

Part C

Environmental risk analysis

21

21.0 Environmental risk analysis

This chapter provides a summary of the environmental risk analysis carried out for this proposal, identifying the potential environmental and community risks and issues assessed as part of this Environmental Impact Statement.

The full results of the Environmental Impact Statement environmental risk analysis are provided in Appendix J (Environmental risk analysis results).

21.1 Purpose

The purpose of the Environmental Impact Statement environmental risk analysis is to build upon preliminary environmental risk analysis in the *Sydney Metro West Scoping Report – Rail infrastructure, stations, precincts and operations* (Sydney Metro, 2021b) to:

- identify the potential environmental and community risks and issues considered as part of this Environmental Impact Statement
- identify any issues not included in the Secretary's environmental assessment requirements to enable appropriate assessment
- consider environmental impacts based on additional detailed investigations and greater project definition, when compared to the preliminary environmental risk analysis
- identify the residual environmental impacts after the implementation of the mitigation measures and performance outcomes described in this Environmental Impact Statement. This provides early identification of high residual impacts to allow a focus on these areas during the refinement of the design and the development of construction methodologies.

This environmental risk analysis is intended to identify broad environmental risks associated with this proposal. Activity and site-specific impacts are detailed within Chapter 7 (Westmead metro station) to Chapter 19 (Cumulative impacts) of this Environmental Impact Statement.

21.2 Environmental risk analysis methodology

The environmental risk analysis was undertaken in accordance with the principles of the Australian and New Zealand standard AS/NZS ISO 31000:2018 Risk Management – Guidelines. This involved identifying foreseeable risks of this proposal and understanding the implications that could occur from each risk, that is, the potential impact. The risk of each potential impact was evaluated by identifying the consequence of the potential impact and the likelihood of each impact occurring.

The first step in the risk analysis involved evaluating the consequence of an identified potential impact, which requires making professional judgements about the possible results of an impact if it occurs. The definitions of the consequences used are provided in Table 21-1. This is followed by identifying the likelihood of the potential impact occurring with the definitions of likelihood provided in Table 22-2. The consequence and likelihood are combined to identify the level of risk of the potential impact, as shown in the risk matrix in Table 21-3.

Table 21-1 Consequence definitions

Consequence level	Definition
Catastrophic	<ul style="list-style-type: none"> • long term (greater than 12 months) and irreversible large-scale environmental impact with loss of valued ecosystems • extended substantial disruptions and impacts to stakeholder(s) or customers.
Severe	<ul style="list-style-type: none"> • long term (6 to 12 months), long-term environmental impairment in neighbouring or valued ecosystems; extensive remediation required • severe disruptions or long-term impacts to stakeholder(s) or customers.
Major	<ul style="list-style-type: none"> • medium term (between 3 and 6 months), impacts external ecosystem and considerable remediation is required • major impacts or disruptions to stakeholder(s) or customers.
Moderate	<ul style="list-style-type: none"> • medium term (between 1 and 3 months), short-term and/or well-contained environmental effects; minor remedial actions probably required • moderate impacts or disruptions to stakeholder(s) or customers.

Consequence level	Definition
Minor	<ul style="list-style-type: none"> short term (less than 1 month), change from normal conditions within environmental regulatory limits and environmental effects are within site boundaries minor or short-term impacts to stakeholder(s) or customers.
Insignificant	<ul style="list-style-type: none"> no noticeable or visible changes to environment and/or highly localised event negligible impact to environment, stakeholder(s) or customers.

Table 21-2 Likelihood definitions

Likelihood	Definition	Probability
Almost certain	Expected to occur frequently during time of activity or project (10 or more times every year)	>90%
Very likely	Expected to occur occasionally during time of activity or project (1 to 10 times every year)	75% to 90%
Likely	More likely to occur than not occur during time of activity or project (once each year)	50% to 75%
Unlikely	More likely not to occur than occur during time of activity or project (once every 1 to 10 years)	25% to 50%
Very unlikely	Not expected to occur during the time of activity or project (once every 10 to 100 years)	10% to 25%
Almost unprecedented	Not expected to ever occur during time of activity or project (less than once every 100 years)	<10%

Table 21-3 Risk matrix

Likelihood	Consequence					
	Insignificant	Minor	Moderate	Major	Severe	Catastrophic
Almost certain	Medium	High	High	Very high	Very high	Very high
Very likely	Medium	Medium	High	High	Very high	Very high
Likely	Low	Medium	Medium	High	High	Very high
Unlikely	Low	Low	Medium	Medium	High	High
Very unlikely	Low	Low	Low	Medium	Medium	High
Almost unprecedented	Low	Low	Low	Low	Medium	Medium

21.3 Environmental risk analysis summary

21.3.1 Preliminary environmental risk analysis

The preliminary environmental risk analysis undertaken as part of the Scoping Report identified the environmental aspects that could potentially cause environmental harm associated with the construction and operation of this proposal. An assessment of cumulative risk was also undertaken. Of these aspects, seven were categorised as high or very high and were recommended for further investigation. Potential benefits of this proposal were also identified during the preliminary analysis.

The preliminary environmental risk analysis identified the following 'key' environmental issues that are relevant to the assessment of work covered by this proposal:

- construction transport and traffic
- construction noise and vibration
- non-Aboriginal heritage
- landscape character and visual amenity
- hydrology, flooding and water quality
- social impacts
- business impacts
- cumulative impacts.

21.3.2 Environmental Impact Statement environmental risk analysis

The preliminary environmental risk analysis in the Scoping Report was used as the starting point for the Environmental Impact Statement environmental risk analysis. The Environmental Impact Statement environmental risk analysis consisted of two main steps:

1. Updated environmental risk analysis, which involved:
 - a. consideration of the findings of the environmental impact assessments for Sydney Metro West
 - b. splitting the grouped environmental issues into specific environmental risks
 - c. identification of the need for project-specific mitigation measures and performance outcomes.
2. Residual environmental risk analysis following consideration of the effect of project-specific mitigation measures, performance outcomes, the design of this proposal, and benefits and opportunities of this proposal.

Following consideration of mitigation measures and performance outcomes specific to this proposal, the environmental risk analysis was updated. Of the 93 risks with an overall rating of high or very high in the updated environmental risk analysis, only three remain (across two broader environmental aspects (construction noise and vibration and cumulative impacts)) as high following mitigation (i.e. the residual risk rating) (refer to Appendix J (Environmental risk analysis results)). No very high ratings remain.

Table 21-4 Summary of residual risks

Risk rating	Risk
Low	<ul style="list-style-type: none"> • operational transport • operational noise and vibration • Aboriginal heritage • biodiversity • flooding • property • air quality • sustainability, greenhouse gas and climate change • waste management and resource use • hazard and risk.
Medium	<ul style="list-style-type: none"> • construction transport • non-Aboriginal heritage • landscape and visual amenity • soils, contamination and groundwater • social impacts • business impacts • hydrology and water quality.
High	<ul style="list-style-type: none"> • construction noise and vibration • cumulative impacts.
Very high	<ul style="list-style-type: none"> • no risks identified.

Figure 21-1 illustrates the decrease in risk items following consideration of mitigation measures and performance outcomes specific to this proposal.

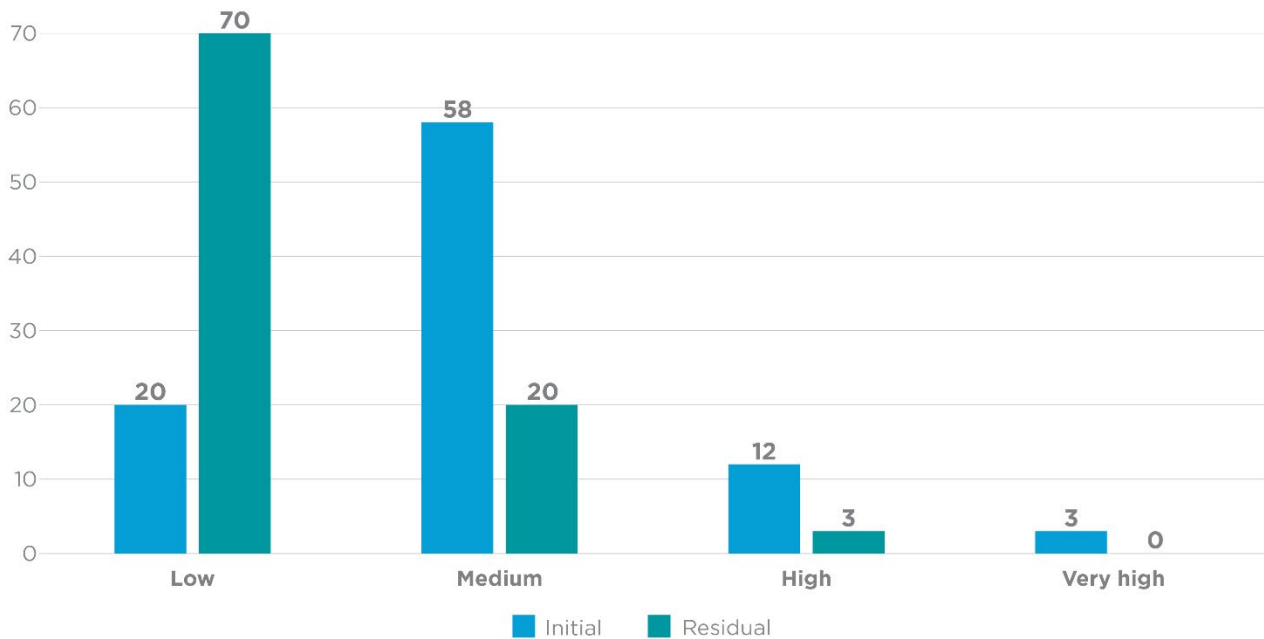


Figure 21-1 Comparison of updated risk to residual risk

21.4 Conclusions and next steps

The environmental risk analysis has identified that issues within the following environmental aspects would have a high residual risk after implementation of the mitigation measures proposed in this Environmental Impact Statement:

- construction noise and vibration – two issues
- cumulative impacts during construction – one issue.

This suggests that an increased focus would be required on these aspects throughout construction of this proposal to reduce these risks further to meet an acceptable risk level. In particular, Sydney Metro has developed an Overarching Community Communications Strategy (Appendix C), and a Construction Noise and Vibration Standard (Appendix H) to guide consultation and manage the noise and vibration related impacts.

Opportunities to reduce or manage construction fatigue are identified through continued coordination and engagement with proponents for other concurrent or consecutive construction projects. Ongoing community and stakeholder engagement would also be carried out so that potential cumulative impacts are better understood and reduced where possible.

The assessment carried out for issues that would have a medium residual risk has determined the likely extent of impacts can be suitably managed with the implementation of feasible and reasonable mitigation measures. The implementation of the Construction Environmental Management Framework (Appendix F) would help to manage these potential residual impacts.

Issues that have a low residual risk can be adequately managed through detailed design and construction, and by the implementation of standard management measures, so that all necessary environmental criteria and guidelines would be achieved.