

Newcastle Inner City Bypass – Rankin Park to Jesmond

Environmental impact statement

Technical Paper 7 – Water Quality and Watercourse Assessment

November 2016



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Aurecon Australasia Pty Ltd



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Executive summary

The project lies primarily within the Ironbark Creek catchment however a small portion of the study area extends into the Styx Creek catchment. The construction of the project would require clearing, earthworks, construction of temporary access roads, watercourse crossings, pavement, and revegetation work.

There are a number of potential pollutants associated with the construction of the project, including naturally occurring hydrocarbons in intercepted groundwater, contaminated soils, fuels from machinery, tannins from cleared and mulched vegetation and sediment laden runoff. Each of these pollutants has the potential to impact on the water quality of the local and regional downstream environment, including the SEPP 14 and Ramsar wetlands. The risks associated with each of these potential sources of pollution have been considered and with management procedures can be adequately managed. During construction, standard erosion and sediment controls are likely to minimise the potential impacts on downstream water qualities, including minimising the risks associated with eutrophication within the local ephemeral drainage lines.

The potential water quality impacts to the local catchments and wider catchments of the SEPP 14 and Ramsar wetlands during the operational stage of the project have been assessed via MUSIC modelling. The analysis indicates that the project is unlikely to have an appreciable impact on the water quality reporting to the SEPP 14 and Ramsar wetlands located downstream. This is in part due to the proposed stormwater management system, which includes proposed operational water quality treatment structures that assist in removing TSS, TN and TP from the stormwater runoff. It is considered unlikely that the project would result in an appreciable impact on the quality of water flowing into the SEPP 14 and Ramsar wetlands, and is therefore considered to be consistent with *Significant impacts guidelines 1.1: Matters of National Environmental Significance* (DotE 2013).

Overall it is considered that the proposed project is likely to result in no appreciable impacts to the water quality of the local catchments and the SEPP 14 and Ramsar wetlands.

The construction of watercourse crossings and stormwater discharges have the potential to alter flow characteristics within the watercourses near the project. A geomorphological inspection of the watercourse determined that many of the watercourses near the project are currently undergoing active erosion and scouring, by way of active head cuts. The active head cuts are likely to continue until a natural bed control point is reached. In most cases this would consist of native bed rock. The proposed project is not likely to increase the extent of the current erosion and scouring however may result in an increased rate of erosion (ie the watercourses would reach the natural bed control points sooner). Where the natural erosion and scouring has the potential to interact with the project, additional scour protection measures at the watercourse crossings may be provided, and would be investigated further during detailed design.

Glossary and acronyms

Term / acronym	Description
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
Blue Book	<i>Managing Urban Stormwater, Soils and Construction, Volume 1 4th Edition, March 2004</i> (Landcom 2004) and <i>Managing Urban Stormwater, Volume 2D – Main road construction</i> (Department of Environment and Climate Change (DECC) 2008)
DECC	Department of Environment and Climate Change
DLWC	NSW Department of Land and Water Conservation
EC	Electrical conductivity
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
LGA	Local government area
mg/L	Milligrams per litre
MNES	Matters of national environmental significance
NCC	Newcastle City Council
NTU	Nephelometric Turbidity Units
NWQMS	National Water Quality Management Strategy
OEH	NSW Office of Environment and Heritage
SEARs	Secretary's Environmental Assessment Requirements
SEPP 14	State environmental planning policy no. 14 – Coastal wetlands
TKN	Total Kjeldahl Nitrogen
TN	Total nitrogen
TOC	Total organic carbon
TP	Total phosphorus
TSS	Total suspended solids
COD	Chemical oxygen demand

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1. Introduction

1.1 Project overview

Roads and Maritime Services (Roads and Maritime) is seeking approval to construct the fifth section of the Newcastle Inner City Bypass between Rankin Park and Jesmond (the project). The approval is sought under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Newcastle Inner City Bypass is part of Roads and Maritimes' long-term strategy to provide an orbital road within Newcastle's road network to connect the Pacific Highway at Bennetts Green with the Pacific Highway at Sandgate.

Construction of the project would form part of the Newcastle Inner City Bypass. This would provide improved traffic flows across the western suburbs of Newcastle and connect key regional destinations such as Bennetts Green, Charlestown and Jesmond shopping centres, John Hunter Hospital precinct, The University of Newcastle and the Pacific Highway.

The north-south road corridor was first planned in the 1950s and incorporated into the Northumberland County Planning Scheme in 1957.

Sections of the Newcastle Inner City Bypass have opened progressively since the early 1980s, as outlined in Table 1-1.

Table 1-1 Newcastle Inner City Bypass sections status

Section	Route	Length	Status
A	West Charlestown Bypass	6 km	Completed in 2003
B	Kotara to Rankin Park	2.4 km	Completed in 1983
C	Rankin Park to Jesmond	3.4 km	Subject to this planning approval
D	Jesmond to Shortland	3.2 km	Completed in 1993
E	Shortland to Sandgate	2.3 km	Completed in 2014

A strategic design for the Rankin Park to Jesmond project was displayed for community comment in 2007. Community feedback was considered to finalise the preferred route corridor, which was reserved in Newcastle City Council's local environmental plan.

In June 2014 the NSW Government announced it would complete the \$280 million Rankin Park to Jesmond section of the bypass, including \$150 million from Restart NSW to progress the project. Roads and Maritime has since carried out a comprehensive review of the 2007 strategic design and a refined strategic design was displayed for community feedback in May and June 2016. A concept design has since been developed for the project, which forms the basis of this assessment that has been prepared to support the environmental impact statement (EIS) for the project.

1.2 The project

The project would involve the construction of about 3.4 kilometres of new four lane divided road between Lookout Road at New Lambton Heights and Newcastle Road at Jesmond. The project is located in the Newcastle local government area (LGA), about 11 kilometres west of the Newcastle central business district and about 160 kilometres north of Sydney (Figure 1-1).

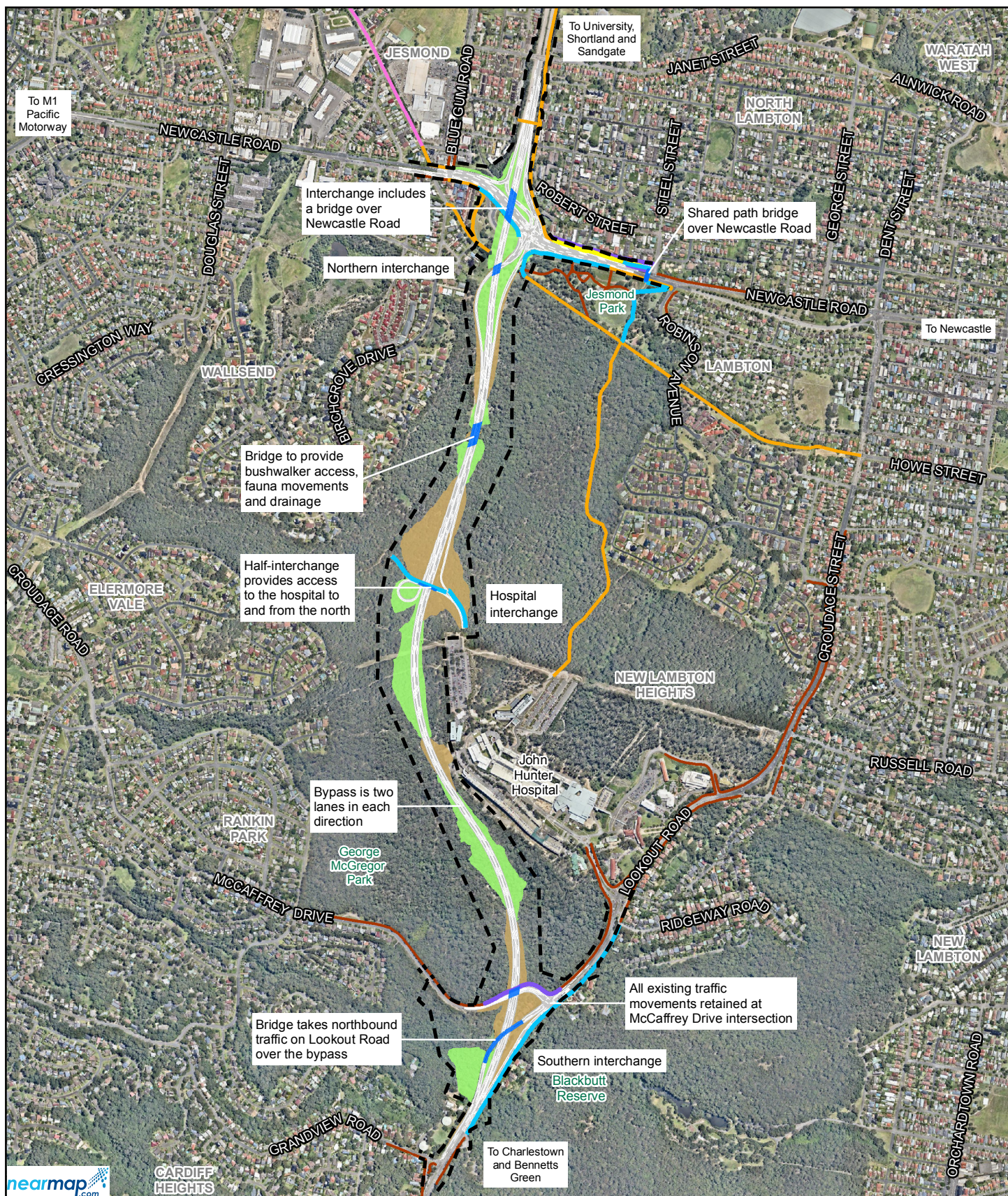
Key features of the project (Figure 1-2) include:

- New road with two lanes in each direction, separated by a median.
- Three interchanges, consisting of:
 - Northern interchange providing access to Newcastle Road and the existing Jesmond to Shortland section of the Newcastle Inner City Bypass. The full interchange provides all movements to/from the bypass and Newcastle Road.
 - Hospital interchange providing access between John Hunter Hospital precinct and the bypass. The half-interchange providing access to/from the north.
 - Southern interchange providing access to Lookout Road and the existing Kotara to Rankin Park section of the Newcastle Inner City Bypass. The bypass would travel under McCaffrey Drive. The half interchange provides connection in both directions on Lookout Road.
- Structures along the road to allow for drainage, animal and bushwalker access.
- Tie in and upgrades to connecting roads, including Lookout Road, McCaffrey Drive and Newcastle Road.
- Large cut and fill embankments due to steep and undulating terrain.
- Pedestrian and cycling facilities, including a shared path bridge over Newcastle Road.
- Noise barriers and/or architectural treatment, as required.
- Permanent operational water quality measures.

Ancillary work to facilitate construction of the project (Figure 1-3), including:

- Adjustment, relocation and/or protection of public utilities and services.
- Mine subsidence treatment, as required.
- Temporary construction facilities, including sedimentation basins, compounds and stockpile sites.
- Temporary and permanent access tracks.
- Concrete/asphalt batching plant, as required.

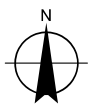
Data source: Geoscience Australia: 250k Topographic Series 3, 2012; Aurecon: The project, 2015; LPI: DTDB, 2006. Created by: fmackay



LEGEND

Design	Earthworks cut	Existing on-road cycleway	Existing footpath
Pavement	Earthworks fill	Existing shared path	Proposed footpath
Bridge	Proposed road corridor	Proposed shared path	Proposed on-road cycleway

Paper Size A4
0 62.5 125 250 375 500
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



Rankin Park to Jesmond
Water Quality and Watercourse
Impact Assessment Report

Job Number 22-17656
Revision 0
Date 26 Aug 2016

Project overview

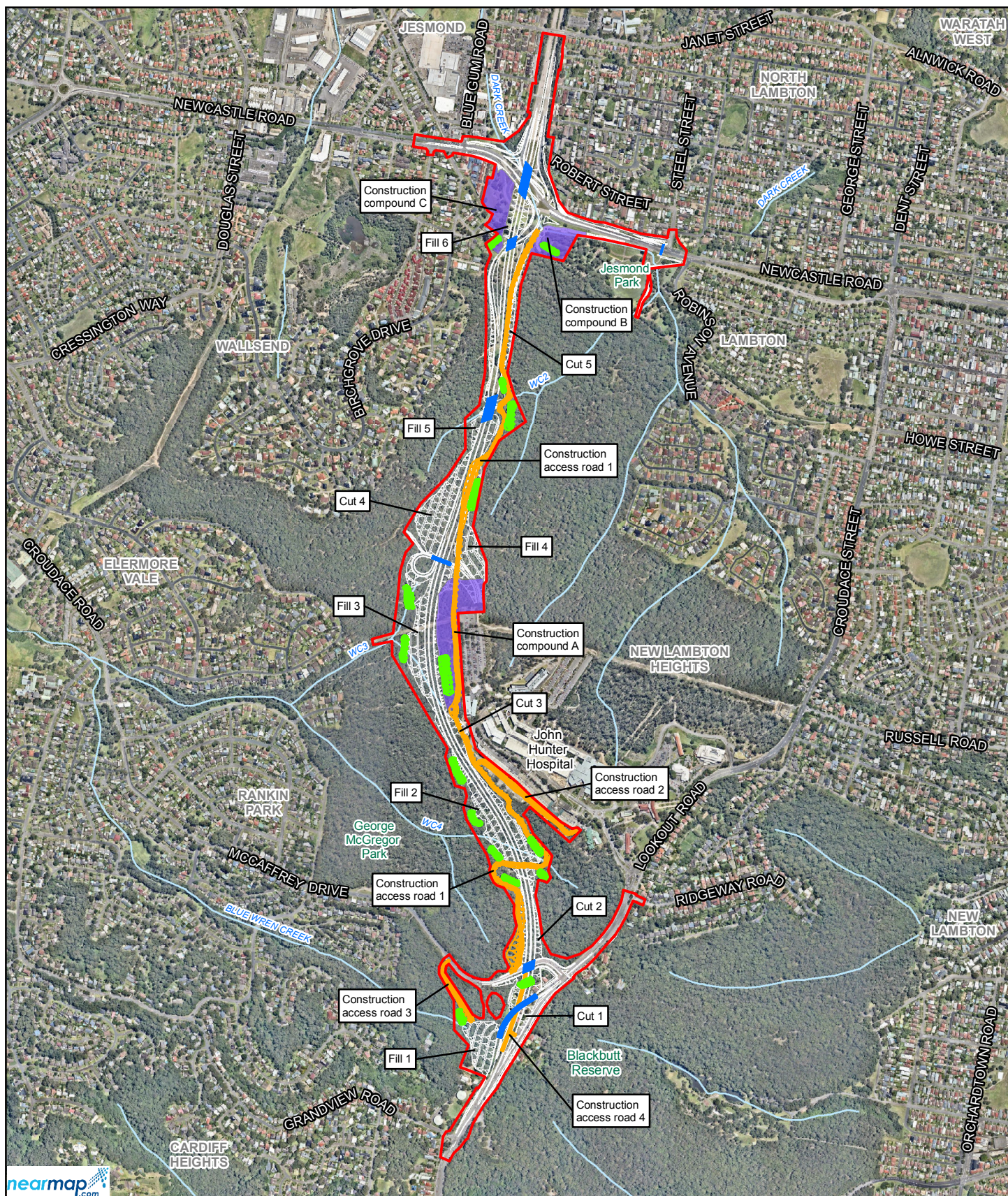
Figure 1-2

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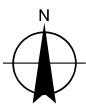
Data source: RMS: Project corridor, 2016; Aurecon: Design / cycleways, 2016; Neamap: Aerial Imagery, 20160331; LPI: DTDB, 2012. Created by: fmacKay



LEGEND

- Construction footprint
- Construction compound
- Construction access tracks
- Construction sedimentation basin
- Design
- Bridge
- ~~~~~ Watercourse

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Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



Rankin Park to Jesmond
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Construction ancillary facilities

Figure 1-3

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Data source: Neamap: Aerial Imagery, 20160331; Aurecon: Construction footprint/ Design / Water quality structures, 2016; LPI: DTDB, 2012. Created by: tmorton, fmacKay

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1.3 Project objectives

The key objectives of the project are to:

- Provide continuity of the Newcastle Inner City Bypass between Bennetts Green and Sandgate.
- Reduce travel times and congestion on the Newcastle Inner City Bypass.
- Provide traffic relief on key parts of the surrounding road network.

In so doing, it is intended to:

- Improve road safety.
- Minimise impacts on the natural and built environment.
- Provide value for money.

To support the project objectives, the concept design and EIS has been developed by:

- Designing the project to consider the environmental constraints and avoid or minimise impacts to the environment.
- Satisfying the technical requirements for the design of the project.
- Optimising the concept design to ensure the project can be constructed and maintained both practically and efficiently.
- Applying appropriate urban design, landscape and visual principles in the concept design of the project elements.
- Carrying out appropriate community and stakeholder consultation.
- Designing all connections, modifications and improvements necessary to link the project to the existing road network.
- Planning temporary arrangements which minimise disruption to local and through traffic and maintain access to adjacent properties during construction.

The overall project goal is to achieve the best possible result for each of these tasks, both in isolation and when considered together.

1.4 Purpose of this report

The objective of this study is to assess potential watercourse impacts and water quality issues from the project operation and construction, and where required, identify feasible and reasonable management measures.

This assessment has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) for the Newcastle Inner City Bypass between Rankin Park and Jesmond for the purpose of seeking project approval for state significant infrastructure under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Table 1-2 outlines the requirements relevant to this assessment and where they are addressed in the report.

The project was referred to the Commonwealth Department of the Environment (now the Commonwealth Department of the Environment and Energy) on 25 August 2015 due to potential for significant impacts on threatened species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). On 15 October 2015, the Commonwealth Minister for the Environment determined that the project was a controlled action subject to assessment and approval under the EPBC Act. The Minister also determined that the project could be assessed in accordance with the *Agreement between the Commonwealth of Australia and the State of New South Wales relating to Environmental Assessment* (the Assessment Bilateral Agreement).

The Assessment Bilateral Agreement accredits the assessment process of Part 5.1 under the EP&A Act, so that a separate assessment under Part 8 of the EPBC Act is not required.

Following consultation between NSW Department of Planning and Environment and the Commonwealth Department for the Environment, Supplementary SEARs were issued for the project on 19 November 2015. Table 1-2 outlines the requirements relevant to this assessment and where they are addressed in the report.

Table 1-2 Secretary's Environmental Assessment Requirements

Agency	Requirement	Where addressed
Department of Planning and Environment	The environmental impact statement must include the following: Erosion, sediment and water quality impacts, including an assessment of: - Potential water quality impacts and mitigation measures to manage water pollution during construction and operation, with reference to relevant public health and environmental water quality criteria, including those specified in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ 2000), and any applicable regional, local or site-specific guidelines - Proposed storm water management system and management measures for the containment of pollutants and minimisation of leachate and sediment mobilisation - Impacts on soil and slope stability resulting from vegetation clearing - Impacts on watercourses, including bed and bank stability - Potential erosion and sediment controls consistent with Managing Urban Stormwater – Soils and Construction (Landcom 2004)	Sections 3, 4 and 5 Section 3 Section 3.2 Section 3.2.5 Section 4.2
Commonwealth Department of the Environment (now the Commonwealth Department of the Environment and Energy)	The proponent must undertake an assessment of all the protected matters that may be impacted by the development under the controlling provision identified in paragraph 1 (Ramsar wetlands) and Attachment A (Ramsar wetlands). The Department of the Environment considers impacts potentially arise in relation to the following: - The Hunter Estuary Wetlands Ramsar site. Resulting in: - A substantial and measurable change in the hydrological regime of the wetland - A substantial and measurable change in the water quality of the wetland.	Section 3.2.1

1.5 Study area

The immediate study area subject to this assessment is between Lookout Road, Rankin Park and Newcastle Road Jesmond. The boundary of the project consists of the operational and construction footprints, including areas that could be indirectly impacted by the project (Figure 1-4).

The water quality component of the assessment also covers the extent of the catchments intersected by the project, including the downstream sensitive receptors associated with the Hunter Estuary Wetlands (Figure 1-4).

1.6 Methodology

The following tasks have been carried out as part of this assessment:

- Collation and review of available surface water quality data within the study area and at sensitive surface water receptors near to, and downstream of the study area to characterise baseline surface water quality.
- A site inspection to visually assess the geomorphology of watercourses at key locations within the study area.
- Identify downstream local catchment and sensitive receiving environments in the wider catchment. Adopt surface water quality trigger values with reference to relevant public health and environmental water quality criteria, including those specified in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ 2000), as well as baseline water quality data.
- Assess potential water impacts to the local catchment and the sensitive receiving environments in the wider catchment during construction and operation. This was done by identifying and modelling potential contaminants, discharges and processes that may impact water quality and assessing whether trigger values may be exceeded at downstream sensitive receiving environments.
- Assess potential impacts on the local geomorphology of watercourses during construction and operation of the project by identifying potential changes in hydrological and hydraulic conditions with consideration of the form and adjustment potential of watercourses in the study area.
- Establish a construction and operational water quality treatment strategy for the project.
- Identification of mitigation measures to manage potential water quality impacts to the local catchment and sensitive receiving environments in the wider catchment.