

8 Environmental risk analysis

Chapter 8 explains how environmental issues for the project were identified through an environmental risk analysis process, and documents the findings of that process.

Director-General's requirements

Environmental Risk Analysis – notwithstanding the above key assessment requirements, the EA 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 environmental assessment.

8.1 Overview

Before lodging the major project application, the RTA reviewed the outcomes of preliminary investigations and identified those environmental issues of most importance for the project through a preliminary environmental risk analysis. The findings formed the basis of the RTA's Major Project Application, and helped the Director-General formulate the 'key issues' for the project as outlined in the Director-General's requirements (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 8-1. The environmental risk analysis is summarised in Table 8-2.

Table 8-1 **Environmental risk categories**

Risk category	Description
A	May have high or moderate impacts. Detailed assessment necessary to determine the level of potential impact and to develop appropriate measures to mitigate and manage the impacts.
B	May have high or moderate impacts. These can be mitigated by the application of standard environmental management measures.
C	Has low impacts. These can be managed by standard environmental management measures.

8.2 Risk analysis summary

A summary of the environmental risk analysis is provided in Table 8-2.

The environmental risk analysis confirms that the DGRs included all key issues. No additional key issues were identified.

All key issues identified in the DGRs have been assigned a risk category of 'A'.

Table 8-2 **Environmental risk analysis — summary**

Issue	DGRs key issue?	Potential impacts	Analysis — Proposed mitigation measures and impacts remaining after their application	Risk category	EA reference
Transport	Yes			A	Section 6.1 Appendix F
Road traffic		<ul style="list-style-type: none"> • There would be impacts on local traffic and through traffic, from introduction of construction traffic to network. • There would be reduced capacity and temporary closures at times. • There would be permanent change to traffic movements to and from Victoria Road. • There would be impacts from the rationalisation of bus stops, introduction of a tidal flow scheme, and introduction of additional clearways to increase capacity. 	<ul style="list-style-type: none"> • Traffic disturbances would be limited to short-term lane and/or road closures during construction. • Opportunities to minimise construction traffic would be investigated (eg timing of material deliveries). • The existing bridge would continue to carry traffic while the new bridge is built. • Road works would be undertaken during the night and outside of peak periods. • There would be a loss of outbound capacity during the AM peak during operation. • Minor short-term delays would occur as traffic switches/tidal flow schemes are implemented. Delays and traffic stoppages would be minimised through appropriate traffic management. • New signs, community updates, and other appropriate methods would be implemented to minimise potential safety issues associated with the tidal flow scheme. • Bus transport reliability and efficiency would improve. • There would be impacts associated with removal of right turns, changing configuration and access to local network (see Section 7.1). • The project would not induce traffic to Victoria Road (eg from routes such as the Harbour Bridge and Parramatta Road) (see Section 7.1). 	A	

Issue	DGRs key issue?	Potential impacts	Analysis — Proposed mitigation measures and impacts remaining after their application	Risk category	EA reference
Maritime activity		<ul style="list-style-type: none"> • There could be restricted access for commercial, pleasure and recreational watercraft. • There would be a permanent obstruction in waterway (from new in-water piers). 	<ul style="list-style-type: none"> • Access beneath the bridge (from one side to the other) would be maintained at all times, though there would be obstructions (piers) on the waterway. • There could be impacts on the rowing course. The construction schedule and related activities would consider local events and consultation with relevant groups to minimise impacts. • To minimise the impact of permanent obstruction in the waterway, piers on the new bridge would be aligned with existing bridge piers, and navigational signs and lighting would be installed. 	B	
Pedestrians and cyclists		<ul style="list-style-type: none"> • Pedestrians and cyclists could be inconvenienced by diversions and restricted access. • Pedestrians and cyclists would benefit from improved connectivity across Iron Cove and Victoria Road, and improved amenity. 	<ul style="list-style-type: none"> • Potential impacts on Bay Run users would be minimised through implementation of diversions and alternative routes. • Pedestrian safety is considered paramount and would be maintained, and improved where possible, under the tidal flow scheme. • The improved connectivity of the Bay Run and regional cycle route, and separation of pedestrians and cyclists, would benefit users. 	B	
Contamination	Yes			A	Section 6.2 Appendix G
Soil, sediment and groundwater		<ul style="list-style-type: none"> • Contaminated soil could be disturbed, with potential impact on water quality and parkland recreation. • Liquid wastes from excavations would be generated through inflow of groundwater and surface water. 	<ul style="list-style-type: none"> • Contaminated sediment, soil and water could be managed using specialised industry best practice management and construction techniques. Measures may include in-water silt curtains, segregation of contaminated material prior to disposal, and surface water diversions. • Impacts are likely to be localised. 		

Issue	DGRs key issue?	Potential impacts	Analysis — Proposed mitigation measures and impacts remaining after their application	Risk category	EA reference
		<ul style="list-style-type: none"> Exposed subsurface contamination and acid sulfate soils (ASS) could potentially pollute receiving waters (Iron Cove). Fuel and oil spills could potentially contaminate soils. Contaminated sediment and potential acid sulfate soils (PASS) could be disturbed, and could have potential impact on water quality and aquatic biota. Contaminated material could be introduced into groundwater during boring and excavation activities. 			
Noise and vibration	Yes	<ul style="list-style-type: none"> Noise during the day and night could affect noise and vibration-sensitive receivers — mostly residents, but also people in parks, schools and churches. Vibration during construction could damage property. 	<ul style="list-style-type: none"> Building condition surveys and vibration monitoring would identify potential superficial or structural damage to buildings where higher risk activities would be performed. This would allow modification of activities to prevent damage, and formulation of an appropriate response. Existing damage would also be assessed in order to provide a baseline for future analysis of damage claims. There could be short to medium term impacts on sensitive receivers from construction activities and heavy vehicle movements during day and night. There would be a minor increase in operational noise at apartment blocks east of the existing Iron Cove Bridge and at some properties on Formosa and Byrnes streets. 	A	Section 6.3 Appendix H

Issue	DGRs key issue?	Potential impacts	Analysis — Proposed mitigation measures and impacts remaining after their application	Risk category	EA reference
Visual amenity and urban design	Yes	<ul style="list-style-type: none"> • There would be visual impacts from the introduction of temporary construction facilities in open space, and from on-site construction equipment. • The new, visually prominent bridge over Iron Cove, and associated lighting, would have a visual impact. • Introducing the tidal flow scheme and reallocating road space in Rozelle could have visual impacts. • There could be impacts from the removal of locally prominent vegetation. 	<ul style="list-style-type: none"> • Noise impact from implementation of the tidal flow scheme would be minimised through technology to reduce the noise level of equipment. • Increases to operational noise of >2 dBA above the DECC base criteria at noise-sensitive receivers (modelled for up to 10 years after project opening) will be mitigated where feasible and reasonable in consultation with affected property owners. • Compounds would be maintained in a neat and tidy condition and screened from prominent views where possible. • Temporary construction compounds would occupy the minimum space required to carry out work, and sites would be decommissioned and progressively restored as soon as possible after work is completed. • To minimise visual impacts, the bridge would be a simple structure. • There would be permanent impacts on public places including overshadowing of Drummoyne Swim Centre, and loss of about 15 per cent of the canopy of the fig tree adjacent to the new bridge (but long-term health of the tree would be maintained). • Palm trees removed from the median in Rozelle would be relocated within the area, subject to landowner consent. • There would be reduced viewing opportunities from the original remnant abutments, but new opportunities for 	A	Section 6.4 Appendix I

Issue	DGRs key issue?	Potential impacts	Analysis — Proposed mitigation measures and impacts remaining after their application	Risk category	EA reference
			<p>viewing from the bridge. Visual screening would be considered.</p> <ul style="list-style-type: none"> The visual impact of the new overhead signage structures, replacement traffic signals and other project elements would be minimised through appropriate placement and design. 		
Social and economic	Yes	<ul style="list-style-type: none"> The local community could be inconvenienced and have their amenity reduced. There could be a temporary loss of open space along the route. The loss of parking could affect businesses during construction and operation. There would be a permanent loss of open space adjacent to King George Park. 	<ul style="list-style-type: none"> During construction, impacts on The Cove at Drummoyne café would be affected by reduced parking and amenity (ie noise and visual). The use of temporary screening and car parking during the construction period would be subject of consultation with the council and business operator. On-street parking along Victoria Road would be removed during peak hours. The travelling public would benefit from faster and more consistent bus travel. Improved connectivity at the crossing of Iron Cove and foreshores would benefit pedestrians and cyclists. 	A	Section 6.5 Appendix J
Non-Aboriginal heritage	Yes	<ul style="list-style-type: none"> There could be potential impacts on listed and non-listed non-Aboriginal heritage items, both known and buried. This would include potential damage to heritage items from vibration during construction. 	<ul style="list-style-type: none"> There would be low to medium visual impact on heritage items through Drummoyne and Rozelle associated with positioning of overhead signage structures. Overhead signage and furniture would be designed to be consistent with existing infrastructure and as unobtrusive as possible. There would be moderate to high visual impact on Iron Cove Bridge. There would be an impact on some attributes of Iron Cove 	A	Section 6.6 Appendix K

Issue	DGRs key issue?	Potential impacts	Analysis — Proposed mitigation measures and impacts remaining after their application	Risk category	EA reference
			<p>Bridge, including a generally high degree of visual impact from and to the west.</p> <ul style="list-style-type: none"> • There would be a high impact on the heritage value of the former bridge abutments (including potential for direct impacts and obscuring the structures from view). • There would be minor to moderate direct and indirect impacts on non-statutory listed items on the foreshores of Iron Cove (Drummoyne Swim Centre, sea wall, King George Park, memorial plaque). • Building condition surveys and vibration monitoring would minimise the potential for impact on heritage items. 		
Air quality	No	<ul style="list-style-type: none"> • Generation of dust and emissions from plant. • Traffic movements could affect air quality along the route. 	<ul style="list-style-type: none"> • There would be minimal impact from construction activities following the adoption of standard mitigation measures to control dust and emissions. • Modelling of air quality impacts suggests negligible change in operational air quality. 	C	Section 7.1
Geology and soils	No	<ul style="list-style-type: none"> • Local soils are considered to be moderately to highly erodible, and there is potential for scouring on-site and movement off-site. 	<ul style="list-style-type: none"> • Erosion and sedimentation are expected to be minimal and managed through the adoption of established management measures. • Potential impacts of acid sulfate soils are addressed in contamination (see risk category A). 	B	Section 7.2

Issue	DGRs key issue?	Potential impacts	Analysis — Proposed mitigation measures and impacts remaining after their application	Risk category	EA reference
Water	No	<ul style="list-style-type: none"> Sedimentation and other contaminants from the site could potentially reduce water quality. Subsurface contamination is discussed in contamination (see risk category A). There is potential for increased point source discharges. There is potential for contamination of clean water from contact with contamination (see contamination — risk category A). 	<ul style="list-style-type: none"> Best management practices would be implemented to minimise impacts on water quality. 	B	Section 7.3
Biodiversity	No	<ul style="list-style-type: none"> There is potential for the proliferation of noxious weed species due to vegetation disturbance along the Drummoyne and Rozelle foreshore. There would be a direct impact on the Moreton Bay Fig adjacent to Drummoyne Swim Centre. There is potential for minor impact on habitat for common native fauna and highly mobile species (foraging and potential roosting). There would be a direct impact on trees on both the Drummoyne and Rozelle sides of Victoria Road. 	<ul style="list-style-type: none"> The spread of noxious weeds would be managed through standard weed management measures. Pruning would be limited to about 15 per cent of canopy with no long-term impact on the health of the tree. An arborist would undertake pruning. Needle-Leaf Mistletoe (<i>Amyema cambagei</i>) in several swamp oaks in King George Park (a regionally significant species in Western Sydney) would not be directly affected by the project. 	C	Section 7.4
Terrestrial flora and fauna					

Issue	DGRs key issue?	Potential impacts	Analysis — Proposed mitigation measures and impacts remaining after their application	Risk category	EA reference
Aquatic flora and fauna		<ul style="list-style-type: none"> • There is potential for impact on aquatic ecology, including sea grasses, mangroves and benthic organisms. • There is potential for indirect impact from mobilisation of bottom sediments. 	<ul style="list-style-type: none"> • Silt curtains would be used during in-water works where interaction with sediment would be required. Curtains would contain any suspended material until settling has occurred. • Standard erosion and sediment control measures would control water discharges from the construction site. • No mangroves or seagrasses would be impacted (the closest are in Sisters Bay, on the Drummoyne side). • No habitat to support listed species (FM Act or EPBC Act) would be impacted. • There would be direct local loss of some common benthic assemblages (polychaete worms and crustaceans) but these are not considered significant. • The overshadowing assessment suggests that shadowing has no or limited impact on intertidal Sargassum algae. 	C	
Cultural plantings		<ul style="list-style-type: none"> • Twenty-three Washington palm trees would be removed from the Victoria Road median, Rozelle. • Some landscaped and planted areas would be lost as a result of the bridge and pedestrian infrastructure. 	<ul style="list-style-type: none"> • The 23 palm trees in the Victoria Road median would be relocated to a suitable location within the area, subject to landowner consent. • Landscaping would be implemented in the vicinity of the bridge abutments, with consideration of the desired aesthetics of the area. 	C	

Issue	DGRs key issue?	Potential impacts	Analysis — Proposed mitigation measures and impacts remaining after their application	Risk category	EA reference
Aboriginal heritage	No			C	Section 7.5
		<ul style="list-style-type: none"> • There could be disturbance of as yet unknown Aboriginal objects. 	<ul style="list-style-type: none"> • No known objects or places of Aboriginal heritage would be impacted by the project. • There is a low likelihood of uncovering unknown Aboriginal objects. Any finds would be managed through standard measures adopted in the event of a find. 		
Resource management and waste minimisation	No			C	Section 7.6
		<ul style="list-style-type: none"> • Contaminated waste could be generated during construction. • Other waste generated during construction would include building materials, excess unsuitable spoil material, and vegetation material. • Consumption of general building materials would include concrete, steel, asphalt, fill and other miscellaneous materials. 	<ul style="list-style-type: none"> • The project would produce a number of waste streams. These would be managed through standard industry best practice measures. Storage, classification and disposal of waste material would be in accordance with environmental guidelines. • Construction materials would be sourced locally wherever practicable. • Products with recycled content would be used wherever practicable. • Low-energy devices for site accommodation and facilities would be used wherever practicable. 		

Issue	DGRs key issue?	Potential impacts	Analysis — Proposed mitigation measures and impacts remaining after their application	Risk category	EA reference
Climate change (including greenhouse gas emissions)	No	<ul style="list-style-type: none"> • There would be emission of greenhouse gases associated with the construction and operation of the project, which would contribute to climate change impacts. Greenhouse gases would include emissions from construction plant, equipment and vehicles; those embodied in construction materials; and those generated from clearing of vegetation. • Climate change could have impacts on the project. • The project would reduce bus congestion. 	<ul style="list-style-type: none"> • Emission of greenhouse gases during construction would be managed through conventional management measures. • The project would improve the efficiency of buses and contribute to a potential long-term reduction in greenhouse gas emissions due to modal shift (as more people shift from cars to buses). • The project would meet design standards that would allow it to withstand weather changes associated with climate change. 	C	Section 7.7
Hazards and risks	No	<ul style="list-style-type: none"> • The potential release of dangerous and hazardous materials to the receiving environment would present a hazard to the environment, human health and safety. • Construction would generate construction waste. 	<ul style="list-style-type: none"> • The project would produce a number of waste streams. These would be managed through standard industry best practice measures. Storage, classification and disposal of waste material would be in accordance with environmental guidelines. • The project would reduce the risk of crashes and spills relative to the 'base case' of no upgrade, as a result of the separation of traffic and removal of contra flow. 	B	Section 7.8

Issue	DGRs key issue?	Potential impacts	Analysis — Proposed mitigation measures and impacts remaining after their application	Risk category	EA reference
		<ul style="list-style-type: none"> • Construction would potentially increase sedimentation of receiving waters (see water — risk category B). • Construction Building the project would potentially disturb contaminated soils and sediments (see contamination — risk category A). • Construction Building the project would potentially disturb potential acid sulfate soils, resulting in production of sulphuric acid (see contamination — risk category A). • There would be risks associated with the operation of the new bridge, and transportation of hazardous goods. 			