



# Part D: **EIS Synthesis and Conclusion**

Image: Railway and Newell Highway north of Narrabri, NSW

# 27. Approach to environmental management and mitigation

*This chapter, together with Chapter 28, provides a synthesis of the EIS. This chapter compiles the key potential impacts that have not been avoided, and the measures proposed to avoid, minimise, manage or offset the impacts identified in Part C. The chapter also provides the outcomes the proponent is seeking to achieve through the implementation of the mitigation measures.*

## 27.1 Compilation of impacts

Part C of the EIS provides an assessment of the potential impacts of the proposal during construction and operation. The key potential impacts during construction and operation requiring mitigation and management are summarised in Table 27.1 and Table 27.2 respectively. The approach to mitigating and managing potential impacts is described in Section 27.2. Further information on these impacts is provided in Chapters 9 to 25.

*Table 27.1 Summary of key potential construction impacts*

Issue	Key potential construction impacts
Traffic, transport and access	<ul style="list-style-type: none"> <li>▶ Temporary impacts to traffic and access, and an increase in heavy and light vehicle movements on the local road network, including in the vicinity of the proposed Newell Highway and Jones Avenue overbridges.</li> <li>▶ Works on level crossings may result in local traffic disruptions and short-term access restrictions.</li> <li>▶ New temporary access tracks may be required in some locations.</li> <li>▶ Construction activities would result in temporary impacts on existing rail operations.</li> </ul>
Biodiversity	<ul style="list-style-type: none"> <li>▶ Permanent removal or modification (clearing) of about 411 hectares of native vegetation, and temporary disturbance of about 72 hectares of native vegetation, which includes threatened ecological communities listed under the TSC Act and/or the EPBC Act.</li> <li>▶ Impacts on aquatic ecological systems as a result of works to culverts, bridges, and across watercourses.</li> </ul>
Noise and vibration	<ul style="list-style-type: none"> <li>▶ Potential for construction noise to exceed the relevant criteria at various sensitive receivers along the proposal site.</li> </ul>
Air quality	<ul style="list-style-type: none"> <li>▶ Generation of dust from construction works and the movement of equipment and machinery.</li> </ul>
Soils and contamination	<ul style="list-style-type: none"> <li>▶ Erosion and sedimentation during construction could result in the contamination of soils and surface waters.</li> <li>▶ The main contaminants that could be exposed during excavation are hydrocarbons and asbestos.</li> <li>▶ Contamination associated with any leaks and spills.</li> </ul>
Hydrology and flooding	<ul style="list-style-type: none"> <li>▶ Potential for inundation during flood events.</li> <li>▶ Changes in flows as a result of construction activities.</li> </ul>
Water quality	<ul style="list-style-type: none"> <li>▶ Erosion and the generation of sediment, particularly during watercourse crossings and the construction of new bridges and culverts.</li> <li>▶ Impacts on downstream water quality if management measures are not implemented, monitored, and maintained.</li> </ul>

Issue	Key potential construction impacts
Aboriginal heritage	<ul style="list-style-type: none"> <li>▶ Potential to impact two listed Aboriginal heritage sites, and 12 unlisted sites.</li> <li>▶ Impacts on any unexpected finds.</li> </ul>
Heritage	<ul style="list-style-type: none"> <li>▶ Removal of two items listed on ARTC's section 170 heritage register (the rail bridges over the Mehi and Gwydir rivers) and a potential heritage item (the rail bridge over Croppa Creek).</li> <li>▶ Impacts on the existing rail line, which is a potential heritage item considered to be generally of local significance.</li> <li>▶ Potential for vibration impacts on Moree Station (a locally listed heritage item) and other potential heritage items, including the former Edgeroi Woolshed, and remaining structures associated with Edgeroi, Bellata, and Gurley stations.</li> <li>▶ Potential to impact any remains associated with a former Aboriginal fringe camp site located near the Mehi River bridge (considered to be a site with archaeological potential).</li> <li>▶ Impacts on any unexpected finds.</li> </ul>
Visual and landscape	<ul style="list-style-type: none"> <li>▶ Visual impacts during construction as a result of the presence of construction works, plant, and disturbance.</li> </ul>
Land use and property	<ul style="list-style-type: none"> <li>▶ Temporary disturbance to land use along the proposal site.</li> <li>▶ Temporary impacts to agricultural/farming practices.</li> <li>▶ Limited acquisition of privately owned land, with resultant changes in land use.</li> </ul>
Socio-economics	<ul style="list-style-type: none"> <li>▶ Beneficial impacts during construction including employment (an estimated average workforce of 180 people), training opportunities, and flow on local and regional economic benefits.</li> <li>▶ Impacts on the amenity of the local community.</li> <li>▶ Impacts associated with the inflow of the workforce into the local area, including a requirement for temporary accommodation.</li> </ul>
Sustainability and climate change	<ul style="list-style-type: none"> <li>▶ Material consumption and associated carbon footprint.</li> <li>▶ Emissions of greenhouse gases.</li> <li>▶ Discharge to surrounding environment including waste production.</li> <li>▶ Clearing and land excavations.</li> <li>▶ Demand for fuel (diesel), water, sand, and aggregate.</li> </ul>
Waste	<ul style="list-style-type: none"> <li>▶ Indicatively, the proposal would generate about 1,171,480 cubic metres of spoil, which would be re-used for track formation/construction (about 25%) and for spoil mounds.</li> <li>▶ Other waste material would include green waste, sleepers, rail tracks, formation material, fencing, and general soil waste.</li> </ul>
Health and safety	<ul style="list-style-type: none"> <li>▶ Introduction of potential ignition sources and fuel sources could increase bushfire risks.</li> <li>▶ If inadequately managed, the storage and handling of dangerous goods and hazardous materials could cause leaks and spills, with resultant contamination and health impacts.</li> <li>▶ Potential rupture of underground utilities during excavation or collision of plant and equipment with aboveground services.</li> <li>▶ Public health and safety risks during construction.</li> </ul>

Table 27.2 Summary of key potential operation impacts

Issue	Key potential operation impacts
Traffic, transport and access	<ul style="list-style-type: none"> <li>▶ Impacts on travel time as a result of increased train activity at level crossings.</li> <li>▶ Improved access across the rail corridor in Moree as a result of the Jones Avenue overbridge.</li> <li>▶ An increase in traffic volumes on Jones Avenue and Tycannah Street in Moree.</li> </ul>
Biodiversity	<ul style="list-style-type: none"> <li>▶ Increase in train strikes on fauna species.</li> </ul>
Noise and vibration	<ul style="list-style-type: none"> <li>▶ Noise levels at a number of residential receivers have the potential to exceed the redeveloped rail line criteria for operational rail noise by the year 2040.</li> </ul>
Air quality	<ul style="list-style-type: none"> <li>▶ Increase in the number of diesel freight trains has the potential to increase levels of pollutants such as nitrogen oxides and particulate matter.</li> <li>▶ Decreasing the number of heavy vehicles using major transport routes such as the Newell Highway would have a positive impact on air quality for sensitive receivers along these routes.</li> </ul>
Soils and contamination	<ul style="list-style-type: none"> <li>▶ If inadequately managed, maintenance could result in erosion of soils.</li> <li>▶ Contamination of soils as a result of any accidental spills.</li> </ul>
Water quality	<ul style="list-style-type: none"> <li>▶ Surface runoff, which may contain sediment, traces of fuel, dissolved metals, and other contaminants deposited in the corridor from operation activities, could impact water quality.</li> <li>▶ Impacts on water quality as a result of any accidental spills.</li> </ul>
Hydrology and flooding	<ul style="list-style-type: none"> <li>▶ Raising the height of the rail formation would impact surface water flows across the floodplain, changing the upstream flooding regime, and resulting in more concentrated flows through culverts that discharge to downstream waterways.</li> <li>▶ Flood modelling predicts that the proposal would: <ul style="list-style-type: none"> <li>• reduce the length of overtopping of the existing rail corridor in the proposal site during a one per cent AEP, local flood event from about 11,124 metres to 1,338 metres</li> <li>• reduce the area of upstream flooding for all flood events except the 0.2 per cent AEP event</li> <li>• reduce the extent of flooding in a one per cent AEP local flood event by about six per cent.</li> </ul> </li> </ul>
Visual and landscape	<ul style="list-style-type: none"> <li>▶ Introduction of new structures in the landscape, mainly associated with the Newell Highway and Jones Avenue overbridges, and the new rail bridges over the Mehi and Gwydir rivers and Croppa Creek.</li> </ul>
Land use and property	<ul style="list-style-type: none"> <li>▶ Use of the rail line would intensify once Inland Rail is operational in 2025.</li> <li>▶ Flood modelling predicts that the proposal would result in: <ul style="list-style-type: none"> <li>• an increase in the number of buildings and structures subject to temporary inundation</li> <li>• an overall decrease in the area of land subject to temporary inundation, with the exception of land used for intensive animal production, mining and quarrying and tree and shrub cover.</li> </ul> </li> </ul>
Socio-economics	<ul style="list-style-type: none"> <li>▶ Beneficial impacts would include better access to and from regional markets, enabler for regional economic development along the Inland Rail corridor, and safety and amenity benefits as a result of the reduction of freight transport on major road corridors.</li> </ul>

Issue	Key potential operation impacts
Sustainability and climate change	<ul style="list-style-type: none"> <li>▶ Potential risk of asset damage or failure in extreme weather events.</li> <li>▶ Emissions of greenhouse gases from operational energy use and embodied energy in materials.</li> <li>▶ Reduction in greenhouse gas emissions from transfer of freight from trucks to rail.</li> <li>▶ Demand for fuel (diesel) and water.</li> </ul>
Waste	<ul style="list-style-type: none"> <li>▶ Small quantities of green waste, general debris, and litter may be generated during maintenance.</li> </ul>
Health and safety	<ul style="list-style-type: none"> <li>▶ Introduction of potential ignition sources could increase bushfire risks.</li> <li>▶ If inadequately managed, transport of hazardous materials and dangerous goods via rail has the potential to impact the surrounding community and the environment through leaks and spills.</li> <li>▶ Public health and safety risks including risks to pedestrians and road vehicles as a result of collisions with trains at level crossings, and other safety risks, such as security risks and unauthorised access.</li> </ul>

## 27.2 Approach to environmental management

The approach to environmental mitigation and management for the proposal involves:

- ▶ Project design – as described in Section 7.1, the proposal incorporates measures to avoid and minimise impacts.
- ▶ Mitigation measures – mitigation measures provided in Chapters 9 to 25 are identified as an outcome of the environmental impact assessment, and are consolidated in Section 27.3.
- ▶ ARTC’s environmental management system – would be used to manage the construction and operation of Inland Rail, including the proposal. The management system would provide the framework for implementing the construction and operation environmental management plans described below, and any conditions of other approvals, licences, or permits.
- ▶ Inland Rail NSW Construction Noise and Vibration Management Framework – describes how ARTC proposes to manage construction noise and vibration for Inland Rail in NSW as a whole, including management measures, processes, and the approach to additional assessment where required. A copy of the framework is provided in Appendix H.
- ▶ Proposal specific CEMP and operational environmental management plan (OEMP) – prepared to guide the approach to environmental management during construction and operation, as described in Sections 27.2.1 and 27.2.2. The CEMP and OEMP would:
  - outline the environmental management practices and procedures to be followed
  - document processes for demonstrating compliance with the commitments made in this EIS, the submissions report (to be prepared), and relevant approval conditions
  - be prepared in consultation with relevant agencies and in accordance with the *Guideline for the Preparation of Environmental Management Plans* (Department of Infrastructure, Planning and Natural Resources, 2004a).
- ▶ Environmental performance outcomes – establishes the intended outcomes to be achieved by the proposal. The environmental performance outcomes are provided in Section 27.4.

## 27.2.1 CEMP

The CEMP would include:

- ▶ ARTC's environmental policy, objectives, and performance targets for construction
- ▶ reference to all relevant statutory and other obligations, including consents, licenses, approvals, and voluntary agreements required
- ▶ management policies, procedures, and review processes to assess the implementation of environmental management practices and the environmental performance of the proposal against the objective and targets
- ▶ requirements and guidelines for management in accordance with:
  - the conditions of approval for the proposal
  - the mitigation measures specified in this EIS
  - relevant construction management guidelines (including those listed in Appendix K)
- ▶ requirements in relation to incorporating environmental protection measures and instructions in all relevant standard operating procedures and emergency response procedures
- ▶ roles and responsibilities of all personnel and contractors to be employed on site
- ▶ incident and contingency management procedures
- ▶ procedures for complaints handling and ongoing communication with the community
- ▶ a monitoring and auditing program, as defined by this EIS and the conditions of the approval.

An outline of the CEMP, including the required sub-plans and a guide to the general construction management measures required in each, is provided in Appendix K.

## 27.2.2 OEMP

The OEMP would include:

- ▶ a description of activities to be undertaken during operation
- ▶ an environmental risk analysis to identify the key environmental performance issues associated with the operation phase
- ▶ statutory and other obligations that the proponent is required to fulfil during operation, including approvals, consultations and agreements required from authorities and other stakeholders under key legislation and policies

- ▶ a description of ARTC's Environmental Management System, and the environment protection licence relevant to the proposal
- ▶ overall environmental policies, guidelines and principles to be applied to operation
- ▶ roles and responsibilities for relevant employees involved in operation, including relevant environmental training and induction requirements
- ▶ incident and contingency management procedures
- ▶ details of how environmental performance would be managed and monitored to meet acceptable outcomes, including what actions would be taken to address identified potential adverse environmental impacts.

## 27.2.3 Approach to design refinements

The design of the proposal as described in the EIS would be subject to ongoing refinements during detailed design. Refinements may be made to:

- ▶ avoid ground conditions or services that present significant construction difficulties in terms of logistics, time and/or cost
- ▶ reduce the construction timeframe
- ▶ avoid areas of environmental sensitivity identified following approval
- ▶ reduce impacts on local residents
- ▶ improve the operation of the proposal without increasing the potential environmental impacts.

Such refinements may include, for example:

- ▶ minor changes to the location of construction compounds and construction site access routes
- ▶ minor changes to access roads as a result of changes to level crossings within the assessment area described in Chapter 2
- ▶ changes to culvert upgrade proposals within the assessment area described in Chapter 2
- ▶ changes to the level crossing upgrade proposals
- ▶ minor changes to the location of key infrastructure, refinement or reorientation of site boundaries
- ▶ minor changes in technology or the features of key proposal components.

Refinements would not include significant changes to the proposal.

For design refinements a consistency review would be undertaken to consider whether the refinement:

- ▶ would result in any of the conditions of approval not being met
- ▶ be consistent with the objectives and operation of the proposal as described in the environmental assessment
- ▶ result in a significant change to the approved project
- ▶ would trigger the requirement for additional Aboriginal heritage assessment and mitigation measures as described in Technical Report 8
- ▶ would result in any potential environmental or social impacts of a greater scale or different nature than that considered by the EIS.

A refinement that does not meet these criteria would be considered a design modification. Approval would be sought from the Minister for Planning for any such modifications in accordance with the requirements of Part 5.1 of the EP&A Act.

## 27.3 Compilation of mitigation measures

Table 27.3 to Table 27.5 provide a summary of the measures proposed to mitigate and manage the potential impacts of the proposal, as detailed in Part C. The measures listed may be revised in response to submissions raised during public exhibition of the EIS and/or any design changes made following exhibition. The final list of mitigation measures would be provided in the submissions/preferred infrastructure report. If the proposal is approved, the conditions of approval, which would include reference to the finalised mitigation measures, would guide subsequent phases of the proposal. The construction contractor would be required to undertake all works in accordance with the conditions of approval and the final list of mitigation measures.

*Table 27.3 Compilation of proposal specific mitigation measures for detailed design/pre-construction*

No.	Issue	Detailed design/pre-construction mitigation measure
<b>D1 Environmental management</b>		
D1.1	<i>CEMP</i>	▶ A CEMP would be prepared to detail the approach to environmental management during construction, as described in Section 27.2.1 and in accordance with the conditions of approval.
<b>D2 Traffic, transport and access</b>		
D2.1	<i>Traffic, transport and access</i>	<ul style="list-style-type: none"> <li>▶ Detailed design would minimise the potential for impacts to the surrounding road and transport network, and property accesses.</li> <li>▶ Where any legal access to a property is permanently affected and a property has no other legal means of access, alternative access to and from a public road would be provided to an equivalent standard, where feasible and practicable. Where an alternative access is not feasible or practicable, and a property is left with no access to a public road, negotiations would be undertaken with the relevant property owner for acquisition of the property in accordance with the provisions of the <i>Land Acquisition (Just Terms Compensation) Act 1991</i>.</li> </ul>
D2.2	<i>Consultation</i>	<ul style="list-style-type: none"> <li>▶ Input would be sought from relevant stakeholders (including Narrabri Shire Council, Moree Plains Shire Council, Gwydir Shire Council, and Roads and Maritime Services) prior to finalising the detailed design of those aspects of the proposal that impact on the operation of the road and transport infrastructure under the management of these stakeholders.</li> <li>▶ The traffic, transport, and access management sub-plan would be developed in consultation with (where relevant) local councils, Roads and Maritime Services, and local public transport/bus operators.</li> </ul>
D2.3	<i>Level crossings</i>	▶ Level crossings would be provided with warning signage, line marking and other relevant controls; in accordance with the relevant national and ARTC standards.

No.	Issue	Detailed design/pre-construction mitigation measure
D3	Biodiversity	
D3.1	<i>Biodiversity offset strategy</i>	<ul style="list-style-type: none"> <li>▶ The biodiversity offset strategy for the proposal would be finalised, in accordance with the requirements of the <i>Framework for Biodiversity Assessment</i> (OEH, 2014b) and the <i>NSW Biodiversity Offsets Policy for Major Projects</i> (OEH, 2014c).</li> <li>▶ The offset strategy would be approved by the Department of Planning and Environment prior to the commencement of construction work that would result in the disturbance of relevant ecological communities, threatened species, or their habitat, unless otherwise agreed.</li> </ul>
D3.2	<i>Direct impacts to biodiversity</i>	<ul style="list-style-type: none"> <li>▶ Detailed design and construction planning would minimise the construction footprint and avoid impacts to native vegetation as far as practicable.</li> </ul>
D3.3	<i>Riparian vegetation</i>	<ul style="list-style-type: none"> <li>▶ Compounds and stockpile sites would be located an appropriate distance from riparian vegetation to avoid indirect impacts on aquatic habitat. This includes a minimum of 100 metres for type 1 class 1 watercourses (the Mehi River and Gwydir River), 50 metres for type 2 class 2 and 3 watercourses (such as Boobiwaa, Gurley and Tycannah creeks), and 10 to 50 metres for type 3 class 2 to 4 watercourses (including Croppa Creek).</li> <li>▶ Direct impacts to in-stream vegetation and native vegetation on the banks of watercourses would be avoided as far as practicable.</li> </ul>
D3.4	<i>Fish passage</i>	<ul style="list-style-type: none"> <li>▶ Detailed design and construction planning would minimise the potential for impacts to fish passage. To ensure that fish passage is maintained, watercourse crossing structures would be designed in accordance with the guideline <i>Why do fish need to cross the road? Fish passage requirements for waterway crossings</i> (Fairfull and Witheridge, 2003) and the minimum design requirements specified in Table 5.1 of Technical Report 3.</li> </ul>
D3.5	<i>Rehabilitation strategy</i>	<ul style="list-style-type: none"> <li>▶ A rehabilitation strategy would be prepared to guide the approach to rehabilitation of disturbed areas following the completion of construction. The strategy would include: <ul style="list-style-type: none"> <li>• clear objectives and timeframes for rehabilitation works (including the biodiversity outcomes to be achieved)</li> <li>• details of the actions and responsibilities to progressively rehabilitate, regenerate, and/or revegetate areas, consistent with the agreed objectives</li> <li>• identification of flora species and sources</li> <li>• procedures for monitoring the success of rehabilitation</li> <li>• corrective actions should the outcomes of rehabilitation not conform to the objectives adopted.</li> </ul> </li> </ul>
D3.6	<i>Pre-clearing surveys</i>	<ul style="list-style-type: none"> <li>▶ Pre-clearing surveys would be undertaken prior to construction. The surveys and inspections, and any subsequent relocation of species, would be undertaken and in accordance with the biodiversity management sub-plan in the CEMP.</li> </ul>

No.	Issue	Detailed design/pre-construction mitigation measure
<b>D4 Noise and vibration</b>		
D4.1	<i>Noise and vibration control</i>	<ul style="list-style-type: none"> <li>▶ The proposal would be designed with the aim of achieving the operational noise and vibration criteria identified by the noise and vibration assessment.</li> <li>▶ Track features such as crossovers, turnouts, and rail joints would be avoided near vibration sensitive structures where practicable.</li> </ul>
D4.2	<i>Construction vibration</i>	<ul style="list-style-type: none"> <li>▶ Where vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure and vibration monitoring would be carried out in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework, to ensure vibration levels remain below appropriate limits for that structure.</li> </ul>
D4.3	<i>Operational noise and vibration review</i>	<ul style="list-style-type: none"> <li>▶ An operational noise and vibration review would be undertaken as described in Section 11.5.1 to guide the approach to identifying feasible and reasonable mitigation measures to incorporate in the detailed design.</li> </ul>
<b>D5 Soils</b>		
D5.1	<i>Structural integrity</i>	<ul style="list-style-type: none"> <li>▶ Foundation and batter design would include measures to minimise operational risks from shrink swell, dispersive and/or low strength soils.</li> </ul>
<b>D6 Hydrology and flooding</b>		
D6.1	<i>Flooding</i>	<ul style="list-style-type: none"> <li>▶ The design features listed in Section 15.3.1 would continue to be refined to not worsen existing flooding characteristics, where feasible and reasonable, up to and including the one per cent AEP event. Detailed flood modelling would consider potential changes to: <ul style="list-style-type: none"> <li>• building and property inundation</li> <li>• level crossing and road flood levels and extent</li> <li>• overland flow paths and storage effects due to spoil mounds and other proposal infrastructure</li> <li>• flood evacuation routes.</li> </ul> </li> <li>▶ Flood modelling to support detailed design would be carried out in accordance with the guidelines listed in Section 15.1.2.</li> <li>▶ Flood modelling and mitigation would consider future floodplain risk management plans, and would be undertaken in consultation with the relevant local council, the OEH, and State Emergency Services.</li> </ul>
D6.2	<i>Emergency routes</i>	<ul style="list-style-type: none"> <li>▶ Where feasible, facilities and routes identified as being critical to emergency response operations would be protected from the probable maximum flood level.</li> </ul>
D6.3	<i>Downstream watercourse stability</i>	<ul style="list-style-type: none"> <li>▶ Further modelling would be undertaken during detailed design to confirm the locations downstream of culverts that require erosion protection, and the extent and type of protection required.</li> </ul>

No.	Issue	Detailed design/pre-construction mitigation measure
<b>D7 Water quality</b>		
D7.1	<i>Water quality</i>	<ul style="list-style-type: none"> <li>▶ The design features listed in Section 16.3.1 would continue to be refined and implemented to minimise the potential impacts of the proposal on water quality.</li> </ul>
D7.2	<i>Surface water monitoring framework</i>	<ul style="list-style-type: none"> <li>▶ A surface water monitoring framework would be developed as part of the soil and water management sub-plan in the CEMP. It would identify monitoring locations at discharge points, and selected watercourses where works are being undertaken.</li> <li>▶ The monitoring framework would include the relevant water quality objectives, parameters, and criteria from Technical Report 7, and specific monitoring locations which have been identified based on the hydrological attributes of the receiving watercourse, in consultation with DPI (Water) and the EPA.</li> </ul>
<b>D8 Aboriginal heritage</b>		
D8.1	<i>Avoiding and minimising impacts to Aboriginal heritage</i>	<ul style="list-style-type: none"> <li>▶ Detailed design and construction planning would avoid direct impacts to the identified items/sites of Aboriginal heritage significance where practicable.</li> <li>▶ An Aboriginal cultural heritage management plan (CHMP) would be prepared and would include measures to minimise the potential for impacts, manage Aboriginal heritage, and procedures for any unexpected finds.</li> <li>▶ The plan would be prepared in consultation with registered Aboriginal parties, incorporate the recommendations of the Aboriginal Cultural Heritage and Archaeological Assessment, and take into account the outcomes of further investigations following detailed design.</li> <li>▶ The location of all construction compounds would be reviewed to ensure they are not located in areas of more than low archaeological potential.</li> </ul>
D8.2	<i>Impact to the following sites within the proposal site:</i> <ul style="list-style-type: none"> <li>▶ <i>Steel Bridge Camp site (10-3-0032)</i></li> <li>▶ <i>Duffys Creek site (10-3-0035)</i></li> <li>▶ <i>NNS IA6 to IA13</i></li> <li>▶ <i>NNS AS1 and NNS AS5 to NNS AS7</i></li> </ul>	<ul style="list-style-type: none"> <li>▶ Impacts to these sites would be avoided where possible. The sites would be fenced prior to construction and their locations marked on all plans. A buffer of 10 metres around the sites would be applied for fencing.</li> <li>▶ If these sites cannot be avoided, salvage of artefacts would be undertaken prior to construction in accordance with the procedures detailed in the Aboriginal Cultural Heritage and Archaeological Assessment (Technical Report 8) .</li> </ul>
D8.3	<i>Impacts to site 10-6-0048 (scarred tree)</i>	<ul style="list-style-type: none"> <li>▶ Impacts to the scarred tree (site 10-6-0048) and the dripline of the tree would be avoided. The site would be fenced prior to construction and marked on all plans.</li> </ul>

No.	Issue	Detailed design/pre-construction mitigation measure
D8.4	<p><i>Impacts to areas of moderate to high archaeological potential within the proposal site:</i></p> <ul style="list-style-type: none"> <li>▶ <i>Gwydir River terraces (survey area 42)</i></li> <li>▶ <i>Croppa Creek and adjoining slopes and terraces (survey area 55)</i></li> <li>▶ <i>Mehi River and terraces (survey area 56)</i></li> </ul>	<ul style="list-style-type: none"> <li>▶ If the detailed design identifies the potential for disturbance below the depth of existing disturbance, further consideration would be given to the potential for archaeological impacts.</li> <li>▶ If required, a detailed methodology for any subsequent archaeological excavation would be developed in consultation with Aboriginal parties for inclusion within the Aboriginal cultural heritage management plan.</li> </ul>
D8.5	<p><i>Impacts to survey area 15 (Lower slopes - Newell Highway overbridge)</i></p>	<ul style="list-style-type: none"> <li>▶ Consideration will be given to undertaking a program of archaeological subsurface testing within this area. Salvage excavations may be required depending on the results of any testing undertaken.</li> </ul>
D8.6	<p><i>Unexpected finds</i></p>	<ul style="list-style-type: none"> <li>▶ An unexpected finds procedure would be developed and included in the CEMP to provide a consistent method for managing any unexpected Aboriginal heritage items discovered during construction, including potential heritage items or objects, and human skeletal remains.</li> </ul>
<b>D9 Non-Aboriginal heritage</b>		
D9.1	<p><i>Impacts to Moree Station</i></p>	<ul style="list-style-type: none"> <li>▶ Detailed design would minimise the potential for impacts to Moree Station, and would have regard to, and be sympathetic with, its heritage significance.</li> </ul>
D9.2	<p><i>Impacts to the bridges over the Mehi and Gwydir rivers and Croppa Creek, underbridges, former stations, Edgeroi Woolshed</i></p>	<ul style="list-style-type: none"> <li>▶ A photographic/archival recording would be undertaken of bridges proposed for removal, former rail station sites, and Edgeroi Woolshed in accordance with ARTC's Archival Recording Standard.</li> <li>▶ The photographic recording would include contextual photographs showing the relationship between the rail line and these items.</li> </ul>
D9.3	<p><i>Impacts to the Anzac Day crossing</i></p>	<ul style="list-style-type: none"> <li>▶ Where practicable, detailed design would provide a level crossing at the same or a similar location as the Anzac Day Crossing south of Crooble.</li> </ul>

No.	Issue	Detailed design/pre-construction mitigation measure
D9.4	<i>Impacts to the former Aboriginal fringe camp near the Mehi River bridge</i>	▶ A heritage management sub-plan would be prepared as part of the CEMP to define the measures to be implemented during construction at the former Aboriginal fringe camp site (Steel Bridge Camp site) near the Mehi River bridge. The plan would provide requirements for archaeological management, including a research design methodology.
D9.5	<i>Potential vibration impacts to heritage structures</i>	▶ For listed and potential heritage items where screening vibration levels are predicted to be exceeded, the detailed assessment referred to under item D4.2 would specifically consider the heritage values of the structure, in consultation with a heritage specialist, to ensure sensitive heritage fabric is adequately monitored and managed.
D9.6	<i>Unexpected finds</i>	▶ An unexpected finds procedure would be developed and included in the CEMP to provide a consistent method for managing any unexpected heritage items or human skeletal remains discovered during construction.
<b>D10 Landscape and visual</b>		
D10.1	<i>Landscape character and visual impacts</i>	▶ Detailed design would be undertaken in accordance with the design vision, objectives, and principles which underpin the concept design, and would take into account the guidelines listed in Section 19.1.2.
D10.2	<i>Artist impressions</i>	▶ Following completion of detailed design of the Mehi River bridge, and the Jones Avenue overbridge, artist impressions and perspective drawings would be developed for consultation purposes.
<b>D11 Land use and property</b>		
D11.1	<i>Property impacts</i>	▶ Individual property agreements would be developed in consultation with landowners/occupants, with respect to the management of construction on or immediately adjacent to private properties. These would detail any required adjustments to fencing, access, farm infrastructure, and relocation of any impacted structures, as required.
D11.2	<i>Acquisitions</i>	▶ All property acquisitions/adjustments would be undertaken in consultation with landowners and in accordance with the requirements of the <i>Land Acquisition (Just Terms Compensation) Act 1991</i> .
D11.3	<i>Access to properties</i>	▶ Access to properties would be maintained and managed in accordance with the mitigation measures listed under item D2.
D11.4	<i>Travelling stock reserves</i>	▶ Local Land Services would be consulted during detailed design to understand how impacts to travelling stock reserves can be avoided during construction and operation. Alternative access arrangements would be made as required.
D11.5	<i>Impacts to services and utilities</i>	▶ Utility and service providers would continue to be consulted during detailed design to identify possible interactions and develop procedures to minimise the potential for service interruptions and impacts on existing land uses.

No.	Issue	Detailed design/pre-construction mitigation measure
D11.6	<i>Consultation and communication</i>	<ul style="list-style-type: none"> <li>▶ Property owners and occupants would be consulted during the design and construction phases, in accordance with the communication management sub-plan for the proposal (described in Chapter 4), to ensure that owners/occupants are informed about the timing and scope of activities in their area; and any potential property impacts/changes, particularly in relation to potential impacts to access, services, or farm operational arrangements.</li> <li>▶ The results of consultation would be incorporated in the individual property agreements as appropriate.</li> <li>▶ Consultation would be undertaken with landowners affected by level crossing changes and agreement obtained, where required.</li> </ul>
D11.7	<i>Biosecurity risks</i>	<ul style="list-style-type: none"> <li>▶ The biodiversity management sub-plan included in the CEMP would detail measures to minimise the potential for biosecurity risks during construction.</li> </ul>
<b>D12 Socio-economics</b>		
D12.1	<i>Communication</i>	<ul style="list-style-type: none"> <li>▶ Key stakeholders (including local councils, emergency service providers, public transport providers, the general community, and surrounding land owners/occupants) would continue to be consulted regarding the proposal in accordance with the communication management plan described in Chapter 4.</li> </ul>
D12.2	<i>Local access to Inland Rail</i>	<ul style="list-style-type: none"> <li>▶ ARTC would continue to work with relevant stakeholders, including Moree Plains Shire Council, to identify opportunities to facilitate local access to Inland Rail via the Moree Gateway.</li> </ul>
D12.3	<i>Accommodation</i>	<ul style="list-style-type: none"> <li>▶ A temporary workforce housing and accommodation plan would be developed and implemented during construction. This would include a requirement for consultation to be undertaken with local accommodation providers and councils regarding the availability of accommodation, and the need to maintain some availability for non-workforce accommodation.</li> </ul>
<b>D13 Sustainability</b>		
D13.1	<i>Sustainability management plan</i>	<ul style="list-style-type: none"> <li>▶ The potential sustainability initiatives identified for the proposal would be reviewed and updated during detailed design.</li> <li>▶ A sustainability management plan would be developed to guide the design, construction, and operation of the proposal, to achieve an 'excellent' rating according to the ISCA infrastructure sustainability rating tool.</li> <li>▶ The sustainability management plan would incorporate the updated sustainability initiatives, and the review and reporting requirements necessary to demonstrate how sustainability has been incorporated into the proposal during design, construction, and operation.</li> </ul>
<b>D14 Climate change</b>		
D14.1	<i>Climate change risk management</i>	<ul style="list-style-type: none"> <li>▶ The climate change risk assessment would continue to be refined as the design of the proposal progresses.</li> <li>▶ The adaptation measures identified for the proposal would be reviewed, and final measures would be incorporated into the design where practicable.</li> </ul>

No.	Issue	Detailed design/pre-construction mitigation measure
<b>D15 Waste</b>		
D15.1	<i>Waste management</i>	▶ Detailed design would include measures to minimise excess spoil generation. This would include a focus on optimising the design to minimise spoil volumes, and the re-use of material on-site.
<b>D16 Health and safety</b>		
D16.1	<i>Public safety</i>	▶ A hazard analysis would be undertaken during detailed design to identify risks to public safety from the proposal, and how these can be mitigated through safety in design.
D16.2	<i>Services and utilities</i>	▶ The location of utilities, services, and other infrastructure would be identified prior to construction to determine requirements for access to, diversion, protection, and/or support.

Table 27.4 Compilation of proposal specific mitigation measures for construction

No.	Issue	
<b>C1 Environmental management</b>		
1.1	<i>CEMP</i>	▶ Construction of the proposal would be undertaken in accordance with the approved CEMP.
<b>C2 Traffic, transport and access</b>		
C2.1	<i>General impacts of construction activities on traffic, transport, access, pedestrians and cyclists.</i>	<p>▶ A traffic, transport and access management sub-plan would be prepared and implemented as part of the CEMP. It would include measures to minimise the potential for impacts on the community and the operation of the surrounding road and transport environment. It would address all the aspects of construction relating to the movement of vehicles, pedestrians and cyclists, and the operation of the surrounding road network, including:</p> <ul style="list-style-type: none"> <li>• construction site traffic control, parking and access arrangements</li> <li>• construction material, equipment and spoil haulage, including arrangements for oversize vehicles</li> <li>• road pavement and access road condition management</li> <li>• management of impacts to public transport, including school buses, pedestrian and cyclist access, and safety</li> <li>• management of impacts to access for surrounding residents and business owners/operators</li> <li>• arrangements for level crossings during construction</li> <li>• road and driver safety.</li> </ul> <p>▶ The traffic, transport and access management sub-plan would be developed in consultation with (where relevant) Narrabri Shire Council, Moree Plains Shire Council, Gwydir Shire Council, Roads and Maritime Services, and public transport/bus operators.</p>
C2.2	<i>Access</i>	▶ Access to individual residences, services and businesses, and access for livestock across the rail corridor, would be maintained during construction. Where alternative access arrangements need to be made, these would be developed in consultation with affected property owners/occupants.
C2.3	<i>Emergency vehicle access</i>	▶ Access for emergency vehicles would be maintained along key emergency access routes throughout the construction period, with suitable alternative access arrangements provided where required.

No.	Issue	
C2.4	<i>Rail traffic diversions</i>	<ul style="list-style-type: none"> <li>▶ Diversions of existing rail traffic would be undertaken in consultation with relevant stakeholders, and alternative arrangements would be provided.</li> </ul>
C2.5	<i>Consultation</i>	<ul style="list-style-type: none"> <li>▶ Consultation with relevant stakeholders would be undertaken regularly to facilitate the efficient delivery of the proposal and to minimise congestion and inconvenience to road users. Stakeholders would include the relevant local council, bus operators, Roads and Maritime Services, emergency services, and affected property owners/occupants.</li> <li>▶ The community would be notified in advance of any proposed road and pedestrian network changes through signage, the local media, and other appropriate forms of communication.</li> <li>▶ Where changes to access arrangements are required, ARTC would advise property owners/occupants and consult with them in advance regarding alternative access arrangements.</li> </ul>
<b>C3</b>	<b>Biodiversity</b>	
C3.1	<i>General biodiversity impacts</i>	<ul style="list-style-type: none"> <li>▶ A biodiversity management sub-plan would be prepared and implemented as part of the CEMP. It would include measures to minimise the potential for biodiversity impacts. The sub-plan would address, as outlined below: <ul style="list-style-type: none"> <li>• a pre-clearing survey and tree-felling procedure</li> <li>• procedures to manage micro-bats</li> <li>• avoiding impacts on surrounding vegetation (item C3.2)</li> <li>• weed management (item C3.3)</li> <li>• dewatering of standing pools in watercourses</li> <li>• measure to minimise impacts on aquatic ecology.</li> </ul> </li> </ul>
C3.2	<i>Avoidance of impacts – terrestrial and aquatic biodiversity</i>	<ul style="list-style-type: none"> <li>▶ Areas of biodiversity value outside the proposal site would be fenced or signposted, where appropriate, to prevent the unnecessary disturbance during the construction phase.</li> </ul>
C3.3	<i>Weed management</i>	<ul style="list-style-type: none"> <li>▶ Noxious weeds would be managed in accordance with the <i>Noxious Weeds Act 1993</i>. Weeds of national environmental significance would be managed in accordance with the <i>Weeds of National Significance Weed Management Guide</i>.</li> <li>▶ Any herbicides would be applied such that impacts on surrounding agricultural properties are avoided.</li> </ul>
C3.4	<i>Rehabilitation</i>	<ul style="list-style-type: none"> <li>▶ Rehabilitation of disturbed areas would be undertaken progressively and in accordance with the rehabilitation strategy.</li> </ul>
<b>C4</b>	<b>Noise and vibration</b>	
C4.1	<i>Noise and vibration management</i>	<ul style="list-style-type: none"> <li>▶ The Inland Rail NSW Construction Noise and Vibration Management Framework would be implemented, and the proposal would be constructed, with the aim of achieving the construction noise management levels and vibration criteria identified by the noise and vibration assessment.</li> <li>▶ All feasible and reasonable noise and vibration mitigation measures would be implemented.</li> <li>▶ Any activities that could exceed the construction noise management levels and vibration criteria would be identified and managed in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework and the CEMP.</li> <li>▶ Notification of impacts would be undertaken in accordance with the communication management sub-plan for the proposal.</li> </ul>

No.	Issue	
<b>C5 Air quality</b>		
C5.1	<i>General air quality impacts</i>	<p>▶ An air quality management sub-plan would be prepared and implemented as part of the CEMP. It would include measures to minimise the potential for air quality impacts on the local community and environment, and would address all aspects of construction, including:</p> <ul style="list-style-type: none"> <li>• spoil handling</li> <li>• machinery operating procedures</li> <li>• soil treatments</li> <li>• stockpile management</li> <li>• haulage</li> <li>• dust suppression</li> <li>• monitoring.</li> </ul>
C5.2	<i>Construction activities and earthworks that may cause dust impacts</i>	<p>▶ Where sensitive receivers are located within 150 metres of construction works, or visible dust is generated from vehicles using unsealed access roads, road watering would be implemented.</p>
<b>C6 Soil and contamination</b>		
C6.1	<i>General soil and erosion management</i>	<p>▶ A soil and water management sub-plan would be prepared as part of the CEMP. It would include a detailed list of measures that would be implemented during construction to minimise the potential for soil and contamination impacts, including:</p> <ul style="list-style-type: none"> <li>• allocation of general site practices and responsibilities</li> <li>• material management practices</li> <li>• stockpiling and topsoil management, including prompt stabilisation of spoil mounds (for example, through mixing of gypsum)</li> <li>• surface water and erosion control practices that take into account site specific soil types (for example, dispersive soils).</li> </ul>
C6.2	<i>Contamination</i>	<p>▶ A contamination and hazardous materials sub-plan would be prepared and implemented as part of the CEMP. It would include:</p> <ul style="list-style-type: none"> <li>• measures to minimise the potential for contamination impacts on the local community, workers, and environment</li> <li>• procedures for incident management and managing unexpected contamination finds (an unexpected finds protocol).</li> </ul>
<b>C7 Hydrology and flooding</b>		
C7.1	<i>Flooding</i>	<p>▶ Construction planning and the layout of construction work sites and compounds would be carried out with consideration of overland flow paths and flood risk, avoiding flood liable land and flood events where possible.</p>
C7.2	<i>Water usage (private bores and surface water)</i>	<p>▶ Consultation would be undertaken with relevant stakeholders (including landowners/occupants) prior to construction, and appropriate approvals and agreements would be sought for the extraction of water. Monitoring would be undertaken during extraction to ensure volumes stipulated by licence requirements and/or private landholder agreements are not exceeded.</p>

No.	Issue	
<b>C8 Water quality</b>		
C8.1	<i>Discharge to surface water</i>	▶ Discharge to surface water would be undertaken in accordance with the environment protection licence for Inland Rail, and would consider the hydrological attributes of the receiving waterbody.
C8.2	<i>Monitoring</i>	▶ Water quality would be monitored during construction in accordance with the surface water monitoring framework (item D.8.2).
<b>C9 Aboriginal heritage</b>		
C9.1	<i>Unexpected finds and human skeletal material</i>	<p>▶ If potential Aboriginal items, objects, or human remains are uncovered, works within the immediate area of the item would cease, and the unexpected finds procedure would be implemented.</p> <p>▶ During pre-work briefings, employees would be made aware of the unexpected finds procedures and obligations under the NPW Act.</p>
<b>C10 Non-Aboriginal heritage</b>		
C10.1	<i>Accidental impacts</i>	▶ To minimise the potential for accidental impacts, the boundary of Moree, Edgeroi, Bellata, and Gurley stations, Edgeroi Woolshed, and the surveyor's trees, would be marked on plans and clearly defined during construction.
C10.2	<i>Unexpected finds and human skeletal material</i>	▶ In the event that unexpected archaeological remains, relics, potential heritage items, or human remains are discovered during construction, all works in the immediate area would cease, and the unexpected finds procedure would be implemented.
<b>C11 Landscape and visual</b>		
C11.1	<i>Light spill</i>	<p>▶ Temporary and any permanent lighting would be designed and sited to comply with:</p> <ul style="list-style-type: none"> <li>• AS 4282-1997 <i>Control of the Obtrusive Effects of Outdoor Lighting</i></li> <li>• <i>Dark Sky Planning Guideline: Protecting the observing conditions at Siding Spring</i> (Department of Planning and Environment, 2016).</li> </ul>
C11.2	<i>Spoil mounds</i>	▶ Spoil mounds would be shaped to reduce their angular profile and ensure that they are integrated within the landscape. Sharp transition angles in the surface profile would be avoided, and rounded profiles would be used to provide a more natural form. Grass cover would be established over the surface area in accordance with the rehabilitation strategy.
<b>C12 Land use and property</b>		
C12.1	<i>Communication</i>	▶ Property owners/occupants would continue to be consulted during construction, in accordance with the requirements of item D11.6.

No.	Issue	
C12.2	<i>Rehabilitation</i>	<ul style="list-style-type: none"> <li>▶ The rehabilitation strategy (item D3.5) would include measures to restore disturbed sites as close as possible to the pre-construction condition or better, or to the satisfaction of landowners.</li> <li>▶ Rehabilitation of disturbed areas would be undertaken progressively, consistent with the rehabilitation strategy and individual property agreements (where relevant).</li> </ul>
<b>C13 Socio-economics</b>		
C13.1	<i>Communication</i>	<ul style="list-style-type: none"> <li>▶ A communication management sub-plan would be prepared as part of the CEMP including a detailed list of the measures that would be implemented during construction to communicate with and respond to community concerns. The plan would include, as a minimum: <ul style="list-style-type: none"> <li>• requirements to provide details and timing of proposed activities to affected residents, the local community and businesses, and local bus operators</li> <li>• consultation actions in relation to access arrangements and servicing requirements</li> <li>• complaints handling procedure</li> <li>• procedure to notify adjacent land users for any changed conditions during the construction period such as traffic, pedestrian or driveway access.</li> </ul> </li> <li>▶ Local residents, businesses, and other stakeholders would be notified before work starts in accordance with the communication management sub-plan, and would be regularly informed of construction activities.</li> </ul>
C13.2	<i>Workforce</i>	<ul style="list-style-type: none"> <li>▶ Where practicable, the workforce would include workers sourced locally, and opportunities for training potential local employees would be provided. This would include exploring opportunities for local Indigenous participation in consultation with local Indigenous service providers.</li> <li>▶ A zero tolerance policy relating to anti-social behaviour would be adopted for work sites.</li> </ul>
C13.3	<i>Demands for goods and services</i>	<ul style="list-style-type: none"> <li>▶ Local suppliers would be identified and approached for procurement of goods and services where practicable.</li> </ul>
<b>C14 Sustainability</b>		
C14.1	<i>Procurement</i>	<ul style="list-style-type: none"> <li>▶ Procurement would be undertaken in accordance with the <i>Sustainable Procurement Guide</i> (Department of Sustainability, Environment, Water, Population and Communities, 2013) and the <i>NSW Government Resource Efficiency Policy</i> (OEH, 2014).</li> </ul>
C14.2	<i>Reporting</i>	<ul style="list-style-type: none"> <li>▶ Sustainability reporting (and corrective action where required) would be undertaken during construction in accordance with the sustainability management plan.</li> </ul>

No.	Issue	
<b>C15 Waste</b>		
C15.1	<i>Waste management</i>	<ul style="list-style-type: none"> <li>▶ A construction waste management plan would be prepared and implemented as part of the CEMP. It would include measures to minimise the potential for impacts on the local community and environment, including those listed in Table 24.6.</li> <li>▶ Waste segregation bins (colour coded as listed in Table 24.7) would be located at key construction compounds where practicable, to facilitate segregation and prevent cross contamination.</li> </ul>
<b>C16 Health and safety</b>		
C16.1	<i>Storage and handling of dangerous goods</i>	<ul style="list-style-type: none"> <li>▶ Hazardous materials and dangerous goods would be stored, handled, and transported in accordance with relevant regulatory requirements and relevant Australian Standards, including SEPP 33 thresholds. This would include a requirement to provide a minimum bund volume of 110% of the largest single stored volume within the bund.</li> <li>▶ A risk management strategy would be developed to manage the potential for risks in situations where the minimum distance from sensitive receivers cannot be achieved, or the quantity of hazardous materials exceed SEPP 33 threshold levels.</li> </ul>
C16.2	<i>Public safety from bushfires, fires, explosions, flooding and inundation</i>	<ul style="list-style-type: none"> <li>▶ An emergency response sub-plan would be developed and implemented as part of the CEMP in consultation with relevant stakeholders. It would include measures to minimise the potential for health and safety impacts on the local community and environment.</li> </ul>

Table 27.5 Compilation of proposal specific mitigation measures for operation

No.	Issue	Operation mitigation measure
<b>01 Environmental management</b>		
01.1	<i>OEMP</i>	<ul style="list-style-type: none"> <li>▶ An OEMP would be prepared to detail the approach to environmental management during operation, as described in Section 27.2 and in accordance with the conditions of approval.</li> <li>▶ The proposal would be operated in accordance with the approved OEMP.</li> </ul>
<b>02 Traffic, transport and access</b>		
02.1	<i>Level crossings</i>	<ul style="list-style-type: none"> <li>▶ The operation of the level crossings that have been subject to changes as part of the proposal would be reviewed after the proposal commences operation to confirm: <ul style="list-style-type: none"> <li>• that the level of protection continues to be appropriate</li> <li>• that the infrastructure is appropriate for the traffic conditions.</li> </ul> </li> </ul>
<b>03 Biodiversity</b>		
03.1	<i>Fish passage</i>	<ul style="list-style-type: none"> <li>▶ Culverts would be regularly inspected and maintained to minimise blockage of fish passage.</li> </ul>
03.2	<i>Weed management</i>	<ul style="list-style-type: none"> <li>▶ Annual inspections would be undertaken for weed infestations and to assess the need for control measures.</li> <li>▶ Any outbreak of noxious and/or weeds of national environmental significance would be managed in accordance with the <i>Noxious Weeds Act 1993</i>, the <i>Weeds of National Significance Weed Management Guide</i>, and the requirements of relevant authorities.</li> </ul>

No.	Issue	Operation mitigation measure
<b>04 Noise and vibration</b>		
04.1	<i>Operational noise and vibration</i>	▶ The proposal would be operated with the aim of achieving the operational noise and vibration criteria identified by the noise and vibration assessment, the requirements of the conditions of approval, and the relevant environment protection licence.
04.2	<i>Monitoring</i>	<p>▶ Once Inland Rail has commenced operation, operational noise and vibration compliance monitoring would be undertaken at representative locations to compare actual noise performance against that predicted by the noise and vibration assessment.</p> <p>▶ Compliance monitoring requirements would be defined as part of the operational noise and vibration review.</p> <p>▶ The results of monitoring would be included in an operational noise and vibration compliance report, prepared in accordance with the conditions of approval.</p>
<b>05 Air quality</b>		
05.1	<i>Rail vehicle emissions</i>	▶ The proposal would be managed in accordance with the air quality management requirements specified in the environment protection licence.
05.2	<i>Impacts during maintenance</i>	▶ Maintenance service vehicles and equipment would be maintained and operated in accordance with the manufacturers specifications.
<b>06 Soils and contamination</b>		
06.1	<i>Soil erosion and sedimentation</i>	▶ During any maintenance work where soils are exposed, sediment and erosion control devices would be installed in accordance with <i>Managing Urban Stormwater: Soils and Construction</i> .
06.2	<i>Contamination</i>	▶ ARTC's existing spill response procedures would be reviewed to determine applicability and suitability during operation. The adopted procedure would include measures to minimise the potential for impacts on the local community and the environment as a result of any leaks and spills.
<b>07 Water quality</b>		
07.1	<i>General water quality management</i>	▶ The proposal would be managed in accordance with the water quality management requirements specified in the environment protection licence.
<b>08 Socio-economics</b>		
08.1	<i>Community safety</i>	<p>▶ A safety awareness program would be implemented to educate the community regarding safety around trains. This would focus on:</p> <ul style="list-style-type: none"> <li>• community and rural property operators who cross the rail corridor to access their properties</li> <li>• residents in Moree, particularly those living on eastern side of town, to ensure that residents are aware of the safety concerns associated with trains passing through town, and encourage use of the Jones Avenue overbridge.</li> </ul>
<b>09 Sustainability</b>		
09.1	<i>Sustainability</i>	▶ Prior to operation commencing, the sustainability management plan would be reviewed and updated, and relevant initiatives would be implemented during operation.

No.	Issue	Operation mitigation measure
O10	Climate change	
O10.1	<i>Climate change</i>	<ul style="list-style-type: none"> <li>▶ The recommended adaptation measures would be reviewed, and a final list of adaptation measures for implementation during operation would be confirmed and implemented.</li> <li>▶ Operational management and maintenance procedures would include measures relating to potential climate change risks, as listed in Chapter 23.</li> <li>▶ Emerging opportunities to manage potential climate change impacts on the proposal would continue to be monitored.</li> </ul>
O11	Waste	
O11.1	<i>Waste management</i>	<ul style="list-style-type: none"> <li>▶ The waste management measures listed in Table 24.8 would be implemented where practicable during operation.</li> </ul>

## 27.4 Compilation of performance outcomes

The SEARs identify a number of desired performance outcomes for the proposal. These desired performance outcomes outline the broader objectives to be achieved in the design, construction, and operation of the proposal. Based on the outcomes of the environmental impact assessment summarised in Part C of the EIS, and the implementation of the mitigation measures compiled in Section 27.3, environmental performance outcomes have been established for the proposal. These are listed in Table 27.6. The first and second columns provide the key issue and desired performance outcome from the SEARs, and the third column provides the proposal specific environmental performance objectives to achieve the desired outcome.

Design development and any design changes would be considered against these environmental performance outcomes.

*Table 27.6 Compilation of environmental performance outcomes*

Key issue (as listed in the SEARs)	SEARS desired performance outcomes	Proposal specific environmental performance outcomes
5. Air quality	The project is designed, constructed and operated in a manner that minimises air quality impacts (including nuisance dust and odour) to minimise risks to human health and the environment to the greatest extent practicable.	<ul style="list-style-type: none"> <li>▶ The proposal is designed to minimise the potential for vegetation clearance and associated dust impacts.</li> <li>▶ The proposal is constructed and operated in accordance with the requirements of the POEO Act and relevant environmental protection licences.</li> <li>▶ Dust generated during construction will not exceed the relevant criteria in the <i>National Environment Protection (Ambient Air Quality) Measure</i> and the <i>Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales</i> (Department of Environment and Conservation, 2005).</li> </ul>

Key issue (as listed in the SEARS)	SEARS desired performance outcomes	Proposal specific environmental performance outcomes
6. Biodiversity	<p>The project design considers all feasible measures to avoid and minimise impacts on terrestrial and aquatic biodiversity.</p> <p>Offsets and/or supplementary measures are assured which are equivalent to any remaining impacts of project construction and operation.</p>	<ul style="list-style-type: none"> <li>▶ The proposal is designed to minimise the surface footprint and impacts on biodiversity.</li> <li>▶ Potential impacts on biodiversity are managed in accordance with relevant legislation, including the EP&amp;A Act, TSC Act, FM Act, EPBC Act, and the <i>Noxious Weeds Act 1993</i>.</li> <li>▶ The biodiversity outcome is consistent with the <i>Framework for Biodiversity Assessment</i> (OEH, 2014b).</li> <li>▶ Offsets are provided in accordance with the <i>NSW Biodiversity Offsets Policy for Major Projects</i> (OEH, 2014c).</li> </ul>
7. Climate change risk	<p>The project is designed, constructed and operated to be resilient to the future impacts of climate change.</p>	<ul style="list-style-type: none"> <li>▶ Climate change risks are considered throughout the design and development process.</li> <li>▶ The proposal is designed to maximise climate change resilience while minimising costs, community, and environmental impacts.</li> <li>▶ The climate change risk assessment is maintained in line with updated global climate models and regional projection data.</li> <li>▶ The proposal is designed, constructed, and operated in accordance with relevant climate change legislation and guidelines.</li> </ul>
8. Flooding	<p>The project minimises adverse impacts on existing flooding characteristics.</p> <p>Construction and operation of the project avoids or minimises the risk of, and adverse impacts from, infrastructure flooding, flooding hazards, or dam failure.</p>	<ul style="list-style-type: none"> <li>▶ Construction is undertaken in a manner that minimises the potential for adverse flooding impacts, through staging of works and the implementation of mitigation measures.</li> <li>▶ The proposal makes a positive contribution to local flooding characteristics by replacing existing drainage infrastructure.</li> <li>▶ Structures such as spoil mounds are designed and located such that flows are not significantly impeded.</li> <li>▶ The proposal reduces the length of overtopping of the existing rail corridor.</li> <li>▶ The proposal reduces or does not significantly increase the area subject to flooding.</li> </ul>
9. Health and safety	<p>The project avoids, to the greatest extent possible, risk to public safety.</p>	<ul style="list-style-type: none"> <li>▶ Construction targets zero safety incidents.</li> <li>▶ All dangerous goods are stored, handled and transported in accordance with relevant regulatory requirements and Australian Standards.</li> </ul>

Key issue (as listed in the SEARS)	SEARS desired performance outcomes	Proposal specific environmental performance outcomes
10. Heritage	<p>The design, construction and operation of the project facilitates, to the greatest extent possible, the long term protection, conservation and management of the heritage significance of items of environmental heritage and Aboriginal objects and places.</p> <p>The design, construction and operation of the project avoids or minimises impacts, to the greatest extent possible, on the heritage significance of environmental heritage and Aboriginal objects and places.</p>	<ul style="list-style-type: none"> <li>▶ The proposal is designed to minimise the surface footprint.</li> <li>▶ The design is sympathetic to the historic significance of the existing rail corridor and the heritage significance of surrounding listed heritage items, and where practicable, avoids and minimises impacts to heritage.</li> <li>▶ Impacts on heritage are managed in accordance with relevant legislation, including the EP&amp;A Act, the <i>Heritage Act 1977</i>, and relevant guidelines.</li> <li>▶ The potential impacts identified are mitigated by photographic/archival recording.</li> </ul>
11. Noise and vibration – amenity	<p>Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on acoustic amenity.</p> <p>Increases in noise emissions and vibration affecting nearby properties and other sensitive receivers during operation of the proposal are effectively managed to protect the amenity and well-being of the community.</p>	<ul style="list-style-type: none"> <li>▶ The proposal minimises impacts to the local community by: <ul style="list-style-type: none"> <li>• controlling noise and vibration at the source</li> <li>• controlling noise and vibration on the source to receiver transmission path</li> <li>• controlling noise and vibration at the receiver</li> <li>• implementing practicable and reasonable measures to minimise the noise and vibration impacts of construction activities on local sensitive receivers.</li> </ul> </li> </ul>
12. Noise and vibration – structural	<p>Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on the structural integrity of buildings, items including Aboriginal places and environmental heritage, and nearby road infrastructure.</p> <p>Increases in noise emissions and vibration affecting environmental heritage as defined in the <i>Heritage Act 1977</i> during operation of the proposal are effectively managed.</p>	<ul style="list-style-type: none"> <li>▶ The proposal minimises impacts to structures by: <ul style="list-style-type: none"> <li>• controlling vibration at the source</li> <li>• controlling vibration on the source to receiver transmission path</li> <li>• implementing practicable and reasonable measures to minimise vibration impacts of construction activities on structures.</li> </ul> </li> </ul>
13. Protected and sensitive lands	<p>The project is designed, constructed and operated to avoid or minimise impacts on protected and sensitive lands.</p>	<ul style="list-style-type: none"> <li>▶ The proposal does not impact on protected and sensitive lands as defined by the SEARS.</li> </ul>

Key issue (as listed in the SEARS)	SEARS desired performance outcomes	Proposal specific environmental performance outcomes
14. Socio-economic, land use property, agriculture and biosecurity	<p>The project minimises adverse social and economic impacts and capitalises on opportunities potentially available to affected communities.</p> <p>The project minimises impacts to property and business and achieves appropriate integration with adjoining land uses, including maintenance of appropriate access to properties and community facilities, and minimisation of displacement of existing land use activities, dwellings and infrastructure.</p>	<ul style="list-style-type: none"> <li>▶ The proposal minimises impacts to the local community and businesses.</li> <li>▶ As part of Inland Rail as a whole, the proposal provides for the development of an efficient and sustainable route for the transport of freight between Brisbane and Melbourne.</li> <li>▶ The proposal provides opportunities for regional economic development, by enabling local and regional businesses to access Inland Rail via regional transport hubs.</li> <li>▶ Impacts to existing land use and properties are minimised.</li> <li>▶ The proposal is appropriately integrated with adjoining land uses, and access to private properties is maintained.</li> <li>▶ The proposal is appropriately integrated with local and regional land use planning strategies.</li> </ul>
15. Soils	<p>The environmental values of land, including soils, subsoils and landforms, are protected.</p> <p>Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulfate soils and site contamination.</p>	<ul style="list-style-type: none"> <li>▶ Site-specific soil, subsoil and landform characteristics are taken into consideration during detailed design and construction.</li> <li>▶ Any contamination is managed in accordance with relevant regulatory requirements.</li> <li>▶ Any soil waste is assessed, classified, managed and disposed of in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014).</li> </ul>
16. Sustainability	<p>The project reduces the NSW Government's operating costs and ensures the effective and efficient use of resources.</p> <p>Conservation of natural resources is maximised.</p>	<ul style="list-style-type: none"> <li>▶ The design process targets an 'excellent' rating in accordance with the ISCA rating tool.</li> <li>▶ Sustainability considerations are integrated throughout the design, construction, and operation phases of the proposal.</li> <li>▶ The proposal contributes to one of the desired outcomes of Inland Rail – to have more than 750,000 fewer tonnes of carbon, one-third less fuel consumption, and reduced truck volumes in over 20 regional towns.</li> </ul>

Key issue (as listed in the SEARS)	SEARS desired performance outcomes	Proposal specific environmental performance outcomes
17. Traffic, transport and access	<p>Network connectivity, safety and efficiency of the transport system in the vicinity of the project are managed to minimise impacts.</p> <p>The safety of transport system customers is maintained.</p> <p>Impacts on network capacity and the level of service are effectively managed.</p> <p>Works are compatible with existing infrastructure and future transport corridors.</p>	<ul style="list-style-type: none"> <li>▶ The proposal provides for more efficient and productive freight rail operations.</li> <li>▶ Impacts to traffic and transport are minimised.</li> <li>▶ Motorist, pedestrian and cyclist safety will be maintained or improved.</li> <li>▶ The proposal contributes to one of the desired outcomes of Inland Rail – to have reduced truck volumes on the road network, improving road safety.</li> <li>▶ Safe access to properties is maintained.</li> <li>▶ The proposal is integrated with existing and future local and regional transport infrastructure and planning strategies.</li> </ul>
18. Visual amenity	<p>The project minimises adverse impacts on the visual amenity of the built and natural environment (including public open space) and capitalises on opportunities to improve visual amenity.</p>	<ul style="list-style-type: none"> <li>▶ Vegetation providing screening to the rail corridor is retained where practicable.</li> <li>▶ The proposal is designed to have regard to the surrounding landscape and visual environment.</li> <li>▶ The proposal incorporates features to minimise the potential visual impacts where visual receptors are concentrated.</li> <li>▶ The proposal makes a positive contribution to the quality of the visual environment in the vicinity of the Newell Highway and Jones Avenue overbridges, and the new bridges over the Mehi and Gwydir rivers and Croppa Creek.</li> <li>▶ The proposal is visually integrated with its surroundings.</li> </ul>
19. Waste	<p>All wastes generated during the construction and operation of the proposal are effectively stored, handled, treated, reused, recycled and/or disposed of lawfully, and in a manner that protects environmental values.</p>	<ul style="list-style-type: none"> <li>▶ Waste is managed in accordance with the POEO Act and the WARR Act.</li> <li>▶ Waste is assessed, classified, managed, and disposed of in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014).</li> <li>▶ Reusable spoil is beneficially reused in accordance with the project spoil reuse hierarchy.</li> </ul>

Key issue (as listed in the SEARS)	SEARS desired performance outcomes	Proposal specific environmental performance outcomes
20. Water - hydrology	<p>Long term impacts on surface water and groundwater hydrology (including drawdown, flow rates and volumes) are minimised.</p> <p>The environmental values of nearby, connected and affected water sources, groundwater and dependent ecological systems including estuarine and marine water (if applicable) are maintained (where values are achieved) or improved and maintained (where values are not achieved).</p> <p>Sustainable use of water resources.</p>	<ul style="list-style-type: none"> <li>▶ The proposal avoids long-term impacts to surface water.</li> <li>▶ Opportunities to reuse water resources are considered during the design process.</li> <li>▶ The use of water during construction is minimised.</li> </ul>
21. Water - quality	<p>The project is designed, constructed and operated to protect the NSW Water Quality Objectives where they are currently being achieved, and contribute towards achievement of the Water Quality Objectives over time where they are currently not being achieved, including downstream of the project to the extent of the project impact including estuarine and marine waters (if applicable).</p>	<ul style="list-style-type: none"> <li>▶ The proposal is designed and constructed such that changes to water flows in watercourses are minimised.</li> <li>▶ Water discharged does not exceed the ANZECC 2000 guidelines for protection of aquatic ecosystems or water quality trigger values.</li> <li>▶ Impacts to water quality during construction and operation are minimised.</li> </ul>

# 28. Conclusion

*This chapter provides the conclusion to the EIS. It summarises the proposal for which approval is sought; the uncertainties that still exist and how these will be resolved; and provides the justification for the proposal, having regard to biophysical, economic and social considerations.*

## 28.1 Summary description of the proposal for which approval is sought

This EIS considers the potential impacts from construction and operation of the Narrabri to North Star section of Inland Rail. It has been prepared to support ARTC's application for approval of the proposal in accordance with the requirements of Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), and as a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The EIS addresses the environmental assessment requirements of the Secretary of the Department of Planning and Environment, dated 8 November 2016.

### 28.1.1 Proposal features

The proposal consists of 188 kilometres of upgraded track and associated facilities, and is generally located within the existing rail corridor between Narrabri and the town of North Star, via Moree. Some works would also be undertaken outside the rail corridor, including works at Bellata, Moree, and Camurra.

The key features of the proposal involve:

- ▶ upgrading the track, track formation, culverts, and underbridges within the existing rail corridor, for a distance of 188 kilometres, between Narrabri and North Star via Moree
- ▶ realigning the track within the existing rail corridor at Bellata, Gurley, and Moree stations to minimise tight curves
- ▶ providing five new crossing loops within the existing rail corridor at Bobbiwaa, Waterloo Creek, Tycannah Creek, Coolleearlee, and Murgo
- ▶ providing a new section of rail line at Camurra about 1.6 kilometres long, to bypass the existing hairpin curve
- ▶ removing the existing bridges and providing three new rail bridges over the Mehi and Gwydir rivers and Croppa Creek
- ▶ realigning about 1.5 kilometres of the Newell Highway near Bellata, and providing a new road bridge over the existing rail corridor
- ▶ providing a new road bridge over the existing rail corridor at Jones Avenue in Moree.

Ancillary work would include works to level crossings, signalling and communications, signage, fencing, and services and utilities within the proposal site.

Further information on the design features of the proposal is provided in Chapter 7.

### 28.1.2 Operation

The proposal would form part of the rail network managed and maintained by ARTC. Train services would be provided by a variety of operators.

Prior to the opening of Inland Rail as a whole, the rail line would be used by existing rail traffic, which includes trains carrying grain and ore at an average rate of about four trains per day.

It is estimated that the operation of Inland Rail would involve an annual average of about 10 trains per day travelling north of Moree (between North Star and Moree) and 12 trains per day travelling south of Moree (between Moree and Narrabri) in 2025. This would increase to about 19 trains per day north of Moree (between North Star and Moree) and 21 trains per day south of Moree (between Moree and Narrabri) in 2040. In the proposal site, this would be additional to the existing rail traffic using the rail line.

The trains would be a mix of grain, bulk freight, and other general transport trains. Total annual freight tonnages would be about 11.8 million tonnes in 2025, increasing to about 19 million tonnes in 2040 (from the existing 2 million tonnes of grain per year).

Train speeds would vary according to axle loads, and range from 80 to 115 kilometres per hour (for 21 tonne trains). Trains would operate 24 hours per day. They would be up to 1,800 metres long; carry double stacked containers; and have a height of 6.5 metres.

Further information on how the proposal would be operated is provided in Chapter 7.

### 28.1.3 Construction

Construction of the proposal would commence once all necessary approvals are obtained, and the detailed design is complete. It is anticipated that construction would take about 24 months, commencing in mid-2018, and concluding in mid-2020.

Construction along the existing rail corridor would depend on the possession strategy. However, it is anticipated that it would involve four main stages:

- ▶ stage 1 – Camurra to North Star
- ▶ stage 2 – Narrabri to Bellata
- ▶ stage 3 – Bellata to Moree South.
- ▶ stage 4 – Moree South to Camurra.

Construction of the Newell Highway overbridge, the bridges over the Mehi and Gwydir rivers and Croppa Creek, the Camurra bypass, and the Jones Avenue overbridge would be undertaken in parallel with the above stages.

Further information on how the proposal would be constructed is provided in Chapter 8.

## 28.2 Proposal uncertainties

The EIS is based on the feasibility design for the proposal. Given the current level of design development, there remain some uncertainties relating to technical requirements, how the proposal would be constructed, and how it would operate as part of Inland Rail overall. These details would be resolved as the design of the proposal, and Inland Rail as a whole, progresses.

A summary of the main uncertainties around the design, construction and/or operational methodologies of the proposal, and how these will be resolved, is provided in Table 28.1.

Table 28.1 Main proposal uncertainties

Category	Uncertainty	How uncertainties will be resolved
Design	Property acquisition – exact areas that need to be acquired.	Refining the amount and location of property acquisition will involve a detailed survey of the proposal site and surrounding properties, and confirmation of the final detailed design.
	Spoil mounds – location and design.	The location, sizing and design of the spoil mounds will be determined during detailed design, with consideration given to the results of hydraulic modelling.
	Final level crossing strategy.	The next stage in the level crossing strategy involves reviewing the proposed arrangements for each crossing in detail, and confirming the preferred approach, taking into account input from affected land owners and stakeholders, and opportunities for alternative access.
	Utilities – impacts to utilities to be defined in detail.	Site utilities investigations will be completed during detailed design to validate current assessments and confirm relocation/ protection requirements.
	Existing sidings – horizontal distances, loading points and mainline impacts.	A detailed survey will be completed during detailed design to assist in defining the specific locations and operational requirements of existing sidings, as well as impacts to loading infrastructure at these sidings.
	Culverts – erosion protection.	Further modelling will be undertaken during detailed design to confirm the locations downstream of culverts that require erosion protection, and the extent and type of protection required.

Category	Uncertainty	How uncertainties will be resolved
Construction methodology	Haul routes – exact routes and haulage methods.	A detailed haulage program will be developed based on the detailed design.
	Compound sites – location, layout and facilities.	The final selection of identified compound locations and final layout of compound sites will be confirmed based on the detailed design, taking into account the criteria and requirements specified in Chapter 8.
Operational methodology	Stop locations between Narrabri and North Star for freight trains using Inland Rail.	Train stopping patterns and associated infrastructure requirements will continue to be refined as the design of the other sections of Inland Rail progresses. Train stopping patterns will be developed in consultation with potential users of Inland Rail and key stakeholders, including the agencies responsible for intermodal terminals along the route (such as Moree Plains Shire Council).

## 28.3 Justification of the proposal

### 28.3.1 Summary of proposal justification

Australia's freight task is set to experience significant growth over the coming decades. The existing freight infrastructure cannot support this projected growth, with increasing pressure on already congested roads and rail lines through Sydney, and increasing use of heavy trucks such as B-doubles and, potentially, B-triples along the Hume-Pacific and Newell highway corridors.

Inland Rail will address the growing freight task by helping to move freight off the congested road network, and moving interstate freight off the congested Sydney suburban rail network. It provides a reliable road-competitive solution to the freight task, and enables the commercial and social benefits of rail to be leveraged to meet Australia's long-term freight challenge.

Inland Rail will connect key production areas in Queensland, NSW and Victoria with export ports in Brisbane and Melbourne, and provide linkages between Melbourne, Brisbane, Sydney, Adelaide and Perth. It will reduce freight transit times, reduce congestion on rail and road networks, and enable the movement of larger freight volumes via rail, by making the movement of longer and double stacked trains possible.

Inland Rail will provide the backbone infrastructure necessary to significantly upgrade the performance of the east coast rail freight network to better serve future freight demands, while also diverting demand from the constrained road freight and rail passenger network.

In summary, as described in Chapter 5, Inland Rail is needed to respond to the growth in demand for freight transport, and address existing freight capacity and infrastructure issues. The analysis of demands undertaken by ARTC indicated that there would be sufficient demand for Inland Rail.

The proposal is a critical component of Inland Rail, and has been designed to maximise use of the existing rail corridor, while still contributing to the overall efficiency of Inland Rail.

The proposal also facilitates safe access for vehicles across the rail corridor in Moree by means of the proposed Jones Avenue overbridge.

## 28.3.2 Summary of proposal benefits

The proposal is a key component of Inland Rail, which would:

- ▶ **Boost the Australian economy** – Inland Rail is expected to increase Australia's gross domestic product by \$16 billion during its construction and first 50 years of operation.
- ▶ **Create jobs** – it is estimated that construction of Inland Rail would require a workforce of up to 16,000 people at the peak of construction, and an average of 700 additional jobs per year over the construction period.
- ▶ **Improve connections within the national freight network** – Inland Rail will enhance the National Land Transport Network by creating a rail linkage between Moree, Brisbane, and Melbourne, providing a connection between Queensland and the southern and western states, and a connection to the east–west trans-continental line (at Parkes).
- ▶ **Provide better access to and from regional markets** – Inland Rail will make it easier for freight to move from farms, mines, and ports to national and overseas markets.
- ▶ **Reduce costs** – it is estimated that rail costs for intercapital freight travelling between Melbourne and Brisbane will reduce by \$10 per tonne. Highway maintenance costs will reduce.
- ▶ **Offer better transit time and reliability** – Inland Rail will allow a transit time of less than 24 hours between Melbourne and Brisbane and a reliability of 98 per cent – matching current road levels.
- ▶ **Increase the capacity of the transport network** – Inland Rail will increase the capacity for freight and passenger services by reducing congestion along the busy coastal transport route, and allow for growth in passenger services, particularly in the Sydney region.
- ▶ **Reduce distances travelled** – with Inland Rail, the rail distance between Melbourne and Brisbane will reduce by 200 kilometres, and the distance between Brisbane and Perth, and Brisbane and Adelaide will reduce by 500 kilometres.
- ▶ **Improve road safety** – it is estimated that each year, there will be up to 15 fewer serious crashes, avoiding fatalities and serious injuries.
- ▶ **Improve sustainability** – carbon emissions will reduce by 750,000 tonnes.

- ▶ **Improve community amenity** – truck volumes and road congestion on some of Australia's busiest highways will reduce, which will also mean a reduction in trucks travelling through more than 20 regional towns. This will lead to corresponding reduction in amenity impacts associated with the movement of freight by road, including noise and air emissions.
- ▶ **Provide an alternative north-south freight link** – Inland Rail will provide a second link between Queensland and the southern states, making Australia's national freight rail network less vulnerable to disruptions, for example from extreme weather events.
- ▶ **Promote complementary supply chain investments** – Inland Rail will be a catalyst for complementary private sector investments, such as fleet upgrades, new metropolitan and regional terminals, and integrated freight precincts.

## 28.3.3 Consequences of not proceeding

The proposal is a section of Inland Rail as a whole, and Inland Rail cannot proceed if the proposal does not proceed. This would mean that the benefits of Inland Rail would not be realised.

## 28.3.4 Environmental considerations

Environmental investigations were undertaken during preparation of the EIS to assess the potential impacts of the proposal. These included specialist assessments of terrestrial and aquatic biodiversity; heritage; traffic and transport; hydrology, flooding and water quality; noise and vibration; soils; landscape and visual amenity; air quality; sustainability and climate change; socio-economics; and waste management. The EIS has documented the potential environmental impacts of the proposal, considering both potential positive and negative impacts, and identifies mitigation and management measures to protect the environment where required.

## Biophysical

The main potential impacts of the proposal on the biophysical environment include:

- ▶ direct impacts to biodiversity as a result of clearing of areas of native vegetation
- ▶ potential indirect flora and fauna impacts
- ▶ water quality impacts during construction
- ▶ geomorphological impacts to watercourses as a result of the construction of new culverts/crossing structures.

## Social and economic

The main potential impacts of the proposal on the cultural environment (including land use, heritage, and socio-economics) include:

- ▶ minor changes to access arrangements as a result of the proposed changes to level crossings
- ▶ impacts to heritage listed items and items with potential heritage significance
- ▶ visual impacts as a result of the introduction of new permanent structures in the landscape
- ▶ amenity related impacts during construction and operation (for example, noise, dust, traffic)
- ▶ acquisition of land
- ▶ minor impacts to surrounding agricultural land uses
- ▶ employment and associated economic benefits during construction
- ▶ contribution to the benefits of Inland Rail, as summarised in Section 28.3.2
- ▶ local and regional benefits via the potential for local and regional connections to Inland Rail.

## Addressing the potential impacts

As described in Chapters 7, 8 and 27, the proposal would incorporate construction management measures and design features to ensure that potential impacts are managed and mitigated as far as practicable. The majority of the potential construction related impacts would be effectively managed by the implementation of best practice construction management, including the implementation of the environmental management approaches described in Section 27.2.

The biodiversity offset strategy would be finalised and implemented to address the residual impacts of the proposal on biodiversity values, according to the requirements for Part 5.1 projects under the EP&A Act, and to offset impacts on EPBC Act matters.

## 28.3.5 Ecologically sustainable development

The EP&A Act adopts the definition of ecologically sustainable development contained in the *Protection of the Environment Administration Act 1991*. An assessment of the proposal against the principles of ecologically sustainable development as per clause 7(4) of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* is provided below.

### Precautionary principle

A range of environmental investigations, as described in Part C of the EIS, have been undertaken during the development of the proposal and the environmental assessment process, to ensure that potential impacts are understood with a high degree of certainty. The assessment of the potential impacts of the proposal is considered to be consistent with the precautionary principle. The assessments undertaken are consistent with accepted scientific and assessment methodologies, and have taken into account relevant statutory and agency requirements. The assessments have applied a conservative approach with regard to construction and operational arrangements, and the modelling used.

The proposal has evolved to avoid impacts where possible and to reflect the findings of the studies undertaken. The route for the proposal has been selected to minimise the potential environmental impacts, particularly the amount of vegetation clearing that would be required, by maximising the use of existing rail corridors.

A number of safeguards have been proposed to minimise potential impacts. These safeguards would be implemented during construction and operation of the proposal. No safeguards have been postponed as a result of lack of scientific certainty.

### Principle of inter-generational equity

Construction of a long linear infrastructure project such as the proposal has the potential for some degree of environmental and social disturbance. These disturbances include the clearing of vegetation; some disturbance to private properties during construction; potential disturbance of some heritage sites; and localised impacts. However, the potential for environmental and social disturbance as a result of construction has to be balanced against the long-term benefits of the overall Inland Rail proposal.

Should the Inland Rail project not proceed, the principle of intergenerational equity may be compromised, as future generations would experience the increased environmental and safety impacts associated with the transport of large volumes of freight via the Newell Highway. The strategic planning studies summarised in Chapter 5 have identified a strong need and justification for Inland Rail. The proposal would, as part of Inland Rail, benefit future generations by providing a safer, more efficient, means of freight transport.

### **Conservation of biological diversity and ecological integrity**

Ecological studies have been undertaken to identify potential adverse impacts on biodiversity. Where potential impacts cannot be avoided, mitigation measures would be implemented to reduce the impact as far as possible.

The proposal would result in the clearing of some vegetation associated with threatened plant communities. Mitigation measures are proposed to minimise and manage the significance of the impact on native vegetation and flora and fauna. Biodiversity offsets would be implemented to address the impacts that cannot be avoided.

### **Improved valuation and pricing of environmental resources**

The assessment has identified the environmental and other consequences of the proposal and identified mitigation measures where appropriate to manage adverse impacts. If approved, the construction and operation of the proposal would be in accordance with relevant legislation, the conditions of approval and the construction and operation environmental management plans. These requirements would result in an economic cost to the proponent. The implementation of mitigation measures would increase both the capital and operating costs of the proposal. This signifies that environmental resources have been given appropriate valuation.

The concept design for the proposal has been developed with an objective of minimising potential impacts on the surrounding environment. This indicates that the concept design has been developed with an environmental objective in mind.

## **28.4 Concluding statement**

The proposal involves upgrading the existing rail line and associated works between Narrabri and North Star, and operating the new/upgraded section of rail line as part of Inland Rail. The proposal is needed to support the development of Inland Rail.

Potential impacts resulting from the proposal are considered manageable through the implementation of the proposed mitigation and management measures.

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

To manage the potential impacts identified by the EIS, and in some cases remove them completely, the assessment chapters outline a range of mitigation measures that would be implemented during construction and operation of the proposal. Chapter 27 summarises the environmental mitigation and management measures that would be implemented. The environmental performance of the proposal would be managed by the implementation of the CEMP and OEMP. These plans would also ensure compliance with relevant legislation and any conditions of approval.

With the implementation of the proposed mitigation and management measures the potential environmental impacts of the proposal would be adequately managed.

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