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Title:	**Victoria Road upgrade** Preliminary Environmental Assessment (Project Application)

Approval and authorisation	
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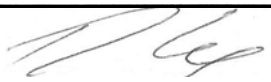
	Signed: 
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Executive summary

Introduction and overview

The Roads and Traffic Authority (RTA) of NSW has a project to upgrade Victoria Road between Westbourne Street, Drummoyne and The Crescent, Rozelle, to improve the efficiency and reliability of bus services and maintain general traffic flow. This project was announced on 20 November 2006 as part of the NSW Premier's *Urban Transport Statement*.

The project would extend along Victoria Road between Westbourne Street, Drummoyne and The Crescent, Rozelle, a distance of nearly 3.5 kilometres. It would involve the implementation of bus lanes, provision of a tidal flow traffic scheme through Drummoyne, an additional new bridge located to the west of the existing Iron Cove Bridge and changed traffic arrangements and roadway adjustments through Rozelle.

Planning and assessment process

In accordance with section 75B(2) of the *Environmental Planning and Assessment Act, 1979* (EP&A Act), the Minister for Planning has declared by Order published in the NSW *Government Gazette* (Week No 51/2007 Friday 21 December 2007), that the Victoria Road upgrade is a project to which Part 3A applies.

Need for the project

Victoria Road currently carries around 1480 buses that transport more than 35,000 passengers per week day and 200,000 passengers each week. Bus travel times are highly variable. Citybound morning bus travel times typically range from five minutes (at about 40 km/hr) to 28 minutes (at about 8 km/h) from Westbourne Street to The Crescent. In a typical weekday morning (7am to 9am) up to 170 buses carry more than 8,000 passengers citybound between Westbourne Street and The Crescent at Rozelle.

In recent years citybound traffic volumes have declined. Investigations have indicated that volumes are currently suppressed by capacity constraints, with demand citybound exceeding supply between Westbourne Street and The Crescent. This is demonstrated by the long queues that form in the AM peak citybound indicating that the traffic demand is greater than road capacity at some intersections. In the PM peak some delays for westbound traffic are experienced at the western end of the project corridor and growth in this peak period has been observed over the last two years.

In recognition of these issues, the Victoria Road upgrade is identified as a priority project in the Premier's *Urban Transport Statement*. It would provide high quality, reliable and efficient bus priority measures to improve bus travel times and assist general traffic flow.

Proposed scope of the environmental assessment

Preliminary environmental assessment indicates that the following key environmental issues will require further detailed assessment and may require project specific impact mitigation measures.

- Non-Aboriginal heritage.
- Traffic and transportation.
- Contaminated land and sediment.
- Noise and vibration.
- Visual amenity and urban design.
- Economic and social.

Further assessments and studies identified in Section 6 of this preliminary environmental assessment would support the development and implementation of procedures, practices and protocols for identifying and managing the environmental impacts of the project. These

procedures, practices and protocols would be included in the statement of commitments for the project.

A number of other environmental issues have also been identified. These issues are generally considered to be common issues frequently encountered in road construction projects (eg soil and water quality, waste management, hazards and risks) and can be managed using standard industry best practice management techniques. Table 6.2 outlines these other environmental issues and proposed mitigation measures.

Contents

Attachments

Attachment A: Community Update July 2008

Abbreviations and glossary

Term	Definition
AHIMS	Aboriginal Heritage Information Management System
CEMP	Construction environmental management plan
Contra-flow	Contra-flow or tidal flow uses reversible lanes to optimise the flow of traffic along a roadway
DECC	Department of Environment and Climate Change
DEW	Department of Environment and Water Resources
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FM Act	*Fisheries Management Act 1994*
HRMP	Hazards and risk management plan
LGA	Local government area
LoS	Level of service
NVMP	Noise and vibration management plan
PM_{10}	Measure of particles in the atmosphere with a diameter of less than ten or equal to a nominal 10 micrometers
RTA	Roads and Traffic Authority
SEPP	State environmental planning policy
SWMP	Soil and water management plan
T3 transit lane	Use of the T3 transit lane is restricted to vehicles carrying at least two other people
TSC Act	*Threatened Species Conservation Act 1995*
WARR Act	*Waste Avoidance and Resource Recovery Act 2001*
WMP	Waste management plan

1 Introduction and methodology

1.1 Background

Victoria Road is one of three major direct road routes between Parramatta and the Sydney CBD. The RTA proposes to upgrade Victoria Road between Westbourne Street, Drummoyne and The Crescent, Rozelle. The project corridor is shown Figure 1.1 below. The project aims to increase the efficiency and reliability of bus services and maintain general traffic flow on Victoria Road through the provision of bus priority measures.

The project was announced as part of the Premier's *Urban Transport Statement* (2006). That initiative draws on the findings of the *Review of Bus Services in NSW* (Unsworth, 2004), which recommends the development of a network of strategic bus corridors linking Sydney's major centres, railway stations and services. The strategic bus corridors are to be complemented by bus priority measures which aim to improve reliability and reduce travel time.

The Victoria Road strategic bus corridor, which includes the project, extends from Parramatta to the Sydney CBD and is one of the busiest transport corridors in Sydney. Victoria Road was identified as a strategic bus corridor for the following reasons:

- Buses using it carry about 200,000 passengers each week.
- During a typical AM peak period, up to 170 buses carry more than 8,000 commuters between the Gladesville Bridge and The Crescent at Rozelle.
- Traffic congestion can lead to 'bus bunching' and scheduling difficulties.

Community consultation has commenced and community updates were released in February, June and December 2007, and July 2008 providing the community with details of the project (refer to Attachment A). Following the December 2007 update, the community and stakeholders were provided an opportunity to make submissions about the project for a period of three months, from 3 December 2007 to 3 March 2008.

A major project application was lodged with the Department of Planning (DoP) in December 2007. At that time the RTA was considering options for a new four-lane bridge on either the eastern or western side of the existing Iron Cove Bridge. Following extensive consultation, options analysis and design work, the RTA has now identified a preferred option for the new bridge, consisting of three-lanes (rather than four) and located to the west of the existing bridge.

As a consequence, the RTA has decided to withdraw the previous major project application and resubmit a new application for the project.

This preliminary environmental assessment covers the proposed three-lane western bridge along with other traffic initiatives in Drummoyne and Rozelle as discussed in Section 4. It has been undertaken based on the same project corridor as the former application, extending between Westbourne Street, Drummoyne and The Crescent, Rozelle which is about 3.5 kilometres long and which includes Iron Cove Bridge and its surrounds. For the purposes of assessment a buffer area of 500 metres either side of the road has been used.

Figure 1.1: Project location

1.2 Purpose of this document

This preliminary environmental assessment (PEA) has been prepared to support a major project application under Section 75E of the *Environmental Planning and Assessment Act, 1979* (EP&A Act). The PEA does the following:

- Describes the project.
- Outlines the findings of the preliminary environmental assessment and identifies a number of environmental management measures.
- Identifies the proposed scope of the subsequent environmental assessment for the project.
- Aims to assist the formulation of environmental assessment requirements by the Director-General under Section 75F(2) of the EP&A Act.

2 Planning and assessment process

2.1 Approval process under Part 3A of the EP&A Act

Section 75B(2) of the EP&A Act provides that:

> *"The following kind of development may be declared to be a project to which this Part applies:*
>
> … (a) *major infrastructure or other development that, in the opinion of the Minister, is of State or regional environmental planning significance*"

In accordance with this provision, the Minister for Planning has declared by Order to be published in the NSW Government Gazette (No. 185), that the Victoria Road upgrade is a project to which Part 3A applies.

2.2 Statutory planning

2.2.1 Local environmental plans

The local environmental plans relevant to the project corridor are:

- *Leichhardt Local Environmental Plan 2000.*
- *Canada Bay Local Environmental Plan 2008.*

2.2.2 Other environmental planning instruments

The following environmental planning instruments (but not limited to) may have relevance to the project, and will be considered in the environmental assessment:

- *Regional Environmental Plan (Sydney Harbour Catchment).*
- *Regional Environmental Plan No. 26 City West.*
- *State Environmental Planning Policy No. 55 - Remediation of Land.*
- *State Environmental Planning Policy (Infrastructure) 2007.*

2.3 State legislation

The following NSW legislation (but not limited to) may have relevance to the project, and will be considered in the environmental assessment:

- *Contaminated Land Management Act 1997.*
- *Fisheries Management Act 1994.*
- *Heritage Act 1977.*
- *National Parks and Wildlife Act 1974.*
- *Native Title (New South Wales) Act 1994.*
- *Native Vegetation Act 2003.*
- *Protection of the Environment Operations Act 1997.*
- *Roads Act 1993.*
- *Threatened Species Conservation Act 1995.*
- *Waste Avoidance and Resource Recovery Act 2001.*
- *Water Act 1912.*
- *Water Management Act 2000.*

2.4 Commonwealth legislation

The following Commonwealth legislation (but not limited to) may have relevance to the project, and will be addressed in the environmental assessment:

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984.*
- *Environmental Protection and Biodiversity Conservation Act 1999.*
- *Protection of Movable Cultural Heritage Act 1986.*
- *Native Title Act 1993.*

2.5 Other project approvals

Commonwealth legislation

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is concerned not only with the assessment of proposals but also with other aspects of environment protection and conservation, as well as Commonwealth-State relations with respect to environmental assessment.

The trigger for the approval requirements under the EPBC Act is a proposed '*action*'. The term "*action*" is broadly defined in Part 23 of the EPBC Act and includes a project, development, undertaking, activity or series of activities. An action will require approval if:

- It is likely to have a significant impact on a matter of '*national environmental significance*'.
- It is likely to have a significant impact on Commonwealth land, or by a Commonwealth agency and is likely to have significant impact on the environment.

Matters of '*national environmental significance*' are world heritage properties; national heritage places; Ramsar wetlands; threatened species and communities; migratory species; nuclear actions; and Commonwealth marine areas. Based on investigations completed to date, there are not expected to be any triggers for a referral to the Department of Environment, Water, Heritage and the Arts (DEWHA).

3 Strategic context and need for the project

3.1 Strategic context

Victoria Road plays a key role in the metropolitan transport system. It services both local and regional travel demands providing a connection between north-west Sydney and the Sydney CBD. Victoria Road is one of Sydney's busiest transport corridors. Around 800 buses use Victoria Road every day, carrying more than 35,000 passengers. These bus services currently experience considerable delays particularly in the AM peak.

It is anticipated that over the next 25-30 years residential and employment land uses will intensify along this corridor.

Urban Transport Statement November 2006

In recent years, the NSW Government has released a series of documents that provide strategic directions for Sydney's inner west. The NSW Premier's *Urban Transport Statement* was released in November 2006. It outlined Sydney's travel and transport challenges, defined 18 key transport corridors and committed to fast tracking delivery of the public transport measure on Victoria Road 'to improve the efficiency and reliability of bus services and assist general traffic flow by 2009'. The *Urban Transport Statement* concluded that the key benefit of this high priority project is to improve travel time certainty for all road users, but particularly bus commuters.

The scope of this project is outlined in the *Urban Transport Statement* as follows:

- Duplication of the Iron Cove Bridge to provide three general traffic lanes and a bus lane.
- Stage 2 works to extend the bus lane from the eastern end of the Iron Cove Bridge to Darling Street, Rozelle.
- The provision of overtaking bus bays through Drummoyne and Rozelle to allow 'limited stop' services to overtake 'all stop' services.
- A tidal flow scheme through Drummoyne and Rozelle.
- Traffic signal adjustments.

This scope was developed following the investigations of the Victoria Road Working Party, which was chaired by the State Member for Drummoyne. The working party was established by the Minister for Roads in mid 2006 to investigate solutions to reduce congestion and improve the reliability of public transport along Victoria Road from Westbourne Street, Drummoyne, to The Crescent at Rozelle. A report from the working party was delivered in October 2006 and identified the urgent need for the implementation of significant bus priority measures from Westbourne Street, Drummoyne to The Crescent, Rozelle.

The NSW Government's *State Plan* released in November 2006 identifies a number of transport related priorities for NSW including:

- Priority P2 - Maintaining and investing in infrastructure.
- Priority E6 - Increasing the share of peak hour journeys on a safe and reliable public transport system, including increasing the proportion of total journeys to work in the Sydney metropolitan region from 20-22 per cent to 25 per cent by 2016.
- Priority E7 - Improving the efficiency of the road network during peak times measured by travel speeds and volumes on Sydney's major road corridors.

During consultation on the *State Plan* the community identified the reliability and efficiency of public transport as a concern. The *State Plan* identifies that a balanced approach is required to allocate road space to all users.

The NSW's Government's *City of Cities – Sydney Metropolitan Strategy* (December 2005) identifies a number of key integrated land use and transport objectives including influencing travel choices to encourage more sustainable travel. Key relevant objectives and initiatives in the strategy include:

- Improving transport between Sydney's centres – extending the rail and bus networks to connect centres (D1.1).
- Improving the existing transport system:
  - Improve the integration of public transport (D2.3).
  - Improve operational management of existing transport networks (D2.4).
- Influence travel choices to encourage more sustainable travel - improve local and regional walking and cycling networks (D3.1).

The transport element of the strategy commits to delivering the strategic bus corridors consistent with those identified in the *Review of Bus Services in New South Wales* (2004). This report, known as the 'Unsworth Review,' identified 43 strategic bus corridors and recommended that a network of strategic bus corridors linking Sydney's major centres, railway stations and services be created. This strategic network is designed to link Sydney's major centres, railway stations, hospitals, education facilities and other community facilities, improving access to important destinations. The new bus corridors are being progressively implemented with the aim of improving bus priority on all corridors by 2012. This includes reprioritising road space in favour of buses through a range of measures including dedicated bus lanes, intersection priority and intelligent technology.

Victoria Road was identified as a strategic bus corridor for the following reasons:

- Buses carry about 200,000 passengers each week along this corridor.
- During a typical AM peak up to 170 buses carry more than 8,000 passengers between Westbourne Street, Drummoyne and The Crescent at Rozelle.
- Traffic congestion can lead to 'bus bunching' and scheduling difficulties due to unreliability.

More recently, the *State Infrastructure Strategy 2008-2018* identified the Victoria Road upgrade project as a major infrastructure project for Sydney. The *State Infrastructure Strategy* is a rolling 10-year plan for infrastructure projects to support service delivery.

3.2 Road corridor status

The current posted speed along Victoria Road within the project corridor is 60 km/h. The Drummoyne section of Victoria Road extends from Westbourne Street to the western abutment of Iron Cove Bridge and is six lanes (three lanes in each direction) and typically 18.1 metres wide, with a narrow median. The kerbside citybound lane functions as a T3 transit lane in the AM peak. Clearways operate during AM and PM peak periods in the peak direction only. There are five signalised intersections and six bus stops in each direction along the section including a major offline stop near Lyons Road on the westbound carriageway. This section is straight and undulating, and the adjacent land uses are mostly residential and retail.

Iron Cove Bridge currently carries five lanes of traffic across Iron Cove, four on the original bridge (which is 13.4 metres wide) and one on a single outrigger lane (3.1 metres wide) added to the upstream (western) side in 1968. It operates under a tidal flow scheme with three citybound lanes in the AM peak and three westbound lanes at all other times. A shared use

(pedestrian and cyclist) path, which operates on the downstream (eastern) side of the bridge, forms part of the Bay Run, a seven kilometre cyclist and pedestrian circuit, around Iron Cove and part of the RTA's regional cycleway network. The bridge is a steel truss structure which spans Iron Cove, linking Drummoyne and Rozelle. It forms a local landmark that has a 'gateway' quality for the suburbs of Drummoyne and Rozelle.

The Rozelle section of Victoria Road provides six through traffic lanes and extends from the eastern abutment of Iron Cove Bridge to The Crescent. There are dual right turn lanes from the citybound carriageway at Darling Street and dual right turn lanes from the westbound carriageway at Robert Street. There are single right turn lanes at the intersections of Evans (westbound), Gordon (eastbound) and Terry (westbound) streets. Right turn lanes at The Crescent operate under a tidal flow scheme with a single right turn in the AM peak and dual right turns at other times. This section is typically 24.5 metres wide. The citybound kerbside lane operates as a T3 transit lane in the AM peak. Clearways are in place during morning and evening peak periods in both directions. There are six signalised intersections and six bus stops along the citybound carriageway including a major stop near Darling Street and seven along the westbound carriageway. It is a straight road rising up citybound to Darling Street then down to Robert Street and includes a central median. It passes through mainly commercial areas, some of which are subject to redevelopment. Between Gordon Street and The Crescent, the road alignment has a pair of horizontal curves, with a low point at Robert Street.

3.3 Current road corridor performance

Victoria Road currently carries around 1480 buses that transport more than 35,000 passengers per week day and 200,000 passengers each week. The 2006 working party reported that bus travel times along this section of Victoria Road are highly variable, with a journey from Drummoyne to the CBD taking up to 40 minutes. Citybound morning bus travel times typically range from five minutes (at about 40 km/hr) to 28 minutes (at about 8 km/h) from Westbourne Street to The Crescent. In a typical weekday morning (7am to 9am) up to 170 buses carry more than 8,000 passengers citybound been Westbourne Street, Drummoyne and The Crescent at Rozelle.

In recent years traffic volumes have declined. The annual average daily traffic (AADT) volume on Iron Cove Bridge was 85,550 in 1999, with around 75,000 recorded in 2007. Notwithstanding this decline in traffic volume, delays on this section of Victoria Road have increased over the same period. The reasons for this are complex but the opening of the Eastern Distributor, increased larger commercial vehicle trips on the network, and implementation of transit lanes on Victoria Road have all served to divert and suppress total traffic but at the same time increased total person trips through the continuing growth of bus patronage. Comparison with historical travel data demonstrates that average travel times have doubled (and travel speeds have halved) in the last decade and this is indicative of the significant congestion experienced daily in the Victoria Road corridor as the total person and commercial trip demand increases.

A traffic survey has been undertaken to provide a better understanding of traffic demand and supply (in the form of intersection capacity) over the project corridor. These studies have confirmed that traffic volumes are currently suppressed by capacity constraints, with demand exceeding supply between Westbourne Street and The Crescent. This is demonstrated by the long queues that form in the AM peak indicating that the traffic demand is greater than the capacity at some intersections. In the PM peak, some delays are experienced at the western end of the project corridor and growth in this peak period has been observed in the last two years. It is noted that traffic volumes in the PM peak are consistently high citybound, also resulting in significant delays to buses.

For the period 2001 to 2005, an average of just over three casualty crashes per kilometre per year were recorded for the Sydney Greater Metropolitan Region (GMR). Casualty crashes are

those traffic incidents where injury or death occurs. For the same period, Victoria Road recorded an average of 16 casualty crashes per kilometre per year, over five times that of the GMR.

3.4 Statement of strategic need

The proposed Victoria Road upgrade is a priority project identified in the *Urban Transport Statement* (November 2006). The proposed Victoria Road upgrade is of significance to the State and region as it would provide high quality, reliable and efficient bus priority measures which would improve bus travel times and assist general traffic flow. This high priority project is also consistent with the goals and objectives identified in key NSW Government strategy documents, including the foundations of the *Sydney Metropolitan Strategy*, because it would:

- Introduce bus lanes, relocating road space in favour of buses and improve the efficiency and reliability of bus services.
- Improve efficiency of the existing infrastructure to maximise its use and increase peak hour patronage.
- Increase investment in public transport, making it a more attractive and reliable option for passengers.
- Provide an opportunity to enhance pedestrian and cyclist accessibility in the subject Victoria Road section.

4 Description of the project

4.1 General

The project would extend along Victoria Road between Westbourne Street, Drummoyne and The Crescent, Rozelle, a distance of nearly 3.5 kilometres. It would involve the implementation of bus lanes, provision of a tidal flow traffic scheme through Drummoyne, an additional new bridge to the west of the existing Iron Cove Bridge and changed traffic arrangements and roadway adjustments through Rozelle.

4.2 The project

The project is described below with reference to the Drummoyne (Westbourne Street to Iron Cove Bridge), Iron Cove Bridge and Rozelle (Iron Cove Bridge to the Crescent) sections.

4.2.1 Drummoyne

A tidal flow traffic scheme would be implemented through Drummoyne to facilitate new citybound lane configurations comprising a bus lane and general traffic lanes.

A new clearway would be implemented in the westbound direction during the operation of the bus lane to facilitate the tidal flow scheme.

To implement tidal flow, some changes would need to be made to existing medians.

4.2.2 Iron Cove Bridge

A new three-lane bridge would be built to the west of the existing Iron Cove Bridge to enable provision of bus lanes in each direction over Iron Cove.

The existing narrow shared use path on the eastern side of the existing bridge would remain and continue to function as a shared-path or be signposted as a footway. An alternative shared-path would also be provided at-grade on the proposed new bridge deck.

4.2.3 Rozelle

Victoria Road would be reconfigured to facilitate the provision of a citybound bus lane and general traffic lanes. It is proposed to alter medians and local access from Victoria Road to achieve this.

5 Existing environment

For the purposes of describing the existing environment, the 'project corridor' is considered to be the existing Victoria Road alignment between the Gladesville Bridge and The Crescent with a buffer of around 500 metres either side of the road.

5.1 Visual amenity

The project corridor is located within a highly developed urban environment, with the main visual features being Victoria Road, Iron Cove Bridge, Iron Cove, local roads, associated infrastructure and a range of building types including residential, commercial and retail. The landform can be characterised as sloping, with little flat ground. Land on both sides of Iron Cove generally slopes towards the cove.

The project corridor features landforms and built structures, which tend to be common throughout the region. Parts of Victoria Road are located within conservation areas and individual heritage items are found in this area. The heritage character is important for its contribution to the streetscape character and the history of the area.

Properties along Victoria Road generally have views of the road. The residential component is characterised largely by Victorian, Federation and Californian bungalow housing styles. More recently, medium density housing in the form of multi-storey apartment complexes have been developed, particularly on the foreshores of Iron Cove.

Visual amenity along the foreshores of Iron Cove is greater than elsewhere in the project corridor due to substantial open space, and views of the city, Iron Cove Bridge and Iron Cove. The apartment complexes and houses along Iron Cove foreshores have views across Iron Cove to Balmain or Birkenhead Point and to the Harbour. They are themselves visually prominent both locally and from within a wider area. Some of these residences would have a direct view of the proposed new bridge.

The volume of traffic carried by Victoria Road reduces the amenity of the area immediately adjacent to the road. Away from Victoria Road, residential areas and water frontages enjoy a high level of amenity.

5.2 Air quality

Local air quality is influenced predominantly by emissions from motor vehicles travelling on Victoria Road and other smaller roads nearby. Other sources of air pollution include domestic/commercial solvents/aerosols and motor vehicle refinishing.

Air quality information is available from a Department of Environment and Climate Change (DECC) air quality monitoring station located in Rozelle, about 1.2 kilometres south of the project corridor. The levels of ozone, nitrogen dioxide, visibility, carbon monoxide and particulates (PM_{10}) were below the standard or goal set by the DECC. These readings are considered indicative of air quality within the project corridor.

5.3 Social and economic

The project corridor is generally characterised by residential, commercial and retail areas, as well as churches and schools. There are a number of additional land uses on Victoria Road likely to attract and generate traffic including clubs, hotels and service stations. The Birkenhead Point Shopping Centre, while located away from this road, depends on access to Victoria Road.

Parking along Victoria Road is limited by clearway, T3 transit lane restrictions, bus zones, time restricted parking and no parking or stopping provisions. A number of businesses, particularly those located in Drummoyne, currently benefit from the time limited parking being available on Victoria Road.

Iron Cove is a valuable regional recreation resource, with established waterfront areas dedicated to public use including walkways and cycle ways, parklands, clubs, swimming pools, and marinas. The waterway is well used by rowers and boating enthusiasts. The project corridor forms part of the Bay Run, a seven kilometre shared bicycle and pedestrian trail around Iron Cove. The Bay Run attracts up to 8,000 people per week.

5.4 Noise and vibration

Road traffic is a dominant source of noise within the project corridor. Sources of noise in the Leichhardt and Canada Bay LGAs are similar to most other metropolitan council areas and include road, rail, domestic (eg barking dogs), industrial, recreational and aircraft noise (City of Canada Bay Council 2005; Leichhardt City Council 2006).

Victoria Road, as a dominant noise source, is characterised by high AADT volumes of 78,145 vehicles per day (2005 AADT) at Iron Cove Bridge. A review of historical records since the commencement of monitoring on Iron Cove Bridge shows that traffic volumes have reduced by approximately 10 per cent over the previous 18 years. A review of March 2007 traffic counts shows weekly average daily traffic data of 77,672 vehicles per day, indicating a continued trend of negative traffic growth.

Noise receivers within close proximity of the project corridor include residential and commercial properties, such as retail and service outlets, churches, schools and recreational areas. Many of these receivers are located immediately adjacent to Victoria Road. The main noise sensitive receivers would be the Drummoyne Swimming Centre, and a café and residences on the western side of Victoria Road in the vicinity of the bridge and its approaches and Birkenhead Quays and Balmain Shores residential units at the northern and southern foreshores of Iron Cove respectively.

5.5 Water quality and hydrology

Water quality

Iron Cove opens to the north-east to form part of Sydney Harbour and is therefore tidal. It is used for recreational activities such as sailing and rowing. There is no natural riparian vegetation on the shoreline due to urban development, and the shoreline has been significantly modified with a seawall and landscaping.

Water quality in Iron Cove is influenced by stormwater runoff from the surrounding land. Past and present land uses, particularly industrial activity along the Rozelle shoreline, are having a detrimental impact on the water quality of Iron Cove. Point sources including industries, landfill sites and reclaimed land, along with diffuse sources of contamination such as road dust, houses and railway lines all contribute pollutants into Iron Cove.

It is possible that groundwater levels could be variable with overall seasonal variations and shorter-term fluctuations due to prolonged rain events.

The regional water table intersects the ground surface in the form of flowing streams in the Ashfield area, including Iron Cove Creek. The water table will rise away from the creeks, following the surface topography but in a more subdued fashion. The water table will be shallower closer to the creeks and Iron Cove.

Groundwater in the vicinity of Iron Cove is likely to be characterised by higher salinity due to interaction between the saline water in Iron Cove and the Parramatta River and the freshwater

from the catchment.

Hydrology

With the exception of Iron Cove, watercourses within the project corridor are all built urban drains. There is minimal natural drainage left, only occurring in open park areas. Due to the location of the project corridor and its proximity to the Parramatta River and Sydney Harbour, all surface water from the project corridor flows into these waterbodies.

The width of Iron Cove underneath the existing Iron Cove Bridge is about 350 metres. Water depth is about 4.1 metres (depth below the average high water mark) near the northern side of Iron Cove, and 3.0-3.9 metres on the southern side of Iron Cove. The depth increases closer to the entrance to Iron Cove, and is about 5.5 metres near Birkenhead Point.

There are no tributaries flowing into Iron Cove from within the project corridor. Hawthorne Canal and Iron Cove Creek are two large stormwater canals that flow into Iron Cove upstream of the project corridor at Dobroyd Point.

5.6 Non-Aboriginal heritage

There are a number of locally and regionally listed heritage items in proximity to the project, including schools, houses and the Iron Cove Bridge. A number of heritage conservation areas traverse the project corridor.

The Iron Cove Bridge is of most prominence. It is a steel truss bridge that has a 'gateway' quality for the suburbs of Balmain and Drummoyne due to its impressive size and landmark status. The bridge is comprised of aesthetically distinctive piers and abutments that reflect the Inter-War Art Deco style prevalent when it was first designed in 1942. It was the last steel truss bridge to be constructed in NSW in which rivets were used for field connections prior to the introduction of high strength bolts. The Iron Cove Bridge has been assessed as being of state significance.

Examination of the history of Victoria Road indicates that it has been widened and realigned a number of times since its formation as a series of local roads and following its consolidation into the existing single thoroughfare. These modifications have required resumption of land either side of the roadway and, in some cases, demolition of existing structures, such as the Rozelle Post Office. Archaeological relics are potentially present as a result of these historical development episodes.

5.7 Aboriginal heritage

The project corridor is a disturbed and heavily developed area. A search of the DECC Aboriginal Heritage Information Management System (AHIMS) listed 14 Aboriginal objects and Aboriginal places that were recorded in or near the search area, none of which were located within or immediately adjacent to the project corridor.

Further, land reclamation undertaken during the 1970s and the rebuilding of the later bridge over Iron Cove is likely to have disturbed or destroyed sites in close proximity to the bridge.

5.8 Geology, landform, soils and contamination issues

The project corridor is located in an area that is characterised by an undulating landform, with some steep slopes towards the Parramatta River and Iron Cove. The project corridor is highly urbanised and cleared of vegetation. There are areas of open space along the foreshores of Iron Cove.

The Sydney 1:100,000 Geological Sheet (Geological Survey of NSW) indicates that the area is underlain by Hawkesbury sandstone, with pockets of Quaternary alluvium in the vicinity of Iron Cove and Parramatta River, with Ashfield shale to the southern, south-east and south-west. The geological sheet also indicates that igneous dykes may cross the southern part of the project corridor.

Hawkesbury sandstone comprises medium-coarse grained sandstone with very minor shale and laminate lenses. The formation is typically horizontally bedded, quartzose sandstone of Triassic age. Groundwater within the Hawkesbury sandstone is expected to occur within joints and bedding parting in the sandstone and perched above the sandstone in natural soil or fill material. The alluvial sediments are shallow and of limited lateral extent and are therefore not a significant source of groundwater.

Ashfield shale comprises black-dark grey shale and laminate and weathers to form clays of moderate-high plasticity. The shale is likely to form an impervious confining bed; however, its hydrogeological characteristics vary with the degree of weathering and jointing.

Soils

The soil material on the land contains soils of the Hawkesbury and Lambert soil landscape units. The soils in the project corridor have been highly disturbed by urban development.

Soils of the Hawkesbury soil landscape unit contain lithosols/siliceous sands, earthy sands and yellow earths, yellow and red podzolic soils. The limitations of this soil type includes extreme soil erosion hazard, mass movement (rock fall) hazard, steep slopes, rock outcrop, shallow, stony, highly permeable soils and low soil fertility.

Soils of the Lambert soil landscape unit contain earthy sands and yellow earths, siliceous sands/Lithosols, leached sands, grey earths and gleyed podzolic soils and yellow podzolic soils. The limitations of this soil type includes a very high soil erosion hazard, rock outcrop, seasonally perched water tables, shallow, highly permeable soils and very low soil fertility.

There are areas of known disturbed land surrounding the bridge abutments and on the Rozelle shore where the former Balmain Power Station was located.

A search of the Acid Sulfate Soil Risk Map for the area revealed a high risk of acid sulfate soils within the project corridor, principally in the foreshore areas of Iron Cove.

Contamination

Land uses in the Iron Cove catchment

The main land uses in the Iron Cove catchment are residential, roads, parklands, community land, commercial land, rail and industrial land. Residential land is the dominant land use.

Historically, the catchment was used as agricultural lands during the 19th century. There was a large increase in manufacturing facilities at the start of the 20th century. Industries within the Iron Cove catchment and adjacent catchments have included coal works, chemical works, brass foundries, timber yards, slaughterhouses, tanneries, breweries, rubber works, distillers, refineries and defence industries.

In the recent historic past, industry has been located adjacent to Iron Cove. In the last 30 years, the majority of industry previously located within the Iron Cove catchment, including that adjacent to the bridge, has either been relocated or replaced with residential housing.

Point and diffuse sources of contamination

A number of industries are located within the Iron Cove catchment and are mainly clustered around the foreshores of Iron Cove, with many having now been decommissioned. These industries are considered to have greater significance in potential contaminant contributions towards the sediments on the site. The key industries associated with the area are:

- Dunlop Rubber Factory, Birkenhead Point (decommissioned 1977).
- Balmain Power Station (decommissioned 1976).
- Monsanto Chemical Factory (formerly Elliott Bros Chemical Works) (date of decommissioning unknown).
- Rozelle Hospital.
- Birkenhead Point Marina (operational).
- Former landfill sites (Rozelle Hospital and Leichhardt Park) (originating in the 1960s, currently non-operational).

Road dust, railway lines and houses have been identified as ongoing diffuse sources of potential contamination in the catchment. Point and diffuse sources within the Iron Cove catchment are considered to be significant contributors to sediment contamination.

The following contaminants may potentially be present within the sediment at the site: heavy metals; sulphur compounds; cyanide compounds; organochlorine pesticides (OCPs); dichloro-diphenyl-trichloroethane (DDT); hexachlorobenzene (HCB); polychlorinated biphenyls (PCBs); polycyclic aromatic hydrocarbons (PAHs); asbestos; phenolic compounds; benzene, toluene, ethylbenzene and xylenes (BTEX); tributylin (TBT) and total petroleum hydrocarbons (TPHs).

5.9 Biodiversity

Terrestrial environment

The project corridor contains very little vegetation. There are some planted street trees, grassed footpath areas, ornamental gardens and landscaped areas. Fauna habitat is limited in such an urban environment and there are no bushland reserves.

Birds utilise the planted street trees and trees in surrounding parks for nesting and foraging. It is likely that only fauna species that are tolerant of highly urbanised conditions, such as pigeons, seagulls, rats and mice, are found in the project corridor.

Any threatened species that may occur within the project corridor are only likely to be there on an occasional basis, and would not be dependent on the project corridor for any part of their life cycle.

Aquatic environment

Iron Cove is surrounded by a constructed shoreline with limited remnant riparian vegetation. There are three main types of aquatic habitat in the project corridor. These include basement rock, constructed hard substratum habitat and unvegetated soft sediments.

Other than a few isolated salt-tolerant plants on the reclamation under Iron Cove Bridge on the Drummoyne side, there are no saltmarsh plants or stands. There are no mangroves in the high intertidal zone within the project corridor or in its vicinity.

There is a relatively extensive uninterrupted intertidal shore on both sides of Iron Cove extending upstream from the project corridor. These shores are known to be used by native

water rats. The aquatic biota encountered includes algae, fish, encrusting fauna and burrowing fauna species that are common in mid-estuarine habitats in the Sydney Estuary.

There are no intertidal saltmarsh areas or stands of mangroves within the project corridor or in the vicinity. There is no seagrass in the project corridor or the immediate vicinity.

There are no rocky reefs in the project corridor, only rock gravel to rock rubble over mud shorelines.

6 Preliminary environmental assessment

6.1 Risk analysis

A preliminary environmental risk analysis was undertaken for the project to identify key environmental issues. It comprised a qualitative assessment based on information gathered during preliminary investigations. The level of environmental risk was assessed by considering potential environmental impacts of the project and the ability to manage those impacts in a way that minimises harm to the environment.

While the approach is qualitative, it provides an important step in the process of project planning and assessment of environmental impact. In particular, it facilitates scoping of environmental investigations and assessments, guides project design, and assists in identifying appropriate mitigation measures and management responses. The identified risks are based on the following risk categories summarised in Table 6.1.

Table 6.1: Environmental risk categories

Risk category	Description
A	May have high or moderate impacts, actual or perceived. 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.

Those environmental issues that were identified as falling within the 'A' risk category were considered to be key environmental issues and are discussed in further detail in Section 6.2.

6.2 Key environmental issues

Preliminary environmental assessment indicates that the following key environmental issues will require further detailed assessment and may require project specific impact mitigation measures.

- Non-Aboriginal heritage.
- Traffic and transportation.
- Contaminated land and sediment.
- Noise and vibration.
- Air quality.
- Visual amenity and urban design.
- Economic and social.

A number of other environmental issues have also been identified in the preliminary environmental assessment. These issues are outlined in Section 6.10 and are generally considered to be common issues frequently encountered in road construction projects. The potential impact of these additional environmental issues will be mitigated during construction and/or operation, largely through the application of best practice impact mitigation and management measures. They are unlikely to require unique or project specific impact mitigation measures.

6.3 Non-Aboriginal heritage

The project would occur in an area that contains numerous heritage items identified by databases and environmental planning instruments. The results of the preliminary assessment of non-Aboriginal heritage issues are summarised below.

6.3.1 Summary of potential issues identified

The following potential non-Aboriginal heritage issues have been identified for the project:

- There are heritage items and conservation areas within the project corridor, some of which represent potential constraints to the project.
- Iron Cove Bridge is a prominent heritage feature in the project corridor. The concept design needs to consider the gateway nature of this harbour crossing and identify opportunities to enhance the visual qualities of both the new structure and the existing Iron Cove Bridge.
- The project has the potential to result in visual impacts on heritage items and heritage conservation areas. In particular the proposed new bridge has the potential to impact on the appearance and curtilage of the existing bridge.

6.3.2 Further assessments

The development of the concept design for the project would be informed by the presence of the identified heritage items, in particular the existing Iron Cove Bridge.

A detailed heritage impact assessment of the items potentially impacted by the project would be prepared to identify appropriate future management requirements.

Consultation would be undertaken with the Heritage Office (Department of Planning) at the earliest opportunity regarding preferred management outcomes for those items that would be affected by the project.

6.4 Traffic and transportation

Improved public transport outcomes, while maintaining general traffic, is the focus of the project. The results of the preliminary assessment of traffic and transport issues are summarised below.

6.4.1 Summary of potential issues identified

The following potential traffic and transport issues have been identified for the project:

- Short-term lane and/or road closures would occur during construction and when implementing tidal flow arrangements.
- Improvements to bus transport are expected through Drummoyne and Rozelle.
- Community may be concerned about changes to local access.
- Likelihood or otherwise of induced traffic.
- Safety issues associated with contra-flow arrangements and improved traffic speeds in curbside lanes.
- Some access to local property may be affected during construction and/or operation.

6.4.2 Further assessments

Detailed traffic modelling will be included in the environmental assessment to assess the effects on bus travel and general traffic.

6.5 Contaminated land and sediments

Iron Cove coupled with former industrial land uses in the surrounding catchment gives rise to potential acid sulfate soil and land contamination issues. The results of the preliminary assessment of contamination issues are summarised below.

6.5.1 Summary of potential issues identified

The following potential contamination issues have been identified for the project:

- The sediments beneath Iron Cove Bridge are contaminated with a range of inorganic and organic contaminants. Contaminants include PAHs, TPH, OPPs, TBT and phenoxyacid herbicides and dioxins. Activities that may disturb and release contaminated sediments into Iron Cove include piling for bridge piers.
- A number of potential sources of contamination occur along the banks of Iron Cove. Along the northern bank these include the former Dunlop Rubber Factory site and the Birkenhead Point Marina. Along the southern bank potential sources include the Leichhardt Park and former Rozelle Hospital landfill site, Rozelle Hospital, the former Balmain Power Station site and the former Monsanto Chemical Factory site.

6.5.2 Further assessments

A detailed sediment contamination assessment would be undertaken to improve understanding of potential impacts and aid the development of safeguards and mitigation measures. Further investigations into potential sources of land contamination would also be undertaken.

6.6 Noise and vibration

The project involves a substantial transport initiative within an established urban environment. In that context there are potential issues associated with noise both during construction and operation. The results of the preliminary assessment of noise and vibration issues are summarised below.

6.6.1 Summary of potential issues identified

The following potential noise and vibration issues have been identified for the project:

- Construction and operation of a new bridge could increase noise levels at sensitive receivers closest to the bridge if traffic is moved closer to these receivers.
- The closest noise sensitive receivers would be the Drummoyne Swim Centre, The Cove café and residences on the western side of Victoria Road, and to a lesser extent the Birkenhead Quays and Balmain Shores residential units at the northern and southern foreshores of Iron Cove respectively,
- Corridor constraints allow little opportunity for noise improvement through adjustments to the vertical or horizontal road alignment.
- Improving the efficiency of bus services may result in a reduction in maximum noise levels by encouraging more free flowing bus movements.
- The application of quieter pavement surfacing is not considered a cost-effective option on roads with a posted speed limit of 60 km/h due to insufficient noise reductions and high maintenance costs.

- Building access requirements, space limitations and minimum safety requirements for driver 'line of sight' present substantial feasibility constraints in constructing noise barriers along the length of the project corridor.

6.6.2 Further assessments

A construction and operational noise and vibration assessment would be undertaken for the project. Occupants of noise sensitive properties would be consulted as part of this assessment and noise mitigation measures would be identified where appropriate.

6.7 Visual amenity and urban design

The project would incorporate important visual features the most prominent of which would be the new bridge adjacent to the existing Iron Cove Bridge. The results of the preliminary assessment of visual and urban design issues are summarised below.

6.7.1 Summary of potential issues identified

The following potential urban design and visual amenity issues have been identified for the project:

- Potential visual impacts include the obstruction of existing views during both construction and operation, early morning shadowing of the Drummoyne Swim Centre and potential effects on the large nearby fig tree and car park.
- The new bridge would be a prominent structure in the locality. It would be seen clearly from the surrounding area.
- There are a number of heritage items and heritage conservation areas in the project corridor that are of high visual quality. A new bridge would be in the vicinity of, and may directly affect some of these items, most notably the existing bridge.
- Impact of other elements such as traffic control devices and street furniture on urban amenity.

6.7.2 Further assessments

An urban and regional design/visual impact assessment would be undertaken to ensure that the new bridge would be appropriately integrated with the surrounding environment while at the same time exploring opportunities to create a structure of aesthetic value. Appropriate measures would also be identified to minimise impacts associated with other project elements.

6.8 Economic and social

The project involves a substantial transport initiative within an established urban environment. In that context there are a range of potential socio-economic issues to be considered. The results of the preliminary assessment of social and economic issues are summarised below.

6.8.1 Summary of potential issues identified

The following potential economic and social issues have been identified for the project:

- Businesses and their patrons may be affected by decreased parking availability along Victoria Road during the operation of clearways and/or bus lanes.
- Construction of the second bridge would impact on those living and working in close proximity to the approaches and by those who use the waterway for recreation and commercial purposes.
- Balmain Shores apartment complex, King George Park, the Birkenhead Point complex, the

loop road from Henley Marine Drive to Victoria Road, King George Park, the Bay Run and cycle track, Drummoyne Swim Centre, Drummoyne Rowing Club, The Cove café and various residential properties would be potentially affected.

- Amenity impacts (noise, dust etc) during construction.
- Generation of economic activity as a result of project construction.
- Potential disruption to travel patterns and public transport during construction.
- Potential for temporary and/or permanent changes to access to and from Victoria Road may affect residents and businesses.
- Water frontages would have direct views of the new bridge.
- Improved access to the city and west as a result of improved bus outcomes while maintaining general traffic movement.
- Depending on the location of the new bridge some property acquisition may be required.

6.8.2 Further assessments

A detailed socio-economic assessment would be undertaken to refine the understanding of stakeholder issues and potential socio-economic impacts.

6.9 Other environmental issues

Other environmental issues listed in Table 6.2 are considered to be of lesser consequence taking into account the scope of the project, the existing environment and the implementation of standard and best practice management and mitigation measures.

The potential environmental issues and the proposed management and mitigation measures identified in Table 6.2 will be reviewed further during the preparation of the detailed environmental assessment. Any additional environmental safeguards required to minimise and mitigate impacts will be documented in the statement of commitments in accordance with section 75F(6) of the EP&A Act as part of the environmental assessment.

Table 6.2: Other environmental issues

Issue	Potential impacts	Management and mitigation measures
Air quality		
The project involve improvements to bus movements, however there may be risks associated with certain elements of the project.	Increased use of buses is likely to contribute towards improved local air quality while fine particulate emissions associated with increased bus movement may be negated by improvements in bus engine technology. The construction of the new bridge and approaches would result in the carriageway being closer to receptors such as King George Park and the swimming pool. Impacts on air quality during construction would be of short duration and have a minor effect due to the limited excavation and cutting work required.	Measures would be adopted to minimise dust and vehicle emissions during construction.
Water traffic		
The project would involve construction works within Iron Cove and result in the presence of new structures in the waterway.	Potential disruption to commercial and recreational waterway users during construction.	The design of the new bridge would require clearance for vessels at least equivalent to the existing Iron Cove Bridge and in accordance with NSW Maritime Authority requirements. Strategies to maintain access for waterway traffic during construction would be developed in consultation with NSW Maritime Authority.
Pedestrians and cyclists		
The project may involve substantial construction areas and may require alteration to pedestrian and cyclist access.	Potential disruption of pedestrian and cyclist movement patterns during construction. Improved facilities during operation.	Key pedestrian and cyclist routes would be maintained. Decisions about alternative routes would be informed by community consultation.
Soils and water		
Potential risks during construction and operational phases.	Soils exposed during excavation and vegetation removal have a high potential to result in erosion as the soils are considered to be highly erodible. As such, waterways within the project area may be impacted through an increase in sediment loads during rainfall events which would lower existing water quality. Other pollutants could potentially be introduced to waterways during	Measures would focus on works in the vicinity of Iron Cove, areas susceptible to flooding, vehicle set down and repair areas, fuel storage and waste disposal. The measures to be implemented during construction of the project will be detailed in the statement of commitments and

Issue	Potential impacts	Management and mitigation measures
	construction through chemical spills and construction waste. During operation, water quality may be affected by surface runoff which could contain pollutants or accidental spills. The project would increase the existing pavement surface area and may therefore increase the volume of some point discharges. Most of the runoff flowing from the road surface would have the potential to contain gross pollutants, sediment, fuels and other chemicals however the quantity of pollutants deposited at the road surface is expected to remain consistent as traffic volumes are not expected to increase as a direct result of construction. Potential disturbance and exposure of acid sulfate soils during bridge construction.	will be in accordance with RTA's *Water Policy and Code of Practice for Water Management* (1999) and *Managing Urban Stormwater: Soils and Construction* (Landcom 2004) (the 'Blue Book'). These measures will be included in the soil and water management plan (SWMP) and implemented prior to the commencement of works in the affected areas. Material would be field screened for acid sulfate soil. Any acid sulfate soil would be handled in accordance with the RTA *Guidelines for the Management of Acid Sulfate Materials.*
Hydrology		
Potential hydrological effects associated with the new bridge	The new bridge may impact on water flow in Iron Cove. There is also potential for an increase in stormwater point discharges into Iron Cove from the new bridge.	A hydrology assessment would be undertaken following completion of the concept design. The findings would be considered in further refining the design.
Aboriginal heritage		
Aboriginal objects, places and culturally important landscapes.	There may be sites or places of cultural significance to the Aboriginal community that are not listed or registered on the AHIMS.	The Metropolitan Local Aboriginal Land Council would be consulted early in any environmental assessment process. The statement of commitments would include procedures dealing with unexpected affectation of Aboriginal objects.
Waste minimisation and management		
The project would generate a number of waste streams and utilise a variety of materials during construction.	Wastes generated during construction would potentially include building materials, excess unsuitable spoil material, vegetation material, waste oils and liquids from maintenance of construction equipment, wastewater, general garbage and sewage.	Waste management would be undertaken in accordance with the resource management hierarchy principles of the *Waste Avoidance and Resource Recovery Act 2001.*

Issue	Potential impacts	Management and mitigation measures
Demand on resources		
The project would require a range of resources including select fill, water and construction materials.	The project would not require any resources that are currently in short supply. There are potential indirect impacts associated with the transportation of materials.	Detailed design and construction planning considerations would include minimising the quantities of materials required and associated transport distances.
Hazards and risks		
During construction and operation the project may encounter a number of hazards and risks which are generally associated with road construction.	Potential hazards and risks associated with construction of the project include hazards of working on and close to an urban arterial road under traffic, storage of hazardous materials and use of heavy machinery.	Specific construction hazards will be addressed through best practice industry occupational health and safety measures including training, accreditation, adherence to WorkCover requirements. These measures would be supported by inspections, audits and site management planning for occupational health and safety. Measures will be included in the statement of commitments.
Biodiversity		
The project requires construction work in riparian and aquatic environments.	Construction work associated with the new bridge may impact on shoreline riparian and aquatic habitats and shading from the new bridge structure may result in an overall loss of marine vegetation (algae). Disturbance of sediments may result in the direct loss of commonly occurring benthic organisms residing in the sediments. Further, given that the sediments of Iron Cove are known to have contaminants such as heavy metals, disturbance of the sediments and associated contaminants may impact on the local biota.	Soil and water management measures to be planned focusing on areas susceptible to erosion and sediment disturbance.
Greenhouse gas emissions		
Operation of the project and construction activities would require energy usage.	Increased use of buses and improved general traffic movement may result in reduced greenhouse gas emissions. Energy usage required for construction activities would result in the release of greenhouse gas emissions.	Greenhouse gas emissions for the construction of the project will be in line with government guidelines.

7 Proposed scope of environmental assessment

Table 7.1 outlines the proposed scope of the environmental assessment for the project. The proposed scope of the environmental assessment is based on the preliminary assessment of key issues discussed in Sections 6.2 to 6.8. On the basis of information gathered to date, the RTA considers that all other issues can be managed through the detailed design stage and with the application of best practice measures and site-specific safeguards as described in Table 6.2.

Table 7.1: Scope of the environmental assessment

Issue	Scope of studies for the environmental assessment
General	• Consideration of planning and statutory requirements. • Strategic justification for the project. • Description of the project. • Discussion of project options. • Outline of construction activities. • Consideration of the principles of ecologically sustainable development in the context of the project.
Stakeholder consultation	• Description of consultation activities conducted to date and issues identified. • Outline of stakeholder consultation and communication strategy.
Environmental risk analysis	• Identification of potential environmental impacts associated with the project, proposed mitigation measures and potentially significant residual impacts after the application of proposed mitigation measures. • Should any additional key environmental impacts be identified, an appropriately detailed impact assessment would be included in the environmental assessment.
Non-Aboriginal heritage	• Detailed heritage impact assessment of the items within the path of the project. • Identification of future management requirements (if any) for affected heritage items. • Identification of potential archaeological constraints. • Consideration of the concept design in the context of the heritage significance of the existing Iron Cove Bridge.
Traffic and transport	• Documentation of traffic modelling results. Assessment of the potential for changes in traffic attributable to the project. • Consideration of public transport benefits.
Contaminated land and acid sulfate soils	• Identification of baseline conditions to determine sediment quality within the study area and potential impact of construction activity. • Identification of potential contamination in areas to be disturbed. • Assessment to determine potential for acid sulfate soils at the bridge abutment locations, and other areas near Iron Cove that could be disturbed during bridge construction.
Noise and vibration	• Identification of all noise sensitive receivers. • Noise monitoring for baseline noise levels. • Modelling and predictions of noise levels.
Visual amenity and urban design	• Discussion of regional context – city gateway. • Consideration of land use, heritage and precinct character.

Issue	Scope of studies for the environmental assessment
	• Consideration of street frontage character. • Consideration of pedestrian, cyclist and open space networks. • Consideration of walking catchments associated with public transport usage. • Analysis of views including those of Iron Cove Bridge. • Documentation of urban and landscape vision and design objectives. • Consideration of project elements (bridges, road furniture etc). • Development of urban design and landscape design concepts.
Economic and social	• Community profile of the project corridor and the surrounding local area. • Discussion of the existing social and economic environment. • Identification of affected stakeholders. • Identification of key issues for stakeholders. • Assessment of impacts.
Draft statement of commitments	• A draft list of environmental management and mitigation measures to be applied to the project.

8 References

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