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WestConnex

WestConnex M5 - King Georges Road interchange upgrade

State Significant Infrastructure Application Report

May 2014



Executive Summary

The NSW Government has established WestConnex Delivery Authority (WDA) to deliver WestConnex. The Authority has been established as a public subsidiary corporation of Roads and Maritime Services (Roads and Maritime). For the purpose of the project planning for the King Georges Road interchange upgrade project (the project) Roads and Maritime will be the proponent.

Roads and Maritime is seeking approval to upgrade the interchange between King Georges Road and the M5 East Motorway. The project is located within the Canterbury and Hurstville local government areas and traverses the suburbs of Narwee and Beverly Hills, approximately 17 km south of Sydney's central business district.

The interchange at the M5 Motorway and King Georges Road in Beverly Hills currently experiences poor performance during peak hours. The east facing ramps are subject to long queuing, which impacts the performance of both King Georges Road and the M5 East Motorway.

The King Georges Road interchange upgrade project would tie into the completed M5 South West Motorway Widening project in the west. Minor treatment would be required to the existing M5 dual carriageways to retain two through lanes in each direction and accommodate the possible future construction of WestConnex M5. The eastern end of the project would tie into the existing M5 East Motorway, near Kooemba Road, Beverly Hills.

Work would be required to the eastbound off-ramp and the westbound on-ramp to make provision for the possible future construction of the WestConnex M5 project. Investigations are progressing to confirm whether this work would extend west of Penshurst Road. The eastbound on-ramp would be extended by shifting the merge further to the east and a new bridge span would be constructed to the north of Cooalongatta Road overbridge. Similarly the westbound off-ramp diverge would be shifted further to the east and a new bridge span would be constructed to the south of Cooalongatta Road overbridge.

Roads and Maritime has prepared this application report to support a State Significant Infrastructure application under section 115X of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). Roads and Maritime has formed the opinion that the impact of the project would be likely to significantly affect aspects of the environment and would require an environmental impact statement to be prepared under Part 5 of the EP&A Act.

Preliminary environmental assessments carried out for this application report indicate that traffic and transport and noise and vibration issues would require detailed assessment and may require project specific impact management and safeguard measures.

A number of other environmental issues have also been identified. These issues are outlined within this report and are considered to be of lesser consequence taking into consideration the project scope, the existing environment and the implementation of standard management and safeguard measures.

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Abbreviations and Glossary

Term	Definition
100-year ARI Flood event	Refers to the flood event that occurs, on average, once every 100 years.
ABS	Australian Bureau of Statistics
AADT	Annual average daily traffic
AHD	Australian height datum
AHIMS	Aboriginal Heritage Information Management System
Alluvium	Relatively recent deposits of sedimentary material laid down in river/creek beds, floodplains, lakes, or at the base of mountain slopes
Aquifer	An underground layer of water-bearing permeable rock or unconsolidated materials (gravel, sand, or silt) from which groundwater can be usefully extracted
Carriageway	The portion of a roadway devoted to vehicular traffic generally delineated by kerbs, a verge or a median
CBD	Central Business District
CEMP	Construction environmental management plan
CHAR	Cultural heritage assessment report
CO	Carbon monoxide
CO _{2-e}	Carbon dioxide equivalent
Culvert	An enclosed channel for conveying water below a road
Curtilage	The land immediately surrounding a house or dwelling, including any closely associated buildings and structures
dB(A)	Decibels using the 'A' weighted scale, measured according to the frequency of the human ear
DPI	Department of Primary Industries
DP&I	Department of Planning and Infrastructure
Endangered ecological community (EEC)	As defined under the <i>Threatened Species Conservation Act 1995</i> , an ecological community that is likely to become extinct or is in immediate danger of extinction
EIS	Environmental impact statement
EPA	NSW Environmental Protection Authority

Term	Definition
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i>
EMS	Environmental management system
Flood Immunity	Relates to the level at which a particular structure would be clear of a certain flood event
Freeway	A toll free highway
GHG	Greenhouse gas
Grade separation	The use of an underpass or overpass to separate road, rail or other traffic that cross each other, so that crossing movements do not conflict
Habitat	The place where an organism lives.
ICNG	Interim Construction Noise Guideline (July 2009)
Interchange	A grade separate junction between roads where the local road passes above or beneath the highway via bridge or underpass structure with one or more interconnecting roadways
km/h	Kilometres per hour
LALC	Local Aboriginal Land Council
LEP	<i>Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act</i>
LGA	Local government area
NES	Matters of national environmental significance under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
OEH	Office of Environment and Heritage (formerly Department of Environment, Climate Change and Water)
PACHCI	<i>RMS' Procedure for Aboriginal Cultural Heritage Consultation and Investigation</i>
PM _{2.5}	Airborne particulate matter with equivalent aerodynamic diameter of 2.5 microns or less.
PM ₁₀	Airborne particulate matter (such as airborne dust or silt) with equivalent aerodynamic diameter of 10 microns or less.
RMS	NSW Roads and Maritime Services

Term	Definition
RNP	Road noise policy
SEPP	State environmental planning policy
SER	Strategic Environmental Review
SHR	NSW State heritage register
tCO _{2-e}	Tonnes of carbon dioxide equivalent. See 'CO _{2-e} ' for explanation
TEU	Twenty-foot equivalent units
Threatened	As defined under the <i>NSW Threatened Species Conservation Act 1995</i> . A species, population or ecological community that is likely to become extinct or is in immediate danger of extinction
TSC Act	<i>Threatened Species Conservation Act 1995 (NSW)</i>
Tunnel portal	The entrance/exit structures at each end of a tunnel
µg/m ³	Micrograms per cubic metre
µS/cm	Microsiemens per centimetre (a measure of electrical conductivity)
Viaduct	A long bridge generally composed of a series of spans over land, which carried a road, or railway. The term is used to distinguish an aqueduct, which is a bridge, supporting a pipe, or channel, carrying water
VOC	Volatile organic compounds

1 Introduction

1.1 Overview of the project

The NSW Government has established WestConnex Delivery Authority (WDA) to deliver WestConnex. The Authority has been established as a public subsidiary corporation of Roads and Maritime Services (Roads and Maritime). For the purpose of the project planning for the King Georges Road interchange upgrade project (the project) Roads and Maritime will be the proponent.

Roads and Maritime is seeking approval to upgrade the interchange between King Georges Road and the M5 East Motorway. The project is located within the Canterbury and Hurstville local government areas (LGAs) and traverses the suburbs of Narwee and Beverly Hills, approximately 17 km south of Sydney's central business district.

The regional context and general location of the project is shown in **Figure 3-1**.

The project is a component of WestConnex. WestConnex is a proposed 33 km motorway to link Sydney's west with the airport and the Port Botany precinct. WestConnex aims to accommodate the growing transport needs of greater Sydney and strengthen access for industry to commercial centres, improving growth opportunities for local businesses. Other components of WestConnex include:

- M4 Widening
- M4 East – Homebush Bay Drive to Parramatta Road and City West Link
- WestConnex M5 – King Georges Road, Beverly Hills to St Peters
- M4 South – Haberfield to St Peters.

The M4 Widening and M4 East projects have been the subject of separate applications and assessment of those projects is currently underway. The WestConnex M5 and M4 South projects will be the subject of separate applications and assessment as the detail for each is refined.

The interchange at the M5 Motorway and King Georges Road in Beverly Hills currently experiences poor performance during peak hours. The east facing ramps are subject to long queuing, which impacts the performance of both King Georges Road and the M5 East Motorway.

The King Georges Road interchange upgrade project would tie into the completed M5 South West Motorway Widening project in the west. Minor treatment would be required to the existing M5 dual carriageways to retain two through lanes in each direction and accommodate the possible future construction of WestConnex M5. The eastern end of the project would tie into the existing M5 East Motorway, near Kooemba Road, Beverly Hills.

Work would be required to the eastbound off-ramp and the westbound on-ramp to make provision for the possible future construction of the WestConnex M5 project. Investigations are progressing to confirm whether this work would extend west of Penshurst Road. The eastbound on-ramp would be extended by shifting the merge further to the east and a new bridge span would be constructed to the north of Cooalongatta Road overbridge. Similarly the westbound off-ramp diverge would be shifted further to the east and a new bridge span would be constructed to the south of Cooalongatta Road overbridge.

A description of the project including key components is provided in **Section 3**. Key features of the project are also shown in **Figure 3-1**.

1.2 Purpose of this document

Roads and Maritime has prepared this application report to support a State Significant Infrastructure application under section 115X of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

Roads and Maritime has formed an opinion that the impact of the project would be likely to significantly affect aspects of the environment and would require an environmental impact statement (EIS) to be prepared under Part 5 of the EP&A Act. The project does not require development consent under Part 4 of the EP&A Act. Accordingly as per clause 14 and Schedule 3 clause 1(1) of *State Environmental Planning Policy (State and Regional Development) 2011* the project is State Significant Infrastructure under Part 5.1 of the EP&A Act and requires the approval of the Minister for Planning.

The requirements of clause 192 of the Environmental Planning and Assessment Regulation 2000 for applications seeking approval of the Minister for Planning to carry out State Significant Infrastructure are addressed in **Attachment A** to this report.

The purpose of this application report is to help the formulation of environmental assessment requirements by the Secretary under section 115Y of the EP&A Act. This application report does the following:

- Describes the project
- Considers the key potential environmental issues for the project
- Considers other potential environmental issues for the project
- Identifies the proposed scope of the environmental assessment and proposed further assessments.

The application report and Secretary's environmental assessment requirements would inform the preparation of an EIS for the project. The form and content of the EIS would be in accordance with clauses 6 and 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

2 Background

2.1 Strategic context and project need

The interchange at the M5 Motorway and King Georges Road in Beverly Hills currently experiences poor performance during peak hours. The east facing ramps are subject to long queuing, which impacts the performance of both King Georges Road and the M5 East Motorway.

The key benefits of the King Georges Road interchange upgrade project include:

- Facilitates the possible future construction of WestConnex M5 western tunnel portals and connection to the M5 East without requiring further modification to the King Georges Road interchange
- Improved performance of the M5 Motorway, M5 Motorway on-ramps and off-ramps, and King Georges Road
- Early realisation of performance improvements to the King Georges Road Interchange ahead of WestConnex M5 completion.

The King Georges Road interchange upgrade project is an initial stage of WestConnex M5. It is a NSW Government commitment to deliver WestConnex for Sydney in response to the recommendations from Infrastructure NSW in its *State Infrastructure Strategy* (Infrastructure NSW 2012) and Transport for NSW's (TfNSW's) *Long Term Transport Master Plan* (LTTMP) (TfNSW 2102). In addition, the *Draft Metropolitan Strategy for Sydney to 2031* (Draft Metropolitan Strategy) (NSW Government 2013) identifies WestConnex as an important corridor and a catalyst for major urban renewal.

2.2 Core project objectives

The following objectives have been established for the project:

- Facilitate the possible future delivery of WestConnex M5
- Reduce congestion on King Georges Road and the M5 Motorway in the vicinity of the interchange
- Improve access to and from the M5 Motorway and King Georges Road
- Maintain or improve road safety on King Georges Road and / or the M5 Motorway
- Minimise environmental and social impacts.

2.3 Identification of the preferred project corridor

The preferred option has evolved from a series of concept developments and evaluations. Project and environmental risk and value management considerations have been reviewed to assess options and further develop the preferred option. Broadly, options considered have included widening to the north of the existing motorway only, widening to the south of the existing motorway only and widening on both sides of the motorway.

The preferred option is largely located within the existing motorway corridor however some property acquisition may be required. Design development is ongoing and is aimed at optimising the function and cost of the project and also preventing or mitigating potential environmental impact.

The preferred option is described in **Chapter 3**.

2.4 Consultation

There has been ongoing consultation regarding WestConnex. The purpose of the stakeholder consultation to date has been to raise awareness of WestConnex through a dedicated website, an information phone line and emails to registered stakeholders.

A range of consultation methods have been utilised for WestConnex to seek input and identify potential issues including:

- A website www.westconnex.com.au with background information, maps, videos, customer surveys and details for how to provide feedback
- A feedback telephone line 1300 660 248
- A project email address info@westconnex.com.au to notify registered stakeholders, invite comment and respond to community feedback
- A postal address (Locked Bag 928 North Sydney 2059) to contact key stakeholders and receive input
- Broad advertising in major metropolitan, suburban and ethnic language publications, advertising targeting public transport users in mX magazine and online advertising targeting road users
- Media announcements that were widely covered in metropolitan television, radio, print and digital news outlets along with trade and advocacy publications such as NRMA's Open Road magazine
- Briefings with key stakeholders including local Councils
- A staffed display at Macarthur Square shopping centre.

The following sections outline how the project team will engage with key stakeholders and the local community during the preparation of the EIS for the project.

2.4.1 Key stakeholders

A range of organisations, groups and individuals will have an interest in and/or would be impacted by the project. Key stakeholders in the project include:

- Outer western Sydney residents – primarily motorway users
- M5 corridor residents and residents near King Georges Road interchange
- Local commercial and industry groups
- Peak non-Government organisations with an interest in the King Georges Road intersection (i.e. Bicycle NSW)
- Local and State government agencies.

A detailed stakeholder management database will be developed and maintained throughout the project. Consultation will be ongoing during preparation of the EIS and feedback received will be provided to the project team and technical specialists.

2.4.2 Proposed consultation activities

A comprehensive Community Involvement Plan (CIP) would be prepared and implemented in developing the project. The purpose of the CIP would be to outline an engagement strategy for key stakeholders and the local community during the preparation of an EIS. Continuing and specific stakeholder engagement for the project would be carried out in accordance with the CIP. The objectives of the CIP would be to:

- Build and develop positive working relationships and trust with the community and stakeholders
- Communicate key messages about the project to allow understanding and acceptance of how impact would be mitigated or managed
- Understand project constraints, limitations and opportunities from community and stakeholder perspectives
- Ensure community and stakeholder issues and suggestions are addressed in the EIS
- Fulfil the Director General’s Requirements for consultation during the EIS process.

The CIP will outline a range of consultation activities to be carried out during development of the EIS including (but not limited to) further NSW Government agency consultation, meetings with any potentially affected property owners and consultation with users of the M5 Motorway and King Georges Road. The community consultation activities described in **Table 2-1** would be carried out to communicate key messages about the project and to provide details on where to access further information on the project.

Table 2-1: Proposed community consultation activities

Proposed consultation activity	Description of proposed consultation activity
Website update	The WestConnex website would be updated to include information about the King Georges Road Interchange early work and an update on Stage 2 generally.
Frequently asked questions	Frequently asked questions and answers would be prepared to communicate key messages about the King Georges Road interchange upgrade and placed on the WestConnex website.
Media release	Media releases would be prepared as required to keep the media informed of the project and its progress.
Community update	Community updates would be prepared as required to inform the local community about the project, including to explain the planning process and notify the community of EIS public exhibition periods, key project features and to direct people to the WestConnex website and contact details for further information.
Emailing	Emails would be sent to relevant stakeholders about the project. A link would be provided to the Stage 2 page of the WestConnex website, to include a copy of the community update/postcard and media release.
Letterbox drop	The community update would be letterbox dropped to residences in the immediate vicinity of the project.

Proposed consultation activity	Description of proposed consultation activity
Other notices	<p>The wider community would be notified of the project through a variety of methods, including:</p> <ul style="list-style-type: none"> ■ Notices along the shared pedestrian / cycleway parallel to this section of the M5 East Motorway ■ Providing hard copies of the community update at Hurstville and Canterbury council chambers and libraries, and Hurstville and Beverly Hills motor registries.

Roads and Maritime, through WDA, will undertake targeted consultation during preparation of the EIS, focusing on stakeholders and local residents who may be affected by the project. Broader consultation will also be carried out during the display of the EIS.

3 Project description

3.1 General project description

The King Georges Road interchange upgrade project is an initial stage of WestConnex M5. The *WestConnex Business Case Executive Summary* (Sydney Motorways Project Office 2013b) estimates the capital cost for the M5 East Airport Link (WestConnex M5) component of WestConnex as between \$3.6 billion and \$3.8 billion (including contingency and in \$2012).

The King Georges Road interchange upgrade project would tie into the completed M5 South West Motorway Widening project in the west. Minor treatment would be required to the existing M5 dual carriageways to retain two through lanes in each direction and accommodate the possible future construction of WestConnex M5. The eastern end of the project would tie into the existing M5 East Motorway, near Kooemba Road, Beverly Hills.

Work would be required to the eastbound off-ramp and the westbound on-ramp to make provision for the possible future construction of the WestConnex M5 project. Investigations are progressing to confirm whether this work will extend west of Penshurst Road. The eastbound on-ramp would be extended by shifting the merge further to the east and a new bridge span would be constructed to the north of Cooalongatta Road overbridge. Similarly the westbound off-ramp diverge would be shifted further to the east and a new bridge span would be constructed to the south of Cooalongatta Road overbridge.

Figure 3-1 shows the general location of the project including the key components outlined in Section 3.2.

3.2 Detailed project description

King Georges Road Ramps

The project would tie into the completed M5 South West Widening three lane dual carriageway. Works to the west facing ramps are required to suit the possible future construction of WestConnex M5, as outlined below, with further investigations required to confirm whether this work would extend west of Penshurst Road:

- The eastbound off-ramp would be widened to diverge in the vicinity of Penshurst Road. The nearside eastbound lane of the motorway would exit to King Georges Road and two lanes would continue eastbound
- The westbound on-ramp would be widened and tie-in with a dedicated third nearside motorway lane in the vicinity of Penshurst Road.

Work to the east facing ramps are required to connect with the existing M5 East layout and also suit the future WestConnex M5 configuration as follows:

- The eastbound on-ramp would be extended by shifting the merge about 200 metres further to the east. The on-ramp would be realigned passing below Cooalongatta Road overbridge via a new bridge span at its northern end

- The westbound off-ramp would be extended by shifting the diverge about 150 metres further to the east. The off-ramp would be realigned passing below Cooalongatta Road overbridge via a new bridge span at its southern end.

Motorway widening

Works to widen the motorway would be limited to the provision of pavement stubs to tie into the possible future construction of the WestConnex M5 configuration at the eastern extent of the project. At opening the project would tie into the existing M5 East Motorway two lane dual carriageway.

Bridges and structures

Work would be required to the eastbound off-ramp and the westbound on-ramp to make provision for the possible future construction of the WestConnex M5 project. Investigations are progressing to confirm whether this work would extend west of Penshurst Road, and therefore require work to the bridge over Penshurst Road.

Additional bridge spans would be required on both the northern and southern ends of the Cooalongatta Road overbridge to accommodate the east facing ramp configurations. New retaining walls would be required to support the existing shared path and noise walls above motorway ramp level.

A number of cut or fill retaining walls may be required to contain the project footprint within the motorway corridor.

Noise attenuation

Noise walls that exist along both sides of the motorway may require adjustment, relocation and/or extension.

Drainage works

Some adjustments and extensions to motorway cross drainage would be required to accommodate the proposed widening.

New pavement and subsurface drainage, and / or augmentation of the existing system, would be required in areas where the motorway pavement would be widened.

Pedestrian and cyclist facilities

Currently cyclists can utilise the M5 Motorway for travel in both directions west of Bexley Road. While motorway shoulders would be provided along most of the project's length, movements would be restricted during construction. Shared paths are currently available north and south of the carriageways east of King Georges Road.

A new cycleway connection would be constructed in the vicinity of the King Georges Road eastbound off-ramp to Welfare Avenue. Eastbound cyclists would use Welfare and Shorter Avenues to access the shared path facility located to the east of King Georges Road. Westbound cyclists would be prevented from accessing the motorway at Bexley Road and be required to use the existing shared path until joining the motorway at King Georges Road via the westbound on-ramp.

Some realignment of the existing shared path network would be required between Cooalongatta Road and Beverly Park to accommodate the widening works. Improvements to the off-motorway shared path network to accommodate both higher speed cyclists and recreational cyclists are being considered and are subject to further investigation.

Emergency facilities

While moving slightly to accommodate widening of the motorway, break down bays between King Georges Road and Cooloongatta Road would be retained generally in their current location. The break down bays opposite Kooemba Street would not be affected by the work.

There are no emergency vehicle cross-overs within the project area.

Ancillary facilities

Construction facilities would be established as part of the project on land outside the road corridor. Other temporary facilities such as stockpiles, sedimentation control basins and motorway access for construction would also be required. The location of these facilities is subject to detailed design and would consider environmental criteria. An area of open space between Tallawalla Street and the motorway has been identified as a possible location for construction facilities.

Utilities and street lighting

Utility modifications and/or protection would be required as part of the project, with existing telecommunications, gas and sewer lines crossing the M5 Motorway within the project area. Utilities such as underground power and telecommunications are located beneath the existing northern and southern shared paths.

Street lighting for the King Georges Road interchange ramps currently extends from Penshurst Road to Elouera Street. Any street lighting affected by the project would be reinstated and the need for additional lighting would be subject to further investigation.

Tolling

Provision would be made for tolling infrastructure on the M5 Motorway and King Georges Road interchange on and off-ramps that would be required by WestConnex M5. Tolling infrastructure would not be required on King Georges Road. No changes to the existing toll regime on the M5 Motorway or King Georges Road is proposed as part of this project,

Urban design and landscaping

Urban design solutions would be consistent with the requirements outlined in *Beyond the Pavement: Urban design policy, procedures and design principles* (Roads and Maritime 2014). In particular urban design treatments would be applied to structures such as retaining walls, gantries, noise barriers and bridge modifications.

Landscaping works would be integrated into road side treatments and adjacent to shared paths to minimise visual impact of the project on the community.



Information on any changes to noise walls, retaining walls, drainage features and temporary construction facilities is subject to detailed design

Figure 3-1: General location of the project
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4 Key Environmental Issues

4.1 Overview

Key issues are those that may have high or moderate impact (actual or perceived) and assessment is necessary to determine the level of potential impact and to develop appropriate measures to mitigate and manage the impact.

The outcomes of the preliminary environmental investigations indicate the following key environmental issues would require further detailed assessment and may require project specific impact mitigation measures:

- Traffic and transport
- Noise and vibration.

A number of other environmental issues have also been identified. These issues are outlined in Chapter 5 and are considered to be of lesser consequence taking into consideration the project scope, the existing environment and the implementation of standard management and safeguard measures. It is expected these other environment issues would not likely be key issues; however the potential impact of these other environmental issues would be assessed further in the EIS for the project.

Preliminary consideration has been given to the provisions of *the Environmental Protection and Biodiversity Conservation Act, 1999* (EPBC Act). A search of the EPBC Act Online Protected Matters Search Tool has been conducted and at this stage it is considered unlikely the project would have a significant impact on matters of National Environmental Significance.

4.2 Traffic and transport

4.2.1 Overview

The M5 East Motorway connects the M5 South West Motorway at King Georges Road, Beverly Hills (in the west) with Southern Cross Drive and the Eastern Distributor (in the east). The motorway is an important link connecting Sydney's Eastern Suburbs, the airport and Port Botany area, and the Princes Highway, with the wider southern and south-western Sydney road network including King Georges Road, the Cumberland Highway and the M7 Motorway.

The M5 transport corridor is the main passenger, commercial and freight route between Sydney Airport, Port Botany and South West Sydney, and links with the orbital road network and interstate routes. The greater M5 corridor supports planned residential and employment growth in South West Sydney and is also a well established route serving suburbs and growth centres in South West Sydney.

Within the study area, the existing motorway provides a two-lane dual carriageway with relatively wide shoulders which support emergency and broken-down vehicles and allow cyclists to travel along the motorway. Cyclists can currently use the motorway shoulders from just west of Bexley Road and can enter or exit this facility from the grade separated intersection at King Georges Road.

King Georges Road forms part of the A3 arterial road corridor. South to north, the A3 corridor begins in Blakehurst and continues north through Sydney's southern and inner western suburbs to the northern beaches area where it finishes near Mona Vale. King Georges Road forms the southern section of the A3 corridor, ending at its intersection with Punchbowl Road. King Georges Road (and the greater A3) connects several major motorway corridors, being the M5 Motorway, the M4 Motorway, the M2 Motorway and the Pacific Highway.

The King Georges Road interchange is a grade separated full diamond interchange with on and off-ramps onto the M5 South West Motorway to the west and the M5 East Motorway to the east.

Traffic data currently available indicates that M5 East Motorway users primarily originate from the suburbs of south-west Sydney (27 per cent), southern Sydney (20 per cent) and from the west central Sydney (36 per cent) in the AM peak. Heavy vehicles using the M5 East Motorway travel to/from industrial areas in west central Sydney (43 per cent). Of the vehicles with origins/destinations to the east of the M5 East tunnels, 48 per cent travel to the Port and Airport area (in the AM peak). From farther afield the motorway attracts regional and interstate users travelling between Sydney Airport and the Hume Highway (Canberra, Melbourne) (Parsons Brinckerhoff, 2013).

King Georges Road carries an average daily flow of 77,000 vehicles per day to the north of the M5 Motorway corridor. The traffic volume on King Georges Road drops to 47,000 vehicles per day south of the M5 Motorway which highlights the large volume of traffic that joins the M5 Motorway at the King Georges Road Interchange.

The King Georges Road Interchange currently suffers from poor performance during peak hours. The east facing ramps are subject to long queuing, which impact the performance of both King Georges Road (entry ramp queues) and the M5 East Motorway (exit ramp queues tailing back onto the motorway).

Within the study area, the M5 Motorway currently carries more than 100,000 vehicles per day, with 10 per cent of these vehicles being heavy vehicles). Substantial traffic delays are experienced eastbound in the AM peak period and westbound in the PM peak period. The result of this congestion is delays in the AM and PM peaks that extend beyond peak hours.

Average speeds on the M5 corridor of 47km/h in the AM peak and 54km/h in the PM peak were surveyed in 2012, which is well below the posted speed limit of 100 km/h on the M5 and 80 km/h on the M5 East.

Preliminary traffic modeling results undertaken for the WestConnex project indicate that traffic volumes are forecast to increase by approximately 15 per cent between 2011 and 2021, and a further five per cent between 2021 and 2026.

No regular bus services operate on the motorway. Bus routes in the area surrounding the motorway provide connections to commercial and residential areas and transport hubs (such as train stations and bus interchanges). The use of surrounding streets rather than the motorway supports multi-functional bus routes. King Georges Road is used by cross-regional bus routes to connect suburbs either side of the motorway.

Bicycles are permitted to ride on the shoulders of the open sections of the M5 East Motorway with marked crossings provided across the motorway ramps. Additionally, there are off road shared paths on either side of the motorway from west of King Georges Road to Bexley Road. King Georges Road provides a north-south crossing of the motorway via traffic lights at the interchange. Within the project area, cyclists can also cross the motorway via a shared path at Cooalongatta Road.

4.2.2 Summary of issues

Construction

The following potential traffic and transport related impacts would be considered and addressed:

- Maintenance of a safe environment for road users during construction, including buses, pedestrians and cyclists
- Safety impacts due to temporary road arrangements or the close proximity of construction activities to through traffic
- Construction activities would require the use of heavy vehicles to deliver construction plant, equipment and materials as well as remove waste from the project site, adding to existing traffic numbers and resulting in a temporary deterioration of intersection and traffic performance on the surrounding road network
- Temporary disruptions and delays to traffic would be experienced during construction due to the narrowing of existing M5 East lanes to facilitate construction, speed restrictions and temporary road closures
- Construction staging would affect traffic on the M5 East Motorway, as well as King Georges Road. As the project's construction would be staged, different construction access routes would be used at different times in the construction program and the heavy vehicle routes may also need to be varied depending on construction staging arrangements
- There is a potential for a temporary shift of traffic to alternative routes, such as Canterbury Road and Stoney Creek Road, during the construction phase, particularly during peak periods. These road corridors also experience congestion with limited spare capacity
- There would be temporary impacts to pedestrian and cyclist facilities on and immediately adjacent to the motorway during construction. Impacts to these facilities would be considered in the context of identified construction staging
- Temporary impacts to pedestrian access is expected, given that some of the works would result in the closure or detour of existing pedestrian access at King Georges Road and Coo loongatta Road
- There may also be some impact to public transport utilising King Georges Road during construction and would be generally consistent with potential delays for general motorists.

Operation

Operation of the project has the potential for the following traffic and transport related impact:

- Improved performance of the M5 Motorway, M5 Motorway on-ramps and off-ramps, and King Georges Road
- Maintained or improved road safety on King Georges Road and the M5 East Motorway from reduced congestion and queuing at the King Georges Road interchange on and off-ramps.

4.2.3 Proposed further assessment

A traffic and transport impact assessment would be carried out to address the potential construction and operational impact of the project. This assessment would identify potential impact and nominate mitigation and management measures to minimise impact.

Data regarding existing traffic volumes and mix would be collected for the motorway and at key locations on King Georges Road. Data on existing cyclist numbers utilising the motorway shoulder and the off-motorway shared path would also be collected to inform the assessment.

With regards to *construction* traffic and transport impact, the assessment would include:

- An assessment of traffic impact on King Georges Road and M5 East traffic and key roads in the surrounding network, during the construction period
- An assessment of construction traffic impact including route identification, number, frequency and size of construction related vehicles, the nature of existing traffic, and the need to close, divert or otherwise reconfigure elements of the road network associated with construction of the project
- An assessment of the impact to cyclists during the construction period
- Recommendations for construction phase mitigation measures.

With regards to *operational* traffic and transport impact, the assessment would include:

- Forecast traffic volumes for the King Georges Road interchange, the M5 East within the study area and the local road network
- Detailed traffic modelling for the project and the local and regional road networks
- An assessment of the performance of key interchanges and intersections by undertaking a Level of Service analysis at key locations
- An assessment of operational traffic impacts including an assessment of existing local and regional traffic volumes and traffic patterns against forecast volumes and potential changes to traffic patterns associated with the project and public transport impacts
- An assessment of the impacts of the project on road users including motorists, public transport, freight, pedestrians and cyclists; on key local and regional road networks
- Consideration of various operational scenarios associated with opening of other components of WestConnex, including WestConnex M5 and M4 South
- Road safety analysis
- Assessment of the cumulative traffic and transport impacts of the project with consideration of future works on the M5 corridor
- Recommendations for operation phase mitigation measures.

4.3 Noise and vibration

4.3.1 Overview

Existing noise and vibration sources within the study area are mainly related to transport infrastructure, primarily road traffic (including heavy vehicles) using the M5 corridor. Additional noise sources within a 600m study area include:

- King Georges Road
- Moorefields Road at the northern extent of the study area
- The East Hills Rail Line at the southern extent of the study area
- Local roads (including Cooloongatta Road).

Residential and non-residential noise sensitive receiver types identified within the study area consist of:

- Residential properties
- Places of worship
- Educational facilities
- Sporting, recreation and open space areas.

These receivers would be assessed for noise and vibration impacts resulting from the construction and operation of the upgraded motorway.

4.3.2 Summary of issues

Construction

Construction of the project has the potential for the following noise and vibration related impact:

- Construction activities have the potential to create airborne noise which could adversely affect residential and non-residential sensitive receivers identified for the project
- Construction activities typically occur during daytime hours; however, due to safety and technical considerations, construction outside normal hours or during the night may be required to ensure continued operation of the road network at peak times and to ensure worker safety
- Increases in road traffic noise levels for receiver locations are expected around the areas of major construction such as the tie-in works, interchange construction, road widening, noise wall construction bridge works and construction facilities
- Construction traffic noise from the use of heavy vehicles and construction equipment
- Potential vibration impacts on buildings near to surface works.

Operation

Operation of the project has the potential for the following noise and vibration related impacts:

- A change to the road configuration has the potential to change noise levels at nearby receiver locations. where impacts are found to exceed the guideline noise levels, feasible and reasonable management and safeguard measures must be considered
- The project is anticipated to provide benefits related to relieving congestion on King Georges Road and to reduce noise generated by vehicle braking during existing heavy traffic periods.

4.3.3 Proposed further assessment

A detailed noise and vibration assessment would be carried out to assess the construction and the operation impact of the project and to provide (as a minimum):

- A detailed assessment for construction and operational scenarios, using a 600 m corridor either side of the project
- Identification of all residential and non-residential sensitive receivers within a 600 m corridor either side of the project
- Identification of existing background noise levels at representative locations within the corridor using attended and unattended noise monitoring equipment
- A traffic count survey taken at the time of the noise monitoring survey to correlate measured noise levels with vehicle numbers
- Identification of project specific noise and vibration criteria for sensitive receivers within the assessment corridor
- Predicted levels of traffic noise at all receiver locations using a calibrated noise model for the project
- Predicted levels of construction noise and vibration at all receiver locations
- Analysis of options for traffic noise mitigation and construction noise and vibration mitigation where exceedances of the project noise and vibration goals are expected
- Consideration of various operational scenarios associated with opening of Stage 2 and Stage 3 of WestConnex.

The assessment of noise and vibration impact for construction and operational scenarios are to be carried out in accordance with the following documents:

- DECCW 2011, *NSW Road Noise Policy*
- Roads and Traffic Authority 2011, *Interim approaches to apply the Road Noise Policy*
- Roads and Traffic Authority 2001, *Environmental Noise Management Manual, Sydney*
- DECC 2006, *Assessing Vibration – a technical guideline*
- DECCW 2009, *Interim Construction Noise Guidelines*.

5 Other Environmental Issues

Other environmental issues listed below 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. It is considered unlikely these would be key issues for the project; however, further assessment would be carried out as part of any future environmental impact assessment for the project. Any environmental management and safeguard measures required to minimise and mitigate impact would be documented as part of the EIS.

5.1 Biodiversity

5.1.1 Overview

The project is located within the Sydney Basin Bioregion within the Sydney Metro - Sydney catchment management sub-region. Before European settlement, the natural vegetation of this area was dominated by a mixture of wet and dry sclerophyll eucalypt forests interspersed with patches of grassy eucalypt woodland (Land and Property Information NSW, 2013a). Extensive vegetation clearing for agriculture, residential and infrastructure development has since resulted in the loss of the vast majority of the native vegetation in the part of the sub-region to the north of the Georges River in which the subject site is located (Department of the Environment Water Heritage and the Arts, 2010). Native vegetation has been reduced to small isolated forest and woodland fragments.

The motorway corridor is highly modified and was cleared for construction of the motorway. The road verges, batters, central median and areas adjacent to the existing noise barriers have been planted with species including exotic grasses and native shrubs and trees.

Despite the limited habitats in the study area, some Threatened species of plant and animals listed under the *Threatened Species Conservation Act 1995* (TSC Act) and/or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) are likely to persist.

A preliminary desktop assessment has been carried out for project corridor, which included a review of:

- Aerial photography
- NSW OEH's *Atlas of NSW Wildlife* database records for threatened species and endangered ecological communities listed under the *Threatened Species Conservation Act 1995* (TSC Act) and the *Fisheries Management Act 1994* (FM Act)
- The *Protected Matters Search Tool* for matters of NES listed under the EPBC Act.

A 10 km search radius around the project area identified 23 endangered ecological communities (EECs) potentially occurring. Of these four in particular are considered to be likely to occur within the project area:

- Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion (endangered – TSC Act)
- Cumberland Plain Shale Woodlands and Shale- Gravel Transition Forest (critically endangered - EPBC & TSC Acts)
- Shale/Sandstone Transition Forest (critically endangered – EPBC Act, Endangered – TSC Act)
- Turpentine-Ironbark Forest in the Sydney Basin Bioregion (critically endangered – EPBC Act).

An area of Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion is located adjacent to the existing M5 East Motorway near Canterbury Golf Course about 250 m to the east of the project area.

The EPBC Protected Matters search also identified 74 threatened species (critically endangered, endangered or vulnerable) 67 listed migratory species as potentially occurring within a 10 km radius of the project area.

Based on database searches and literature review, threatened species within the study area may include:

- Two Critically Endangered plant species (EPBC Act) - *Hibbertia puberula* subsp. *Glabrescens* and *Thelymitra* sp. (Kangaloon Sun-orchid) and the Endangered (TSC Act) *Wahlenbergia multicaulis* (Tadgells Bluebell)
- One Critically Endangered bird species (EPBC Act) *Neophema chrysogaster* (Orange-bellied Parrot) and the endangered (TSC Act) *Lathamus discolor* (Swift Parrot)
- *Litoria aurea* (Green and Gold Bell Frog) is listed as Endangered under the TSC Act
- Three bat species which could have foraging habitat in the project area - *Miniopterus schreibersii oceanensis* (Eastern Bent-wing Bat), *Myotis macropus* (Southern Myotis) and *Pteropus poliocephalus* (Grey-headed Flying-fox) all which are listed as vulnerable under the EPBC and TSC Acts.

The migratory species listed as potentially occurring in the study area are only likely to fly over the site or use vegetation remnants and marine areas on a transient basis. The project area is unlikely to be classed as an 'important habitat' for any Migratory species as defined under the EPBC Act Policy Statement 1.1 *Significant Impact Guidelines - matters of national environmental significance* (Department of the Environment Water Heritage and the Arts, 2009).

5.1.2 Potential impact

Construction

Construction of the project has the potential for the following biodiversity related impacts:

- Indirect impacts to areas of Threatened Ecological Communities i.e. Cooks River/Castlereagh Ironbark Forest in the Sydney Basin, associated with the Beverley Grove site
- Clearing of planted vegetation that may provide habitat for threatened species, specifically species such as the Grey-headed Flying-fox, Southern Myotis and Little Lorikeet
- Clearing of mixed planted native and exotic vegetation which could also provide habitat for threatened species
- Possible introduction or spread of environmental weeds
- Mortality of animals during clearing and construction
- Impacts to Threatened plants e.g. *Acacia pubescens*, *Wahlenbergia multicaulis*
- Disturbance and/or mortality of bats roosting under bridges or in culverts e.g. Eastern Bent-wing Bat and Southern Myotis.

Operation

Operation of the project has the potential to impact on biodiversity through accidental vehicle strike however is unlikely that the project would directly lead to greater numbers of strikes compared to what is currently experienced.

A biodiversity assessment would be prepared as part of the EIS to provide an assessment of the potential ecological impacts of the project, with specific reference to vegetation and habitat clearing, connectivity, edge effects, weed dispersal, bushfire risk, riparian habitat impacts and soil and water quality impacts.

The assessment would also include recommendations for biodiversity safeguards and management measures to reduce the intensity and extent of impacts on flora and fauna, particularly threatened flora and fauna.

5.2 Socio-economic

5.2.1 Overview

The project is located in the local government areas (LGAs) of Canterbury and Hurstville. Compared to NSW as a whole, the LGAs generally comprise a younger population with a median age of 36 years with about 20 per cent of these two LGAs comprising people under the age of 14 years. The main occupations comprise professionals, clerical and administrative workers, and technicians and trades workers. About 60 per cent of the population is employed in full time work. About 50 per cent of the population in these two LGAs were born in Australia. The other 50 per cent of the population were born in a variety of overseas countries including China, Lebanon and Greece. In Canterbury City, about 70 per cent of the population speaks a language other than English at home.

A mix of residential and commercial land uses are located adjacent to the project area, with Beverly Hills and Kingsgrove town centres located relatively close to the King Georges Road interchange. These town centres provide local services and retail shopping to surrounding residents. To the east of the study area in Kingsgrove an industrial park is located, to the north and south of the motorway. The motorway also provides access to other commercial and industrial areas, including industrial parks in Tempe as well as Sydney Airport and Port Botany to the east of the motorway.

The M5 is used by vehicles as a route to efficiently access other areas of Sydney hence it has limited connectivity with regional and local roads and community facilities. The only on-ramp/off-ramp within the project area is at King Georges Road. King Georges Road forms part of the A3. **Section 4.1** provides a description of King Georges Road and the A3. Beverly Hills Girls High School, Regina Coeli Primary School and Beverly Hills North Public School as well as a number of churches and Beverley Hills Station can all be accessed via King Georges Road.

Off-road shared path facilities are provided between Kings Georges Road and Bexley Road, which are linked to local cycle routes. A designated underpass for pedestrians and cyclists is provided at Beverly Grove Park, with designated at-grade crossing points provided where the shared path intersects with King Georges Road and Cooloongatta Road. Currently cyclists can also use the shoulder of the M5 Freeway for travel in both directions between just west of Bexley Road and west of King Georges Road.

Recreational facilities located near the project include Canterbury Golf Course and local parks, including Beverly Hills Park and Beverly Grove Park, Beverly Hills.

Community facilities, including churches, community halls, emergency services and scout/guide halls are concentrated at or near town centres with most being located near train stations (such as Beverly Hills Station).

5.2.2 Potential impact

The project would provide improved access for local and regional communities and reduce traffic congestion at the M5 East Motorway, King Georges Road interchange during peak travel times. The *WestConnex Strategic Environmental Review* (Sydney Motorways Project Office 2013b) recognises the potential socio-economic impacts of WestConnex as including impacts to livability and amenity (including construction impacts on communities), access and connectivity and impacts to social infrastructure. Although only a minor component of WestConnex, the project has the potential for the following socio-economic related impact:

- A small number of direct property impact, and impact associated with property acquisition, including uncertainty about the property acquisition process
- Some adjustment to the off-road shared cycle path (that would retain its current functionality) and restriction of on-freeway cyclists to west of King Georges Road.

Construction of the project has the potential for the following socio-economic related impact:

- Impacts on amenity for local residents and users of schools and community facilities, due to increased dust, construction traffic and noise and vibration from construction activities
- Disruption and uncertainty for road users due to potential changes to access during construction
- Potential changes to access for pedestrians and cyclists near construction works, including the shared pedestrian and cycle path facility between King Georges Road and Kingsgrove
- Use of land for construction facilities.

Operation of the project has the potential for the following socio-economic related impact:

- Acquisition of property may be required. Social impacts typically associated with property acquisition include uncertainty about the property acquisition process
- Amenity impact for local residents, particularly increased traffic noise, visual impacts at sensitive receivers
- Cyclists would be prevented from using the motorway east of King Georges Road.

A socio-economic impact assessment would be prepared as part of the EIS to consider the potential impact of the project including, both positive and negative, direct and indirect impact of the project's design, construction, operation and maintenance. The assessment would also include identification of appropriate management and safeguard measures, including measures to enhance the project's benefits to avoid, manage or mitigate its potential impact.

5.3 Water quality, hydrology and flooding

5.3.1 Overview

Catchment and drainage

The project area is located wholly within the Cooks River Catchment. Surface water initially drains into Wolli Creek which forms a major tributary of the Cooks River which in turn discharges into Botany Bay.

The M5 East corridor runs parallel and adjacent to the upper reaches of Wolli Creek. Within the project area Wolli Creek is contained within an open concrete channel that runs adjacent and to the south of the existing motorway.

Under the *Sydney Water (Stormwater Drainage Areas) Order 2011* Sydney Water is responsible for this portion of Wolli Creek. Roads and Maritime is a significant landholder, with roads occupying 22% of the sub-catchment area. There are no other waterways within the project area.

Existing motorway pavement drainage is generally designed to convey a 1 in 5-year annual recurrence interval event with no flows encroaching onto traffic lanes. Cross-drainage, which conveys stormwater from the surrounding catchments in culverts under the motorway, is generally designed to cater for a 1 in 100-year annual recurrence interval event.

Flooding

There are no known flooding issues along the current motorway alignment or King Georges Road in the vicinity of the project. The potential for flooding is considered to increase in the lower reaches, near the Cooks River due to the larger volume of water entering downstream reaches of Cooks River combined with the tidal influence.

The most recent flooding events (to 2010) include November 1984, a 100 year average recurrence interval (ARI) event, January 1991 (5-20 year ARI), April 1998 (5-20 year ARI) and February 2001 (1 year ARI). The primary waterway of interest, Wolli Creek drains a relatively small area, so the extent of flooding in extreme rainfall events is expected to be minimal. Even for a 100 year rainfall event, Wolli Creek remains mostly within the reserve areas surrounding the channel (MWH and PB, 2009). Any areas of the M5 East corridor that are prone to flooding up to the probable maximum flood level would be subject to a risk management process, in accordance with the *NSW Floodplain Development Manual* (NSW Office of Environment and Heritage 2005).

Water quality

Sealed surfaces within the catchment are the major source of pollutants reaching Wolli Creek. About 71 per cent of the Upper Wolli Creek Sub-catchment is made up of sealed surfaces, which includes roofs, pavements, roads and railway tracks (City of Canterbury, 2010). The large proportion of sealed surfaces reflects the highly urbanised character of the catchment and has an impact on water quality within the creek.

5.3.2 Potential impact

Construction of the project has the potential for the following water quality, hydrology and flooding related impact:

- Direct erosion impact due to the exposure and mobilisation of soils during construction. This may potentially impact on water quality of Wolli Creek
- Direct impact to water quality from accidental chemical spills or materials during construction or improper management of run-off, sediment control and discharge from the construction site.

Due to its position in the catchment, the project is unlikely to have a significant impact on flood regimes during construction. Additionally, the project does not require construction works to be undertaken within or across significant watercourses. A section of Wolli Creek is covered to accommodate motorway infrastructure. Additional sections of the concrete-lined creek may need to be covered temporarily to accommodate construction of the project. There is the potential for minor changes in flooding behavior as a result of these works.

Operation of the project has the potential for the following water quality, hydrology and flooding related impact:

- Contamination of Wolli Creek as a result of any spills occurring during operation from maintenance activities or vehicle crashes
- Increase in sediment and pollution loads in stormwater due to the removal of buffer vegetation, increase in road surface and increase in vehicular traffic. This has the potential to impact on water quality through road runoff containing suspended solids, nutrients from atmospheric fallout and other pollutants from vehicle, tyre and road surface wear.

An assessment of water quality, hydrology and flooding issues would be prepared as part of the EIS to consider potential impact of the project including, both positive and negative, direct and indirect impact of the project's design, construction, operation and maintenance. The assessment would also assess the risk of erosion and sedimentation in accordance with the *Erosion and Sedimentation Management Procedure* (RTA, 2008).

5.4 Air quality

The air pollutants most relevant to vehicles are carbon monoxide (CO), nitrogen dioxide (NO²), and particulate matter (fine particles with equivalent aerodynamic diameters of 10 microns or less (PM₁₀)). Health research also identifies PM_{2.5} as a particular concern.

The closest OEH air quality monitoring stations to the project area are at Earlwood and Chullora. *The New South Wales Air Quality Statement 2013* (OEH, 2013) shows that the Earlwood and Chullora stations both recorded exceedances of PM₁₀ and PM_{2.5} criteria (five days/year and four days/year respectively). Both stations also recorded days above the 4-hr ozone standard (three days/year and one day/year respectively), however this has been attributed mainly to drier and hotter weather through the middle of the year and the impact of bushfires in September, October and November.

Typically exceedances of PM₁₀ criteria are driven by unavoidable events, such as dust storms, bushfires and hazard reduction burns, though other emission sources may include industry, vehicles, and domestic activities such as solid fuel heaters.

Air quality in the Sydney region has improved since the 1980s; largely due to initiatives to reduce air pollution from industry, vehicles, business and homes. The most recent State of the Environment Report (EPA, 2012) notes concentrations of four of the six main indicators of air quality (carbon monoxide, nitrogen dioxide, sulfur dioxide and lead) have complied with national air quality standards in recent years. However, national standards of ozone and particulate matter (PM₁₀) continue to be exceeded in some regions of the state, including Sydney.

The existing air quality of the project area is influenced by major roads and other transport infrastructure such as the M5 corridor, King Georges Road, Canterbury Road and the East Hills Rail Line. Light industrial land use is also present to the east of the study area that may contribute to the local airshed. Emissions from vehicles on the road network are key contributors to the local airshed. Air quality in and around the project corridor is also influenced by emissions from other sources across the Sydney basin transported to the area through regional weather patterns.

Locations in the vicinity of the project area which may be sensitive to changes in air quality include residences, businesses and schools. The project has the potential to impact on local air quality during both construction and operational phases.

Construction of the project has the potential for temporary reductions in air quality from dust (particulate matter) during clearing, earthworks and construction activities and from emissions, such as exhaust fumes, generated by the operation of machinery and other construction vehicles. During operation of the project there is the potential for increases or decreases in near roadside air pollutant concentrations due to changes in traffic volumes. The nature of any changes in concentrations would depend on the projected traffic volumes, mode of travel, road grade and mix of vehicles.

An air quality assessment would be prepared as part of the EIS and would assess air quality impact from proposed construction activities and a screening level air quality assessment of potential near roadside air pollutant concentrations during operations.

5.5 Aboriginal and non-Aboriginal heritage

5.5.1 Aboriginal heritage

Previous cultural heritage surveys have been carried out in proximity to the project area, including a survey which was carried out for the proposed M5 East Motorway in 1994. A shell horizon was located on the northern and southern banks of Wollie Creek as well as several rock shelters recorded along the creek. The survey area covered the banks of Wollie Creek from the Cooks River Bridge past Turella and Bardwell Park stations to Bexley North. Three rock shelters were recorded which contain archaeological deposit comprising shell, bone, charcoal and flaked stone.

The project is wholly within the Metropolitan Local Aboriginal Land Council (LALC) area. The traditional owners of the land around Wollie Creek Valley were the Bidjigal people (River Flat Clan) of the Eora Nation. Consultation has not been carried out with any Aboriginal stakeholders at this stage, but would be a necessary and important component of further assessment.

A search of the Aboriginal Heritage Information Management System (AHIMS) was carried out in April 2014. The search revealed there are no recorded Aboriginal sites within 500 m of the project area.

A search of the National Native Title Register Native Title Applications and Determination areas was conducted in April, 2014. It found that the project is not within or adjacent to any Native Title Application or Determination areas.

Construction of the project has the potential to impact on Aboriginal heritage values, sites and deposits, particularly unknown/unidentified archaeological items that may be uncovered, disturbed, damaged or destroyed during construction works.

The risk of significant impacts to Aboriginal sites and / or artefacts is likely to be low given the disturbed and highly urbanised environment along the project corridor.

An Aboriginal cultural heritage assessment would be undertaken for the project, including completion of at least stage 1 of the Roads and Maritime Procedure for *Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI) in consultation with the Roads and Maritime Aboriginal Cultural Heritage Advisor. Aboriginal heritage investigations would be prepared in accordance with the following policy documents and heritage guidelines:

- RTA 'Procedure for Aboriginal Cultural Heritage Consultation and Investigation' (PACHCI) (RTA, 2011)
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010)
- *Code of Practice for Archaeological investigation of Aboriginal Objects in NSW* (DECCW, 2010).

5.5.2 Non-Aboriginal heritage

A preliminary desktop assessment of non-Aboriginal heritage issues has been undertaken for the project. The following statutory and non-statutory registers and local planning instruments have been searched to identify heritage items within 300 m of the project area:

- World Heritage properties
- National Heritage places
- Commonwealth Heritage places
- Register of the National Estate (Australian Heritage Council)
- NSW State Heritage Register and Inventory (NSW Heritage Branch)
- Relevant s170 Heritage and Conservation Registers
- *Canterbury Local Environmental Plan 2012* heritage schedules
-

The desktop register search did not find any listed heritage items within a 300 m buffer of the project area. The closest heritage item identified was the State Heritage listed Beverley hills railway station group (SHR No: 01086), about 600 m to the south of the King Georges Road M5 East Freeway interchange.

The National Trust lists two 'Urban Conservation Areas' on its register which partially lie within the study area:

- Interwar Housing - Canterbury Urban Conservation Area - Precinct 23 - Jordan Avenue, Beverly Hills (#S10973)
- Interwar Housing - Hurstville Urban Conservation Area - Precinct 1 - Beverly Hills - Pallamanna Parade, (#S10977).

The National Trust defines an 'Urban Conservation Area' as areas that have '*an overall townscape, architectural or historic character which, in the Trust's view, should be conserved even though not every individual building in the area is significant*' (National Trust of Australia, nd).

The study area has been subject to ground disturbing activities over a long period of time during the original road construction, associated ancillary activities and the development of the surrounding suburbs. Despite this, there may be areas of potential heritage significance, within the urban landscape which should be considered in design and construction plans.

Construction of the project has the potential to impact non-Aboriginal heritage values, sites and deposits, particularly unknown/unidentified archaeological items that may be uncovered, disturbed, damaged or destroyed during construction work.

The risk of significant impact to non-Aboriginal heritage sites and / or artefacts is likely to be low given the disturbed and highly urbanised environment along the project corridor.

An assessment of the significance of any identified non-Aboriginal heritage items adjacent to the project would be undertaken in accordance with the Burra Charter and the NSW Heritage Office, *Assessing Heritage Significance, NSW Heritage Manual 2* (2001), *Statements of Heritage Impact* (1991) and *Assessing Significance for Historical Archaeological Sites and Relics* (2009).

5.6 Land use and property

The project traverses Canterbury and Hurstville LGAs. The area immediately adjacent to the project spans the suburbs of Narwee and Beverly Hills.

The M5 Motorway is contained within an existing road corridor. Within the study area, land uses comprise predominantly residential development and sports and recreational facilities.

The suburbs of Narwee and Beverly Hills contain mostly low to medium density residential development with large areas of open space including the Canterbury Municipal Golf Course and Beverly Grove Park both adjacent to the motorway. Off-road shared path facilities are provided between Kings Georges Road and Bexley Road, which are linked to local bicycle networks. There are no major industrial zones within the project area.

Acquisition or lease of property may be required for construction purposes. This could include areas for construction facilities and construction access to the motorway. Construction of the project may require temporary closure of some local roads during construction and may also require changes in access to private properties and sports and recreational facilities.

Land use and property issues are considered throughout the design development process and detailed design phases of the project. Standard management and safeguard measures would be detailed in the EIS for the project.

5.7 Urban design, landscape and visual assessment

Along the length of the project area the M5 Motorway passes through several distinct landscape character zones, each defined by factors such as form of the motorway, visual catchments and land use types.

The landscape surrounding the project area is dominated by urban development and open space. Much of the urban landscape is characterised by low to medium density residential housing interspersed with open space/ recreational land comprising the Canterbury Golf Course and Beverly Grove Park. Much of the development surrounding the M5 East Motorway and King Georges Road has a limited visual exposure to the project due to visual screening by noise barriers, landscaping, vegetation and landform.

From within the motorway, the landscape and urban character is generally contained within the vegetation planting and visual screening along each side of the corridor. Where views are available beyond these limits, they generally comprise views of the top of adjoining buildings and vegetation.

The introduction of new road infrastructure may result in the partial or total removal of existing landscaping which may impact on the landscape and cultural values of the surrounding suburbs. Construction of the project has the potential for reduced visual amenity associated with construction activities, placement and use of construction sites and facilities, the need for temporary structures and the potential for physical impacts on existing public open space and use of land. Removal of visual screens and vegetation planting along the freeway to facilitate construction may have visual impacts for motorists and adjoining residents.

Operation of the project has the potential for visual impact associated with the introduction of new infrastructure affecting existing views from residences and surrounding development, including visibility of new interchange infrastructure, noise attenuation walls, ramps, gantries and signs.

The design of the project would be in keeping with urban design principles for the project and the Roads and Maritime guideline *Beyond the Pavement: Urban design policy, procedures and design principles* (Roads and Maritime 2014), which identifies urban design principles regarding road infrastructure.

5.8 Geology, soils and contamination

The topography of the project area is generally flat and follows the existing grade and alignment of the M5 East Motorway. The King Georges Road intersection comprises a mix of cut and fill barriers extending in both directions along the motorway corridor. The elevation of the surface road remains fairly low, with the highest point being around 40m Australian Height Datum (AHD) at King Georges Road intersection. Next to the project area, landform is generally undulating with broad and rounded crests and ridges grading into concave lower slopes.

The project is contained within the wider Sydney Basin. The Geology of the project area is described according to the *NSW Geological Survey 1:100 000 Geological Map* (Sheets 9130 and 9030) (NSW Geological Survey, 1991a and 1991b). The geology underlying the project corridor comprises Ashfield Shale and Bringelly Shale with smaller areas of alluvium, gravel, sand, silt and clay.

Soil types in the project area are generally alluvial, highly erosive or residual. Two predominant soils landscapes units (Blacktown and Birrong) are present near the King Georges Road intersection and east along the M5 corridor.

The project is located in areas of 'moderate' and 'very low' salinity potential (DIPNR, 2002). The areas of moderate salinity are generally located on Wianamatta Group Shales (including Bringelly Shale and Ashfield Shale) and Tertiary Alluvial Terraces. Soils in the area are moderately to well drained due to their elevated position in the landscape.

The *Australian Soil Resource Information System* shows that the project area is classified as predominantly 'Low Probability of Occurrence' for Acid Sulfate Soils (ASS). The eastern extent of the project area (toward Bexley Road) is classified as 'Extremely Low Probability of Occurrence'.

A search of the Contaminated Land Record (NSW Department of Environment, Climate Change and Water) was undertaken in April, 2014. There were no registered sites found within 500m of the project area.

Groundwater is likely to be present at depth within the underlying Hawkesbury Sandstone. A groundwater borehole search was carried out using the NSW Natural Resource Atlas Online GIS system. The search located two groundwater boreholes within one kilometre of the project location. At both sites (either side of Wolli Creek to the east of the project area) groundwater was measured between 4.3 m and seven metres depth.

Construction of the project has the potential for direct erosion impact during construction due to excavation, vegetation removal or heavy vehicle use resulting in soil exposure and mobilisation. Additionally, the mobilisation of surface and subsurface contaminants during construction (impacting groundwater, surface water and soils) could occur.

Appropriate management strategies would be sought once more detailed designs are available and the risks to soil, water quality and groundwater have been investigated further. Standard management and safeguard measures would be detailed in the EIS for the project.

5.9 Resource and waste management

Raw and processed materials would be required for construction of the project. These materials would include concrete, steel, imported fill and fuel to power construction equipment and water. The quantity and types of materials required for construction would be further defined during detailed design.

Procurement and delivery of the materials required to construct the project, including concrete, steel, plant and road base would be required from quarries, manufacturers and suppliers outside the project area.

For operations, only relatively small quantities of asphalt, concrete and other materials would be used to maintain the project.

Construction and operation of the project would see varying amounts of waste produced. Construction wastes generated would include fill material, general construction and demolition waste, vegetation waste, packaging materials and liquid wastes. Operational wastes (which would be much smaller in quantity) may include spills and leakages from vehicles, litter generated by road users and sediment from the water quality control basin. An assessment of resource and waste management issues would be presented in the EIS.

5.10 Greenhouse gas and climate change

Climate change refers to the warming temperatures and altered climatic conditions associated with the concentration of gases in the atmosphere, known as greenhouse gases. There is a need to understand how these potential changes can impact future climatic conditions and the effect they could have on the project.

Greenhouse gases generated through construction and operation of the project have the potential to contribute to altered climatic conditions. In 2010 the NSW Government published refined climate change projections for each region in NSW including the Sydney metropolitan area. In summary, climate change predictions identified by the NSW Government for the Sydney region are:

- More intense extreme rainfall events
- Increased spring and summer precipitation and a decrease in winter precipitation
- Increased evaporation in spring and summer
- Higher average temperatures
- More frequent occurrence of extreme temperatures.

Greenhouse gas emissions are categorised into three different scopes:

- Scope 1 emissions are direct emissions generated on site, such as those from the combustion of fuels used to power plant, equipment and vehicles used on site and the clearing of vegetation
- Scope 2 emissions are the indirect emissions from the consumption of electricity that is generated off-site such as the electricity used to power variable message signs and lights
- Scope 3 includes emissions in the supply chain, or those from the use of a product. These include embodied energy in construction materials and vehicles travelling on the motorway (ie the completed project). Examples of road project Scope 3 emissions include:

- Emission associated with offsite mining and production of materials such as concrete, asphalt and aggregates used in the construction and maintenance of a road
- Emissions from the combustion of fuel when transporting materials
- Emission from the vehicles using the road.

Climate change issues are generally adequately managed through the development of construction management plans and appropriate consideration of climate change issues during the design development process. Standard management and safeguard measures would be detailed in the EIS for the project.

5.11 Hazard and risk

Hazards and risks arising from construction and operation of the project have the potential to impact the environment and human health.

The key potential hazard to arise during construction would be impact to environmental and human health resulting from construction vehicle accident/collisions and accidental releases, or improper handling and storage of hazardous substances within the project area. The quantities of hazardous substances that would be stored on the project are anticipated to be small.

Operational hazards are not considered likely given the M5 is currently a major transport route and the addition of extra lanes would not result in a change to the motorway's existing use. Despite this, vehicle collisions could result in the accidental spill of dangerous goods and has the potential to adversely affect the quality of the local environment and impact human safety.

Management and safeguard measures would be implemented to avoid, minimise or manage specific hazards and risks from construction and operation of the project. Standard management and safeguard measures would be detailed in the EIS for the project.

6 Conclusions

The interchange at the M5 Motorway and King Georges Road in Beverly Hills currently experiences poor performance during peak hours. The east facing ramps are subject to long queuing, which impacts the performance of both King Georges Road and the M5 East Motorway.

The King Georges Road interchange upgrade project would tie into the completed M5 South West Motorway Widening project in the west. Minor treatment would be required to the existing M5 dual carriageways to retain two through lanes in each direction and accommodate the possible future construction of WestConnex M5. The eastern end of the project would tie into the existing M5 East Motorway, near Kooemba Road, Beverly Hills.

Work would be required to the eastbound off-ramp and the westbound on-ramp to make provision for the possible future construction of the WestConnex M5 project. Investigations are progressing to confirm whether this work would extend west of Penshurst Road. The eastbound on-ramp would be extended by shifting the merge further to the east and a new bridge span would be constructed to the north of Cooalongatta Road overbridge. Similarly the westbound off-ramp diverge would be shifted further to the east and a new bridge span would be constructed to the south of Cooalongatta Road overbridge.

Roads and Maritime has formed the opinion that the impacts of the project would be likely to significantly affect the environment. On this basis, the project is declared to be State Significant Infrastructure under section 115U(2) of the EP&A Act by reason of the operation clause 14 of and clause 1 of Schedule 3 to *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). Accordingly, approval from the Minister for Planning is required for the project.

The key environmental issues identified for the project include traffic and transport and noise and vibration. It is concluded that detailed environmental assessments are required for these issues as part of the EIS, including the development of management and mitigation strategies to minimise impacts. A number of other environmental impacts are also likely as a consequence of the project, and these will also require assessment as part of the EIS.

The application report and Secretary's environmental assessment requirements would inform the preparation of an EIS for the project. The form and content of the EIS would be in accordance with clauses 6 and 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

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Attachment A - Requirements of the Environmental Planning and Assessment Regulation 2000

Clause 192 of the Environmental Planning and Assessment Regulation 2000 requires that an application for approval of the Minister to carry out State Significant Infrastructure must include:

- a) Details of any approval that would, but for section 115ZG of the Act, be required for the carrying out of the State Significant Infrastructure
- b) Details of any authorisations that must be given under section 115ZH of the Act if the application is approved
- c) A statement as to the basis on which the proposed infrastructure is State significant infrastructure, including, if relevant, the capital investment value of the proposed infrastructure.

Approvals that would otherwise apply

Approvals that may be required to carry out the project, if not for section 115ZG of the Planning Act, include:

- An Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act 1974*
- A water use approval under section 89, a water management work approval under section 90 or an activity approval under section 91 of the *Water Management Act 2000*. Section 115ZG does not remove the need to obtain an aquifer interference approval under the *Water Management Act 2000*, if that were to be otherwise required
- An approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977*.

Authorisations if the application is approved

Authorisations that may be required for the project under section 115ZH of the EP&A Act include:

- An environmental protection licence under Chapter 3 of the *Protection of the Environment Operations Act 1997*

State Significant Infrastructure statement

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) permits development for the purposes of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent. As the project is for a road and road infrastructure facilities, and is to be carried out by or on behalf of Roads and Maritime, the project is permissible without development consent under Part 4 of the EP&A Act.

The project is permissible without consent by virtue of clause 94 of *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP), meaning that the project is an activity within the meaning of Part 5 of the EP&A Act and Roads and Maritime is the determining authority.

Roads and Maritime, as proponent and determining authority, has formed the view that the project is likely to significantly affect the environment. On this basis the project is declared to be State Significant Infrastructure (SSI) under section 115U(2) of the EP&A Act by reason of the operation clause 14 and clause 1 of Schedule 3 of *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP).

Accordingly, the project is subject to Part 5.1 of the EP&A Act and requires the approval of the Minister for Planning.