STATE SIGNIFICANT INFRASTRUCTURE ASSESSMENT:

WestConnex M5 King Georges Road Interchange Upgrade

(SSI 6547)

Secretary's Environmental Assessment Report
Section 115ZA of the
Environmental Planning and Assessment Act 1979

February 2015

Cover Photograph: M5 Motorway on-ramp, *Environmental Impact Statement*

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EXECUTIVE SUMMARY

The Proposal

Roads and Maritime Services (the Proponent) proposes to upgrade the King Georges Road Interchange with the M5 Motorway, both as a standalone augmentation of the Motorway network and as part of the WestConnex scheme.

WestConnex is an approximately 33 kilometre motorway linking Sydney's west and south-west with Sydney Airport and the Port Botany precinct. The M5 King Georges Road Interchange Upgrade would be the second stage of WestConnex. It involves work to the existing M5 Motorway carriageways including improvements to all on-ramps and off-ramps at the interchange of the M5 with King Georges Road. Works also include modifications to surrounding roads and other infrastructure, including cycleways, noise walls and drainage facilities.

Need and Justification

Road congestion currently costs the NSW economy approximately $5.1 billion per year. This is forecast to increase to $8.8 billion per year if no action is taken. Presently the M5 corridor experiences considerable congestion each day and a significant contributor is the high volume of freight requiring transportation from Port Botany to distribution centres based in Southern and Western Sydney. A reduction in congestion will benefit individual road users and the economy at large.

The proposed M5 King Georges Road Interchange Upgrade would assist with improving the operation of the current interchange both in the short and long term. In this respect, the proposed Interchange Upgrade has a number of key benefits including:

- Reduced congestion and improved travel times for commuters along the M5 between Penshurst Road and Cooloongatta Road and King Georges Road between Canterbury Road and Stoney Creek Road;
- Improved access to and from the M5 for commuters, business and industry;
- Improved freight distribution efficiency due to reduced congestion and improved travel times; and
- Improved road safety by reducing congestion and improving the free flow of traffic.

Importantly the proposal will result in a safer and more efficient interchange. The key benefit will be major travel time savings for road users both in the short and long term. In summary, morning peak savings are predicted to be in order of 1 minute northbound (9%) and 1 minute southbound (9%) in 2017; 3 minutes northbound (23%) and 4 minutes southbound (21%) in 2027, while the evening peak savings are predicted to be in order of 1 minute southbound (9%) in 2017 and 3 minutes northbound (23%) and 4 minutes southbound (25%) in 2027.

In addition to the stand alone benefits of the project, the Interchange Upgrade will also provide incremental improvements to Sydney's broader motorway network. The interchange upgrade provides key enabling works for the WestConnex Scheme which will improve the performance of key arterial routes including the M5 Motorway, M5 on-ramps and off-ramps, and King Georges Road.

The proposal is consistent with key State Government planning and transport strategies which generally seek to improve the State's transport infrastructure, including:

- *NSW 2021: A plan to make NSW number one* (2011);
- *State Infrastructure Strategy Update* (2014);
- *NSW Long Term Transport Master Plan* (2012); and
- *A Plan for Growing Sydney (the Sydney Metropolitan Strategy)* (2014).

Assessment and Approvals Process
The proposal is 'State Significant Infrastructure'. It has also been declared 'Critical' State Significant Infrastructure as it has been deemed essential for the State. The Minister for Planning is the approval authority.

The Environmental Impact Statement was publicly exhibited from 22 October 2014 to 21 November 2014. A total of 39 submissions were received, including 7 submissions from public authorities and councils. Submissions from public authorities and councils gave qualified support to the proposal or did not indicate support or objection. Key concerns raised include traffic impacts on local roads, noise impacts, emissions from plant and equipment, sediment runoff, rehabilitation of impacted vegetation, and mitigation measures for drainage lines to be incorporated into proposal.

Of the 32 public submissions received, 13 (41%) objected to the proposal, 3 (9%) supported the proposal and 16 (50%) did not object but raised concerns. Key concerns raised were the adequacy and accuracy of traffic modelling and methodology; lack of consideration for alternatives; changes to the location, design and length of access ramps; concerns with the number of lanes and lane widths and impacts on safety, traffic flow and operational performance; lack of upgrades to King Georges Road to accompany the interchange upgrade and increased traffic on King Georges Road as a result of the project; noise and vibration impacts; vegetation disturbances including Downy Wattle (*Acacia pubescens*) and Cook River/ Castlereagh Ironbark Forest communities; and further consideration of landscaping and screening for visual amenity.

The Proponent lodged a Response to Submissions Report which provided a response to public, agencies and council submissions. The Report outlined a number of design refinements, such as the minor relocation of retaining walls on both sides of the carriageway to provide additional space for street lightings, increased shoulder width from 2.5m to 2.8m adjacent to Penshurst Road bridge to accommodate widening of the bridge over Penshurst Road, and an additional breakdown bay to be provided at the westbound off ramp.

Key Assessment Issues
The proposal has been assessed in accordance with the requirements of the *Environmental Planning and Assessment Act 1979* as State Significant Infrastructure and Critical Infrastructure.

Traffic and Transport
The Department is satisfied that the Proponent's modelling has demonstrated that operation of the project would improve traffic speeds and safety for users of the interchange and the network in both the short and long term. The proposal will also see a reduction in exit ramp queues. Both the project and full WestConnex scenarios are particularly effective at reducing queue lengths in the evening (PM) peak.

Modelling anticipates that in 2027, peak travel times on King Georges Road northbound will decrease by approximately three minutes in both the morning and evening peak periods whilst southbound traffic would experience travel time savings of approximately four minutes in the morning and five minutes in the evening peak period.

The broad trends evident in the comparison of the do minimum (2014) and project (2017) scenarios are generally consistent in terms of Level of Service. Under project conditions, improvements are observed at the M5 Motorway interchange with average delays decreasing in both the morning and evening peaks. In the morning peak, all intersections performed better with the project scenarios in 2017 and 2027 than without. In the evening peak, all intersections maintained the same LoS or performed better with the project scenarios in 2017 than without.

Cycling Facilities

The proposal will impact on existing cycling facilities located along the M5 shoulders east of King Georges Road due to their proposed closure. However, the Department is satisfied that the construction of significant cycle infrastructure within the carriageway is not warranted given the low number of current users and the availability of reasonable alternatives. Notwithstanding, the Department has recommended that the detailed design of the proposal does not preclude the future upgrade of cycle infrastructure at this location. Further, the Department has recommended that a Cycling and Pedestrian Access Strategy be prepared detailing works to be carried out to maintain cyclist movements in consultation with Councils and cyclist groups.

Noise and Vibration

The proposal has the potential to cause noise and vibration impacts during construction. It is anticipated that primary construction works will occur during the day with the possibility of night time construction subject to a licence issued by the Environment Protection Authority under the *Protection of the Environment (Operations) Act 1997*.

Noise modelling indicates that, under worst case scenarios exceedance of construction noise would impact on a small number of residential receivers in the eight noise catchment areas. The Department's assessment concludes that these impacts are acceptable given the temporary duration of the impacts, the implementation of best practice construction management measures, the early installation of permanent noise barriers to shield construction noise, and the inclusion of respite periods for high intensity noise and vibration works. It is expected that these measures will ensure an acceptable acoustic environment during construction works.

The operational noise impacts on the M5 and on/off ramps would generally improve across all catchments as a result of improved road paving, height increases of existing noise walls, the construction of new noise walls, and faster moving traffic. The Department's assessment does conclude however that a total of six residential receivers within noise catchment areas 3 and 8 would require architectural treatment to ensure relevant amenity noise goals are achieved. This is supported by relevant recommended conditions.

Biodiversity

The proposal will result in the loss of nine individuals of the threatened flora species, Downy Wattle, within the proposed road realignment. The Department recommends that a Biodiversity Offset Package be prepared with offset mitigation measures for the species.

Other issues

Other issues considered in the Department's assessment relate to visual impacts, overshadowing, air quality, socio-economic impacts, geology, soils and contamination, hydrology and flooding, Aboriginal and non-Aboriginal heritage, greenhouse gas emissions, sustainability and cumulative impacts. The impacts associated with these issues can be appropriately managed through the implementation of specific requirements and relevant ongoing management plans.

Conclusions and Recommendations

The proposal, as both a stand-alone augmentation of the Motorway network and as part of the broader WestConnex scheme, is a key component of achieving the NSW Government's transport policy and objectives, as identified in NSW Government strategic transport planning. The King Georges Road Interchange Upgrade is justified in its own right by improving traffic flow and performance on key arterial routes such as King Georges Road, M5 Motorway, M5 on-ramps and off-ramps. The proposal would provide a net benefit to the State, having regard to both long-term and short-term economic, environmental and social considerations.

The benefits to the community arising from the proposal, include improved travel times and improved connectivity. The proposal would benefit business and industry through improved access to the M5 and improved freight distribution efficiency. The proposal will also improve road safety and help Sydney cope with expected population growth.

The potential environmental impacts associated with the construction and operations of the proposal are acceptable. The proposal would comply with the objects of the *Environmental Planning and Assessment Act 1979* and with the principles of Ecologically Sustainable Development. The Department's assessment therefore concludes that the application should be approved subject to recommended conditions.

Key Recommended Conditions of Approval

Issue: Noise

To mitigate potential operational noise impacts, a number of conditions have been imposed and come into effect during the operational phase:

- Provision for updating the existing operational environmental management plans, including noise and vibration, that cover the project area;
- Submission of an Operational Noise Review (Condition E2), prepared in consultation with the EPA, to the Secretary, providing a detailed review of the operational noise mitigation measures proposed to be implemented for the SSI;
- Stringent requirements to verify predicted noise impacts based on monitored noise levels and measured traffic numbers, and review noise controls;
- the Proponent shall offer to install architectural treatments at eligible properties to reduce the impact of operational traffic noise at the affected premise.

(See conditions E2 — Operational Noise Review, E3-E4 — Architectural treatment requirements, E5 — Operational Noise Compliance Report, E7— Operational Environmental Management Plan

Issue: Visual amenity

A number of conditions have been imposed to the SSI to ensure impacts on visual amenity are minimised to sensitive receivers during the construction and operational phase. These include:

- A detailed Urban Design and Landscape Plan to ensure the proposal integrates with its surrounds, and effectively rehabilitates areas degraded or disturbed by construction work;
- The plan would be developed in consultation with Councils and the community;
- The plan would also set out architectural and landscape design opportunities to improve the design of the proposal; and
- Conditions in place to minimise light spill on sensitive receivers during construction.

(See conditions B15-B16 — Urban Design and Landscape Plan, B18 — Minimising light spillage to adjacent properties)

Issue: Cyclist and pedestrian access

A number of conditions have been imposed to reduce the impact on cyclists and pedestrians during the operational phase. These include:

- Undertaking safety audits of existing paths between Belmore Road and Bexley Road to provide a baseline to revision of the cycle network;
- Development of a Cycling and Pedestrian Access Strategy to maintain accessible routes west- and eastbound;
- Restrictions on closing existing cyclist access on the M5 shoulder until shared paths are upgraded and revised crossings over King Georges Road are provided.

(See conditions B6 — Belmore Road and Bexley Road shared path safety audit, B7 — Restriction on closing M5 shoulder to cycling, B8 — Cycling and Pedestrian Access Strategy)

Issue: Biodiversity impacts

Biodiversity impacts are considered to be minor and manageable. A number of conditions have been imposed to assist with the management of biodiversity impacts during the construction and operational phases, including:

- Preparation of a Construction Flora and Fauna Management Plan (Condition D31) that details the avoidance and mitigation measures identified in the preliminary biodiversity assessment;
- A series for objectives for the Plan, including minimising vegetation clearing, and further detailed requirements for offsetting biodiversity impacts.

(See conditions B6 — Biodiversity clearing objectives, D22 — Biodiversity management measures, D23 — Biodiversity Offset Package, D31(f) — Construction Flora and Fauna Management Plan)

Issue: Construction impacts, particularly around compound sites.

A comprehensive set of requirements for construction environmental management has been conditioned to ensure management of construction activities are consistent with existing standards and best practice construction procedures, to prevent and minimise environmental impacts, including;

- A management plan to govern establishment, operation, decommissioning, and rehabilitation, of construction compound sites, including measures to reduce noise, dust and vibration impacts to sensitive receivers;
- A series of management plans to ensure best practice safeguards and environmental controls for construction traffic and access, the appropriate management of required traffic interruptions and/or road or lane closures, construction noise and vibration, construction soil and water management. Aboriginal and non-Aboriginal heritage, and construction air quality;
- Prior to the commencement of construction of the SSI, or as otherwise agreed by the Secretary, the Proponent shall appoint a suitably qualified and experienced Environmental Representative(s) that is independent of the design and construction personnel, and that has been approved by the Secretary;
- Requirements for the Environmental Representative(s) to report monthly on their actions and decisions, including environmental auditing undertaken in accordance with the Proponent's Environmental Management System(s), monitoring of the environmental performance and implementation of the required environmental management plans and monitoring programs, and any steps taken to avoid or minimise unintended or adverse environmental impacts.

(See conditions D1 — Appointment of Environmental Representative, D5-D6— Building conditions surveys, D7-D13 — Noise and vibration requirements, D14 — Air Quality requirements, D15 — Aboriginal and Non Aboriginal heritage requirements, D16-D21 — Construction transport and access requirements, D22-D23 — Biodiversity requirements, D26-D29 — Ancillary facilities criteria and management, D30-D31 — Construction Environmental Management Plan, D31(a) — Construction Compound and Ancillary Facilities Management Plan, D31(b) — Construction Noise and Vibration Management Plan, D31(c) — Construction Traffic and Access Management Plan, D31(d) — Construction Soil and Water Management Plan, D31(e) — Construction Heritage Management Plan, D31(f) — Construction Flora and Fauna Management Plan, D31(g) — Construction Air Quality Management Plan)

1. BACKGROUND

Roads and Maritime Services (RMS) proposes to upgrade the King Georges Road Interchange within and adjacent to the M5 Motorway. The project is a component of the WestConnex scheme involving a 33km motorway linking Sydney's west and south-west with Sydney Airport and the Port Botany precinct. The project location is shown in **Figure 1.**

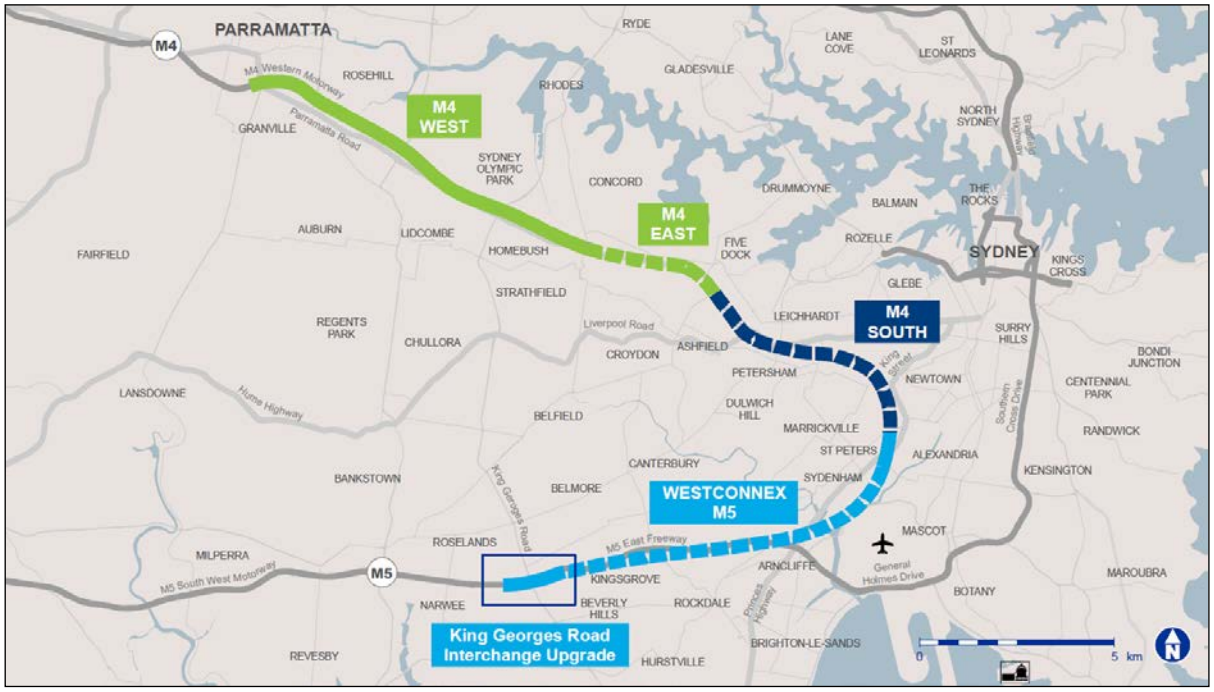

Figure 1: Proposed location and broader WestConnex Motorway proposal (*RMS 2014)*

The existing M5 Motorway operates as a 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. It was constructed incrementally between 1992 and 2001 and is the primary road corridor serving the south western and southern Sydney.

The current project is relevant to the section of the M5 Motorway specifically within the vicinity of the King Georges Road Interchange. This section generally has two lanes in each direction, with a few short sections of three lanes. In the eastbound direction, the speed limit is 90 kilometres per hour from King Georges Road to Kingsgrove Road, and then 80 kilometres per hour to the M1. The speed limit in the westbound direction is 80 kilometres per hour from the M1 to Kingsgrove Road, and then 100 kilometres per hour to King Georges Road.

King Georges Road is an arterial road running south-north from the Princes Highway in Blakehurst to Punchbowl Road in Wiley Park. It crosses a number of major routes through Sydney such as the M5 Motorway. King Georges Road provides three lanes in each direction in the study area, and is divided by a median. Both directions are 'clearways' in the morning and evening peaks, with parking outside peak times. The speed limit is 60 kilometres per hour, with frequent school zones and a reduced speed to 40 kilometres per hour during peak school periods.

1.1 Land Use

The study area consists of a residential landscape, which is bisected by the M5 Motorway. The study area adjoins residential areas that consist primarily of freestanding dwellings. There are also some pockets of medium-density flats close to King Georges Road (refer to **Figure 2**).

Planted vegetation dominates the motorway verges and consists of a diversity of plant species, both exotic and non-indigenous, as well as species representative of the original local vegetation, which may have been sourced from local seed. Small and isolated patches of remnant vegetation are also present. However based on a high level of disturbance, the species composition and vegetation structure of remnant vegetation in the study area has been substantially altered and their current condition is highly degraded.

2. PROPOSED PROJECT

2.1. Project Description

The King Georges Road interchange is a key link between the M5 Motorway and King Georges Road. The M5 Motorway corridor is the main passenger, commercial and freight thoroughfare between Sydney Airport, Port Botany, and suburban south-western Sydney with links to the existing orbital road network and interstate routes.

The WestConnex M5 King Georges Road proposal represents a $104 million investment in road infrastructure that is expected to create up to 100 jobs. The proposal will tie into the completed M5 Motorway widening project and it is expected that it will integrate with the future WestConnex M5 east configuration. The key components of the proposal are listed in **Table 1** and a summary of proposed lane configurations is provided in **Table 2**. **Figure 2** shows the location of the proposed works.

Table 1: Key Components of the Project

Aspect	***Description***
Project Summary	• Upgrading part of the M5 dual carriageways to retain 2 lanes in each direction and accommodate the possible future construction of WestConnex New M5; • Improvements to on-ramps and off-ramps at the interchange with King Georges Road; • Modifications to the surrounding roads and associated infrastructure including cycleways, noise walls and drainage facilities; • Tying into the recently completed M5 West Widening project; and • Temporary ancillary construction facilities and temporary works to facilitate the construction of the project.
Ramps	• Adjust the eastbound off-ramp and westbound on-ramp to the west of King Georges Road to provide for the possible construction of the WestConnex New M5 project and to tie into the completed M5 Motorway widening project; and • To extend the eastbound on-ramp to the east of King Georges Road by 160m to and a new bridge span to be built to the north of the Cooloongatta Road overbridge. Similarly, the westbound off-ramp is to begin 190m further east and a new bridge span is to be built to the south of the Cooloongatta Road overbridge. Both ramps would be extended to increase vehicle capacity.
Infrastructure	• Upgrading of the existing operational management control system including installation of signage gantries; • Provision of noise barriers either via adjustment of existing noise walls or complete reconstruction; and • Adjustments and additions to motorway cross drainage and water quality control measures.
Cyclists	• Diversion of cyclists from the M5 corridor between King Georges Road and Bexley Road onto the shared paths on either side of the motorway.

Table 2: Summary of Proposed Lane Configurations

Location	Current Lane Configuration	Proposed Lane Configuration
Motorway west of King Georges Road	Recently widened to three lanes in each direction	Three lanes plus shoulders in each direction
Motorway below King Georges Road	Two lanes plus shoulders in each direction	Two lanes plus shoulders in each direction
Motorway east of King Georges Road	Two lanes plus shoulders in each direction	Two lanes plus shoulders in each direction
Eastbound off-ramp	One lane diverging to four lanes at King Georges Road Nearside eastbound lane is trapped to form the ramp lane under the M5 West Widening project	One lane diverging to four lanes at King Georges Road New auxiliary lane at start of ramp, west of Penshurst Road
Eastbound on-ramp	Two lanes at King Georges Road merging back to one lane and then merging into through lanes	Two lanes at King Georges Road merging back to one lane and then merging into through lanes
Westbound off-ramp	One lane diverging to four lanes at King Georges Road Auxiliary lane diverges from motorway east of Coolangatta Road	One lane diverging to four lanes at King Georges Road Auxiliary lane diverges from motorway east of Coolangatta Road
Westbound on-ramp	Two lanes at King Georges Road merging back to one lane Ramp lane would form the added (third) westbound lane under the M5 West Widening project	Two lanes at King Georges Road merging back to one lane Ramp lane would form the added (third) westbound lane

Ancillary Facilities

Six potential ancillary facility sites, located in close proximity to the corridor have been identified, with exact numbers required to be confirmed by the successful construction contractor. The Department notes that all of the identified potential ancillary facility sites did not satisfy the Department's standard location criteria for ancillary facilities as all sites are located within 200 metres of residential buildings. The proposed ancillary sites also require the need for heavy vehicles to traverse through during construction, including the requirement for additional vegetation clearing to facilitate construction.

The Department accepts that available sites to accommodate ancillary facilities are limited due to the established urban environment and therefore it may not be reasonable to require full compliance with the standard criteria. The Department also notes that the precise activities conducted in ancillary facilities are dependent on the successful construction contractor's work methods and programs, which are not usually developed until a contractor has been selected following project approval.

The Department has recommended that any ancillary facilities established for the project must be managed in accordance with Construction Compound and Ancillary Facilities Management Plan. This plan would specify appropriate mitigation measures to be implemented where the standard criteria cannot met. This is consistent with the approach taken for other linear infrastructure projects, such as WestConnex M4 Widening.

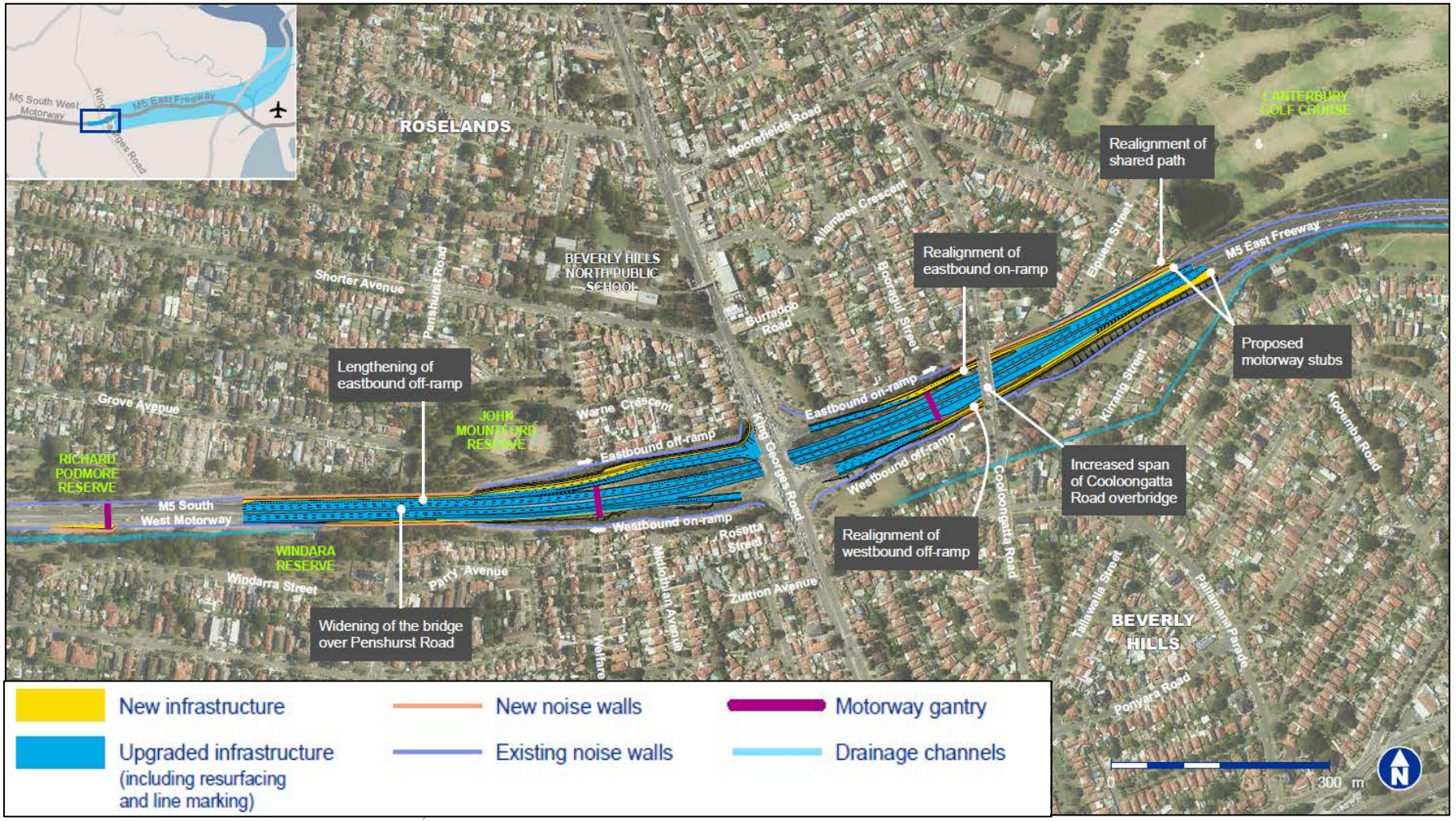

Figure 2: Location of works - proposed King Georges Road Interchange Upgrade (*RMS 2014)*

2.2. Supplementary information provided by the Proponent

Following completion of the public exhibition period, the Proponent has identified a number of design refinements for the Project. These include:

- retaining walls to be located 500mm from carriageways on both sides of motorway between Penshurst Road and Cooloongatta Road to provide additional space for street lightings;
- provision of street lighting on both sides of the M5, west of Penshurst Road to cover full extent of west facing ramps;
- size of cast-in-place piles at bridge over Penshurst Road to be revised upon detailed loading analysis;
- increase shoulder width from 2.5m to 2.8m adjacent to Penshurst Road bridge to accommodate structural width required for the widening of bridge over Penshurst Road;
- additional breakdown bay provided and retaining wall to be extended at westbound off ramp near Cooloongatta Road to prevent vehicles exiting and entering the main carriageway; and
- westbound ramp separated from the carriageway by a painted median to limit the nearside shoulder width to 3m to avoid the use of temporary concrete barrier in the 100 km/h zone.

The design refinements do not greatly differ from the original proposal and therefore are considered consistent with the preliminary assessment undertaken of the project.

2.3. Project Need and Justification

M5 King Georges Road Interchange Upgrade

The M5 King Georges Road Interchange Upgrade improves the operation of the current interchange and improves congestion and the performance on key arterials routes. The Department is satisfied that the M5 King Georges Road Interchange Upgrade will improve the performance of the M5 Motorway, M5 on-ramps and off-ramps, and King Georges Road. While the augmentation of an existing interchange is relatively modest, it results in an incremental improvement in the intersection and is also a key piece of enabling works for the greater WestConnex scheme.

WestConnex

WestConnex will be integral to Sydney's road network and will extend from Parramatta to Beverly Hills via the inner west and inner south of Sydney. WestConnex provides improved connectivity between industrial, commercial and residential land uses in Sydney's west and east, particularly through providing connects between Sydney, the Sydney Airport and Port Botany precinct, the Parramatta CBD, and the Sydney Olympic Park/Rhodes precinct.

The broader Sydney road network currently experiences congestion through much of the day. The *Long Term Transport Management* Plan anticipates that congestion will increase as road demand increases and augmentations are not made to the arterial road network. The Plan notes that congestion currently costs the NSW economy approximately $5.1 billion per year. This is forecast to increase to approximately $8.8 billion per year if no action is taken.

Journeys to work in Sydney are primarily conducted by private vehicle. Journey to work data compiled by the Bureau of Transport Statistics demonstrates that 72 per cent of journeys to work in the greater metropolitan area are by private vehicle, either as a driver or a passenger. Approximately 66 per cent of jobs in Sydney are outside major centres to which often less efficient public transport options are available. The Department accepts that the many journeys to work are to and from dispersed locations that are best served by road transport.

The Plan also highlights the growth of weekend road demand over the past decade. Many weekend trips are for social or recreational purposes that typically involve a dispersed range of source and destination points. These travel patterns are considered to be best served by road.

Heavy and light commercial vehicles play an important role in the movement of freight across Sydney. The M5, in addition to the M4 and M7 corridors, serves around 60 per cent of import containers from Port Botany. Modelling figures by the Bureau of Freight Statistics estimates that the average number of weekday freight trips in the Sydney Metropolitan Area would increase by almost 40 per cent between 2011 and 2031. As part of WestConnex, the M5 King Georges Road Interchange Upgrade project would support the freight transport task by improving access to, and reliability of, the motorway network.

The WestConnex proposal is expected to deliver broader economic benefits to New South Wales. It is expected to cut road travel times between Parramatta and Sydney Airport by up to 40 minutes and eliminate 52 sets of traffic lights along its alignment. The *WestConnex Business Case Executive Summary* (Sydney Motorways Project Office, 2013), attributes WestConnex as having expected significant reduction in traffic congestion on many parts of the Sydney road network whilst facilitating improvements across the network and generating more than $20 billion worth of benefits to the Australian economy, while also creating 10,000 jobs during the construction phase.

The Department recognises the economic cost of congestion and the demand for a diverse range of trips that are best served by road transport. The Department accepts the importance of WestConnex in reducing congestion and the need to provide more efficient connections between these varied destinations.

The Department considers that the M5 King Georges Road Interchange Upgrade project is supported by a strong strategic planning framework and is consistent with the Government's key priorities and high level planning framework including:

NSW 2021*: *A plan to make NSW number one (2011) - WestConnex will deliver key road infrastructure identified by the NSW Government which will improve interchange performance at M5 and King Georges Road.

State Infrastructure Strategy Update (2014) – The strategy notes the progress in planning for early WestConnex stages since the previous version of the State Infrastructure Strategy in 2012 and reiterates the importance of WestConnex to improving general and freight transport through its connection to Port Botany and Sydney Airport.

NSW Long Term Transport Master Plan (2012) – WestConnex is identified under the Plan as a critical link in Sydney's motorway network, resulting in increased capacity to accommodate commercial vehicles and freight demand, as indicated in **Figure 3**.

A Plan for Growing Sydney (the Sydney Metropolitan Strategy) (2014) - WestConnex is consistent with the identified goals to achieve a competitive economy with world-class services and transport, with improving connections to Sydney Airport and between agriculture industries in regional NSW and Sydney's ports, making goods export more cost effective.

A Plan for Growing Sydney (2014) – WestConnex is consistent with key directions including delivering infrastructure, and expanding the reach of the Global Economic Corridor.

National Infrastructure Plan (2013) – Action 6 of the National Infrastructure Plan is to 'create a complete national freight network'. WestConnex will improve Sydney Airport and Port Botany's connection to the Sydney motorway network.

National Land Freight Strategy Discussion Paper (2011) – The project is consistent with the identified goal to complete the urban motorway networks, including the M5, to national freight specifications.

Figure 3: Potential Connections to bridge gaps in the Sydney Motorway Network by 2031 ***(Source: Long Term Transport Master Plan, Transport for NSW 2012)***

2.5 Project Development and Alternatives

The Environmental Impact Statement considers several project alternatives. These include do nothing/ do minimum, delivery of the project as part of WestConnex M5, public transport, rail freight, and demand management. The assessment of alternatives focuses on suggestions by the community that the NSW Government invest in public transport and other alternative projects.

Public Transport

Amongst the most common issue raised in public submissions was the concern that the NSW Government should provide public transport infrastructure instead of upgrading an interchange with additional lane and ramp capacity to cater for or encourage more vehicles.

The Department notes that the application does not represent the totality of the NSW Government's transport infrastructure planning or expenditure. Indeed, the NSW Government is currently investing in public transport projects, including the North West Rail Link and the CBD and Eastern Suburbs Light Rail at the same time as improving Sydney's road network. The Department does not consider that the construction of a motorway is mutually exclusive with the provision of public transport infrastructure. Not one mode of

transport will serve all of Sydney's or NSW's transport needs and the Department considers that there is a place for both road and public transport.

The Department considers the WestConnex network and roads more generally, play a necessary role in the transportation of freight. While the NSW Government aims to increase rail's mode share of freight movements, it is anticipated that more than 70 per cent of Port Botany's projected trade would still be moved by road at point-to-point distribution. Concurrent intermodal terminal projects at Chullora, Villawood, Enfield and Moorebank allow the critical first stage link in enabling freight to be redistributed from rail to road for onward distribution within metropolitan Sydney utilising the urban road network.

Notwithstanding the critical role of intermodal rail freight at the initial stage of the freight journey, much of the distribution of freight in the Sydney area is at the end of the freight chain, which relies on dispersed point-to-point transport connections to end customer markets across Sydney. The M5 King Georges Road Interchange Upgrade and WestConnex are considered more appropriate in undertaking this task, whilst concurrently supporting the role of intermodal terminals in the freight transportation.

Shared Path/ Ramp Configuration Options

The M5 Motorway corridor currently provides for cyclists through a mix of shared paths and motorway shoulders. The existing motorway provides a two-lane dual carriageway with relatively wide shoulders which support emergency and broken-down vehicles and cyclists to travel along the motorway. Currently, cyclists are able to utilise the M5 for travel in both directions west of Bexley Road and can enter or exit this facility from the grade separated intersection at King Georges Road.

Shared paths are also available north and south of the motorway east of King Georges Road through to Bexley Road. West of King Georges Road a shared path is only found south of the motorway, with wide motorway shoulders designated as cycleway eastbound and westbound. Construction and operation of the project will result in cyclists no longer being able to use the motorway shoulder east of King Georges Road.

Submissions from the public and Bike South West Inc. have raised concerns over the existing shared path and proposed changes to cycling facilities. The concerns raised include:

- the M5 shoulder will be permanently closed to cyclists; and
- there is no commitment to upgrading or improving the existing pathways.

A number of upgrade options to the shared path from Penshurst Road to Bexley Road and alternate shared path alignments and designs were considered. In its assessment of options, RMS concluded that the provision of shared path underpasses was not cost effective due the relatively low number of cyclists using the M5 motorway at this location. Further discussions are outlined in **Chapter 5.**

3. STATUTORY CONTEXT

3.1. State Significant Infrastructure

The proposal is State Significant Infrastructure under Part 5.1 of the *Environmental Planning and Assessment Act 1979*. Section 115U of the Act provides that *a state environmental planning policy may declare any development, or any class or description of development*, to be State significant infrastructure. Clause 14 of *State Environmental Planning Policy (State and Regional Development) 2011* provides that, pursuant to Section 115U of the Act, development is declared to be State significant infrastructure if:

(a) the development on the land concerned is, by the operation of a State environmental planning policy, permissible without development consent under Part 4 of the Act, and

(b) the development is specified in Schedule 3.

The proposal is for the purpose of a road carried out by a public authority that is permissible without consent under clause 94 of *State Environmental Planning Policy (Infrastructure) 2007.*
The proposal is also infrastructure that would, in the opinion of the Proponent, require an environmental impact statement under Part 5 of the Act and is State significant infrastructure.

3.2. Critical Infrastructure

On 2 December 2014, the Minister for Planning declared the proposal to be a critical infrastructure project under Section 115V of the *Environmental Planning and Assessment Act 1979*. The Minister is the approval authority for critical State Significant Infrastructure.

3.3. Permissibility

As discussed above in **Section 3.1**, the proposal is development without consent in accordance with Clause 94 of the *State Environmental Planning Policy (Infrastructure) 2007.*

3.4. Environmental Planning Instruments

In accordance with Section 115ZF(2) of the Act, the only environmental planning instruments that apply to the proposal are *State Environmental Planning Policy (Infrastructure) 2007* (insofar as it relates to the declaration of development that does not require consent) and *State Environmental Planning Policy (State and Regional Development) 2011* (as it pertains to the declaration of infrastructure as State Significant Infrastructure and as Critical State Significant Infrastructure). There are no other environmental planning instruments that substantially govern the carrying out of the project.

3.5. Objects of the Act

Decisions made under the Act must have regard to the objects of the Act, as set out in Section 5 of the Act. The Department has given due consideration to the objects of the Act including:

- how the proposal would impact on the management, development and conservation of the area, with reference to the management of traffic and transport, noise and vibration, biodiversity and urban design, visual amenity and landscaping (refer to **Section 5**);
- the strategic justification of the proposal in terms of the orderly and economic use and development of land (refer to **Section 2.3**), and how the proposal would affect traffic and access throughout the region and beyond (refer to **Section 5.1**);
- protection of the environment by assessing the effectiveness of proposed management and mitigation measures. In particular, the Department has considered the impact of the proposal on biodiversity and how the provision of offsets for affected threatened species and communities would contribute to the protection of the environment (refer to **Section 5.3**);
- the principles of ecologically sustainable development (refer to **Section 3.6**); and
- public involvement and participation in the assessment of the proposal by placing the proposal documents on exhibition at community locations in the local area (Council offices and libraries) for 31 days and on the Department's website. The Response to Submissions Report was also made publicly available on the Department's website (refer to **Section 4**).

3.6. Ecologically Sustainable Development

The Act adopts the definition of Ecologically Sustainable Development (ESD) found in the *Protection of the Environment Administration Act 1991.* Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

(a) the precautionary principle;
(b) inter-generational equity;
(c) conservation of biological diversity and ecological integrity; and
(d) improved valuation, pricing and incentive mechanisms.

The principles of ESD have been addressed in the Environmental Impact Statement. The Environmental Impact Statement includes detailed discussion on the sustainability of the project, as well as detailed studies and/or consideration in the areas of construction and operational traffic and transport management, noise and vibration, heritage, biodiversity, water quality, air quality, socio-economics, climate change and cumulative impacts. The Proponent has set out a number of objectives that would be met throughout the project. These include:

- facilitate the efficient 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 the M5 Motorway; and
- minimise environmental and social impacts.

The Department considers that sustainability targets and measures committed within the Environmental Impact Statement are acceptable and that the proposal is consistent with the principles of ESD.

4. CONSULTATION AND SUBMISSIONS

4.1. Exhibition

Under Section 115Z(3) of the Act, the Department is required to make the Environmental Impact Statement publicly available for at least 30 days. The Department exhibited the proposal from Wednesday 22 October 2014 to Friday 21 November 2014 (a total of 31 days) on the Department's website, and at the following exhibition locations:

- Department of Planning and Environment, Information Centre, Sydney;
- Nature Conservation Council, Newtown;
- Roads and Maritime Services (Head Office), North Sydney;
- City of Canterbury Council, Administrative Centre, Campsie;
- Campsie Library, Campsie;
- Hurstville City Council, Civic Centre, Hurstville;
- Hurstville City Library, Hurstville; and
- Penshurst Branch Library, Penshurst.

The Department also advertised the public exhibition in the Sydney Morning Herald, the Daily Telegraph and the Bankstown-Canterbury Torch on Wednesday 22 October 2014 and the St George Leader on Thursday 23 October 2014, and notified State and relevant local government authorities directly in writing. The Department received 39 submissions during the exhibition period including 7 submissions from public authorities. A copy of all submissions is contained in **Appendix C** and summarised in **Sections 4.2 and 4.4**

4.2. State and Local Government Authority Submissions

No public authority objected to the proposal; however, each raised issues for consideration. The issues raised in public authority submissions in order of frequency are summarised in **Table 3**. Details of the issues raised in submissions are provided below.

Office of Environment and Heritage (OEH) provided a recommended condition of approval regarding an offset strategy for impacts to *Acacia pubescence* (Downy Wattle).

Environment Protection Authority (EPA) recommended assessment of diesel heavy vehicles and equipment emissions impacts and a condition to minimise dust during construction.

NSW Office of Water (NOW) recommended controls for preventing sediment runoff into drainage lines and rehabilitation of disturbed vegetation.

Sydney Water reserved the right to assess impacts on their assets within and adjacent to the project and advised that an environmental approval may be required.

NSW Health noted that public health issues had been identified and addressed.

Canterbury City Council requested the submission of a Traffic Management and Traffic Control Plan and identified a number of local roads that should be classified as significant local roads. The Council did not support construction staff parking or heavy vehicle movements on local roads and suggested consultation with local bus companies regarding to road closures on Penshurst Road.

Hazards associated with public accessibility to ponding areas were raised and Council recommended the Grey Headed Flying Fox camps be considered in impact assessments. Council also requested confirmation that the existing stormwater infrastructure has the capacity to receive expected flows from upstream catchments which may be impacted by climate change events.

Hurstville City Council requested that residents be informed throughout the projects duration regarding impacts from noise and loss of amenities. Concerns regarding induced traffic on the local road network were also increased.

Table 3: Summary of the representations from Commonwealth, State and Local Government agencies

Issue raised/Agency	EPA	NOW	OEH	NSW Health	Sydney Water	Canter-bury City Council	Hurstville City Council	Total
Ongoing liaison with agencies, councils and residents throughout construction		✓			✓		✓	3
Traffic Management Plan and Traffic Control Plan submissions and early notification of road closures						✓	✓	2
Noise mitigation to multi-unit buildings	✓							1
Compliance with standards and strategies to reduce off road diesel emissions from plant and equipment	✓							1
Soil and Water Management Plan preparation and implementation to address sediment runoff		✓						1
Rehabilitation of impacted vegetation along drainage lines resulting from construction		✓						1
Mitigation measures for drainage lines to be incorporated into proposal		✓						1
Downy Wattle plants offset package requirements and conditions			✓					1
Rights to assess final design in relation to infrastructure assets impacted					✓			1
Environmental Approval to cover any assets requiring relocation resulting from the project					✓			1
Consultation with local public transport service providers						✓		1
Classification of local roads						✓		1
Induced traffic during operation to impact on local road network							✓	1
Operational intersection performance data						✓		1
Construction workforce parking and local school impacts						✓		1
Haulage routes on local roads						✓		1
Further noise assessments						✓		1
Threatened fauna and bat populations including Grey Headed Flying Fox						✓		1
Hazardous public accessibility to proposed pond						✓		1
Design capacity of stormwater infrastructure during climate change flows						✓		1

4.3. Submissions from the General Public, Businesses and Interest Groups

The Department received a total of 32 submissions received during the public exhibition period. Of the submissions received, a total of 20 were individually prepared submissions and a total of 12 submissions were one of two types of form letters. No further public submissions were received after the close of exhibition. **Figure 4** shows a summary of the issues raised in the 32 public submissions received.

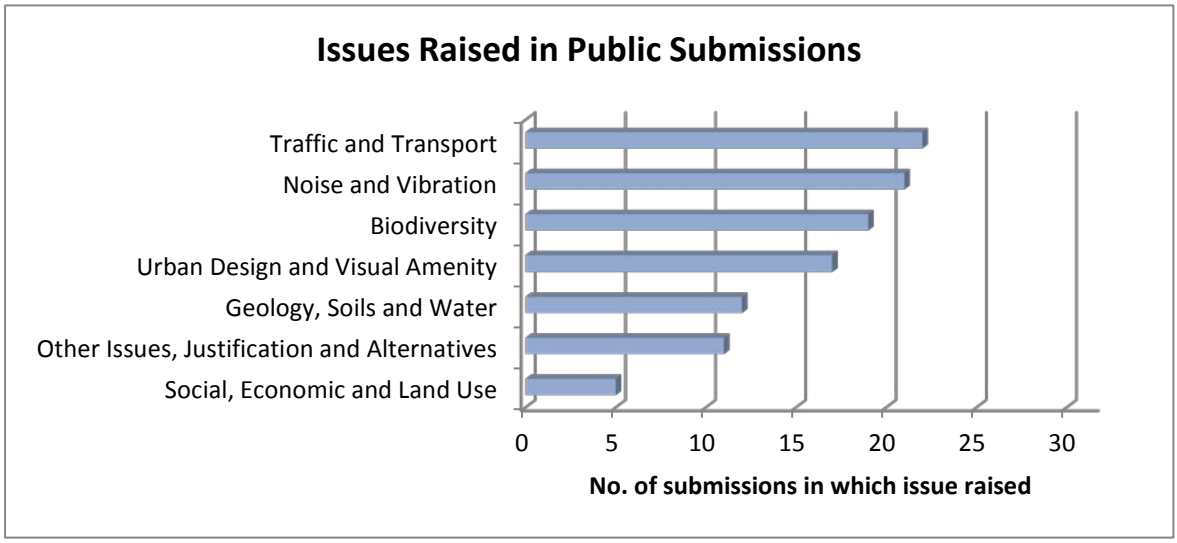

Figure 4: Issues raised from the general public, businesses and special interest groups

4.4. Key Issues Raised in Submissions

Key issues raised in the submissions are summarised below and further addressed in the **Section 5** and 6 of this report.

Traffic and Transport

- questions the adequacy and accuracy of traffic modelling and methodology, including a lack of consideration for alternatives not including the project;
- issues with the planned location, design and length of access ramps;
- concerns regarding the proposed number of lanes and lane widths;
- impacts these will have on safety, traffic flow and operational performance;
- proposed alternatives to intersection designs, signalisation patterns and performance;
- lack of upgrades to King Georges Road to accompany the interchange upgrade and the potential increase traffic impacts to King Georges Road as a result;
- lack of allocated bus lanes along the M5 moving through the interchange and the lack of public transport infrastructure;
- lack of proposed cyclist infrastructure and alternative routes, and the impact to existing cyclist connectivity as a result of the proposed design;
- safety and accessibility concerns with, and proposed alternatives to, planned pedestrian crossing locations;
- concerns regarding construction compound access and impacts caused by haulage routes along local roads;
- issues raised regarding the potential for induced traffic on local roads and 'rat runs' as a result of increasing capacity at the interchange;
- further attention required regarding disability and elderly pedestrian mobility and access, particularly ensuring smooth pathways and low gradients;
- concerns raised regarding the impacts resulting from commuter behaviour associated with tolls and toll avoidance; and
- questions raised regarding the lack adequacy of proposed mitigation measures for construction and operational traffic.

Noise and Vibration

- requests for standard construction hours to be applied;
- noise concerns with night construction and during operation;
- questions raised regarding noise modelling and methodology;
- concerns regarding the acceptability of existing background noise for the proposal;
- adequacy of proposed mitigation measures to address noise impacts associated with heavy vehicle pneumatic braking and exhaust noise along the motorway; and
- requests for increased heights of proposed noise walls and broadened compensatory and residential treatments.

Biodiversity

- concerns regarding vegetation disturbance including Downy Wattle and Cook River/Castlereagh Ironbark Forest communities;
- bat populations within region were identified and concerns raised regarding potential habitat fragmentation for these and other fauna populations;
- need for further consideration for mitigation and ecological value regarding cumulative biodiversity impacts resulting from other projects in the region;
- questions raised regarding the adequacy and accuracy of biodiversity surveys and methodology; and
- potential lack of adequacy of proposed mitigation measures.

Urban Design, Landscaping and Visual Amenity

- further information regarding structural treatments and interchange finishes; and
- need for further consideration of landscaping and screening.

Hydrology and Flooding

- requests for further consideration of potential increases to localised flood risks and the need for the stormwater capacity to be designed to account for heavy surface water runoff.

Social, Economic and Land Use

- requests for monetary compensation as a mitigation measure to property value impacts;
- lack of adequacy of social and economic impact assessment methodology, particularly regarding cumulative impacts relating to WestConnex; and
- questions regarding adequacy of proposed mitigation measures and the lack of such measures for operation of the proposal.

Other Issues, Justification and Alternatives

- general issues raised regarding air quality, climate change and greenhouse gases and the need for greater consideration of these issues within an assessment of the proposal;
- cumulative impacts;
- concerns regarding subsidence risks and potential resulting property damage concerns;
- general questions regarding the adequacy of Environmental Impact Statement;
- further need for cost/benefit or similar economic assessment and a release of a business case to justify the proposal;
- questions regarding the strategic need and justification of the proposal;
- dependency of proposal's effectiveness, approval and operation on all WestConnex components being approved and the prejudice imposed on the approval of these WestConnex components as a result;
- lack of consideration of public transport and other road alternatives; and
- further consideration needed of concurrent and future developments near the project and in Greater Sydney, particularly relating to the airport.

5. ASSESSMENT

5.1. Traffic and Transport

Issue
Traffic and transport impacts were key issues raised by the community and Councils during the exhibition of the proposal. In particular, concerns were raised regarding:

- the performance of the King Georges Road interchange upgrade;
- traffic impacts on King Georges Road and the surrounding local road network;
- impacts on cycle access/routes; and
- construction traffic impacts.

The Department considers that other issues raised in submissions have been adequately dealt with by the Proponent in its Response to Submissions and by the Department in its recommended conditions of approval.

To support the proposal, the Proponent prepared a Traffic and Transport Assessment to identify and assess the traffic and transport issues associated with the project. The traffic conditions were modelled for the M5 Motorway/King Georges Road Interchange under the following scenarios:

- 2014 — Existing traffic conditions;
- 2017 — Project opening for the King Georges Road Interchange Upgrade (the 'project scenario'), and a 'do minimal' scenario; and
- 2027 — Post opening of King Georges Road Interchange Upgrade and the complete WestConnex Scheme (the 'full WestConnex scenario'), and a 'do minimal' scenario.

Under the existing traffic conditions, traffic on the M5 Motorway in the vicinity of King Georges Road is highest in the morning (AM) and evening (PM) peaks, with significant traffic also recorded on the M5 eastbound (entry ramp) and M5 westbound (exit ramp) in both the AM and PM peaks. Modelling has indicated that overall demand of the road network within the project study area will continue to grow strongly.

The Department has reviewed the modelling used for the project and is satisfied that the modelling is appropriate to determine the operational traffic and transport impacts associated with the project.

Consideration
Performance of the King Georges Road Interchange Upgrade

To assess the performance of the King Georges Road Interchange Upgrade, the Department has analysed:

- Travel time savings;
- Midblock performance; and
- Queue lengths at the M5 Motorway exit ramps.

Travel Time Savings
The modelling indicates that travel time savings occur on King Georges Road and the M5 Motorway under both the project and full WestConnex scenarios, when measured against the 'do minimum' scenario. With the project in 2017, average travel times are maintained at a higher performance level with shorter travel times than under the 'do minimum' scenario.

The performance of the network in 2027, with the full WestConnex Scheme in operation, is predicted to significantly improve compared to the accompanying 'do minimal' scenario. Travel times on King Georges Road northbound will improve by approximately three minutes, in both the morning and afternoon peak. Further, southbound traffic will experience

travel time savings of approximately four minutes in the morning and evening peak period. These improvements occur despite the increased traffic demand that will arise under the project and full WestConnex scenarios. **Table 4** provides details of modelled travel times.

Table 4: Modelled existing, 2017 and 2027 travel times

		Travel time (minutes)			
Year	Scenario	King Georges Rd Northbound (between Stoney Creek Rd & Canterbury Rd)	King Georges Rd Southbound (between Canterbury Rd and Stoney Creek Rd)	M5 Motorway Eastbound (between West of Penshurst Rd and East of Coolangatta Rd)	M5 Motorway Westbound (between East of Coolangatta Rd and West of Penshurst Rd)
AM Peak					
2014	Base	9	9	4	1
2017	Do minimum	11	15	5	2
	Project	10	14	5	2
2027	Do minimum	13	19	6	2
	WestConnex	10	15	3	1
PM Peak					
2014	Base	8	9	1	1
2017	Do minimum	9	11	2	2
	Project	9	10	2	2
2027	Do minimum	13	16	2	3
	WestConnex	10	12	2	1

Midblock Performance

Midblock performance essentially measures how well traffic is able to move along a section of road and the amount of delay that is experienced. Midblock performance is measured by comparing the sign posted speed to the modelled speed.

The level of service (LoS) for midblock performance is measured as a percentage of posted speed results. For example, average speeds over 85% of the sign-posted speed rate as a LoS of “A”, which indicates that traffic is free flowing. By comparison, average speeds lower than 30% of the signposted speed rate as a LoS of “F”, which indicates that traffic movement is congested and is travelling well below the sign posted speed limit.

Modelling shows that the midblock performance will worsen if the project was not to proceed. In the morning peak, eastbound congestion on the M5 Motorway west of Penshurst Road worsens from LoS D (46%) to LoS F (14%) in 2027. Further, all eastbound M5 Motorway locations will operate at LoS F by 2027 under the do minimum scenario in the morning peak.

The project is anticipated to significantly improve midblock LoS on the M5 Motorway at opening (2017). The modelling predicts that westbound congestion on M5 East Motorway east of Cooloongatta Road would improve in the morning peak from LoS B (74%) to LoS A (100%), with similar results for the evening peak period. Similarly, operation of the project would improve midblock LoS on the M5 west of Penshurst Road from LoS D (46%) to LoS A (100%), during AM peak, and from LoS A (97%) to LoS A (98%) during PM peak times.

Under the 2027 full WestConnex scenario, midblock LoS is expected to significantly outperform the do minimal scenario on the M5 Motorway during both the morning and evening peaks. All M5 Motorway locations operate at LoS C or better in both the morning and evening peak periods under the full WestConnex scenario.

Midblock performance along King Georges Road is generally constant between the scenarios, with no significant impact expected. **Tables 5 and 6** provide details of midblock performance for the 2017 'do minimum' and project scenarios and the 2027 'do minimum' and full WestConnex scenarios.

Table 5: Midblock Performance - 2017 'do minimum' and project scenarios

		2017 'do minimum'				2017 'project'			
		AM		PM		AM		PM	
Location	Direction	% of free flow	LoS	% of free flow	LoS	% of free flow	LoS	% of free flow	LoS
M5 East Motorway (East of Coolangatta Road)	Eastbound	13%	F	64%	C	9%	F	61%	C
	Westbound	74%	B	70%	B	100%	A	95%	A
M5 South West Motorway (West of Penshurst Road)	Eastbound	46%	D	97%	A	100%	A	98%	A
	Westbound	97%	A	95%	A	100%	A	100%	A
M5 East Motorway (Eastbound On Ramp)	Eastbound	7%	F	64%	C	2%	F	60%	C
M5 East Motorway (Westbound Off Ramp)	Westbound	88%	A	79%	B	82%	B	65%	C
M5 South West Motorway (Eastbound Off Ramp)	Eastbound	100%	A	100%	A	100%	A	100%	A
M5 South West Motorway (Westbound On Ramp)	Westbound	70%	B	64%	C	70%	B	70%	B
King Georges Road (South of Moorefield Road)	Northbound	95%	A	75%	B	96%	A	79%	B
	Southbound	13%	F	51%	C	13%	F	49%	D
King Georges Road (North of Broad Arrow Road)	Northbound	85%	B	85%	A	87%	A	86%	A
	Southbound	76%	B	30%	F	81%	B	19%	F

Table 6: Midblock Performance 2027 'do minimum' and project scenarios

		2027 'do minimum'				2027 'full WestConnex'			
		AM		PM		AM		PM	
Location	Direction	% of free flow	LoS	% of free flow	LoS	% of free flow	LoS	% of free flow	LoS
M5 East Motorway (East of Coolangatta Road)	Eastbound	13%	F	68%	B	60%	C	59%	C
	Westbound	77%	B	51%	C	100%	A	100%	A
M5 South West Motorway (West of Penshurst Road)	Eastbound	14%	F	62%	C	100%	A	100%	A
	Westbound	96%	A	97%	A	100%	A	100%	A
M5 East Motorway (Eastbound On Ramp)	Eastbound	7%	F	67%	B	74%	B	75%	B
M5 East Motorway (Westbound Off Ramp)	Westbound	100%	A	31%	E	69%	B	100%	A
M5 South West Motorway (Eastbound Off Ramp)	Eastbound	100%	A	39%	E	100%	A	100%	A
M5 South West Motorway (Westbound On Ramp)	Westbound	69%	B	63%	C	69%	B	69%	B
King Georges Road (South of Moorefield Road)	Northbound	95%	A	89%	A	93%	A	53%	C
	Southbound	22%	F	44%	D	58%	C	62%	C
King Georges Road (North of Broad Arrow Road)	Northbound	87%	A	88%	A	82%	B	87%	A
	Southbound	37%	E	12%	F	46%	D	28%	F

Queue Lengths at M5 Motorway Exit Ramps

Existing congestion at the King Georges Road interchange is responsible for creating long queues of traffic, causing direct impacts on the performance of the interchange and surrounding roads. In particular, significant queuing on the M5 Motorway exit ramps, during morning and evening peak hours, results in traffic congestion, slow speeds and unreliable travel times. The project provides additional vehicle queuing capacity by extending all entry and exit ramps, as well as the M5 Motorway carriageway itself. Queue lengths at the M5 Motorway exit ramps for existing traffic (2014), and the 2017 and 2027 'do minimum' scenarios, are presented in **Table 7.**

Table 7: Queue Lengths at M5 Motorway exit ramps - Project and Full WestConnex

Scenario	AM queue (metres)			
	7-8am		8-9am	
	Eastbound exit ramp	Westbound exit ramp	Eastbound exit ramp	Eastbound exit ramp
2017 'do minimum'	371	243	382	321
2017 Project	358	229	323	284
2027 'do minimum'	610	440	424	450
2027 Full WestConnex	397	396	356	374
Scenario	PM queue (metres)			
	4-5pm		5-6pm	
	Eastbound exit ramp	Westbound exit ramp	Eastbound exit ramp	Westbound exit ramp
2017 'do minimum'	371	243	382	321
2017 Project	358	229	323	284
2027 'do minimum'	610	440	424	450
2027 Full WestConnex	397	396	356	374

Modelling of the queue lengths for the project and the full WestConnex scenarios shows that, under both scenarios, exit ramp queues are reduced compared to the corresponding 'do minimum' scenario. Modelling indicates that, as traffic volumes increase, the queue lengths at both exit ramps to the King Georges Road would increase without the project and full WestConnex. Both the project and WestConnex scenarios effectively reduce queue lengths compared to the corresponding 'do minimum', particularly in the evening peak.

These improvements to ramp configuration would reduce queuing of traffic entering the motorway and removes the impediment to through traffic on King Georges Road, improving its operational performance.

<u>Traffic Impacts on King Georges Road and the surrounding local road network</u>

The King Georges Road interchange currently experiences poor performance during peak hours. The east facing ramps are subjected to long queuing, which impacts the performance of both King Georges Road and the M5 East Motorway and leads to negative impacts on the performance of the M5 South West Motorway and the local road network.

Modelling shows that, without the project, network performance will continue to decrease, with average speeds in 2027 falling to approximately 10 km/h in both the morning and evening 'do minimum' scenarios. Without the project and completion of the full WestConnex Scheme, modelling indicates that traffic volumes will increase due to the upsurge in queue lengths at both exit ramps to King Georges Road.

Modelling of intersection performance of the surrounding intersections predominantly results in LoSs of B and F, while midblock performance on King Georges Road north of the M5 Motorway reduces to LoS C for northbound vehicles in the weekday morning peak and for the weekday morning, interpeak and evening peak for southbound vehicles. The remaining

periods result in LoS of B. **Tables 8** and **9** provide details of modelled existing and future intersection performance.

Operation of the project is expected to improve on or at least maintain intersection performance at the King Georges Road interchange and on adjacent intersections. Under project conditions, improvements are observed at the interchange with average delays decreasing in both the morning and evening peaks. In the morning peak, all intersections performed better with the project scenarios in 2017 and 2027 than without. In the evening peak, all intersections maintained the same LoS or performed better with the project scenarios in 2017 than without.

It is noted that King Georges Road/ Canterbury Road maintains a LoS of F in 2017 and 2027. The intersection is predicted to maintain a LoS of F (>140 seconds waiting time) in 2027 without and with the project. While LoS of F is not desirable, this indicates that the intersection is, or will be, operating at greater than capacity. The outcome of the projected LoS in 2017, where the LoS improved in the 2017 evening peak against the do minimum scenario, indicates that the project slows the rate of service decline of the intersection. It is therefore considered that the King Georges Road/ Canterbury Road interchange will benefit from the project.

The Department also acknowledges that, due to the constraints of the existing urban environment, significant improvements to the performance of King Georges Road may not be able to be achieved without a major upgrade particularly in relation to the King Georges Road/Canterbury Road intersection, which would likely require a grade-separated intersection to gain a substantial service improvement. In recognising the constraints of the existing and future road network, and given that the Proponent is also the roads authority for much of the affected road network, the Department does not believe further action is required under this determination.

However, the operational performance of intersections along King Georges Road is generally improved with the project and full WestConnex in 2027 compared to the 'do minimum' scenario. These improvements are projected to occur despite the increased traffic demand that would arise under the full WestConnex scenario.

The Department notes that intersection performance is a network-wide issue, with the performance of some intersections likely to deteriorate over time due to traffic growth irrespective of the project. These performance deteriorations reflect increased congestion due to an increased number of vehicles on Sydney's road, regardless of the impact of the WestConnex project, and are therefore not solely project related.

With the project and full WestConnex, modelling indicates that vehicle volumes will increase due to the improved capacity for more vehicles to access the network without impacting on network performance. The proposal will also see a reduction in the exit ramp queue. Both the project and full WestConnex scenarios are particularly effective at reducing queue lengths in the evening (PM) peak.

Modelling anticipates that in 2027, peak travel times on King Georges Road northbound will decrease by approximately three minutes in both the morning and evening peak periods whilst southbound traffic would experience travel time savings of approximately four minutes in the morning and five minutes in the evening peak period.

Notwithstanding, with both the project and full WestConnex in operation, the proposal will result in overall improvements to the road network with overall travel time reduced due to the greater road capacity for motorists.

Table 8 - Intersection Performance Morning (AM) Peak

	2014		2017				2027			
			Without Project		With Project		Without Project		With Project	
Intersection	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay
King Georges Road/ Canterbury Road	F	89	F	110	F	117	F	>140	F	129
King Georges Road/ Roselands Drive	B	28	B	25	D	44	B	19	B	20
King Georges Road/ Moorefields Road	D	49	D	48	E	65	B	27	B	24
King Georges Road/ M5 Motorway	E	59	F	75	F	71	F	83	F	74
King Georges Road/ Shorter Avenue	D	46	F	75	E	67	F	79	C	43
King Georges Road/ Broad Arrow Road	C	38	C	39	C	37	F	95	F	88
King Georges Road/ Morgan Street	B	23	B	20	B	16	B	18	B	20
King Georges Road/ Stoney Creek Road	F	82	F	94	F	87	F	129	F	113

Table 9 - Intersection Performance Evening (PM) Peak

	2014		2017				2027			
			Without Project		With Project		Without Project		With Project	
Intersection	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay
King Georges Road/ Canterbury Road	F	72	F	>140	F	131	F	>140	F	>140
King Georges Road/ Roselands Drive	C	30	C	31	C	32	B	52	C	34
King Georges Road/ Moorefields Road	B	17	B	17	B	18	B	27	B	19
King Georges Road/ M5 Motorway	E	57	F	73	F	71	F	82	E	65
King Georges Road/ Shorter Avenue	C	32	D	44	C	37	D	48	B	26
King Georges Road/ Broad Arrow Road	F	88	F	81	F	73	F	95	F	88
King Georges Road/ Morgan Street	D	45	D	45	C	36	D	48	D	51
King Georges Road/ Stoney Creek Road	F	76	F	75	F	79	F	129	F	105

Impacts on Cycle Access/Routes

Submissions raised concerns regarding the inconvenience caused by the Project through the closure of the M5 shoulders east of King Georges Road, and suggested alternative arrangements including footbridges to address this concern.

The existing M5 Motorway provides a two-lane dual carriageway with wide shoulders that support emergency and broken-down vehicles and allow cyclists to travel along the motorway. Cyclists use the motorway shoulders from just west of Bexley Road and can enter or exit the motorway shoulders from the grade-separated intersection at King Georges Road.

From the start of construction, the motorway shoulders would be closed to cyclists from Belmore Road to Bexley Road to allow road widening, bridge construction activities (at Penshurst Road and Cooloongatta Road) and repaving of the carriageway. From project opening, the motorway shoulders would remain closed east of King Georges Road due to revised lane configuration underneath King Georges Road, reconfigured lane mergers from the on and off-ramps at King Georges Road and in preparation for the proposed construction of WestConnex New M5. With the closure of the motorway shoulders, cyclists would be diverted onto the shared paths on either side of the motorway.

In order to establish the number of cycle users, a cycling count survey was undertaken for one full week between the dates of 12th and 18th May 2014, at 16 locations in the vicinity of the M5 Motorway/King Georges Road intersection. The survey identified that on an average weekday, no more than 10 cyclists use the M5 Motorway, and that the shared paths parallel to the motorway received substantially higher use. The Department accepts that there is minimal demand to warrant the construction of a pedestrian bridge or tunnels and that there are spatial limitations at present for this to occur. However, in acknowledging a number of submissions on this matter, and the potential for increased cycle demand, the Department has recommended that the detailed design of the proposal does not preclude future upgrade of cycle infrastructure proposed separately to this proposal.

Further, in response to submissions and Council's position, the Proponent has reviewed its options for crossing King Georges Road. For east-bound cyclists exiting the M5 Motorway at King Georges Road, traffic signals at the eastbound off ramp and King Georges Road intersection would be re-phased to provide eastbound cyclists with a simpler, safer and more time-efficient route for crossing King Georges Road and accessing the shared path on the eastern side of the interchange. This would include:

- pedestrian traffic signals, on the eastbound exit ramp controlling the left turning traffic, will default to green;
- access across King Georges Road via a new pedestrian crossing between the traffic islands on the east bound exit ramp and the east bound entry ramp; and
- access to the existing shared path via the the pedestrian crossing on the east bound entry ramp.

The above arrangement effectively reduces the current movements to two movements in most cases. Details are provided in **Figure 5.**

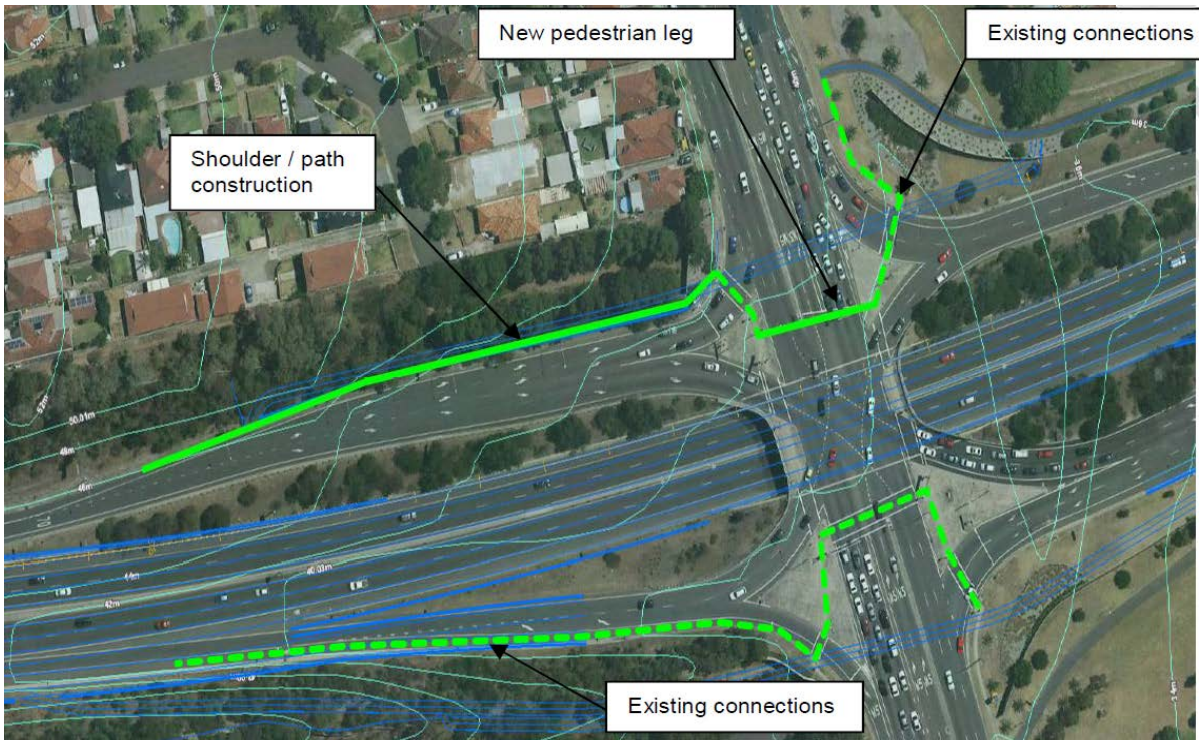

Figure 5: Proposed Crossing Arrangement for East-Bound Motorway Cyclists

For west-bound cyclists, the existing shared path is through a break in the noise wall. An additional noise wall is situated behind the first noise wall to maintain the integrity of the mitigation effect of the wall. The Proponent has committed to forming an alternative access through the noise wall that better aligns with the crossing location, pending further investigation. To address the above design changes, the Department has recommended that a Cycling and Pedestrian Access Strategy be prepared outlining details of works to be carried out on the east-bound and west-bound cyclist movements, in consultation with Councils, and community cycling and pedestrian groups. It is also recommended that these works be completed prior to the closure of the shoulders.

Further, submissions and site inspections made by the Department identified deficiencies in the shared path and the Department notes that the Proponent has committed to carrying out improvements in this regard. The Department has reinforced this commitment in its recommended conditions to ensure that the shared path between Belmore Road and Bexley Road is appropriately upgraded.

Construction Traffic Impacts

The project is to be constructed during daytime periods, i.e. with the existing M5 and King Georges Road interchange in operation. Shoulder widths will be reduced and daytime speed limits reduced to 80 kilometres per hour to accommodate the reduced lane widths on the M5 Motorway between Penshurst Road and Elouera Street, Beverly Hills. Lane width reduction and other traffic management during construction would be conducted in accordance with relevant standards.

Speed reductions are expected to add less than one minute to travel times on the M5 Motorway between Penshurst Road and Elouera Street in free-flow conditions. Travel times in peak periods are not expected to change as the 80 kilometres per hour speed limit will be greater than existing average travel speeds. Some night works will require full or partial lane closures of the M5.

The proximity of King Georges Road (an arterial road) to the potential work sites and the grid street layout will result in construction vehicles using King Georges Road for the majority of

the journeys to the various sites. Given the relatively low number of construction vehicles, the number of work compounds and the short distances travelled on low volume local roads, the Department's assessment concludes that the construction traffic impact is unlikely to be significant. However, to ensure that any residual impacts are appropriately managed, the Department has recommended that detailed construction traffic routes be provided in the recommended Construction Traffic Management Plan and be subject to performance criteria including limits to pollution emissions and frequency of construction traffic movements.

Conclusion and Key Recommendations

The Department accepts that the proposal will increase capacity at the King Georges Road and M5 Motorway intersection and will improve travel times through the corridor. The proposal will provide most motorists travelling through the corridor (between west of Penshurst Road and east of Cooloongatta Road) and King Georges Road (between Canterbury Road and Stoney Creek Road) with a faster journey than they would experience without the project, with flow on benefits expressed through reduced travel times and road safety improvements. The Department considers that this improvement to travel times is the key benefit of the proposal.

In relation to cyclists, the Department acknowledges that there will be an impact on a small number of cyclists, but accepts that, at the current time, the construction of significant infrastructure is not warranted. However, the Department considers that future upgrades to cyclist infrastructure should not be precluded in the project design. In this case, the alternate design proposed by the Proponent is satisfactory, subject to further details of works to be carried out on the east-bound and west-bound cyclist movements to be outlined in the Cycling and Pedestrian Access Strategy.

5.2. Noise and Vibration

Issue

The existing ambient noise environment is variable, with road traffic noise the primary contributor. Eight noise catchment areas (NCA) were defined for the noise assessment, as shown in **Figure 6**. Key elements of the proposal with potential noise and vibration impacts include construction compound sites and facilities, work within the corridor and operational traffic noise.

Construction related impacts have been assessed in accordance with the noise management levels identified in the Interim Construction Noise Guideline ICNG (DECC, 2009) and Assessing Vibration: A Technical Guideline (DECC, 2006) and German Standard DIN4150-3 Structure Vibration. Operational impacts have been assessed in accordance with the EPA's NSW Road Noise Policy (RNP, DECC 2011).

Submissions

A total of 65.6% of public and community group submissions raised concerns regarding noise impact, including concerns regarding construction hours and noise generation at night, the adequacy of the noise assessment methodology and modelling, and the adequacy of proposed mitigation measures such as the location and heights of proposed noise walls.

The EPA recommended a condition requiring architectural treatment of all affected floors of multi-unit buildings in cases where road traffic noise modelling identifies a need for architectural treatment of a particular residential building. Councils requested that noise impact assessment address specific residents' concerns and that the community be engaged on this matter.

Consideration

Construction

A worst-case assessment of construction work within the main corridor and on/off ramps has predicted minor daytime exceedances of noise management levels of less than 10dB at residential receivers in NCA 4, NCA 5, NCA 6 and NCA 8. The Department considers that the proposed adjustments to existing noise walls in this instance would be adequate to maintain a comfortable level of construction noise, minimising detrimental adverse noise impacts on sensitive receivers. More significant noise management level exceedances during day time hours are predicted within NCA 1, NCA 2, NCA 3 and NCA 7, partly due to elevated receiver positions in these locations and the proposed removal of noise wall sections. Out of hours work would also impact receivers within NCA 1, NCA 2 and NCA 7 in a worst-case scenario (i.e. during noise intensive work adjacent to these receivers) by greater than 20dB.

The Proponent has identified a suite of mitigation measures to address the construction noise issues in these locations. These mitigation measures include but are not limited to improvements to existing noise walls, upgrading of road pavement, timing of noise intensive construction activities with respite periods, procedures for notifying receivers, complaints management, and the provision of architectural treatments where required. It is predicted that these measures will reduce noise levels to acceptable levels and/or provide alternative solutions to address impacts at sensitive receivers. The measures are contemporary, and have been proven effective for similar construction activities. Furthermore, the recommended conditions require a review of their adequacy and potential refinement prior to construction commencing.

Work within construction site compounds located in Penshurst Road, King Georges Road (north), King Georges Road (south), Elouera Street, and Kirrang Street will impact upon residential receivers in NCA 2, NCA 5, NCA 6, and NCA 7 respectively. Noise management level exceedances of over 25dB are predicted during both standard daytime and out of hours work periods.

Construction of the Penshurst Road Bridge is predicted to result in noise management level exceedances of over 10dB in NCA 1 and NCA 2 while construction of the Cooloongatta Road Bridge is predicted to result in similar exceedances in NCA 5, NCA 6 and NCA 7 during standard daytime hours. Out of hours work is proposed for bridge construction resulting in a predicted worst-case scenario exceedance of 20dB at receivers immediately adjacent the works. Temporary removal of existing noise walls in close proximity to residential receivers in NCA 7 is predicted to result in noise management level exceedances up to 30dB during day time hours and 45dB during night-time work during use of a small rock breaker and dozer.

Road traffic noise during construction of the project would be comparable to the existing noise levels along the main corridor. Heavy vehicles accessing the site compounds via local roads would need to be managed by minimising the number of truck movements adjacent to sensitive receivers and favouring access via larger roads or industrial areas.

The Proponent has proposed mitigation measures including maximising offset distances between noisy machinery and nearby receivers, scheduling activities to provide respite periods and the introduction of temporary acoustic fencing are considered appropriate. It is also noted that to mitigate vibratory noise resulting from bridge works, the Proponent has committed to using less intrusive construction including bored piling methods to reduce noise impacts.

The Department notes that the expected noise levels are consistent with similar infrastructure projects located in an urban setting. Similarly, the proposed mitigation measures have been demonstrably effective on similar projects.

The Department has carefully considered the construction impacts and proposed mitigation and management measures to address these impacts, in particular the optimisation of noise walls and scheduling of noise-intensive work. The Department considers that adequate noise mitigation measures are available to manage the predicted noise impacts on sensitive receivers during construction of the project.

The Department has also considered the intermittent and temporary nature of the predicted construction noise impacts within each NCA and conditions have been recommended limiting the construction hours and stipulating requirements for out of hours' work where it is required. The Proponent would also be required to prepare a Construction Noise and Vibration Management Plan, which would stipulate these management measures.

Operation

The Department is satisfied with the assessment methodology used by the Proponent for operational noise. The Department also notes that the project area is currently characterised by significant road traffic noise along the main corridor.

During operation of the project, it is predicted that there will be a general reduction in operational noise impacts across the eight NCAs, including a reduction in the maximum noise level experienced by receivers adjacent to the M5 Motorway. This is primarily due to the existing and new noise walls and the proposed new low noise pavement. However, operational noise modelling indicates that six residential receivers would qualify for architectural treatments to address predicted noise exceedances during daytime and night time periods. No other sensitive receivers such as schools and child care centres would require architectural treatment. The Department recommends that a full review of noise mitigation measures be undertaken 12 months after commencement of operation to assess the effectiveness of mitigation measures and determine any adjustments that may be required.

Current RMS practice requires that architectural treatment be provided to ground and first floors of multi-storey dwellings affected by road noise. However, the EPA's submission recommended that architectural treatment should be applied to all affected floors of multi-storey buildings. While the Department notes that there are no multi floor dwellings in the immediate proximity of the project, no evidence has been provided suggesting that higher floors are subject to similar noise impacts to warrant imposing the condition at this stage.

The Department has recommended conditions that require a review (undertaken in consultation with the community) of noise mitigation measures within and monitoring of operational noise impacts consistent with government endorsed road noise guidelines. This will ensure that noise management measures, including noise wall locations and heights and property treatments will be optimised, where feasible and reasonable.

Figure 6: Noise Catchment Areas (*RMS 2014*)

Conclusion and Key Recommendations
The Department notes that construction noise and vibration impacts are consistent with other infrastructure projects of this scale and that these can be appropriately managed in consultation with the community through the implementation of the recommended CNVMP.

In relation to operational noise impacts, the Department notes the existing noise-affected environment and that the project in the longer term is predicted to improve this environment.

Notwithstanding, the Department has recommended conditions to ensure mitigation measures are appropriately implemented to address construction noise issues, particularly with the optimisation of noise walls and scheduling of noise-intensive work including limiting construction hours and stipulating requirements for out of hours work where required.

5.3. Biodiversity

Issue
The study area is located in the Sydney Basin bioregion within the Sydney Metro catchment management area of the Cumberland sub-region. Planted vegetation is the dominant vegetation in the area and consists of a diversity of plant species. Small and isolated patches of remnant vegetation occur; however, due to a high level of urban development disturbance, this vegetation is highly degraded.

The proposal is likely to result in the loss of 3.23 hectares of vegetation. This includes 0.01 hectares of remnant vegetation and 3.22 hectares of planted vegetation, including an artificial pond, mixed planting, planted monocultures and landscaped gardens. The planted vegetation includes a mixture of endemic and introduced species, including weed species.

The remnant community is the Cooks River/Castlereagh Ironbark Forest in the Sydney Basin. It is listed as an endangered ecological community under the *Threatened Species Conservation Act 1995*. The Cooks River/Castlereagh Ironbark Forest in the Sydney Basin is also the subject of a current assessment for inclusion as a critically endangered ecological community under the *Environment Protection and Biodiversity Act 1999 (EPBC)*. The community within the project area does not meet the threshold criteria for inclusion as part of the proposed *EPBC Act* listing.

The proposal is also expected to cause the loss of nine individuals of the Downy Wattle (*Acacia pubescens)* which is listed as a threatened species. Other individuals are located within the designated project area but are not expected to be directly impacted by construction activities. The Downy Wattle individuals are located along the M5 west of King Georges Road and are understood to have been planted as part of the landscaping works for the M5, although the Department notes that one submission suggests that these may have been translocated remnant individuals.

No threatened fauna species or evidence of roosts were found during surveys, but the flora and fauna assessment found that vegetation within the project area is potential foraging habitat for several threatened bat and bird species. The assessment found that there is a high likelihood that the Grey-headed Flying-fox (*Pteropus poliocephalus*) forages for food at the site. The Department notes that there is a known Grey-headed Flying-fox colony at Turrella, approximately six kilometres from the site. Further, assessments of threatened flora and fauna did not identify significant impact to both species.

Submissions
Public and community group submissions raised concern with the reduction of remnant bushland and removal of Downy Wattle and the justification of the removal of the threatened ecological community on the grounds of its size and fragmentation; suggested that the

Downy Wattles within the site are translocated remnant individuals; and stated the vegetation within the site is a food source for the Grey-Headed Flying Fox.

The Office of Environment and Heritage submission recommended that a condition of approval require the development and implementation of a Downy Wattle offset package. Canterbury City Council's submission noted the presence of the Grey-Headed Flying-Fox colony at Turrella and the likelihood that those bats forage within the M5 green corridor.

Consideration

The Department is satisfied with the Proponent's assessment and concurs that the proposal is unlikely to have a significant impact on any species, population, or ecological community under the *Threatened Species Conservation Act 1995*. The assessment is considered conservative and the Department notes that impacts can generally be avoided through appropriate protection of remnant vegetation using established construction management techniques, such as the implementation of exclusion zones.

The impact to 0.01 hectares (i.e. 100 square metres) of Cooks River/Castlereagh Ironbark Forest in the Sydney Basin EEC was assessed against the NSW Biodiversity Offsets Policy for Major Projects (OEH, 2014b) and the related Framework for Biodiversity Assessment. The Department notes that the Framework does not require an offset for a site with a site value score of less than 17. The affected patch of Cooks River/Castlereagh Ironbark Forest has a score of less than 17. Given the small area, poor condition and low site value score, the Department concludes that the loss of 0.01 hectares of this community will not have a significant impact on its ongoing viability and will not require offsetting.

The Department notes that the proposal will remove potential food habitat for the Grey-headed Flying-fox and other bat species. No known roosts or colonies occur within the project site. While the proposal will impact on this food habitat, the affected species are mobile and are able to access foraging habitat at dispersed locations. Given the broad foraging range of the Grey-headed Flying-fox, the loss of 3.23 hectares of low quality habitat is not expected to impact on the viability of the species.

Impacts to the Downy Wattle are not expected to be significant. The nine affected Downy Wattle individuals are not remnant trees in their original locations, and their removal is not expected to cause significant impacts on the species' distribution, range, or continued viability. The Office of Environment and Heritage submission suggests a condition of approval that requires an offset package for these individuals that outlines outcomes and objectives, a final suite of measures, management and monitoring requirements, and timing and responsibility. The Proponent's Submissions Report commits to a Downy Wattle Management Plan to address OEH's concerns. The Department has reinforced this commitment as a recommended condition.

The Proponent has nominated mitigation and management measures to address potential construction impacts. These include marking areas for clearing, pre-clearing fauna surveys, avoidance of sensitive environmental areas, management of unexpected flora and fauna finds, and procedures for managing weeds and fauna injury and mortality. These are all standard environmental management measures, and are required to be addressed in the recommended Construction Flora and Fauna Management Plan.

Conclusion and Key Recommendations

The impacts on vegetation and threatened species and ecological communities are minor. The Department considers that these impacts are acceptable given the broader benefits of the project and the proposed management, mitigation and management measures available. In addition vegetation loss will be addressed through landscaping measures, which are discussed later in this report.

5.4. Urban Design, Landscaping and Visual Amenity

Issue
The visual assessment considered the project from two perspectives, firstly, from within the motorway corridor, and secondly from outside the perimeter of the motorway corridor, where local residents and users of a number of public open areas and a shared cycle and pedestrian path, are the main visual receivers. The assessment has been separated into a Landscape Character assessment and a Visual Impact assessment and impacts have been separated into those associated with construction and those expected from operation.

Urban design objectives and direction for the project have been taken from the *WestConnex Motorway Urban Design Framework*. The framework sets out criteria for the project to ensure urban design and amenity within and along the road corridor are maintained and improved where possible. Consistency in design, along the WestConnex road corridor in its entirety, and sensitivity to the surrounding environment are important concepts enforced by various criteria.

Impacts to the Landscape Character within this study area are considered minor for both the residential landscape and motorway corridor. The works associated with the project are mostly upgrades, and changes will be limited to a small area of existing infrastructure. The reduction in vegetation at points along the road corridor to allow for widening has been considered in the proposed new landscaping and noise wall construction with acknowledgement from the Proponent that removal of established and relatively developed vegetation will need to be compensated for in the new design. These impacts will be primarily noticeable in the short-term, as revegetation matures.

As with the Landscape Character, the Visual Impacts from the project will generally be minor due to the majority of works occurring within the existing infrastructure corridor. Some short term impacts associated with construction compounds and immature vegetation from re-planting along the outside perimeter of the corridor may impact on residents at the immediate boundary of works and users of the shared path.

Submissions
Issues raised related to impacts on mature vegetation and plantings, the community value of these plantings, the need to reduce vegetation impacts and appropriate restoration of vegetation. Screening and treatment of noise walls and other infrastructure were also raised. Council's did not raise any specific urban design and landscape matters.

Consideration
Construction
In regards to the magnitude of change, construction compounds pose the greatest impacts on the environment outside of the motorway corridor. The locations of the construction compounds are within open spaces along the road corridor of varying aesthetic quality. These open spaces provide important recreational and visual quality to the area and users of the shared paths. They are also valuable to residents directly overlooking the compounds.

Kirrang Street (south) and Penshurst Road construction compounds are expected to have moderate to high visual impact on surrounding residential areas. Whilst the other compound sites have comparatively lower visual amenity and proximity to surrounding residences, they are also considered valuable in the context of the area when considering alternative spaces and barriers between the carriageway and dwellings.

The Department acknowledges that the compounds are temporary and there is limited space available for their placement. The majority of visual amenity issues associated with the construction compounds are considered minor provided the planting guides and rehabilitation details in the project landscape plan are satisfactorily implemented and noise walls and

fencing are appropriately placed to reduce impacts on neighbouring residences. The conditions of approval require a Construction Compound and Ancillary Facilities Management Plan which will outline the proposed mitigation measures for all compounds required for the project, including the rehabilitation of sites.

A number of residences, not directly neighbouring construction compounds have been identified as sensitive receivers due to their proximity to widening works and their existing views of vegetated mounds and parklands that will be altered during construction. Consistent with the impacts on residents overlooking construction compounds, the Department concludes that these impacts are minor in light of their temporary nature and the re-vegetation will be delivered as part of the project.

Operation

The key visual impact associated with the project involves clearing vegetation to facilitate the construction of noise walls; including modifications to existing noise walls and construction of new noise walls. To enable the noise wall and retaining wall construction, clearance of bushland along the motorway corridor and reduction of the landscape buffer edge will occur. While the impacts of these changes will be noticeable to residents in the short-term, the Department is confident landscaping and urban design initiatives for the project at these areas will see visual amenity improve over time.

Notwithstanding, to ensure that mitigation measures are appropriately considered during detailed design and construction and that appropriate consultation is carried out with the affected community, the Department recommends the development of an Urban Design and Landscape Management Plan prior to the commencement of works which shall outline in detail an integrated urban and landscape design for the project and include, but not necessarily be limited to an assessment of the visual screening effects of existing vegetation and the proposed landscaping; description of the disturbed areas (including compounds) and details of the location of existing vegetation and proposed landscaping.

Conclusion and Key Recommendations

The Department concludes that the urban design and landscape impacts will generally be low due to the scope of the works and the existing environment, and the potential for the improved integration of urban design and landscaping outcomes.

The Department does however, acknowledge that some receivers, particularly those in close proximity to works may experience medium to high visual impacts. Notwithstanding, the proposed mitigation measures to minimise these impacts are considered acceptable in addressing the potential amenity visual impacts on these sensitive receivers.

5.5 Other Issues

The following is a range of residual issues that would be appropriately addressed through the implementation of best practice management and mitigation measures.

Air Quality

The study area accommodates a range of services and facilities that cater for the needs of both local and regional communities, including educational facilities, health, medical and emergency services, sport, recreation and leisure facilities, and community and cultural facilities. Areas considered sensitive to direct air quality impacts are generally located within 200 metres of the project. Current land uses within 200 metres of the project mainly include low-density residences and community and educational facilities, including:

- open space, including Richard Podmore Reserve, Robert Gardner Reserve, Windara Reserve, John Mountford Reserve, M5 Linear Park and Canterbury Golf Course;
- Beverly Hills North Public School, on the western side of King Georges Road;
- two childcare centres, including Active Kids Childcare, on Penshurst Road; and

- places of worship, including St Matthews Anglican Church and New Apostolistic Church on Shorter Street.

Construction

Construction related air quality impacts would result from the clearing of vegetation and topsoil, excavation and levelling of soil, haulage of soil and fill, wind erosion from unsealed surfaces and stockpiles; and construction vehicles traversing on unsealed roads.

There is potential for particulate matter to cause a nuisance if dust-generating activities are located close to receivers, such as residential dwellings and local businesses. The magnitude of dust impacts depends on the amount of earthworks, activity duration and local meteorology, particularly wind speed and direction. The Proponent has indicated that dust emissions would be managed through the implementation of standard and tested dust mitigation measures including but not limited to: where possible, off road diesel equipment used will be compliant with Australian Design standards; engines of on-site vehicles and plant would be switched off when not in use; dust emissions from haulage activities particularly vehicle traffic would be restricted to designated routes which can be managed by regular watering or street cleaning and with appropriate speed limits.

To reinforce this position, the Department has recommended a condition requiring the preparation of a Construction Air Quality Management Plan to detail potential sources of dust, strategies and measure to minimise dust and other emissions, and procedures to follow in the event of adverse impacts. The Department has also recommended conditions requiring the Proponent to prepare and implement a Construction Air Quality Management Plan and maintain a Complaints Management System, to address potential sources of dust and other emissions including managerial procedures in the event of air pollution events.

Operation

An assessment of air quality impacts was undertaken using modelling by the RMS "*Tool for Roadside Air Quality*" (TRAQ). The assessment focused on key pollutants associated with road traffic including carbon monoxide, nitrogen dioxides, and particulate matter. The modelling predicted annual emissions of key pollutants at the year of opening (2017) and ten years thereafter (2027), assuming the development of the full WestConnex Scheme. The modelling results indicated that the level of pollutant concentrations would generally decrease. Minor increases would only occur in the absence of the full WestConnex in 2027. Given these findings, the effects of the project on both regional and local air quality are predicted to be minimal. An assessment undertaken by the EPA concurred with this outcome.

The Department has undertaken a review of the methodology and is satisfied that the TRAQ model used is appropriate and that the Proponent has undertaken an appropriate level of assessment based on the scale of the project and the local conditions. The Department is satisfied that the project would not lead to unacceptable air quality outcomes within the project area. On this basis, the Department accepts the Proponent's position that no specific management measures are considered necessary.

Socio Economic

The area is predominately residential with a mix of low, medium and higher density neighbourhoods. Residents have good access to large areas of open space, recreation and community facilities, commercial uses and public transport. A small number of businesses are present around King Georges Road north of the M5 Motorway including neighbourhood shops servicing the local population, and larger-scale retail outlets servicing the broader southern Sydney population.

The project involves the compulsory acquisition of one property at 19 Elouera Street, Beverly Hills. Acquisition is required prior to construction of the project and will occur in accordance

with the *Land Acquisition (Just Terms Compensation) Act 1991*. Consultation with the property owner will continue throughout the development of the project.

Existing businesses within the project area may be impacted during construction due to traffic disruptions and delays, including increased construction traffic on surrounding local roads. The Environmental Impact Statement determined that these impacts will not be significant due to the temporary nature of works, and the fact that no works will directly restrict customers from accessing those businesses.

Temporary impacts on social infrastructure include access restrictions to the Windarra Reserve and Eloura Street Reserve as these areas are proposed for laydown and stockpile sites during construction. The amenity of both reserves is likely to be diminished during construction.

The Department acknowledges some minor socio-economic impacts are expected, primarily during construction of the project. However, these impacts are temporary in nature, can be appropriately managed and are justified by the project's broader transport benefits.

Geology, Soils and Contamination

The proposal is located in a highly urbanised setting comprising disturbed terrain and sealed surfaces. While the project traverses sections of the Salt Pan Creek and Wolli Creek catchments, the only waterways within the project area are urbanised drainage systems comprising piped and open concrete-lined channels. Wolli Creek and the Cooks River are located 7 kilometres to the east and Salt Pan Creek is located 2.7 kilometres to the west of the project area and is the ultimate discharge point for runoff from the motorway corridor west of King Georges Road. A primary objective of the *Botany Bay and Catchment Water Quality Improvement Plan* is to reduce stormwater pollution.

An assessment of potential construction and operational impacts of the project on geology, soils and contamination has identified that the impacts are generally limited to potential transport of contaminants from the road surfaces in runoff. Runoff from the motorway is currently controlled via a road surface drainage system which would operate during construction and operation of the project. Motorway runoff captured east of King Georges Road is directed to a water quality pond and ultimately to Wolli Creek.

The risk of soil erosion within the project area during construction is minimal as construction activities will be staged and standard erosion controls would be in place prior to commencement of construction work and all surface areas would be sealed or rehabilitated and landscaped progressively during construction of the project.

The potential for Acid Sulfate soils is low to extremely low. The risk of contamination issues within the project area is considered to be low. No registered contaminated sites were identified within the project area or in a 500 meter radius.

The overall volume of runoff to Wolli Creek would increase due to an increase in sealed surface area. The Proponent is proposing to upgrade 140 m^2 of the open water area of the existing water quality pond to a biofiltration system which would provide for the improved treatment of runoff prior to discharge into Wolli Creek and therefore reduce subsequent transport of contaminants from road surfaces during rainfall events. This upgrade would ensure that the reduction targets for the incremental increase in pollution load attributable to the project are met. Given the minor nature of the road widening in the project area that drains to Salt Pan Creek catchment, the project is anticipated to have a negligible effect on the quality of stormwater runoff within this catchment.

The Department concludes that the geology, soil and contamination impacts will generally be limited to potential runoff issues which can be appropriately managed by upgrading the

existing water quality pond to treat the increased volume of runoff within the Wolli Creek catchment area.

Hydrology & Flooding
Investigation into the hydraulic capacity of the existing pavement drainage system was undertaken to determine whether existing infrastructure can accommodate the expected changes to the interchange. To determine the impacts from the project on flooding and drainage patterns in the Salt Pan Creek and Wolli Creek catchments, TUFLOW and DRAINS models were used to understand existing pavement drainage systems and catchment based rainfall runoff. A pavement drainage strategy for the project was prepared to inform necessary upgrades.

Due to the relatively minor changes to the existing infrastructure as well as the project footprint lying on land above the probable maximum flood (PMF) event, impacts to flooding and hydrology from the proposed works will be minor. The project will not result in a loss of floodplain storage and existing development will not be impacted by negligible changes in flood behaviour, including minor increase of stormwater entering Wolli Creek.

Aboriginal Heritage
An Aboriginal heritage study was conducted in accordance with relevant guidelines. The study involved:

- a desktop review of the Aboriginal Heritage Information Management System (AHIMS);
- analysis of geological features to predict the likelihood of Aboriginal artefacts; and
- an archaeological survey conducted with involvement of registered Aboriginal stakeholders.

The study found that there are no recorded Aboriginal artefacts within the study area, and that the study area's landforms and high levels of disturbance have a very low potential to contain archaeological deposits. The field survey did not find any artefacts.

The Department concurs with the study's recommendations that:

- The proposed works are able to proceed without the need for further archaeological and/or Aboriginal heritage assessment; and
- If Aboriginal objects or suspected human remains are located during works then an Unexpected Finds Procedures must be followed.

Given the very low level of archaeological potential, the Department considers that standard heritage management measures such as unexpected finds and human remains procedures and staff training are appropriate.

Non-Aboriginal Heritage
A non-Aboriginal heritage assessment was conducted including a review of statutory and non-statutory registers and a site inspection. The site inspection did not find any unlisted items.

The assessment found that there are no statutory items or conservation areas within or in close proximity to the site. Two non-statutory conservation areas are adjacent to the existing M5: the Pallamanna Parade and Welfare Avenue Urban Conservation Area. These are listed on the Register of the National Estate, which has ceased to be a statutory list. These areas are separated from the M5 by noise walls and roadside vegetation. The proposal is not expected to have any direct or indirect impacts on these areas.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusion

The proposal, as both a stand-alone augmentation of the Motorway network and as part of the broader WestConnex scheme, is a key component of achieving the NSW Government's transport policy and objectives, as identified in NSW Government strategic transport planning. The King Georges Road Interchange Upgrade is justified in its own right by improving traffic flow and performance on key arterial routes such as King Georges Road, M5 Motorway, M5 on-ramps and off-ramps. The proposal would provide a net benefit to the State, having regard to both long-term and short-term economic, environmental and social considerations.

The benefits to the community arising from the proposal, including travel time savings and improved connectivity would be significant. In summary, peak travel times on King Georges Road northbound will be reduced by approximately three minutes in both the morning and evening peak periods whilst southbound traffic would experience travel time savings of approximately four minutes in the morning and five minutes in the evening peak period.

The proposal will also benefit business and industry through improved access to the M5 and improved freight distribution efficiency. The proposal will also improve road safety and help Sydney cope with expected population growth.

The potential environmental impacts associated with the construction and operation of the proposal would be acceptable subject to the implementation of appropriate management and mitigation measures. The proposal would comply with the objects of the *Environmental Planning and Assessment Act* and with the principles of ESD. On balance, it is concluded that the proposal's benefits outweigh its potential impacts and that any residual impacts can generally be managed and would not, subject to conditions, result in any long term adverse or irreversible effects.

The Department's assessment therefore concludes that the project is in the public interest and should be approved.

6.2. Recommendations

It is recommended that the proposal be approved subject to the recommended conditions of approval. The key recommendations are:

- a cycling and pedestrian access strategy outlining details of works to be carried out on the east-bound and west-bound cyclist movements;
- a construction noise and vibration management plan to offset impacts on sensitive receivers during construction;
- a Biodiversity Offset Package to offset residual impacts on the threatened species;
- a construction flora and fauna management plan to address potential construction impacts on flora and fauna, including procedures for managing weeds and fauna injury and mortality;
- a construction compound and ancillary facilities management plan to mitigate any impacts for all compounds required for the project, including the rehabilitation of sites;
- an urban design and landscape management plan to offset amenity impacts on sensitive receivers within close proximity to works; and
- an independent audit of the proposal's environmental performance during operation.

26.2.15

Chris Wilson
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Infrastructure and Industry Assessments

APPENDIX A ENVIRONMENTAL ASSESSMENT

See the Department's website at
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6547

APPENDIX B SUBMISSIONS

See the Department's website at
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6547

APPENDIX C PROPONENT'S RESPONSE TO SUBMISSIONS

See the Department's website at
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6547

APPENDIX D OTHER RELEVANT REPORTS OR DOCUMENTS

See the Department's website at
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6547

APPENDIX E RECOMMENDED CONDITIONS OF APPROVAL