

CHAPTER

# 07

INLAND  
RAIL 

## Sustainability

GOWRIE TO HELIDON 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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## 7. Sustainability

### 7.1 Summary

Australian Rail Track Corporation (ARTC) aims to create long-term value and deliver Inland Rail with the best possible outcomes for local communities, the economy and the natural environment. Seven key objectives and associated targets drive our performance at both program and project levels:

- ▶ Leadership and governance
- ▶ Community and economy
- ▶ Environment and heritage
- ▶ Resource use
- ▶ Sustainable procurement
- ▶ Future operations.

Sustainability is an important consideration for the Gowrie to Helidon project (the Project). As part of the wider Inland Rail Program, the Project provides opportunities to:

- ▶ Maximise resource efficiency
- ▶ Enhance local economic activity
- ▶ Mitigate potential environmental and social impacts.

These key areas of focus align with Inland Rail's Environment and Sustainability Policy (ARTC, 2018a), which outlines the sustainability objectives, targets and commitments for the Project. This policy is included in Appendix G: Corporate Policies.

During the development of the design, a broad range of sustainability initiatives have been identified and incorporated into the Project. These opportunities and initiatives will contribute towards achieving an Infrastructure Sustainability (IS) rating for the Project against version 1.2 of the IS Rating Scheme, which is administered by the Infrastructure Sustainability Council of Australia (ISCA). The Project's sustainability initiatives will also contribute to the Inland Rail Program's target of achieving an 'Excellent' rating under the IS Rating Scheme. Inland Rail publicly reports on their performance to stakeholders and the community in annual sustainability reports.

### 7.2 Scope of chapter

This chapter provides a summary of the sustainability considerations in relation to the design, construction and operation of the Project, including:

- ▶ Describing the legislation, policies, standards and guidelines relevant to sustainability in the context of the Project (refer Section 7.3)
- ▶ Defining ARTC's approach to sustainability within the context of the wider Inland Rail Program, and how this has been considered during the early stages of design of the Project (refer Section 7.4)
- ▶ Detailing the proposed Sustainability Management Plan requirements and identified sustainability initiatives that will guide the detailed design (refer Section 7.7), construction and operation of the Project (refer Section 7.8).

The early design stages capture the key design inputs required for the Environmental Impact Statement (EIS) and will provide the basis from which primary approval documentation will be developed. It will also advise the development of detailed designs as the Project progresses.

### 7.3 Legislation, policies, standards and guidelines

The legislation, policies and guidelines outlined in Table 7.1 have been used to guide the implementation of sustainability initiatives during the Project design phase, and in consideration of the whole-of-life of the Project. Table 7.1 should be read in conjunction with the regulatory context presented in the technical discipline studies, such as ecology, hydrology, visual impact assessment and cultural heritage, which also focus on preservation of natural, social and built environments.

**TABLE 7.1: REGULATORY CONTEXT**

<b>Legislation, policy or guideline</b>	<b>Relevance to the Project</b>
<b>Commonwealth legislation</b>	
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth) (EPBC Act)	The EPBC Act promotes ecological sustainable development 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.
<b>State legislation</b>	
<i>Environment Protection Act 1994</i> (Qld)	Aims to protect the environment while allowing for ecologically sustainable development that focuses on the protection of ecological processes on which life depends.
<i>State Development and Public Works Organisation Act 1971</i> (Qld)	Establishes the framework for assessment of declared coordinated projects in Queensland.
<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.
<b>Planning frameworks, strategies and statutory guidelines</b>	
<i>National Strategy for Ecologically Sustainable Development</i> (NSES) (Council of Australian Governments, 1992)	The National Strategy for Ecologically Sustainable Development sets out the broad strategic and policy framework under which governments will cooperatively make decisions and take actions to pursue ecologically sustainable development in Australia.
<i>United Nations Framework Convention on Climate Change</i> , including Paris Agreement on climate change	Australia is a party to the Paris Agreement 2015. In August 2015, the Australian Government committed to reduce emissions by 26 to 28 per cent below 2005 levels by 2030.
<i>Sustainable Procurement Guide</i> (Commonwealth of Australia, 2018)	Sets the priorities and direction for sustainable procurement governments, businesses and individuals.
<i>Guide for sustainable procurement of services</i> (Eco-Buy Limited, 2013).	Sets the priorities and direction for sustainable procurement for Australian Government agencies and organisations.
<i>Infrastructure Sustainability Planning Guidelines</i> (ISCA, 2016a)	Details how the IS rating scheme may be applied to the planning design, construction and operational phases of infrastructure projects, with the scheme evaluating sustainability performance of infrastructure development in terms of governance, economic, environmental and social.
<i>Infrastructure Sustainability Rating Scheme Version 1.2</i> , April 2018 update (ISCA, 2016b)	Inland Rail has adopted the IS Rating Scheme for guiding sustainability for all projects within the Program.
<i>Queensland Climate Change Response, including the Climate Transition Strategy and Climate Adaptation Strategy</i> (Department of Environment and Heritage (DEH), 2017a and 2017b)	Provides guidance on the transition to a zero net emissions future and how we can prepare for the current and future impacts of a changing climate.
<i>Crime Prevention through Environmental Design</i> (CPTED) (Queensland Government, 2007)	The fundamental idea of <i>Crime Prevention through Environmental Design</i> is to use knowledge and creativity to design built environments in ways that lessen or prevent the incidence of crime.
<b>Program-related guidelines</b>	
<i>Inland Rail Sustainable Procurement Policy</i> (ARTC, 2018c)	Inland Rail is committed to identifying and managing the social, environmental and economic risks and opportunities within our supply chain. The policy sets the priorities and direction for sustainable procurement in the context of Inland Rail (Appendix G: Corporate Policies).
<i>Inland Rail Environment and Sustainability Policy</i> (ARTC, 2018a)	Sets the priorities and direction for implementing sustainability initiatives during the planning, design and operation phases of Inland Rail (refer Table 7.2 and Appendix G: Corporate Policies).

## 7.4 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 National Strategy for Ecologically Sustainable Development (Council of Australian Governments, 1992). The National Strategy for Ecologically Sustainable Development definition of ecologically sustainable development is:

*‘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 *National Strategy for Ecologically Sustainable Development* (COAG, 1992) as shown in Table 7.2.

**TABLE 7.2: 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"> <li>▶ Multi-criteria analysis (MCA) has been used as the decision-making process to assess potential economic, environmental, social and equity considerations consistently for the Project during design development (refer Chapter 2: Project Rationale).</li> <li>▶ Value engineering provides the key to achieving return on investment. The concepts of Ecologically Sustainable Development 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.</li> </ul>
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"> <li>▶ The draft EIS and design have been developed with input from field studies, scientific modelling and results of technical assessments across all engineering, planning and environmental disciplines.</li> <li>▶ Technical investigations and mitigation strategies completed for the Project and design have been developed to be compliant with the Terms of Reference for the Project and, where applicable, relevant survey and monitoring guidelines, policies standards and procedures.</li> </ul>
The global dimension of environmental impacts of actions and policies should be recognised and considered	<ul style="list-style-type: none"> <li>▶ 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 (e.g. every tonne of freight moved by rail rather than road reduces greenhouse emissions by two-thirds).</li> </ul>
The need to develop a strong, growing and diversified economy that can enhance the capacity for environmental protection should be recognised	<ul style="list-style-type: none"> <li>▶ The addition of Inland Rail will even the playing field between road and rail. This will enhance the competition between the two modes in Australia, driving innovation and efficiency in each competing sector (ARTC, 2015a).</li> <li>▶ 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.</li> <li>▶ 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.</li> <li>▶ The Project will provide a more direct and efficient route through the Toowoomba Range, which has been identified as a major constraint to the agricultural sector bid to shift transport from road to rail.</li> </ul>
The need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised	<ul style="list-style-type: none"> <li>▶ 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.</li> </ul>

Guiding principle	Project response
Cost-effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms	<ul style="list-style-type: none"> <li>▶ 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)</li> <li>▶ 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</li> </ul>
Decisions and actions should provide for broad community involvement on issues that affect them	<ul style="list-style-type: none"> <li>▶ An extensive community and stakeholder, including all levels of government, consultation process has been undertaken to support preparation of the draft EIS, and communicate findings and obtain input at key milestones. Consultation items raised and how these outcomes have been addressed is provided in Appendix D: Community Consultation.</li> <li>▶ Preparation of a Community and Stakeholder Engagement Plan is a proponent commitment for the Project. Refer Appendix Q: Social Impact Assessment and Appendix F: 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.</li> </ul>

## 7.5 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, 2018a). A copy of the policy is provided in Appendix G: Corporate Policies.

The sustainability commitments embedded into the Inland Rail Environment and Sustainability Policy have guided the Project’s approach to sustainability and environmental protection and are supported by identified targets for Inland Rail projects as part of the Program-wide Inland Rail Sustainability Strategy. 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 7.6) and be provided to the contractor to guide the identification of Project-specific initiatives. These commitments are summarised in Table 7.3.

**TABLE 7.3: INLAND RAIL SUSTAINABILITY COMMITMENTS AND THE APPLICATION OF THESE ON THE PROJECT**

ARTC commitments	Application on the Project
<p>No harm:</p> <ul style="list-style-type: none"> <li>▶ Our goal is that no one is harmed at work, on our network, or as a result of Inland Rail activities.</li> </ul>	<ul style="list-style-type: none"> <li>▶ <b>Health and community wellbeing</b>—in accordance with the Social Impact Management Plan (SIMP) and the Health and Community Wellbeing Action Plan, create a safe environment, developing programs and initiatives to improve safety outcomes for local communities (refer Chapter 16: Social)</li> <li>▶ Consultation with Queensland Fire and Emergency Service has been undertaken during the design to confirm emergency access requirements to the tunnel and the viaducts. This relationship will be ongoing, with the Queensland Police Service and Queensland Ambulance Service also to be actively consulted during detailed design with the intent of providing the agencies with an understanding of the scope, size and timing of the Project and minimising disruption to emergency access across the rail corridor (refer Chapter 6: Project Description and Chapter 16: Social).</li> <li>▶ ARTC attendance at the local disaster management group during construction (refer Chapter 16: Social)</li> <li>▶ Rail is a safer mode of transport and will reduce the number of trucks on the existing road network. No level crossings are proposed as part of the Project, with the Project also eliminating an existing level crossing, with both actions aligning with the national and Queensland Level Crossing Safety strategies.</li> <li>▶ Crime prevention through environmental design—incorporating measures in design, construction and operation that reduce the likelihood of damage and injury to people and property and the impact these have on local communities and investigating the opportunity for designing temporary construction diversions and lighting to meet crime prevention through environmental design guidance (refer Chapter 10: Landscape and Visual Amenity).</li> </ul>



## ARTC commitments

Engage early and meaningfully with stakeholders, including Indigenous organisations, communities, industry and government:

- ▶ Build effective working relationships and a shared understanding of the Program and solutions.

Promote long-term economic benefits within communities:

- ▶ Create lasting 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.

Protect the environment by minimising the environmental footprint:

- ▶ Apply principles of avoid, minimise, 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.

## Application on the Project

▶ **Community and stakeholder engagement**—development and implementation of a Community and Stakeholder Engagement Plan that ensured the community, Traditional Owners and all levels of government were actively consulted during the preparation the design and the EIS.

▶ **Community and stakeholder engagement**—a Community and Stakeholder Engagement Action Plan (refer Chapter 16: Social) will be developed and implemented, which will encourage, plan, implement and monitor stakeholder and community engagement. The action plan will ensure that all Project-related opportunities and concerns are considered, and relationships and communication channels between Inland all relevant stakeholders are maintained.

▶ **Heritage**—ARTC has actively engaged and will continue to engage with the Indigenous and non-Indigenous communities to understand the value and history of the land, including the identification of heritage items and values (refer Chapter 16: Social and Chapter 18: Cultural Heritage).

▶ **Procurement**—encourage sustainability throughout the value chain for goods and services, including rail operators used to build, operate and maintain Inland Rail.

▶ **Community and stakeholder engagement**—encourage, plan, implement and monitor stakeholder and community engagement.

▶ **Heritage**—recognising the role that engagement with the Indigenous and non-Indigenous communities have in the identification of heritage items and values, and investigating the opportunity to interpret heritage to promote local heritage values.

▶ **Community health and wellbeing**—identification of opportunities to support economic benefits to local, regional and Indigenous communities.

▶ Implement the SIMP, specifically relating to workforce management, housing and accommodation, and local business and industry content (refer Chapter 16: Social).

▶ ARTC has developed an Australian Industry Participation Plan and will work with its various service providers, consultants and contractors in its implementation.

▶ Design supports, via a series of the tie-ins between the ARTC and Queensland Rail (QR) networks, the proposed InterLinkSQ intermodal development at Charlton.

▶ The Project provides for a more direct and efficient route through the Toowoomba Range, along with interoperability between the ARTC and QR networks. Further discussion on the potential benefits from a more efficient and direct route are provided in Chapter 2: Project Rationale.

▶ **Environment**—seeking opportunities to reduce the environmental footprint of the Project, such as the use of viaducts and tunnels to avoid and minimise impacts to ecological and agricultural values.

▶ **Waste**—seeking opportunities to minimise waste generation and to reuse or recycle materials.

▶ **Energy and carbon**—seeking opportunities to reduce the carbon footprint of the Project through considering construction and operational greenhouse emissions.

▶ **Water**—seeking 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**—seeking opportunities to reduce the environmental impacts of materials used during construction and operation of the Project through encouraging dematerialisation of the design and improving the service life of the materials.

ARTC commitments	Application on the Project
<p>Future-proof Inland Rail to be efficient and effective in the long term:</p> <ul style="list-style-type: none"> <li>▶ Design for climate change resilience</li> <li>▶ Incorporate future demand requirements and corridor uses in current design.</li> </ul>	<ul style="list-style-type: none"> <li>▶ <b>Climate change</b>—considering climate change impacts and opportunities to reduce the risks to Inland Rail associated with a future climate.</li> <li>▶ <b>Future proofing</b>—considering 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.</li> </ul>
<p>Base decisions on balanced consideration of technical, economic, environmental and social elements:</p> <ul style="list-style-type: none"> <li>▶ Adopt a consistent approach across the program.</li> </ul>	<ul style="list-style-type: none"> <li>▶ <b>Decision making</b>—consistently considering the environmental, social, local economic and technical impacts during decision making and ensure such considerations are built into the decision-making process.</li> </ul>
<p>Regularly review and audit processes and performance:</p> <ul style="list-style-type: none"> <li>▶ Challenge the way we have always done things</li> <li>▶ Ensure we are doing what we said we would do.</li> </ul>	<ul style="list-style-type: none"> <li>▶ <b>Leadership</b>—demonstrating sustainability leadership across the delivery of the Inland Rail Program and at the Project level.</li> <li>▶ <b>Management and governance</b>—recognising the importance of monitoring and review of progress to identify opportunities for continuous improvement.</li> <li>▶ <b>Benefits identification</b>—early identification of the benefits the Project will bring, so that the promised benefits can be assessed and reviewed during operation.</li> </ul>
<p>Drive culture of continuous improvement:</p> <ul style="list-style-type: none"> <li>▶ Seek to improve, collaborate and add value throughout delivery</li> <li>▶ Continually improve the Environmental Management System to enhance environmental performance.</li> </ul>	<ul style="list-style-type: none"> <li>▶ <b>Management and governance</b>—encouraging improvement in the delivery of the Project and on the promises made to stakeholders and the community.</li> <li>▶ <b>Stakeholder participation</b>—continue to consult with community and stakeholder groups to identify opportunities for improving Project outcomes.</li> <li>▶ <b>Innovation</b>—reviewing the outcomes from the way things are done to find new and better ways of achieving the desired outcomes.</li> </ul>

## 7.6 Sustainability Management Plan

A Sustainability Management Plan will be developed by the contractor responsible for the delivery and construction of the Project. The plan will:

- ▶ Demonstrate leadership and commitment to sustainability
- ▶ Include targets or requirements 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 the embedding of sustainability throughout the design, procurement and construction of the Project
- ▶ Outline the process for the identification, assessment and implementation of sustainability initiatives and opportunities, particularly those associated with the efficient use of energy, water and transport
- ▶ Prescribe the process to be used to manage the assessment, monitoring and review of sustainability against achieving the requirements to contribute to 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 and construction.

The Sustainability Management Plan will be reviewed and audited by ARTC as part of its management of the IS Rating Scheme it is pursuing, in line with version 1.2 of the rating scheme. Prior to the commencement of operations, the Sustainability Management Plan will be reviewed and updated by ARTC to focus on operations and maintenance activities.

The development and implementation of the Sustainability Management Plan will align with the Inland Rail Sustainability Strategy, which is provided in Appendix G: Corporate Policies.



## 7.7 Sustainability in design

Sustainability initiatives and measures have been identified and captured in the design phase as they have been developed for the Project. A summary of these measures, as presented in this EIS, is provided in Table 7.4. It is noted that this table does not include all management measures that are presented as discipline-based measures presented elsewhere in this EIS (refer Chapter 23: Draft Outline Environmental Management Plan).

**TABLE 7.4: DESIGN FRAMEWORK FOR SUSTAINABILITY INITIATIVES**

Theme	Topic	Sustainability initiatives		
Governance	Making informed decisions	Sustainability Management Plan will be developed by the contractor responsible for the delivery and construction of the Project to provide sustainability outcomes to support the Inland Rail Environment and Sustainability Policy.		
		Use of safety in design process that provides a comprehensive framework to avoid or minimise risk and enhance safety to support design objectives.		
		Use of MCA, which considers, among other things, environmental, social and local economic impacts to evaluate alignment options (refer Chapter 2: Project Rationale)		
		Due to design constraints, alignment changes from the Initial Advice Statement (ARTC, 2017a) alignment have been made in following locations: <ul style="list-style-type: none"> <li>▶ InterLinkSQ, with the aim of reducing potential interface conflicts between the InterLinkSQ project, the West Moreton System and ARTC. The assessment also considers impacts to existing built infrastructure; in particular, Toowoomba Regional Council’s rising sewer main</li> <li>▶ Toowoomba Range Tunnel to improve flood immunity (i.e. change in the vertical alignment)</li> <li>▶ Withcott Seedlings, with the aim of avoiding direct impacts on their dam infrastructure and wider business operations.</li> </ul> These changes were subject to MCA, which is outlined in Chapter 2: Project Rationale.		
		Development of a constructability assessment that identifies all processes from start to finish during the construction phase to inform how the Project will be built.		
		Implementation of a value management process that highlights potential opportunities for defining, maximising and achieving efficiencies.		
		Implementation of Consultation Manager to record stakeholder feedback during the design, construction and commissioning phases of the Project.		
		The Project generally aligns with the Gowrie to Grandchester future state transport corridor protected under the <i>Transport Planning and Coordination Act 1994</i> (Qld) in 2005.		
		Future proofing		The alignment has considered future asset requirements, including ultimate corridor considerations, to minimise potential for premature decommissioning of the infrastructure as part of upgrade works and future disruption or impacts to the environment and landholders. In particular, the following were considered: <ul style="list-style-type: none"> <li>▶ Additional earthworks and property required to accommodate extended crossing loops for trains up to 3,600 metres (m) in length</li> <li>▶ Structures designed to accommodate 30-tonne axle load</li> <li>▶ Track structure and formation designed to suit 30-tonne axle load connections to existing operating rail via turnout connections to Inland Rail.</li> </ul>
				The design has endeavoured not to preclude future development of a dedicated passenger rail line (including stations) along the rail corridor and/or the Gowrie to Grandchester future state transport corridor.
ARTC is an open network and, as such, does not preclude the future use of the rail alignment by passenger trains				
The design has endeavoured to not preclude opportunities for adjacent land use and business to access the Inland Rail corridor in the future.				

Theme	Topic	Sustainability initiatives
Governance [continued]	Climate response	<p>The Project has been designed to consider the impacts of climate change and flooding events to achieve the Basis of Design for Inland Rail (refer Chapter 6: Project Description and Chapter 13: Surface Water and Hydrology), which includes:</p> <ul style="list-style-type: none"> <li>▶ 50-year design life for formation and embankment performance</li> <li>▶ Track drainage ensures that the performance of the formation and track is not affected by water</li> <li>▶ Earthworks designed to ensure that the rail formation is not over-topped during a 1% Annual Exceedance Probability (AEP) flood event</li> <li>▶ Embankment cross section can sustain flood levels up to the 1% AEP</li> <li>▶ Bridges are designed to withstand flood events up to and including 0.05% AEP (2000-year event).</li> </ul> <p>Tunnel portals are designed to withstand flood events up to and including the 1 in 10,000 AEP flood event.</p> <hr/> <p>Consideration of climate change in modelling used to inform design of drainage and waterways, including:</p> <ul style="list-style-type: none"> <li>▶ Application of the Australian Rainfall and Runoff Interim Climate Change Guidelines (Engineers Australia, 2014)</li> <li>▶ Assessment of impacts associated with the 1% AEP to determine the sensitivity of the design to potential changes in rainfall intensity</li> <li>▶ Where new track is to be constructed in greenfield areas, track crossing and longitudinal drainage with capacity to convey the 1% AEP without overtopping formation</li> <li>▶ Where enhancement or upgrading to existing track is to be undertaken, no worsening of the existing track flood immunity.</li> </ul> <p>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.</p> <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> <hr/> <p>Design of mitigation measures applied to manage runoff and flooding to sensitive receptors.</p> <hr/> <p>Consideration of extreme frequency flood events to improve flood immunity, including consideration of the 1 in a 100 year and 1-in-2,000 year AEP flood events on flood sensitive receptors.</p> <hr/> <p>Consideration of long duration flood events (i.e. three-day inundation) on infrastructure components, including embankments.</p> <hr/> <p>Implementation of changes to horizontal and vertical alignment of the infrastructure to accommodate viaducts to minimise hydrological impacts to adjoining properties.</p>

The Project has embraced the three main aspects of sustainability, that is, the consideration of the economic, environmental and social impacts and opportunities. The sustainability initiatives that have been identified, documented and implemented during the current design in accordance with these principles are identified in Table 7.5 under the themes of:

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

**TABLE 7.5: SUSTAINABILITY IN DESIGN INITIATIVES**

Theme	Topic	Sustainability initiatives
Advancing local, regional and national economies	Supporting local and Indigenous businesses	Development of a Sustainable Procurement Policy (refer Appendix G: Corporate Policies) and strategy to ensure Project supply opportunities are available to local business (within 125 kilometres (km) of the Project).
		ARTC has engaged with local business to identify opportunities to develop and promote local business participation.
		Consideration of local material sourcing strategies, including the use of existing borrow pits and identifying opportunities for the use of local material sources, quarries and concrete suppliers.
		Commitment 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.
		Preference for locally sourced workforce (i.e. Toowoomba and Lockyer Valley local government areas) to reduce drive in/drive out resourcing and avoid fly-in fly-out resourcing.
Environmental protection	Biodiversity conservation	The Project considers the reuse of previously disturbed land, including existing rail corridors and non-productive land, to minimise impacts to agricultural land, native vegetation and other sensitive environments.
		Design incorporates over 6 kms of viaducts and a tunnel, which will maintain connectivity for fauna. These design measures will be supported by fauna-friendly fencing and dedicated crossings independent of these structures.
		Where culverts are to be replaced or constructed, in addition to fish passage considerations, the opportunity for dry fauna passage is not precluded.
		Design is developed to minimise impacts to waterways, riparian vegetation and in-stream flora and habitats, including: <ul style="list-style-type: none"> <li>▶ Adoption of a crossing structure hierarchy (i.e. the majority of the crossing structures are viaducts and bridges), as applicable and relevant to local conditions and constructability</li> <li>▶ Aim to avoid, then minimise the extent of waterway diversions or realignments</li> <li>▶ Avoidance of discharges/impacts to hydrology, including surface flows</li> <li>▶ Consideration of water quality design matters in response to impacts identified through the EIS.</li> </ul>
	Efficient use of resources and minimisation of carbon footprint	Reuse of local sources of aggregate and treated dispersive and reactive materials to improve mass haul.
		Reuse of material excavated below the rail embankment for less critical parts of infrastructure.
		Reuse of excavated material as a stabilised structural fill.
		The number, width and depth of cuts has been optimised to avoid the generation of material that would be considered surplus to Project requirements.
		Investigate the viability of the potential re-use of ballast as high-quality general fill or structural fill to minimise the import of rock amount.
	Maximising the use of onsite materials through reuse of spoil to minimise the disposal and transportation of materials.	
	Implementation of a geotechnical program to inform the design and minimise the extent of: <ul style="list-style-type: none"> <li>▶ Structural fill required</li> <li>▶ Cuttings expected to require blasting</li> <li>▶ Imported non-dispersive soil to embankments.</li> </ul>	
	Refining the horizontal and vertical design and alignments to minimise the quantity of offsite fill required.	

Theme	Topic	Sustainability initiatives
Environmental protection [continued]	Efficient use of resources and minimisation of carbon footprint [continued]	Co-location with previously proposed transport corridors and alignment with property boundaries wherever practically possible to minimise land severance and loss of productive agricultural land.
		Use of existing brownfield operating rail environments minimising land-take impacts.
		During pre-construction, engage with the Queensland Department of Agriculture and Fisheries (DAF) to identify opportunities for commercial timber salvage to supply local timber mills prior to commencement of construction.
		Consideration of the shape and size of batters to encourage cut-and-fill balancing.
		Completing an assessment of the availability, quality and volume of materials that are readily accessible, using standard construction equipment onsite or close by.
		Adopting the intent to preferentially reuse material, identifying ways to treat or ameliorate materials that would normally be considered unsuitable for use.
Respect for people, communities and valued places	Being a good neighbour	The rail corridor has been positioned to align with the existing West Moreton System rail corridor and generally follows the Gowrie to Grandchester future state transport corridor.
		Consultation with property owners to ensure that a satisfactory level of access between adjoining properties is maintained, and to identify action that will minimise or offset changes to connectivity or changes to water flows that affect their properties.
		Minimise vegetation clearing and land disturbance to that required for safe construction and operation of the rail network to maintain the rural character of the area.
		Evaluation of the use of landscape treatments on embankments to soften their visual impact.
	Respecting heritage and culture values	Continued engagement with registered Aboriginal parties in accordance with the Cultural Heritage Management Plan (CHMP) for the Project discussed in Chapter 18: Cultural Heritage.
		Location of proposed permanent and temporary infrastructure and activities to minimise impacts to locations of cultural heritage value.
		Alignment options assessment has sought to reduce the proximity of the Project to Indigenous and non-Indigenous cultural heritage where possible.
	Building relationships	Incorporation of community and stakeholder feedback into alignment and design decision making and identification of management measures.
	Community safety, health and wellbeing	Road and rail interfaces have been optimised (i.e. grade separation) to minimise safety risks, consider wait times and maintain a high level of local accessibility.
		Elimination of an existing level crossing on the West Moreton System in line the <i>Queensland Level Crossing Safety Strategy 2012–2021</i> (DTMR, 2012a) and the <i>National Railway Level Crossing Safety Strategy 2017–2020</i> (National Level Crossing Safety Committee, 2017) in preference to a grade separation.
A more efficient and direct route through the Toowoomba Range will potentially reduce rail traffic along the West Moreton System between Gowrie and Helidon, including through Toowoomba and Murphys Creek, reducing potential rail safety indicated and the amenity issues associated with older rail line.		
Landholders, stakeholder and the wider community have been consulted to identify specific measures that will reduce impacts on farm management, connectivity or amenity, including consideration of existing lighting, noise levels and visual amenity within the area and the location and design of the Project to reduce impacts.		
		Watercourse crossing structures (including culverts and bridges) have been designed to minimise the need for ongoing maintenance and risk of blockage.

Theme	Topic	Sustainability initiatives
Respect for people, communities and valued places [continued]	Community safety, health and wellbeing [continued]	Crossing loops have been positioned to avoid, where possible, sensitive receptors to noise and air quality emissions.
		Temporary construction facilities, e.g. laydowns and flash-butt welding, have been positioned to avoid, where practically possible, sensitive receptors to noise, air quality and visual impacts.
		Permanent alignment selection for rail and road infrastructure has considered the proximity of sensitive receptors to potential noise, air quality and vibration impacts.
		Complaints and feedback from stakeholders during construction will be managed according to Inland Rail's and/or the construction contractor's Complaint Management Handling Procedure. The aim of the procedure is to ensure that complaints are dealt with efficiently and effectively, and that stakeholders have confidence in the organisations complaint system (refer Appendix Q: Social Impact Assessment).
		Future controls through the safety in design process are incorporated into the design to address key safety risks throughout the Project life cycle.

## 7.8 Future sustainability opportunities

A summary of future sustainability opportunities for the Project is provided in Table 7.6. These opportunities were identified during the concept design phase but require further investigation during the detailed design, construction and/or operational phases.

The future sustainability opportunities identified in Table 7.6 will be investigated and implemented as appropriate. This will enable the key deliverables identified in the Inland Rail Sustainability Strategy (refer Appendix G: Corporate Policies) to be achieved.

**TABLE 7.6: SUSTAINABILITY OPPORTUNITIES THAT MAY BE IMPLEMENTED DURING FUTURE PHASES OF THE PROJECT**

Theme	Area	Sustainability opportunities
Governance	Sustainability leadership	<ul style="list-style-type: none"> <li>▶ Create a culture within the delivery teams for the Project and ARTC where implementation of sustainability initiatives is inherent in all business activities.</li> <li>▶ Commit to be a responsible and attractive employer.</li> <li>▶ Maintain a high level of safety and security through the development of management systems.</li> </ul>
	Monitoring and evaluating performance	<ul style="list-style-type: none"> <li>▶ Maintain dialogue with supply chain stakeholders.</li> <li>▶ Report transparently about environmental performance.</li> <li>▶ Include performance requirements for the contractor to report against sustainability targets on a monthly basis.</li> </ul>
	Making informed decisions	<ul style="list-style-type: none"> <li>▶ Build an environmental management system for Inland Rail that collects sustainability data in a consistent and reliable format.</li> <li>▶ Create a robust sustainability reporting framework that supports decision-making against the Inland Rail Sustainability Strategy (ARTC, 2019a).</li> </ul>
	Future proofing	<ul style="list-style-type: none"> <li>▶ Embed the principles of sustainability and environmental benefits into rail asset management programs, including: <ul style="list-style-type: none"> <li>▶ Resource consumption (energy, water, fuel, chemicals)</li> <li>▶ Equipment efficiency</li> <li>▶ Procurement of environmentally friendly and socially friendly materials and suppliers</li> <li>▶ Triple-bottom-line reporting into asset risk analysis, including potential for environmental damage, negative social impacts and regulatory compliance issues from asset failures</li> </ul> </li> <li>▶ Review of sustainability impacts from asset disposal.</li> </ul>

Theme	Area	Sustainability opportunities
Governance [continued]	Encouraging innovation	<ul style="list-style-type: none"> <li>▶ Apply precautionary approaches to environmental challenges and support initiatives, projects and new technologies for further improved environmental performance.</li> <li>▶ Partnering with key material providers (e.g. providers of rails and sleepers) to pursue innovation opportunities.</li> <li>▶ The Inland Rail Program has the 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.</li> </ul>
	Learning from our experiences/ continuous improvement	<ul style="list-style-type: none"> <li>▶ Establishment of a Program-wide sustainability network to enable the sharing of lessons learnt between projects and with the broader industry.</li> <li>▶ Identify environmental risks and processes across ARTC and the Inland Rail Program and support new ways of acting to reduce them.</li> <li>▶ Provide access to training on environmental improvement and requirements.</li> <li>▶ Provide awareness and visibility initiatives across ARTC and the Inland Rail Program.</li> </ul>
Advancing local, regional and national economies	Supporting local and Indigenous businesses	<ul style="list-style-type: none"> <li>▶ Include specific details on opportunities and targets for local and Indigenous business participation in the Project's implementation plan in alignment with ARTC's Sustainable Procurement Policy (refer Appendix G: Corporate Policies). It is anticipated that local employment and business targets will be developed and negotiated through the competitive tendering/bidding process for construction contracts.</li> <li>▶ Pursue opportunities identified in the SIMP (refer Chapter 16: Social).</li> </ul>
	Job creation and skills development	<ul style="list-style-type: none"> <li>▶ Work with government agencies to assist the local workforce to adjust to construction employment opportunities through: <ul style="list-style-type: none"> <li>▶ Workforce upskilling</li> <li>▶ Engagement of small business</li> <li>▶ Liaison with education and training providers</li> <li>▶ Development of procurement and tendering processes for local business and suppliers</li> <li>▶ Development of a 'work life balance policy' that includes outreach to women.</li> </ul> </li> <li>▶ Focus on local impacts and communities through better understanding and engagement, engaging in local plans and assets.</li> <li>▶ Contribute to regional skills capacity, including opportunities for apprentices as well as vocational education and training students to continue skills development beyond the life of the Project.</li> <li>▶ Having a clear and efficient process for people to seek information about employment opportunities and to register their interest in Inland Rail.</li> <li>▶ Continued engagement with communities, representative organisations and service providers to develop new local businesses.</li> <li>▶ Pursue opportunities identified in the SIMP (refer Chapter 16: Social).</li> </ul>
	Stimulating sustainable procurement	<ul style="list-style-type: none"> <li>▶ Engage with suppliers and contractors to ensure they recognise and understand their role in supporting ARTC's sustainable objectives.</li> <li>▶ Select products and services that have lower environmental impacts across their life cycle compared to competing products and services, in the context of whole-of-life value for money.</li> <li>▶ Foster a viable market for sustainable products and services by supporting businesses and industry groups that demonstrate innovation in sustainability.</li> <li>▶ Support suppliers who are socially responsible and adopt ethical practices.</li> </ul>



Theme	Area	Sustainability opportunities
Respect for people, communities and valued places	Building relationships	<ul style="list-style-type: none"> <li>▶ In accordance with the SIMP, establish a community reference group/s to ensure a representative selection of the community: <ul style="list-style-type: none"> <li>▶ Are afforded the opportunity to provide feedback and are involved in the Project</li> <li>▶ Have an increased understanding of the Project</li> <li>▶ Contribute to a more effective response from the Project team to community issues and concerns.</li> </ul> </li> <li>▶ Implementation of communication mechanisms that will be maintained by ARTC/Inland Rail throughout the approval, pre-construction and construction phases.</li> <li>▶ Work with rail operators to manage noise and air quality amenity issues, including ongoing air quality monitoring as part of a wider supply chain initiative for coal dust.</li> <li>▶ Ongoing engagement with health, community, disaster management groups and emergency services to develop joint arrangements for responses to Project-related demands.</li> </ul>
	Community safety, health and wellbeing	<ul style="list-style-type: none"> <li>▶ Moving freight competitively by rail will take long-haul truck traffic off roads, reducing local impacts on air quality, noise and facilitating opportunities for improved road safety.</li> <li>▶ 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"> <li>▶ Fire detection and response</li> <li>▶ Remote monitoring of tracks at unattended or secure locations</li> <li>▶ Video surveillance and analysis</li> <li>▶ Train schedule monitoring</li> <li>▶ Track maintenance and detection of damage or obstructions</li> <li>▶ Railway crossing management and detection of objects on the line</li> <li>▶ Detection and recognition of over speeding</li> <li>▶ Detection of objects protruding from moving trains.</li> </ul> </li> <li>▶ Further investigate possible re-use of temporary project areas and infrastructure established for the Toowoomba Second Range Crossing Project.</li> <li>▶ Implementation of health and community wellbeing actions from the SIMP (refer Chapter 16: Social).</li> <li>▶ Complaints and feedback from stakeholders during operations will initially be managed in accordance with Inland Rail's Complaint Management Handling Procedure and, ultimately, through the relevant management system (e.g. ARTC currently manages complaints, incidents and feedback through Enviroline).</li> </ul>
Environmental Protection	Biodiversity conservation/ ecological integrity	<ul style="list-style-type: none"> <li>▶ Investigate opportunities to complement fauna design measures implemented along the Toowoomba Bypass in consultation with the Department of Transport and Main Roads (DTMR).</li> <li>▶ Investigate opportunities to work with local environmental groups to implement environmental programs, such as supplementary planting of habitat corridors, weed management and studies targeting threatened species.</li> <li>▶ During detailed design, continue to refine and optimise alignment design to minimise the corridor footprint on environmentally sensitive areas.</li> <li>▶ Evaluate technically feasible options to revegetate soils on steep slopes and maintain this cover as protection from ongoing erosive flows.</li> <li>▶ Adopt waterway design principles to promote natural flow through culverts and 'wet areas'.</li> <li>▶ Use endemic species in site restoration that retard weed spread and require minimal maintenance wherever practically possible.</li> </ul>

Theme	Area	Sustainability opportunities
Environmental Protection [continued]	Using energy, water and material resources efficiently	<ul style="list-style-type: none"> <li>▶ Explore opportunities for material delivery and haulage via the existing rail networks.</li> <li>▶ Promote the selection of fuel/energy efficient plant and equipment used during construction. During detailed design: <ul style="list-style-type: none"> <li>▶ Identify opportunities to change batter slopes and save earthworks, where not adversely impacting bulk earthworks or material re-use</li> <li>▶ Review vertical alignment to determine potential earthworks volumes and culvert design savings</li> <li>▶ Assess culverts with low afflux at rail property boundary to achieve potential culvert optimisation</li> <li>▶ Identify potential earthworks savings by reverting from reinforced concrete pipes to reinforced concrete box culverts to reduce cover requirements.</li> </ul> </li> <li>▶ Investigate the refinement of earthworks and substructure quantities through: <ul style="list-style-type: none"> <li>▶ Potential re-use of dispersive soils over the outer part of embankments, using lime and specialist revegetation detailing</li> <li>▶ Re-use of high-plasticity clay soils</li> <li>▶ Use of geogrids and stabilisation to reduce the volume of subgrade treatment</li> <li>▶ Use of low embankments, providing the opportunity to omit rock protection [subject to hydraulic assessment].</li> </ul> </li> <li>▶ During construction, investigate the use of: <ul style="list-style-type: none"> <li>▶ LIDAR aerial surveying for accurate knowledge and control of cut-and-fill requirements</li> <li>▶ Alignment designs capable of taking into account available materials</li> <li>▶ Prefabricated solutions for structures</li> <li>▶ Mobile crushing plants and materials handling</li> <li>▶ Positioning of pre-casting and manufacturing locations to reduce transport footprint.</li> </ul> </li> <li>▶ Investigate opportunities to reduce groundwater inflow into the tunnel, along with the capture and reuse of groundwater inflow during construction and operations.</li> <li>▶ Investigate the opportunity to balance the use of materials across Project boundaries, including the exchanging of surplus fill, aggregates, pipe work and common use materials between Inland Rail projects.</li> <li>▶ Investigate the use of pre-fabricated Project components throughout the construction life cycle.</li> </ul>
	Pollution prevention and minimising carbon footprint	<ul style="list-style-type: none"> <li>▶ Consider the use of solar power systems, including stand-alone systems, for the provision of power at site offices and for permanent infrastructure associated with signalling.</li> <li>▶ Investigate the implementation of signalling control systems that automatically adjust control and speed profiles so that the train arrives at target destinations on time, while minimising energy consumption.</li> <li>▶ Work with rail operators to ensure rollingstock are maintained and adhere to relevant operating restrictions, and potential issues with the track are identified and reported.</li> <li>▶ Invest in practical methods to address waste minimisation, energy and water-saving technologies and practices during construction, operation and maintenance.</li> </ul>

## 7.9 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. During the design, a broad range of sustainability initiatives were identified. These initiatives have either already been implemented or are subject to further development during detailed design.

Further sustainability initiatives to be explored and adopted by the Project have been identified during technical investigations and stakeholder engagement activities undertaken for the Project and, where applicable, the Inland Rail Program. These initiatives will be investigated during detailed design, construction and/or operation and, where feasible, implemented by the Project.

The design and future sustainability initiatives identified during the preparation of the 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, which is currently being progressed separately as a registered project with the Infrastructure Sustainability Council of Australia.