CHAPTER

25

Conclusions

Inland Rail is a subsidiary of
Australian Rail Track Corporation

INLAND RAIL

Contents

25. Conclusions

25.1 Background

This chapter presents a summary of the conclusions for the revised draft Environmental Impact Statement (EIS) of the Inland Rail New South Wales (NSW)/Queensland (QLD) Border to Gowrie Project (B2G) (the Project). Assessment outcomes and conclusions are presented for the relevant environmental, social and economic impacts of the Project based on the approach to environmental management and impact mitigation as presented in this revised draft EIS.

This revised draft EIS addresses the Coordinator-General's Terms of Reference (ToR, November 2018), the submissions received during notification of the draft EIS in 2021, and the additional information requirements from the Coordinator-General following the public notification of the draft EIS. The ToR set out the matters to be addressed in an EIS for the Project under the *State Development and Public Works Organisation Act 1971* (Qld). Further, as the Project is being assessed under the assessment bilateral agreement between the Commonwealth of Australia and the State of Queensland, the revised draft EIS also addresses the ToR requirements that relate to the assessment of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) controlling provisions.

25.2 Project overview and rationale

Inland Rail presents a unique opportunity to establish a competitive freight system, by providing trunk rail infrastructure that supports a network of intermodal terminals and local sidings for the distribution of commodities at the national, regional and local level.

The Project is 217 km section of new dedicated single-track, open-access freight railway between the NSW/QLD border and Gowrie, in Queensland. The Project is comprised of 7 km of standard-gauge rail (1,435 millimetres (mm)) and 210 km of dual standard/narrow-gauge rail (1,435 mm standard and 1,067 mm narrow). The new railway will comprise approximately 149 km of new rail corridor (greenfield) and approximately 68 km of existing open access rail corridor (brownfield), that forms part of Queensland Rail's (QR) South Western Line and Millmerran Branch Line.

It is estimated that, once operational, the Project will involve an annual average of 14 train services per day during the initial years of operation. This is likely to increase to an average of 20 trains per day after 15 years, and up to 25 trains per day during peak operational periods. Annual freight tonnages will increase in parallel, from approximately 14.2 million tonnes per year in year one of operations to 21.8 million tonnes per year in peak operations. This transfer of freight from road to train has the potential to recognise the road safety benefits of reduced freight truck movements on local and State road networks, with one 1,800 m double-stacked freight train carrying the same amount of freight as 110 B-double trucks.

As a component of the larger Inland Rail Program, the potential benefits of the Project cannot be separated from those that are attributed to the full Melbourne to Brisbane alignment.

The Australian Government has committed to enhancing the national transport network by constructing a high-performance and direct interstate freight rail corridor, known as Inland Rail, between Melbourne and Brisbane. Australian Rail Track Corporation (ARTC) is responsible for the delivery of the Inland Rail Program and its ongoing management and maintenance.

The Inland Rail route, which is approximately 1,600 kilometres (km) long, involves:

- Using the existing interstate rail line through Victoria and southern NSW
- Upgrading approximately 400 km of existing track, mainly in western NSW
- Providing approximately 600 km of new track in northern NSW and south-east Queensland.

The objectives of the Inland Rail Program 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, and to stimulate growth for inter-capital and bulk rail freight
- Deliver an increase in 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, alleviate 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.

Inland Rail has been divided into sections as part of a staged delivery, one of which is the B2G Project, that will connect the existing NSW and Queensland freight rail networks, enabling the key technical characteristics of the Inland Rail service offering to be achieved. The Project connects directly to the Inland Rail North Star to NSW/QLD Border (NS2B) project in the south and the Inland Rail Gowrie to Helidon (G2H) project in the northeast.

25.3 Land use and tenure

The land use and tenure aspects relevant to the Project have been assessed through the identification of existing and proposed land use and tenure, including agricultural land, resource interests, native title, State forests and future development activity. It also provides an impact assessment to identify potential impacts on existing and proposed land uses as well as tenure, that may arise as a result of the Project and identifies management measures used to avoid or mitigate potential impacts.

The Project will result in the change from rural land uses to a rail corridor and have the following impacts:

- Acquisition of land
- Partial revocation of Whetstone and Bringalily State forests
- Changes in tenure including potential impacts to native title
- Changes in land uses particularly impacts on agricultural uses and activities:
  - loss of agricultural land
  - land fragmentation and disruption to access and infrastructure
- Alterations to stock routes
- Alterations to biosecurity fences
- Accessibility:
  - impacts on road network
  - impacts on property access
  - Impacts on services and utilities.

Where possible, potential impacts have been avoided or minimised through mitigation measures that have been factored into the revised reference design. Where impacts cannot be avoided, mitigation measures will be implemented during detailed design and planning for land access to further reduce and manage the potential impacts.

The Project will improve rail access to regional markets and support future industrial development including at regional hubs such as the Toowoomba Enterprise Hub.

The Project is consistent with the intent of regional and State planning instruments including the State Planning Policy (Department of Infrastructure, Local Government and Planning, 2017c), ShapingSEQ 2023 (Department of State Development, Infrastructure, Local Government and Planning, 2023), Darling Downs Regional Transport Plan (Department of Transport and Main Roads (DTMR), 2019g) and the Darling Downs Regional Plan (Department of State Development, Infrastructure and Planning, 2013).

25.4 Land resources

The Project traverses a large linear area with a diverse range of geology, soils and landforms. Many soils in the Project extent are susceptible to varying extents of erosion. Impacts to soils will be mitigated through the preparation and implementation of the Soil Management Plan, the Construction Environmental Management Plan (CEMP) and associated plans including an Erosion and Sediment Control Plan, a Rehabilitation and Landscaping Management Plan, and through adherence to the Flood and Geomorphic Impacts Mitigation Framework to manage any change of hydrological conditions as a result of the Project with consideration of soil characteristics.

In accordance with the Flood and Geomorphic Impacts Mitigation Framework, potential impacts to land resources will be further mitigated in the Project's future delivery by minimising impacts to existing flow paths attributable to the Project (including those on adjacent properties) with reference to site-specific soils conditions. This will be through the application of flooding design treatments (eliminate, reduce, mitigate) with reference to the Flood Impact Objectives (FIOs) (afflux, velocity, inundation) developed and applied to identify locations where the Project has the potential to cause a change in flood characteristics that may result in adverse impacts. The Project will target achieving the FIOs for events up to and including the 1% AEP event for land, sensitive receptors, and/or infrastructure that is potentially impacted by the Project.

There are multiple soil conservation plans potentially impacted by the Project. These soil conservation plans are aimed at preventing adverse and unsustainable impacts to land resources in a manner exceeding the land's capability, through the administration of soil erosion control measures by landowners in Queensland using approved property plan and Project area plans in accordance with the Soil Conservation Act. The detail of the soil conservation plans potentially impacted by the Project, including those directly intersected by the Project, will be assessed and verified during detailed design in consultation with stakeholders, as relevant. All potentially affected and available soil conservation plans will be assessed and verified in consultation with relevant agencies and landowners to allow appropriate consideration and management of potential impacts to soil conservation plans. Mitigation measures such as stabilising groundcover vegetation, the provision of scour protection and flooding infrastructure, or constructing contour banks will be undertaken in conjunction with the Project's Flood and Geomorphic Mitigation Framework and reconsidered as appropriate based on any updated information following the detailed review of the soil conservation plans undertaken in consultation with the landowner.

25.5 Landscape and visual impact assessment

The Project will introduce rail infrastructure into mostly intact rural and natural areas, leading to the removal of vegetation and the provision of elements such as embankments, deep cuts, viaducts, and new road and rail bridges. The Project has the potential to impact upon landscapes identified as having high scenic amenity including tree-lined watercourses, particularly the Condamine River and other tributaries traversed by the alignment, as well as the elevated and timbered hills in the vicinity of Pittsworth.

Visual impacts are often contained and mitigated by existing vegetation and topography, although elevated areas provide broader views, especially from scenic lookouts including Mount Basalt Reserve, Commodore Peak Picnic Area, and Mount Kingsthorpe summit. Viewpoints were assessed to represent impacts on these views and visual impacts of up to a high level of effect prior to mitigation were identified including:

- The impact of the Cunningham Highway road bridge and the introduction of additional rail infrastructure
- The impact of the new road bridge and embankments north of Brookstead and additional rail infrastructure near Brookstead State School
- The impact of bridges and large embankments on the northern edge of Pittsworth near the Pittsworth Motor Inn
- The impact of the large cuts and embankments close to rural residential lots near Southbrook
- The impact of large embankments and new rail and bridge infrastructure at Pittsworth and the District Assembly of God near Pittsworth
- The impact of embankments and a proposed controlled level crossing in proximity to existing rural residential lots near Athol School Road
- The impact on views obtained from the summit of Mount Kingsthorpe lookout.

The Project has incorporated a range of landscape mitigation measures in its revised reference design. The location and application of noise barriers within the rail corridor as a proposed noise mitigation measure will be determined during detailed design and will include consultation with landowners on the potential for impacts to visual amenity. Furthermore, a range of additional mitigation measures will be incorporated in the future Project delivery, including consultation with key stakeholders and undertaking an updated visual impact assessment as part of detailed design, minimising disturbance to existing vegetation where practicable, rehabilitation of disturbed land, and opportunities for urban design of key structures.

25.6 Flora and fauna

The Project is situated within the Brigalow Belt south bioregion, which has experienced a long history of human disturbance as a result of agricultural practices and resource development. At a regional level, most remaining areas of vegetation are now fragmented, occurring on the rockier hilly areas of ranges, as part of State-protected lands (State forests), as roadside vegetation, or as relatively small, isolated remnants.

The Project footprint provides suitable habitat for a large number of protected matters, including:

- Matters of National Environmental Significance (MNES) threatened species
- MNES Threatened Ecological Communities (TECs)
- Non-threatened migratory species (birds, assessed as Matters of State Environmental Significance (MSES))
- State-listed threatened species and special least concern species (MSES, listed under the *Nature Conservation Act 1992* (Qld) (NC Act))
- MSES regulated vegetation including 'endangered', 'of concern' and 'least concern' regional ecosystems (REs) protected under the *Vegetation Management Act 1999* (Qld) (VM Act).

MNES threatened species and TEC's are controlling provisions under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Site assessments determined three TECs, 10 threatened flora species, and 14 threatened fauna species, four non-threatened migratory birds, and two SLC mammals were considered known to occur in the Project footprint. A further nine threatened flora species, 16 threatened fauna species, and four non-threatened migratory birds were considered likely or potential to occur. One MSES threatened fauna species was included due to the presence of State-mapped essential habitat within the Project footprint.

Without appropriate control measures, the Project has the potential to impact ecological receptors through:

- Habitat loss and degradation from vegetation clearing
- Fauna species injury and mortality
- Reduction in biological viability of soil to support plant growth
- Introduction and spread of weed, pathogen and animal pest species (both terrestrial and aquatic)
- Habitat fragmentation leading to:
  - reduction in the connectivity loss of biodiversity corridors
  - barrier effects
  - edge effects
- Noise and vibration from construction activities and rollingstock
- Air quality emissions and dust generation
- Lighting
- Erosion and sedimentation from altered hydrology
- Changes to groundwater resources affecting groundwater dependant ecosystems
- Contamination of land
- Aquatic habitat degradation
- Waterway barrier effects.

The revised reference design has developed with consideration to avoid, where appropriate for the Project stage, impacts to ecological values. Where avoidance of impacts has not been possible, development of management and mitigation measures has sought to minimise the likelihood and consequence of these impacts.

Opportunities to further reduce vegetation clearing and disturbance requirements will be further investigated in future design stages, particularly for riparian vegetation providing functional fauna connectivity, where it is expected that disturbance requirements will be significantly reduced.

A program of management, mitigation and compensation measures for impacts to flora, fauna and habitats are described including:

- Construction planning and design refinement to minimise vegetation clearing requirements at watercourses and other areas with connectivity function.
- Design to incorporate fauna passage structures, appropriate to relevant species, based on identified connectivity areas to facilitate movement and maintain connectivity. This will be based on considerations such as using bridges over culverts and designing cross drainage structures with consideration for fish passage.
- Development of the following management plans as part of the Project CEMP including the Biodiversity Management Plan, Biosecurity Management Plan, Soil Management Plan, and Rehabilitation and Landscaping Management Plan.
- Finalisation of the Draft Koala Management Plan and incorporation into the Biodiversity Management Plan to reduce impacts to the koala population and provide management and reporting requirements through all stages of the Project.
- Finalisation of the Draft Fauna Management Plan and incorporation into the Biodiversity Management Plan to provide management and reporting requirements during the construction works and operations stages of the Project.
- Development of a Wildlife Connectivity Plan, in accordance with the Fauna Connectivity Strategy, to mitigate impacts to fauna connectivity and prevent direct injury or mortality as a result of collisions with trains and other vehicles. This will be through the installation of fauna exclusion fencing and provision of fauna movement opportunities via a range of crossing structures designed for the target threatened fauna appropriate for a broad range of species.
- In consultation with relevant agencies and landholders, preparation and implementation of property-specific Offset Area Management Plans to provide the delivery of environmental offsets, where appropriate, ahead of clearing works.
- Annual monitoring of remnant and regrowth vegetation communities and habitats retained within the Project footprint.

ARTC will continue to monitor the effectiveness of the mitigation measures with contingencies under an adaptive management framework, to change or improve management strategies that have been identified as not meeting the performance criteria (i.e. where deleterious impacts to the identified ecological values are observed, or not minimised).

The Project will result in significant residual impacts to threatened ecological values after the implementation of mitigation measures, including rehabilitation. In accordance with the MNES significant impact guideline, the potential for significant impacts is likely for five EPBC Act listed threatened flora species, 10 threatened fauna species and three threatened ecological communities.

A significant residual impact assessment of prescribed environmental matters (i.e. MSES) was undertaken in accordance with the MSES significant impact criteria. This assessment indicated that the Project is likely to result in significant residual impacts to two threatened flora species and four threatened fauna species. These potential significant residual impacts are based on the detailed ground-truthing of the Project footprint, as well as State vegetation management mapping.

The provisions of environmental offsets for the MNES and MSES presented above will be provided respectively under the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (Department of Sustainability, Environment, Water, Population and Communities, 2012a) and delivered in line with the *Queensland Environmental Offsets Policy 2017* (Qld).

ARTC's Environmental Offset Delivery Strategy will inform the development of offset delivery components including an Environmental Offset Delivery Plan and Offset Area Management Plans. A detailed Environmental Offset Delivery Plan and property-specific Offset Area Management Plan will be developed in consultation with relevant Australian Government and State regulatory agencies and implemented by ARTC prior to the commencement of construction.

25.7 Sustainability

Through the revised reference design process, ARTC has addressed climate-change risk-reduction concerns and identified opportunities for sustainability initiatives.

The Project has embraced the three main aspects of sustainability, namely consideration of the economic, environmental and social impacts and opportunities. The sustainability initiatives fall broadly under the themes of:

- Advancing local, regional and national economies
- Environmental protection
- Respect for people, communities and valued places.

Sustainability initiatives to be explored and adopted by the Project have been identified during technical investigations and stakeholder engagement undertaken for the Inland Rail Program, and the Project. These initiatives will be investigated further during detailed design and, where feasible, implemented during construction and operations activities. The implementation of these sustainability measures will contribute to the Inland Rail sustainability objectives.

25.8 Air quality

The air quality impact assessment undertaken for the Project concludes that with the proposed mitigation measures in place, the implementation of the Project can be managed so that air quality impacts to environmental values and sensitive receptors are maintained at an acceptable level.

The air quality impact assessment addressed both the construction works and operations stages of the Project. These assessments included:

- A qualitative construction dust risk assessment in reference to the guidance on the assessment of dust from demolition and construction
- A quantitative dispersion modelling assessment of operations stage impacts (e.g. diesel exhaust emissions)
- An assessment of the deposition of pollutants at sensitive receptors and potential contamination of water tanks
- A qualitative assessment of the impact of odour from agricultural trains using the factors of frequency, intensity, duration, offensiveness and location.

For the assessment of construction impacts, the risk of dust deposition and human health impacts resulting from particulate matter emissions was based on the scale of construction activities and the proximity to sensitive receptors. The outcome of the assessment showed that the residual risk with the proposed mitigation measures is low or negligible. It is expected that with implementation of the proposed mitigation measures, Project works are not anticipated to adversely impact environmental values related to air quality.

For the assessment of operational impacts, diesel exhaust emissions from locomotives were estimated for projected peak train movements for the Project in the year 2040. Ground level concentrations of particulate matter, nitrogen dioxide (NO2), volatile organic compounds, and heavy metals were predicted at sensitive receptors. The assessment predicted that cumulative pollutant concentrations and deposition levels would be below the relevant air quality goals at all identified sensitive receptors for all pollutants of concern. Based on the *Environmental Protection (Air) Policy 2019* (Qld), the operation of the Project is not expected to adversely impact environmental values, including human health.

25.9 Surface water quality

A significance assessment was undertaken that assessed the significant residual impact of identified potential impacts with design considerations, and additional mitigation and management measures in place. The assessment identified that the combination of design considerations and mitigation measures would mitigate most potential impacts, such that the residual significance would be low. It is not expected that significant residual impact on surface water quality will occur as a result of Project activities.

A review of historic and field data for water quality identified that surface waters within the Project footprint do not currently achieve all water quality objectives for the protection of aquatic ecosystems within each basin. Existing degraded water quality conditions within the impact assessment area are likely to be attributable to land clearing and agricultural and rural land uses in the catchment.

All waterways within the Project footprint have been identified as sensitive receptors. Several high–sensitivity, water quality receptors with associated environmental values were identified within the Project footprint, including the Macintyre River, Macintyre Brook, Canning Creek and the Condamine River. Associated environmental values included MNES species and MSES wetlands.

Without adequate mitigation, construction and operational Project works have the potential to impact on surface water quality through:

- Changes to water quality and hydrology
- Alteration to the structure and function of waterways
- Extraction of water for construction
- Increase in salinity
- Increase in contaminants
- Increases in erosion and sedimentation
- Increased debris
- Exacerbation of impacts from inadequate rehabilitation processes.

Additionally, the Project has the potential to impact waterway morphology and the availability of surface waters for existing users.

25.10 Flooding and geomorphology

Detailed modelling and analysis have shown Project works can be designed, planned and implemented to:

- Minimise the potential for adverse impacts on existing water flows including overland flow, and flooding profiles
- Minimise impacts to the existing hydrological and geomorphological regime
- Minimise risks to life, property, infrastructure and the environment.

Potentially affected landowners and other stakeholders have been and will continue to be consulted about the Project, potential flood impacts and design outcomes covering the operations and construction stages.

A Flood and Geomorphic Impact Mitigation Framework has been developed to assess and minimise flooding impacts with regard to FIOs developed for the Project in consultation with the International Independent Panel of Flood Experts. FIOs have been developed for the following aspects:

- Change in peak water levels
- Change in time of inundation
- Change in velocities
- Change in hazard
- Flood flow distribution
- Velocities
- Extreme event risk management
- Sensitivity testing.

Detailed consideration of flood impact potential is required during detailed design where modelling indicates the FIOs are likely to be exceeded. Further refinement of the detailed design including consideration of alternative design options and the preparation of site-specific mitigation measures in consultation with relevant landowners will be required. It is expected that through this process, that whilst some FIO exceedances will be reduced or removed, not all exceedances will be able to be mitigated through engineering design.

A comprehensive consultation process has been conducted to provide the community with detailed information and certainty around the flood modelling and the Project design. In future stages, ARTC will continue to work with:

- Landowners concerned with hydrology and flooding
- Directly impacted landowners affected by the alignment
- Local councils, State government agencies and local flood specialists throughout the detailed design, construction works and operation stages of the Project.

Flooding impacts for construction works will be managed through flood risk assessments (FRA) undertaken within the Project temporary footprint that are deemed to be high risk based on their proximity to flood sensitive receptors. The FRA approach will be documented via a Flood Risk Management Plan (FRMP) and erosion and sediment control will be developed as a component of the CEMP and endorsed by the Environmental Monitor prior to commencement of Project works.

An assessment of existing conditions, including channel and floodplain characterisation, was conducted for all watercourses within the Project footprint. This assessment distinguished current geomorphic changes from those potentially caused by the Project, categorising the sensitivity of sites to change. Areas with minimal human intervention were found to be generally stable, whereas modifications, such as those affecting the North Condamine River upstream of the Project, have created unstable channels posing risks such as avulsion, potentially impacting the Gore Highway and the Project. These sites will undergo further evaluation during the detailed design phase.

A geomorphological risk-based assessment has been undertaken to enable the identification of design treatment mitigations informing the design of cross-drainage, waterway crossing infrastructure and scour mitigations. The on-going management of geomorphic impacts will be in accordance with the Flood and Geomorphic Impact Mitigation Framework, incorporating design treatments and ongoing monitoring to manage residual impacts.

25.11 Groundwater

Potential impacts related to groundwater for the Project are considered minor and temporary in nature, associated with the construction works stage. All potential impacts on groundwater resources are localised and not expected to extend outside the Project footprint and are manageable with the implementation of mitigation measures.

The existing groundwater conditions of the impact assessment area have been identified in accordance with industry standard methodology and relevant legislation. Through an assessment of existing conditions, Project activities with the potential to impact on groundwater resources were identified.

Project activities, throughout the Project lifecycle, can impact on groundwater resources via:

- Loss or damage to existing landowner bores or groundwater use from the bore (e.g. quality/yield degradation)
- Loss of access to landholder bores or the bore itself due to Project location
- Seepage/inflows and groundwater level drawdown at deep cuts
- Alteration of aquifer parameters and/or flow patterns
- Subsidence/settlement of compressible substrates
- Contamination/reduction of groundwater quality
- Acid rock drainage
- Groundwater level mounding
- Alteration to groundwater recharge/discharge mechanisms.

In the few deep cut locations where construction activities have the potential to intersect with groundwater, the modelling has predicted impacts to be localised within the Project footprint. Best practice engineered controls will be used at deep cut locations where groundwater is intercepted to minimise the extent and duration of disturbance to groundwater resources, ensuring structurally sound construction sites. As a conservative approach, the predictive modelling will be updated prior to construction commencement based on confirmed design at potential groundwater interception locations, both up and down gradient, to confirm the inflows and drawdown. Additionally, monitoring and management plans reviewed and updated accordingly, as required.

The Project will implement a groundwater ‘make good’ or mitigation framework. This framework considers two pathways for bores to be made good: bores located on land accessed by the Project and bores located on land not accessed by the Project.

Implementation of a Groundwater Management and Monitoring Program that embraces adaptive management principles will be undertaken to confirm that specific potential impacts identified for each stage of the Project can be managed based on specific activities, locations, and WQOs to protect groundwater resources and users.

25.12 Noise and vibration

The Project passes through agricultural regions, townships, and state forests. The landowners, residents, and natural environment of these rural and township settings can be sensitive to noise and vibration attributable to the construction and the on-going railway operation associated with the Project. The potential noise and vibration impacts to sensitive land uses and receptors from the construction and operation of the Project is summarised in the sections below. Reasonable and practicable measures to reduce and control noise and vibration emissions and mitigate associated impacts have been considered.

25.12.1 Construction

Without appropriate mitigation and management controls, construction activities have the potential to generate noise impacts that exceed applicable limits at sensitive receptors during various stages of the construction program. However, these impacts will be temporary as the work progresses along the Project alignment, and the worst-case noise and vibration levels used for assessment will not occur at all locations throughout the entire construction schedule. Additionally, due to the remote nature of a significant portion of the Project, large areas of the construction zone are sufficiently distant from sensitive land uses and receptors, minimizing the potential for noise impacts in these regions.

Earthworks are expected to result in the highest noise levels and the greatest number of exceedances. If left unmitigated, rail and road civil works also have the potential to exceed applicable guideline levels. However, noise disruptions from these activities are anticipated to be significantly shorter in duration than those caused by earthworks—particularly during the sleeper and rail installation, tamping, and regulating stages, which progress sequentially along the rail alignment.

To minimise noise and vibration impacts in accordance with regulatory guidelines, mitigation measures will be implemented during construction. Construction-related road traffic noise will also be addressed through management measures aimed at reducing temporary increases in traffic noise on local roads. Additionally, new and upgraded roads within the Project scope will be reviewed for reasonable and practicable mitigation measures to minimize overall road traffic noise.

Noise and vibration management during construction will be governed by a Noise and Vibration Management Plan (NVMP), which will form part of the CEMP. The NVMP will be developed in accordance with relevant guidelines and approval requirements, outlining processes, responsibilities, and all reasonable and practicable management measures to be implemented. It will include updated noise and vibration assessments based on the finalized construction work programs and address predicted emissions at specific project locations. Furthermore, the NVMP will demonstrate compliance with the requirements of the Code of Practice (CoP) Vol. 2 and other applicable legislative requirements. It will also detail monitoring procedures and adaptive management strategies for the application of reasonable and practicable noise and vibration mitigation measures.

25.12.2 Railway operations

Railway operations have the potential to create airborne noise, ground-borne noise and groundborne vibration in surrounding areas. However, these impacts will be infrequent and will only occur when trains pass through the immediate local area.

An assessment of potential (unmitigated) rail noise levels at sensitive receptors under the typical worst-case 2040 design year train movement scenario indicates that the noise criteria outlined in the Operational Railway Noise and Vibration: Government Supported Transport Infrastructure (Interim Guideline) (DTMR, 2019a) are met at most sensitive receptors. However, 97 sensitive receptors (82 residential and 15 non-residential) exceed the noise levels that trigger a review of mitigation measures.

Potential sleep disturbance impacts from (unmitigated) rail noise have been assessed based on the Australian Government Department of Health's publication, The Health Effects of Environmental Noise (enHEALTH, 2018). The assessment predicts that 169 dwellings will exceed the sleep disturbance threshold, of which 82 residential receptors are also expected to exceed the Interim Guideline limits.

Noise mitigation measures will be implemented where sensitive receptors are located near the railway alignment. ARTC will primarily focus on controlling noise and vibration at the source and within railway lands. For example, railway noise barriers have proven effective in reducing noise in impacted townships. Where such measures are not feasible or fully effective, at-property treatments will be considered on a case-by-case basis in consultation with affected property owners and based on updated modelling. These at-property treatments may include architectural modifications, construction enhancements, upgrades to existing property fencing (subject to landowner consultation), or, in some cases, property relocation.

The management of noise and vibration during railway operations will be governed by a Noise and Vibration Management Plan (NVMP), which will be a component of the Operations Environmental Management Plan (EMP). The NVMP will define processes, responsibilities, monitoring strategies, and adaptive management measures. for the acoustical environment. It will also confirm the noise and vibration mitigation measures to be implemented during project operations. The NVMP will present updated noise and vibration assessments based on the finalized project design and demonstrate compliance with the Interim Guidelines and other applicable legislative and project requirements before the commencement of operational works.

Noise and vibration levels will continue to be assessed throughout the design and construction phases to refine mitigation strategies. A noise and vibration monitoring program will be conducted during railway operations, with findings used to verify noise and vibration levels at sensitive receptors and to determine the need for additional reasonable and practicable mitigation measures.

25.13 Social

The social impact assessment identifies how the Project may affect local and regional communities during construction and operation and how ARTC will mitigate the negative social impacts and enhance benefits. The social impact assessment has:

- Identified potentially impacted communities
- Incorporated stakeholder input
- Developed a baseline of social characteristics
- Assessed likely social impacts and benefits
- Evaluated the significance of social impacts and benefits
- Developed a Social Impact Management Plan to manage social impacts.

The SIA includes a social impact management plan (SIMP), which outlines the objectives, outcomes and measures for mitigation of social impacts. Measures intended to enhance Project benefits and opportunities are also provided.

During the construction works stage, the Project's potential social impacts include:

- Direct landholder impacts through the acquisition of land for the permanent and temporary footprints requiring:
  - relocation of affected households and businesses
  - loss and severance of agricultural land
- Nuisance-related temporary impacts from construction activities including noise, air quality and traffic which have the potential to affect the amenity and operation of adjoining residential, agricultural, business, tourism and community land uses
- Community wellbeing impacts from stress and anxiety related to land acquisition, land values, amenity, flooding risks
- Effects on Indigenous cultural heritage landscapes or heritage values, by affecting natural and rural landscapes, and potentially feelings of connection to Country
- Potential impacts to town character and services through the introduction of non-resident workforce accommodation facilities
- Potential for impacts on rental housing availability in Goondiwindi, Millmerran, Pittsworth, Inglewood and/or Toowoomba, if workforce accommodation facility demands are not managed
- Potential shortages in specific trades and labour, including farm labourers and tradespeople.

Impacts of the Project's operation as part of the Inland Rail Program include:

- The operation of trains has the potential to impact the quiet rural and township amenity, learning environments of some schools, the amenity and use of community facilities, traffic and landholder movements across the rail corridor
- The presence of a freight rail line may increase the risk of road/rail accidents and rail fatalities, resulting in social impacts for individuals, families, communities and rail staff
- Land uses and buildings may be affected by changes in flood events due to the rail infrastructure.

Potential Project benefits and opportunities include:

- Employment for up to a peak of 900 personnel during the construction stage, including opportunities for local people, Traditional Owners and local, regional and Indigenous businesses
- Opportunities for businesses (particularly in Yelarbon and Inglewood) to benefit from increased trade from workers and non-resident workforce accommodation service providers
- Training and career pathway development for young people, Indigenous people and unemployed people
- Financial benefits for landowners who lease or sell land to the Project for use during construction
- Community facility upgrades as part of the Community Wellbeing Plan delivery
- Monitoring of change in community values and priorities, to support councils to plan for and prioritise liveability and wellbeing.

Social Impact Management Plan sub-plans will provide the objectives, outcomes and measures of social impacts, including how the Project will: communicate and engage with the community; maximise training and employment opportunities; manage impacts on housing and accommodation and other impacts on community facilities, services and community wellbeing; as well as impacts on businesses, including agribusiness and tourism. An Australian Industry Participation Plan will be prepared to support opportunities for businesses to supply the Project. This will include capacity building programs for local and Indigenous businesses to be delivered as part of the Australian Industry Participation Plan and within the Inland Rail Skills Academy. A monitoring strategy that will enable the Project to report on the delivery and effectiveness of the SIMP is also provided.

25.14 Economics

The economic assessment of the Project focused on the specific economic impacts during construction and operation, contributing to the broader Inland Rail Program, which aims to enhance Australia's national rail network and support the interstate freight market.

Key economic benefits of the Inland Rail Program, as outlined in the 2015 Business Case, include:

- Reduced consumer prices through lower freight transport costs.
- Positive net economic benefits from improved freight productivity, reliability, and reduced environmental and road congestion impacts. Inland Rail is economically viable with a benefit-cost ratio of 1.02 at a 7% discount rate (2.62 at 4%).
- Economic growth, increased profits, and GDP growth ($16 billion over construction and operation).
- Job creation, including over 300 direct and indirect jobs annually in Queensland's Darling Downs–Maranoa region during construction.
- Increased competition between rail and road freight, spurring innovation and efficiency.
- Potential for expanded freight precincts and industry clustering around Inland Rail terminals.

At the Project level, it is expected to provide $703.26 million in incremental benefits (present value, 7% discount rate), primarily from enhanced freight productivity, reliability, reduced crashes, and environmental benefits.

Locally, the Project will boost economic growth in the Darling Downs–Maranoa region, with real Gross Regional Product projected to increase by $410 million during construction. While labour market risks exist, the local workforce may benefit from training and recruitment opportunities.

The Project will also support regional development by offering opportunities for local businesses, including Indigenous and regional suppliers, particularly in construction-related services. Increased demand from construction activities will benefit local retail, hospitality, and support services.

Furthermore, the Project can stimulate business development at the Toowoomba Enterprise Hub, enhancing access to markets and fostering private sector investment, potentially expanding international export opportunities through Wellcamp Airport.

However, the Project may impact local agriculture and tourism through land loss, farm management disruption, and changes in accessibility. The estimated loss in agricultural production is $1.20 million annually. ARTC will work with landowners to mitigate these impacts and collaborate with tourism associations to address potential disruptions.

ARTC is committed to maximizing economic benefits while minimizing adverse effects, with a range of actions to manage social and economic impacts.

25.15 Cultural heritage

The cultural heritage assessment addresses the Indigenous and non-Indigenous cultural heritage values of the Project area, describing the Project's existing cultural heritage environment, potential impacts, proposed mitigation measures and provides a significance impact assessment. All Project works will be undertaken in accordance with a Heritage Management Plan, as a component of the CEMP.

The assessment of non-Indigenous heritage values identified 41 areas of interest, of which 21 are of local heritage significance. The assessment of impacts found that, with appropriate mitigation measures, Project impacts would be moderate for one heritage place, the Green Hills Hotel Complex (B2G-21-H13), and neutral (i.e. no impact) or slight for the remainder.

ARTC has three approved and registered CHMPs with the Bigambul People, Endorsed Party s35(7) and Western Wakka Wakka People under the *Aboriginal Cultural Heritage Act 2003 Qld*. The relevant approved CHMP developed with the relevant Aboriginal Party covers the construction of new rail infrastructure and associated structures for the Inland Rail Program, as well as operation and maintenance of the rail corridor that will be managed by ARTC. The CHMP will not extend to activities performed by QR.

25.16 Traffic, transport and access

The traffic, transport, and access assessment evaluates the construction and operational impacts of the Project on surrounding transport infrastructure, based on the revised reference design. It addresses construction traffic, material movement, and workforce impacts on local and State-controlled roads, as well as broader transport systems.

The revised reference design for the Project directly interfaces with seven State-controlled roads in nine locations and 55 local roads separated between GRC and TRC. Construction traffic is expected to exceed 5% of background traffic on 18 State-controlled roads and 77 local government roads, though the impacts are largely due to low existing traffic volumes, with no immediate need for road upgrades identified. Intersection analyses highlight the need for additional right- and left-turn treatments at specific locations, while broader operational safety upgrades are required independently of construction activities. Pavement assessments indicate several roads exceed the 5% axle repetitions threshold, with several road segments exceeding this threshold by a significant margin, requiring further analysis to determine potential contributions for maintenance.

Public transport, school bus routes, and cycle paths will experience minimal operational disruptions with mitigation measures to be implemented where necessary, particularly for school zones and high-pedestrian areas. Stock route access will be maintained through crossings or alternative provisions, and rail operational traffic is not expected to affect surrounding roads.

Design solutions for avoiding, minimising or mitigating impacts have been incorporated into the revised reference design as appropriate and where possible. Where mitigation measures could not be incorporated into the revised reference design, mitigation measures will be adopted. A detailed Traffic Management Plan will address safety, route suitability, and stakeholder coordination to minimise impacts for the safe operation of transport systems throughout the construction period.

25.17 Hazard and risk

An assessment has identified the following potential hazards and risk associated with the Project works that may impact people, property and the environment:

- Bushfire
- Flooding
- Climatic conditions
- Landslide, sudden subsidence, movement of soil or rocks
- Fatigue and heat stress
- Rail incidents
- Road–rail incidents
- Existing infrastructure and utilities
- Contaminated land
- Bridges
- Emergency access
- Freight of dangerous goods

ARTC's risk management policies and procedures aligned to industry best practice will be implemented to effectively manage hazards and risks to an acceptable level. Opportunities to further reduce the level of risk will be investigated in the future delivery stages of the Project through the application of the hierarchy of controls (i.e. elimination, substitution, engineering controls, administrative controls and personal protective equipment).

25.18 Waste and resource management

Construction and maintenance activities for the Project are expected to result in the production of commercial and industrial, construction and demolition, general, green, recyclable and regulated wastes.

Project impacts that relate to waste and resource management include:

- Additional demand for waste disposal beyond current levels, resulting in increased consumption of airspace and reduction of community access to waste facilities surrounding the Project footprint
- Possible uncontrolled release of waste from inappropriate storage or failure of management systems resulting in contamination of receiving environments (i.e. land, surface water and air)
- Possible increase in the incidence of vermin, insects and pests from inappropriate storage and handling of putrescible wastes
- Reduced visual amenity of land uses adjacent to the Project
- Increased transportation of waste materials onsite and offsite, resulting in:
  - the increase of greenhouse gas emissions due to the combustion of hydrocarbons from the operation of vehicles/plant
  - decreased amenity of land uses adjacent to the Project from the generation of dust and road deterioration
- Risks to human health and safety of site personnel, through the release of pollutants from ineffective management of regulated wastes.

Where potential waste management impacts have not been fully avoided or mitigated through the revised reference design and construction planning, additional mitigation measures to maximise the reuse and treatment of fill have been proposed for implementation in future stages. The general intent of these proposed mitigation measures is to:

- Minimise double handling during resource recovery activities and promote segregation of materials, by providing sufficient area for storage and segregation of materials
- Separate and segregate the different material types onsite, where practicable
- Manage movement of excavated material within the Project footprint and external to the Project
- Develop procedures to record, monitor and report the offsite destination of each load of excavated material, recovered materials and residual waste.

Waste and resource recovery activities associated with the Project are not anticipated to pose a significant risk to the environment or public health with the implementation of effective control measures.

25.19 Draft Outline Environmental Management Plan

A draft Outline EMP has been developed for the Project to:

- Provide an environmental management framework to enable the identified environmental outcomes to be achieved for the life of the Project, through the detailed design, pre-construction and early works activities, construction works and operations stages of the Project
- Establish the process for the preparation and implementation of the CEMP and the Operations Environmental Management Plan (Operations EMP)
- Support the development, refinement and implementation of the Social Impact Management Plan.

The draft Outline EMP will be updated following completion of the EIS process, incorporating relevant permit and approval conditions, design refinements, and detailed construction planning, to inform the CEMP and Operations EMP.

The CEMP provides a structured approach to the management of environmental issues during the construction of the Project and will be developed by ARTC consistent with the final Outline EMP. The CEMP will be endorsed by the Environmental Monitor as being consistent with the final Outline EMP, all permit and approval conditions, and relevant laws, prior to the commencement of any relevant Project works.

The Operations EMP will form part of an overarching management approach by ARTC to the operation and maintenance of the Project within the Inland Rail network and will be developed by ARTC consistent with the final Outline EMP. The Operations EMP will be endorsed by ARTC as being consistent with the final Outline EMP, all permit and approval conditions, relevant laws and ARTC's environmental management policies, prior to the commencement of operations.

The draft Outline EMP provides direction for the CEMP and Operations EMP and includes the following:

- Environmental outcomes—environmental outcomes are mandatory and must be achieved. The environmental outcomes are derived from statutory requirements or other relevant criteria and are reflected in the criteria adopted in the revised draft EIS.
- Performance criteria—measurable objectives or indicators of the environmental outcome. Environmental outcomes are deemed to be achieved if the performance criteria are met. If the performance criteria are not met, mitigation measures must be implemented to achieve the environmental outcomes.
- Mitigation measures—measures directed at achieving the environmental outcomes. The proposed mitigation measures have been identified through the EIS process, recognising that additional or different mitigation measures may be applied to achieve the environmental outcome. Additional mitigation measures may be developed in consultation with directly affected persons, relevant stakeholders and with the advice of the Environmental Monitor and Community Relations Monitor.
- Monitoring requirements—monitoring and reporting requirements to demonstrate that the environmental outcomes have been achieved.
- Corrective actions.
- Reporting.

It is proposed that the conditions included in the Coordinator-General's evaluation report and the Commonwealth Minister for the Environment's decision under the EPBC Act for the construction stage will be incorporated into the final Outline EMP and the CEMP to ensure that all works are authorised and consistent with the approval conditions for the Project. Similarly, all approval conditions relevant to the operations stage will be incorporated into the final Outline EMP and Operations EMP.

The CEMP will be developed in advance of relevant Project works for those relevant Project works and will be amended and updated as construction proceeds.

25.20 Concluding statement

The Project, and the Inland Rail Program as a whole, provides a 'step change' opportunity to ease traffic congestion around east coast cities, improve road safety, lower freight transport emissions and lead to greater efficiencies for freight transport in Australia. By providing a continuous rail freight route between Melbourne and Brisbane, the service offering will be competitive with road freight and will better connect regional farms with international export markets in a safe and sustainable manner.

There are key advantages in providing for a mode shift of freight to rail, including:

- Improved access to and from regional markets
- Reduced costs for the market
- Improved reliability and certainty of transit time
- Increased capacity of the east-coast road network, with reduced maintenance and deferred upgrades required
- Reduced distances travelled resulting in a reduced time between the point of source and the market for goods and produce
- Increased safety in the road network, with each freight train capable of moving the equivalent of 110 B-double heavy vehicles
- Re-distribution of road traffic, resulting in less heavy vehicle traffic through many urban centres
- Reduced fuel consumption and greenhouse gas emissions
- Improved sustainability.

The revised draft EIS has adopted a conservative approach to identifying the potential impacts of the Project, including cumulative impacts. Project revisions have been developed taking into account consultation with the community and key stakeholders and submissions made; however, a proposal of this scale would inevitably have some impacts on the local environment and community, particularly during construction and as a result of establishing a significant new section of freight rail corridor. Where environmental impacts have been identified through the assessment process, efforts have been made to avoid or minimise those impacts through development of the revised reference design.

Where residual impacts remain, further design refinement and mitigation measures have been proposed for implementation during the detailed design, construction works and operations stages of the Project. The detailed design for the Project would be developed with the objective of further avoiding and 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 objective in mind, taking into account the input of stakeholders and the local community, and the conditions of approval.

The Project will have some residual impacts in construction and operation. These include social, noise and vibration and traffic disruptions in some areas, some loss and degradation of flora and fauna habitat, and changes to areas of agricultural land and the existing flooding regime. With implementation of the proposed mitigation measures set out in the Outline EMP, and the approach to management described in the revised draft EIS, it is concluded that the potential environmental impacts of the Project would be adequately managed.

Opportunities have also been identified through the assessment to maximise the potentially significant economic and social benefits of the Project, through local employment, local industry participation and opportunities for complementary investment that provides for continued community benefit.

The Project footprint will be further refined through detailed design to minimise the amount of vegetation clearing and disturbance to the greatest extent possible, including refinement of mitigation measures of the significant residual impact expected to occur on both MNES and MSES, which will require environmental offsets. ARTC proposes to provide its offsets as the detailed design process concludes. ARTC has developed an Environmental Offset Delivery Strategy, which will be finalised in consultation with relevant Australian Government and State agencies to address residual impacts calculated at the conclusion of the detailed design stage.

Overall, the Project, and the Inland Rail Program as a whole, offers a safe and sustainable solution to existing freight bottlenecks and growing pressure on existing road and rail corridors. The Project in its entirety presents opportunities for long-term economic, safety and sustainability benefits by connecting regional and urban markets to buyers in a more efficient and safer mode of transport.