

CHAPTER 09

Assessment approach and methodology

ILLABO TO STOCKINBINGAL ENVIRONMENTAL IMPACT STATEMENT

ARTC

INLAND
RAIL
An Australian Government Initiative

Contents

9.	Assessment approach and methodology	9-1
9.1	Impact scoping	9-1
9.2	Impact assessment method	9-2
9.2.1	Defining the environmental baseline (existing environment)	9-2
9.2.2	Assessment of potential impacts	9-2
9.2.3	Cumulative impacts	9-4
9.2.4	Mitigation, management and residual impacts	9-4
9.3	Guide to how the impact assessment results are detailed in the EIS	9-4

Tables

Table 9-1:	Environmental risk assessment matrix	9-2
Table 9-2:	Where key issue SEARS are addressed	9-5

9. Assessment approach and methodology

This chapter describes the overall approach and methodology used to undertake the environmental impact statement (EIS) for the Inland Rail—Illabo to Stockinbingal (I2S) project (the proposal). The detailed methodologies for individual technical assessments are described in the technical reports and summarised in Chapter 10 to Chapter 25.

9.1 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 Secretary's Environmental Assessment Requirements (SEARs) identify the following as key issues for the EIS:

- ▶ biodiversity
- ▶ protected and sensitive lands
- ▶ transport and traffic
- ▶ flooding, hydrology and geomorphology
- ▶ water—hydrology
- ▶ water—quality
- ▶ soils
- ▶ heritage
- ▶ noise and vibration
- ▶ economic, land use and agriculture
- ▶ social
- ▶ visual amenity
- ▶ waste
- ▶ climate change and 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 32(d) 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), the impacts of concurrent activities within the project and the cumulative impacts (parallel and sequential) with other projects.*'

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 *AS/NZS ISO 31000:2018 Risk Management—Guidelines* (Standards Australia, 2018). The assessment involved a preliminary, desktop-level risk assessment to broadly identify potential environmental impacts and risks associated with constructing and operating the proposal (pre-mitigation). Potential impacts and risks were identified based on the results of preliminary investigations, previous experience with other Inland Rail projects or similar 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 9-1. This determines the significance of the potential environmental risk associated with a given impact.

TABLE 9-1: 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 in Appendix G.

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 actions were 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 or 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 also in Appendix G.

9.2 Impact assessment method

9.2.1 Defining the environmental baseline (existing environment)

Identification and assessment of baseline environmental values and 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 in Chapter 2: General biophysical and cultural environment and the existing environment is described in greater depth in Chapter 10 through to Chapter 25.

Some assessments were not able to undertake fully comprehensive field surveys and site assessments as a result of land access limitations in some areas. For these assessments (biodiversity and Aboriginal cultural heritage), assessment methodologies and approaches were developed in consultation with the (then) NSW Department of Planning, Industry and Environment (DPIE) (now the Department of Planning and Environment (DPE)). Approaches included supplementing available survey data with aerial photography assessment, observations from adjoining properties and public land, extrapolation, modelling, and recommendations in relation to specific pre-construction survey requirements. In addition, the Biodiversity Assessment Method (BAM) allows assessment based on existing native mapping in some circumstances (refer to Chapter 10: Biodiversity).

Further information is in individual technical reports.

9.2.2 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 (pre-mitigated).

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. This included consideration of the Rapid Assessment Framework, a requirement under the Environmental Planning and Assessment Amendment

(Major Projects) Regulation 2021. The Rapid Assessment Framework includes a series of guidelines, in particular the *State Significant Infrastructure Guidelines* (DPIE, 2021a). 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 about 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* (EPA, 2016) and the *Interim Construction Noise Guideline* (DECC, 2009) require compliance-type assessments. The *Social impact assessment guideline for State Significant Projects* (DPIE, 2021d) 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 follows. A summary of individual assessment methodologies is in Chapter 10 through to Chapter 25, with further detail in the technical reports. The approach to the assessment of the workforce accommodation camp is included in Appendix I.

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.

9.2.2.1 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 both prior to, and with mitigation in place (as relevant) and identify any additional mitigation measures required to address residual impacts.

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

- ▶ biodiversity
- ▶ noise and vibration
- ▶ water—flooding, hydrology and water quality
- ▶ soils
- ▶ climate change risk
- ▶ sustainability.

For some of these 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. For example, the significance of an impact under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) is based on the Commonwealth Significant Impact Guidelines 1.1 and 1.2 (DAWE, 2013a&b).

9.2.2.2 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:

- ▶ social and economic impacts
- ▶ visual amenity
- ▶ heritage.

9.2.3 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(p)) requires, *'An assessment of the relevant 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 (refer to Chapter 26: Cumulative and residual impacts).

9.2.4 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 at the end of each chapter from Chapter 10 through to Chapter 25 with the exception of Chapter 23: Sustainability.

9.3 Guide to how the impact assessment results are detailed in the EIS

The assessment results are presented in four parts:

- ▶ Chapter 10 to Chapter 25 provide 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

- ▶ Chapter 26 describes the potential cumulative impacts from the proposal and includes a discussion on residual impacts
- ▶ Chapter 27 and Chapter 28 provides a synthesis of the results of the assessments as a whole and includes a compilation of mitigation measures and assessment results that relate to the overall approach to environmental management of the proposal.

Table 9-2 lists where the SEARs key issues are addressed. Further information about where individual SEARs are addressed is in Appendix A. Chapter 10 through to Chapter 25 summarise the detailed assessment results that are in technical papers 1 to 14, as relevant. The assessment results relating to the workforce accommodation camp are included in Appendix I.

TABLE 9-2: WHERE KEY ISSUE SEARS ARE ADDRESSED

Key issue SEAR	Where key issue SEARs are addressed
1. Biodiversity	Chapter 10: Biodiversity Technical Paper 1: Biodiversity Development Assessment Report Technical Paper 2: Aquatic ecology
2. Protected and sensitive lands	Chapter 10: Biodiversity Technical Paper 1: Biodiversity Development Assessment Report Technical Paper 2: Aquatic Biodiversity Assessment
3. Transport and traffic	Chapter 11: Traffic, transport and access Technical Paper 3: Traffic, Transport and Access Impact Assessment
4. Flooding, hydrology and geomorphology	Chapter 12: Hydrology and flooding Technical Paper 4: Hydrology and Flooding Impact Assessment
5. Water—hydrology	Chapter 12: Hydrology and flooding Technical Paper 4: Hydrology and Flooding Impact Assessment
6. Water—quality	Chapter 13: Water quality Technical Paper 5: Water Quality Impact Assessment Technical Paper 6: Groundwater Impact Assessment
7. Soils	Chapter 20: Soils and contamination Technical Paper 14: Contaminated Land Assessment
8. Heritage	Chapter 15: Cultural heritage Technical Paper 7: Aboriginal Cultural Heritage Assessment Report
9. Noise and vibration	Chapter 16: Noise and vibration Technical Paper 8: Construction Noise and Vibration Impact Technical Paper 9: Operational Noise and Vibration Assessment (Rail) Report Technical Paper 10: Operational Noise and Vibration Impact Assessment (Non-rail)
10. Economic, land use and property	Chapter 18: Land use and property Chapter 17: Social and economic Technical Paper 12: Economic Impact Assessment
11. Social	Chapter 17: Social and economic Technical Paper 11: Social Impact Assessment Technical Paper 12: Economic Impact Assessment
12. Visual amenity	Chapter 19: Landscape and visual impacts Technical Paper 13: Landscape Character and Visual Impact Assessment
13. Waste	Chapter 21: Waste
14. Climate change and sustainability risk	Chapter 22: Climate change risk Chapter 23: Sustainability