Appendices

Appendix A – Secretary's environmental assessment requirements and summary of agency requirements

Table A.1 General standard SEARs

Item	Requirement	EIS reference
1. Environmental Impact Assessment Process	1. The Environmental Impact Statement must be prepared in accordance with Part 3 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (the Regulation).	Appendix C
	2. The project will impact on matters of national environmental significance (MNES) protected under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and will be assessed in accordance with the NSW Bilateral Agreement (2015). The Proponent must assess impacts to MNES protected under the EPBC Act. This assessment must be in accordance with the requirements listed in Attachment A.	Chapter 10 and Technical Report 4 Refer Table A.3 for requirements in full
	3. The onus is on the Proponent to ensure legislative requirements relevant to the project are met.	Chapter 3
2. Environmental Impact Statement	1. The EIS must include, but not necessarily be limited to, the following: (a) executive summary	Executive summary
	(b) a description of the project, including all components and activities (including ancillary components and activities) required to construct and operate it	Part B
	(c) statement of the objective(s) of the project	Section 1.3
	(d) a summary of the strategic need for the project with regard to its critical State significance and relevant State Government policy	Chapter 5
	(e) an analysis of any feasible alternatives to the project	Section 6.1
	(f) a description of feasible options within the project.	Section 6.3
	(g) a description of how alternatives to and options within the project were analysed to inform the selection of the preferred alternative / option. The description must contain sufficient detail to enable an understanding of why the preferred alternative to and options(s) within the project were selected	Sections 6.2 and 6.3
	(h) a concise description of the general biophysical and socio-economic environment that is likely to be impacted by the project (including offsite impacts). Elements of the environment that are not likely to be affected by the project do not need to be described	Chapter 2
	(i) a demonstration of how the project design has been developed to avoid or minimise likely adverse impacts	Section 7.1.2
	(j) the identification and assessment of key issues as provided in the 'Assessment of Key Issues' performance outcome	Part C
	(k) a statement of the outcome(s) the proponent will achieve for each key issue	Section 27.4

Item	Requirement	EIS reference
	(l) measures to avoid, minimise or offset impacts must be linked to the impact(s) they treat, so it is clear which measures will be applied to each impact	Chapters in Part C
	(m) consideration of the interactions between measures proposed to avoid or minimise impact(s), between impacts themselves and between measures and impacts	Chapters in Part C
	(n) an assessment of the cumulative impacts of the project taking into account other projects that have been approved but where construction has not commenced, projects that have commenced construction, and projects that have recently been completed	Chapter 26
	(o) statutory context of the project as a whole, including: ▸ how the project meets the provisions of the EP&A Act and EP&A Regulation ▸ a list of any approvals that must be obtained under any other Act or law before the project may lawfully be carried out	Chapter 3
	(p) a chapter that synthesises the environmental impact assessment and provides: ▸ a succinct but full description of the project for which approval is sought ▸ a description of any uncertainties that still exist around design, construction methodologies and/or operational methodologies and how these will be resolved in the next stages of the project ▸ a compilation of the impacts of the project that have not been avoided ▸ a compilation of the proposed measures associated with each impact to avoid or minimise (through design refinements or ongoing management during construction and operation) or offset these impacts ▸ a compilation of the outcome(s) the proponent will achieve ▸ the reasons justifying carrying out the project as proposed, having regard to the biophysical, economic and social considerations, including ecologically sustainable development and cumulative impacts.	The synthesis is provided in the two chapters in Part D – chapters 27 and 28
	(q) relevant project plans, drawings, diagrams in an electronic format that enables integration with mapping and other technical software.	Throughout the EIS
	2. The EIS must only include data and analysis that is reasonably needed to make a decision on the proposal. Relevant information must be succinctly summarised in the EIS and included in full in appendices. Irrelevant, conflicting or duplicated information must be avoided.	Detailed findings are provided in appendices and technical reports

Item	Requirement	EIS reference
3. Assessment of key issues	1. The level of assessment of likely impacts must be proportionate to the significance of, or degree of impact on, the issue, within the context of the proposal location and the surrounding environment. The level of assessment must be commensurate to the degree of impact and sufficient to ensure that the Department and other government agencies are able to understand and assess impacts.	Part C
	2. For each key issue the Proponent must: (a) describe the biophysical and socio-economic environment, as far as it is relevant to that issue; (b) describe the legislative and policy context, as far as it is relevant to the issue; (c) identify, describe and quantify (if possible) the impacts associated with the issue, including the likelihood and consequence (including worst case scenario) of the impact (comprehensive risk assessment), and the cumulative impacts; (d) demonstrate how potential impacts have been avoided (through design, or construction or operation methodologies); (e) detail how likely impacts that have not been avoided through design will be minimised, and the predicted effectiveness of these measures (against performance criteria where relevant); and (f) detail how any residual impacts will be managed or offset, and the approach and effectiveness of these measures. Where multiple reasonable and feasible options to avoid or minimise impacts are available, they must be identified and considered and the proposed measure justified taking into account the public interest.	Refer individual chapters in Part C
4. Consultation	1. The project must be informed by consultation, including with relevant government agencies, infrastructure and service providers, special interest groups, affected landowners, businesses and the community. The consultation process must be undertaken in accordance with the current guidelines.	Chapter 4
	2. The Proponent must document the consultation process, and demonstrate how the project has responded to the inputs received.	Sections 4.1 to 4.3
	3. The Proponent must describe the timing and type of community consultation proposed during the design and delivery of the project, the mechanisms for community feedback, the mechanisms for keeping the community informed, and procedures for complaints handling and resolution.	Section 4.5

Table A.2 Key issue requirements

Key issue	Requirement	EIS reference
5. Air quality	1. The Proponent must undertake an air quality impact assessment (AQIA) for construction and operation of the project in accordance with the current guidelines	Chapter 13
	2. The Proponent must ensure the AQIA also includes the following: (a) demonstrated ability to comply with the relevant regulatory framework, specifically the *Protection of the Environment Operations Act 1997* and the Protection of the Environment Operations (Clean Air) Regulation (2010); and	Section 13.1.1
	(b) a cumulative local and regional air quality impact assessment.	Section 13.4
6. Biodiversity	1. The Proponent must assess biodiversity impacts in accordance with the current guidelines including the Framework for Biodiversity Assessment (FBA).	Chapter 10, Technical Report 2
	2. The Proponent must assess any impacts on biodiversity values not covered by the FBA as specified in s2.3.	Sections 10.3.2 to 10.3.4
	3. The Proponent must assess impacts on the EECs, threatened species and/or populations as listed in Attachment B and provide the information specified in s9.2 of the FBA.	Section 10.3.2
	4. The Proponent must identify whether the project as a whole, or any component of the project, would be classified as a Key Threatening Process in accordance with the listing in the *Threatened Species Conservation Act 1995* (TSC Act), *Fisheries Management Act 1994* (FM Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).	Section 10.3.2
	5. The Proponent must assess impacts on MNES as outlined in Section 1.2 *(in Table A.1).*	Refer to Table A.3
7. Climate Change Risk	1. The Proponent must assess the risk and vulnerability of the project to climate change in accordance with the current guidelines.	Chapter 23
	2. The Proponent must quantify specific climate change risks with reference to the NSW Government's climate projections at 10km resolution (or lesser resolution if 10km projections are not available) and incorporate specific adaptation actions in the design.	Section 23.2 Appendix J
8. Flooding	1. The Proponent must assess and model the impacts on flood behaviour during construction and operation for a full range of flood events up to the probable maximum flood (taking into account storm intensity due to climate change) including: (a) any detrimental increases in the potential flood affectation of other properties, assets and infrastructure;	Chapter 15, Technical Report 6 Sections 15.3.3 and 15.3.5

Key issue	Requirement	EIS reference
	(b) consistency (or inconsistency) with applicable Council floodplain risk management plans;	Section 15.3.5
	(c) compatibility with the flood hazard of the land;	Section 15.3.5
	(d) compatibility with the hydraulic functions of flow conveyance in flood ways and storage areas of the land;	Section 15.3.5
	(e) downstream velocity and scour potential;	Section 15.3.5
	(f) impacts the development may have upon existing community emergency management arrangements for flooding. These matters must be discussed with the State Emergency Services and Council; and	Section 15.3.5
	(g) any impacts the development may have on the social and economic costs to the community as consequence of flooding.	Section 15.3.5
9. Health and Safety	1. The Proponent must assess the likely risks of the project to public safety, paying particular attention to pedestrian safety, subsidence risks, bushfire risks and the handling and use of dangerous goods.	Chapter 25
10. Heritage	1. The Proponent must identify and assess any direct and/or indirect impacts (including cumulative impacts) to the heritage significance of: (a) Aboriginal places and objects, as defined under the *National Parks and Wildlife Act 1974* and in accordance with the principles and methods of assessment identified in the current guidelines;	Sections 17.1.2, 17.2.2 and 17.3 Technical Report 8
	(b) Aboriginal places of heritage significance, as defined in the *Standard Instrument – Principal Local Environmental Plan*;	Section 7.2.2
	(c) environmental heritage, as defined under the *Heritage Act 1977*; and	Sections 18.2 and 18.3 Technical Report 9
	(d) items listed on the National and World Heritage lists.	Sections 18.2 and 18.3 Technical Report 9
	2. Where impacts to State or locally significant heritage items are identified, the assessment must: (a) include a statement of heritage impact for all heritage items (including significance assessment);	No impacts to listed items are predicted. Heritage impacts are considered in section 18.3
	(b) consider impacts to the item of significance caused by , but not limited to, vibration, demolition, archaeological disturbance, altered historical arrangements and access,	Section 18.3 Technical Report 9

Key issue	Requirement	EIS reference
	visual amenity, landscape and vistas, curtilage, subsidence and architectural noise treatment (as relevant)	
	(c) outline measures to avoid and minimise those impacts in accordance with the current guidelines; and	Section 18.4
	(d) be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria).	Technical Report 9
	3. Where archaeological investigations of Aboriginal objects are proposed these must be conducted by a suitably qualified archaeologist, in accordance with section 1.6 of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010).	Chapter 17, Technical Report 8
	4. Where impacts to Aboriginal objects and/or places are proposed, consultation must be undertaken with Aboriginal people in accordance with the current guidelines.	Section 17.1.1 Technical Report 8
11. Noise and Vibration - Amenity	1. The Proponent must assess construction and operational noise and vibration impacts in accordance with relevant NSW noise and vibration guidelines. The assessment must include consideration of impacts to sensitive receivers including small businesses, and include consideration of sleep disturbance and, as relevant, the characteristics of noise and vibration (for example, low frequency noise).	Chapter 11 Technical Report 5
	2. The Proponent must demonstrate that blast impacts are capable of complying with the current guidelines, if blasting is required.	No blasting required
12. Noise and Vibration - Structural	1. The Proponent must assess construction and operation noise and vibration impacts in accordance with relevant NSW noise and vibration guidelines. The assessment must include consideration of impacts to the structural integrity and heritage significance of items (including Aboriginal places and items of environmental heritage).	Chapter 12 Technical Report 5
	2. The Proponent must demonstrate that blast impacts are capable of complying with the current guidelines, if blasting is required.	No blasting required
13. Protected and Sensitive Lands	1. The Proponent must assess the impacts of the project on environmentally sensitive land and processes (and the impact of processes on the project) including, but not limited to: (a) protected areas (including land and water) managed by OEH and/or DPI Fisheries under the *National Parks and Wildlife Act 1974*;	Section 10.2.4 Technical Report 3 None would be impacted – refer section 10.2.4
	(b) Key Fish Habitat as mapped and defined in accordance with the *Fisheries Management Act 1994* (FM Act);	Sections 10.2.4 and 10.3.3
	(c) waterfront land as defined in the *Water Management Act 2000*;	Sections 15.3 and 16.3

Key issue	Requirement	EIS reference
	(d) land or waters identified as Critical Habitat under the TSC Act, FM Act or EPBC Act; and	None would be impacted – refer section 10.2.4
	(e) biobank sites, private conservation lands and other lands identified as offsets.	None would be impacted – refer section 10.2.4
14. Socio-economic, Land Use Property,	1. The Proponent must assess social and economic impacts in accordance with the current guidelines.	Chapter 21 Technical Report 11
Agriculture and Biosecurity	2. The Proponent must assess agricultural land use impacts in accordance with the current guidelines	Chapter 20
	3. The Proponent must undertake an assessment of biosecurity risks and management measures relating to the potential for spread of pests, diseases or weeds along the length of the project alignment.	Sections 20.3 and 20.4
	4. The Proponent must assess impacts from construction and operation on potentially affected properties, businesses, recreational users and land and water users (for example, recreational and commercial fishers, oyster farmers), including property acquisitions/adjustments, access, amenity and relevant statutory rights.	Potential property impacts - section 20.3. Potential business impacts: Section 21.3. The proposal would not impact on recreational or water uses.
	5. Where the project may impact on significant mineral resources, the proponent must assess the impact of the project on these resources, including: (a) any operating mines, extractive industries or known mineral or petroleum resources; (b) exploration activities in the vicinity of the proposed development; and (c) access for future exploration in the area.	No impacts predicted – refer to section 20.2.4
	6. The Proponent must identify encroachments into adjoining road reserves, and any Crown land affected by the proposal.	Sections 20.2.5 and 20.3
15. Soils	1. The Proponent must assess whether the land is likely to be contaminated and identify if remediation of the land is required, having regard to the ecological and human health risks posed by the contamination in the context of past, existing and future land uses. Where assessment and/or remediation is required, the Proponent must document how the assessment and/or remediation would be undertaken in accordance with current guidelines.	Chapter 14

Key issue	Requirement	EIS reference
	2. The Proponent must assess whether salinity is likely to be an issue and if so, determine the presence, extent and severity of soil salinity within the project area.	Salinity is not expected to be an issue for the proposal site – refer to sections 14.2.1 and 14.3.2
	3. The Proponent must assess the impacts of the project on soil salinity and how it may affect groundwater resources and hydrology.	Section 14.3.2
	4. The Proponent must assess the impacts on soil and land resources (including erosion risk or hazard). Particular attention must be given to soil erosion and sediment transport consistent with the practices and principles in the current guidelines.	Sections 14.3 and 14.4
16. Sustainability	1. The Proponent must assess the sustainability of the project in accordance with the Infrastructure Sustainability Council of Australia (ISCA) *Infrastructure Sustainability Rating Tool* and recommend an appropriate target rating for the project.	Chapter 22
	2. The Proponent must assess the project against the current guidelines including targets and strategies to improve Government efficiency in use of water, energy and transport.	Chapter 22
17. Transport and Traffic	1. The Proponent must assess construction transport and traffic (vehicle, pedestrian, bus services, train operation and cyclists) impacts, including, but not necessarily limited to: (a) a considered approach to route identification and scheduling of transport movements;	Chapter 9 Technical Report 1 Section 8.3 and section 9.3.2
	(b) the number, frequency and size of construction related vehicles (passenger, commercial and heavy vehicles, including spoil management movements and track machines);	Section 8.6.4 Section 9.3.2
	(c) construction worker parking;	Section 9.3.2
	(d) the nature of existing traffic (types and number of movements) on construction access routes (including consideration of peak traffic times and sensitive road users and parking arrangements) and assessment of traffic impacts on these routes including identifying traffic management measures to mitigate any issues;	Sections 9.2, 9.3.2 and 9.4.4
	(e) provisions proposed to ensure safe access and egress to/from the classified road network;	Sections 9.3.2 and 9.4
	(f) the nature of any train paths (types and number of movements) and potential impact to these train paths due to additional track possession requirements; and	Section 2.5 and section 9.3.2

Key issue	Requirement	EIS reference
	(g) the need to close, divert or otherwise reconfigure elements of the road and cycle network associated with construction of the project.	Section 8.3 and section 9.3.2
	2. The Proponent must assess (and model) the operational transport impacts of the project for both road and rail, including: (a) Existing and forecast travel demand and traffic volumes for the project (road and rail);	Chapter 9 Technical Report 1 Section 7.6 and section 9.3.3
	(b) travel time analysis (road and rail);	Section 9.3.3
	(c) performance of key interchanges and intersections by undertaking a level of service analysis at key locations	Section 9.3.3
	(d) assessment of impacts on the operation of bus services and public transport infrastructure;	Section 9.3.3
	(e) wider transport interactions (local and regional roads, cycling, public and freight transport and the broader NSW rail network); and	Section 9.3.3
	(f) identification of traffic and transport measures to mitigate any impacts.	Section 9.4
	3. The proponent must assess the feasibility of level crossings (existing and planned) and take into account: (a) safety assessments;	Section 6.3.4 Sections 9.2.3 and 9.3.3
	(b) consistency with any Interface Agreements and related Safety Management Plans, including draft Interface Agreements and draft Safety Management Plans; and	Technical Report 1
	(c) operation of level crossings with regard to road and rail travel speeds, vehicle types, train lengths, train numbers, road and rail traffic volumes and sight distance.	Section 9.3.3 Technical Report 1
	4. The proponent must assess the likely risks of the project to public safety, paying particular attention to pedestrian safety	Sections 9.3.2 and 9.3.3 Section 25.3
18. Visual Amenity	1. The Proponent must assess the visual impact of the project and any ancillary infrastructure on: (a) views and vistas;	Chapter 19 Technical Report 10 Sections 19.2.2, 19.3.2 and 19.3.3
	(b) streetscapes, key sites and buildings;	Sections 19.2.1, 19.3.2 and 19.3.3
	(c) heritage items including Aboriginal places and environmental heritage; and	Sections 19.3.2 and 19.3.3 Technical Report 8 and 9
	(d) the local community.	Sections 19.2.2, 19.3.2 and 19.3.3

Key issue	Requirement	EIS reference
	2. The Proponent must provide artist impressions and perspective drawings of the project to illustrate how the project has responded to the visual impact through urban design and landscaping.	These would be provided for consultation purposes as an outcome of the detailed design of the proposal – see sections 19.3.3 and 19.4
19. Waste	1. The Proponent must assess predicted waste generated from the project during construction and operation, including: a) classification of the waste in accordance with the current guidelines;	Chapter 24 Sections 24.2 and 24.3
	b) estimates / details of the quantity of each classification of waste to be generated during the construction of the project, including bulk earthworks and spoil balance;	Section 24.2.2
	c) handling of waste including measures to facilitate segregation and prevent cross contamination;	Section 24.3
	d) management of waste including estimated location and volume of stockpiles;	Section 7.4.2 and sections 24.2.2 and 20.3
	e) waste minimisation and reuse;	Sections 24.2 and 20.3
	f) lawful recycling or disposal locations for each type of waste; and	Section 24.2.2
	g) contingencies for the above, including managing unexpected waste volumes.	Section 24.3
	2. The Proponent must assess potential environmental impacts from the excavation, handling, storage on site and transport of the waste particularly with relation to sediment/leachate control, noise and dust.	Section 24.2.2 Chapters 11, 13, 14 and 16
20. Water - Hydrology	1. The Proponent must describe (and map) the existing hydrological regime for any surface and groundwater resource (including reliance by users and for ecological purposes) likely to be impacted by the project, including stream orders, as per the FBA.	Section 15.2 Technical Report 6 Technical Report 3

Key issue	Requirement	EIS reference
	2. The Proponent must assess (and model if appropriate) the impact of the construction and operation of the project and any ancillary facilities (both built elements and discharges) on surface and groundwater hydrology in accordance with the current guidelines, including: (a) natural processes within rivers, wetlands, estuaries, marine waters and floodplains that affect the health of the fluvial, riparian, estuarine or marine system and landscape health (such as modified discharge volumes, durations and velocities), aquatic connectivity and access to habitat for spawning and refuge;	Sections 15.3.2 and 15.3.4 Technical Report 6 Sections 15.3.2 and 15.3.4
	(b) direct or indirect increases in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses;	Sections 15.3.2 and 15.3.4
	(c) minimising the effects of proposed stormwater and wastewater management during construction and operation on natural hydrological attributes (such as volumes, flow rates, management methods and re-use options) and on the conveyance capacity of existing stormwater systems where discharges are proposed through such systems; and	Sections 15.3.2 and 15.3.4 No discharges are proposed through existing stormwater systems
	(d) water take (direct or passive) from all surface and groundwater	Sections 15.3.2 and 15.3.4
	3. The Proponent must identify any requirements for baseline monitoring of hydrological attributes.	Section 16.4 Technical Report 6
21. Water - Quality	1. The Proponent must: (a) state the ambient NSW Water Quality Objectives (NSW WQO) and environmental values for the receiving waters relevant to the project, including the indicators and associated trigger values or criteria for the identified environmental values;	Section 16.2.3 Technical Report 7 – Table 2-2
	(b) identify and estimate the quality and quantity of all pollutants that may be introduced into the water cycle by source and discharge point and describe the nature and degree of impact that any discharge(s) may have on the receiving environment, including consideration of all pollutants that pose a risk of non-trivial harm to human health and the environment	Section 16.3.2
	(c) identify the rainfall event that the water quality protection measures will be designed to cope with	Section 16.4.1
	(d) assess the significance of any identified impacts including consideration of the relevant ambient water quality outcomes	Section 16.3 Technical Report 7
	(e) demonstrate how construction and operation of the project will, to the extent that the project can influence, ensure that:	Sections 16.3.1, 16.3.2 and 16.4

Key issue	Requirement	EIS reference
	▸ where the NSW WQOs for receiving waters are currently being met they will continue to be protected; and ▸ where the NSW WQOs are not currently being met, activities will work toward their achievement over time	Technical Report 6 – Table 2-2
	(f) justify, if required, why the WQOs cannot be maintained or achieved over time	Sections 16.2.3 and 16.3.2 Technical Report 7
	(g) demonstrate that all practical measures to avoid or minimise water pollution and protect human health and the environment from harm are investigated and implemented	Sections 16.3.1 and 16.4 Technical Report 7
	(h) identify sensitive receiving environments (which may include estuarine and marine waters downstream) and develop a strategy to avoid or minimise impacts on these environments; and	Sections 16.3.1 and 16.4 Technical reports 6 and 7
	(i) identify proposed monitoring locations, monitoring frequency and indicators of surface water quality.	Technical Report 7

Table A.3 Summary of EPBC Act assessment requirements (from Attachment A to the SEARs)

Requirement		EIS reference
General requirements	4. The title of the action, background to the development and current status.	Submission certificate and chapter 5
– project description	5. The precise location and description of all works to be undertaken that may have impacts on matters of national environmental significance (MNES).	The location of the proposal site is described in chapter 2. The proposal is described in chapters 7 (proposal features) and 8 (construction). See also Figure 10.1.
	6. How the action relates to other actions that have been, or are being taken, in the region affected by the action.	Chapter 5
	7. How the works are to be undertaken and design parameters for those aspects that may have relevant impacts on MNES.	Chapter 8 (construction description) and section 10.3.1
Impacts	8. The EIS must include an assessment of the relevant impacts of the action on threatened species and communities; including: ▸ a description and detailed assessment of the nature and extent of the likely impacts ▸ a statement whether any relevant impacts are likely to be known, unpredictable or irreversible ▸ analysis of the significance of the relevant impacts ▸ any technical data and other information used or needed to make a detailed assessment of the relevant impacts ▸ a comparative description of the impacts of alternatives, if any, on the threatened species and communities.	Chapter 10 Impacts on EPBC Act matters are considered in Technical Report 4, and summarised in section 10.3.2

Requirement		EIS reference
Avoidance, mitigation and offsetting	9. For each of the relevant matters protected that are likely to be impacted by the development, the EIS must provide information on proposed avoidance and mitigation measures to detail with the relevant impacts of the action, including: ▸ a description and an assessment of the expected or predicted effectiveness of the mitigation measures ▸ any statutory policy basis for the mitigation measures ▸ the cost of the mitigation measures ▸ a description of the outcomes that the avoidance and mitigation measures will achieve ▸ an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action ▸ a description of the offsets proposed to address the residual adverse significant impacts, and how these offsets will be established.	Section 10.4 Technical Report 4
	10. Where a significant residual adverse impact to a relevant protected matter is considered likely, the EIS must provide information on the proposed offset strategy, including discussion of the conservation benefit associated with the proposed offset strategy.	Section 10.4.1 Appendix L
Key issues - biodiversity	11. The EIS must address the following issues in relation to biodiversity, including separate: ▸ identification of each EPBC Act listed threatened species and community likely to be impacted by the development ▸ any likely impacts must be described for each matter and, if there are impacts, how these impacts are avoided, mitigated and, if required, offset.	Technical Report 4, and summarised in chapter 10

Requirement		EIS reference
	12 For each of the relevant EPBC Act listed threatened species and communities likely to be impacted by the development, the EIS must provide a separate: ▸ description of the habitat and habits with consideration of, and reference to, any relevant Commonwealth guidelines and policy statements ▸ details of the scope, timing and methodology of studies or surveys used, and how they are consistent with published Australian Government guidelines and policy statements ▸ description of the impacts of the action having regard to the full national extent of the species or community's range.	Technical Report 4, and summarised in Sections 10.3.3 and 10.3.4
	13. For each of the relevant EPBC Act listed threatened species and communities likely to be impacted by the development, the EIS must provide a separate: ▸ identification of significant residual adverse impacts likely to occur after the proposed activities to avoid and mitigate all impacts are taken into account ▸ details of how the NSW Framework for Biodiversity Assessment (FBA) has been applied in accordance with the objects of the EPBC Act to offset significant residual adverse impacts ▸ details of the offset package to compensate for significant residual impacts, including details of the credit profiles required to offset the development	Technical Report 4, and summarised in Sections 10.3 and 10.4 Appendix L
	14. Any significant residual impacts not addressed by the FBA may need to be addressed in accordance with the EPBC Act Environmental Offset Policy.	Section 10.4.1
	15. For each threatened species and community likely to be impacted by the development, the EIS must provide reference to, and consideration of, relevant approved conservation advice or recovery plan for the species or community.	Technical Report 4
Environmental record of person proposing to take the action	16. Information in relation to the environmental record of a person proposed to take action must include details as prescribed in Schedule 4 Clause 6 of the EPBC Regulations 2000.	Technical Report 4

Table A.4 Agency requirements

Agency	Issues raised	Where addressed in the EIS
Department of Planning and Environment	▸ Consider the provisions of the relevant LEPs and their associated mapping ▸ Consider the buffer around the Parkes for the National Logistics Hub and the Radio Telescope ▸ Consider the endorsed land use strategies for each LGA	Chapters 2, 5 and 20
Department of Primary Industries	▸ Consider the requirements of the *Water Act 1912*, *Water Management Act 2000* and associated regulations and instruments ▸ Identification of an adequate and secure water supply for the life of the project ▸ Assessment of impacts on surface and ground water sources ▸ Description of drainage lines and watercourses within the alignment ▸ Proposed surface and groundwater monitoring activities ▸ Cumulative impacts on water resources and mitigation measures ▸ Assessment of impediment to surface or groundwater flow, and potential flood impacts ▸ A statement of where each element of the SEARs is addressed in the EIS ▸ Assess agricultural land use impacts in accordance with the current guidelines ▸ Assess impacts from construction and operation on potentially affected properties, businesses, recreational users and land and water users ▸ Address impacts on the aquatic ecology, waterway crossings and riparian buffer zones ▸ Identify any Crown land affected by the proposal ▸ Assessment of biosecurity risks and associated mitigation measures	Chapters 10, 15, 16 and 20

Agency	Issues raised	Where addressed in the EIS
Office of Environment and Heritage	▸ Biodiversity impacts to be assessed in accordance with the Framework for Biodiversity Assessment ▸ Impacts on the species and ecological communities specified by OEH require further consideration under the Framework ▸ Identify and describe the existing Aboriginal and cultural heritage values, consult when required and assess impacts ▸ Provision of a heritage assessment ▸ Outlines mitigation measures for heritage impacts ▸ Heritage assessment is undertaken by a qualified heritage consultant ▸ Provision of a statement of heritage impact for all heritage items ▸ Consider all impacts in an extensive manner ▸ Appropriate assessment methodology when potential archaeological impacts are identified ▸ Map features relevant to water and soils ▸ Background conditions for any water resource likely to be affected ▸ Assess impacts on water quality and ▸ Assess impacts on hydrology ▸ Map features relevant to flooding as described in the Floodplain Development Manual 2005 ▸ Description of flood assessment and modelling ▸ Model effect of the proposal on the flood behaviour ▸ Assess impacts of the proposal on flood behaviour	Chapters 10, 15 - 18
Transport for NSW	▸ Assessment of construction transport and traffic on bus services and train operation ▸ Assessment if traffic impacts on construction routes and identify mitigation measures ▸ Impact on existing train paths due to additional track possession requirements ▸ Identify measures to minimise delays and impacts ▸ Assess and model operation impacts on road and rail, for existing and forecasted ▸ Impacts on operation of bus services and public transport infrastructure ▸ Assessment of existing and proposed level crossings ▸ Wider transport interactions including walking and the broader NSW network	Chapter 9

Agency	Issues raised	Where addressed in the EIS
	▸ Identify mitigation measures ▸ Details of property acquisition	
Roads and Maritime	▸ Traffic report to be prepared in accordance with the *RTA's Guide to Traffic Generating Developments 2002* ▸ Details of intermodal hubs required for operation ▸ Access requirements ▸ Description of oversize vehicles and the materials to be transported ▸ Traffic impacts and mitigation measures during construction and operation ▸ Vibration assessment must consider impact on nearby road infrastructure ▸ Local climate that may affect safety of road vehicles during construction and operation ▸ A TMP is to be developed with the associated local councils and RMS prior to commencement of construction ▸ Detail rail encroachments on existing road reserves	Chapters 9 and 12
EPA	▸ Requirement for a contaminated land management plan ▸ Requirement for a noise and vibration plan ▸ Provision of specific requirements for assessment of water quality impacts ▸ Requirement for an erosion and sediment control plan. ▸ Provision of specific requirements for assessment of air quality impacts ▸ Requirement for a construction waste management plan. ▸ SEARs should refer to the NSW Waste Avoidance and Resource Recovery Strategy 2014-21 and *Waste Classification Guidelines – Part 1: Classification of Waste*	Chapter 27
Narromine Shire Council	▸ Requirement for flood modelling	Chapter 15
Parkes Shire Council	▸ Address the Parkes National Logistics Hub	Chapter 20

Appendix B – Environmental risk assessment report

Australian Rail Track Corporation

Inland Rail – Parkes to Narromine
Environmental Risk Assessment

June 2017

Table of contents

Table index

1. Overview

As part of the process of undertaking a detailed environmental impact statement (EIS) for the Parkes to Narromine section of Inland Rail, an environmental risk assessment has been undertaken. The purpose of undertaking the risk assessment process is to identify key issues to be incorporated into the impact assessment.

The environmental risk assessment has been carried out in the form of a preliminary, desktop level risk assessment, to broadly assess the potential environmental impacts and risks associated with construction and operation of the proposal. The environmental risk assessment identifies and ranks potential impacts with the aim of refining and prioritising the scope of the environmental assessment including the specialist studies which support this environmental impact statement.

The environmental impact assessment addresses the issues that have been confirmed as key issues through this environmental risk assessment process. Key issues are those issues that have high or very high impacts (actual or perceived) and require comprehensive assessment to determine the severity of potential effects and to identify appropriate management and mitigation measures.

2. Environmental risk assessment process

This environmental risk assessment process has included:

- impact screening which has resulted in the progressive identification and refinement of potential key issues
- an environmental risk analysis to confirm the significance of the environmental impacts/risks associated with the key issues and to identify any other potential environmental risks not incorporated into the Secretary's Environmental Assessment Requirements (SEARs) for the proposal.

These steps are discussed further in sections 2.1 and 2.2.

2.1 Impact screening

An initial environmental risk assessment was undertaken as part of the State Significant Infrastructure Application Supporting Document (GHD 2016) to help identify the key issues and inform the state significant infrastructure (SSI) application. Key issues were identified based on the findings of preliminary investigations undertaken for the proposal, and experience with other similar projects. An environmental risk workshop was held with key members of the project team, which assisted in the identification and prioritisation of issues. This initial risk assessment identified the following key issues associated with the proposal:

- air quality
- biodiversity
- hydrology and flooding
- heritage (Aboriginal and non-Aboriginal)
- noise and vibration
- land use, socio-economic and visual issues
- geology, soils and contamination
- traffic and transport
- water quality, watercourses and groundwater.

A number of other issues were identified as part of the initial environmental risk assessment, but were not categorised as key issues. These included:

- waste and resources
- hazard and risks
- sustainability
- utilities and services
- greenhouse gas and energy
- climate change
- cumulative impacts.

The key issues identified in the SEARs were generally consistent with the issues identified in the SSI application report but added a number of other potentially significant issues. The SEARs identified the following key issues to be assessed as part of the EIS for the proposal:

- air quality
- biodiversity
- climate change risk
- flooding
- health and safety
- heritage (Aboriginal and non-Aboriginal)
- noise and vibration (amenity and structural)
- protected and sensitive lands
- socio-economic, land use property, agriculture and biosecurity
- soils (including acid sulphate soils and site contamination)
- sustainability
- transport and traffic
- visual amenity
- waste
- water (hydrology and quality).

The proposal either would result in impacts to these key issues, or would result in impacts from these key issues, depending on the issue. An impact can be considered as any change to the environment either wholly or partially resulting from activities associated with the proposal. Impacts may either be beneficial to the community and the environment, or may give rise to changes that are considered less than desirable. The events or activities that would lead to impacts that do not provide a benefit would require some level of monitoring, mitigation and/or management. The extent of monitoring or management required would depend on the level of risk that may be associated with the impact.

2.2 Risk analysis framework

The environmental risk analysis was undertaken in general accordance with the principles of the Australian/New Zealand Standard *AS/NZS ISO 31000:2009 Risk management – Principles and guidelines* (Australian/New Zealand Standard 2004). The risk analysis involved assessing the risk level of each identified potential impact by identifying the consequences of the impact and the likelihood that the impact can occur.

Definitions of the ‘consequence’ and ‘likelihood’ of the impacts are discussed in more detail in the following sections.

2.2.1 Evaluating consequence

Consequence is defined as the implication of an impact. The consequences of an impact require a degree of subjective assessment as the likely consequences of an impact may consist of several elements.

The elements that have been considered in this risk assessment are described in Table 2-1.

Table 2-1 Consequences of occurence

Consequence level	Description
Extreme	Long-term (greater than 12 months) and irreversible large-scale environmental, social or economic impacts May be local or wider spatial extent (including up to state-wide) One or more fatalities Resulting in major prosecution under relevant environmental legislation Extended substantial disruption and impacts to stakeholders or customers
Major	Medium to long-term (6 to 12 months) and potentially irreversible May be local or wider spatial extent (no greater than nearby local government areas) Two to ten serious injuries Extensive remediation required Resulting in a fine or equivalent penalty under relevant environmental legislation Severe disruptions or long-term impacts to stakeholders or customers
Moderate	Short to medium-term (1 to 6 months), reversible and/or well-contained impacts May be local spatial extent (the site and nearby surrounds) One serious injury Minor remedial actions Moderate disruptions or impacts to stakeholders or customers
Minor	Short-term (less than 1 month), and reversible May be localised spatial extent (within site boundaries) One or more minor injuries Within environmental regulatory limits Minor or short-term disruptions or impacts to stakeholders or customers
Not significant	Very short-term and readily reversible (not significant) No appreciable changes to environment No injuries Negligible impacts to environment, stakeholders or customers

2.2.2 Evaluating likelihood

The likelihood of an impact occurring can be described in terms of probability. Overlaying this is the need to recognise the uncertainty that may be associated with the possible impacts, particularly during the initial risk assessment process. Where there is scientific uncertainty a cautious approach will identify a higher level of risk (worst-case scenario).

Each identifiable impact can be assigned likelihood between rare and almost certain (refer to Table 2.2). In simplifying the possible impacts for the purpose of a risk assessment, an element of subjectivity is introduced. The purpose of the risk assessment is not necessarily to agree on the probability of any particular impact, but to facilitate an understanding of the relative probability of different impacts.

Table 2.2 Likelihood and probability of occurrence

Likelihood	Description	Probability
Almost Certain	Expected to occur	>85%
Likely	Probably will occur	50-85%
Possible	May occur	21-49%
Unlikely	Not expected to occur in most circumstances	1-20%
Rare	May occur in exceptional circumstances	<1%

2.2.3 Environmental risk assessment matrix

Based on the assessment of likelihood and consequence any foreseeable impact can be assigned a risk level. This determines the significance of the environmental risk associated with a given impact. Table 2.3 is to be read as a matrix, with increasing consequence left to right and decreasing likelihood top to bottom.

Table 2.3 Environmental risk assessment matrix

	Consequence				
Likelihood	**Not significant**	**Minor**	**Moderate**	**Major**	**Extreme**
Almost Certain	Medium	Medium	High	Very high	Very high
Likely	Low	Medium	High	High	Very high
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Medium	Medium	High
Rare	Low	Low	Low	Medium	High

Very high impacts were considered the highest priority and were the focus of the concept design and environmental assessment. In general, the following was applied when scoping requirements for the environmental assessment.

- **Very high impacts** – Assessment and planning is necessary to avoid these impacts to the greatest extent possible.
- **High impacts** – Detailed specialist investigation and assessment is necessary to enable identification of appropriate management and mitigation options.
- **Medium impacts** –Further investigation as part of the environmental assessment is desirable, to address some uncertainties. Impacts could be mitigated through the application of relatively standard environmental mitigation measures.
- **Low impacts** – May not require specialist investigations, particularly where identifiable management/mitigation guidelines exist then potentially only broad or desktop investigation is necessary. Impacts could be mitigated through other working controls (such as detailed design requirements, normal working practice, safety and quality controls).

3. Environmental risk assessment

Using the risk framework discussed in section 2.2 an environmental risk assessment was undertaken for the construction and operation of the proposal and is presented in Table 3.1. The environmental risk assessment included consideration of each of the key issues and their associated impacts. The assessment was based on evidence, previous experience and professional judgement of potential risks, and their consequence, likelihood and significance (without mitigation).

The preliminary risk assessment for the proposal involved:

- identifying potential key issues
- identifying potential key impacts/risks associated with each of these key issues
- evaluating the likelihood of occurrence and consequence in accordance with the definitions provided in section 2.2
- assigning a risk ranking/priority using Table 2.3
- deciding on a response – it was determined that generally a specialist study would be undertaken for any key issues which included a risk ranking of very high or high.

Table 3.1 Environmental risk assessment

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Transport and traffic – Construction	Construction traffic impacts, including temporary delays to local and regional traffic	Almost Certain	Moderate	High	The potential for significant impacts would be reduced through the effective implementation of management measures set out in the CEMP. However, based on the risk level for some traffic and transport impacts being assessed as high, traffic and transport risks have been assessed through preparation of a specialist study, which is provided in technical report 1. The results of the transport and traffic specialist study are summarised in chapter 9.	Likely	Minor	Medium
	Congestion in surrounding road networks due to diversion of road users during construction	Unlikely	Minor	Low		Unlikely	Minor	Low
	Reduced pedestrian and road user access	Unlikely	Minor	Low		Unlikely	Minor	Low
	Loss of parking spaces and loading zones in towns near construction areas	Almost Certain	Minor	Medium	-	Likely	Minor	Medium
	Impacts to emergency services through delays in access due to works	Unlikely	Major	Medium	-	Unlikely	Major	Medium
	Impacts on access to private properties	Likely	Minor	Medium	This would only impact a small number of properties.	Likely	Minor	Medium
	Impacts to rural roads unsuitable for construction traffic	Possible	Moderate	Medium	-	Possible	Moderate	Medium

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Transport and traffic - Operation	Increase in travel times due to increase in level crossing waiting times associated with increasing length and frequency of trains	Likely	Moderate	High	-	Likely	Moderate	High
	Reduction in road congestion and traffic due to reduction in heavy vehicles on road transporting freight				Community and environmental benefit.			
Biodiversity - Construction	Clearing of native vegetation resulting in loss of fauna habitat, habitat fragmentation and loss of connectivity	Almost Certain	Moderate	High	The proposal route and construction width has been designed to minimise the amount of clearing required, with the majority of the proposal to be constructed within previously disturbed areas. However, some limited clearing will still be required. The potential significance of this impact needs to be assessed in the context of the amount and nature of the vegetation that would need to be cleared, and the resultant potential for impacts to threatened fauna and flora. The potential for impacts to threatened flora and fauna has been assessed through preparation of a biodiversity specialist study, which is provided in technical report 2 The results of the biodiversity specialist study are summarised in chapter 10.	Almost Certain	Moderate	High
	Direct impacts on threatened species and endangered populations and communities (terrestrial) from clearing	Likely	Moderate	High		Likely	Moderate	High

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
	Direct impacts on threatened species and endangered populations and communities (aquatic) from clearing	Possible	Minor	Medium	Impacts reduced through the implementation of a CEMP	Unlikely	Minor	Low
	Increased potential for pest plants and animals during construction from movement of vehicles, machinery and materials in and out of the site, particularly in greenfield sections such as the Parkes northwest link	Possible	Moderate	Medium	Impacts reduced through the implementation of a CEMP	Unlikely	Minor	Low
	Impacts to groundwater dependant ecosystems as a result of groundwater drawdown	Rare	Moderate	Low	Impacts reduced through the implementation of a CEMP	Rare	Minor	Low
	Indirect impacts due to increased dust, sedimentation and erosion, noise, light	Likely	Minor	Medium	Impacts reduced through the implementation of a CEMP	Possible	Minor	Medium
	Disturbance to aquatic habitats and reduced water quality as a result of fugitive sediments and altered hydrology	Almost Certain	Minor	Medium	The proposal would be specifically designed and operated to minimise the potential impacts to aquatic ecology within the proposal area. As a result, it is considered unlikely that the proposal would result in significant impacts on the ecology of watercourses in the proposal area. The design and construction of the proposal would incorporate the controls	Possible	Minor	Medium
	Alterations to surface water flow regimes and interruptions to fish passage	Unlikely	Moderate	Medium		Rare	Minor	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
					listed in chapter 26 further reducing the potential significance of the impacts. The potential for impacts to aquatic ecology has been assessed through preparation of a biodiversity specialist study, which is provided as technical report 2 The results of the biodiversity specialist study are summarised in chapter 10.			
	Native fauna mortality from vehicle strikes.	Almost Certain	Minor	Medium	-	Almost Certain	Minor	Medium
	Domesticated animal mortality from vehicle strikes.	Possible	Moderate	Medium	-	Unlikely	Moderate	Medium
Biodiversity - Operation	Native fauna mortality from train strikes.	Possible	Minor	Low	See above cells regarding assessment of biodiversity impacts.	Possible	Minor	Low
	Domesticated animal mortality from train strikes.	Unlikely	Minor	Low	-	Unlikely	Minor	Low
	Native fauna mortality from maintenance vehicle strikes.	Unlikely	Minor	Low	-	Unlikely	Minor	Low
	Domesticated animal mortality from maintenance vehicle strikes.	Rare	Minor	Low	-	Rare	Minor	Low
	Impacts on fauna from noise and light during operation	Unlikely	Minor	Low	-	Unlikely	Minor	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
	Increased potential for pest plants and animals during maintenance from movement of vehicles, machinery and materials in and out of the rail corridor	Possible	Moderate	Medium	-	Possible	Moderate	Medium
Noise and vibration (amenity) - Construction	Noise impacts on local residents and sensitive receivers from construction activities including out of hours works	Likely	Moderate	High	Construction and operation activities associated with the proposal would increase local noise levels. Any increases related to construction would be temporary. In some cases, the predicted noise levels during proposal operation would be likely to exceed the applicable noise criteria for residential receivers based on the existing land use. The potential significance of these impacts needs to be assessed in the context of the noise levels that construction and operation of the proposal will generate and the presence of sensitive receivers in proximity to the proposal. The potential for amenity and structural impacts from noise during construction and operation of the proposal has been assessed through preparation of a noise specialist study, which is provided in technical report 5. The results of the noise	Likely	Moderate	High
	Noise impacts on local residents and sensitive receivers from construction traffic	Likely	Minor	Medium		Possible	Minor	Medium
Noise and vibration (amenity) - Operation	Noise impacts on local residents and sensitive receivers from the operation of trains	Likely	Major	High		Possible	Moderate	Medium

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
					specialist study are summarised in chapters 11 and 12.			
Noise and vibration (structural) - Construction	Damage to structures including heritage structures from vibration caused by construction activities	Possible	Moderate	Medium	Refer to heritage			
Noise and vibration (structural) - Operation	Damage to structures including heritage structures from vibration caused by operation of trains	Unlikely	Minor	Low	Refer to heritage			
Air quality – Construction	Generation of dust during construction (from exposed soil/stockpiles, blasting , excavation and vehicle movements)	Almost Certain	Minor	Medium	The potential for air quality impacts during construction would be significantly reduced through the effective implementation of management measures set out in the construction environmental management plan (CEMP). Although the risk level for potential air quality impacts did not exceed medium an air quality impact assessment has been conducted for the proposal in accordance with the SEARs and is incorporated into chapter 13.	Possible	Not significant	Low
	Emissions from vehicles or plant during construction	Likely	Minor	Medium		Likely	Not significant	Low
	Odours/emissions from disturbance of contaminated soils	Unlikely	Minor	Low	-	Rare	Minor	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Air quality - Operation	Generation of dust from transport of uncovered loads	Unlikely	Minor	Low	-	Rare	Minor	Low
	Impacts on local air quality during operation from maintenance vehicle and train emissions	Unlikely	Not significant	Low	-	Unlikely	Not significant	Low
Soils (including site contamination and saline soils) - Construction	Impacts associated with the disturbance of contaminated or soil salinity/saline soils during construction.	Possible	Minor	Medium	Previous contamination assessments (GHD 2014) reported that all samples collected along the proposal route were below the health investigation and screening levels for the relevant land use. Targeted geotechnical investigations would be undertaken as part of the design development process. All construction works have the potential to generate erosion through the exposure of soils and excavation. However, the potential for impacts to soils and landforms would be significantly reduced through the effective implementation of management measures set out in the CEMP. The design and construction of the proposal would incorporate the mitigation measures listed in chapter 26, further reducing the potential significance of these impacts. Although the risk level for potential soil impacts generally did not exceed medium,	Unlikely	Minor	Low
	Disturbance of soils and subsequent loss or degradation of soil quality during earthworks at construction compound sites	Possible	Not significant	Low		Unlikely	Not significant	Low
	Disturbance of landforms during earthworks reducing the stability of landforms on the northwest connection near Parkes	Possible	Not significant	Low		Unlikely	Not significant	Low
	Increased erosion and sedimentation due to excavation activities and vehicle movement	Likely	Moderate	High		Unlikely	Minor	Medium
	Contamination of soils/groundwater due to spills and leaks during construction	Possible	Minor	Medium		Unlikely	Minor	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
					an assessment of soil impacts has been conducted for the proposal in accordance with the SEARs and is incorporated into chapter 14.			
Soils (including site contamination and saline soils) - Operation	Changes to surface, including vegetation removal and creation of embankments, increasing potential for erosion in proposal area and sedimentation down-gradient	Possible	Moderate	Medium	-	Possible	Minor	Medium
Flooding - Construction	Impact of flooding on unprotected areas during construction resulting in wash-outs or erosion	Possible	Moderate	Medium	The proposal would be specifically designed and operated to minimise the potential impacts of flooding on the proposal infrastructure, or to minimise impacts the proposal would have on flooding behaviour near the proposal. The potential for impacts to and from flooding has been assessed through preparation of a hydrology and flooding specialist study, which is provided in technical report 6. The results of the hydrology and flooding specialist study are summarised in chapter 15.	Possible	Minor	Medium
	Temporary impact to the behaviour of local surface water systems during construction	Possible	Minor	Medium		Possible	Not significant	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Flooding - Operation	Presence of or change to structures associated with the proposal could impact upstream and downstream local flood behaviour	Likely	Moderate	High	-	Possible	Moderate	Medium
	Change to structures associated with the proposal and track height could impact upstream and downstream regional flood behaviour	Likely	Moderate	High	-	Possible	Minor	Medium
Water (hydrology) - Construction	Changes to flow patterns and altered hydrology due to construction in watercourses	Possible	Moderate	Medium	All construction works have the potential to generate erosion through the exposure of soils and excavation. Erosion of soil has the potential to impact on water quality and hydrology. Construction works across watercourses also have the potential to directly impact on these watercourses. However, the potential for these impacts would be significantly reduced through the construction planning process and the implementation of management measures set out in the CEMP. The design and construction of the proposal would incorporate the project controls listed in chapter 26, further reducing the potential significance of these impacts. The potential for impacts to water	Unlikely	Minor	Low
	Blockages of flow paths affecting low flows through construction within creek lines and through erosion and sedimentation control structures	Possible	Moderate	Medium		Possible	Minor	Medium
	Sedimentation and changes to geomorphology (aggradation in bed channels) in watercourses	Possible	Major	High		Unlikely	Minor	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
					hydrology and quality has been assessed through preparation of a hydrology and flooding specialist study, which is provided in technical report 5. The results of the hydrology and flooding specialist study are summarised in chapter 15.			
Water (hydrology) - Operation	Impacts on upstream and downstream drainage due to the introduction of built structures such as embankments, culverts and bridges	Possible	Major	High	-	Possible	Moderate	Medium
Water (water quality) - Construction	Reduced water quality (increased TSS and turbidity) due to earthworks and erosion and sedimentation near watercourses	Possible	Major	High	-	Possible	Minor	Medium
	Impacts on water quality from contamination from spills and leaks during construction	Unlikely	Major	Medium	-	Unlikely	Minor	Low
	Impacts on groundwater quality and quantity during drawdown/extraction	Possible	Major	High	-	Unlikely	Moderate	Medium
	Potential for pollution of watercourses due to operation	Rare	Minor	Low	-	Rare	Minor	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Water (water quality) – Operation	(freight materials, contaminants from train operation)							
	Modification to existing drainage infrastructure resulting in water quality impacts	Likely	Moderate	High	-	Possible	Minor	Medium
	Impacts on water quality from contamination from spills and leaks during operation	Unlikely	Major	Medium	-	Unlikely	Minor	Low
	Impact to surface water quality and receiving environments due to increased runoff from increase in impervious surfaces	Likely	Moderate	High	-	Rare	Not significant	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Aboriginal heritage – Construction	Disturbance of known or unidentified items or places of Aboriginal heritage significance	Possible	Major	High	The proposal route has been designed to minimise the amount of ground disturbance required, with the majority of the rail line using existing infrastructure. However, some disturbance will still be required. The potential significance of this risk needs to be assessed in the context of the amount of ground disturbance required and the presence of items or places of heritage significance in these areas. The potential for impacts to Aboriginal heritage has been assessed through preparation of an Aboriginal heritage specialist study, which is provided in technical report 8. The results of the Aboriginal heritage specialist study are summarised in chapter 17.	Unlikely	Major	Medium
Non-Aboriginal – Construction	Design that detracts from the heritage significance of a nearby items	Unlikely	Moderate	Medium	The proposal route has been designed to minimise the amount of ground disturbance required, with the majority of the rail line using existing infrastructure. However, some disturbance will still be required. In addition, construction and operation activities have the potential to impact on heritage items in the proposal area due to demolition, altered historical arrangements and access, visual amenity, landscape and vistas, curtilage, subsidence and	Unlikely	Minor	Low
	Impacts on listed heritage items or items with heritage values due to demolition, altered historical arrangements and access, visual amenity, landscape and vistas, curtilage, subsidence and architectural noise treatment	Possible	Moderate	Medium		Unlikely	Minor	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
	Damage to heritage items from vibration during construction or operation	Possible	Major	High	architectural noise treatment. The potential significance of these risks needs to be assessed in the context of the amount of disturbance or potentially damaging activities required and the presence of items or places of heritage significance in these areas. The potential for impacts to non-Aboriginal heritage has been assessed through preparation of a non-Aboriginal heritage specialist study, which is provided in technical report 9. The results of the non-Aboriginal heritage specialist study are summarised in chapter 18.	Unlikely	Moderate	Medium
	Disturbance of known or unidentified items or places of non-Aboriginal heritage significance	Possible	Major	High		Possible	Moderate	Medium
Non-Aboriginal – Operation	Change to the values of a heritage conservation area	Unlikely	Moderate	Medium	-	Rare	Moderate	Low
Visual amenity - Construction	Impacts to nearby residents and business owners due to the presence of construction compounds and activities	Likely	Minor	Low	Construction of the proposal has the potential to result in visual impacts along the construction route, as the construction works would be visible to some residents, businesses, road users and visitors. While some of these impacts have a risk level of high these impacts (construction related disturbance) would be short-term and would be reduced through the effective implementation of management measures set out in the CEMP. The proposal would also result in the introduction of new structures in the	Possible	Minor	Medium

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
					landscape. While visual amenity impacts during construction would be short-term and reduced through implementation of management measures a separate visual amenity specialist study has been prepared and included as technical report 10 and summarised in chapter 19.			
	Light impacts from out-of-hours work during construction	Possible	Minor	Medium	-	Unlikely	Minor	Low
	Adverse impacts on landscape character during construction, particularly in greenfield areas	Possible	Moderate	Medium	Parkes north west connection may result in landscape impacts.	Possible	Minor	Medium
Visual amenity - Operation	Impacts on visual amenity due to the introduction of built elements, including noise walls and embankments, and the removal of vegetation in a rural environment	Likely	Moderate	High	This may only occur in some sections of the proposal, it will not occur along the full length.	Possible	Moderate	Medium
	Visual impact of operational lighting	Unlikely	Minor	Low	-	Unlikely	Minor	Low
Protected and sensitive lands – Construction / operation	Direct and indirect impacts on protected areas managed by OEH and/or DPI Fisheries under the National Parks and Wildlife Act 1974	Unlikely	Minor	Low	The proposal route and construction width has been designed to minimise the extent of potential impacts to protected and sensitive lands, with the majority of the proposal to be constructed within	Rare	Not significant	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
	Direct and indirect impacts on Key Fish Habitat as mapped and defined in accordance with the Fisheries Management Act 1994 (FM Act)	Unlikely	Minor	Low	previously disturbed areas. Assessment of the impacts to protected and sensitive land would be undertaken as part of the preparation of the biodiversity specialist study and the results summarised in a chapter 10, which would be prepared in accordance with the SEARs.	Rare	Not significant	Low
	Direct and indirect impacts on waterfront land as defined in the Water Management Act 2000	Possible	Moderate	Medium		Unlikely	Minor	Low
	Direct and indirect impacts on land or waters identified as Critical Habitat under the Threatened Species Conservation Act 1995, FM Act or EPBC Act.	Rare	Not significant	Low	-	Rare	Not significant	Low
	Direct and indirect impacts on biobank sites, private conservation lands and other lands identified as offsets of relevance	Rare	Not significant	Low	-	Rare	Not significant	Low
Socio-economic, land use property – Construction	Stimulatory impact of construction industry in each region	-	-		Benefit to local businesses	-	-	-
	Positive impacts due to job creation	-	-		Benefit to community	-	-	-

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
	Training and employment opportunities of local workforce	-	-		Benefit to community	-	-	-
	Increased trade for food and accommodation during construction	-	-		Benefit to local businesses	-	-	-
	Replacement of overhead power lines, establishment of compound sites and relocation of utilities and required access to properties	Likely	Minor	Medium	Consultation in line with property access agreements with landowners will minimise risk.	Likely	Minor	Medium
	Establishment of compound sites within private property	Likely	Minor	Medium	Consultation in line with property access agreements with landowners will minimise risk.	Likely	Minor	Medium
	Impacts on land use as a result of property acquisition	Possible	Minor	Medium	A small number of properties will be directly impacted.	Possible	Minor	Medium
	Increased demand for accommodation driving up prices for local residents and potentially causing a shortage of emergency accommodation	Possible	Moderate	Medium	Increase in demand will be short term and likely to be less than 6 months. ARTC commits to removing workforce from a local area in the event of the requirement for emergency accommodation.	Possible	Minor	Medium
Socio-economic, land use property – Operation	Positive impacts due to job creation	-	-		Benefit to community	-	-	-

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
	Positive impacts due to enhanced efficiencies and capacity for transporting goods	-	-		Economic benefit	-	-	-
	Development stimulus during operation	-	-		Economic benefit	-	-	-
	Positive impacts resulting from reduction in heavy vehicles on road	-	-		Community and environmental benefit	-	-	-
	Impacts to local amenity due to increased frequency of trains	Likely	Moderate	High	Mitigation measures would be adopted for aspects impacting local amenity such as noise and air quality.	Possible	Minor	Medium
	Severance of properties resulting in smaller lot sizes that may impact on use.	Likely	Minor	Medium	This is only relevant to the Parkes north west connection.	Likely	Minor	Medium
Sustainability – Construction/ operation	Increased electricity and fuel use during construction and operation	Almost Certain	Minor	Medium	The proposal would have some positive impacts on sustainability through the reduction in road congestion and use of heavy vehicles to transport freight. An Infrastructure Sustainability assessment has been conducted in accordance with the SEARs and the Infrastructure Sustainability Council of Australia (ISCA) and is provided in Appendix I	Almost Certain	Minor	Medium

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
	Increased demand on local and regional resources during construction	Almost Certain	Minor	Medium		Almost Certain	Minor	Medium
	Reduction in fuel consumption of heavy vehicles on road during operation	-	-		Environmental benefit	-	-	-
	Increase in efficiency of transportation of freight goods	-	-		Economic benefit	-	-	-
Climate change risk – Construction	Greenhouse gas emissions from combustion of fuels during plant/vehicle operation	Almost Certain	Minor	Medium	Climate change impacts have been assessed in accordance with the SEARs as part of a chapter within the EIS (chapter 23). The assessment of flooding risks has been considered as part of a separate specialist study for hydrology and flooding (technical report 6).	Almost Certain	Not significant	Medium
	Increased energy consumption associated with the operation of site compounds	Almost Certain	Minor	Medium	-	Almost Certain	Not significant	Medium
Climate change risk – Operation	Greenhouse gas emissions due to operation of the rail line, predominantly burning of diesel.	Likely	Minor	Medium	-	Likely	Minor	Medium
	Impacts to infrastructure due to increased heat and rainfall/flooding	Possible	Minor	Medium	-	Possible	Minor	Medium

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
	Reduction in emissions from freight vehicles due to reduction in amount of road freight vehicles	-	-		Environmental benefit	-	-	
Waste - Construction	Inappropriate management of waste generated during construction resulting in excessive waste being directed to landfill	Unlikely	Minor	Low	The potential for significant impacts would be reduced through the effective implementation of management measures set out in the CEMP, which would also include a waste management plan. Although the risk level for potential waste management impacts did not exceed medium an waste management impact assessment has been conducted for the proposal in accordance with the SEARs and is incorporated into chapter 24.	Rare	Minor	Low
Waste - Operation	Increased littering from maintenance teams	Rare	Not significant	Low		Rare	Not significant	Low
Health and safety - Construction	Impacts from transport, storage and use of hazardous substances and dangerous goods	Possible	Minor	Medium	Contractors working on the proposal would be required to adopt strict on site health and safety practices in accordance with regulatory requirements (Work Health and Safety Act 2011 and the Work Health and Safety Regulation 2011). Contractors working within or near to rail corridors would also be trained in accordance with Rail Industry Safety Induction requirements.	Unlikely	Minor	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
					An assessment of health and safety impacts has been conducted for the proposal in accordance with the SEARs and is incorporated into chapter 25.			
	Reduced safety for road users and pedestrians during construction particularly in the vicinity of houses, businesses and townships	Possible	Moderate	Medium	-	Possible	Minor	Medium
	Adverse health from noise and air pollution during construction	Possible	Minor	Medium	-	Unlikely	Minor	Low
	Potential for proposal to exacerbate bushfires (storage of dangerous goods, construction site issues such as smoking or hot works)	Rare	Minor	Low	-	Rare	Minor	Low
	Potential for environmental damage resulting from a bushfire passing through the site (e.g. explosion of fuel storages/tanks, vehicles and machinery)	Rare	Minor	Low	-	Rare	Minor	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Health and safety - Operation	Impact from spill or accident during the transport, storage and use of hazardous substances and dangerous goods	Unlikely	Moderate	Medium	-	Rare	Moderate	Low
	Potential for train strike for pedestrians crossing line outside of crossings near houses, businesses and townships	Possible	Extreme	High	-	Unlikely	Extreme	High
	Potential for train strike for pedestrians crossing line outside of crossings in rural areas	Unlikely	Extreme	High	-	Unlikely	Extreme	High
	Adverse health from noise during operation	Possible	Minor	Medium	-	Unlikely	Minor	Low

4. Summary of analysis and recommendations

The environmental risk analysis undertaken in this chapter has confirmed that there are no additional key issues to those key issues identified originally in the preliminary environmental assessment and provided in the SEARs.

The following key issues were confirmed as key considerations, which required further assessment in the form of specialist studies:

- biodiversity
- flooding and water (quality and hydrology)
- Aboriginal heritage
- non-Aboriginal heritage
- noise (structural and amenity)
- socio-economic
- traffic and transport
- visual amenity.

While the key issues of soil and health and safety also included impacts which were assessed as high, the impacts are considered to be well understood based on previous experience with similar projects, and implementation of standard design and management measures would minimise these risks. Therefore, these risks have been assessed within chapters of the EIS.

The environmental risk analysis undertaken as part of this report did not identify any impacts with a risk level of very high once mitigation measures are applied. This is because very high impacts would have been identified through the initial proposal planning stages, and the proposal route and design modified to avoid very high impacts, or mitigation measures identified. The EIS includes a discussion of the options, which were considered prior to selection of the current proposal.

Appendix C – Environmental Planning and Assessment Regulation 2000 checklist

Table C.1 Requirements of Schedule 2 (Part 3) of the Regulation

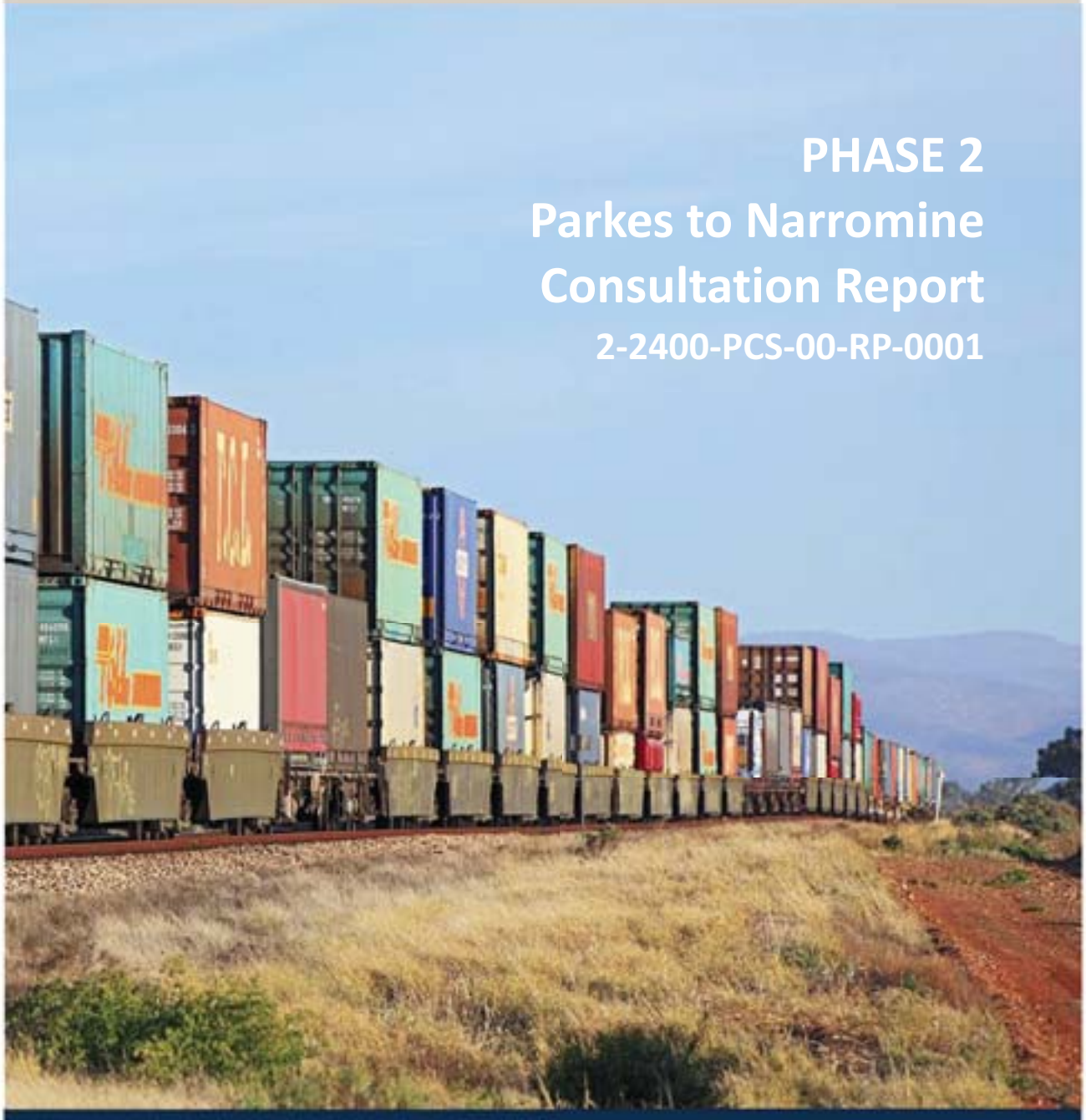
Requirement	EIS reference
6. Form of the environmental impact statement An environmental impact statement must contain the following information:	
(a) the name, address and professional qualifications of the person by whom the statement is prepared	Refer certification at the front of the EIS with respect to a-f
(b) the name and address of the responsible person	
(c) the address of the land: (i) in respect of which the development application is to be made, or (ii) on which the activity or infrastructure to which the statement relates is to be carried out	
(d) a description of the development, activity or infrastructure to which the statement relates	
(e) an assessment by the person by whom the statement is prepared of the environmental impact of the development, activity or infrastructure to which the statement relates, dealing with the matters referred to in this Schedule	
(f) a declaration by the person by whom the statement is prepared to the effect that: (i) the statement has been prepared in accordance with this Schedule, and (ii) the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates, and (iii) that the information contained in the statement is neither false nor misleading.	
7. Content of environmental impact statement (1) An environmental impact statement must also include each of the following:	
(a) a summary of the environmental impact statement	Executive summary
(b) a statement of the objectives of the development, activity or infrastructure	Chapter 1
(c) an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure	Chapter 6
(d) an analysis of the development, activity or infrastructure, including: (i) a full description of the development, activity or infrastructure, and	Chapters 7 and 8
(ii) a general description of the environment likely to be affected by the development, activity or infrastructure, together with a detailed description of those aspects of the environment that are likely to be significantly affected, and	Chapter 2 and Part C

Requirement	EIS reference
(iii) the likely impact on the environment of the development, activity or infrastructure, and	Part C
(iv) a full description of the measures proposed to mitigate any adverse effects of the development, activity or infrastructure on the environment, and	Part C
(v) a list of any approvals that must be obtained under any other Act or law before the development, activity or infrastructure may lawfully be carried out	Chapter 3
(e) a compilation (in a single section of the environmental impact statement) of the measures referred to in item (d) (iv)	Chapter 27
(f) the reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development set out in subclause (4).	Chapter 28

Appendix D – Consultation report

ARTC InlandRail

The Australian Government's priority freight rail project



PHASE 2
Parkes to Narromine
Consultation Report

2-2400-PCS-00-RP-0001

Document Control

Client:	Australian Rail Track Corporation
Project:	Inland Rail
Document title:	Inland Rail – Parkes to Narromine Consultation Report
Prepared by:	GHD Pty Ltd on behalf of ARTC
Purpose:	Report on the consultation activities and outcomes prior to and during the preparation of the EIS for Inland Rail Parkes to Narromine proposal
Approved by:	Simon Eldridge
Date approved:	19.06.2017
Issued to:	Alison Crocker
Filename:	2-2400-PCS-00-RP-0001
Status	Issued for Release

TABLE OF CONTENTS

TABLES

1. Introduction

1.1. Project background

The Australian Government has committed to building a significant new piece of national transport infrastructure by constructing Inland Rail between Melbourne and Brisbane, via central-west New South Wales (NSW) and Toowoomba in Queensland. The Inland Rail project ('Inland Rail') is a major national project that will complete the spine of Australia's national rail network and enhance the interstate freight market.

The Inland Rail route, which is about 1,700 kilometres long, will involve:

- using the existing interstate rail line through Victoria and southern NSW
- upgrading about 1100 kilometres of existing track, mainly in NSW
- providing about 600 kilometres of new track in northern NSW and south-east Queensland.

Inland Rail has been divided into 13 projects, seven of which are located in NSW. Two priority construction projects have been identified for the Inland Rail program in NSW:

- Narrabri to North Star – consisting of about 183 kilometres of upgraded track and associated facilities
- Parkes to Narromine – consisting of about 106 kilometres of upgraded track and associated facilities.

Australian Rail Track Corporation Ltd (ARTC) is seeking approval to construct and operate the Parkes to Narromine section of Inland Rail ('the proposal'). ARTC has identified this proposal as one of three priority projects for implementation of Inland Rail.

1.2. Purpose of this report

The purpose of this Consultation Report is to provide an overview of the communication and consultation approach and the activities carried out for this proposal prior to and during preparation of the EIS. This report also summarises the feedback received from stakeholders and the community during this period from early to mid-2015 until the end of October 2016.

2. Consultation objectives, strategy and approach

2.1. Consultation objectives and strategy

ARTC's values commit the organisation to active engagement with stakeholders and the community. For Inland Rail, effective communication and stakeholder engagement are fundamental to reducing risk, optimising route alignment, minimising social and environmental impacts, securing statutory approvals, and helping gain and maintain the social licence to operate. ARTC believes that identifying, engaging and effectively communicating with landowners and other stakeholders is critical to the successful delivery of Inland Rail.

The overarching objective for the communication and engagement for Inland Rail is to create goodwill among shareholders and stakeholders through responsive engagement, supporting responsible and efficient project delivery, sustainable operations and making rail the mode of choice for freight customers on this route.

ARTC's approach to consultation for Inland Rail is based around six strategic themes:

- building awareness, understanding and support for Inland Rail among customers, stakeholders and the community

- harnessing a sense of ownership through advocates of Inland Rail
- creating an active dialogue with customers, communities and other stakeholders
- identifying and managing issues and opportunities
- achieving a design that minimises the potential for environmental and community impacts
- actively seek opportunities to create beneficial outcomes for stakeholders, while not compromising the scope and budget of Inland Rail (for example, improving local rail and road interfaces where it benefits Inland Rail and improves community safety and amenity).

2.2. Consultation approach

The strategic approach to consultation applied during this proposal included:

- early and regular engagement
- inclusive – relevant stakeholders are consulted or involved during the planning and design of the proposal
- transparent – views and opinions captured from the public are reflected back during the engagement process and are available to participants
- equitable – relevant groups are included in the conversation with recognition, provisions are made for traditional owners, disabled, youth and the elderly to be included, and gender equity occurs
- accessible – different socio-economic groups are able to participate
- iterative – how the engagement process has shaped the proposal is communicated prior to each phase of engagement and delivery.

ARTC's approach is based around the foundations of public participation developed by the International Association for Public Participation (IAP2). It also draws on the international standard for stakeholder engagement, the Accountability AA1000 Stakeholder Engagement Standard.

In early 2015, ARTC developed the *Inland Rail Strategic Stakeholder and Engagement Plan*. The aim of the plan was to inform early engagement with local councils, including those within which the proposal site is located, ahead of the commencement of formal consultation and fieldwork.

ARTC's approach to stakeholder engagement during this early stage was to:

- provide an update to key stakeholders
- revisit issues raised by councils and other local stakeholders during early consultation
- discuss any issues identified during technical studies
- seek input regarding key local stakeholder groups to be engaged through future consultation
- identify new opportunities and issues associated with delivery of Inland Rail at a local level.

This approach was welcomed by the local councils, who were actively seeking information and urging early engagement.

Later in 2015, ARTC developed the *Communication and Engagement Plan – Parkes to Narromine* to guide engagement with the local community. As defined by the plan, consultation has been, and will continue to be undertaken, over five phases:

- development of the business case
- planning, design, and approvals (including preparation of the EIS)
- construction
- commissioning and handover
- operation.

Consultation activities undertaken for Inland Rail and the proposal have been guided by this plan and are detailed in section 3.

2.3. Stakeholder identification

Understanding the local community and identifying stakeholders is critical to the success of Inland Rail. There are key stakeholders and stakeholder groups that have been, and will continue to be, engaged throughout the lifecycle of Inland Rail.

ARTC's definition of a stakeholder is a person, group or organisation that has an interest in Inland Rail and/or is directly or indirectly impacted by Inland Rail. In general terms the key stakeholders for Inland Rail are summarised in Table 1.

Table 1 - Key stakeholder identification

STAKEHOLDER GROUP	STAKEHOLDERS	
Government	Federal and State Elected representatives	Relevant Australian and State, Ministers, MPs (including key parliamentary committees)
	Local Government	Local Government Councillors and Executives
	Government agencies	Relevant Australian and state government departments, agencies and their officers Economic regulatory bodies Emergency services
	Projects	Neighbouring and related projects
Business and industry	Customers	Rail companies and their advisors Freight logistics Executive and their advisors and relevant agencies multimodal freight terminal operators and proponents
	Collaborators	Rail investors and their advisors

STAKEHOLDER GROUP	STAKEHOLDERS	
	Suppliers	Professional services and advisory firms (engineering, financial, environmental, and legal) Construction, infrastructure and materials supply companies Real estate and rural estate agents Local/regional small to medium businesses and chambers of commerce
	Trade Unions	Rail Bus and Tram Union Transport Workers' Union
	Industry	Ports End users Peak industry groups such as the Australian Rail Association, and the Australian Logistics Council Agricultural and Farming groups
Community		Local property owners Impacted landowners Community groups and individuals such as Baradine and District Progress Association Traditional owners (Kamilaroi and Gamilleroi people)
Special Interest Groups		Peak environmental groups such as Landcare and Warrumbungle Landcare Group Local groups, coalitions or individuals Relevant university academics and researchers such as Charles Sturt University

Key stakeholders for the proposal are listed in Table 3 to Table 5.

3. Consultation activities undertaken prior to and during the preparation of the EIS

Stakeholder and community consultation for Inland Rail is an evolving process that commenced in 2010 and will continue on an ongoing basis.

3.1. Consultation tools and activities

A range of communication and consultation tools were utilised by the project team prior to and during the preparation of the EIS to raise awareness of Inland Rail and the proposal and to seek feedback from stakeholders and the community. Table 2 below outlines the communication and engagement tools used and the purpose and timing of activities. Sections 3.2, 3.3 and 3.4 provide more information on correspondence and consultation activities carried

out with specific stakeholder groups and Section 4 summarises the key issues raised during consultation together with responses.

Table 2 - Communication and consultation tools and activities

COMMUNICATION AND CONSULTATION TOOL	PURPOSE	DATE
Toll free community information line (1800 732 761)	Obtain feedback and raise awareness of Inland Rail and the proposal.	Established in January 2015 and continues to be managed.
Project email (inlandrailenquires@artc.com.au)	Online communication channel where stakeholders can provide feedback or ask questions of the project team.	Established in 2014 and continues to be managed.
Inland Rail website (http://inlandrail.artc.com.au)	Raise awareness and understanding of Inland Rail. Provide information and promote channels through which stakeholders can communicate their views, issues and concerns.	Established and updated regularly since 2014.
Community baseline assessment – a written survey and face to face interviews conducted by the University of Melbourne	To seek feedback from the community.	Commenced May 2016 and completed February 2017.
Fact sheets / Question and Answers – provided in hard copy and available on the Inland Rail website	Raise awareness and understanding of Inland Rail. Provide information on land access guidelines and procedures.	First edition of fact sheets made available in October 2015 and updated on an as needs basis.
Project information packs – including fact sheets, maps and technical information	Provided to stakeholders to increase understanding of Inland Rail.	Ongoing since 2015 Project information packs handed out at each face to face meeting with landholders, businesses, community members etc.
Supplier eNewsletter	Provide an update on the status of Inland Rail and ways to get involved.	Ongoing since November 2015
Community information sessions	Provide information on Inland Rail and the proposal to the local community and seek local input to inform the design process and development of the EIS.	Held in Parkes and Narromine in May 2016. Refer to Table 5 for further information.

COMMUNICATION AND CONSULTATION TOOL	PURPOSE	DATE
Workshops	Opportunity to discuss Inland Rail and the proposal and address specific questions and concerns in person. Provide an opportunity for stakeholder input to inform the design process and development of the EIS.	Commenced in April 2015 and have been held on a regular basis with different stakeholder groups. Refer to Table 3 and Table 5 for proposal-specific events.
Landowner face to face meetings	Raise awareness of the proposal and the potential impacts on landowners. Provide an opportunity for landowners to ask questions and have input into the design and EIS process.	Commenced in March 2016 and will be ongoing. Refer to Table 5 for proposal-specific events.
Stakeholder meetings and briefings	Opportunity to discuss Inland Rail and the proposal and address specific questions and concerns in person. Build relationships and trust. Provide an opportunity for stakeholder input to inform the design process and development of the EIS.	Commenced in 2014 and were ongoing. Refer to Table 3 and Table 5 for proposal-specific events.
Submissions	Submissions from local councils and businesses were invited to provide an opportunity for local knowledge and views to be shared with the project team regarding Inland Rail. Public submissions to the Inland Rail Implementation Group report (2015) were also invited prior to the preparation of the EIS.	Early 2015
Attendance and presentations at industry forums	Raise awareness and understanding of Inland Rail and the proposal. Provide an opportunity for stakeholders to ask questions and understand the opportunities to be involved in Inland Rail.	Commenced in 2014 and were ongoing. Refer to Table 4 for details regarding specific events.
Letter mail outs to all property owners identified along the rail corridor.	Raise awareness and understanding of Inland Rail and the proposal. Provide updates on the proposal's progress. Provide details for how the project team can be contacted for further information and	Provided on an ongoing basis at regular intervals since May/June 2016.

COMMUNICATION AND CONSULTATION TOOL	PURPOSE	DATE
	details for providing feedback.	
Briefing papers	To provide government with information on key issues and strategies and information on project milestones.	Provided on an ongoing basis as required.
Advertisements and proactive media articles	Raise awareness and understanding of Inland Rail. Provide information and promote channels through which stakeholders can communicate their views, issues and concerns. Celebrate project milestones publically.	Ongoing. Specific advertisements were placed in local newspapers, The Australian and the Koori News in December 2015 to January 2016 requesting cultural heritage knowledge holders.
Media releases	Raise awareness and understanding of Inland Rail. Provide information and promote channels through which stakeholders can communicate their views, issues and concerns. Celebrate project milestones publically.	Regular media releases published since 2014 and are ongoing (available via Inland Rail website).
Project database	Record all correspondence relating to the proposal, including feedback, concerns, supportive comments so that they are contained in a central location and can be considered by the project team in during the design development and EIS process.	Established in 2014

3.2. Consultation with government departments and agencies

The primary mechanism for consultation with relevant state governments prior to the preparation of the EIS was through the Inland Rail Implementation Group. In late 2013, the then Deputy Prime Minister, the Hon Warren Truss MP, established an Inland Rail Implementation Group to develop a delivery programme for the implementation of Inland Rail. The Implementation Group was chaired by former Deputy Prime Minister, the Hon John Anderson AO, with senior representatives from the Australian, New South Wales, Queensland and Victorian governments, and ARTC.

To support the Inland Rail Implementation Group's investigations, ARTC was tasked with developing an Inland Rail Programme Business Case, to include a 10-year delivery schedule, cost estimate, development strategy and a detailed analysis of the economic benefits of Inland Rail. The Inland Rail Implementation Group took a consultative approach, engaging with a broad range of stakeholders including potential future users as well as individuals, communities and others who would live and work along the alignment to understand the breadth of issues associated with Inland Rail, and to inform the report to the Australian Government.

The Inland Rail Implementation Group delivered its Report to the Australian Government in August 2015, supported by the Inland Rail Programme Business Case.

Further to the early consultation carried out by the Inland Rail Implementation Group, Table 3 provides an overview of consultation activities carried out with key government groups prior to and during the preparation of the EIS.

Table 3 - Consultation activities with government

STAKEHOLDER	ACTIVITY	DATE
Parkes Shire Council	Technical workshop	29 April 2015
	Face to face Inland Rail update meeting	19 August 2015
	Email introduction to project team	24 August 2015
	Face to face project technical meeting	27 August 2015
	Email correspondence and update on Inland Rail Business Case	14 September 2015
	Email update on route selection, supplier/contractor opportunities and general project	4 November 2015
	Email update regarding launch of Suppliers e-newsletter	5 November 2015
	Email update regarding proposal technical field studies and land access requests	14 March 2016
	Email correspondence regarding community information sessions	16 May 2016
	Face to face proposal update meeting	23 May 2016
	Update on outcomes from information sessions	9 June 2016
	Meeting to discuss social impact assessment for the proposal	27 June 2016
Narromine Shire Council	Technical workshop	2 June 2015
	Face to face Inland Rail update meeting	19 August 2015

STAKEHOLDER	ACTIVITY	DATE
	Email introduction to project team	24 August 2015
	Email correspondence and update on Inland Rail Business Case	14 September 2015
	Email update on tender for Technical Advisory services for Inland Rail	4 November 2015
	Project update regarding cultural heritage consultation including advertising and request for cultural knowledge holders	10 December 2015
	Email update regarding technical field studies	5 April 2016
	Face to face meeting to gain access approvals for field studies	2 June 2016
	Email regarding outcome of community information sessions	9 June 2016
	Meeting to discuss social impact assessment	20 June 2016
	Email circulation of community survey	15 July 2016
	Face to face meeting to gain access approvals for technical investigations	29 July 2016
	Email circulation of community survey	23 August 2016
	Email informing Council of the flooding consultation	15 September 2016
	Email program update	21 September 2016
	Email program update	21 October 2016

3.3. Consultation with industry

Consultation activities consisting of attendance and presentations occurred with key business and industry stakeholders relevant to the proposal at a number of industry conferences, as identified in Table 4.

Table 4 - Consultation activities with industry

CONFERENCE	DATE
CEDA Trustee	4 March 2015
Australian Logistics Council Forum 2015	10-12 March 2015
Regional Development Australia	12 March 2015
Freight Outlook Conference	17 March 2015
Australian Property Institute (Dubbo)	18 March 2015
QLD Infrastructure Conference 2015	5 May 2015
Australian Property Institute NSW 2015 Country Conference	8 May 2015
Women in Project Management Leadership Summit	20 May 2015
Heavy Haul Rail Conference	May-June 2015
7th Annual Victorian Transport Infrastructure Conference	23-24 June 2015
Transport and Logistics Symposium	4-5 August 2015
Integrated Logistics Hub Conference	26-27 August 2015
Public Sector Infrastructure Summit	27-18 October 2015
AusIntermodal 2015 Conference	20 November 2015
NSW Major Projects Conference	25 November 2015
Ausrail Plus	25-26 November 2015
Australian Logistics Council Forum 2016	2-3 March 2016
2016 Australian Property Institute Rural QLD Conference	18-19 March 2016
7th Annual QLD Transport Infrastructure Conference 2016	10-11 May 2016
8th Annual Victorian Transport Infrastructure Conference 2016	15-16 June 2016

Consultation and correspondence with utility and other service providers within the proposal site was also carried out with:

- AARNet
- Essential Energy
- APA Group
- Jemena
- Soul Australia Communication – Pipe Network Pty Ltd
- Nextgen Group Holdings
- Telstra
- TPG
- Santos

3.4. Consultation with potentially affected landowners, special interest groups and community members

Consultation activities occurred with relevant landowners and community stakeholders for the proposal as identified in Table 5.

Table 5 - Consultation activities with potentially affected landowners, special interest groups and community

STAKEHOLDER	ACTIVITY	DATE
Cultural knowledge holders	Advertisement Correspondence	December 2015 / January 2016 February 2016 ongoing
Western Zone Aboriginal Land Council Director	Face to face meeting	10 February 2016
Narromine Aboriginal Elders Group	Face to face introductory meeting	10 February 2016
Landowner feedback	Face to face meetings with identified landowners along the alignment for property access to enable field studies	1 March 2016 and ongoing
Narromine Registered Aboriginal Parties	Workshop attended by Paul Brydon, National Koori Site Management (Geoffrey Maher) and Kulila Site Consultants (Maria Maher)	11 May 2016 – refer to Umwelt, 2016, *ARTC Inland Rail – Parkes to Narromine Aboriginal Cultural Heritage and Archaeological Assessment* for minutes.
Parkes Registered Aboriginal Parties	Workshop attended by Mooka (Esther Cutmore, Stuart Cutmore, Shawn Williams, Wayne Williams and Neville Williams) and Aboriginal Archaeology Service (Tony Williams and Andrew Williams).	12 May 2016– refer to Umwelt, 2016, *ARTC Inland Rail – Parkes to Narromine Aboriginal Cultural Heritage and Archaeological Assessment* for minutes.
Impacted landowners within 1km from the alignment	Mail out providing an introductory overview of the proposal and proposed	25 May 2016

STAKEHOLDER	ACTIVITY	DATE
	activities sent to 115 landowners	
Impacted business and government agencies within 1 km from the alignment including grain operators/owners etc.	Mail out providing an introductory overview of the proposal sent to 25 business and agencies	25 May 2016
Parkes Community	Drop in information session attended by nine community members	23 May 2016
Narromine Community	Drop in information session attended by 21 community members	26 May 2016
North Parkes Mine (neighbouring and related project stakeholder)	Introductory meeting	15 June 2016
Parkes Farmers in collaboration with NSW Farmers Federation	Workshop attended by 11 participants	15 June 2016
Narromine Farmers in collaboration with NSW Farmers Federation	Workshop attended by 19 participants	16 June 2016
Quarries that may be used for materials	One on one meetings held with two quarries.	August 2016
Landholders potentially affected by flooding issues	One on one meetings held with 29 landholders regarding flood mapping and water flow modelling consultation	20 – 23 September 2016
Landholders potentially affected by level crossing changes	One on one meetings held with 23 landowners regarding 38 private level crossings	7 – 18 November 2016
Narromine Community	Drop in information session attended by 51 community members	19 November 2016
Interested community members	Emails to project email address	Ongoing
Interested community members	Calls to 1800 number	Ongoing
Contact with private, business and public landholders for property access	Calls made by ARTC – 145 calls made to date. Property Access Agreements issued for noise, ecology, heritage and/or	Ongoing

STAKEHOLDER	ACTIVITY	DATE
	geotechnical investigations – 90 issued to date.	

4. Feedback received prior to and during the preparation of the EIS

4.1. Summary of feedback received

The results of consultation for Inland Rail prior to the preparation of the EIS indicated sustained positive interest in Inland Rail from all key stakeholder groups. Customer descriptions of Inland Rail included Inland Rail being:

- a vital piece of infrastructure that will reduce freight transit times and reduce congestion
- the best response to the freight challenge
- essential infrastructure.

Local councils and regional businesses highlighted the strong regional development potential and enhanced connectivity that Inland Rail would bring. Farming and mining exporters commented that Inland Rail would create competition in the logistics supply chain, potentially driving down costs and making them more competitive in world markets.

Motoring organisations and councils identified the potential of Inland Rail to reduce the burden on regional road networks and improve road safety outcomes.

Overwhelmingly, stakeholder sentiment toward Inland Rail is strongly supportive and positive. Table 6 provides an overview of the proposal's key issues as determined by consultation undertaken to date and how these issues have been or will be addressed.

Table 6 – Key issues raised and how addressed

ISSUE CATEGORY	KEY ISSUES	RESPONSE
Consultation	• Request for discussions to be held with individual landowners regarding private level crossing requirements and any proposed changes to level crossings • Request for landowners to be consulted about construction (access etc) and culvert replacement	• Further consultation to be undertaken during detailed design in accordance with the Inland Rail Level Crossing Strategy. • Further consultation to occur as part of additional drainage assessment undertaken during detailed design. • Ongoing consultation to be undertaken during detailed design and construction.
Design	• Consider any impacts to private and public level crossings • Ensure design of culverts is effective during times	• Inland Rail Level Crossing Strategy to progress during detailed design. • See EIS for current hydrology modelling

ISSUE CATEGORY	KEY ISSUES	RESPONSE
	of flood • Maintain access to private properties for farm movements (stock, vehicles/equipment, etc). • Consider any potential impacts with the proposed reclassification of some routes to allow for B triple vehicles including the Newell Highway	results - additional drainage assessment to be undertaken during detailed design. • Ongoing consultation to be undertaken during detailed design and construction. • Detailed design to take into consideration, where relevant for proposal.
Economic	• Consider potential impacts of the project on heavy vehicle movements particularly during peak harvest times • Potential benefits of the Inland Rail project including increased opportunities for education, employment and vocational training; increased modal competition between road and rail; reduction in road rehabilitation, maintenance and capital costs; improved road safety and community amenity	• Ongoing consultation to be undertaken during detailed design and construction. • Noted.
Environment	• Culvert design and construction to consider flooding • Maintenance to be undertaken such that impacts of weeds, bushfire, and other damage considered • Impact of noise and vibration during operation • Potential construction and operation amenity impacts on residential properties near alignment • Consider potential impacts of the proposal on heavy vehicle movements particularly during peak harvest times • Safety impacts associated with proposal and motorists and heavy vehicle movements over the rail alignment • Impacts on culturally important locations to be assessed • Visual impacts during operation, and the need to consider mitigation strategies such as tree screening	• See EIS. • Additional drainage assessment to be undertaken during detailed design. • Ongoing consultation to be undertaken during detailed design and construction.

ISSUE CATEGORY	KEY ISSUES	RESPONSE
Land use/properties	• Process of property acquisition • Concern about proposal impact on property value	• Further consultation to be undertaken during detailed design. • Acquisition to be undertaken in accordance with legislative requirements.

5. Next steps

The proposal EIS will be placed on public exhibition for a minimum of 30 days. During that time, the communication and consultation methodologies adopted during preparation of the EIS will continue to be used, to enable landowners, community members and other stakeholders to ask questions and to provide feedback to the ARTC project team members. Consultation tools used during this period will include:

- mail out to affected and adjoining landowners
- community information sessions and briefings
- updates to ARTC Inland Rail website at key milestones, i.e. announcing public exhibition of EIS and outlining location details for drop-in information days
- project newsletter distributed to stakeholders
- Frequently Asked Questions document updated to include EIS information, i.e. details on how to make a submission
- advertisements in local newspapers giving information regarding the proposal and display of the EIS

The EIS will be available for viewing at the following locations:

- Parkes Shire Council Administration Centre, 2 Cecile Street, Parkes
- Narromine Shire Council Administration Centre, 124 Dandaloo Street, Narromine
- Peak Hill Library, 98 Caswell Street, Peak Hill
- Department of Planning and Environment: Western Region Office Information Centre - Area 1, Level 1, 188 Macquarie Street, Dubbo
- Department of Planning and Environment Information Centre, 320 Pitt Street, Sydney

The EIS will also be made available for viewing and in web audio on the Department of Planning and Environment and Inland Rail websites.

The public will be able to review the EIS and send submissions to the Department of Planning and Environment for consideration.

At the completion of the public exhibition period the Department of Planning and Environment will provide ARTC with a copy of all public and government submissions and a summary of issues raised. ARTC will manage submissions received in accordance with the *Environmental Planning and Assessment Regulation 2000*. While all submissions

received will be posted on the Department of Planning and Environment website, if requested the privacy of submitters will be protected by removing names from submissions.

ARTC will prepare a submissions report responding to the issues raised, and this will be made available for viewing on the Department of Planning and Environment and Inland Rail websites. If changes to the proposal need to be made as a result of the submissions received, a preferred project report will be prepared. ARTC will continue to liaise directly with key stakeholders regarding the proposal's progress.

Appendix E – Consistency with relevant strategic plans

Strategic planning context for the proposal

A summary of the reports and strategies that are relevant to the need for, and development of, the proposal is provided below.

National planning

Australian Infrastructure Plan

The *Australian Infrastructure Plan* (Infrastructure Australia, 2016) sets out the infrastructure challenges and opportunities that Australia faces over the next 15 years and the solutions required. The plan was informed by the Northern Australia Audit and the Australian Infrastructure Audit, which provide a comprehensive review of existing and required infrastructure over the coming decades.

The plan has four main themes:

- productive cities, productive regions
- efficient infrastructure markets
- sustainable and equitable infrastructure
- better decisions and better delivery.

Inland Rail is referenced in relation to the first theme. The plan states that 'the efficient movement of freight into, out of, and across Australia is critical to the nation's ongoing productivity growth and competitiveness.' It recognises that the Melbourne to Brisbane corridor is one of the most important and busiest freight routes in Australia, supporting key population, production, and employment precincts. The Plan states that Inland Rail would improve the efficiency of freight moving between Melbourne and Brisbane, as it would bypass the Sydney metropolitan area.

As part of the *Australian Infrastructure Plan,* the *Infrastructure Priority List* is designed to give guidance to decision makers, visibility to industry, and transparency for the community. It is a 'rolling' list which will be updated periodically as proposals move through stages of development and delivery, and to respond to emerging challenges and opportunities. Inland Rail is included as a priority initiative on the *Infrastructure Priority List* in the 'national connectivity' category. It is identified for longer term planning and business case development to address 'freight connectivity Melbourne-Brisbane'.

State of Australia's Cities 2014-2015

The State of Australian Cities reports bring together current research and data to present a comprehensive picture of how Australia's cities are evolving, to strengthen the knowledge base used to develop policy. The 2014-2015 report (Department of Infrastructure and Regional Development, 2015) observed that there is more demand for transport in Australia, including freight, than ever before.

Further growth in population, transport passengers, and freight demands is forecast. Recognised key challenges for policy makers include the potential conflicts between the usability of cities with the utility and long term capacity of freight hubs, ports, airports, and the movement of goods and people in cities. The interstate freight task is forecast to grow significantly in the coming decades, with resultant pressure on to transport infrastructure. The report notes that the issues associated with this will be particularly felt in the cities where many freight movements originate and terminate, as there are already capacity constraints experienced when the movement of freight conflicts with the transport of people on roads and rail.

The report notes that all levels of government and industry have agreed on the need to apply a national focus and effort to deliver a streamlined, integrated and multimodal transport and logistics system, capable of efficiently moving freight throughout Australia.

Inland Rail provides a response to some of the issues raised in this report, as it aims to:

- provide a step-change improvement in rail service quality in the Melbourne to Brisbane corridor to deliver a freight rail service on the east coast that is competitive with road
- improve road safety, ease congestion and reduce environmental impacts by moving freight from road to rail
- bypass bottlenecks on the congested metropolitan rail networks on the east coast, and free up train paths for other services on the coastal route.

Urban Transport Strategy

The *Urban Transport Strategy* (Infrastructure Australia, 2013), *National Land Freight Strategy* (Standing Council on Transport and Infrastructure, 2012), and the *National Ports Strategy* (Infrastructure Australia, 2011) form the key components of strategic planning for transport in Australia.

Relevant to Inland Rail, the *Urban Transport Strategy* recognises that some of Australia's public transport sub-systems influence the performance of urban roads and the national freight systems. The strategy notes that as Australia is highly urbanised, and that urban transport strongly affects national productivity, with road congestion impacting on national productivity and economic activity.

One of the aims of the strategy is to promote the best use of capacity on high use roads. This can be achieved in a number of ways, including by removing freight from urban roads, and prioritising freight on the national freight network.

Inland Rail is consistent with this strategy, as it aims to:

- improve road safety, ease congestion and reduce environmental impacts by moving freight from road to rail
- bypass bottlenecks on congested metropolitan rail networks on the east coast, and free up train paths for other services on the coastal route.

National Land Freight Strategy

The *National Land Freight Strategy* (Standing Council on Transport and Infrastructure, 2013) is a partnership between Commonwealth, State, Territory and local governments and industry to deliver a streamlined, integrated and multimodal freight transport and logistics system, capable of efficiently moving freight throughout Australia. The strategy recognises that 'the efficient movement of land freight is crucial for Australia's productivity and competitiveness, and affects the lives of every Australian' and that 'continued growth in freight volumes is giving rise to a range of increasingly complex challenges for governments, industry and the community.'

The strategy seeks to direct the efforts of all governments and industry towards the long term vision, objectives and outcomes for freight in Australia. Identifying the current and future places for freight movement is a core element of the strategy. Inland Rail is included on the map of key freight routes developed by the strategy, based on the route provided in the *National Land Freight Strategy Update Paper* (Infrastructure Australia, 2012). The map shows a single new national network to reflect the emphasis on potential future freight flows, freight (vehicle) connectivity, ports, and settlements.

The background paper for the strategy, the *National Land Freight Strategy Discussion Paper* (Infrastructure Australia, 2011) provides a case and priorities for a national land freight network strategy, and an indicative list of projects and programs that Infrastructure Australia has already flagged for inclusion in a long term national land freight network plan. This includes Inland Rail.

National Ports Strategy

The Council of Australian Governments (COAG) endorsed the *National Ports Strategy* (Infrastructure Australia, 2011) in July 2012 as part of a collaborative approach to the future development and planning of Australia's port and freight infrastructure. The strategy was jointly authored by Infrastructure Australia and the National Transport Commission following extensive consultation and engagement with stakeholders.

The *National Ports Strategy* covers both bulk commodity ports and container ports, identifying:

- the most effective regulatory and governance frameworks
- ways to improve land planning and corridor preservation
- the future infrastructure requirements of Australia's ports, including road and rail links.

The strategy notes that there are major efficiency implications for Australia if significant improvements are not made to ports and related landside road and rail systems over the coming decades.

Inland Rail would connect key production areas in Queensland, NSW and Victoria with export ports in Brisbane and Melbourne. As a result, it is consistent with the *National Ports Strategy*.

NSW planning

State Priorities: NSW Making it Happen

On 14 September 2015 the NSW Premier announced 30 priorities for the state, to grow the economy, deliver infrastructure, protect the vulnerable, and improve health, education and public services across NSW. These consist of 12 'Premier's Priorities' and 18 'State Priorities'. Collectively, these replace NSW 2021 as the new state plan. The transport priority relevant to the proposal is 'improving road travel reliability'.

Newell Highway Corridor Strategy

The *Newell Highway Corridor Strategy* (NSW Government, 2015) sets out the objectives, current performance, and issues in managing the Newell Highway corridor over the long term. It details a series of safety, asset and traffic actions to meet the current and future issues along the highway. The strategy notes that:

- The Newell Highway currently provides the major freight route between Queensland and Victoria, and connects numerous regional centres and communities along its 1,060 kilometre length.
- The Newell Highway serves as a key economic link to domestic and export markets for agricultural products from the Central West, and interstate road freight between Queensland and Victoria.
- Traffic volumes along the Newell Highway vary significantly, from around 1,200 to 4,000 vehicles per day in rural areas. Traffic volumes along the Newell Highway increase substantially within the urban areas (such as Parkes, Dubbo, Narrabri and Moree). In urban areas, average daily traffic volumes can exceed 20,000 vehicles a day.
- The Newell Highway experiences high levels of heavy vehicle use, with around 26 to 52 per cent of daily traffic made up of heavy vehicles, depending on the location. Relative use of heavy vehicles is highest to the north between Narrabri and Boggabilla, with up to 1,500 heavy vehicles per day near the Queensland border, and rural sections around Narrandera.
- A number of significant intermodal freight hubs are located along and around the Newell Highway, including major hubs at Tocumwal, Forbes, Parkes, Dubbo, Narrabri, and Moree. The NSW government aims to support these hubs by improving inland rail access, and supporting the road connections.

Relevant to the proposal, the strategy notes the issues associated with moving significant volumes of freight along the road corridor, and issues associated with the rail level crossing in Parkes.

Consistent with the strategy, Inland Rail supports north–south freight movement between the communities of the Central West, along with interstate movements between Victoria, NSW and Queensland. It would also some of the significant intermodal freight hubs noted by the strategy.

Rebuilding NSW - State Infrastructure Strategy

Rebuilding NSW - State Infrastructure Strategy (NSW Government, 2014a) was prepared following consideration of the recommendations provided by Infrastructure NSW in the *State Infrastructure Strategy Update 2014* report (Infrastructure NSW, 2014). The strategy sets out the infrastructure projects and initiatives that the NSW Government will prioritise over the short, medium and long term. The strategy highlights the importance of sustaining productivity growth in our major centres and our regional communities, and recognises the need for investment in road and rail projects.

Although the proposal is not included in the strategy, it is considered to be consistent with the strategy. The strategy notes that the transport freight industry is critical to the NSW economy, and that by 2031,

the amount of freight travelling in NSW will nearly double. It also notes that there are too many constraints on the rail network, reducing the efficiency of freight connections between regional NSW and key markets.

In particular, the *State Infrastructure Strategy Update 2014* report notes that road and rail freight within the metropolitan area operate largely on networks that are shared with passenger vehicles and public transport. Many of these journeys occur at similar times of day, resulting in highly variable travel speeds and journey times. The report recognises that a key challenge in the modal shift from road to rail is the regular disruption to freight trains running on the shared Metropolitan Rail Network, as passenger train services are increasing and are given priority across the day, meaning that the efficiency of freight trains will gradually decline.

The update report notes that:

- In 2013, the NSW rail network carried 157 million tonnes of freight (33 per cent of the total State freight task). Coal made up most of NSW's rail freight task, with significant grain and cotton movements drawn from across western NSW.
- The regional freight network in NSW plays a critical role in supporting the national freight task, with 75 per cent of interstate truck freight in Australia using the NSW road network for some part of its journey.
- By 2031, the freight task in NSW will nearly double to 794 million tonnes, with significant growth in major regional exports, in particular mining production, and meat and livestock.
- The main transport challenge for regional NSW is to manage this growth efficiently by improving road productivity, enhancing local freight connectivity across the regions, and developing a sustainable and viable regional rail freight network.
- A viable regional rail freight network – one with the capacity to carry a greater share of the total freight task – is critical to the productivity and competitiveness of regional businesses, as well as the broader NSW economy.

NSW Freight and Ports Strategy

The *NSW Freight and Ports Strategy* (NSW Government, 2013) aims to create a transport network where goods move efficiently to their markets. The strategy responds to Infrastructure Australia's *National Port Strategy* (Infrastructure Australia, 2011) and the *National Land Freight Strategy* (Standing Council on Transport and Infrastructure, 2012), and is consistent with the objectives of the *NSW Long Term Transport Master Plan* (Transport for NSW, 2012).

Freight and logistics are an indispensable component of economic activity. The strategy notes that in 2013, congestion and inefficiencies are evident in all network modes. Providing a network that eliminates or at least minimises congestion will support economic growth and productivity and encourage regional development.

The strategy identifies the following issues relevant to the movement of rail freight:

- NSW has experienced under investment in freight infrastructure, particularly rail. While a number of rail infrastructure projects have been undertaken in the last 10 years, the focus has been on coal and passenger transport.
- The transport of freight via the shared metropolitan rail network is limited by the needs of passenger transport, particularly during morning and afternoon passenger peaks.
- Projected growth in freight demand is increasing the pressure on the existing rail network. By 2031, all key corridors will struggle to meet demand unless action is taken.

Inland Rail is relevant to the following key actions included in the strategy

- improve productivity of the rail freight network
- identify and protect strategic freight corridors (including Inland Rail).
- develop and maintain projects to support network capacity
- develop and maintain capacity for freight on the rail network
- foster intermodal terminal network development
- coordinate regional infrastructure and service provision
- prioritise safety of freight transport.

NSW Road Safety Strategy 2012-2021

The *NSW Road Safety Strategy 2012-2021* (Transport for NSW, 2012) sets the direction for road safety in NSW for the next seven years. The NSW Government is committed to reducing road fatalities to at least 4.3 per 100,000 people by 2016, together with at least a 30 per cent reduction in fatalities and serious injuries by 2021.

The strategy notes that heavy trucks are often involved in serious road accidents in NSW. While they represent only 2.2 per cent of registered motor vehicles and seven per cent of all motor vehicle travel, heavy trucks were involved in 17 per cent of fatalities on NSW roads. Nearly 30 per cent of fatal heavy vehicle crashes involved heavy vehicles from interstate.

The proposal contributes to the strategy as it aims to improve road safety by moving freight from road to rail.

NSW Long Term Transport Master Plan

The *NSW Long Term Transport Master Plan* (Transport for NSW, 2012) provides a framework for addressing transport challenges across NSW over the next 20 years. The master plan is designed to guide the allocation of available funds to deliver maximum benefits to the people of NSW. It integrates transport with wider land use planning.

The plan recognises the rapid growth in freight demand across NSW, and that the NSW freight network is a critical part of the national freight network. It notes issues associated with sharing infrastructure between freight and passenger journeys, and the negative impacts associated with moving ever-increasing volumes of freight around NSW:

- increased traffic congestion
- displaced local economic activities
- impacts on communities from higher numbers of trucks moving through urban areas.

The plan notes that allowing the efficient flow of goods to the market has inherent benefits for the environment and community. It includes the following actions that are relevant to the proposal:

- protect strategic rail freight corridors (including Inland Rail)
- continue to work with the Australian Government to develop the Inland Rail
- improve road safety.

Regional and local planning

Draft Central West and Orana Regional Plan

The *Draft Central West and Orana Regional Plan* (Department of Planning and Environment, 2016) is a consolidated strategic plan prepared for the 20 local government areas in the Central West and Orana region, and includes the Parkes and Narromine LGAs. It is currently in draft stage on public exhibition for review and approval.

The draft plan outlines a number of challenges facing the region, such as its aging population, increasing freight volumes and climate change. A regional vision is presented of a sustainable future based on diverse economic industries, helping to service a healthy environment and strong, resilient communities.

The draft plan presents four goals with associated actions to help achieve this vision. These goals are:

- a growing and diverse regional economy
- a region with strong freight transport and utility infrastructure networks that support economic growth
- a region that protects and enhances its productive agricultural land, natural resources and environmental assets
- strong communities and liveable places that cater for the region's changing population.

Economic Development Strategy for Regional NSW

The *Economic Development Strategy for Regional NSW* (DTIRIS, 2015), provides the framework for driving economic growth in regional NSW. Inland Rail is relevant to the following goals included in the strategy:

- drive regional employment and regional business growth
- invest in economic infrastructure and connectivity.

The strategy notes that greater physical and virtual connectivity between regional centres, major ports, Sydney, neighbouring states, and the broader region can increase prosperity in regional NSW.

Relevant actions include improvements in regional transport through regional transport plans and *NSW Freight and Ports Strategy*.

A Plan for Growing Sydney (the Sydney Metropolitan Strategy)

A Plan for Growing Sydney, released in December 2014, is the NSW Government's 20-year plan for the Sydney metropolitan area. It provides direction for Sydney's productivity, environmental management, and liveability, and for the location of housing, employment, infrastructure and open space.

The proposal is not mentioned in the strategy. However, it is considered to be consistent with key directions of the strategy, including direction 1.5 – 'enhance capacity at Sydney's gateways and freight networks'. This direction recognises the existing land use conflicts between residential areas and the freight transport network, and the strategy notes that curfews on freight operations mean that freight movements are often forced into peak periods when there is greater pressure on the roads. This adds to the economic costs of freight movements, and the economic, social and environmental costs of traffic congestion.

Inland Rail provides a response to some of the issues raised in the strategy, as it aims to:

- improve road safety, ease congestion and reduce environmental impacts by moving freight from road to rail
- bypass bottlenecks within the congested Sydney rail networks, freeing up train paths for other services.

Regional Transport Plans

The regional transport plans, which include the *Central West Regional Transport Plan* and the *New England North West Transport Plan* (NSW Government, 2013), support the *NSW Long Term Transport Master Plan* and outline specific actions and priorities for each region.

The *Central West Regional Transport Plan* includes the following actions that are relevant to the proposal:

- invest in rail freight facilities (including the Parkes National Logistics Hub and Inland Rail)
- improve road safety.

The *New England North West Regional Transport Plan* includes the following actions that are relevant to the proposal:

- investigate opportunities for an inland rail freight line
- improve road safety.

Central West Freight Study

The *Central West Freight Study* (Regional Development Australia Central West, 2013) documents the freight task in the Central West region, in terms of net tonnes transported via road, rail and air. It highlights constraints and opportunities, considers possible network improvements, and provides guidance on the benefits to the region of these improvements.

Relevant to the proposal, the study notes that Inland Rail is strongly supported, and that it meets the strategic merit test applied by the study. The study notes that Inland Rail would:

- provide an opportunity for regional businesses to access Melbourne and Brisbane markets and export ports, as well as other regional nodes
- provide a viable alternative for freight travelling along the Newell Highway
- unlock significant value in the supply chain, open up new markets to freight users across the region, and provide significant economic benefits to the region and the broader NSW economy.

Appendix F – Air quality data

This appendix provides background data and analysis used to undertake the air quality impact assessment. The results of the assessment are summarised in chapter 13.

Dust emission inventory

Construction has been assessed as a 30 m wide corridor undergoing earthworks with earth movements related to cut and fill activities typical of road and rail construction. Dust emissions for each construction area have been calculated using generic emission factors based on a range of typical construction activities. The derived emission rates were characterised using generic emission factors published in the *Western Regional Air Partnership Fugitive Dust Handbook* (Countess Environmental, 2006).

Particulate emissions were calculated using generic emission factors based on typical construction activities including:

- general construction with minimal/no earthworks – relevant to site compounds and spoil sites
- construction activities with minor earth movements – relevant to general track construction works along the proposal site.

The dust emissions inventory is provided in Table F.1.

Table F.1 Dust emissions inventory

Particle size	Emission factor	Units	Notes
General construction with minor earth excavation			
Total suspended particles (TSP)	1.90E-05	$g/m^2/s$	TSP/PM_{10} ratio assumed to be a factor of 2
PM_{10}	0.11	tons PM_{10}/acre/month	WRAP handbook - General construction using Best Available Control Measures (BACM) with minimal earth movement, i.e. cut and fill
	9.51E-06	$g/m^2/s$	
$PM_{2.5}$	9.51E-07	$g/m^2/s$	$PM_{2.5}$/PM_{10} ratio assumed to be 0.1
Construction with excavation, cut and fill			
TSP	7.26E-05	$g/m^2/s$	TSP/PM_{10} ratio assumed to be a factor of 2
PM_{10}	0.42	tons PM_{10}/acre/month	WRAP handbook - Road construction using Best Available Control Measures (BACM) with significant earth movement, i.e. cut and fill, typical of road construction
	3.63E-05	$g/m^2/s$	
$PM_{2.5}$	3.63E-06	$g/m^2/s$	$PM_{2.5}$/PM_{10} ratio assumed to be 0.1

Dust dispersion modelling

A screening level assessment was undertaken with consideration of the Approved Methods. The predicted worst-case 24 hour PM_{10} concentrations are presented Figures F.1 – F.3 as concentration versus distance graphs for the following scenarios:

- Scenario 1 – construction within the rail corridor in areas where upgrades to formation are required, widening of embankments, and construction of the Parkes north west connection
- Scenario 2 – construction within the rail corridor where the track is being upgraded, significant earthworks are not expected and the potential for dust impacts is lower than for Scenario 1
- Scenario 3 – establishment of site compounds.

The calculations consider a background dust level of 16.9 $\mu g/m^3$ and are worst case predictions, which would depend on background dust levels and local meteorology on any given day.

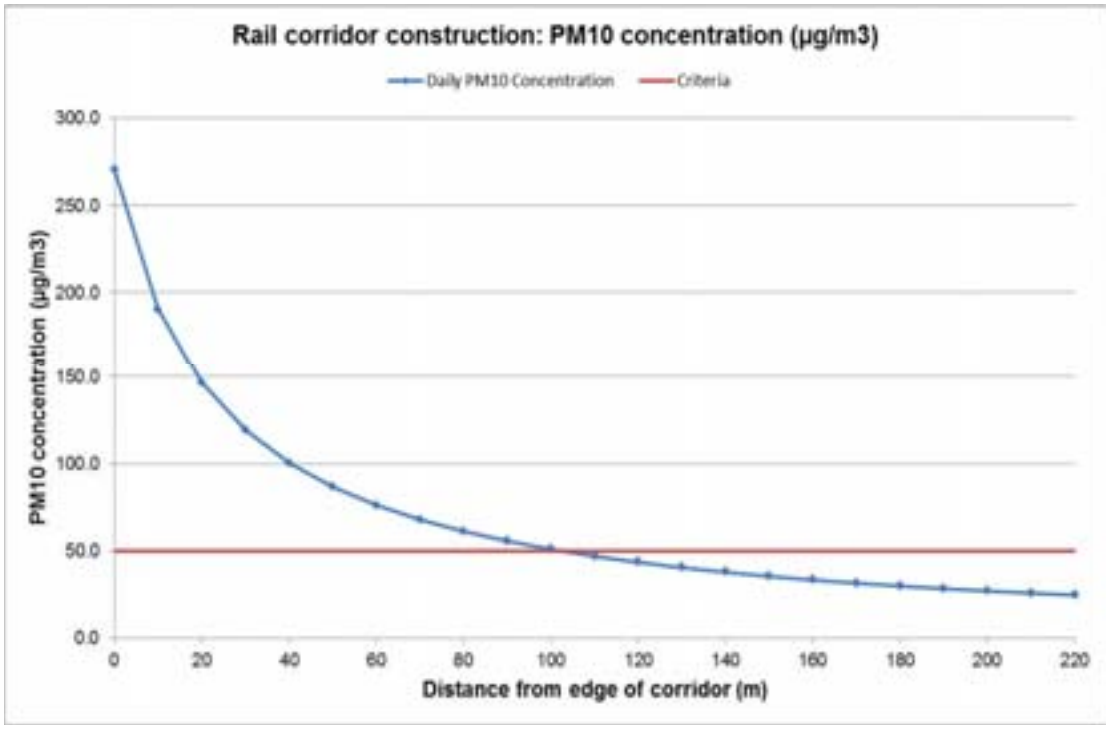


Figure F.1 Daily PM_{10} concentration versus distance relationship from the boundary of the proposal site (scenario 1)

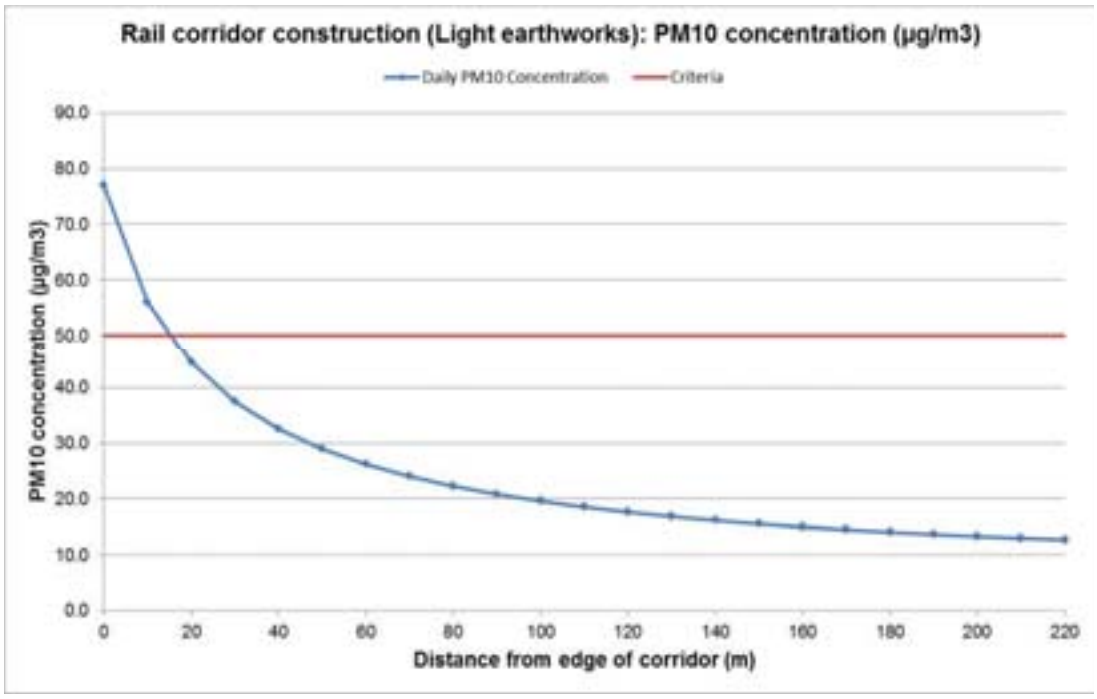


Figure F.2 Daily PM_{10} concentration versus distance relationship from the boundary of the proposal site (scenario 2)

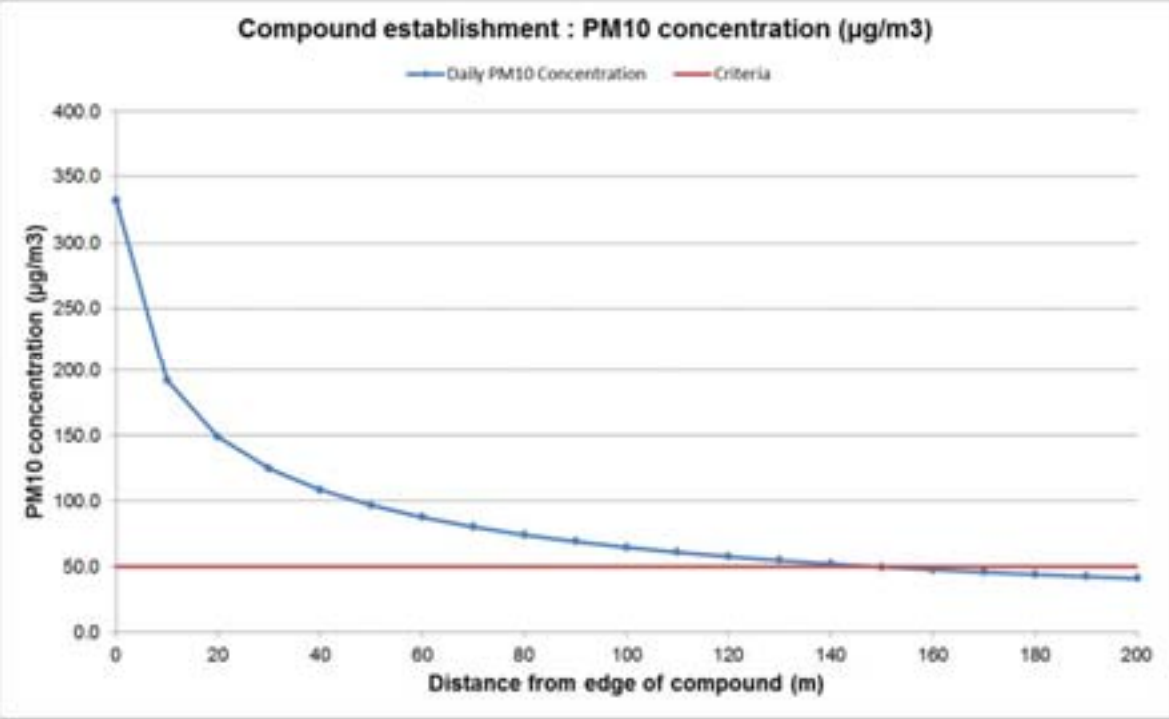


Figure F.3 Daily PM_{10} concentration versus distance relationship from the boundary of the compound site during establishment (scenario 3)

Derivation of ambient air quality

Table F.2 summarises Bathurst's PM_{10} average and 70th percentile values for the last five years. The highest 70th percentile concentration of PM_{10} was used in the cumulative impact assessment, in line with the Victorian government guidance document (EPAV, 2007). This document prescribes the use of the 70th percentile concentration of PM_{10} to be assessed in aggregate with the predicted maximum concentration from the proposal as an alternative to the approach defined by the Approved Methods (DEC, 2005) where a contemporaneous hourly background concentration is added to predictions based on representative local measurements. This is considered appropriate for use in this desktop level one dust assessment. To be conservative, the highest 70th percentile annual PM_{10} level at Bathurst was used.

Table F.2 Annual average and 70th percentile PM_{10} levels at Bathurst

Year	Average PM_{10} (µg/m³)	70th percentile PM_{10} (µg/m³)
2011	11.0	12.9
2012	13.4	15.1
2013	15.1	16.2
2014	14.6	16.9
2015	13.4	14.6
Used background level	**-**	**16.9**

Appendix G – Preliminary land acquisition details

Table G.1 Land acquisition - preliminary

Location	Descriptor	Ownership	LEP zoning	Proposed future use
Parkes LGA				
Brolgan Road (near Millers Lookout Road), Parkes	Lot 1 DP1082995,	Private	SP1 – Special Activities (Freight Transport Facility)	Parkes north west connection/Brolgan Road overbridge
Brolgan Road (near Coopers Road)	Lot 200 DP627302,	Private	RU1 – Primary Production	Parkes north west connection/Brolgan Road overbridge
Brolgan Road (near Millers Lookout Road)	Lot 2 DP1082995	Private	RU1	Parkes north west connection/Brolgan Road overbridge
Brolgan Road	Lot 6 DP857631	Private	SP1	Parkes north west connection
Brolgan Road (near Millers Lookout Road)	Lot 98 DP750179	Private	SP1	Parkes north west connection
Brolgan Road (near Millers Lookout Road)	Lot 99 DP750179	Private	SP1	Parkes north west connection
Brolgan Road (near Millers Lookout Road)	Lot 360 DP750179,	Private	SP1	Parkes north west connection
Brolgan Road (near Coopers Road)	Lot 307 DP750179,	Private	RU1	Parkes north west connection
Millers Lookout Road	-	Public - Road	RU1	Parkes north west connection
Brolgan Road	-	Public - Road	RU1	Parkes north west connection
Brolgan Road	Plan 29281 - 1603	Public - Road	RU1	Parkes north west connection
Coopers Road	-	Public - Road	SP2 – Infrastructure (Rail Infrastructure)	Parkes north west connection
L4 Condobolin Road, Parkes	Lot 4 DP615657	Private	SP1	Parkes north west connection
629 Henry Parkes Way, Parkes	Lot 1 DP1121716	Private	RU1	Parkes north west connection

Appendix H –Inland Rail NSW Construction Noise and Vibration Management Framework

ARTC InlandRail

The Australian Government's priority freight rail project

NSW Construction Noise and Vibration Management Framework

0-9000-ENV-00-RP-0001

Document Control

Client:	Australian Rail Track Corporation
Project:	Inland Rail Programme
Document title:	NSW Construction Noise and Vibration Management Framework
Date issued:	16/06/2017
Originator/Company:	ARTC
Purpose:	To provide consistent approach to NSW construction noise/vibration assessments and selection of feasible and reasonable controls during construction.
Endorsed by:	Stuart Ross
Approved by:	Sarah Connelly
Date approved:	19/06/2017
Status	Issued for Release

Disclaimer: This document has been prepared by ARTC for internal use and may not be relied on by any other party without ARTC's prior written consent. Use of this document shall be subject to the terms of the relevant contract with ARTC.

ARTC and its employees shall have no liability to unauthorised users of the information for any loss, damage, cost or expense incurred or arising by reason of an unauthorised user using or relying upon the information in this document, whether caused by error, negligence, omission or misrepresentation in this document.

This document is uncontrolled when printed.

TABLE OF CONTENTS

TABLES

1. INTRODUCTION

The Australian Government has committed to delivering the Inland Rail Programme (Inland Rail), which is a high performance and direct interstate freight rail corridor between Melbourne and Brisbane, via central-west New South Wales and Toowoomba in Queensland.

Inland Rail is a major nation-building programme of works that will enhance Australia's existing national rail network and serve the interstate freight market.

The Inland Rail route, which is about 1,700 kilometres long, involves:

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

The Inland Rail consists of 13 proposals, seven of which are located within NSW. Each of these proposals (and, in some cases as appropriate, separate work sites within a proposal) will be subject to an assessment and, if required, approval under the statutory requirements of the relevant jurisdiction/s.

The NSW Inland Rail Construction Noise and Vibration Management Framework (the Framework) outlines the approach that ARTC will take to assessing and managing noise and vibration arising from the construction of the NSW components of Inland Rail. The Framework is identified in the Inland Rail Noise and Vibration Strategy (01-9000-PE-P11-ST-0003) and provides the necessary detail to allow practical application of relevant guidelines and standards at all project stages.

Terms and acronyms used in this Framework are defined in Table 1.

Table 1 Definitions

Term or Acronym	Definition
AA	Alternate accommodation – Refer to additional mitigation measures
ARTC	Australian Rail Track Corporation. Australian Government-owned corporation tasked with developing a 10 year program to implement Inland Rail
CO	Communication– Refer to additional mitigation measures
CNVIS	Construction Noise and Vibration Impact Statement. Informs the development of the CNVMP (see Table 2)
CO1	Category 1: Personalised communication (doorknock, meeting, telephone call) – Refer to additional mitigation measures
CO2	Category 2: Communication to inform (newsletter, email, letterbox drop, advertisements, website and media) – Refer to additional mitigation measures

Term or Acronym	Definition
CNVMP	Construction Noise and Vibration Management Plan. Details how construction noise and vibration impacts will be minimised and managed. The CNVMP is based on the Project Environmental Management Plan.
DECC	The former Department of Environment and Climate Change
EIS	An Environmental Impact Statement is a document prepared to describe the effect of proposed activities on the environment. An EIS is determined by NSW Planning and Environment, and is developed in response to the Secretary's Environmental Assessment Requirements (SEARs).
Enhancement Works	Enhancement works involve bridge works, and/ or track lowering, and may also include ancillary works such as gantry works, signalling and communications.
Environmental impact assessment	A broad term that covers a range of assessments required under the *Environmental Planning and Assessment Act 1979* (EP&A Act) and any related amendments to the Act.
Feasible	Relates to engineering considerations, what can practically be built (e.g. safety, access, and site constraints).
Greenfield	This involves construction within an entirely new corridor.
ICNG	Interim Construction Noise Guideline (DECC 2009)
Inland Rail Programme (Inland Rail)	The Inland Rail programme encompasses the design and construction of a new inland rail connection between Melbourne and Brisbane, via Wagga Wagga, Parkes, Moree, and Toowoomba. The route for Inland Rail is about 1,700 km in length. Inland Rail will involve a combination of track upgrades, enhancement of existing rail track and the provision of new track in greenfield areas.
Inland Rail Proposal	Specific works subject to an environmental impact assessment and confined to a particular geographic area within the Programme alignment, for example Parkes to Narromine.
NML	Noise Management Levels
OOHW	Out of hours work. Works conducted outside of the Standard Programme Construction Hours.
Preconstruction Activities	This includes enabling works such as geotechnical investigations, the movement of machinery, and other activities that may be undertaken prior to formal commencement of project construction.
Project Environmental Management Plan	Prepared by ARTC to guide the construction contractor in environmental management. This document will form the basis of the contractor's CNVMP.

Term or Acronym	Definition
Reasonable	Selecting reasonable measures from those that are feasible involves judging whether the overall noise benefits outweigh adverse social, economic and environmental effects including the cost of the measure. Further advice on determining reasonable measures can be found in the Interim Construction Noise Guideline.
Receiver	A premises that is subject to construction noise or vibration. - Noise sensitive receivers are properties where the occupants can be adversely impacted by noise or vibration including dwellings, hospitals, places of worship, childcare centres etc.. - Impacted receivers are those exposed to noise and vibration above the relevant management levels. - Residential receivers are properties where people reside on a permanent basis.
REF	Review of Environmental Factors is a document prepared to describe the effect of proposed activities on the environment. A REF will be prepared for projects where an EIS is not triggered. A REF is determined by ARTC.
RO	Respite Offer
SEARs	Secretary's Environmental Assessment Requirements are the requirements that must be addressed as part of the EIS.
SSI	State Significant Infrastructure
Standard Programme Construction Hours	Hours of work for construction activities undertaken as part of the Inland Rail Programme: 6am – 6pm Monday – Sunday (including public holidays)
Upgrade works	Can involve any or all of the following: upgrading the track, formation, culverts, curve easings, construction of passing loops and/ or ancillary works to level crossings, signalling and communications, signage, fencing, services and utilities.

1.1. Aim and Scope

The Framework is applicable to all NSW Inland Rail proposals and fulfils the recommendation in the *Interim Construction Noise Guideline, DECC 2009* (ICNG) for organisations to detail best practice, project-specific approaches to minimise noise impacts from pre-construction activities and construction and provide the public with transparency. The Framework also establishes the requirement for the management of construction vibration.

The Framework applies to all project stages, from the environmental impact assessment through to construction and is most relevant to:

- Project managers
- Acoustic consultants

- Environmental officers
- Construction contractors.

This Framework does not take precedence over proposal specific approval or licence conditions. The Framework will be reviewed as the Inland Rail Programme progresses to incorporate learning from Inland Rail proposals and in response to release or update of relevant guidelines, standards and policies.

Any reference to 'construction noise' in this Framework should also be taken to include noise generated by 'pre-construction activities'. Similarly a reference to vibration also includes vibration generated as part of pre-construction activities. Within NSW there are seven Inland Rail proposals, these are described in Table 2.

Table 2 NSW Inland Rail Proposals

PROPOSAL	DESCRIPTION	PROJECT TYPE	ASSESSMENT TYPE
Albury to Illabo	Providing double-stack capability for 185km of existing track.	Enhancement	REF
Illabo to Stockinbingal	New 37km standard gauge rail line that eliminates a twisty section of track known as the Bethungra Spiral.	Greenfield	SSI EIS
Stockinbingal to Parkes	Providing double-stack capability and passing loops on 173km of existing track.	Enhancement	REF
Parkes to Narromine	Upgrade of the existing 107km section of track, with passing loops, ancillary works and new 5.3km connection to the Broken Hill line.	Upgrade	SSI EIS underway
Narromine to Narrabri	307km of new track constructed between Narromine and Narrabri.	Greenfield	SSI EIS
Narrabri to North Star	188km of existing track upgraded to take heavier axle loads and double stacked trains	Upgrade	SSI EIS underway
North Star to NSW/Qld border	52 km of new track.	Greenfield	SSI EIS

1.2. Objectives

The objectives of this Framework are to:

- Ensure neighbours and people living in close proximity to places where work is being undertaken are not unduly affected and also address the requirements of relevant NSW guidelines, standards and policies

- Provide a consistent approach to the evaluation, selection and delivery of feasible and reasonable noise and vibration controls during construction
- Balance the needs of adjacent communities, rail commuters and train operators by facilitating efficient project delivery.

2. CONSTRUCTION NOISE AND VIBRATION ASSESSMENT

The level of detail available on the construction methodology and project design increases as the planning and approval process progresses. Noise and vibration assessments are undertaken to quantify the impact of construction activities on receivers. The results of the assessment are then used to develop management measures to mitigate the impact of construction activities on receivers. Assessments should:

- Be based on the best information available at the time
- Assess a realistic, worst-case scenario
- Provide sufficient detail to identify project specific noise and vibration mitigation measures.

Assessments and plans incorporating different levels of detail will be required pre and post project approval. Table 3 identifies the document and information required at each stage.

Each aspect of construction noise and vibration is to be assessed in accordance with NSW state guidelines, Australian or international standards (Table 4), and the SEARs and relevant conditions of approval. Assessments should be quantitative and where possible estimate the duration of impact on receivers, noting that works will move along the alignment and are unlikely to affect a single receiver for the entire project construction period.

Table 3 Construction Noise and Vibration Assessment Documents

Project Stage	Document	Description	Content
Pre-approval	Environmental impact assessment (EIS or REF) – Noise and Vibration Study	Describes all noise and vibration effects of the project on the environment and advises how best to manage the impacts.	• Description of works, duration and working hours and noise management levels • Identification of noise sensitive receivers including impacted commercial receivers • Identification of vibration sensitive structures including heritage buildings, and other vibration sensitive receivers (including sensitive scientific and medical equipment) • Assessment of likely noise impacts, including sleep disturbance • Assessment of construction methods with the potential to cause discomfort, cosmetic or structural damage • Conceptual description of feasible and reasonable work practices to minimise

Project Stage	Document	Description	Content
			noise and vibration impacts • Changes made to the proposal in response to submissions
Post-approval	Construction Environmental Management Plan – Noise and Vibration	Prepared by ARTC to collate the environmental management requirements for each proposal and guide the development of the contractor's CNVMP. Based on detailed design incorporating a Construction Noise and Vibration Impact Statement (CNVIS).	• Description of works, duration, working hours and noise management levels • Assessment of likely noise impacts, including sleep disturbance based on detailed design • Assessment of construction methods with the potential to cause discomfort, cosmetic or structural damage, based on detailed design • Defines the requirements for pre-construction dilapidation surveys • Approval and licence conditions • Feasible and reasonable work practices • Monitoring, training and auditing requirements
	Construction Noise and Vibration Management Plan (CNVMP)	Details how construction noise and vibration impacts will be minimised and managed. Incorporates project specific approval or licence conditions. Prepared prior to the commencement of construction, usually by the construction contractor.	• Description of works, duration and working hours and noise management levels • Identification of noise sensitive receivers including impacted commercial receivers • Identification of vibration sensitive structures and receivers, and requirements for dilapidation surveys and/ or monitoring during construction • Details of construction including and indicative schedule for key construction scenarios • Feasible and reasonable work practices to minimise noise and vibration impacts • Monitoring and auditing procedures • Blast Management Plan (if applicable) considering methods contained in AS2187.2-2006

Table 4 Construction Noise and Vibration Guidelines and Standards

Aspect	Description	Framework
Airborne noise	Construction noise	Interim Construction Noise Guideline (Department of Environment and Climate Change, NSW, 2009)
	Construction traffic noise	NSW Road Noise Policy (NSW EPA, 2011)
	Sleep disturbance (for works extending over more than two consecutive nights)	Interim Construction Noise Guideline (Department of Environment and Climate Change, NSW, 2009) NSW Road Noise Policy (NSW EPA, 2011)
Ground-borne noise	Sound transmitted through the ground into a structure, for example by underground works such as tunnelling.	Interim Construction Noise Guideline (Department of Environment and Climate Change, NSW, 2009)
Vibration	Human responses to vibration.	Assessing Vibration: a technical guideline (Department of Environment and Conservation, NSW, 2006)
	Effect of vibration on structures (cosmetic and/ or structural damage)	German Standard DIN 4150-3: Structural Vibration – effects of vibration on structures.
Blasting	Overpressure and vibration from blasting, potential to cause annoyance/ discomfort, cosmetic or structural damage	Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration (ANZECC 1990) or other limit set by conditions of consent[1] AS 2187: Part 2-2006 'Explosives - Storage and Use - Part 2: Use of Explosives'

2.1. Standard Programme Construction Hours

Assessment of noise and vibration should be undertaken with reference to the Standard Programme Construction Hours:

- 6am – 6pm Monday – Sunday

These working hours will apply to locations where there are impacted receivers. Extended working hours outside of the Standard Programme Construction Hours are permissible where impacts to receivers can be appropriately managed. Any changes to working hours must be supported by the results of a noise and vibration assessment (e.g. EIS or CNVIS).

The Standard Programme Construction Hours have been developed to:

[1] Recent NSW infrastructure project approvals have recognised that levels presented in Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration are restrictive and have applied these upper limits: vibration (PPV): 25mm/s, overpressure: 125dBL at the nearest receiver. More conservative limits apply to heritage structures and buildings.

- Accommodate the remote location of worksites and the efficient use of the workforce
- Reduce the duration of impact on individual receivers and minimise disruption to commuters and freight operators using existing operational rail lines
- Minimise the potential to cause sleep disturbance.

2.1.1. Standard Programme Blasting Hours

The Standard Programme Blasting Hours are below. These are consistent with the ICNG.

- Monday – Friday 9am – 5pm
- Saturday 9am -1pm
- No blasting on Sundays or public holidays.

2.2. Works outside of Standard Programme Construction Hours

Works may be conducted outside of the Standard Programme Construction Hours if one or more of the following applies:

- The delivery of oversized plant or structures that police or other authorities have determined requires special arrangements to transport along public roads
- Emergency work to avoid the loss of life or damage to property, or to prevent environmental harm
- Works that do not exceed the noise management level adopted in the Construction Noise and Vibration Management Plan (CNVMP) at the nearest receiver
- Works that do not exceed the 'preferred' human exposure vibration level adopted in the Construction Noise and Vibration Management Plan (CNVMP) at the nearest receiver
- Where agreement is reached between ARTC and potentially affected sensitive receivers. Agreements must be made in writing (refer to Section 7.2.2 of the ICNG for further guidance)
- Works to ensure construction personnel, road user or public safety
- Works that cannot be undertaken during the day due to ambient daytime temperatures that may be carried out during the night
- Rail tamping where the stress free temperature of the rail cannot be achieved during the Standard Programme Working Hours
- Works required to be conducted during a track possession.

2.3. Track Possessions

Track possessions will be required to undertake construction work on operational rail lines as part of the Inland Rail Programme. Track possessions are undertaken when safety or construction requirements mean that construction cannot be completed during Standard Programme Construction Hours.

Noise and vibration impacts from track possessions should be assessed in the environmental impact assessment, noting that the number of possessions required by a proposal or the scale of the possession may not be defined. A further detailed assessment should be undertaken as part of the CNVIS to inform site specific mitigation measures.

3. MANAGEMENT MEASURES

3.1. Standard Management Measures

The measures below will be applied to all works conducted during Standard Programme Construction Hours in order to minimise potential noise and vibration impacts at surrounding noise sensitive receivers. It is considered that the measures in Table 5 are feasible and reasonable for all Inland Rail projects in most circumstances.

Table 5 Standard Management Measures

Standard Management Measures
Site inductions for all employees and contractors will address: • Environmental aspects and impacts • Proposal specific and standard noise management measures • Licence and approval conditions • Hours of work • Environmental incident reporting and management procedures • Complaint management
Daily site specific briefings for all employees and contractors will include: • Site specific noise management measures • Location of nearest noise sensitive receivers • Construction employee parking areas • Behavioural practices (e.g. avoid swearing, shouting, dropping materials from heights) • Designated loading/unloading areas and procedures
Work compounds, storage areas, parking areas, unloading/loading areas and other semi-permanent construction sites should be located away from noise sensitive receivers. Where this is not possible, the orientation and layout of the work site will consider noise impacts, and opportunities to shield receivers from noise through the use of site buildings and stockpiles should be considered.
When working adjacent to schools, medical centres, childcare centres or places of worship, particularly noisy activities will be scheduled outside of operating or service hours where possible.
Equipment that is used intermittently is to be shut down when not in use.
The off-set distance between noisy plant and noise sensitive receivers will be maximised.
The number of vehicle trips to and from site will be optimised.
Regularly inspect and maintain equipment to ensure it is operating correctly.
Avoid the simultaneous operation of noisy plant within discernible range of noise sensitive receivers where possible.

Standard Management Measures
Use of non-tonal reversing alarms for all permanent mobile plant[2].
Where available, equipment selection will favour the use of quieter and less vibration emitting construction methods.
A telephone, email and web based community information service will be established to allow the community to obtain additional information on construction activities, provide feedback or make a complaint.
Regular communications on the activities and progress of the proposal will be provided to the community (e.g. via newsletter, email and/or website).
Noise or vibration monitoring in response to complaints will be undertaken where the results or the process assist in resolving or understanding the receiver's issue.
Where vibration levels are predicted to approach the criteria for cosmetic building damage or limits for critical or sensitive areas, attended vibration measurements should be undertaken at the commencement of vibration generating activities to confirm that vibration limits are within the acceptable range.
Where vibration and overpressure from blasting or construction activities are predicted to approach the relevant limits, dilapidation surveys on potentially affected buildings will be undertaken.

3.2. Additional Management Measures

Where works conducted outside of Standard Programme Construction Hours result in exceedance of noise or vibration management levels, the proposal will implement the measures described above as well as additional measures based on impact that are described below. Due to the number of proposals and variety of locations that make up the Inland Rail Programme in NSW, these measures may need to be adapted to suit individual proposals and community expectations.

3.2.1. Communication (CO)

The level of noise and vibration impact and duration will guide communication with receivers. Accurate and timely communication is essential to manage and understand community expectations for out of hours works (OOHW).

Two categories of communication have been developed commensurate with the scale of the impact. The purpose of the communication is described below, but the method of communication will be at the discretion of the proposal and detailed in the Proposal's Community Engagement Plan.

- Category 1 CO1: Communication should be personalised (e.g. door knock, meeting, telephone call). Contact with these residents should commence early to enable feedback to be considered by the proposal.
- Category 2 CO2: Communication to provide information on the proposal via letter box drop, email, newsletter, media advertisements and/or website a minimum of 5 days prior to the works commencing.

At minimum the information provided to stakeholders (CO1 or CO2) will include:

- The reason the work is required to be undertaken outside of the Standard Programme Construction Hours

[2] Excludes light vehicles

- A diagram that identifies the location of the proposed works in relation to nearby cross streets and local landmarks
- The nature, scope and duration of the works, including start and finish times
- The expected noise impacts on receivers
- Information on how to obtain further information or make a complaint, including an after-hours number and Programme website.

3.2.2. Respite Offer (RO)

Residential receivers subject to lengthy periods of noise or vibration may be eligible for a respite offer in accordance with Tables 6, 7 and 8. The purpose of such an offer is to provide residents with respite from an ongoing impact and may comprise of pre-purchased movie tickets, dinner vouchers or similar.

Respite offers are not applicable to non-residential receivers.

3.2.3. Alternate Accommodation (AA)

Alternate accommodation options (i.e. accommodation in motels away from the worksite) may be provided for residents living in close proximity to construction sites in accordance with Tables 6 - 8.

Acceptable accommodation measures will be developed with the affected community and project team.

3.2.4. Assigning Additional Management Measures

Tables 6-8 identify appropriate additional management measures for noise sensitive receivers by matching the predicted exceedance of the relevant management level to the appropriate management measures which serve to counter or mitigate that exceedance. The management levels are derived from the assessment process outlined in the relevant guideline or standard (Table 4).

OOHW has been divided into two periods (rest and sleep) in Tables 6-8 to recognise the different impact that works can have at those times.

Management measures for works within the Standard Programme Construction Hours are listed in Table 5, and therefore only works outside of this period are considered in Tables 6-8.

Table 6 Additional Management Measures – Airborne Noise

Time Period		Exceedance of NML	Perception	Duration	Communication Category/ Management Measure
OOHW Rest Period Evenings	Monday – Sunday 6pm – 10pm (including public holidays)	<5	Noticeable	Any	CO1
		5-15	Clearly audible	Any	CO1
		15-25	Moderately intrusive	Any	CO1, CO2

Time Period		Exceedance of NML	Perception	Duration	Communication Category/ Management Measure
		>25	Highly intrusive	Any	CO1, CO2
				>2 consecutive rest periods	CO1, CO2,RO
OOHW Sleep Period Night	Monday – Sunday 10pm – 6am (including public holidays)	<5	Noticeable	Any	CO1
		5-15	Clearly audible	Any	CO1
		15	Moderately intrusive	Any	CO1, CO2
				>2 consecutive sleep periods	CO1, CO2, RO
		>25	Highly intrusive	Any	CO1, CO2, RO
				>2 consecutive sleep periods	CO1, CO2, RO, AA

Table 7 relates to exceedances of ground-borne construction noise at noise sensitive receivers.

Table 7 Additional Management Measures – Ground- borne Noise

Time Period		Exceedance of NML	Perception	Duration	Communication Category/ Management Measure
OOHW Rest Period Evenings	Monday – Sunday 6pm – 10pm (including public holidays)	<5	Noticeable	Any	CO1
		5-15	Clearly audible	Any	CO1
		15-25	Moderately intrusive	Any	CO1, CO2
		>25	Highly intrusive	Any	CO1, CO2
				>2 consecutive	CO1, CO2,RO

Time Period		Exceedance of NML	Perception	Duration	Communication Category/ Management Measure
				rest periods	
OOHW Sleep Period Night	Monday – Sunday 10pm – 6am (including public holidays)	<5	Noticeable	Any	CO1
		5-15	Clearly audible	Any	CO1
		15	Moderately intrusive	Any	CO1, CO2
				>2 consecutive sleep periods	CO1, CO2, RO, AA
		>25	Highly intrusive	Any	CO1, CO2, RO
				>2 consecutive sleep periods	CO1, CO2, RO, AA

Table 8 relates to exceedances of the human comfort vibration values for continuous, impulsive and intermittent vibration at noise sensitive receivers. Potential exceedances of the cosmetic or structural damage criteria are to be addressed via the Standard Management Measures in Table 5.

Table 8 Additional Management Measures – Vibration

Time Period		Duration	Exceedence of 'preferred' value	Exceedence of 'maximum' value
OOHW Rest Period Evenings	Monday – Sunday 6pm – 10pm (including public holidays)	Any	CO1, CO2	CO1, CO2, RO
OOHW Sleep Period Night	Monday – Sunday 10pm-6am (including public holidays)	Any	CO1, CO2, RO	CO1, CO2, RO, AA

4. COMPLAINT HANDLING AND COMMUNITY ENGAGEMENT

Complaints will be handled in accordance with Inland Rail's complaints management system. Community engagement plans will be developed for each proposal incorporating the requirements of this Framework.

5. MONITORING AND AUDITING

5.1. Noise and Vibration Monitoring

Compliance noise and vibration monitoring will be undertaken as specified in this Framework, with the methodology and results documented. Noise measurements shall be undertaken consistent *AS1055.1-1997 Acoustics – Description and Measurement of Environmental Noise – General Procedures*. Vibration measurements shall be undertaken in accordance with *Assessing Vibration: a technical guideline* and *BS7385 Part 2-1993 Evaluation and measurement of vibration in buildings*, as recommended in *AS 2187: Part 2-2006 'Explosives - Storage and Use - Part 2: Use of Explosives'*.

5.1.1. Track Possession Monitoring Programme

If there is the potential to impact sensitive receivers, during a track possession, a monitoring programme should be initiated to confirm predicted noise and vibration levels and identify any additional feasible and reasonable measures to reduce impact on receivers. The monitoring programme (for either noise, vibration or both) should be risk based, and would not need to occur if there are no impacted receivers within the vicinity of the work. Design of the monitoring programme will be included in the proposal CNVMP.

5.1.2. Dilapidation Surveys

If construction activities have potential to cause cosmetic or structural damage through vibration or overpressure to public utilities, structures, buildings or their contents an existing condition report of buildings and structures will be undertaken in accordance with *AS 4349.0 Inspection of buildings – General requirements*. Where a heritage structure is assessed as potentially susceptible to vibration damage, a more conservative cosmetic damage criterion should be adopted.

5.2. Auditing

Periodic audits will be undertaken of proposal construction activities and the implementation of the CNVMP to ensure that noise and vibration predictions are accurate and the required management measures are in place. The Proposal Environmental Management Plan and CNVMP will prescribe the auditing regime for each proposal.

Appendix I – Sustainability assessment results

Assessment using the infrastructure sustainability ratings tool

Purpose of the assessment

The purpose of the assessment was to:

- determine the likely infrastructure sustainability (IS) ratings that would apply to the proposal under a business as usual (BAU) approach
- identify IS credits that would provide additional value to the proposal, such as cost reductions, improved environmental outcomes, and .improved stakeholder relationships, and outline the cost implications for each activity
- determine the resultant IS rating and potential impacts on the proposal with the revised approach.

Approach

The assessment process involved:

- A workshop with ARTC and GHD team members was held on 13 April 2016 to discuss the IS rating scheme and its application to the proposal. Each credit was applied over the proposal and reviewed.
- Following the workshop:
  - the applicable IS rating scheme credits for the proposal were determined
  - the value or improvements the IS framework will apply to the proposal were determined
  - the appropriate staging of actions to address issues was identified
  - additional time and resources for implementation were evaluated
  - key issues or concerns that may need to be addressed were identified.
- The findings of the assessment were documented in an amended IS rating calculation spreadsheet.

The assessment undertaken using the IS rating tool was based a design rating only, and includes design elements and construction requirements for sustainability. An 'as-built' assessment may be undertaken using the tool following practical completion. This would be based on sustainability performance measured during construction.

Assessment outcomes

The indicative IS rating that applies to the proposal are listed in Table H.1. The preferred approach incorporates additional sustainability activities and initiatives.

Table I.1 IS rating tool results

Approach	Score	Rating
Business as usual	33.6	Commended
Preferred approach	50.4	Excellent

The major differences between BAU and the preferred approach are listed in Table H.2. The level and score for each credit is provided, along with the value to the proposal for the preferred approach. Opportunities to improve the sustainability outcomes of the proposal are listed in Table H.2.

It is noted that not many infrastructure projects have achieved ISCA IS ratings to date. However, for comparison purposes, projects registered for ratings in urban areas are aiming to achieve scores in the 50 to 65 range. Some higher profile projects such as North West Metro and Melbourne Metro are targeting scores of 65 or higher. Other projects (mostly road projects) are targeting scores in the 35-50 range.

Achieving an ‘excellent’ rating via the IS rating tool would provide proposal specific sustainability outcomes in terms of:

- reduction in transport via waste and material efficiency
- reduction in waste disposal and waste transport
- reduction in power and water use
- long term operation and maintenance savings
- improved project timelines and stakeholder engagement
- reduction in overall proposal carbon emissions and fewer tonnes of carbon compared to transport by road vehicle.

Through achievement of an ‘excellent’ rating with the ISCA rating tool, the proposal would also be consistent with the principles of ESD, and would align with relevant sustainability policies and guidelines.

Table I.2 Opportunities to improve the sustainability outcomes of the proposal

Credit	Description	BAU[1] level	Alternative level	Score increase	Cost and implementation	Value to proposal
Management and governance						
Man-1	Sustainability leadership and commitment	1/3	2/3	0.36	ARTC time to develop a sustainability policy and integrate in proposal contracts.	Provides overarching intent to all stakeholders in project delivery. Committed targets and objects to ensure outcomes are achieved and not motherhood statements
Man-2	Management system accreditation	1/1	1/1	0.00	No additional cost - ARTC to specify in contracts. Head contractor to hold appropriate accreditation.	Accreditation will reduce project risk and improve standards.
Man-3	Risk and opportunity management	1/2	2/2	0.43	Minor cost for contractors in improved process. To be integrated through both design and construction.	Plays a significant role in reducing project risks and improving innovation and opportunities. This can lead to significant cost savings or beneficial outcomes.
Man-4	Organisational structure, roles and responsibilities	1/3	2/3	0.36	Achieving a level two credit should not impose any additional cost on the proposal Achieving a level three credit involves engaging an independent sustainability professional on a quarterly in bi-annual basis.	Having appropriate lines of responsibility would enhance project outcomes, reduce risk, and improve efficiency and project delivery
Man-5	Inspection and auditing	1/2	1/2	0.00	BAU – no additional cost to the proposal. Requirement of contractor.	Inspections and audits will enhance performance and identify any problems at an early stage.
Man-6	Reporting and review	1/3	1/3	0.00	BAU – no additional cost.	Value in accountability and communication to proposal stakeholders.

Credit	Description	BAU[1] level	Alternative level	Score increase	Cost and implementation	Value to proposal
					ARTC to specify any reporting requirements.	
Man-7	Knowledge sharing	1/3	3/3	1.43	No additional cost. ARTC to coordinate through measures such as a monthly committee meeting.	Shared learning and value across proposal stages which, if done correctly, can result in efficiency and improved outcomes across proposals.
Man-8	Decision-making	1/3	2/3	1.07	No additional cost to proposal – contractor responsibility.	If implemented correctly, MAN-8 can assist decision making and in some cases reduce cost.
Procurement and purchasing						
Pro-1	Commitment to sustainable procurement	1/3	2/3	0.83	No additional cost to proposal – contractor responsibility.	Improved project wide sustainability outcomes and improved stakeholder relations.
Pro-2	Identification of suppliers	1/3	2/3	0.83	Small additional time commitment in procurement process.	Innovation and cost savings with forward procurement.
Pro-3	Supplier evaluation and contract award	0/3	0/3	0.0	-	-
Pro-4	Managing supplier performance	0/3	0/3	0.0	-	-
Climate change adaptation						
Cli-1	Climate change risk assessment	1/3	2/3	0.83	If a climate risk workshop is undertaken at an early stage the cost will be minimal.	Risk mitigation in design. Improves durability of asset and potential significant costs later on through maintenance and repair and outages. Improves reliability of service to clients.

Credit	Description	BAU[1] level	Alternative level	Score increase	Cost and implementation	Value to proposal
					It is not likely feasible for adaptation options to be implemented for all medium climate risks identified	
Cli-2	Adaptation options	0/3	1/3	0.83	A climate risk assessment should be undertaken as early as possible to inform design. The cost of mitigating risks increases for the proposal the further back this task takes place.	Risk mitigation in design. Improves durability of asset, and potential significant costs later on through maintenance and repair and outages. Improves reliability of service to clients.
Energy and carbon						
Ene-1	Energy and carbon monitoring and reduction	1/3	1/3	1.56	Monitoring and modelling of energy and greenhouse gas (GHG) emissions is a standard process that will incorporate a minor additional cost to the proposal. This is required for a range of credits covering energy, greenhouse, water and materials. Further monitoring and modelling should be undertaken by the contractor.	Significant savings can be achieved by using modelling to influence the design and construction stage. This can result in major reductions in concrete, steel, and haulage. Typically significant savings have been achieved by ISCA rated projects to date through this credit.
Ene-2	Energy and carbon reduction opportunities	0/3	1/3	0.0	Monitoring and modelling of energy and GHG emissions is a standard process that will incorporate a minor additional cost to the proposal. This is required for a range of credits covering energy, greenhouse, water and materials. Further monitoring and modelling should be undertaken by the contractor.	Significant savings can be achieved by using modelling to influence design and construction stage. This can result in major reductions in concrete, steel, and haulage. Typically significant savings have been achieved by ISCA rated projects to date through this credit.
Ene-3	Renewable energy	0/3	0/3	0.0	-	-
Water						

Credit	Description	BAU[1] level	Alternative level	Score increase	Cost and implementation	Value to proposal
Wat-1	Water use monitoring and reduction	1/3	1/3		Can be implemented at minimal cost during construction phase.	Provide a positive initiative to communicate to stakeholders in drought prone region.
Wat-2	Water saving opportunities	1/3	1/3		Review of options to reduce water use can be undertaken by construction contractor at negligible cost.	-
Wat-3	Replace potable water	0/3	1/3		The cost of using non-potable water may be negligible depending on location and circumstance.	Potential minor savings by sourcing non-potable water.
Materials						
Mat-1	Materials footprint measurement and reduction	1/3	2/3	2.33	Minimal cost to apply the ISCA materials calculator. To be undertaken with bill of quantities prior to detailed design stage to assist in base case and estimated savings.	Reducing material quantities will result in cost savings and reduced greenhouse gas outcomes on the proposal.
Mat-2	Environmentally labelled products and supply chains	0/3	0/3	0.0	-	-
Discharge						
Dis-1	Receiving water quality	1/3	1/3	0.0	BAU requirement during construction	No risk or harm to surrounding area/waterways.
Dis-2	Noise	1/3	3/3	1.56	Level 3 may be achieved as BAU depending on the extent of monitoring and modelling undertaken.	Improved stakeholder relationships - avoided future costs.
Dis-3	Vibration	1/3	3/3	1.56	Similar to noise, specific goals will need to be met - level 3 could potentially be achieved as BAU.	Meet compliance requirements.

Credit	Description	BAU[1] level	Alternative level	Score increase	Cost and implementation	Value to proposal
Dis-4	Air quality	1/3	1/3	0.0	BAU cost to proposal.	Meet compliance requirements.
Dis-5	Light pollution	1/1	1/1	0.0	BAU cost to proposal.	Meet compliance requirements.
Land						
Lan-1	Previous land use	0/3	0/3	0.0	No cost. No points achievable for this credit due to predominantly agricultural land uses in the study area.	Credits for rating.
Lan-2	Conservation of onsite resources	1/3	2/3	0.17	No cost. Potential to achieve Level 2.	Reduces the need to source and transport materials from outside of the proposal site, which has can then reduce Cost and emissions associated with material transport.
Lan-3	Contamination and remediation	1/3	2/3	0.83	BAU cost to proposal.	Reduced risk and improved environmental outcomes.
Lan-4	Flooding design	1/2	1/2	0.0	Flooding design will be an important component and cost in the design process. Whilst the design will alter the existing landscape, the target will be for altered flood levels to be no worse than existing. A level 1 credit may be achievable if the design does not increase existing flood risk.	Reduce impacts on line outages and costs regarding impacts to adjacent properties.
Waste						
Was-1	Waste management	1/3	1/2	0.00	BAU cost to proposal - possible additional costs for tracking and auditing if seeking a level 2 credit.	Smart waste management can save significant cost and improve the proposals sustainability outcomes.

Credit	Description	BAU[1] level	Alternative level	Score increase	Cost and implementation	Value to proposal
Was-2	Diversion from landfill	0/3	0/3	0.00	-	-
Was-3	Deconstruction/ Disassembly/ Adaptability	0/3	3/3	2.33	Minor cost to develop a deconstruction plan. Can be developed as part of detailed design stage.	Reduces future maintenance costs, repairs or future line upgrades.
Ecology						
Eco-1	Ecologically sensitive sites	1/1	1/1	0.0	BAU cost to proposal.	Environmental performance.
Eco-2	Ecological value	0/3	0/3	0.0	Potential costs to enhance ecological value. To achieve level 1 negligible costs may be involved.	Enhance environmental outcomes and improve stakeholder/community relations.
Eco-3	Biodiversity enhancement	1/3	1/3	0.0	Costs for offsetting but may be a proposal BAU requirement.	Enhance environmental outcomes and improve stakeholder/community relations.
Eco-4	Habitat connectivity	1/3	2/3	1.0	Cost may be a BAU compliance requirement. Costs for offsetting are a proposal BAU requirement.	Enhance environmental outcomes and improve stakeholder/community relations.
Community health, well-being and safety						
Hea-1	Community health and well-being	0/3	1/3	0.50	BAU cost to proposal.	Minimise disruption to the proposal - cost and timelines. To be further investigated as proposal progresses.
Hea-2	Crime prevention	1/2	1/2	0.0	Contractors likely to implement measures to reduce the likelihood of crime during construction.	Reduced the cost of maintenance.

Credit	Description	BAU[1] level	Alternative level	Score increase	Cost and implementation	Value to proposal
Hea-3	Community and user safety	1/2	1/2	0.0	Minor additional cost to achieve level 2 credit. Level 2 to be further considered as proposal progresses.	Reduced cost of future safety incidents. Community and stakeholder benefits.
Heritage						
Her-1	Heritage assessment and management	1/3	1/3	0.0	BAU for EIS. Level 2 could occur, with some additional costs for non-compulsory items	Improved stakeholder relationships.
Her-2	Monitoring and management of heritage	0/3	0/3	0.0	-	-
Stakeholder participation						
Sta-1	Stakeholder engagement strategy	1/3	1/3	0.0	BAU cost to proposal.	Improved stakeholder relationships.
Sta-2	Level of engagement	1/3	1/3	0.0	Costs to implement additional stakeholder engagement measures.	Improved stakeholder relationships.
Sta-3	Effective communication	1/3	1/3	0.0	Costs to implement additional stakeholder engagement measures.	Improved stakeholder relationships.
Sta-4	Addressing community concerns	1/3	1/3	0.0	Costs to implement additional stakeholder engagement measures.	Improved stakeholder relationships.
Urban and landscape design						
Urb-1	Site and context analysis	1/1	1/1	0.0	-	-
Urb-2	Site planning	0/3	0/3	0.0	-	-

Credit	Description	BAU[1] level	Alternative level	Score increase	Cost and implementation	Value to proposal
Urb-3	Urban design	0/3	0/3	0.0	-	-
Urb-4	Implementation	0/3	0/3	0.0	-	-

Note 1: Business as usual

Appendix J – Climate change risk assessment

Climate change risk assessment

The climate change risk assessment identifies risks and risk mitigation measures associated with the predicted impacts of climate change on the design, construction, and operation of the proposal. The objectives of this assessment are to:

- identify significant potential impacts of climate change on the proposal's infrastructure and service delivery
- assess the level of associated risks.

The climate change risk assessment was undertaken in general accordance with the following standards and guidelines:

- *AS/NZS ISO 31000:2009 Risk management – Principles and guidelines*
- *AS 5334:2013 Climate change adaptation for settlements and infrastructure – a risk based approach*
- *Climate Change Impacts and Risk Management – A Guide for Business and Government* (AGO, 2006).

The risk assessment involved assessing the risk level of each identified potential impact by identifying the consequences of the impact and the likelihood that the impact can occur.

Definitions of the 'consequence' and 'likelihood' of the impacts are discussed in more detail in the following section.

Methodology

The assessment involved the following main tasks:

Review of climate data and the existing climate environment

Data on climatic conditions and climate change projections for the study area was reviewed, based on available data from the Australian Bureau of Meteorology (BoM) and the *Climate Change in Australia* web-based data portal (maintained by CSIRO and BoM). Due to the long design life of the proposal and potential exposure to flooding impacts (described in chapter 16), it was determined that an assessment of the impact from climate change was appropriate for the proposal. The climate change risk assessment considers a number of climate variables and extreme weather events which could have the potential to impact infrastructure associated with the proposal.

The climatic environment is relatively consistent along the length of the proposal site. There is minimal change in climatic conditions or variability. As such, three reference points in the study area were selected to best represent the climatic environment in the vicinity of the proposal site. Historic weather records were analysed from three BoM weather stations.

It is noted that the weather station at Narromine does not record sufficient meteorological information to establish historic climate conditions, therefore the weather station at Dubbo (about 35 kilometres east of Narromine) was used for historic data. Based on the spatial distance and topographic conditions at the two towns, the climatic conditions are considered to be similar, hence the historic climate data from Dubbo is considered representative of the conditions at Narromine.

Climate projections

To determine the potential implications of climate change for the design and operation of the proposal, and assess the risk and vulnerability of the proposal to climate change, it is necessary to develop projections of the future climate in the study area (that is, the area in which the proposal site is located). The principal means of developing projections of the future climate is to use global climate models.

The Intergovernmental Panel on Climate Change (IPCC) has developed four scenarios for global climate projections that relate to how the world may respond to the challenge of a changing climate, the need to continue to produce and use energy and resources, and the global greenhouse gas emissions that may occur. These scenarios incorporate diverging tendencies based on alternative economic, globalisation and environmental pathways. These have been modified through subsequent reports and renamed as representative concentration pathways (RCPs) in the IPCC's Fifth Assessment Report.

CSIRO and BoM's *Climate Change in Australia* technical reports and Climate Futures Exploration Tool link strongly to the findings of the latest IPCC Fifth Assessment Report, and update the projections previously outlined in the 2007 Technical Report. The 2015 Technical Report released by CSIRO and BoM uses over 40 global climate models to produce climate change projections as they relate to IPCC RCP scenarios. These RCPs include:

- RCP2.6 requiring very strong emission reductions from a peak at around 2020 to reach a CO2 concentration at about 420 parts per million (ppm) by 2100
- RCP4.5 with slower emission reductions that stabilise the CO2 concentration at about 540 ppm by 2100
- RCP6.0 with some mitigation strategies and technologies, reaching 660 ppm by 2100 and total radiative forcing stabilising shortly after 2100
- RCP8.5 which assumes little curbing of emissions and increases leading to a CO2 concentration of about 940 ppm by 2100.

To develop projections for the study area, the RCP scenarios were adopted for two timeframes. A moderate RCP (RCP6.0) was used for a 2030 near term scenario, and an extreme RCP (RCP8.5) was used for a 2070 long term scenario, to reflect the more pronounced level of uncertainty as the timescale of the projection is extended. The climate projection scenarios adopted for the proposal are listed in J.1.

Generally, under any scenario, the extent of climate change is projected to increase over time, and the changes are more uncertain for longer term projections. Given the anticipated design life of track formation/concrete sleepers and structures (50 years and 100 years respectively), both scenarios are considered appropriate for the assessment.

The CSIRO and BoM reports and Climate Futures Exploration Tool do not provide projections at a 10 kilometre resolution (as requested by the SEARS), however projections from the tool are spatially focussed around natural resource management regions, where information data and reports are available. While the projections remain at a cluster level, these are supported by global and regional climate models as well as statistically downscaled results. Importantly, the data within the tool is underpinned by extensive, independently peer-reviewed climate model evaluation (CSIRO and BoM, 2015).

Table J.1 Adopted climate projection scenarios for the assessment

Scenario	Year	IPCC scenario	Scenario description	Rationale
Near-term moderate change scenario	2030	RCP6.0	An intermediate emissions scenario with balance on all energy sources.	This represents a more likely near term climate scenario for the assessment.
Long term extreme change scenario	2070	RCP8.5	A high emission scenario representing a future with little curbing of emissions which have both stabilised by 2100.	This represents an extreme or near worst-case climate scenario, and is useful to highlight the long term challenges and monitoring that may be required for adaptation for the proposal

Risk assessment

A high level risk assessment was undertaken to determine how changing patterns of rainfall, hydrology and extreme weather may impact on the future resilience of the proposal. Through discussions with the design team, review of design drawings and documents, publications, case studies and work completed on similar projects, potential risks to the construction and operation of the proposal were identified. Extreme weather events and climate change impacts on existing rail infrastructure across the Australian network were also considered as part of the risk assessment, to determine relevance and ascertain appropriate mitigation measures and adaptation options applicable to the proposal.

The risk matrix adopted for this assessment is based on the risk management matrix within AS 5334-2013, which in turn is based on the approach within AS/NZS 31000:2009, and is used to guide:

- the allocation of consequences against service reliability, financial, environmental, safety and governance objectives
- the determination of likelihood that a described event may arise
- the relative level of risk associated with that event, that can then be used to prioritise its management.

The proposal's potential vulnerability to these risks was considered, along with currently proposed control measures. Appropriate high level adaptation options and approaches were identified to address the potential risks.

Tables J.2 and J.3 provide the likelihood and consequence criteria used for the climate change risk assessment. The criteria are adapted from those provided in AS 5334:2013 for infrastructure. The consequence rating considers the potential consequence of climate change on the proposal in terms of the physical asset of Inland Rail (damages) and in terms of service provision (loss).

The likelihood of a given climate change impact occurring is described in terms of probability. Consideration has also been given to whether climate change impacts and extreme weather events have occurred on existing rail infrastructure across the Australian network. Overlaying this is the need to recognise the uncertainty that may be associated with the possible impacts. Where there is scientific uncertainty a cautious approach will identify a higher level of risk (worst-case scenario).

Table J.2 Consequences of occurrence

Consequence level	Description
Extreme	Significant permanent damage and/or complete loss of the infrastructure and the infrastructure service Loss of infrastructure support and translocation of service to other sites Early renewal of infrastructure by > 90%
Major	Extensive infrastructure damage requiring major repair Major loss of infrastructure service Early renewal of infrastructure by 50 – 90%
Moderate	Limited infrastructure damage and loss of service Damage recoverable by maintenance and minor repair Early renewal of infrastructure by 20 – 50%
Minor	Localised infrastructure service disruption No permanent damage. Some minor restoration work required Early renewal of infrastructure by 10 – 20% Need for new/modified ancillary equipment
Not significant	No infrastructure damage, little change to service

Table J.3 Likelihood and probability of occurrence

Likelihood	Description	Recurrent or event risks	Long term risks
Almost certain	Could occur several times per year	Has happened several times in the past year and in each of the previous 5 years *or* Could occur several times per year	Has a greater than 90% chance of occurring in the identified time period if the risk is not mitigated
Likely	May arise about once per year	Has happened at least once in the past year and in each of the previous 5 years *or* May arise about once per year	Has a 60 – 90% chance of occurring in the identified time period if the risk is not mitigated
Possible	May occur a couple of times in a generation	Has happened during the past 5 years but not in every year *or* May arise once in 25 years	Has a 40 – 60% chance of occurring in the identified time period if the risk is not mitigated
Unlikely	May occur once in a generation	May have occurred once in the last 5 years *or* May arise once in 25 to 50 years	Has a 10 – 30% chance of occurring in the future if the risk is not mitigated
Rare	May occur once in a lifetime	Has not occurred in the past 5 years *or* Unlikely during the next 50 years	May occur in exceptional circumstances, i.e. less than 10% chance of occurring in the identified time period if the risk is not mitigated

Based on the assessment of likelihood and consequence any foreseeable climate change impact can be assigned a risk level. This determines the significance of the environmental risk associated with a given impact. The risk assessment matrix is provided as Table J.4.

Table J.4 Risk assessment matrix

Likelihood	Consequences				
	Not significant	Minor	Moderate	Major	Extreme
Almost certain	Medium	Medium	High	Very high	Very high
Likely	Low	Medium	High	High	Very high
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Medium	Medium	High
Rare	Low	Low	Low	Medium	High

The initial risk ratings are conservative based on initial design information. A conservative approach allows for potential adaptation measures to be identified and considered during the design process. The potential adaptation measures identified were general measures to be considered and refined during the design, as it was not possible to outline specific measures during the concept design stages. It is likely some potential measures will be incorporated as business as usual, in line with relevant Australian standards and building codes. Specific measures would be incorporated as the design progresses, allowing for the risk ratings to be re-evaluated at final design.

As a guide, AGO (2006) suggests that the management priority levels for risks of various magnitudes can be interpreted as follows:

- 'Very high' priority risks demand urgent attention at the most senior level and cannot be simply accepted as a part of routine operations without executive sanction
- 'High' priority risks are the most severe that can be accepted as a part of routine operations without executive sanction but they will be the responsibility of the most senior operational management
- 'Medium' priority risks can be expected to form part of routine operations but they will be explicitly assigned to relevant managers for action and maintained under review
- 'Low' priority risk will be maintained under review but it is expected that existing controls will be sufficient.

Identify climate change adaptation measures

Based on the identified risks and potential impacts, appropriate adaptation measures and/or design strategies are recommended. Adaptation responses can be grouped according to the type of treatment.

Depending on the level, type and certainty of specific climate risks, adaptation can be either reactionary or precautionary. Development of adaptation responses should be both relevant and targeted. In some cases, excessive adaptation measures can be unsustainable. For example, designing oversized drainage for a one in 50-year flood event (that is, a flood with a two per cent AEP) may be excessive, if diversion to overland flows could achieve a similar outcome, with resultant savings in concrete and the carbon footprint. In other circumstances, simple measures, such as regular or increased monitoring during maintenance inspections, can be adequate to mitigate a risk that may have a high uncertainty level.

Examples of commonly identified treatments, which may be applicable to the proposal, include:

- Policy - changes to policies, standards and guidelines, such as developing new or updating existing and internal standards to better consider climate change.
- Behavioural - adjustments to existing processes, operational systems and procedures, such as conducting more frequent inspections for maintenance and monitoring.
- Physical - engineered solutions or relocation of assets such as the use of larger drains to account for more frequent rainfall events.

- Investigations - specialist assessments and explorations of each site, their assets, specific issues and solutions, such as detailed flood modelling assessment of the project area to determine future flood extents due to climate change.

Assumptions

The following assumptions were made:

- climate change scenarios were based on publicly available projections
- the assessment of risks was qualitative not quantitative
- climate change projections were regional rather than localised
- the consequences and risks for infrastructure and service delivery were based on consideration of the proposal only, not the wider Inland Rail programme.

Assessment results

Existing environment

Climate

The study area is generally characterised by a warm and temperate climate with significant temperature variations between summer and winter. The long-term monthly mean temperatures observed across the three reference points show that 9 am temperatures range from 6.7 to 24.8 degrees Celsius across the study area, and 3 pm temperatures range from 13.2 to 31.6 degrees Celsius, with a mean around 23.2 degrees. Temperatures on record have varied between -6 and 45.1 degrees.

There is moderate rainfall during the year which is summer dominated falling mainly as storms. The highest rainfall recorded across the three reference points occurred during the January and February months. Relative humidity is highest in the mornings and lowest in the afternoons. The highest humidity tends to occur during June and July in the morning, with the lowest during December and January in the afternoon.

The historic climate conditions for the study area are listed in Table J.5.

Table J.5 Historic climatic condition

Station location	Data range (years)	Temp range (avg. max.)	Extreme heat – mean no. days >35^{0}C	Mean rainfall (mm/ year)	Mean wind speed 3pm (km/h)	Mean relative humidity 9am (%)	Solar radiation (MJ/m^2)
Parkes Airport (site 065068) / Parkes Macarthur Street (site 065026)[1]	1889 to 2016	23.6	28.9	614.3	15.4	65	18.4
Peak Hill Post Office (site 050031)	1890 to 2016	24.5	32.1	561.2	7.7	63	18.6

Station location	Data range (years)	Temp range (avg. max.)	Extreme heat – mean no. days >35^{0}C	Mean rainfall (mm/ year)	Mean wind speed 3pm (km/h)	Mean relative humidity 9am (%)	Solar radiation (MJ/m^2)
Dubbo Airport (site 065070) / Trangie Post Office (site 051048)[2]	1898 to 2016	24.9	28.1	536.4	18.4	67	19

Notes 1: Parkes Macarthur Street weather station site ceased operation in 2012. Parkes Airport station was established in 1941 and was used for more recent weather data up to current. The average of both weather station data has been used.

2: Trangie Post Office weather station site ceased operation in 2005. Dubbo Airport station is located about 34 km east of Narromine, which is located roughly equidistant between the two stations. The average of both weather station data has been used.

Bushfires

The fire season within the Parkes Shire Bush Fire District generally runs from November through to March. According to the *Bushfire Risk Management Plan* developed by Parkes Bush Fire Management Committee, between 1951 and 1987 there were five major fires involving State Forest areas. These areas are now part of Goobang National Park, where a major fire occurred in January 1998. Every five to ten years a major fire occurs in the eastern range of the district, usually from a lightning strike. Goobang National Park is located about 7.6 kilometres east of Peak Hill and is not likely to significantly impact the proposal.

Areas of Dubbo, Narromine and Wellington are covered by the Orana Bushfire Risk Management Plan, where bushfire season is stated to generally commence in early October and conclude at the end of March. Local knowledge indicates that major fires occur approximately every 10 to 15 years, with the main sources of ignition relating to human activities including use of machinery and campfires. Lightning strikes are also identified as a source of ignition.

Climate change risk assessment results

The climate change risk assessment results are provided in Table J.6.

Table J.6 Climate change risk assessment

Climate variable	Historic trend	Climate change projections (2030)[1]	Climate change projections (2070)	Potential risk	Initial risk rating	Potential avoidance / adaptation measures	Final risk rating (residual risk) after adaptation measures	Implications for proposal
Max. daily temperature (mean) (°C)	Parkes: 23.6 Peak Hill: 24.5 Dubbo: 24.9	Warmer: +0.5 to 1.5 °C Parkes: 25.1 Peak Hill: 26.0 Dubbo: 26.4	Much hotter: >3 °C Parkes: 26.6 Peak Hill: 27.5 Dubbo: 27.9	Increases in average temperature will likely increase the probability (and therefore expected frequency) of extreme weather events such as severe storms, leading to disruption of services and damage to infrastructure.	Medium	Ensure no significant vegetation cover placing infrastructure at high risk. Structures designed for high wind loading to withstand wind speed effects, with reference to relevant standards.	Medium	The frequency of infrastructure damage and disruption on services can be decreased with appropriate adaptation measures, but still may arise periodically.
				Increases in average temperature will likely increase the probability (and therefore expected frequency) of extreme weather events such as bushfires.	High	Ensure fire safety standards are adhered to. Ensure appropriate vegetation buffers along rail corridor to reduce risk of possible impact from bushfires.	Medium	Likely to impact upon operations in instances of extreme weather. Site proximity to bushland high, but buffered by main roads and local properties. Damage from bushfire could be reduced with adaptation measures.

[1] Note: Where a range of values has been indicated in the CSIRO projection models, the higher value has been adopted for increased values to represent a worst case scenario

Climate variable	Historic trend	Climate change projections (2030)[1]	Climate change projections (2070)	Potential risk	Initial risk rating	Potential avoidance / adaptation measures	Final risk rating (residual risk) after adaptation measures	Implications for proposal
				Increases in average temperature will likely increase the probability (and therefore expected frequency) of extreme weather events such as extreme rainfall.	Medium	Ensure track drainage and embankments meets expected conditions during flooding events or high flows. Site electrical/critical infrastructure adequately covered to withstand extreme rainfall/inundation.	Low	With adequate drainage factored into design, risks from extreme rainfall events can be managed appropriately.
Extreme heat (projected number of days above 35 °C[2] (annual mean))	Parkes: 29 Peak Hill: 32 Dubbo: 28	Data not available	Parkes: 66 Dubbo: 71	Any increase in temperatures may lead to an increase in malfunction of communication and signalling equipment.	Medium	Backup power for critical infrastructure. Outdoor equipment and appropriate housing designed to operate in extreme heat conditions.	Low	Unlikely to impact the proposal.
				Increased potential of track buckling if prolonged heat above stress free temperature.	Medium	Track design to consider greater level of heat tolerance and make allowance for increased frequency of heat events at stress points. Undertake adequate preventative maintenance of the track and	Low	Unlikely to impact the proposal.

Climate variable	Historic trend	Climate change projections (2030)[1]	Climate change projections (2070)	Potential risk	Initial risk rating	Potential avoidance / adaptation measures	Final risk rating (residual risk) after adaptation measures	Implications for proposal
						infrastructure as part of standard procedures.		
				Increased severity and frequency of extreme heat days can lead to more frequent interruptions of mains power supply.	Medium	Maintenance inspection cycle would identify equipment which is not performing efficiently or is becoming degraded.	Low	Unlikely to impact the proposal.
Annual rainfall (mm)	Parkes: 614.3 Peak Hill: 561.2 Dubbo: 536.4	Wetter: 5 to 15% Parkes: 706.4 mm Peak Hill: 645.4 mm Dubbo: 616.9 mm	Little change: -5 to 5% Parkes: 645 mm Peak Hill: 589.3 mm Dubbo: 563.2 mm	Reductions in average annual rainfall leading to changes in soil profile and potential failure of embankments. Sub-surface soil stability for prolonged periods of heating and drying.	Medium	Potential risks of seasonal variations may require remedial measures at some locations. Scheduled maintenance checks to track and embankments.	Low	Unlikely to impact the proposal.

Climate variable	Historic trend	Climate change projections (2030)[1]	Climate change projections (2070)	Potential risk	Initial risk rating	Potential avoidance / adaptation measures	Final risk rating (residual risk) after adaptation measures	Implications for proposal
				Potential increased risk of flooding or inundation of track and associated infrastructure resulting from summer rains and thunderstorms.	High	Monitor track and equipment conditions following heavy or prolonger rainfall events. Drainage diversions and lines to direct and accommodate flows to be considered in design. Drainage structures are designed with sufficient hydraulic capacity to accommodate high flows. The use of real time data to trigger alerts Installation of flood meters	Medium	With adequate drainage and design, increase in rainfall and associated potential flood risk can be appropriately managed for the proposal.
Wind speed at 3pm (km/h)	Parkes: 15.4 Peak Hill: 7.7 Dubbo: 18.4	Small decrease: -3.09 to -1% Parkes: 14.9 km/h Peak Hill: 7.5 km/h	Large Increase: >3.09% Parkes: 15.9 km/h Peak Hill: 7.9 km/h Dubbo: 19 km/h	Damage to rail infrastructure from falling debris, trees, and branches.	Medium	Ensure no significant vegetation cover placing infrastructure at high risk. Structures designed for high wind loading to withstand wind speed effects, with reference to relevant Australian wind standards.	Low	Projected wind speed increase unlikely to impact the proposal.

Climate variable	Historic trend	Climate change projections (2030)[1]	Climate change projections (2070)	Potential risk	Initial risk rating	Potential avoidance / adaptation measures	Final risk rating (residual risk) after adaptation measures	Implications for proposal
		Dubbo: 17.8 km/h						
				Changes to track speed affecting train operations and scheduling	Medium	Design to consider potential impacts of increased long term wind speed on train operations and make allowance for changes to train speed where applicable.	Low	With adequate design consideration for changing wind speed, potential risk associated with track speed can be appropriately managed for the proposal.
				Damage to rail infrastructure and derailment of double stacked trains from increased wind.	Medium	Structures designed for high wind loading to withstand wind speed effects, with reference to relevant Australian wind standards.	Low	With adequate design consideration for changing wind speed, potential risk associated with derailment can be appropriately managed for the proposal.

Climate variable	Historic trend	Climate change projections (2030)[1]	Climate change projections (2070)	Potential risk	Initial risk rating	Potential avoidance / adaptation measures	Final risk rating (residual risk) after adaptation measures	Implications for proposal
Humidity at 9am (%)	Parkes: 65% Peak Hill: 63% Dubbo: 67%	Small decrease: -10% to -1% Parkes: 59% Peak Hill: 57% Dubbo: 60%	Small decrease: -10% to -1% Parkes: 59% Peak Hill: 57% Dubbo: 60%	Decrease in humidity may potentially lead to changes in other hazards, such as increase bushfire risk.	Low	Ensure appropriate buffers along rail corridor to reduce risk of impact from possible bushfire.	Low	Impacts of humidity changes are unlikely to have any significant impact on the proposal.
Time in drought	NA	Large increase: >30%	Large increase: >30%	Sub-surface soil stability for prolonged periods of heating and drying.	Low	Potential risks of seasonal variations may require remedial measures at some locations. Appropriate design for long term dry spells.	Low	Unlikely to impact the proposal.
Solar radiation (annual mean)	Parkes: 18.4 (MJ/m^2) Peak Hill: 18.6 (MJ/m^2) Dubbo: 19 (MJ/m^2)	No change	Large increase: >1.08% Parkes: 18.6 (MJ/m^2) Peak Hill: 18.8 (MJ/m^2)	Increase in solar radiation, resulting from decrease in cloud cover may result in potential increase in periods of direct sunshine - potential glare issues during rail operation.	Low	Continued monitoring and maintenance of cables and signalling equipment.	Low	Unlikely to impact the proposal.

Climate variable	Historic trend	Climate change projections (2030)[1]	Climate change projections (2070)	Potential risk	Initial risk rating	Potential avoidance / adaptation measures	Final risk rating (residual risk) after adaptation measures	Implications for proposal
			Dubbo: 19.2 (MJ/m^2)	Potential impacts to electrical cables and signalling equipment through prolonged direct exposure to sunlight.				
Bushfires (risk days)	Regional		Likely increase due to change in combined climate variables conducive for bushfire conditions	Bushfires in vicinity of the alignment could damage fencing, utilities and signals causing potential operational safety hazards and impacting rail operations.	Medium	Ensure appropriate vegetation buffers along rail corridor to reduce risk of possible impact from bushfires Communication with rural fire services along the route alignment Use of real time data to trigger alerts	Low	With appropriate vegetation buffer around asset, potential impacts of bushfire can be appropriately managed for the proposal

Notes 1: where a range of values has been indicated in the CSIRO projection models, the higher value has been adopted for increased values to represent a worst case scenario.
2: projections of the number of days above 35 °C were obtained using the Climate Thresholds Calculator available from http://www.climatechangeinaustralia.gov.au/en/climate-projections/explore-data/threshold-calculator/#. The results are for the 2070 scenario and are an average of the eight available models. Projections were not available for the 2030 scenario.

Appendix K – CEMP outline

Table K.1 CEMP outline

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
1. General	The CEMP would outline the construction conditions and temporary environmental protection measures to manage the impact of construction activities. It would be consistent with the mitigation and management measures documented in this EIS, conditions of the approval, the conditions of any licences or permits issued by government authorities, and ARTC's environmental management system.	Site induction	▸ All employees, contractors and subcontractors would receive an environmental induction which would include: • all proposal specific and standard noise and vibration mitigation measures • relevant conditions of licences/approvals/determinations etc • permissible hours of work • any limitations on high noise generating activities • location of nearest sensitive receivers • heritage requirements • construction employee areas • designated loading/unloading areas and procedures • construction traffic routes • site opening/closing times (including deliveries) • environmental incident procedures.
		Roles and responsibilities	▸ The CEMP would identify all members of the Inland Rail and construction team, including roles and responsibilities relevant to implementation of the CEMP. ▸ Contact details would be provided, including contacts in the case of emergencies or incidents as well as out-of-hours contacts.
		Reporting and communication	▸ The CEMP would outline reporting requirements for different levels of environment incidents, as well as the required procedure for emergency and incident management, non-compliance management and corrective and preventative actions.

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
			▸ Any additional training requirements would be identified (in addition to the site induction). ▸ Reporting requirements would be included, including for the control of environmental records.
		Monitoring and auditing	▸ The CEMP would identify monitoring, auditing and inspection requirements, and determine the framework for the management of key environmental issues for construction.
		Environmental control maps	▸ The location of sensitive areas (e.g. heritage items and trees/vegetation to be retained) would be clearly identified on environmental control maps, which would be supplied to construction managers and workers.
		Working hours and out of recommended standard working hours protocol	▸ Permissible working hours and activities would be defined. ▸ A protocol for works undertaken outside recommended standard construction working hours (as per DECC, 2009) would be prepared in accordance with the conditions of approval.
2. Soil and water	The soil and water management sub-plan would detail how potential impacts on soils, erosion, sedimentation, watercourses and water quality (surface and groundwater) would be mitigated and managed during construction. The plan would consider site-specific conditions including dispersive soils and potential	Erosion of exposed soils and sediment management	▸ Sediment and erosion control devices would be installed to minimise mobilisation and transport of sediment in accordance with *Managing Urban Stormwater, Soils and Construction* (Landcom, 2004). ▸ Maintenance and checking of the erosion and sedimentation controls would be undertaken on a regular basis and any subsequent records retained. Sediment would be cleared from behind barriers/sand bags on a regular basis as required and all controls would be managed to ensure they work effectively at all times. ▸ The area of exposed surfaces would be minimised. Disturbed areas would be stabilised progressively to ensure that no areas remain unstable for any extended length of time.

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
	treatment options during construction. The plan would provide for incident management in relation to potential water quality contamination incidents. It would include procedures to manage the impact of the proposal on flooding, and would take into account the requirements of relevant guidelines, including: ▸ *Managing Stormwater: Urban Soils and Construction Vol 1* (Landcom, 2004) ▸ *Managing Stormwater: Urban Soils and Construction Vol 2A Installation of Services* (DECC, 2008) ▸ *Managing Urban Stormwater Volume 2C: Unsealed roads* (DECC, 2008) ▸ *Erosion and sediment control on unsealed roads* (OEH, 2012) ▸ *Technical Guideline: Temporary stormwater drainage for road construction* (RMS, 2011)		▸ Soil and sediment that accumulates in erosion and sediment control structures would be reused where practicable during site reinstatement, unless it is contaminated or otherwise inappropriate for reuse. ▸ Work would cease where practicable during heavy rainfall events when there is a risk of sediment loss off site or ground disturbance due to waterlogged conditions. ▸ Equipment, plant and materials would be placed in designated lay-down areas where they are least likely to cause erosion. ▸ Erosion control devices would be removed as part of the final site clean-up. This would include removing any sediment in drainage lines that has been trapped by erosion control devices, and restoring disturbed areas. ▸ Exposed surfaces would be stabilised, and final landscaping implemented, as soon as practicable.
		Stockpile management	▸ Stockpiles would be managed by implementing sediment and erosion control devices in accordance with *Managing Urban Stormwater, Soils and Construction* (Landcom, 2004). ▸ No stockpiles of materials or storage of fuels or chemicals would be located within high/medium flood risk areas or flow paths.
		Spill/incident management	▸ Spill kits would be maintained on-site at all times. ▸ Machinery would be checked daily to ensure that no oil, fuel or other liquids are leaking. ▸ Refuelling of plant and equipment would be undertaken within designated areas with appropriate controls. ▸ Visual monitoring of local water quality (i.e. turbidity, hydrocarbon spills/slicks) would be undertaken on a regular basis to identify any potential spills.

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
	▸ *Waste Classification Guidelines* (EPA, 2014).		▸ Vehicle wash down and/or cement truck washout would occur in a designated bunded area or off-site.
		Groundwater	▸ Any groundwater encountered during construction would be managed and disposed of in accordance with the *Waste Classification Guidelines* (EPA, 2014). Groundwater would be managed to ensure it does not cause pollution of waters in accordance with section 120 of the POEO Act. ▸ If dewatering is required during construction, the water would be tested, and treated if necessary, prior to re-use, discharge or disposal in accordance with the testing results.
3. Contamination and hazardous materials	A contamination and hazardous materials sub-plan would detail how potential and actual contaminated soils and materials would be managed during construction to minimise the potential for significant on and off-site impacts. It would include the listed management measures. Construction hazard and risk issues associated with the use and storage of hazardous materials would be addressed through risk management measures developed in accordance with relevant Department of Planning and Environment guidelines, Australian and ISO standards.	Hazardous materials	▸ Any hazardous materials that are to remain on site would be surveyed and recorded on a hazardous building material register. A risk assessment would be undertaken and a management plan implemented, including any remediation measures. The register and management plan would be maintained and updated in accordance with the relevant WorkCover codes of practice. ▸ Where required, any materials classified as Hazardous Waste would be treated, or an immobilisation approval obtained, in accordance with Part 10 of the *Protection of the Environment Operations (Waste) Regulation 2014* prior to off-site disposal. ▸ In the event synthetic material fibres are found on site, they would be handled and disposed of in accordance with the National Code of Practice for the Safe Use of Synthetic Mineral Fibres. ▸ The storage of hazardous materials, and refuelling/maintenance of construction plant and equipment, would be undertaken in clearly marked designated areas that are designed to contain spills and leaks. ▸ The storage of hazardous materials and dangerous goods would be undertaken in accordance with all relevant Australian Standards and regulatory requirements.

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
	The plan would take into account the requirements of relevant legislation and guidelines, including: ▸ POEO Act and the *Waste Avoidance and Resource Recovery Act 2001* ▸ *Waste Classification Guidelines* (EPA, 2014) ▸ *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1*) (NEPM) (National Environment Protection Council, 2013) ▸ WorkCover NSW ▸ *AS 1940: The Storage and Handling of Flammable and Combustible Liquids.* ▸ AS 3780-2008: The Storage and Handling of Corrosive Substances. ▸ Dangerous Goods (Storage and Handling) Regulations 2012		▸ Fuels, chemicals and liquids would be appropriately stored, in accordance with the following requirements. • Would be stored on an impervious base that must be able to withstand fuel or chemical spills without degradation • The fuels and chemicals stored must be compatible (i.e. will not react with each other). The safety data sheets would be consulted in this regard • For liquids, a minimum bund volume requirement of 110% of the volume of the largest single stored volume, within the bund • The storage facility would be undercover • All containers would be labelled with the details of the contents • Safety data sheets would be available at the site • The storage facility would be inspected for compliance to the above requirements ▸ Spill kits would be kept at fuel, oil and chemical storage locations ▸ The removal, handling and disposal of any asbestos containing materials would be undertaken by an appropriately licensed contractor, and in accordance with: • *Code of Practice for the Safe Removal of Asbestos 2005* • *Code of Practice for the Management and Control of Asbestos in Workplaces 2005.*
		Incident management	▸ Spill kits, appropriate for the type and volume of hazardous materials stored or in use, would be readily available and accessible to construction workers. ▸ All hazardous materials, spills and leaks would be reported to site managers, and actions would be immediately taken to remedy spills and leaks.

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
			▸ Training in the use of spill kits would be given to all personnel involved in the storage, distribution or use of hazardous materials. ▸ Incidents would be managed in accordance with the conditions of approval for the proposal.
		Unexpected finds	▸ An 'unexpected finds protocol' would be prepared and included in the CEMP to assist with the identification, reporting, assessment, management, health and safety implications, remediation, and/or disposal (at an appropriately licensed facility) of any potentially contaminated soil and/or water. This would include specifying appropriate reporting requirements in accordance with the *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997* (EPA, 2015). ▸ In the event that indicators of contamination are encountered during construction (such as odours or visually contaminated materials), work in the affected area would cease immediately, and the procedures detailed in the unexpected finds protocol would be implemented. Unexpected soil contamination could include: • unexpected staining or odours • potential asbestos containing materials • underground storage tanks, buried drums or machinery, etc. ▸ The unexpected finds protocol would include the following general approach: • site workers would make the area safe, stop work, and notify the construction supervisor, who would quarantine/fence the area, notify staff on-site and the project manager • the project manager or their representative would notify an appropriately qualified environmental consultant who would carry

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
			out an assessment of the nature and extent of the unexpected contamination • remediation would be undertaken as required and as advised by the environmental consultant • works may only recommence at the site after approval has been obtained by the environmental consultant and the project manager. • validation of the remediation would be carried out to assess the success of the remediation works. ▸ Awareness training would be provided for all onsite staff to assist in the identification of potentially contaminated material.
		General contamination management	▸ Machinery would be checked daily to ensure that no oil, fuel or other liquids are leaking. ▸ Refuelling of plant and equipment would be undertaken within a designated refuelling point.
4. Traffic, transport and access	The traffic, transport and access management sub-plan would detail how traffic, public transport and access would be managed during construction to minimise the potential for significant impacts. It would include measures relating to construction vehicle and traffic movements, parking and access requirements for construction personnel, safety signage, and training of personnel in traffic management.	Construction site traffic	▸ Traffic and access would be managed in accordance with *Traffic Control at Work Sites* (RTA, 2010) and in consultation with Roads and Maritime, and local councils. ▸ Adequate road signage would be provided to inform drivers of the work, timing and alternative access arrangements. ▸ Measures to manage traffic flows around the area affected by construction would be provided, including required regulatory and directional signposting, line marking, variable message signs, and all other necessary traffic control devices. ▸ The plan would specify routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and the local community.

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
	It would cover all construction zones and worksites, including the construction compounds.		▸ Construction vehicles would park within the construction compound where practicable. ▸ The timing of deliveries accessing the site would be programmed to ensure there is sufficient space within the proposal site to accommodate deliveries. ▸ The queuing and idling of construction vehicles would be minimised. ▸ Designated queuing and idling areas would be determined near the work site to minimise disruption to the local community. ▸ Adequate sight lines would be provided to allow for safe entry and exit from the construction sites. ▸ Access to all private properties adjacent to the proposal site would be maintained during construction, unless otherwise agreed with relevant property owners. ▸ Contractors, including transport/deliveries contractors, would be provided with a copy of the traffic, transport and access management sub-plan to ensure disruptions to the local community are minimised. ▸ Councils, Roads and Maritime Services and emergency services would be liaised with at an early stage to establish requirements and measures to be adopted to maintain emergency vehicle movements.
		Pedestrian and cyclists	▸ The plan would include measures to maximise safety and access for pedestrians and cyclists, including details of alternative access arrangements. ▸ Adequate road signage would be provided to inform pedestrians of the work, and ensure that the risk of accidents and disruption to surrounding land uses is minimised. ▸ Adequate road signage would be provided to inform pedestrians and cyclists of the work, timing and alternative access arrangements.

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
			▸ Appropriate controls would be established where vehicles are required to cross footpaths to access construction sites. This may include manual supervision, physical barriers or temporary traffic signals as required.
5. Noise and vibration	The noise and vibration management sub-plan would detail how potential noise and vibration impacts would be mitigated and managed during construction. The plan would be prepared in accordance with the Draft Inland Rail NSW construction noise and vibration management framework. The requirements of relevant standards and guidelines, including AS 2436-2010 and the *Interim Construction Noise Guideline* (DECC, 2009) would be addressed. The plan would also include reference the working hours protocol (item 1) and the complaints management procedures specified in the communication and complaints management plan (refer to item 8).	Notification and behaviour	▸ Notification undertaken during construction would inform relevant stakeholders of the work locations and timing, and the potential for noise impacts. ▸ Construction compounds located within 200 metres of sensitive receivers would be managed to minimise noise generating activities, including unnecessary shouting, loud stereos/radios, dropping of materials from height, throwing of metal items, and slamming of doors, particularly at the start and finish of shifts.
		Construction hours and scheduling	▸ The relevant noise and vibration criteria would be defined. ▸ For work undertaken in the vicinity of receivers where 'highly noise affected' impacts are predicted no more than four consecutive nights of high noise and/or vibration generating work would be undertaken over any seven day period, unless otherwise approved by ARTC.
		Equipment and plant	▸ Quieter and less vibration emitting construction methods would be used where reasonable and feasible. ▸ The noise levels of plant and equipment would have operating sound power or sound pressure levels that comply with the required criteria. ▸ Simultaneous operation of noisy plant within range of sensitive receivers would be avoided. ▸ The offset distance between noisy plant and adjacent sensitive receivers would be maximised. ▸ Plant used intermittently would be throttled down or shut down. ▸ Noise-emitting plant would be directed away from sensitive receivers.

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
			▸ Stationary noise sources (such as pumps, compressors, fans etc) would be enclosed or shielded whilst ensuring that the health and safety of workers is maintained. ▸ Consider site topography when situating plant and use structures (such as site shed placement, earth bunds, fencing, noise barriers) to shield receivers from noise.
		Traffic flow and deliveries	▸ For construction sites located near sensitive receivers, plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. ▸ Loading and unloading of materials/deliveries would occur as far as possible from sensitive receivers, and preferably during standard construction hours. ▸ Site access points and roads would be selected to minimise impacts on sensitive receivers. ▸ Where practicable, delivery vehicles would be fitted with straps rather than chains for unloading.
		Measuring and monitoring	▸ Attended vibration measurements would be undertaken at the commencement of vibration generating activities located in close proximity to sensitive receptors to confirm that vibration levels are within the acceptable range to prevent cosmetic building damage. ▸ Additional vibration and noise monitoring may be required in response to complaints.
		Vibration	▸ Where construction is required within the safe working buffer distance, alternative work methods would be considered, such as the use of smaller equipment. If no alternative work method is feasible or reasonable, then compliance vibration monitoring would be undertaken. ▸ Trial vibration testing would be undertaken as required, prior to undertaking any high vibration activities. Trials would be undertaken in non-sensitive areas and at a range of distances from the source. The

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
			results of the trial monitoring would be compared against predicted vibration levels and the potential for impact refined, if deemed appropriate. ▸ The trial period may also be used to determine the effectiveness of source-based mitigation measures, such as changing the operating speed of the vibratory roller to generate a higher frequency of vibration, which may allow for a higher vibration threshold at the structure. ▸ For identified properties within buffer distances, or where pre-construction monitoring indicates that vibration levels from construction activities would exceed the target levels, a dilapidation survey of potentially affected structures would be undertaken to enable post-construction verification.
6. Heritage (Aboriginal and non-Aboriginal)	The heritage management sub-plan would detail how potential impacts on heritage would be mitigated and managed during construction. The plan would be prepared in consultation with relevant agencies and Aboriginal groups for management of Aboriginal heritage, listed non-Aboriginal heritage items and archaeological areas, and any previously unidentified items/areas of potential heritage significance identified during construction. It would incorporate the results of archaeological subsurface testing	General – built and non-Aboriginal heritage	▸ All identified items within and in the immediate vicinity of the proposal site would be marked on the environmental control maps, site plans, fenced off where appropriate, and avoided. ▸ The detailed construction methodologies would take into account mapped heritage items. ▸ Heritage requirements would be included in the site induction.
		Aboriginal heritage	▸ The plan would be prepared in consultation with registered Aboriginal parties, incorporate the recommendations of the Aboriginal Cultural Heritage Assessment of the proposal, the mitigation measures provided in chapter 17, and the outcomes of any further investigations following detailed design.
		Unexpected finds	▸ If previously unidentified Aboriginal or non-Aboriginal heritage/archaeological items or relics are uncovered during construction works, all works in the vicinity of the find shall cease and ARTC would be notified. Appropriate advice would be sought from a suitably qualified heritage consultant/archaeologist (and in consultation

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
	and an unexpected finds procedure.		with the relevant division of the Department of Planning and Environment, as required). Works in the vicinity of the find shall not re-commence until clearance has been received from the heritage consultant/archaeologist and ARTC.
7. Visual amenity	The visual amenity sub-plan would provide measures to minimise the potential impacts of the proposal during construction.	General worksite management	▸ Work sites would be maintained in a clean and tidy condition at all times. ▸ Temporary hoardings, barriers, traffic management and signage would be removed when no longer required. ▸ On completion of construction, all work sites and other land occupied temporarily would be rehabilitated in accordance with the rehabilitation plan.
		Lighting	▸ Directional lighting would be mounted to avoid light spill into adjoining residences. ▸ Lighting would be installed and maintained in accordance with *AS 4282: Control of the Obtrusive Effects of Outdoor Lighting.*
8. Communication management plan	The communication management sub-plan would provide guidance for the management of communication and consultation during the construction period, including objectives of consultation, stakeholders, contact mechanisms, and protocols. It would be consistent with the consultation plan developed by ARTC, as described in chapter 4. The plan would also include implementation and maintenance of a complaints register and	Communication and complaints	▸ Contact details for a 24-hour project response line and email address would be provided for ongoing stakeholder contact throughout the construction period. ▸ Provision of accurate public information signs while work is in progress. ▸ Staging of works would be undertaken to minimise disruption, in consultation with relevant stakeholder groups, to minimise impacts to community activities and functions. ▸ Relevant stakeholders would be notified regarding service disruptions in accordance with the communication management plan. ▸ Complaints would be managed according to the following procedure: • Details of all complaints received will be recorded.

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
	complaints handling and escalation procedures, consistent with ARTC requirements.		• A detailed written response will be provided to the complainant within 14 calendar days.
9. Biodiversity management	The biodiversity management sub-plan would detail how construction impacts on aquatic and terrestrial flora and fauna would be mitigated, managed and monitored.	Vegetation management	▸ Employee education and training including inductions for staff, contractors and visitors to the site would include the biodiversity issues present at the site and so they know their role and responsibilities in relation to the protection and/or minimisation of impacts to native biodiversity. ▸ The CEMP and construction plans would clearly document the location and full extent of clearing required.
		Management of trees to be retained	▸ The management of trees in the vicinity of the construction zone would be consistent with the *AS 4970-2009 Protection of trees on development sites* (incorporating Amendment No. 1 (March 2010)).
		Pre-clearance surveys – woody native vegetation	▸ Pre-clearance surveys would be implemented within areas of woody native vegetation that are to be cleared. Pre-clearance surveys will be undertaken by suitably qualified and experienced ecologists and involve the following: • The demarcation of areas approved for clearing to reduce risk of accidental clearing/disturbance of surrounding native vegetation. • The likely habitat resources and habitat trees would be identified and marked. Habitat trees are those containing hollows, cracks or fissures and spouts, active nests, dreys or other signs of recent fauna usage. Other habitat features to be identified include fallen timber/hollow logs and burrows. • The potential presence of threatened flora and fauna species, endangered populations and TECs would be identified. • The identification of species or habitat features that are suitable for translocation or salvage.

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
			• In areas of koala habitat, visual inspection of trees for koalas prior to clearing.
		Pre-clearance surveys – bridges and culverts (micro-bats)	Pre-clearance surveys would be implemented on the day prior to the disturbance of culverts with the potential to provide roosting habitat for micro-bats, and would involve: ▸ Recording: • roosting species (if identifiable) • count/estimate of the number of roosting individuals • location and time of relocation (if applicable) or other actions taken to discourage the roosting of micro-bats. ▸ If roosting bats are identified, the bats would be left undisturbed until dusk. At dusk, roosting bats can be captured and released at a location to be agreed during pre-clearance surveys. ▸ Following removal or departure of all roosting bats, crevices would be removed or blocked off (for example, by covering the entrance with shade cloth).
		Tree-felling	Tree clearing would be completed as close to the completion of pre-clearance surveys as practicable and would include: ▸ All habitat trees would be vigorously shaken with heavy machinery the day prior to clearing. ▸ On the day of habitat tree felling, the following would be undertaken: • all habitat trees would be subject to a visual inspection for threatened species • all reasonable attempts would be made to reduce the impact of felling on all fauna species

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
			• the lowering of hollow-bearing trees would be done as gently as possible with heavy machinery • if a native fauna species is identified in a habitat tree on the day of felling, the supervising ecologist or appropriately qualified fauna handler would advise the most appropriate method to minimise potential harm • uninjured animals would be released on the day of capture into nearby suitable secure habitat and would not be held for extended periods of time • injured animals would be taken to the nearest veterinary clinic or wildlife carer as soon as possible for assessment and treatment. ▸ Following felling, habitat trees would be inspected for remaining or injured fauna species and to ensure that no hollows are blocked against the ground. This may require the tree to be rolled to ensure adequate access. ▸ All felled habitat trees would remain in place for a least one night to allow any fauna still present to move on.
		Aquatic ecology	▸ Works within the riparian zone would maximise, where practicable, the preservation of any existing vegetation and minimise disturbance. ▸ Designs for works within or near watercourses would provide for the retention of natural functions and maintenance of fish passage in accordance with *Why do fish need to cross the road? Fish passage requirements for waterway crossings* (Fairfull and Witheridge, 2003). ▸ Management of sediment that has accumulated upstream to avoid sediment mobilisation. ▸ Any large woody debris in the development footprint would be relocated upstream or downstream in consultation with an appropriately qualified specialist.

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
		Dewatering of pools	▸ A dewatering procedure would be included, detailing methods for collection and relocation of protected fish and euthanasia of pest species. ▸ Any pools in watercourses that would be impacted by construction would be dewatered according to the dewatering procedure.
		Weed management	▸ Weeds would be managed and disposed of in accordance with the requirements of the *Noxious Weeds Act 1993* and/or the Weeds of National Significance Weed Management Guide. ▸ Weed control mitigation and management strategies would be documented and implemented as follows: • vehicles or equipment being brought onto the proposal site and/or travelling around the site must be inspected and cleaned prior to commencing work to limit the spread of seeds and plant material • regular inspections to monitor the spread of weed species training of environmental personnel on the identification of target weed species. ▸ Any outbreak of noxious weeds will be controlled and eradicated as required under the *Noxious Weeds Act 1993*, and as required by the Local Land Services and other relevant authorities. Weed control and eradication techniques may include: • spraying with herbicides • physical removal e.g. chipping, and/or • minimisation of area available for weed infestation, through prompt revegetation of bare areas.

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
10. Air quality and dust	The air quality and dust management sub-plan would detail how potential impacts on air quality would be mitigated and managed during construction.	Dust suppression – construction works	▸ Shade cloth would be fastened to the perimeter fence on the proposal site where construction is being undertaken within 100 metres of sensitive receptors to minimise dust transported from the site during construction. ▸ Dust generation would be monitored visually, and where required, dust control measures such as water spraying would be implemented to control the generation of dust. ▸ Dust suppressants would be applied to stockpiled dirt if the pile is inactive for extended periods. ▸ Access points would be inspected to determine whether sediment is being transferred to the surrounding road network. If required, sediment would be promptly removed from roads to minimise dust generation. ▸ Works (including the spraying of paint and other materials) would be suspended during strong winds or in weather conditions where high levels of dust or airborne particulates are likely. ▸ Any exposed surfaces would be stabilised as soon as practicable. ▸ In locations where nearby sensitive receivers may be affected, adopt a site 'shut down and cover up' policy during periods of extreme weather conditions, e.g. high winds.
		Dust suppression – vehicle movements	▸ Vehicle movements would be limited to designated entries and exits, haulage routes, and parking areas. ▸ Materials transported to and from the site would be covered to reduce dust generation in transit.
		Vehicle emissions	▸ All plant and machinery would be fitted with emission control devices complying with relevant Australian Standards. ▸ Machinery would be turned off when not in use and not left to idle for prolonged periods.

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
			▸ Surveillance would be undertaken to identify any vehicle, plant or equipment that is causing visible emissions. If any defective vehicles, plant or equipment are identified, operation of this machinery would cease and service/maintenance would be undertaken.
		Communication	▸ Advance warning would be provided to sensitive receivers in relation any significant dust generating activities undertaken in close proximity to sensitive receptors, including stock.
11. Spoil and waste	The spoil and waste management sub-plan would detail how waste would be managed during construction to minimise the potential for significant impacts. It would include disposal requirements, measures to measures to reduce, re-use or recycle wastes where possible. It would set targets for waste diversion, demonstrate how targets can be achieved, and outline how waste diversion would be tracked and reported. The plan would be prepared in accordance with the *Waste Classification Guidelines* (EPA, 2014).	Waste management	▸ Resource management hierarchy principles would be followed: • avoid unnecessary resource consumption as a priority • avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery) • disposal is undertaken as a last resort. ▸ Waste material, including soil and spoil to be taken off site, would be classified and managed in accordance with the *Waste Classification Guidelines* (EPA, 2014) and would be disposed of in accordance with the POEO Act. ▸ All waste documentation would be collated and maintained on file in accordance with these guidelines. ▸ Waste material would not to be left on site once the works have been completed. ▸ Working areas would be maintained, kept free of rubbish, and cleaned up at the end of each working day. ▸ Any waste material identified as being contaminated would be managed in accordance with the *Contaminated Land Management Act 1997* and other relevant legislation and guidelines.

Item/sub-plan	What would the plan address?	Issue	Management measures to be included in the CEMP and implemented during construction
			▸ The removal, handling and disposal of any asbestos containing materials would be undertaken by an appropriately licensed contractor, and in accordance with: • *Code of Practice for the Safe Removal of Asbestos 2005* • *Code of Practice for the Management and Control of Asbestos in Workplaces 2005.*
12. Hazards, risk and contingency management	The hazards, risk and contingency management sub-plan would be aligned to ISO 4260 and AS/NZS *4360:2004 Risk Management*, and would provide a systematic pro-active approach of ongoing risk identification and contingency planning. It would identify hazards and risks, and measures to minimise risks and respond to incidents during construction.		▸ Hazards and risks associated with construction activities would be identified prior to construction. ▸ A process for regularly reviewing work practices/procedures would be implemented throughout construction to identify, report, and respond to any new environmental hazards/risks. ▸ Site-specific work health and safety management plans and safe work method statements would be developed and implemented in accordance with work health and safety requirements. ▸ The plan would support the contamination and hazardous materials sub-plan developed as per item 3.
13. Emergency response plan	An emergency response sub-plan would be prepared to address protocols and procedures to be followed during emergency situations (including bushfires, fires, explosions, flooding and inundation).	Emergency response	The plans would include: ▸ Details of traffic management measures to be implemented during emergencies ▸ Design and management measures to address the potential environmental impacts of an emergency situation. ▸ Training programs to ensure that all staff are familiar with the plan.