CHAPTER 27

Approach to environmental management and mitigation

ARTC | INLAND RAIL
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This chapter, together with Chapter 28, provides a synthesis of the EIS for the Inland Rail—Illabo to Stockinbingal project (the proposal). 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 Chapters 10 to 26. The chapter also provides the outcomes the proponent is seeking to achieve through the implementation of the mitigation measures.

The Secretary's Environmental Assessment Requirements (SEARs) relevant to environmental management and mitigation, and where they are addressed, are provided in Appendix A.

27.1 Compilation of impacts

The potential impacts during construction and operation requiring mitigation and management are summarised in Table 27.1. These impacts are assessed in detail in Chapters 10 to 26.

The identified impacts would be mitigated by implementing the environmental management procedures and plans described in Section 27.2 and the mitigations compiled in Section 27.3.

TABLE 27.1 SUMMARY OF POTENTIAL CONSTRUCTION IMPACTS

Issue	Potential construction impacts
Biodiversity	Permanent removal of about 73 hectares (ha) of native vegetation, resulting in loss of fauna habitat, habitat fragmentation and loss of connectivity. This includes about 43 ha of threatened ecological communities listed under the *Biodiversity Conservation Act 2016* (NSW) (BC Act) and/or the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act). Impacts on known or potential habitat for two threatened fauna species (superb parrot and squirrel glider) under the BC Act. Impacts on aquatic biodiversity as a result of works at watercourses and through changes to flow regimes, including through the removal of 10 farm dams. Potential for fauna loss and mortality from vehicle strikes.
Traffic, transport and access	Temporary impacts on traffic and access, and an increase in heavy and light vehicle movements on the local road network. Realignment of Burley Griffin Way resulting in detours and change to traffic control. Impacts to bus routes and services as a result of increased road use and diversions due to road realignment.
Hydrology and flooding	Changes to surface water flows and geomorphological conditions due to the construction of bridges and culverts in flowing watercourses. Changes to overland flows due to the presence of construction infrastructure.
Water quality	Erosion and the generation of sediment, particularly during changes in surface water flow, due to presence of construction activities, and construction of bridges and culverts in flowing watercourses. Impacts to water quality from spills and leaks during construction and if management measures are not implemented, monitored and maintained.
Groundwater	Changes to groundwater flow paths and surface infiltration are caused due to compaction and settlements. Construction dewatering resulting in impact to sensitive receptors.
Aboriginal heritage	Direct impacts on seven of the 22 Aboriginal heritage items/sites located within the proposal site during construction. Potential to indirectly impact three Aboriginal sites located outside the proposal site, as a result of changes to the visual setting, if appropriate management measures are not implemented. There would be direct impact on potential archaeological deposits, including areas that could not be surveyed due to access restrictions. Potential impacts on any unexpected finds.
Non-Aboriginal heritage	Potential direct or indirect impacts on two locally listed heritage sites, the Stockinbingal Railway Station and Stockinbingal Heritage Conservation Area. These heritage sites are located within the proposal site, however construction activity at these locations would be minimal and no direct impacts would occur to the heritage sites. Potential for indirect impacts on the Billabong Creek rail underbridge (which is not currently heritage listed but was constructed in 1878), including visual impacts. Potential impacts on any unexpected finds.

Issue	Potential construction impacts
Noise and vibration	Potential for construction noise to exceed the relevant criteria at numerous receivers along the proposal site. Potential for blasting overpressure to exceed the relevant criteria at receivers at multiple locations. Exceedances of noise criteria predicted at residential receivers when work is undertaken outside the NSW EPA's recommended standard hours, including potential for sleep disturbance impacts.
Social and economic	Social impacts (including dislocation, stress and uncertainty), for property owners/occupants and local communities, as a result of the proposal's land requirements and potential property impacts. Beneficial impacts during construction, including employment (an estimated workforce of up to 425 people at peak periods), training opportunities, and flow-on local and regional employment and economic benefits. Impacts on local amenity in some areas, mainly as a result of potential dust, noise and visual impacts. Impacts associated with the inflow of the workforce into the local area and workforce accommodation camp (refer to Appendix I for further detail).
Land use and property	In addition to the proposal's permanent land requirements, about 154 ha would be required during construction only. The proposal's land requirements would have the potential to partially affect a property where part of a site is required, requiring adjustments to/relocation of facilities to other parts of the site, or fully affect a property if the entire site on which a property is located is required. The majority of land affected by the proposal is currently used for agriculture. There would be a change in use of land temporarily occupied for construction—from existing land uses to construction work site, with the potential for temporary land-use impacts, mainly to agricultural/farming practices.
Landscape and visual	Visual impacts in the vicinity of work areas and from identified viewpoints as a result of visible construction elements, such as works, machinery and equipment, stockpiles, compounds and partially constructed structures. Lighting impacts during construction as a result of night-time construction activities.
Soils and contamination	Disturbance of soils, including dispersive soils, acid sulfate soils (ASS) or saline soils, resulting in erosion of exposed soil and stockpiled materials, with associated water quality impacts and/or the production and mobilisation of sulfuric acid. Contamination associated with any leaks and accidental spills of construction plant and equipment.
Waste	Indicatively, the proposal would generate about 1.5 million cubic metres (m^3) of spoil, which would be excavated and reused as far as practicable. Other waste material would include green waste, sleepers, rail tracks, formation material, fencing and general soil waste.
Climate change risk	As part of the climate change risk assessment process for the proposal, impacts to rail structure and human health and safety was conducted using variables: extreme rainfall/flood events, extreme heat, bushfire events, storm events and wind, and mean rainfall reduction/drought. Due to previous events experienced in and around the rail corridor, and observed and projected trends, risks to rail infrastructure, by way of physical damage, delays in schedule and potential risks to human health and safety are likely.
Sustainability	Sustainability initiatives, particularly in relation to energy consumption and savings throughout the project lifecycle, must be incorporated into detailed design. The sustainability opportunities were identified during the feasibility design phase but further investigation during the detailed design, construction and/or operation phases would be required.
Air quality	Generation of dust during ground disturbance and excavation, and as a result of the movement of vehicles equipment and machinery. One construction site has medium-to-high risk of dust soiling and human health impacts for earthworks and other construction activities. Three haulage routes have medium-to-high risk of human health impacts for trackout activities.
Health and safety	Introduction of potential ignition sources and fuel sources during construction works could increase bushfire risks. If inadequately managed, the storage and handling of dangerous goods and hazardous materials on construction sites could cause leaks and spills, with resultant contamination and health impacts. Potential rupture of underground utilities during excavation or collision of plant and equipment with aboveground services. Public and worker health and safety risks during construction. Impacts to emergency vehicle movements from disruption of traffic and access.

Issue	Potential construction impacts
Cumulative & residual	The cumulative impacts have been an important consideration given the potential overlap of construction with other projects in the vicinity of the proposal—specifically, the other adjoining Inland Rail projects. The cumulative impacts are associated with the two adjacent sections of Inland Rail—Stockinbingal to Parkes (to the north) and Albury to Illabo (to the south). Given the proximity and timing of the other Inland Rail projects, the primary impacts are traffic and access during construction, heritage, social and economic impacts associated with workforce and accommodation requirements, and biodiversity.

TABLE 27.2 SUMMARY OF POTENTIAL OPERATION IMPACTS

Issue	Potential operation impacts
Biodiversity	Potential for train strike impacts on fauna species. Impacts on fauna connectivity as a result of the presence of the new rail corridor, particularly for terrestrial fauna, including the squirrel glider.
Traffic, transport and access	Increase in travel times due to introduction of new level crossings, resulting in wait times associated with length and frequency of trains as well as increases in travel distances due to changes (realignments or closures) to the local public road network. Realignment of Burley Griffin Way resulting in a positive change to road conditions. Impacts on access to private properties.
Hydrology and flooding	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. Potential failure of in-stream works, culverts or bridge embankments as a result of erosion.
Water quality	increased runoff from increase in impervious surfaces, which may contain sediment, traces of fuel, dissolved metals, and other contaminants deposited in the corridor from operation activities, could impact water quality. Introduction and/or modification of drainage infrastructure and culverts resulting in water quality impacts. Impacts on water quality as a result of any accidental spills.
Groundwater	The proposed groundwater bores (if retained) could provide flow pathways between groundwater systems that are ordinarily poorly connected or not connected at all. Contamination of groundwater during maintenance procedures.
Noise and vibration	Noise levels at five receivers have the potential to exceed the redeveloped rail line criteria for operational rail noise by the year 2040. Predicted noise levels were found to exceed the assessment criteria by less than 5dB(A) at these receivers. The highest forecast noise level was 3dB(A) above the noise assessment criteria.
Social and economic	Beneficial impacts would include better access to and from regional markets, the enabling of 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.
Land use and property	Direct impacts on land use during operation would result from the permanent land requirements and the presence of operational rail and road infrastructure within the proposal's operational footprint. About 458 ha of land would be permanently required for the proposal. The permanent land requirements would affect 47 lots that are associated with 19 farms. The key potential impact on farming operations relates to property severance. Some severed portions of properties may become unviable due to size of remaining area, configuration or access. Potential to result in a shift in the distribution of holding sizes as a result of land requirements.
Landscape and visual	The views at five viewpoints are predicted to have a moderate to high–moderate potential for impact during operation as a result of vegetation clearing, construction of major features close to the viewpoint and changes in landform due to borrow pits. The landscape character for rural settlements and woodlands would have moderate-to-low impact due to the realignment of Burley Griffin Way and vegetation clearing. Introduction of new light sources into the rural landscape, including fixed lighting and headlights from new rail movements during operation.
Soils and contamination	Maintenance and repair activities may require excavation and ground disturbance and, if inadequately managed, could result in erosion of soils. Contamination associated with any leaks and accidental spills of petroleum, chemicals or other hazardous materials as a result of leakage or rail accidents.
Waste	Small quantities of waste ballast, green waste, general debris and litter may be generated during maintenance.

Issue	Potential operation impacts
Climate change risk	Based on the climate change risk assessment for the proposal, extreme rainfall events, flooding and extreme heat will present the highest risk, including risk of asset damage or failure, risk to health and safety of staff, flooding of tracks and assets, and service disruption in both the near future and far future.
Air quality	Introduction of diesel freight trains has the potential to increase levels of pollutants such as nitrogen oxides and particulate matter. Decreasing the number of heavy vehicles using major transport routes would have a positive impact on air quality for sensitive receivers in the broader region.
Health and safety	Introduction of potential ignition sources during rail operation could increase bushfire risks. 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. 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. The realignment of Burley Griffin Way would improve access for emergency vehicles and improve road safety for motorists using this road.
Cumulative and residual	The cumulative impacts of the proposal during operation are associated with the overall operation of the Inland Rail program, as the proposal would be operational in 2027 along with the other Inland Rail sections. There would be overall cumulative benefits across the economy, transport and communities.

27.2 Approach to environmental management

Inland Rail operates within the broader ARTC Environmental Management System. ARTC manages its environmental responsibilities and environmental performance by implementing an environmental management system that is consistent with the principles contained within the ISO 14000 series and standards.

The Inland Rail Environment and Sustainability policy guides the planning, design and implementation of the Inland Rail Program. It outlines the organisations commitment to effectively manage any risks that may lead to an impact on the environment during construction and operation of Inland Rail, including the proposal.

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

- Proposal design—as described in Chapter 7: Proposal description—operation, the proposal incorporates measures to avoid and minimise impacts.
- Mitigation measures—mitigation measures provided in Chapters 10 to 26 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 tracking the compliance of 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 surveys and investigations where required. A copy of the framework is provided in Appendix H.
- Proposal-specific Construction Environmental Management Plan (CEMP) and operational environmental management framework (EMF)—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 EMF 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/preferred infrastructure report (to be prepared), and relevant approval conditions
  - be prepared in consultation with relevant agencies and in accordance with the Environmental Management Plan Guideline for Infrastructure Projects (DPIE, 2020a).
- Environmental performance outcomes—establishes the intended outcomes to be achieved by the proposal. The environmental performance outcomes are provided in section 27.3.

27.2.1 Construction environmental management plan

The management of environmental impacts during construction would be documented in the CEMP. The CEMP would provide a centralised mechanism through which all potential construction-related environmental impacts will be managed. It would also provide the overall framework for the system and procedures to ensure that environmental impacts are minimised, and that legislative and approval requirements are fulfilled.

The CEMP would define how specific environmental issues are to be managed during construction in accordance with the mitigation measures provided in the EIS and the conditions of approval. It would be prepared in consultation with relevant agencies and in accordance with the *Environmental Management Plan Guideline for Infrastructure Projects* and the Inland Rail Construction Environmental Management Framework. The CEMP would include:

- ARTC's environmental policy, objectives and performance targets for construction
- reference to all relevant statutory and other obligations, including consents, licences, 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 F)
  - 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 onsite
  - 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.
  - The CEMP would comprise a main CEMP document, issue-specific sub-plans, activity-specific procedures and strategies, and site-based control maps. The CEMP, issue-specific sub plans and strategies/plans proposed to manage the impacts identified in the EIS (in accordance with the mitigation measures) are shown in Figure 27.1.

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 E.

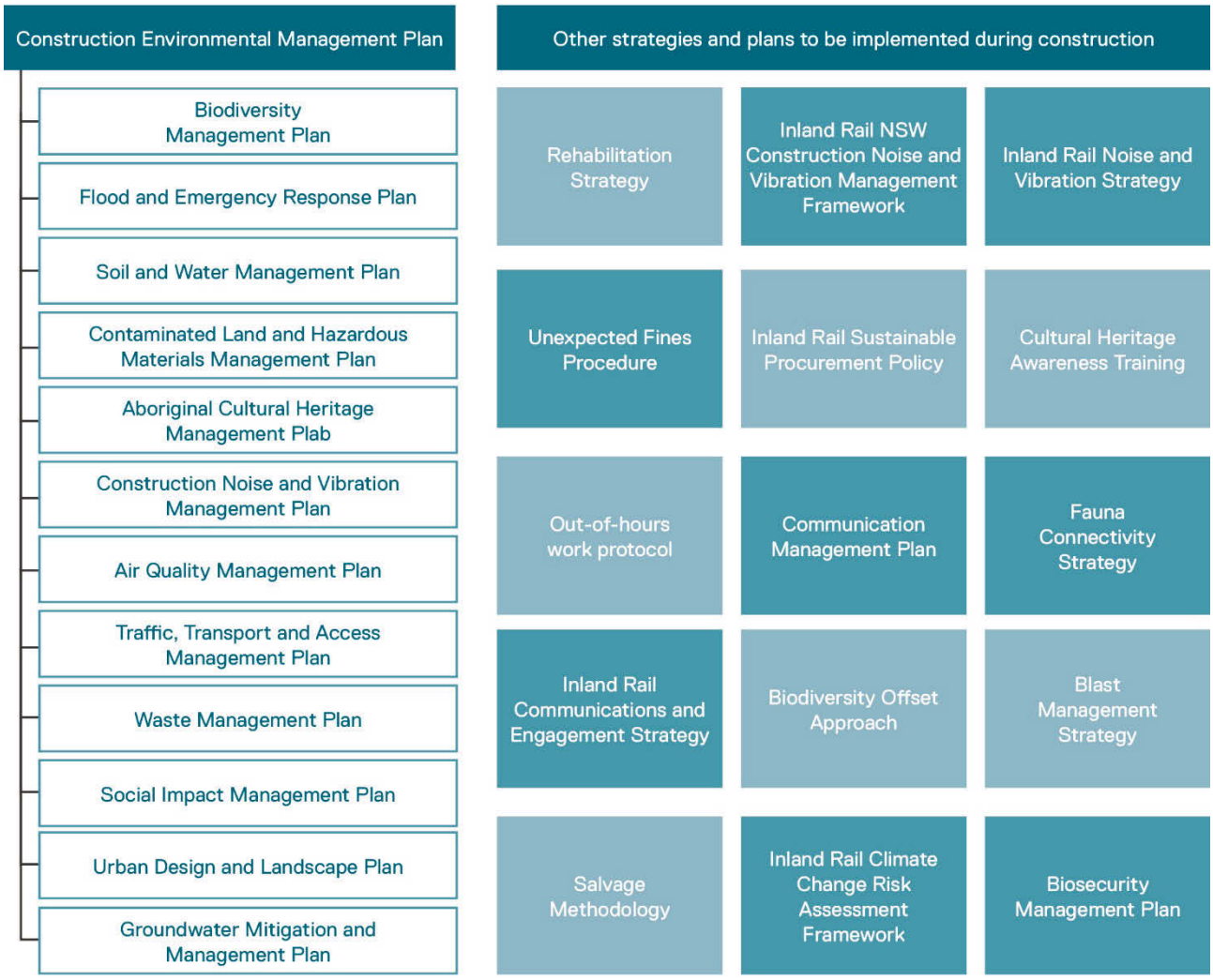

FIGURE 27.1CEMP SUB-PLANS AND KEY RELATED STRATEGIES AND PLANS

27.2.2 Operational Environmental Management Framework (EMF)

The EMF would:

- describe desired outcomes and processes for the prevention and management of environmental impacts resulting from the operation of the standard-gauge ARTC network
- set out the responsibilities and accountabilities within ARTC and others in this regard
- identify key management systems that support the delivery of environmental compliance across the ARTC network.

The EMF 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 (EPL) 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.

27.3 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. The measures proposed to mitigate the potential impacts of the workforce accommodation camp are contained separately, in Appendix I. 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 Response to Submissions (RtS) report or the Submissions and 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 SUMMARY OF PROPOSAL SPECIFIC MITIGATION MEASURES FOR DETAILED DESIGN/PRE-CONSTRUCTION

Ref	Issue	Mitigation measure
Biodiversity		
BD-1	Impacts on fish passage	Watercourse crossing structures, both temporary and permanent in nature, would meet Inland Rail design standards and be designed in accordance with *Why do fish need to cross the road? Fish passage requirements for waterway crossings* (Fairfull, S. and Witheridge, G., 2003) and *Policy and Guidelines for fish habitat conservation and management* (DPI, 2013a) as far as practicable.
BD-2	Fauna connectivity	A fauna connectivity strategy would be prepared to guide detailed design. It would include investigation and design of: ▸ locations for fauna crossing structures, particularly for squirrel glider, including consideration of height of remaining trees, height of double-stacked trains (up to 6.5 m), gap between trees and the gliding angle of squirrel gliders ▸ the provision of localised fencing to direct fauna to crossing structures in accordance with relevant guidelines ▸ fauna furniture to be included in the design of bridges and culverts, where appropriate, to encourage crossings by native fauna. The connectivity strategy would include monitoring and reporting requirements in relation to the operational performance of the final measures.
BD-3	Managing the potential for biodiversity impacts during construction	Pre-clearing surveys would be undertaken prior to construction, by a suitably qualified ecologist, in accordance with the biodiversity management plan. Specific surveys would include: ▸ surveys for roosting microbats and birds in structures, including telegraph poles and buildings that are proposed to be removed ▸ searches for nest trees ▸ identification of hollow-bearing trees and logs requiring fauna management during removal ▸ aquatic fauna salvage in watercourses or residual pools within 50 m of the construction footprint and in areas that would be enclosed by silt curtains (e.g. piling locations).
BD-4	Managing the potential for biodiversity impacts during construction	Clearing extents/site boundary/limit of works would be consistent with project extents defined in a condition of approval.
BD-5	Managing the potential for biodiversity impacts during construction	The clearing extents/site boundary/limit of works would be clearly defined with flagging or marking tape, signage or other suitable means to delineate no-go areas. This delineation and marking process would align with the project flagging/marking tape process and specifications.
BD-6	Managing the potential for biodiversity (aquatic) impacts during construction	Direct impacts on in-stream vegetation and native vegetation on the banks of watercourses would be avoided as far as practicable by establishing appropriate setback distances.
Traffic, transport and access		
T-1	Road user safety at changes to the road network	Road safety audits and risk assessment would be undertaken where changes to the road network are required, in accordance with relevant Austroads guidelines, to ensure the safety of all road users is considered in the design process.
T-2	Road user safety at level crossings	Public level crossings would be designed in accordance with relevant guidelines and standards, including *AS 1742.7:2016: Manual of uniform traffic control devices* (Standards Australia, 2016) and in consultation with Transport for NSW.

Ref	Issue	Mitigation measure
T-3	Closure of level crossings	Consultation with Transport for NSW would be undertaken regarding the proposed closure of level crossings.
T-4	Pre-construction route at Troy Street and Hibernia Street	Input would be sought from affected residents and the local councils, prior to the alternative route being established on Troy Street, in accordance with the Inland Rail Communications and Engagement Strategy. Consultation with relevant stakeholders would be undertaken regarding the need to temporarily relocate the Stockinbingal bus stop during the temporary closure of Hibernia Street. Stakeholders would include Transport for NSW and Cootamundra–Gundagai Regional Council.
Hydrology and flooding		
HF-1	Flooding impacts	The design would continue to be refined where practicable to not worsen existing flooding characteristics at sensitive receptors, up to and including the one per cent Annual Exceedance Probability (1% AEP) event. Detailed flood modelling would consider potential changes to: ▸ building and property inundation (including floor level surveys and consideration of existing inundation levels) ▸ contour banks and dams (including survey of these features to ensure continuous operation of these features) ▸ existing rail line, at rail connections ▸ level crossings and road flood levels and extent of flooding along roads ▸ overland flow paths and storage effects of construction and operational infrastructure. Flood modelling, and any mitigation identified as an outcome of modelling, would consider floodplain risk management plans, and would be undertaken in consultation with the relevant local council and local emergency management committees; the NSW Department of Planning and Environment, the NSW State Emergency Service and potentially impacted landholders. Following refinement of the cross-drainage design, where velocity QDL exceedances occur in land adjacent to the corridor that cannot be resolved through infrastructure measures within the corridor, negotiate mitigation measures with the affected landowners for the affected land areas.
HF-2	Construction water supply	Construction water supply options would continue to be explored during detailed design and would include: ▸ ongoing consultation with Goldenfields Water (or an equivalent commercial water supply operator) to access the local reticulated network ▸ investigation of options to utilise recycled water from sewage treatment plants ▸ access to groundwater bores where it can be bought on-market ▸ investigation into the use of farm dams for water harvesting and storage.
HF-3	Retaining water flows	Detailed design would consider channelling of water around Ironbong Road level crossing and Burley Griffin Way realignment, and the potential formation of detention basins as a means of retaining flows in a similar manner to existing farm dams and flood levees.
Water quality		
WQ-1	Water quality	The construction impact zone defined for the proposal would allow sufficient room for provision of temporary and permanent erosion and sediment control measures/pollution control measures where required based on consideration of overland flow paths and flood risk. Water quality control measures would be designed to capture and treat the 80th percentile five-day rainfall event and any other requirements, as outlined in the Blue Book.
WQ-2	Surface water monitoring	A surface water monitoring framework would be developed and implemented as part of the soil and water management plan in the Construction Environmental Management Plan (CEMP). It would identify: ▸ monitoring locations at discharge points and selected watercourses where works are being undertaken ▸ monitoring parameters ▸ frequency and duration of monitoring. The monitoring framework would include relevant water quality objectives (WQOs), parameters and criteria. It would be developed in consultation with the NSW Department of Planning and Environment and the NSW Environment Protection Authority.

Ref	Issue	Mitigation measure
Groundwater		
GW-1	Management of groundwater bores	Any bores that are decommissioned will be undertaken in accordance with the *Minimum Construction Requirements for Water Bores in Australia—Edition 4* (NUDLC, 2020).
GW-2	Management of groundwater bores	Any existing groundwater bores that are destroyed during construction would be replaced subject to discussion with the registered owner.
GW-3	Avoid or minimise groundwater seepage	Appropriate drainage measures would be installed at the base of cuts and along high-walls to manage groundwater seepage, in the unlikely event that they be encountered.
Cultural heritage		
Aboriginal heritage		
AH-1	Avoiding and minimising impacts on Aboriginal heritage	Detailed design and construction planning would avoid direct impacts on identified items/sites of Aboriginal heritage significance as far as reasonably practicable. The location of construction compounds and associated access routes would be reviewed to ensure, as far as practicable, they are not located in areas of medium or high archaeological potential.
AH-2	Management of salvaged items	A detailed salvage methodology would be prepared by a suitably qualified archaeologist in consultation with relevant registered Aboriginal parties. The methodology would be included in the Aboriginal cultural heritage management plan (mitigation measure AH-9 to ensure any artefacts salvaged are managed in accordance with the requirements of the *National Parks and Wildlife Act 1974*). This includes artefacts within the areas of Zone 1 and Zone 2. The methodology would include the process for consultation with Heritage NSW and registered Aboriginal parties in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010a) the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010b), and the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH, 2011a). It would also include requirements in relation to the management of, and care and control plans for, salvaged objects. Registered Aboriginal parties would be engaged to assist in the salvage, which would be managed by an appropriately qualified archaeologist engaged to support the process. Detailed analysis and reporting of cultural material collected would be provided to the NSW Department of Planning and Environment.
AH-3	Management of salvaged items	Archaeological survey and test excavation (if required) would be performed prior to the commencement of impact works at Zone 5 and 6, to confirm the precise nature and extent of the archaeological resource and to inform the selection of the applicable mitigation measures.
AH-4	Management of salvaged items	Additional mitigation and management measures would be developed, in consultation with the registered Aboriginal parties, for areas or items of Aboriginal cultural heritage significance identified during the archaeological survey (mitigation measure AH-3). The additional measures would be included in the Aboriginal cultural heritage management plan (mitigation measure AH-9).
AH-5	Avoiding and minimising impacts on Aboriginal heritage	A pre-construction survey would be undertaken to update the Aboriginal Heritage Information Management System (AHIMS) record and/or confirm the locations of the previously listed AHIMS sites that could not be located during the site survey: ▸ Artefact Sites ARTC12 and 16 (AHIMS 50-5-0268, 50-5-0272) ▸ Artefact Sites ARTC10 and 11 (AHIMS 50-2-0054, 50-2-0055). Surveys would be undertaken with registered Aboriginal parties in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010a). If the sites are located, impacts would be avoided, as far as practicable, and protection measures put in place in accordance with the Aboriginal cultural heritage management plan (mitigation measure AH-9). Any sites with the potential to be impacted would be managed in accordance with the salvage methodology (mitigation measure AH-2).
AH-6	Impacts on artefact scatters	Surface collection (salvage) of artefacts that have been identified in Zones 1, 2, 4, 7 and 11 would occur prior to construction in accordance with the approved salvage methodology.

Ref	Issue	Mitigation measure
AH-7	Avoiding and minimising impacts on Aboriginal heritage	For registered AHIMS sites and Aboriginal sites identified during archaeological surveys located in close proximity to, but outside of, the proposal site, the extent of these sites would be demarcated with high-visibility fencing as far as practicable to avoid accidental impact during construction impacts. This particularly applies to scarred trees ARTC6, ARTC18, and ARTC19. The sites would also be clearly marked on all mapping and plans used by contractors working on the project. Scarred tree ARTC20, which is located within the proposal site, should be marked on all mapping and plans used by contractors working on the project and should be fenced with high-visibility fencing to avoid accidental impact during construction works. Potential excavation near the tree should include consideration of a tree protection zone, defined in consultation with an arborist.
AH-8	Avoiding and minimising impacts on Aboriginal heritage	Clearing extents/site boundary/limit of works would be consistent with project extents defined in a condition of approval and would be clearly defined with flagging or marking tape, signage or other suitable means to delineate no-go areas.
Non-Aboriginal heritage		
NAH-1	Avoiding and minimising impacts on Aboriginal heritage	Detailed design and construction planning would avoid direct impacts on identified items/sites of non-Aboriginal heritage significance as far as reasonably practicable. This would include the following listed items within the construction footprint: ▸ Stockinbingal Railway Station ▸ Stockinbingal Heritage Conservation Area.
Noise and vibration		
NV-1	Managing the potential for construction noise and vibration impacts	Location and activity-specific construction noise and vibration impact statements would be prepared based on a more detailed understanding of the construction methods, including the size and type of construction equipment, duration and timing of works, construction traffic associated with the proposal, and detailed reviews of local receivers as required.
NV-2	Minimising the potential for construction vibration (structural) impacts	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.
NV-3	Blasting management	A blast management strategy would be prepared in accordance with relevant guidelines, and in consultation with the NSW Environment Protection Authority, and would include: ▸ sequencing and review of trial blasting to inform blasting ▸ regularity of blasting ▸ intensity of blasting ▸ periods of relief ▸ blasting program. Monitoring of airblast and ground vibration caused by blasting would be conducted in line with *AS 2187.2:2006: Storage and use Part 2: Explosives* (Standards Australia, 2006). Monitoring would be conducted at the nearest sensitive receiver and non-sensitive receiver (if closer to the blasting zone than the closest sensitive receiver) and assessed in accordance with the criteria outlined in this document.
NV-4	Noise and vibration impacts during operation	Feasible and reasonable mitigation measures would be identified where exceedances of operational noise and vibration criteria are confirmed. Measures would be identified in accordance with the outcome of the operational noise and vibration review and the Inland Rail Noise and Vibration Strategy. Where at-property noise treatments are identified as the preferred mitigation option, these would be developed in consultation with individual property owners.

Ref	Issue	Mitigation measure
NV-5	Structural vibration impacts	If the operational noise and vibration review indicates that vibration levels are predicted to exceed the screening criteria at sensitive receivers, a more detailed assessment of the structure would be carried out. For any heritage items with the potential to be affected, the detailed assessment would determine any specific sensitivities, in consultation with a heritage specialist, to ensure risks are adequately managed. If a heritage structure is found to be structurally unsound following inspection, a more conservative cosmetic damage objective (e.g. 2.5 mm/s peak component particle velocity for long-term vibration) would be considered.
Social and economic		
SE-1	Avoiding and minimising social and economic impacts	ARTC and the construction contractor would collaborate on the implementation of the Social Impact Management Plan (SIMP) for the proposal during the detailed design/pre-construction phase. The SIMP would be developed using the recommendations provided in the Social Impact Assessment (SIA) for the proposal and address, but not be limited to, workforce management; industry participation; housing and accommodation; community health and wellbeing; and appropriate community and stakeholder engagement.
Land use and property		
LP-1	Land use and property impacts, including severance and other impacts on operations	The design and construction planning would continue to be refined to minimise potential impacts on land uses and properties as far as reasonably practicable. This would include measures to manage severance impacts where practicable, including appropriate access solutions.
LP-2	Acquisition and property impacts	All property acquisitions/adjustments would be undertaken in consultation with landowners and, where relevant, in accordance with the requirements of the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW) (Land Acquisition Act). In line with the Land Acquisition Act, ARTC's preference is for acquisition by agreement where practicable.
LP-3	Acquisition and property impacts	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, where appropriate. These would detail any required adjustments to fencing, access, farm infrastructure, and relocation of any impacted structures as required.
LP-4	Impacts of construction on private properties	Property owners and occupants would be consulted in accordance with the project-specific communication management plan to ensure that owners/occupants are informed about: ▸ the timing and scope of activities in their area ▸ any potential property impacts/changes, particularly in relation to potential impacts on access, services, or farm operational arrangements ▸ activities that have the potential to impact on livestock.
LP-5	Impacts of construction on private properties	Feasible and reasonable property-specific measures would be identified during detailed design in consultation with landholders. These would be implemented during construction where construction is located on or immediately adjacent to private properties and has the potential to affect farm operational arrangements. The measures would include, as appropriate: ▸ arrangements in terms of works timing and practices ▸ any required adjustments to fencing ▸ access, and farm infrastructure ▸ relocation of any impacted structures.
LP-6	Maintaining permanent access to properties	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 landowner for acquisition of the property.
LP-7	Internal access arrangements	ARTC would consult with adjoining landowners regarding temporary construction impacts on viability and productivity. This may include consideration of temporary farm infrastructure to maintain farm management practices, and/or modification of construction activities and footprint.

Ref	Issue	Mitigation measure
LP-8	Impacts on livestock	Stock fencing must be in accordance with the Inland Rail fencing standards and be constructed prior to the removal of existing fencing or any works being carried out on the subject land, unless otherwise agreed with the landowner. Where fencing is required, the relevant landowner will select the type of fencing in a like-for-like fashion from ARTC's standard fence and gate types, to suit the farm operations. Internal fencing matters will be considered, as appropriate, during the land acquisition process.
LP-9	Minimising impacts on routes used for stock movement	Local Land Services (LLS) would be consulted during detailed design to understand how impacts on routes used for stock movement can be minimised and managed during construction and operation. Alternative access arrangements would be made, as required, subject to maintaining rail safety.
Landscape and visual		
LV-1	Minimising the potential for visual and landscape impacts	Detailed design and construction planning would seek to minimise the construction and operation footprints, and avoid impacts on mature native vegetation as far as reasonably practicable.
LV-2	Minimising the potential for visual and landscape impacts	An urban design and landscape plan would be prepared to provide a consistent approach to design and landscaping. The urban design and landscape plan would include: ▸ vegetation screening in strategic locations to visually mitigate impacts from new structures and rail operations, including around bridges and locations where the proposal would be visible from sensitive receivers, where the presence of screening does not impact safe rail operations ▸ appropriate species that respond to the existing landscape character setting and environmental conditions ▸ design guidelines to minimise the visual impacts of bridges, with consideration of the existing landscape and visual context and with regard to *Bridge aesthetics: design guidelines to improve the appearance of bridges in NSW* (RMS, 2012). Detailed design would be undertaken in accordance with the urban design objectives developed for the design, and the urban design and landscape framework and plan.
LV-3	Batter slopes in contrast with the existing landform	Batter slopes would be integrated into the surrounding landscape as far as practicable. Appropriate slope stabilisation would be integrated into batter design to ensure successful rehabilitation and stabilisation.
Soils and contamination		
SC-1	Structural integrity	Detailed design would include engineering measures to minimise operational risks from dispersive, saline and/or low strength soils, particularly through foundation and batter design.
SC-2	Contamination	Hazardous materials surveys would be undertaken during detailed design for all proposed demolition activities.
SC-3	Contamination (waste)	Any hazardous or dangerous waste (e.g. asbestos, chemicals, oils) would be correctly stored and managed onsite, and if necessary, disposed of by a licensed contractor or facility and in accordance with the relevant state occupation health and safety legislative, and regulatory obligations. This includes wastes generated as a result of demolition.

Ref	Issue	Mitigation measure
SC-4	Contamination (investigations)	Site investigations would be undertaken by a suitably qualified and experience consultant as defined in Schedule B9 of the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPC, 2013) to assess exposure risks to site workers and other receptors as a result of disturbances to the following areas considered to be at a medium-to-low risk of being contaminated: ▸ AEC 2—disused broken machinery and parts, potential asbestos containing material ▸ AEC 3—four grain silos and machinery associated with these silos ▸ including tractors and multi-feeders within a private property. ▸ AEC 5—a locked chemical storage shed and drums containing pesticides ▸ AEC 6—fox baits ▸ AEC 7—stockpile of waste including wood and rubble ▸ AEC 8—the Main South Line (railway line) ▸ AEC 9—crossing the Main South Line (railway line) ▸ AEC 10—The Forbes Line (railway line north of Stockinbingal). The results of the site investigations would be assessed against the criteria contained within the *National Environment Protection (Assessment of Site Contamination) Measure 1999* to determine the need for any remediation.
SC-5	Erosion and sedimentation control	Where practical, vegetation clearing and ground-disturbing works should be staged sequentially/across the project to minimise areas exposed to erosion and sediment risk.
Waste		
WM-1	Waste management	Detailed design would include measures to minimise spoil generation. This would include a focus on optimising the design to minimise spoil volumes and the reuse of material onsite.
Climate change risk		
CC-1	Climate change risk management	The climate adaptation measures identified for the proposal would be reviewed, and the final measures would be incorporated in design and implemented during construction and operation, as far as practicable.
Sustainability		
SU-1	Sustainable procurement	Procurement would be undertaken in accordance with the *Inland Rail Sustainable Procurement Policy* (ARTC, 2018c), the *Sustainable Procurement Guide* (Commonwealth of Australia, 2021) and the *NSW Government Resource Efficiency Policy* (OEH, 2014b).
SU-2	Climate change risk management	Sustainability initiatives, particularly in relation to energy consumption and savings throughout the project lifecycle, must be incorporated into detailed design.
Air quality		
N/A		
Health and safety		
HS-1	Public safety	A hazard analysis would be undertaken during detailed design to identify risks to public safety from the proposal and how these can be further mitigated through safety in design.
HS-2	Utilities	Utility and service providers would continue to be consulted during detailed design to identify possible interactions and to develop procedures to minimise the potential for service interruptions and impacts on existing land uses. Any relocations or requirements for access, diversion, protection and/or support would be in place prior to construction.
HS-3	Bushfire	Detailed design and construction planning would maintain appropriate access during construction and operation, ensuring local roads allow emergency access, first-response firefighting, access to water supply for firefighting purposes and safe evacuation routes.
HS-4	Flood and emergency response	A flood and emergency response plan would be prepared and implemented as part of the CEMP. The plan would include measures, processes and responsibilities to minimise the potential impacts of construction activities on flood behaviour and bushfire risk as far as practicable. It would also outline measures to manage emergency responses during construction.
Cumulative impacts		

Ref	Issue	Mitigation measure
CR-1	Cumulative impacts	Coordination and consultation would occur with the proponents of any current development proposals, with potential for cumulative impacts at the appropriate project stages. If consultation with these proponents during detailed design confirms the likelihood of a cumulative impact, ongoing consultation and coordination would include: ▸ provision of regular updates on construction planning for the proposal ▸ identification of key potential conflict points with other construction projects ▸ developing mitigation strategies in order to manage conflicts. Depending on the nature of the conflict, this could involve coordination of traffic management arrangements between projects, where reasonable and feasible.

TABLE 27.4 COMPILATION OF PROPOSAL SPECIFIC MITIGATION MEASURES FOR CONSTRUCTION

Ref	Issue	Mitigation measure
Biodiversity		
BD-7	Managing the potential for biodiversity impacts during construction	A biodiversity management plan would be prepared prior to construction and implemented as part of the Construction Environmental Management Plan (CEMP). The plan would include measures to manage biodiversity and minimise the potential for impacts during construction. The plan would be prepared in accordance with relevant legislation, guidelines and standards. The plan would include, but not be limited to: ▸ locations and requirements for pre-clearing surveys, including terrestrial and aquatic habitats ▸ establishing protocols for the staged clearing of vegetation and safe tree felling and log removal to reduce the risk of fauna mortality ▸ measures to avoid and minimise clearing of hollow-bearing trees and paddock trees where practicable ▸ measures relating to the provision and management of nest boxes, including reuse of hollows and monitoring protocols ▸ animal handling protocols, including relocation and emergency care ▸ an unexpected finds protocol ▸ measures to manage biosecurity risks in accordance with the *Biosecurity Act 2015* (Cth) ▸ measures to reduce the risk of terrestrial and aquatic fauna mortality/injury ▸ measures relating to the stripping, stockpiling and management of topsoil where it contains seedbank or weed material.
BD-8	Rehabilitation of vegetation and habitats subject to temporary disturbance	A rehabilitation strategy would be prepared to guide rehabilitation planning, implementation, monitoring and maintenance of disturbed areas once construction is complete. The strategy would include clear objectives for rehabilitation of native vegetation in temporary disturbances areas and in riparian areas.
BD-9	Managing the potential for biodiversity (aquatic) impacts during construction	Scheduling of construction activities to minimise time of works in or adjacent to drainage lines and waterfront land (watercourse bed and land within 40 m of the highest bank of the watercourse (DPI, 2012a), particularly during periods of flow
BD-10	Managing the potential for biodiversity (aquatic) impacts during construction	Where it is not practicable to work in the dry, a sediment or silt curtain attached to the same sides of the bank and around the works area would be installed for erosion and sediment control, and to maintain fish passage.
Traffic, transport and access		
T-5	General impacts of construction activities on traffic, transport, access, pedestrians and cyclists	A traffic, transport and access management plan would be prepared and implemented as part of the CEMP. The plan would include measures, processes and responsibilities to minimise the potential for impacts on the community and the operation of the surrounding road and transport environment during construction. The plan would be developed in consultation with local councils, TfNSW, emergency services and public transport/bus operators. It would include, as appropriate, additional reasonable and feasible measures identified as an outcome of consultation undertaken under the Inland Rail Communications and Engagement Strategy.

Ref	Issue	Mitigation measure
T-6	General impacts of construction activities on traffic flow	Traffic control would be engaged to maintain vehicle flow and safe access where required on construction and diversion routes and at construction accesses. This would include at the Hibernia Street and Dudauman Street intersection, to prevent queuing across the existing rail line
T-7	Emergency vehicle access	Emergency vehicle access routes that may be impacted by the proposal would be identified and appropriate control measures would be implemented, in consultation with the relevant emergency services providers.
T-8	Heavy vehicles damaging local roads	A dilapidation survey would be undertaken of the made public roads within the proposed haulage routes at the commencement of construction and provided to the relevant road authority. Upgrades to pavements on construction routes would be undertaken prior to construction, as deemed to be required. Pavement monitoring would be carried out during works. Rectification measures would be implemented as needed during and/or following completion of construction to address any damage caused by construction.
T-9	Impact on livestock highways	Local Land Services would be notified of increased heavy vehicle movements along livestock highways during the construction phase as well as periods of changed traffic operations. Construction staff would be informed of the location of the livestock highways.
Hydrology and flooding		
HF-4	Flooding impacts	Construction planning and the layout of construction work sites and compounds would be undertaken with consideration of overland flow paths and flood risk, avoiding flood-prone land and flood events where practicable. Following development of the construction methodology, critical stages of the works should be identified and tested in the flood model to identify potential construction-phase flooding impacts. The tests should simulate the following in the model for a number of construction-phase scenarios as required: ▸ key stages of temporary embankment opening during demolition/reconstruction that could pass additional flow downstream ▸ location and level of long-term construction facilities (such as compounds, access tracks and stockpiles) that could obstruct and divert flows ▸ location and level of temporary works in waterways and overland flow paths during bridge and culvert construction that could obstruct and divert flows. The construction-phase flood modelling should be iterated through sufficient scenarios to inform planning of the works such that construction -phase flood impacts are identified and managed accordingly. The outcomes of the modelling should be used to inform the construction-phase flood emergency response plan (mitigation measure HS-4).
HF-5	Sedimentation and erosion management	A soil and water management plan would be prepared and implemented as part of the CEMP. The plan would include measures, processes and responsibilities to minimise the potential for soil and water impacts (including impacts to groundwater and geomorphology) during construction.
HF-6	Dewatering of farm dams that require relocation and/or decommissioning	A dam dewatering protocol would be developed as part of the soil and water management plan. It would consider: ▸ options for reuse of water in the dam ▸ licensing and approval requirements, where relevant ▸ the quality and quantity of the water to be released, where relevant ▸ strategies to minimise impacts on native, threatened or protected species ▸ strategies to minimise spread of nuisance flora and fauna species.
Water quality		
WQ-3	Sedimentation and erosion management	A soil and water management plan would be prepared and implemented as part of the CEMP. The plan would include measures, processes and responsibilities to minimise the potential for soil and water impacts (including impacts to groundwater and geomorphology) during construction.

Ref	Issue	Mitigation measure
WQ-4	Dewatering of farm dams that require relocation and/or decommissioning	A dam dewatering protocol would be developed as part of the soil and water management plan. It would consider: ▸ options for reuse of water in the dam ▸ licensing and approval requirements, where relevant ▸ the quality and quantity of the water to be released, where relevant ▸ strategies to minimise impacts on native, threatened or protected species ▸ strategies to minimise spread of nuisance flora and fauna species.
WQ-5	Disposal of wastewater (concrete batching plants)	All wastewater from concrete batching plants would be captured and would either be disposed of to an appropriately licensed facility or treated prior to discharge to surface water bodies. All discharge water would comply with the WQOs and the relevant EPL requirements: ▸ measures to prevent or minimise mud and dirt being tracked onto public roadways by trucks and any equipment leaving the site ▸ requirements for training, inspections, corrective actions, notification and classification of environmental incidents, record keeping, monitoring and performance objectives for handover on completion of construction ▸ any other requirements necessary to comply with conditions of approval subsequent approvals or regulatory requirements ▸ erosion and sediment control plans and Soil and Water Management Plan (SWMP) will be signed off by a Suitably Qualified Person (e.g. Certified Professional in Erosion and Sediment Control (CPESC) in accordance with regulatory requirements. .
Groundwater		
GW-4	Groundwater management	A groundwater mitigation and management plan (GWMMP) would be prepared as part of the CEMP. The GWMMP would comply with the proposal conditions of approval and be implemented to monitor the effectiveness of mitigation and management measures applied during the construction phase of the proposal. The GWMMP would at a minimum: ▸ provide details of the groundwater monitoring network, frequency of monitoring, and test parameters ▸ be based on baseline studies developed for the proposal and establish baseline monitoring reports ▸ contain procedures for the documentation and reporting of results ▸ include requirements for training, inspections, corrective actions, notification and classification of environmental incidents, record keeping, monitoring and performance objectives for handover on completion of construction.
GW-5	Monitoring groundwater drawdown and quality	A groundwater monitoring program would be developed and implemented as part of the GWMMP to monitor potential groundwater impacts. The program would define the following: ▸ monitoring parameters ▸ monitoring locations ▸ frequency and duration of monitoring. The monitoring program would include baseline monitoring to determine the water quality of groundwater from the proposed bore field bores.
GW-6	Unforeseen water table penetration by earthworks	If excavations intersect the water table, potential impacts would be assessed by a hydrogeologist and adaptive management measures implemented as required.

Ref	Issue	Mitigation measure
Cultural heritage		
Aboriginal heritage		
AH-9	Protecting Aboriginal heritage and minimising impacts during construction	An Aboriginal cultural heritage management plan would be prepared prior to construction and implemented as part of the CEMP. The plan would include measures to minimise the potential for impacts and manage Aboriginal heritage, including: ▸ a salvage methodology (mitigation measure AH-2) ▸ an unexpected finds procedure (mitigation measure AH-11) ▸ plans and installation procedures for fencing and protective coverings ▸ induction package for construction workers and supervisors ▸ erosion and sediment controls in accordance with *Managing Urban Stormwater: Soils and construction – Volume 1* (Landcom, 2004) to minimise the potential for erosion impacts to Aboriginal sites located close to watercourses/drainage lines ▸ measures to manage the potential for impacts to potential Aboriginal heritage items (including burial sites) located in sensitive landscapes (such as alluvium landscapes) ▸ measures to protect sites close to the proposal site from inadvertent impacts ▸ outcomes of further investigations (mitigation measures AH-3 and AH-5). The plan would be prepared in consultation with registered Aboriginal parties and the NSW Department of Planning and Environment.
AH-10	Protecting Aboriginal heritage and minimising impacts during construction	A requirement for cultural heritage awareness training would be included in the Aboriginal cultural heritage management plan. Cultural heritage awareness training would be provided by an Aboriginal representative at the commencement of substantial works for the project.
AH-11	Unexpected finds	An unexpected finds procedure would be developed and included in the Aboriginal cultural heritage management plan to provide a consistent method for managing any unexpected Aboriginal heritage items discovered during construction, including potential heritage items or objects and a flow chart of the procedure on the findings of skeletal remains.
AH-12	Update AHIMS records	AHIMS records would be updated for AHIMS Register locations no longer considered to be sites: ▸ Scarred Tree 50-5-0117 (AHIMS 50-5-0117) ▸ Scarred Tree 50-5-0120 (AHIMS 50-5-0120) ▸ Scarred Tree 50-5-0121 (AHIMS 50-5-0121) ▸ Zone 1—low density scatter (AHIMS 50-5-0280) (part) ▸ PAD Zone 7 North (AHIMS 50-5-0281) ▸ PAD Zone 7 South (AHIMS 50-5-0288) ▸ PAD Zone 8 (AHIMS 50-5-0282) ▸ PAD Zone 11 (AHIMS 50-2-0056) ▸ PAD Zone 11 East (AHIMS 50-2-0057).
Non-Aboriginal heritage		
NAH-2	Avoiding impacts during construction	The CEMP would define a requirement for non-Aboriginal historical heritage awareness training for site workers prior to commencement of construction works. The awareness training would promote an understanding of heritage items that may be impacted during the works, and the requirements of the unexpected finds procedure.
NAH-3	Unexpected finds including human skeletal remains	An unexpected finds procedure would be developed as part of the CEMP to provide a consistent method for managing any unexpected heritage or archaeological items and unexpected human skeletal remains. Non-Aboriginal awareness training (mitigation measure NAH-2) is to include a flow chart of the procedure on the findings of skeletal remains.
NAH-4	Avoiding impacts during construction	The existing fencing and signage around Stockinbingal Railway Station would be maintained to avoid impacts during construction. The Billabong Creek rail underbridge would be fenced and marked on site plans within the CEMP as an area to be avoided during construction.
Noise and vibration		
NV-6	Managing the potential for noise and vibration impacts during construction	A construction noise and vibration management plan would be prepared and implemented in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework. The plan would include measures, processes and responsibilities to manage and monitor noise and vibration, and minimise the potential for impacts during construction.

Ref	Issue	Mitigation measure
NV-7	Impacts of out-of-hours work	An out-of-hours work (OOHW) protocol would be developed to define the process for considering, approving and managing OOHW, including implementation of feasible and reasonable measures and communication requirements to separately address the following situations: ▸ works that routinely occur within the construction hours generally proposed for the proposal but outside Interim Construction Noise Guideline standard hours ▸ works (such as evening and night works during rail possessions) that would occur outside the construction hours proposed for the proposal Measures would be aimed at pro-active communication and engagement with potentially affected receivers, provision of respite periods and/or alternative accommodation for defined exceedance levels. All work outside the proposal construction hours would be undertaken in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework and in accordance with the OOHW protocol. The protocol would provide guidance for the preparation of OOHW plans for each construction work location and for key works, and guidance around mitigating impacts to receivers at Stockinbingal. OOHW plans would be prepared in consultation with key stakeholders (including the NSW Environment Protection Authority) and the community and incorporated into the construction noise and vibration management plan (mitigation measure NV-6).
NV-8	Minimising the potential for construction vibration (structural) impacts	If vibration-generating activities are conducted within minimum working distances of a sensitive receiver, attended vibration measurements would be undertaken at the commencement of vibration-generating activities to confirm that structural vibration limits are within the acceptable range. Where vibration levels are found to be unacceptable, alternative work methods would be implemented so the vibration impacts are reduced to acceptable levels.
NV-9	Minimising the potential for construction vibration (structural) impacts	Dilapidation surveys: Property condition surveys would be completed prior to any vibration-intensive work being carried out at or within the minimum distances that may cause cosmetic damage. Where a receiver is determined to be structurally unsound, a reassessment of the minimum working distances would be required. Minimum working distances would be confirmed prior to carrying out any vibration intensive work onsite.
NV-10	Impacts on heritage items as a result of construction vibration	Prior to the commencement of vibration-intensive works within the minimum working distances for cosmetic damage for heritage items, the potential for damage to the item would be assessed. Where there is potential for damage, alternative methods that generate less vibration would be investigated and substituted where practicable. Where residual cosmetic damage risks remain, condition surveys would be carried out and vibration monitoring with real-time notification of exceedance would occur during the activity. Site activities would be modified, where practicable, to avoid exceeding the cosmetic damage criteria. Any identified vibration-related damage to the items would be rectified.
NV-11	Minimising potential for impacts of blasting	Blasting would be undertaken during the recommended standard hours for blasting. Management measures defined by the blasting management strategy would be implemented.
Social and economic		
SE-2	Management of social and economic impacts	ARTC and the construction contractor would collaborate on the implementation of the SIMP for the proposal during the construction phase. The SIMP would be developed using the recommendations provided in the SIA for the proposal and address, but not be limited to, workforce management; industry participation; housing and accommodation; community health and wellbeing; and appropriate community and stakeholder engagement.

Ref	Issue	Mitigation measure
Land use and property		
LP-10	Biosecurity	The biodiversity management plan included in the CEMP (mitigation measure BD-7) would include measures to minimise the potential for biosecurity risks during construction, in accordance with the *Biosecurity Act 2015* (Cth). The biosecurity management plan would be developed with reference to the *Riverina Regional Strategic Weed Management Plan 2017-2022* (LLS, 2017) and in consultation with LLS and DPI.
LP-11	Access to properties	Access to individual residences, services and businesses, and for livestock across the rail corridor, would be maintained during construction where reasonably practicable. The traffic, transport and access management plan included in the CEMP (mitigation measure T-4) would include measures in relation to property access during construction. Where alternative access arrangements need to be made, these would be developed in consultation with affected property owners/occupants and LLS for travelling stock reserves.
LP-12	Water supplies for farm operations	Farm water pipelines, dams and drainage channels would be replaced or reinstated to ensure continuity of stock and domestic water supplies prior to removal of existing impacted infrastructure.
LP-13	Bushfire risk	The flood and emergency response plan (mitigation measure HS-4) would include measures to minimise the potential for bushfire risks.
Landscape and visual		
LV-4	Visual impacts of construction compounds	Construction compounds would be located, as far as practicable, within cleared areas and away from sensitive receivers. Construction compounds would be designed and orientated to minimise visual impacts. This would include locating areas of low visual amenity away from sensitive receivers, and erecting boundary screening around construction compounds, where appropriate.
LV-5	Landscape character and visual impacts	Rehabilitation of disturbed areas would be undertaken progressively in accordance with the rehabilitation strategy (mitigation measure BD-8 and the appendix of the landscape character and visual impact assessment for the proposal) to be undertaken during detailed design and individual property agreements (where relevant).
LV-6	Minimising light spill	Lighting of work areas, construction compounds and work sites would be oriented to minimise glare and light spill impact on adjacent receivers.
LV-7	Visual impacts of construction	Mitigation measures for visual impacts would be included in the CEMP, including (where relevant): ▸ selecting laydown areas and other ancillary sites to reduce visual impacts ▸ locating construction compounds as far from sensitive receivers as possible ▸ use of hoarding and other visual screening methods ▸ keeping stockpile height to a minimum in the vicinity of sensitive receivers. Any existing ground surface or vegetation that has been disturbed in order to replace any existing track would be reinstated to match the adjoining landscape surface in order to maintain the current visual scene.

Ref	Issue	Mitigation measure
Soils and contamination		
SC-6	General soil and erosion management	A soil and water management plan (SWMP) would be prepared as part of the CEMP. The SWMP would comply with the conditions of approval and be in accordance with best practice, reflected in *Managing Urban Stormwater: Soils and construction - Volume 1* (Landcom, 2004), *Volume 2C Unsealed roads* (DECC, 2008) and *Volume 2D, Main Road Construction* (DECC, 2008) (collectively known as the Blue Book). The SWMP would include: ▸ water quality and soil/land conservation objectives for the proposal ▸ a progressive erosion and sediment control plan that allows for staging and site-specific erosion and sediment controls at all work sites in accordance with the Blue Book. Physical controls may include sediment fences and basins; containment bunds; silt traps; turbidity barriers and diversions; dust suppression; and earth compaction around stockpiles and earthworks areas. The controls would aim to: ▸ divert water from upslope areas around the site ▸ reduce erosion from within the site ▸ intercept runoff and capture sediment from site ▸ protect watercourses, drainage lines and drain inlets down-gradient from the site. The plan would identify: ▸ monitoring locations at discharge points and selected watercourses where works are being undertaken, monitoring parameters, and frequency and duration of monitoring.
SC-7	Contamination management	A contaminated land and hazardous materials management plan would be prepared and implemented as part of the CEMP. The plan would include but not be limited to: ▸ further investigations during detailed design would be required to characterise contamination at registered or otherwise identified contaminated sites. Results would be used to further inform CEMP requirements. ▸ a methodology to manage excavation and spoil management with known contaminated sites ▸ capture and management of any surface runoff contaminated by exposure to the contaminated land ▸ measures to ensure the safety of site personnel, environment and local communities during construction ▸ procedures for incident management and managing unexpected contamination finds (an unexpected finds protocol).
SC-8	Rehabilitation (local roads)	Where decommissioning or realignment of local roads is required, the CEMP would include decommissioning and rehabilitation requirements, as per relevant conditions of approval and road authority requirements. This would include measures to manage: ▸ milling and removal of bitumen pavement ▸ removal of any decommissioned culverts ▸ tying and ripping of base and sub-base material ▸ application of soil ameliorants ▸ topsoiling and/or compost blanket ▸ stabilisation and rehabilitation (for example planting and or seeding).

Ref	Issue	Mitigation measure
Waste		
WM-2	Waste management	A waste management plan would be prepared for the proposal, including: ▸ waste targets for the proposal ▸ estimated waste generation (volumes and types of waste arisings) ▸ waste mitigation and management measures for the waste types and quantities, and contingencies for any unexpected waste volumes ▸ general protocols and performance objectives for keeping the worksite clean and tidy ▸ processes for monitoring, documenting and reporting waste types, volumes and how these arisings compare to waste targets (e.g. description of waste streams and estimated volumes, temporary waste storage areas and disposal locations on and offsite (including stockpiles and landfilling) as well as waste disposal and National Environmental Protection Measures (NEPM) criteria for disposal sites ▸ requirements for waste segregation (e.g. inert—including virgin excavated material, vegetation, building and demolition waste, concrete and asphalt; solid—such as food waste and litter; industrial/regulated—such as asbestos; hazardous—such as flammable liquids; liquid—such as sewage ▸ requirements for secure temporary storage, collection frequency and disposal/recycling requirements ▸ effluent management for construction staff amenities ▸ procedures and reporting/documentation requirements for ensuring waste transporters and receivers are appropriately licenced according to the type of waste ▸ requirements for training, inspections, audits, corrective actions, notification and classification of environmental incidents, record keeping, monitoring and performance objectives for handover on completion of construction ▸ any other requirements necessary to comply with conditions of approval, subsequent approvals or regulatory requirements.
WM-3	Waste management	All waste generated would be classified in accordance with the *Waste Classification Guidelines* (EPA, 2014a) and disposed of in accordance with the relevant requirements of the Protection of the Environment Operations (Waste) Regulation 2014.
Climate change risk		
CC-2	Climate change risk management	Sensitivity testing would be undertaken in line with climate change scenario planning for Representative Concentration Pathway (RCP) 8.5 by reviewing implications for increases in rainfall (in accordance with the Inland Rail Climate Change Risk Assessment Framework).
CC-3	Climate change risk management	The design would consider climate change (RCP 8.5) in modelling used to inform design of drainage and waterways, including: ▸ application of the latest *Inland Rail Climate Change Risk Assessment Framework* (ARTC, 2021c) ▸ application of the latest *Australian Rainfall and Runoff Interim Climate Change Guidelines* (Engineers Australia, 2014) ▸ assessment of impacts associated with the 1% AEP, to determine the sensitivity of the design to potential changes in the rainfall intensity ▸ where enhancement or upgrading to existing track is to be undertaken, no worsening of the existing track flood immunity would occur.
Sustainability		
N/A		
Air quality		
AQ-1	General air quality management	An air quality management 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: ▸ spoil handling ▸ machinery operating procedures ▸ soil treatments ▸ stockpile management ▸ haulage dust suppression ▸ monitoring.

Ref	Issue	Mitigation measure
AQ-2	Construction activities and earthworks that may cause dust impacts	Where sensitive receptors are located within the study area (350 m from construction footprint and 50 m of the route(s) used by construction vehicles on public roads, up to 500 m from the site access points) determined for each key activity, or visible dust is generated from vehicles using unsealed access roads, road watering and/or other stabilising approaches would be implemented.
AQ-3	Blasting management	Blasting will not be undertaken if the prevailing wind conditions are likely to transport dust emissions towards the nearest sensitive receptors.
AQ-4	Impacts on sensitive receivers (communications)	Where sensitive receivers are located in close proximity to construction sites, especially sites 4 and 6: ▸ implement the Inland Rail Communications and Engagement Strategy, which would include community engagement before work commences onsite ▸ display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary ▸ display the head or regional office contact information.
Health and safety		
HS-5	Physical hazards	Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
HS-6	Bushfire	The construction contractor would develop procedures to manage hot work/high fire-risk activities, including observation of local fire authorities and emergency services directives, checking extent of worksite vegetation prior to hot work, and ensuring appropriate firefighting equipment and trained personnel are available. The construction contractor procedures would comply with the ARTC Safety Management System.
HS-7	Bushfire	The *ARTC Engineering (Track and Civil) Code of Practice—Section 17 Right of Way: Vegetation Management* (ARTC, 2013a) would be implemented to minimise fire risk within the rail corridor, which includes specifications for vegetation management/fire hazard reduction within the corridor. Local fire authorities and local emergency services would be consulted to ensure appropriate operational actions are taken, such as providing feedback on the firefighting vehicles accessibility, fire prevention plans and cooperation on burning-off activities.
Cumulative impacts		
N/A		

TABLE 27.5 COMPILATION OF PROPOSAL SPECIFIC MITIGATION MEASURES FOR OPERATION

Ref	Issue	Mitigation measure
Biodiversity		
BD-11	Weed management	Weed management protocols for the operational rail corridor and other ARTC facilities would be in accordance with the requirements of the *Biosecurity Act 2015* (Cth) and incorporated into the operational environmental management framework. These protocols would include: ▸ site hygiene and waste-management procedures to deter pest animals ▸ weed surveillance and treatment during operation and maintenance activities ▸ requirements in relation to pesticide and herbicide use, including any limitations on use. Restrictions may apply in proximity to watercourses, known areas of matters of national environmental significance (MNES), or *Biodiversity Conservation Act 2016* (NSW) listed receptors, habitat or land uses sensitive to spray-drift from the application of pesticides and herbicides ▸ erosion and sediment control risks associated with broad-scale weed removal or treatment.
BD-12	Fauna connectivity	The operational performance of fauna connectivity measures (including impacts on fauna as a result of train operations) would be monitored in accordance with the fauna connectivity strategy. This would include recording of wildlife collisions with trains, and monitoring of use of crossing structures by target species (including the Squirrel Glider) and feral predators. The need for additional measures or modifications to existing measures would be identified to respond to any issues identified.

Ref	Issue	Mitigation measure
BD-13	Aquatic ecology	Culverts that provide for the flow of watercourses would be inspected and maintained in accordance with ARTC's standard operating procedures to address any issues that may contribute to the blockage of fish passage.
Traffic, transport and access		
N/A		
Hydrology and flooding		
HF-7	Management of flood emergency risks beyond the rail corridor	To mitigate flood risks to life or property beyond the rail corridor along Old Sydney Road, flood risk information would be provided in sufficient detail, e.g. through appropriate signage, so that relevant emergency services personnel and affected third parties are made aware of the potential for flooding west of the proposed raised level crossing.
Water quality		
WQ-6	Flooding impacts	The proposal would be managed in accordance with the water quality management requirements specified in the environment protection licence.
Groundwater		
GW-7	Management of groundwater seepage	Drainage measures would be maintained where required to manage ongoing groundwater seepage during operation.
Cultural heritage		
N/A		
Noise and vibration		
NV-12	Operational noise and vibration	The proposal would be operated with the aim of achieving the operational noise and vibration criteria identified by the operational noise and vibration review, the requirements of the conditions of approval, and the environment protection licence for Inland Rail.
NV-13	Operational noise and vibration monitoring	Operational noise and vibration compliance monitoring would be undertaken, once Inland Rail has commenced operation, at representative locations to compare actual noise performance against that predicted by the operational noise and vibration review. Compliance monitoring requirements would be defined by the operational noise and vibration review. The results of monitoring would be included in an operational noise and vibration compliance report, prepared in accordance with the conditions of approval. The need for any additional feasible and reasonable mitigation measures would be identified as an outcome of the monitoring.
Social and economic		
SE-3	Ongoing management of social and economic impacts	ARTC and the construction contractor would collaborate on the implementation of the SIMP for the proposal during the operation phase. The SIMP would be developed using the recommendations provided in the SIA for the proposal and address but not be limited to workforce management, industry participation, housing and accommodation, community health and wellbeing, and appropriate community and stakeholder engagement.
Land use and property		
LP-14	Safe movement	Interface agreements would be required for all private crossings on Inland Rail and would be put in place to assist in the safe movement of stock and non-standard machinery across the rail corridor.
Landscape and visual impacts		
LV-8	Landscape character and visual impacts	Vegetation provided in accordance with the rehabilitation strategy (mitigation measure BD -8) and the urban design and landscape plan (mitigation measure LV-2) would be subject to ongoing monitoring and maintenance in accordance with ARTCs standard operating procedures.
Soils and contamination		
SC-9	Soil erosion and sedimentation	During any maintenance work where soils are exposed, sediment and erosion control devices would be installed in accordance with *Managing Urban Stormwater: Soils and Construction, Volume 1* (Landcom, 2004).
SC-10	Contamination	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.

Ref	Issue	Mitigation measure
Waste		
WM-4	Waste management	Operational waste, including general litter clean up, would be managed in accordance with ARTC's existing operational maintenance requirements and the waste hierarchy principles in the *Waste Avoidance and Resource Recovery Act 2001* (NSW).
Climate change risk		
CC-4	Climate change risk management	Operational management and maintenance procedures would address potential climate change risks and adaptation measures.
Sustainability		
SU-3	Sustainability	Prior to operation commencing, a sustainability handover plan would be prepared, and relevant initiatives would be maintained and implemented through operational management and maintenance procedures.
Air quality		
AQ-5	Locomotive emissions	Locomotive emissions would be managed in accordance with the air quality management requirements specified in the rollingstock operator's environment protection licence.
AQ-6	Impacts during track maintenance	Maintenance service vehicles and equipment would be maintained and operated in accordance with the manufacturer's specifications.
Health and safety		
HS-7	Bushfire	The *ARTC Engineering (Track and Civil) Code of Practice—Section 17 Right of Way: Vegetation Management* (ARTC, 2013a) would be implemented to minimise fire risk within the rail corridor, which includes specifications for vegetation management/fire hazard reduction within the corridor. Local fire authorities and local emergency services would be consulted to ensure appropriate operational actions are taken, such as providing feedback on the firefighting vehicles accessibility, fire prevention plans and cooperation on burning-off activities.
Cumulative impacts		
N/A		

27.4 Proposal uncertainties and approach to design refinements

27.4.1 Proposal uncertainties

The EIS is based on the reference 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 uncertainties around the design, construction and/or operational methodologies of the proposal, and how these will be resolved, is provided in Table 27.6.

TABLE 27.6 PROPOSAL UNCERTAINTIES

Category	Uncertainty	How uncertainties would be resolved
Design	Property acquisition—exact areas that need to be acquired	All property acquisitions/adjustments would be undertaken in consultation with landowners and, where relevant, in accordance with the requirements of the Land Acquisition Act. In line with the Land Acquisition Act, ARTC's preference is for acquisition by agreement where practicable. Refining the number and location of property acquisitions would involve a detailed survey of the proposal site and surrounding properties, and confirmation of the final detailed design. 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, where appropriate. These would detail any required adjustments to fencing, access, farm infrastructure and relocation of any impacted structures as required.
	Flooding—exact nature of potential impacts and design responses	Further flood modelling would be undertaken, incorporating the detailed design and construction planning information. This would provide further guidance on potential flood risks and confirm the required mitigation requirements.

Category	Uncertainty	How uncertainties would be resolved
	Drainage—erosion protection	Further hydrology modelling would be undertaken during detailed design to confirm the drainage design, including the number and locations that require erosion protection, and the extent and type of protection required.
	Utilities—impacts on utilities to be defined in detail	Site utilities investigations would be completed during detailed design to validate the assessments undertaken to date and confirm relocation/protection requirements. The location, nature and extent of utility changes would be confirmed during detailed design in consultation with utility providers. Further consultation would be undertaken with utility providers to refine and confirm changes and manage the proposed staging of work.
	Noise barriers	The approach to noise attenuation would be subject to further reasonable and feasible considerations during detailed design, including construction limitations. Further noise modelling would be required to confirm the requirements for noise attenuation.
	Biodiversity	Pre-clearing surveys would be undertaken prior to construction.
	Fauna connectivity	A fauna connectivity strategy would be developed and would include investigation and design of potential fauna connectivity structures that could be installed and where along the rail corridor.
	Aboriginal heritage	Further surveys would be undertaken in targeted areas.
Construction	Haul routes—exact routes and haulage methods	A detailed haulage program would be developed based on the detailed design.
	Construction compounds and workforce accommodation camp—location, layout and facilities	The final selection of identified compound and workforce accommodation camp location/s and final layout of compound and workforce accommodation camp sites would be confirmed based on the detailed design and final construction methodology.
	Management of spoil	Detailed design would include measures to minimise spoil generation. This would include a focus on optimising the design to minimise spoil volumes and the reuse of material on site.
	Temporary land requirements— exact areas that need to be leased	The boundaries of the additional areas to be temporarily leased during construction only would be confirmed based on the final design and detailed surveys.
	Construction water supply	Construction water supply options would continue to be explored during detailed design and would include: ▸ ongoing consultation with Goldenfields Water (or an equivalent commercial water supply operator) to access the local reticulated network ▸ investigation of options to utilise recycled water from sewage treatment plants ▸ access to groundwater bores where it can be bought on-market ▸ investigation into the use of farm dams for water harvesting and storage.
Operation	Performance of future rollingstock—noise and air quality emissions Long-term frequency of rail movements	Ongoing monitoring in accordance with the operational Environmental Management Plan (EMP).

27.4.2 Approach to design refinements

The reference design defines a proposal that provides a sound basis for developing the detailed design to the standard required to support project delivery. Sufficient flexibility has been provided to allow for the design to be refined during the detailed design stage, where relevant, to improve the performance, minimise impacts on the community and the environment, and in response to feedback from the community and stakeholders. As a result, the final design may vary from the reference design described in this EIS.

Any proposed variations would be reviewed for consistency with the assessments described in this document, including relevant mitigation measures, performance outcomes and any future conditions of approval. If any proposed variations are not consistent with the approvals, appropriate modifications to the project approval would be sought in accordance with the requirements of the EP&A Act.

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 construction or operation of the proposal without increasing the potential environmental impacts.

Such refinements may include, for example:

- 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
- changes to culvert upgrades
- changes to the level crossing upgrades
- 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 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 Division 5.2 of the EP&A Act.

27.5 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 in section 27.1, 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 27.7.

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

TABLE 27.7 COMPILATION OF ENVIRONMENTAL PERFORMANCE OUTCOMES

Key issue	SEARs desired performance outcomes	Proposal-specific environmental performance outcomes
1. Biodiversity	The project design considers all feasible measures to avoid and minimise impacts on terrestrial and aquatic biodiversity. Offsets and/or supplementary measures are assured, which are equivalent to any remaining impacts of project construction and operation.	▸ The proposal is designed to minimise the surface footprint and impacts on biodiversity ▸ The biodiversity outcome is consistent with the NSW Biodiversity Assessment Method 2020 ▸ Offsets are provided in accordance with the NSW Biodiversity Offsets Scheme.
2. Protected and sensitive lands	The project is designed, constructed and operated to avoid or minimise impacts on protected and sensitive lands. The project is designed, constructed and operated to avoid or minimise future exposure to coastal hazards and processes.	▸ The proposal is designed to minimise the surface footprint and impacts on protected and sensitive lands.
3. Transport and traffic	Network connectivity, safety and efficiency of the transport system in the vicinity of the project are managed to minimise impacts. The safety of transport system customers is maintained. Impacts on network capacity and the level of service are effectively managed. Works are compatible with existing infrastructure and future transport corridors.	▸ The proposal provides for more efficient and productive freight rail operations ▸ Impacts to traffic and transport are minimised ▸ Motorist, pedestrian and cyclist safety will be maintained or improved ▸ The proposal contributes to one of the desired outcomes of Inland Rail—to have reduced truck volumes on the road network, improving road safety ▸ The proposal is integrated with existing and future local and regional transport infrastructure and planning strategies.
4. Flooding, hydrology and geomorphology	The project minimises changes to the existing flood regime's impacts on property, public safety and the environment resulting from alteration of the water flow characteristics of watercourses and overland flow paths. Where feasible, the project includes remedial measures to mitigate any adverse water flow impacts or flood safety risks caused by the existing rail infrastructure within the project area. Construction and operation of the project avoids or minimises the risk of, and adverse impacts from, infrastructure flooding, flooding hazards, or flooding induced by infrastructure failure.	▸ Construction is undertaken in a manner that minimises the potential for adverse flooding impacts as far as practicable, through staging of works and the implementation of mitigation measures ▸ Structures are designed and located such that flows are not significantly impeded ▸ The proposal reduces the length of overtopping of the existing rail corridor ▸ The proposal reduces or does not significantly increase the area subject to flooding.
5. Water—hydrology	Long-term impacts on surface water and groundwater hydrology (including drawdown, flow rates and volumes) are minimised. 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). Sustainable use of water resources.	▸ Opportunities to reuse water resources are considered during the design process ▸ The use of water during construction is minimised.

Key issue	SEARs desired performance outcomes	Proposal-specific environmental performance outcomes
6. Water—quality	The project is designed, constructed and operated to protect the NSW WQOs where they are currently being achieved, and contribute towards achievement of them 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).	▸ The proposal is designed and constructed such that changes to water flows in watercourses are minimised as far as practicable ▸ Water discharged does not exceed the ANZG 2018 guidelines for protection of aquatic ecosystems or water quality trigger values ▸ Impacts to water quality during construction and operation are minimised as far as practicable.
7. Soils	The environmental values of land, including soils, subsoils and landforms, are protected. Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to ASS and site contamination.	▸ Site-specific soil, subsoil and landform characteristics are taken into consideration during detailed design and construction ▸ Any contamination is managed in accordance with relevant regulatory requirements.
8. Heritage	The design, construction and operation of the project facilitates, to the greatest extent practicable, the long-term protection, conservation and management of the heritage and cultural significance of items of environmental heritage, and Aboriginal objects and places. The design, construction and operation of the project avoids or minimises impacts, to the greatest extent practicable, on the heritage significance of environmental heritage and Aboriginal objects and places.	▸ The proposal is designed to minimise the surface footprint as far as practicable ▸ 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 ▸ Impacts on heritage are managed in accordance with relevant legislation, including the EP&A Act, the *National Parks and Wildlife Act 1974* (NSW), and relevant guidelines.

9. Noise and vibration—amenity	Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on acoustic amenity.
	Increases in noise emissions and vibration affecting nearby properties and other sensitive receivers during operation of the project are effectively managed to protect the amenity and wellbeing of the community.
	Increases in noise emissions and vibration affecting environmental heritage, as defined in the *Heritage Act 1977* (NSW), during operation of the project are effectively managed.
		▸ The proposal minimises impacts to the local community as far as practicable by:
		  ▸ controlling construction and operational noise and vibration at the source
		  ▸ controlling construction and operational noise and vibration on the source to receiver transmission path
		  ▸ implementing feasible and reasonable measures to minimise the noise and vibration impacts of construction and operational activities on local sensitive receivers.

10. Noise and vibration—structural	Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on acoustic amenity.
	Increases in noise emissions and vibration-affecting nearby properties and other sensitive receivers during operation of the project are effectively managed to protect the amenity and wellbeing of the community.
	Increases in noise emissions and vibration affecting environmental heritage, as defined in the *Heritage Act 1977* (NSW), during operation of the project are effectively managed.
		▸ The proposal minimises impacts to structures as far as practicable by:
		  ▸ controlling vibration at the source
		  ▸ controlling vibration on the source to receiver transmission path
		  ▸ implementing feasible and reasonable measures to minimise vibration impacts of construction activities on structures.

Key issue	SEARs desired performance outcomes	Proposal-specific environmental performance outcomes
10. Economic, land use and agriculture	The project minimises adverse economic impacts and capitalises on opportunities potentially available to affected communities. The project minimises impacts to property and business including agricultural enterprises and accommodation, 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.	▸ 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 ▸ The proposal provides opportunities for regional economic development, by enabling local and regional businesses to access Inland Rail via regional transport hubs ▸ Impacts to land use and properties are minimised as far as practicable ▸ The proposal is appropriately integrated with adjoining land uses, and access to private properties is maintained ▸ The proposal is appropriately integrated with local and regional land-use planning strategies.
11. Social	The project minimises adverse social impacts and capitalises on opportunities potentially available to affected communities.	▸ The proposal minimises impacts to the local community and businesses.
12. Visual amenity	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.	▸ Vegetation providing screening to the rail corridor is retained where practicable ▸ The proposal is designed to have regard to the surrounding landscape and visual environment as far as practicable ▸ The proposal incorporates features to minimise the potential visual impacts where visual receptors are concentrated ▸ The proposal is visually integrated with its surroundings.
13. Waste	All wastes generated during the construction and operation of the project are effectively stored, handled, treated, reused, recycled and/or disposed of lawfully and in a manner that protects environmental values.	▸ Waste is managed in accordance with the POEO Act and the *Waste Avoidance and Resource Recovery Act 2001* (NSW) (WARR Act) ▸ Waste is assessed, classified, managed, and disposed of in accordance with the *Waste Classification Guidelines* (EPA, 2014a) ▸ Reusable spoil is beneficially reused in accordance with the project spoil reuse hierarchy.
14. Climate change and sustainability	The project reduces the NSW Government's operating costs and ensures the effective and efficient use of resources. Conservation of natural resources is maximised. The project is designed, constructed and operated to be resilient to the future impacts of climate change.	▸ Climate change risks are considered throughout the design and development process ▸ The proposal is designed to maximise climate change resilience while minimising costs, community and environmental impacts ▸ The proposal is designed, constructed and operated in accordance with relevant climate change legislation and guidelines ▸ The design process targets an 'excellent' rating in accordance with the ISCA rating tool ▸ Sustainability considerations are integrated throughout the design, construction and operation phases of the proposal ▸ 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.