

CHAPTER

06

Sustainability

INLAND
RAIL 

INLAND RAIL—BORDER TO GOWRIE ENVIRONMENTAL IMPACT STATEMENT

**ARTC**

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

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6. Sustainability

6.1 Introduction

This chapter provides a summary of the sustainability considerations in relation to the design, construction and operation of the Inland Rail—Border to Gowrie Project (the Project) including:

- ▶ Describing the policies, standards and guidelines relevant to sustainability in the context of the Project (refer Section 6.2)
- ▶ Defining sustainability within the context of the wider Inland Rail Program and how this has been considered during the development of the reference design for the Project (refer Section 6.2)
- ▶ Detailing the Sustainability Management Plan requirements and identifying sustainability initiatives that will guide the detail design, construction and operation of the Project (refer Section 6.5).

The reference design stage captures the key design inputs required for the draft EIS and provides the basis on which impact assessment has been undertaken. It will also inform the development of detail design as the Project progresses.

6.2 Legislation, policies, standards and guidelines

The legislation, policies and guidelines outlined in Table 6.1 have been used to guide the implementation of sustainability initiatives during the reference design process, in considering the whole-of-life of the Project. Table 6.1 should be read in conjunction with the regulatory context of specific matters such as ecology, hydrology, visual impact assessment and cultural heritage, which also interface with the preservation of natural, social and built environments considered in this chapter.

Full discussion on legislation of relevance to the Project is presented in Chapter 3: Legislation and Project Approvals Process.

TABLE 6.1 REGULATORY CONTEXT

Legislation, policy or guideline	Relevance to the Project
Commonwealth legislation	
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth) (EPBC Act)	The EPBC Act promotes ecologically sustainable development (ESD) through the conservation and ecologically sustainable use of natural resources.
<i>National Greenhouse and Energy Reporting Act 2007</i> (Cth)	Outlines the approach to providing data and reporting in relation to greenhouse gas emissions and energy consumption and production.
State legislation	
<i>Environmental Protection Act 1994</i> (Qld) (EP Act)	The EP Act aims to protect the environment while allowing for ecologically sustainable development.
<i>Planning Act 2016</i> (Qld) (Planning Act)	The purpose of the Planning Act is to establish an efficient, effective, transparent, integrated, coordinated and accountable system of land use planning, development assessment and related matters that facilitates the achievement of ecological sustainability in Queensland.
Planning frameworks, strategies and statutory guidelines	
<i>National Strategy for Ecologically Sustainable Development</i> (NSESD) (Council of Australian Governments, 1992)	The NSESD sets out the broad strategic and policy framework under which governments will cooperatively make decisions and take actions to pursue ESD in Australia.
<i>United Nations Framework Convention on Climate Change, including the Paris Agreement</i> (United Nations, 2015)	Australia is a party to the Paris Agreement 2015. In August 2015, the Australian Government committed to reducing emissions by 26 to 28 per cent below 2005 levels by 2030.
<i>Sustainable Procurement Guide</i> (Commonwealth of Australia, 2018a)	Sets the priorities and direction for sustainable procurement for Australian Government agencies and organisations.

Legislation, policy or guideline	Relevance to the Project
<i>Infrastructure Sustainability Planning Guidelines</i> (Infrastructure Sustainability Council of Australia, 2016)	Details how the Infrastructure Sustainability (IS) Rating Scheme may be applied to the planning phase of infrastructure projects, which occurs prior to the detail design phase.
<i>Infrastructure Sustainability Rating Scheme Version 1.2</i> (Infrastructure Sustainability Council of Australia, 2018)	Inland Rail has adopted the IS Rating Scheme for guiding infrastructure sustainability for all projects within the program.
<i>Queensland Climate Change Response, including the Climate Transition Strategy and Climate Adaptation Strategy</i> (Queensland Government, 2017a)	Provides guidance on the context for consideration of climate change mitigation and adaptation approaches in Queensland.
<i>Crime Prevention through Environmental Design</i> (CPTED) (Queensland Government, 2007)	The fundamental idea of CPTED is to use knowledge and creativity to design those built environments in ways that lessen or prevent the incidence of such crime.

Inland Rail guidelines	
<i>Inland Rail Sustainable Procurement Policy</i> (ARTC, 2020a)	Sets the priorities and direction for sustainable procurement in the context of Inland Rail. Refer Appendix E: Corporate Environment and Safety Policies.
<i>Inland Rail Environment and Sustainability Policy</i> (ARTC, 2018d)	Sets the priorities and direction for implementing sustainability initiatives during the planning, design, construction and operation phases of Inland Rail. Refer Appendix E: Corporate environment and safety policies.

6.3 Definition of ecologically sustainable development

The pursuit of sustainable development has gained momentum since the release of *Our Common Future*, commonly referred to as the Brundtland Report (World Commission on Environment and Development, 1987). In the Australian context, the definition of sustainable development is based on the information contained in the Brundtland Report, as well as the NSESD (Council of Australian Governments, 1992), which provides the following definition:

'...using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased'.

The Project, being part of the Inland Rail Program, meets the intent of the guiding principles for the NSESD, as shown in Table 6.2.

TABLE 6.2 GUIDING PRINCIPLES OF THE NATIONAL STRATEGY FOR ECOLOGICALLY SUSTAINABLE DEVELOPMENT AND RELEVANCE TO THE PROJECT

Guiding principle	Project response
▶ Decision making processes should effectively integrate both long and short-term economic, environmental, social and equity considerations	<ul style="list-style-type: none"> ▶ Multi-criteria analysis has been used as the decision-making process to assess potential economic, environmental, social and equity considerations consistently for the Project during reference design development. ▶ Value engineering provides the key to achieving return on investment. The concepts of ESD and energy efficiency have been incorporated into each major decision from Project inception, through concept planning, design, construction, operation and decommissioning, thereby offering the opportunity to demonstrate whole-of-life benefits for the Project.
▶ Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation	<ul style="list-style-type: none"> ▶ The draft EIS and reference design have been developed with input from field studies, scientific modelling and results of technical assessments across all engineering, planning and environmental disciplines. ▶ Technical investigations and mitigation strategies completed for the Project and reference design have been developed to be compliant with the ToR.

Guiding principle	Project response
<ul style="list-style-type: none"> ▶ The global dimension of environmental impacts of actions and policies should be recognised and considered 	<ul style="list-style-type: none"> ▶ As discussed in Chapter 2: Project Rationale, Inland Rail will provide a long-haul freight solution that is time and cost competitive compared to road freight. Consequently, Inland Rail will replace some of the long-haul road freight task, resulting in reduced road congestion and fewer vehicular carbon emissions. ▶ It is estimated that transportation of freight on Inland Rail will use one-third of the fuel compared to transportation of the same volume of freight via the existing road route (ARTC, 2015a).
<ul style="list-style-type: none"> ▶ The need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognised 	<ul style="list-style-type: none"> ▶ The addition of a major asset like the \$10 billion Inland Rail Program will even the playing field between road and rail. This will enhance the competition between the two modes in Australia, thus driving innovation and efficiency in each competing sector (ARTC, 2015a). ▶ Other strategic benefits include the expansion and enhancement of the national standard gauge network, the removal of a large portion of expensive future road freight, and the greater regional economic development, particularly along the Inland Rail corridor. ▶ It will better link producers, farmers and businesses to national and global markets. Almost 70 per cent of freight carried on Inland Rail will be household goods and groceries produced in Australia and consumed in our major cities.
<ul style="list-style-type: none"> ▶ The need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised 	<ul style="list-style-type: none"> ▶ Perhaps the most basic benefit outlined in the report is that Inland Rail would improve the productivity and efficiency of the Australian economy, by providing a 'backbone link' in the eastern Australian rail and road network.
<ul style="list-style-type: none"> ▶ Cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms 	<ul style="list-style-type: none"> ▶ It is estimated that Inland Rail would provide savings of \$10 per tonne for Melbourne–Brisbane inter-capital freight and would also 'significantly improve' rail connections between eastern Australian regional areas and the east coast ports (ARTC, 2015a). ▶ The trickle-down effect of this is lower prices for consumers, which in turn reduces the cost of living—a key component of most quality of life metrics.
<ul style="list-style-type: none"> ▶ Decisions and actions should provide for broad community involvement on issues that affect them 	<ul style="list-style-type: none"> ▶ An extensive Stakeholder Engagement Plan has been implemented to support preparation of the draft EIS and communicate findings and obtain input at key milestones. The Stakeholder Engagement Plan to support assessment of the draft EIS includes outcomes and how these outcomes have been addressed is provided in Appendix C: Stakeholder Engagement Report. In summary, the engagement program has involved: <ul style="list-style-type: none"> ▶ Regular communication with the community through community consultative committee meetings (16) ▶ More than 300 meetings with directly affected landowners since September 2017 ▶ Traditional Owner groups (4) ▶ State EIS government forum (1) ▶ Council EIS forums (2) ▶ Australian Government meetings (10) ▶ Queensland State Government meetings (24) ▶ New South Wales State Government meetings (12) ▶ TRC fortnightly technical working group meetings, commencing September 2017 ▶ GRC meetings with officers and councillors (14) ▶ Meetings with local business and industry ▶ Meetings with peak bodies, community and environmental groups (numerous in the region and Australia-wide) ▶ Meetings with government, local governments and Chambers of Commerce for the Social Impact Assessment ▶ Meetings with elected representatives (16) ▶ Presentations at industry forums.

Guiding principle	Project response
<ul style="list-style-type: none"> ▶ Decisions and actions should provide for broad community involvement on issues which affect them (continued) 	<ul style="list-style-type: none"> ▶ ARTC has consulted New South Wales State Government departments and Gwydir and Moree Plains Shire councils to discuss cross border issues. Since July 2018, ARTC has held 23 face-to-face meetings, exchanged 23 calls and sent 53 emails to GRC, Moree Plains Shire Council and Gwydir Shire Council presenting Project updates and draft EIS findings and seeking feedback in relation to the southern portion of the Project alignment and the adjoining New South Wales section of Inland Rail. ▶ Preparation of a Community and Stakeholder Engagement Plan is a proponent commitment for the Project. Refer Appendix U: Social Impact Assessment Report and Appendix Z: Proponent Commitments. The Community and Stakeholder Engagement Plan will be reviewed and amended over the course of the Project to reflect the changing activities and needs of the Project.

6.4 ARTC policy and commitments

In recognition of the role the Inland Rail Program has in demonstrating sustainability leadership, ARTC has developed an *Environment and Sustainability Policy* (ARTC, 2018d). A copy of the policy is provided in Appendix E: Corporate Environment and Sustainability Policies.

The sustainability commitments embedded into the *Environment and Sustainability Policy* (ARTC, 2018d) have guided the Project's approach to sustainability and are supported by identified targets for Inland Rail projects as part of the Program-wide Sustainability Strategy (ARTC, 2019a). The *Inland Rail Sustainability Strategy* has been prepared to ensure consistent application of sustainability initiatives across the Inland Rail Program. The Sustainability Strategy will inform the Sustainability Management Plan prepared for the Project (refer Section 6.5.1) and be provided to the Principal Contractor to guide the identification of Project-specific initiatives. The sustainability commitments for Inland Rail and how these will be implemented for the Project is summarised in Table 6.3.

TABLE 6.3 INLAND RAIL SUSTAINABILITY COMMITMENTS AND THE APPLICATION OF THESE TO THE PROJECT

ARTC Commitments	Application on the Project
<p>No Harm:</p> <ul style="list-style-type: none"> ▶ Our goal is that no-one is harmed at work, on our network, or as a result of Inland Rail activities 	<ul style="list-style-type: none"> ▶ Development and implementation of a community wellbeing plan to provide a framework for cooperation with key stakeholders to implement mitigation measures addressing impacts on quality of life as the result of Project impacts on amenity, character, cohesion or connectivity (refer Chapter 15: Social). ▶ Consultation with Queensland Police Service (QPS), Queensland Ambulance Service (QAS) and Queensland Fire and Emergency Service (QFES) during the detail design process to provide these agencies with an understanding for the scope and size of the Project and potential flash points to ensure appropriate emergency vehicle access is provided across the rail corridor (refer Chapter 15: Social). ▶ ARTC attendance at Local Disaster Management Group and District Management Group meetings during construction (refer Chapter 15: Social). ▶ CPTED: Incorporate measures in design, construction and operation that reduce the likelihood of damage and injury to people and property and the impact these issues have on local communities. during construction and operation. Example 1: Providing legible temporary traffic diversions during construction and lighting to meet CPTED guidance Example 2: Designated active and passive crossings are to be provided to prevent unauthorised passage into and across the rail corridor

ARTC Commitments	Application on the Project
<p>Engage early and meaningfully with stakeholders, including Indigenous organisations, communities, industry and government:</p> <ul style="list-style-type: none"> ▶ Build effective working relationships and a shared understanding of the program and solutions 	<ul style="list-style-type: none"> ▶ Development and implementation of a Community and Stakeholder Engagement Plan that ensures due consideration of all Project related opportunities and concerns and maintains productive relationships and communication between ARTC Inland Rail, the Principal Contractor, landowners, Traditional Owners and all levels of government (refer Chapter 15: Social) ▶ Heritage: Recognise the role that engagement with Indigenous and non-Indigenous communities have in the identification of heritage items and values (refer Chapter 17: Cultural Heritage) ▶ Heritage: Recognise the role that engagement with the Indigenous and non-Indigenous community has in the identification of heritage items and values and investigate the opportunity to interpret heritage to promote local heritage values.
<p>Promote long-term economic benefits within regional communities:</p> <ul style="list-style-type: none"> ▶ Create opportunities for development of skilled local and Indigenous workers ▶ Support local and Indigenous businesses to ensure they are prepared for and provided with opportunities to participate ▶ Enable Inland Rail to be a catalyst for complementary private-sector investment 	<ul style="list-style-type: none"> ▶ Procurement: Encourage sustainability throughout the value chain for goods and services used to build and operate Inland Rail ▶ Community and stakeholder engagement: Encourage, plan, implement and monitor stakeholder and community engagement ▶ Local business: Implementation of an Indigenous participation plan ▶ Local business: Implementation of Inland Rail Skills Academy ▶ Workforce: Local resident and Indigenous workforce targets will be established by ARTC and passed onto the Principal Contractor ▶ Local business: ARTC has a commitment to local content in its supply chain ▶ Implement the Social Impact Management Plan specifically relating to workforce management, accommodation and local business and industry content (refer Chapter 15: Social) ▶ ARTC has developed an Australian Industry Participation Plan and will work with various service providers, consultants and contractors to implement the plan
<p>Protect the environment by minimising the environmental footprint:</p> <ul style="list-style-type: none"> ▶ Apply principles of avoid, minimise, and offset to manage impacts to receiving environments and ecological values ▶ Reduce greenhouse gas emissions and minimise waste ▶ Minimise water use ▶ Continually investigate opportunities to improve environmental values and prevent pollution ▶ Obtain and comply with all relevant environmental approvals 	<ul style="list-style-type: none"> ▶ Environment: Seek opportunities to reduce the environmental footprint of the Project ▶ Waste: Seek opportunities to minimise waste generation and to reuse or recycle materials ▶ Energy and carbon: Seek opportunities to reduce the carbon footprint of the Project by considering construction and operational greenhouse emissions ▶ Water: Seek opportunities to reduce the total amount of water used on the Project and to identify sources of water that reduce the demand on potable water supplies ▶ Resources and embodied energy: Seek opportunities to reduce the environmental impacts of materials used during construction and operation of the Project by encouraging dematerialisation of the design and improving the service life of materials
<p>Future-proof Inland Rail to be efficient and effective in the long term:</p> <ul style="list-style-type: none"> ▶ Design for climate change resilience ▶ Incorporate future demand requirements and corridor uses in the current design 	<ul style="list-style-type: none"> ▶ Climate change: Consider climate change impacts and opportunities to reduce the risks to Inland Rail associated with a future climate ▶ Future-proofing: Consider the future demand requirements to reduce the potential for impacts to the natural and social environment associated with future upgrades to meet increased demand for freight rail

ARTC Commitments	Application on the Project
Base decisions on balanced consideration of technical, economic, environmental and social issues: <ul style="list-style-type: none"> ▶ Adopt a consistent approach across the program 	<ul style="list-style-type: none"> ▶ Decision making: Consistently consider the environmental, social, local economic and technical impacts during decision making and ensure such considerations are built into the decision-making process
Regularly review and audit processes and performance: <ul style="list-style-type: none"> ▶ Challenge the way we have always done things ▶ Ensure we are doing what we said we would do 	<ul style="list-style-type: none"> ▶ Leadership: Demonstrate sustainability leadership across the delivery of Inland Rail and at the Project level ▶ Management and governance: Recognise the importance of monitoring and reviewing progress to identify opportunities for continuous improvement ▶ Benefits identification: Identify the benefits of the Project early so that the promised benefits can be assessed and reviewed during operation
Drive culture of continuous improvement: <ul style="list-style-type: none"> ▶ Seek to improve, collaborate and add value throughout delivery ▶ Continually improve the Environmental Management System to enhance environmental performance 	<ul style="list-style-type: none"> ▶ Management and governance: Encourage improvement in the delivery of the Project and on the promises made to stakeholders and the community ▶ Stakeholder participation: Continue to consult with community and stakeholder groups to identify opportunities for improving Project outcomes ▶ Innovation: Review the outcomes of the way things are done to find new and better ways of achieving the desired outcomes

6.5 Sustainability management and measures

6.5.1 Sustainability Management Plan

A Sustainability Management Plan will be developed to guide the design, construction and operation of the Project. The Plan will:

- ▶ Demonstrate leadership and commitment to sustainability
- ▶ Set targets for safety, local employment, materials, waste, procurement, ecological connectivity, greenhouse gas emissions and climate resilience in line with the Inland Rail objectives and targets
- ▶ Establish the roles, responsibilities and resourcing requirements for embedding sustainability throughout the design, procurement, construction and operation of the Project. It is anticipated that local employment and business targets will be developed and negotiated through the competitive tendering/bidding process for construction contracts.
- ▶ Document the process for identification, assessment and implementation of sustainability initiatives and opportunities, particularly those associated with the efficient use of energy, water and transport
- ▶ Document the process for managing the assessment, monitoring and review of sustainability to achieve an 'Excellent' rating under the IS Rating Scheme
- ▶ Outline the documentation and reporting requirements necessary to demonstrate how sustainability has been incorporated into the Project during design, construction and operation.

Prior to the commencement of operations, the design and construction the Sustainability Management Plan will be reviewed and updated to focus on operation and maintenance aspects.

6.5.2 Sustainability in reference design

During the development of the reference design, design frameworks were used to guide the design development, to identify sustainability initiatives. These reference frameworks are outlined in Table 6.4.

TABLE 6.4 REFERENCE DESIGN FRAMEWORK FOR SUSTAINABILITY INITIATIVES

Topic	Sustainability initiatives
Making informed decisions	<p>Development of a Sustainability Management Plan that guides the reference design and EIS process for the Project to provide sustainability outcomes that support the <i>Inland Rail Environment and Sustainability Policy</i> (ARTC, 2018d).</p> <hr/> <p>Use of a safety in the design process that provides a comprehensive framework to avoid or minimise risk and enhance safety.</p> <hr/> <p>Use of multi-criteria analysis assessments that considers environmental, social and economic impacts to evaluate alignment options.</p> <hr/> <p>Development of a constructability assessment that identifies methods and activities from start to finish during the construction phase to inform how the Project could be built.</p> <hr/> <p>Implementation of a value management process that highlights potential opportunities for defining, maximising and achieving efficiencies.</p> <hr/> <p>Implementation of a Consultation Manager System to record stakeholder feedback for all phases of the Project.</p>
Future-proofing	<p>The horizontal and vertical alignment of the Project has considered future asset requirements, including ultimate corridor considerations, to minimise the potential for premature decommissioning of the infrastructure and future disruption or impacts to the environment and landowners.</p> <p>In particular, the following were considered:</p> <ul style="list-style-type: none"> ▶ Additional earthworks and property required to accommodate extended crossing loops for trains up to 3,600 m long ▶ Structures designed to accommodate 30 tonne axle load (TAL) ▶ Track structure and formation designed to suit 30 TAL ▶ Connections to existing brownfield operating rail corridors via turnout connections to Inland Rail. <hr/> <p>The design has endeavoured not to preclude opportunities for adjacent land use or business to access the Inland Rail corridor in the future.</p>
Climate response	<p>The Project has been designed to achieve the Basis of Design for Inland Rail (refer Chapter 5: Project Description), which includes:</p> <ul style="list-style-type: none"> ▶ 50-year design life for formation and embankment performance ▶ Track drainage ensures that the potential for performance of the formation and track is unlikely to be affected by water ▶ Earthworks designed to ensure that the rail formation is not over-topped during a 1% AEP flood event ▶ Embankment cross section can sustain flood levels up to the 1% AEP ▶ Bridges are designed to withstand flood events up to and including 0.05% AEP (2,000-year event). <hr/> <p>Consideration of climate change in modelling used to inform design of drainage and waterways including:</p> <ul style="list-style-type: none"> ▶ Application of the <i>Australian Rainfall and Runoff Discussion Paper: An interim guideline for considering climate change in rainfall and runoff</i> (Engineers Australia, 2014) ▶ Assessment of impacts associated with the 1% AEP to determine the sensitivity of the design to potential changes in rainfall intensity ▶ Where enhancement or upgrading to existing track is to be undertaken, no worsening of the existing track flood immunity ▶ Adoption of afflux design limits of 0.01 m for the building floor envelope and neighbouring infrastructure that are already flooded, unless agreed otherwise with affected stakeholders for the 1% AEP. <hr/> <p>Consideration and implementation of treatment and adaptation options associated with the direct and indirect impacts of climate change and natural hazards to reduce the potential for service disruption.</p>

Topic	Sustainability initiatives
Climate response (continued)	Design of mitigation measures applied to manage runoff and flooding to sensitive receivers.
	Consideration of extreme frequency flood events to improve flood immunity including consideration of the 1% AEP and 0.05% AEP flood events.
	Consideration of long duration flood events (i.e. three-day inundation) on infrastructure components including embankments.
	Implementation of changes to horizontal and vertical alignment of the infrastructure to accommodate proposed bridges, such as across the Condamine River floodplain, where six bridges have been incorporated into the design with a combined length of 6 km to minimise hydrological impacts to adjoining properties.
	The reference design includes the option to modify the existing Yelarbon flood levee to increase the flood immunity for the township of Yelarbon with the addition of the Project. This solution has been discussed with GRC and agreed in principle as an acceptable design solution.

The Project has embraced the three main aspects of sustainability: consideration of the economic, environmental and social impacts and opportunities. The sustainability initiatives that have been identified, documented and implemented during reference design in accordance with these principles, are identified in Table 6.5 under the themes of:

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

6.5.3 Project specific sustainability initiatives

A summary of sustainability initiatives identified during reference design for further investigation and implementation during detail design, construction and/or operation of the Project is provided in Table 6.5.

TABLE 6.5 SUSTAINABILITY IN REFERENCE DESIGN INITIATIVES

Theme	Topic	Sustainability initiatives
Advancing local, regional and national economies	Supporting local businesses and Indigenous businesses	Adherence to the <i>Inland Rail Sustainable Procurement Policy</i> (ARTC, 2020a) to ensure that supply opportunities are available to local business. Refer Appendix E: Corporate Environment and Safety Policies
		Engagement has commenced with local businesses and service providers to identify opportunities for participation in construction of the Project
		ARTC’s Business Development Manager has engaged with local business to identify opportunities to develop and promote local business use of Inland Rail once operational
		Local material sourcing strategies have been considered, including identifying opportunities for the use of local material sources, quarries and concrete suppliers
		A commitment by ARTC to develop a clear and efficient process for people to seek information about employment opportunities and to register their interest in Inland Rail
		Work has commenced with local communities and government stakeholders to identify education and training pathways, and employment opportunities for local residents during and post construction
Environmental protection	Biodiversity conservation	The Project considers the re-use of previously disturbed land, including existing rail corridors and non-productive land, to minimise impacts to agricultural land and native vegetation
		The Project has been positioned to align with roads and property boundaries, where possible, to reduce impacts to habitat, fauna passage and remnant vegetation
		Where culverts are to be replaced or constructed, the opportunity for dry fauna passage is not precluded. This is in addition to fish passage considerations
		Design has identified and implemented measures to maintain connectivity for fauna, including the use of fencing and dedicated crossings associated with the three main terrestrial biodiversity corridors (Whetstone State Forest, Bringalily State Forest and between Pittsworth and Southbrook) and fish passages. Refer Appendix M: Preliminary Fauna Movement Provision and Fencing Strategy
		Design has been developed to minimise impacts to watercourses, riparian vegetation and in-stream flora and habitats including: <ul style="list-style-type: none"> ▶ Adopting a crossing structure hierarchy (e.g. bridges preferred to culverts), as applicable and relevant to local conditions and constructability ▶ Aiming to avoid, then minimise the extent of watercourse diversions or realignments ▶ Avoiding discharges/impacts to hydrology associated with wetlands, including surface flows ▶ Considering water quality design matters in response to impacts identified through the draft EIS

Theme	Topic	Sustainability initiatives
Environmental protection (continued)	Efficient use of resources and minimisation of carbon footprint	Re-use of local sources of aggregate and treatment of dispersive and reactive materials has been considered to improve mass haul
		Re-use of material excavated below the rail embankment for less critical parts of infrastructure has been considered
		Re-use of excavated material as a stabilised structural fill has been considered
		The number, width and depth of cuts have been optimised to avoid the generation of material that would be considered surplus to Project requirements
		The viability of the re-use of ballast as high quality general fill or structural fill has been considered to minimise the import of rock armour
		The use of onsite materials through re-use of spoil has been considered to minimise the disposal and transportation of materials. Preliminary ways to treat or ameliorate materials that would normally be considered unsuitable for use have been identified. Refer Appendix Y: Spoil Management Strategy
		The horizontal and vertical design have been refined within the confines of the Project footprint to minimise the quantity of offsite fill required
		The Project has been aligned to avoid, where possible, steep terrain and topographical constraints to minimise earthworks and provide for more efficient track geometry and grade
		The Project alignment has been co-located with existing transport corridors and property boundaries, wherever practically possible, to minimise land severance and loss of productive agricultural land
		Existing brownfield operating rail environments (South Western and Millmerran Branch Lines) have been used where possible to minimise land take impacts
Respect for people, communities and valued places	Being a good neighbour	Initial discussions with the Department of Natural Resources, Mines and Energy (DNRME) to identify opportunities for State forest timber salvage to supply local timber mills prior to commencement of rail construction
		The shape and size of batters have been optimised to encourage cut-and-fill balancing
		Erosion and sediment control and scour protection have been provided for in the permanent and temporary Project footprint to minimise the potential for soil loss during construction and operation
		The Project has been co-located with existing transport corridors as much as possible, including being positioned within the existing South Western Line and Millmerran Branch Line rail corridors, to avoid introducing a new linear infrastructure corridor in proximity to receptors potentially sensitive to noise and vibration
		Crossing loops at Yelarbon, Inglewood, Kooroongarra, Yandilla and Broxburn have been positioned to avoid, where possible, the exposure of sensitive receptors to noise and vibrations and emissions from idling trains
		The rail alignment has been positioned to align with roads and private property boundaries where possible to reduce impacts to limit property severance

Theme	Topic	Sustainability initiatives
Respect for people, communities and valued places (continued)	Being a good neighbour (continued)	Consultation has been undertaken with property owners to ensure that a satisfactory level of access between adjoining properties is maintained, and to identify actions which will minimise or offset changes to connectivity or changes to water flows which affect their properties
		The Project footprint has been restricted to that required for safe construction and operation of the rail network to maintain the rural character of the area
Respecting heritage and culture values		Engagement with registered Aboriginal Parties has occurred in the establishment of Cultural Heritage Management Plan (CHMPs) for the Project, formulating ARTC's commitments to fulfilling its duty of care under the <i>Aboriginal and Cultural Heritage Act</i> (Qld) in a manner that is endorsed by the relevant parties
		Permanent and temporary infrastructure and ancillary activities have been located to minimise impacts to locations of cultural heritage value
		Alignment selection has sought to reduce the proximity of the Project to non-Indigenous cultural heritage
Building relationships		Community and stakeholder feedback has been incorporated into decision making for the Project, including design, impact mitigation and construction planning (e.g. the Condamine River floodplain crossing solution)
Community safety, health and wellbeing		Road and rail interfaces for public roads have been optimised to minimise safety risks, be considerate of wait times and maintain a high level of local accessibility
		Landowners have been consulted to identify specific measures that will reduce impacts on property management, connectivity or amenity, including consideration of the level of existing lighting, noise levels and visual amenity within the area and the location and design of the Project to reduce impacts
		Connectivity of stock routes has been maintained, acknowledging their importance to local graziers as a conduit for stock movement and as a source of/pathway to food and water
		Watercourse crossing structures (including culverts and bridges) have been designed to minimise the need for ongoing maintenance and risk of blockage
		Crossing loops have been positioned to avoid, where possible, sensitive receptors to emissions
		The rail corridor has been positioned to minimise impacts to licensed groundwater bores
		Temporary construction facilities (e.g. laydown areas) have been positioned to avoid sensitive receptors to noise, where practically possible
		Sensitive receptors to potential noise, air quality and vibration impacts have been considered during permanent alignment selection for rail and road infrastructure
		Future controls have been incorporated into the reference design through the safety in design process to address key safety risks throughout the Project life cycle

TABLE 6.6 SUSTAINABILITY OPPORTUNITIES FOR FUTURE PHASES OF THE PROJECT

Theme	Area	Sustainability opportunities
Governance	Sustainability leadership	<ul style="list-style-type: none"> ▶ Create a culture within ARTC where implementation of sustainability initiatives is inherent in all business activities ▶ Commit to operating as a responsible and attractive employer ▶ Maintain a high level of safety and security through the development of management systems.
	Monitoring and evaluating performance	<ul style="list-style-type: none"> ▶ Maintain dialogue with supply chain stakeholders ▶ Report transparently about environmental performance ▶ Include performance requirements for the Principal Contractor to report against sustainability targets on a monthly basis.
Making informed decisions		<ul style="list-style-type: none"> ▶ Build an Environmental Management System for Inland Rail that collects sustainability data from individual projects, in line with IS Rating Scheme credit requirements, in a consistent and reliable format ▶ Create a robust sustainability reporting framework that supports decision making against the <i>Inland Rail Sustainability Strategy</i> (ARTC, 2019a).
Future proofing		<ul style="list-style-type: none"> ▶ Embed the principles of sustainability and environmental benefits into rail asset management programs including: <ul style="list-style-type: none"> ▶ Resource consumption (energy, water, fuel, chemicals) ▶ Equipment efficiency ▶ Procurement of environmentally friendly and socially friendly materials and suppliers ▶ Triple bottom line reporting into asset risk analysis including potential for environmental damage, negative social impacts and regulatory compliance issues from asset failures ▶ Review of sustainability impacts from asset disposal.
Encouraging innovation		<ul style="list-style-type: none"> ▶ Apply precautionary approaches to environmental challenges and support initiatives, projects and new technologies for further improved environmental performance ▶ The Inland Rail Program has potential to act as catalyst for market-driven investments in the freight and complementary industries. ARTC will assess opportunities to support such developments as they arise ▶ Partnering with key material providers (e.g. providers of rails and sleepers) to pursue innovation opportunities.
Learning from our experiences/continuous improvement		<ul style="list-style-type: none"> ▶ Establish a Program-wide sustainability network to enable the sharing of lessons learnt between projects and with the broader industry ▶ Identify environmental risks and processes across the Inland Rail Program and support new ways of acting to reduce these ▶ Provide access to training on environmental improvement and requirements and provide awareness and visibility initiatives across ARTC.

Theme	Area	Sustainability opportunities
Advancing local, regional and national economies	Supporting local and Indigenous businesses	<ul style="list-style-type: none"> ▶ Include specific details on opportunities and targets for local and Indigenous business participation in the Project’s implementation plan for the Inland Rail Sustainable Procurement Policy (refer Appendix E: Corporate Environment and Safety Policies). It is anticipated that local employment and business targets will be developed and negotiated through the competitive tendering/bidding process for construction contracts.
	Job creation and skills development	<ul style="list-style-type: none"> ▶ Work with government agencies to assist the local workforce to adjust to construction employment opportunities through: <ul style="list-style-type: none"> ▶ Workforce upskilling ▶ Engagement of small business ▶ Liaison with education and training providers ▶ Development of procurement and tendering processes for local business and suppliers. ▶ Focus on local impacts and communities through consultation and opportunity planning ▶ Consider skills development and training partnerships with training providers to continue skills development beyond the life of the Project ▶ Continue engaging with communities, representative organisations and service providers to develop new local businesses.
	Stimulating sustainable procurement	<ul style="list-style-type: none"> ▶ Engage with suppliers and contractors to ensure they recognise and understand their role in supporting ARTC’s sustainable objectives ▶ Select products and services that have lower environmental impacts across their life cycle compared with competing products and services, in the context of whole-of-life value for money. ▶ Foster a viable market for sustainable products and services by supporting businesses and industry groups that demonstrate innovation in sustainability ▶ Support suppliers who are socially responsible and adopt ethical practices.
Respect for people, communities and valued places	Building relationships	<ul style="list-style-type: none"> ▶ Establish a Community Reference Group, as per the Social Impact Management Plan (refer Chapter 15: Social) to ensure a representative selection of the community: <ul style="list-style-type: none"> ▶ Are afforded the opportunity to provide feedback and are involved in the Project ▶ Have an increased understanding about the Project ▶ Contribute to a more effective response from the Project team to community issues and concerns. ▶ Implement communication mechanisms that will be maintained by ARTC throughout the detail design, pre-construction and construction phases.
	Community safety, health and wellbeing	<ul style="list-style-type: none"> ▶ Move freight competitively by rail, taking long-haul truck traffic off roads reducing greenhouse gas emissions ▶ Explore the use of closed-circuit television monitoring systems that address rail trespass and road vehicle incursions specifically targeting: <ul style="list-style-type: none"> ▶ Fire detection and response ▶ Remote monitoring of tracks and unattended or secure locations ▶ Video surveillance and analysis ▶ Train schedule monitoring ▶ Track maintenance and detection of damage or obstructions ▶ Railway crossing management and detection of objects on the line ▶ Detection and recognition of over speeding ▶ Detection of objects protruding from moving trains. ▶ Possible re-use of work sites, laydown areas, haul roads associated with projects being pursued within the region or neighbouring regions ▶ Implementation of health and community wellbeing actions from the Social Impact Management Plan (refer Chapter 15: Social).

Theme	Area	Sustainability opportunities
Environmental protection	Biodiversity conservation/ ecological integrity	<ul style="list-style-type: none"> ▶ Investigate opportunities to work with local land care groups to implement a program of supplementary planting of habitat corridors ▶ During detail design, continuing to refine and optimise alignment design to minimise the corridor footprint on environmentally sensitive areas ▶ Evaluate technically feasible options to re-vegetate soils slopes steeper than 1:3 and maintain this cover as protection from ongoing erosive flows ▶ Adopt waterway design principles to promote natural flow through culverts and 'wet areas' ▶ Use endemic species in site restoration that retard weed spread and require minimal maintenance wherever practically possible.
	Using resources efficiently	<ul style="list-style-type: none"> ▶ Explore opportunities for the delivery and haulage of materials via the existing rail networks ▶ Promote the selection of fuel/energy efficient plant and equipment used during construction. During detail design: <ul style="list-style-type: none"> ▶ Identify opportunities to change batter slopes and save earthworks where not adversely impacting bulk earthworks or material re-use ▶ Review vertical alignment to determine potential earthworks volumes and culvert design savings ▶ Assess culverts with low afflux at rail property boundary to achieve potential culvert optimisation ▶ Identify potential earthworks savings by reverting from reinforced concrete pipe to reinforced concrete box culvert to reduce cover requirements. ▶ Investigate the refinement of earthworks and substructure quantities through: <ul style="list-style-type: none"> ▶ Potential re-use of dispersive soils over the outer part of embankments using lime and specialist revegetation detailing ▶ Re-use high plasticity clay soils ▶ Use geogrids and stabilisation to reduce the volume of subgrade treatment. ▶ Use low embankments providing the opportunity to omit rock protection (subject to hydraulic assessment) ▶ During construction, investigate using of: <ul style="list-style-type: none"> ▶ Light detection and radar (LiDAR) aerial surveying for accurate knowledge and control of cut and fill requirements ▶ Pre-fabricated solutions for structures ▶ Mobile crushing plants and materials handling ▶ Positioning of pre-casting and manufacturing locations to reduce transport footprint. ▶ Investigate the opportunity to balance the use of materials across Project boundaries, including exchanging surplus fill, aggregates, pipe work and common use materials between projects ▶ Investigate the use of pre-fabricated Project components throughout the construction life cycle.
	Preventing pollution and minimising carbon footprint	<ul style="list-style-type: none"> ▶ Consider the use solar power systems, including stand-alone systems, for the provision of power at site offices, accommodation camps and for permanent infrastructure associated with signalling ▶ Investigate the implementation of signalling control systems that automatically adjusts control and speed profiles so that the train arrives at target destinations on time while minimising energy consumption ▶ Invest in practical methods to address waste minimisation, energy and water saving technologies and practices during construction, operation and maintenance.

6.6 Conclusions

Sustainability is an important consideration for the Project, especially for maximising resource efficiency, enhancing local economic activity and improving potential environmental and social outcomes for the Project. During the reference design, a broad range of sustainability initiatives were identified. These initiatives have either already been implemented or are subject to further development during detail design.

Further 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 during detail design, construction and/or operation and, where feasible, implemented by the Project.

The reference design and future sustainability initiatives identified during the preparation of the draft EIS will contribute to the achievement of an 'Excellent' rating of performance against version 1.2 of the IS Rating Scheme for the Inland Rail Program that is currently being progressed separately as a registered project with the Infrastructure Sustainability Council of Australia.