities, and flooding where works modify the landscape within and around watercourses
- temporary outages through relocation of utilities
- community safety from air quality and noise and vibration and risks to pedestrians and road users at new road–rail interfaces
- impacts to emergency vehicle movements from disruption of traffic and access.

To address these impacts, utility and service providers would continue to be consulted during detailed design to identify possible interactions and to develop procedures to minimise the potential for service interruptions and impacts on existing land uses. Emergency and incident response plans and procedures would also be developed and implemented in consultation with emergency services under the flood and emergency response plan.

During operation of the rail corridor, the hazards associated with the proposal site would generally remain the same. To address these impacts, there would be specifications for vegetation management/fire hazard reduction within the corridor. A safety awareness program would also be developed and implemented to educate landowners and the broader community regarding safety around trains.

Measures to control impacts to health and safety of workers, visitors and the public would be supported by measures proposed for the control of impacts associated with traffic, transport and access, water quality, noise and vibration, soils and contamination and air quality.

Cumulative and residual

The potential for cumulative impacts resulting from the interaction of the proposal with other projects, either existing or proposed, in the surrounding area is considered low. Cumulative impacts are limited to adjacent sections of Inland Rail comprising Stockinbingal to Parkes to the north and Albury to Illabo to the south.

Based on construction timing of the proposal and the timing of these projects, there are expected to be minor cumulative impacts associated with traffic, transport and access, cultural heritage, noise and vibration, social and economic and biodiversity. For example, there may be an increase in traffic, and demand for accommodation and workforce; however, cumulative impacts were not considered significant in the assessment.

Coordination and consultation would occur with the proponents of any current development proposals with potential for cumulative impacts at the appropriate project stages. Potential cumulative impacts on short-term accommodation due to the concurrent construction of the proposal and A2I would be managed through the provision of a workforce accommodation camp (refer to Appendix I).

There are no predicted cumulative impacts during operation.

Opportunities would be identified during detailed design to address identified high- and medium-level residual risks, by resolving through design development, developing effective construction methodologies, planning for effective implementation measures and by implementing a process of review, correction and audit for management measures. Low-level residual risks would also be addressed through an appropriate process of review and continual improvement.

Concluding statement

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.

The strategic need and the proposal's its anticipated benefits justify undertaking the proposal, taking into account ecologically sustainable development. The proposal is considered to best meet objectives when compared to all other alternatives considered.

This EIS has been prepared in accordance with the provisions of Part 5.2 of the EP&A Act and addresses the SEARs. It also considers the issues raised by the community and stakeholders during the development of the proposal

A proposal of this scale would inevitably have some impact on the local environment and community, particularly during construction. As described in the EIS, the proposal would incorporate environmental management and design features to manage and mitigate potential impacts as far as practicable.

The majority of the construction-related impacts can be effectively mitigated by the implementation of best-practice construction management, including the implementation of the environmental management approaches and the mitigation measures compiled in Chapter 27: Approach to environmental management and mitigation. The potential remains for residual impacts, particularly as a result of construction noise at the Stockinbingal end of the proposal. Approaches to further reduce these impacts would be explored with key stakeholders during detailed design, and further communication and engagement with potentially affected receivers during construction.

The biodiversity offsets would be finalised and implemented to address the residual impacts of the proposal on biodiversity values, according to the requirements for Division 5.2 approvals under the EP&A Act.

The detailed design for the proposal would be developed with the objective of minimising potential impacts on the local and regional environment, and the local community. The design and construction methodology would continue to be developed with this overriding objective in mind, taking into account the input of stakeholders.

The residual impacts of the proposal are outweighed by the long-term benefits, including:

- enable Inland Rail to operate by making it possible for double-stacked freight trains to operate between Illabo and Stockinbingal
- improve road safety with the realignment of Burley Griffin Way and new road overpass
- create jobs during construction and flow-on benefits to the local economy.

The potential residual construction and operational impacts of the proposal are considered manageable with the implementation of the proposed mitigation and management measures.