

9 Environmental risk analysis

*A detailed environmental risk analysis was conducted as part of this EIS. This chapter outlines the environmental risk analysis process and identifies the key environmental issues. The Director General's requirements in regards to an environmental risk analysis are detailed in **Table 9-1** below.*

Table 9-1 Director General's requirements – environmental risk

Director General's requirements	Where addressed
The EIS must include an environmental risk analysis to identify potential environmental impacts associated with the project (construction and operation), proposed mitigation measures and potentially significant residual environmental impacts after the application of proposed mitigation measures. Where additional key environmental impacts are identified through this environmental risk analysis, an appropriately detailed impact assessment of this additional key environmental impact must be included in the EIS.	This chapter

9.1 Environmental risk analysis process

An environmental risk analysis has been carried out to identify and confirm the key environmental issues for the project. Key issues are those that may have major or moderate impacts (actual or perceived) and require detailed assessment to determine the level or severity of potential effects and identify appropriate impact mitigation and management measures.

The environmental risk analysis process carried out for the project included:

- Preliminary environmental investigations to help identify the key environmental issues and inform the State Significant Infrastructure Application Report (RTA 2011).
- An assessment of the key issues identified in the Director General's requirements (DGRs) for the project (refer to Appendix A for the DGRs).
- An environmental risk review to confirm the key environmental issues based on the results of the detailed investigations presented in this EIS.

These steps are described in further detail in **Sections 9.2 to 9.4** below.

9.2 Preliminary environmental investigations

Preliminary environmental investigations were carried out prior to the preparation of this EIS to inform the State Significant Infrastructure Application Report (RTA, 2011). The outcomes of these investigations identified the following as key environmental issues for the project:

- Historic heritage.
- Aboriginal heritage.
- Noise and vibration.
- Land use, property and socio-economic impacts.
- Urban design (including landscape character and visual impacts).

The outcomes of the preliminary environmental investigations were documented in the State Significant Infrastructure Application Report (RTA, 2011), which was submitted to the Director General of the NSW Department of Planning and Infrastructure in conjunction with a State Significant Infrastructure approval application. The purpose of the State Significant Infrastructure Application Report was to assist the Director General in identifying the environmental impact assessment requirements for the project, including the key issues to be addressed in the EIS.

9.3 Assessment of the key issues identified in the DGRs

The key environmental issues identified in the DGRs are consistent with but add to the key issues identified in the State Significant Infrastructure Application Report. The DGRs identified the following as the key issues to be addressed in the EIS for the project:

- Historic heritage.
- Aboriginal heritage.
- Traffic and transport.
- Visual amenity, urban design and landscaping.
- Noise and vibration.
- Soils, sediments, water and waste.
- Land use, property and socio-economic.
- Flora and fauna.
- Air quality.

The above-listed key issues have been assessed in detail as part of the preparation of this EIS. These results of this assessment are presented in Chapter 7.

9.4 Environmental risk review

An environmental risk review was undertaken as part of this environmental impact statement to help identify any additional key issues, other than those already identified in the DGRs. As required by the DGRs, the process of environmental risk analysis continued during the course of preparing the environmental assessment. The emphasis was on using the detailed information gathered during the assessment process to review the environmental aspects of the project. More specifically, the analysis:

- Identified environmental issues, including key issues in the DGRs, and any other issues.
- Examined potential impacts and proposed mitigation measures in relation to the identified issues.
- Identified the nature and extent of impacts likely to remain after mitigation measures are applied.

Based on this analysis, an environmental risk category was assigned to each potential impact. This enabled the identification of any matters that might be considered as additional key issues, and provided a basis for an appropriately detailed assessment of these additional key issues in this environmental assessment.

The environmental risk categories are described in **Table 9-2**.

Table 9-2 Environmental risk category criteria for identified environmental issues

Risk category	Description
Key issue	High or moderate impact (actual and perceived) requiring further investigation to identify specific management and mitigation measures.
Other issue	Moderate or low impact that can be managed effectively with standard and best practice management and mitigation measures.

9.5 Confirmation of the key environmental issues

A summary of the environmental risk analysis is provided in **Table 9-3**. The environmental risk analysis confirms that the DGRs included all key issues. No additional key issues were identified.

Table 9-3 Results of the environmental risk review for confirmation of key issues

Issue	Key issue in DGRs	Main potential adverse impacts	Main potential adverse impacts remaining following application of environmental management measures	Risk category following analysis	EIS reference ¹²
Historic heritage	Yes	Significant adverse impacts on the State heritage listed Thompson Square Conservation Area, its archaeology and historic views and vistas and setting of Thompson Square. Demolition of the existing Windsor bridge, which is of State heritage significance and listed on RMS' section 170 register..	Significant residual adverse impacts on the State heritage listed Thompson Square Conservation Area, its archaeology and historic views and vistas and setting of Thompson Square. Demolition of the existing Windsor bridge, which is of State heritage significance and listed on RMS' section 170 register.	Key issue	Chapter 7, Section 7.1
Aboriginal heritage	Yes	Destruction or disturbance of Aboriginal objects. Loss of archaeological evidence and record of Aboriginal occupation. Potential for moderate impacts on Aboriginal cultural heritage values.	Destruction or disturbance of Aboriginal objects. Potential for minor impacts on Aboriginal cultural heritage values. No residual significant impacts are anticipated.	Key issue	Chapter 7, Section 7.2
Traffic and transport	Yes	Major disruptions to traffic flow and parking during the construction period. Traffic flow disruptions may extend to through traffic and major arterial traffic routes linking Windsor, Sydney and the Blue Mountains.	Minor to moderate disruptions to traffic flow and parking during the construction period. Traffic flow disruptions would largely be limited to local traffic. No residual significant impacts are anticipated.	Key issue	Chapter 7, Section 7.3

¹² Refers to relevant section of this environmental impact statement (EIS) where the issues are described in detail.

Issue	Key issue in DGRs	Main potential adverse impacts	Main potential adverse impacts remaining following application of environmental management measures	Risk category following analysis	EIS reference ¹²
Visual amenity, urban design and landscaping	Yes	Major impacts on the visual amenity of the Windsor township during the construction period. Major long-term impacts on the visual character and urban design of the Windsor township during operation.	Moderate to high impacts on the visual amenity of the Windsor township during the construction period. Moderate to high long-term impacts on the visual character and urban design of the Windsor township during operation. No residual significant impacts are anticipated.	Key issue	Chapter 7, Section 7.4
Noise and vibration	Yes	Major noise and vibration impacts during construction. Potential vibration impacts on heritage buildings. Potential for minor long-term noise impacts on two properties.	Minor to moderate noise impacts during construction. Minor risk to heritage items from construction vibration. Minor additional noise impacts for some properties during operation. No residual significant impacts are anticipated.	Key issue	Chapter 7, Section 7.5
Soils, sediments and water	Yes	Major impacts on water quality due to erosion of soils/sediments from construction areas adjacent to the Hawkesbury River and disturbance of sediments on the bed of the Hawkesbury River. Minor to moderate risk of impacts on water quality as a result of accidental spills. Missed opportunities to minimise the amount of waste generated Moderate quantities of waste requiring disposal.	Minor, localised increases in turbidity and suspended sediment in the Hawkesbury River during the construction period (including demolition of the existing bridge). Negligible risk of impacts on water quality as a result of accidental spills. Minor quantities of waste requiring disposal. No residual significant impacts are anticipated.	Key issue	Chapter 7, Section 7.6

Issue	Key issue in DGRs	Main potential adverse impacts	Main potential adverse impacts remaining following application of environmental management measures	Risk category following analysis	EIS reference ¹²
Hydrology	Yes	Negligible impacts on flood levels for events greater than the 10 year ARI flood event Minor impacts on flood levels at some properties for events between the 3 year and 10 year ARI flood events	Negligible impacts on flood levels for events greater than the 10 year ARI flood event Minor to moderate impacts on flood levels at some properties for events between the 3 year and 10 year ARI flood events. No residual significant impacts are anticipated.	Key issue	Chapter 7, Section 7.7
Land use, property and socio-economic impacts	Yes	Major impacts on the amenity of land uses during the construction period. Moderate socio-economic impacts during construction as a result of the impacts on the amenity of land uses. Changes in access arrangements for two properties on Bridge Street.	Minor to moderate impacts on the amenity of land uses during the construction period. Potential for minor socio-economic impacts during construction as a result of the impacts on the amenity of land uses. Changes in access arrangements for two properties on Bridge Street. No residual significant impacts are anticipated.	Key issue	Chapter 7, Section 7.8
Flora and fauna	Yes	Moderate impacts on local and downstream aquatic habitat due to erosion of soils/sediments from construction areas adjacent to the Hawkesbury River and disturbance of sediments on the bed of the Hawkesbury River. High risk of weed spread.	Potential for minor, localised impacts on aquatic habitat during the construction period (including demolition of the existing bridge). Negligible to minor risk of weed spread. No residual significant impacts are anticipated.	Key issue	Chapter 7, Section 7.9
Air quality	Yes	Moderate to major risk of dust impacts on the Windsor township during the construction period.	Minor risk of localised dust impacts during the construction period. No residual significant impacts are anticipated.	Key issue	Chapter 7, Section 7.10

Issue	Key issue in DGRs	Main potential adverse impacts	Main potential adverse impacts remaining following application of environmental management measures	Risk category following analysis	EIS reference ¹²
Greenhouse gas and climate change	No	Missed opportunities for minimising greenhouse gas emissions during selection of construction materials and the construction process.	Negligible impacts on greenhouse gas emissions and climate change. No residual significant impacts are anticipated.	Other issue	Chapter 8, Section 8.1 and Section 8.2
Hazards and risks	No	Minor risks associated with use of chemicals during construction.	Negligible risks associated with use of chemicals during construction. No residual significant impacts are anticipated.	Other issue	Chapter 8, Section 8.3

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