

PART A
Introduction, project background
and description

INLAND
RAIL 



CHAPTER A9
Assessment approach
and methodology



Narromine to Narrabri
Environmental Impact Statement

ARTC

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

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A9. Assessment approach and methodology

This chapter provides a description of the overall approach and methodology used to undertake the EIS for the Inland Rail—Narromine to Narrabri project (the proposal). The detailed methodologies for individual technical assessments are described in the technical reports and are summarised in chapters B1 to B14.

A9.1 Impact scoping

The first step of the impact assessment process involved identifying key potential environmental issues, impacts and risks that would be subject to detailed assessment as part of the EIS. The SEARs identify the following as key issues for the EIS:

- ▶ Socio-economic, land use and property
- ▶ Biodiversity
- ▶ Protected and sensitive lands
- ▶ Transport and traffic
- ▶ Water—flooding, resources and quality
- ▶ Soils
- ▶ Air quality
- ▶ Heritage
- ▶ Noise and vibration—amenity and structural
- ▶ Rehabilitation (of borrow sites)
- ▶ Visual amenity
- ▶ Waste
- ▶ Climate change risk
- ▶ Sustainability.

The key issues identified by the SEARs were informed by the scoping report, which was submitted to support the request for the SEARs made in July 2018.

SEAR 2(c) requires, for each key issue identified by the SEARs, that the proponent must, '*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*'.

To address this requirement, an environmental risk assessment was undertaken. The aim of the assessment was to identify—for each key issue—key potential impacts for consideration as part of the detailed impact assessments, which may be in addition to those specified by the SEARs.

The approach to the environmental risk assessment was informed by the principles of the Australian/New Zealand Standard *AS/NZS ISO 31000:2009 Risk management—Principles and guidelines* (Standards Australia/Standards New Zealand Standard Committee, 2009). The assessment involved a preliminary, desktop-level risk assessment to broadly identify potential environmental impacts and risks associated with constructing and operating the proposal. Potential impacts and risks were identified based on the results of preliminary investigations, previous experience and professional judgement.

The likelihood and consequence of the identified impacts and risks were then ranked. Based on the assessment of consequence and likelihood, the identified impacts and risks were assigned a risk level using the matrix shown in Table A9.1. This determines the significance of the potential environmental risk associated with a given impact.

TABLE A9.1 ENVIRONMENTAL RISK ASSESSMENT MATRIX

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

Further information on the risk assessment methodology is provided in Appendix E.

Very high and high impacts were considered the highest priority and, where present, were the focus of the concept design and environmental assessment. In general, the following was applied (in conjunction with the SEARs) 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. In general, impacts could be mitigated by applying best-practice environmental management measures and controls.
- ▶ Low impacts—may not require specialist investigations, particularly where identifiable management/mitigation guidelines exist. Impacts could be mitigated through other working controls (such as detailed design requirements, normal working practice, safety and quality controls).

The results of the environmental risk assessment are provided in Appendix E.

A9.2 Impact assessment method

A9.2.1 Defining the environmental baseline/existing environment

The identification and assessment of baseline environmental values/conditions provides the foundation against which potential impacts are assessed. The approach to describing and defining the existing environment was specific to each impact assessment and was undertaken in accordance with relevant guidelines and best practice. Specific tasks employed included mapping, fieldwork, review of previous studies, database searches, stakeholder interviews and modelling.

The environmental baseline (or existing environment) is described in detail in the technical reports. A summary of the key features of the existing environment is provided in Chapter A2 and Part B of the EIS.

Some assessments were not able to undertake fully comprehensive field surveys/site assessments as a result of land access limitations in some areas. For these assessments (including biodiversity and Aboriginal heritage), assessment methodologies and approaches were developed in consultation with the Department of Planning, Industry and Environment (DPIE). Approaches included supplementing available survey data with aerial photography assessment, observations from adjoining properties/public land, extrapolation, modelling, and recommendations in relation to specific pre-construction survey requirements.

The prevailing drought conditions at the time the assessments were undertaken also formed one of the key considerations in the development of relevant individual assessment methodologies and approaches.

Further information is provided in individual technical reports.

A9.2.2 Assessment of potential impacts

Potential impacts considered by individual impact assessments include those specified by the SEARs and identified as an outcome of the environmental risk assessment.

The assessment methodologies applied were specific to each key issue and defined in accordance with the requirements of the SEARs and relevant issue-specific guidelines and policies. For many of the key issues, the SEARs specify the guidelines that define the assessment methodologies.

Potential impacts were assessed using a (predominantly) qualitative or quantitative approach, depending on the nature of the issue and the requirements of relevant guidelines and policies. In general, these requirements include the need to undertake either a compliance or significance type of assessment.

The decision as to the appropriate assessment type was influenced by the requirements of relevant NSW assessment guidelines for individual impact assessments. For example, the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA, 2016) and the *Interim Construction Noise Guideline* (DECC, 2009) require compliance-type assessments. The *Social impact assessment guideline for State significant mining, petroleum production and extractive industry development* (Department of Planning and Environment (DP&E), 2017) and *Assessing Heritage Significance* (NSW Heritage Office, 2001) require significance-type assessments. A general explanation of how each broad type of assessment methodology was applied is provided below. A summary of individual assessment methodologies is provided in the chapters in Part B, with further detail provided in the technical reports.

The impacts have been assessed assuming that a number of design features are incorporated into the proposal to minimise the potential for impacts. These features form part of the baseline proposal for which approval is sought.

Compliance assessment

A compliance form of assessment was used where a potential impact (or the majority of potential impacts associated with an environmental issue) is able to be quantified, compliance with a known guideline or standard (e.g. published limits or thresholds) can be quantitatively assessed, and/or quantitative assessment calculations are required.

Compliance assessments used mapping, modelling and/or spatial analysis to assess the degree to which the proposal complies with quantified guidelines and/or criteria. Individual assessment methodologies were determined based on the requirements of relevant assessment guidelines; however, the general methodology was as follows:

- ▶ Identify criteria where these are specified in guidelines (such as air and noise criteria)
- ▶ Identify and quantify potential impacts using mapping, modelling, calculations and/or spatial analysis
- ▶ Assess potential impacts against criteria (where these exist) or guideline values
- ▶ Identify and apply appropriate mitigation measures where non-compliant impacts exist
- ▶ Re-assess the potential impacts with the implementation of specific mitigation where relevant (such as with the implementation of noise barriers)
- ▶ Assess impacts against criteria, with mitigation in place (where relevant) and identify any additional mitigation measures required.

The following key issues listed by the SEARs were subject, either broadly or specifically, to compliance-type assessments:

- ▶ Biodiversity
- ▶ Noise and vibration
- ▶ Water—flooding and quality
- ▶ Soils
- ▶ Air quality
- ▶ Climate change risk
- ▶ Sustainability.

It is noted that for some of the above issues, although a predominantly quantitative approach has been taken, it may not be possible to quantify all potential impacts. As a result, there have been some elements of a significance assessment in relation to these issues.

Significance assessment

A significance form of assessment was used for those issues where:

- ▶ The impact (or the majority of the impact) is not able to be quantified—there are no relevant quantified criteria or models to measure potential impacts
- ▶ The impact depends on the sensitivity or vulnerability of the environmental value or receptor and the magnitude of the impact at this receptor
- ▶ Relevant guidelines require this form of assessment.

Significance assessments broadly involved:

- ▶ Identifying the key environmental values or sensitive receptors
- ▶ Rating the sensitivity of each in accordance with the relevant impact assessment guideline
- ▶ Identifying and assessing potential impacts
- ▶ Rating the magnitude of impacts in accordance with the relevant impact assessment guideline
- ▶ Rating the potential significance of impacts according to sensitivity and magnitude
- ▶ Recommending appropriate best-practice mitigation measures for significant impacts.

The following key issues listed by the SEARs were subject to significance-type assessments:

- ▶ Socio-economic impacts
- ▶ Visual amenity
- ▶ Heritage.

A9.2.3 Cumulative impacts

For an EIS, cumulative impacts can be defined as the successive, incremental, and combined effect of multiple impacts. Each of the impacts considered may in themselves be minor but could become significant when considered together.

The SEARs (item 2.1(o)) requires, *'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'*.

An assessment of potential cumulative impacts has been undertaken for relevant key issues in accordance with the SEARs (see chapters B1 to B14). A summary of the results is provided in chapter D1.

A9.2.4 Mitigation, management and residual impacts

Mitigation and management measures were identified to minimise or avoid the key potential impacts identified. The aim of these measures is to protect existing environmental values and sensitive receptors, and to achieve the objectives and requirements of relevant legislation, policies and guidelines.

The SEARs also require consideration of how residual impacts would be managed or offset. For the purpose of the EIS, residual impacts are considered to be the impacts of the proposal that may remain in the medium to long term, even after the implementation of the identified mitigation measures.

The residual risk level of the potential impacts identified by the environmental risk assessment was assessed after mitigation and management measures were applied. The pre-mitigated risk level was compared to the residual risk level to assess the effectiveness of the mitigation and management measures. A residual risk assessment is provided at the end of each chapter in Part B.

A9.3 Guide to how the impact assessment results are provided in the EIS

The assessment results are presented in four parts:

- ▶ Part B provides impact assessment results as they relate to constructing and operating the main proposal infrastructure, including the rail alignment and associated road infrastructure. In general, the chapters discuss the potential impacts of the proposal as a whole, with specific reference to particular differences in impacts of the proposed rail infrastructure compared to the proposed road infrastructure, where relevant to individual issues.
- ▶ Part C provides impact assessment results as they relate to establishing and operating the key construction infrastructure (borrow pits, multi-function compounds and temporary workforce accommodation)
- ▶ Part D provides a synthesis of the results of the assessments as a whole and includes assessment results that relate to the overall approach to environmental management of the proposal
- ▶ The map book (Part E) provides detailed mapping information for the proposal site and proposal features, including the environmental baseline.

Table A9.2 lists where the key issue SEARs are addressed. Further information about where individual SEARs are addressed is provided in Appendix A. The chapters in parts B and C summarise the detailed assessment results that are provided in technical reports 1 to 14.

TABLE A9.2 WHERE KEY ISSUE SEARS ARE ADDRESSED

Key issue SEAR	Where key issue SEARs are addressed
5. Socio-economic, land use and property	Chapter B12: Land use and property Chapter B14: Socio-economic assessment Chapters in Part C (as relevant)
6. Biodiversity	Chapter B1: Biodiversity Chapters in Part C (as relevant)
7. Protected and sensitive lands	Chapter B1: Biodiversity Chapters in Part C (as relevant)
8. Transport and traffic	Chapter B11: Traffic, transport and access Chapters in Part C (as relevant)
9. Water—flooding	Chapter B3: Flooding Chapters in Part C (as relevant)
10. Water—resources	Chapter B2: Water resources Chapters in Part C (as relevant)
11. Water—quality	Chapter B5: Water quality Chapters in Part C (as relevant)
12. Soils	Chapter B4: Soils and contamination Chapters in Part C (as relevant)
13. Air quality	Chapter B10: Air quality Chapters in Part C (as relevant)
14. Heritage	Chapter B6: Aboriginal heritage Chapter B7: Non-Aboriginal heritage Chapters in Part C (as relevant)
15. Noise and vibration—amenity 16. Noise and vibration—structural	Chapter B8: Noise and vibration (construction) Chapter B9: Noise and vibration (operation) Chapters in Part C (as relevant)
17. Rehabilitation	Chapter C3: Borrow pits
18. Visual amenity	Chapter B13: Visual amenity Chapters in Part C (as relevant)
19. Waste	Chapter D2: Waste management
20. Climate change risk	Chapter D4: Climate change and greenhouse gases
21. Sustainability	Chapter D3: Sustainability