



**Planning &
Infrastructure**

***MAJOR PROJECT ASSESSMENT:
M5 West Widening Project
(MP 10_0052)***



Director General's
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979

October 2011

ABBREVIATIONS

Department	NSW Department of Planning and Infrastructure
Director General	Director General of the Department of Planning & Infrastructure
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
Minister	Minister for Planning and Infrastructure
M5 Motorway	M5 South West Motorway
M5 Corridor	The corridor area comprising the M5 South West Motorway and M5 East Freeway and spanning from Camden Valley Way, Prestons to Southern Cross Drive, Mascot.
Part 3A	Part 3A of the <i>Environmental Planning and Assessment Act 1979</i>
Proponent	NSW Roads & Traffic Authority

Cover Photograph: Existing M5 Motorway Alignment (Source: Environmental Assessment, September 2010)

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NSW Government
Department of Planning and Infrastructure

EXECUTIVE SUMMARY

The NSW Roads & Traffic Authority (the Proponent) proposes to widen approximately 20 kilometres of the existing M5 South West Motorway (the M5 Motorway), between King Georges Road at Beverly Hills and Camden Valley Way at Prestons (the “M5 West Widening project”). The project involves providing additional traffic lanes on the M5 Motorway for the majority of its length through pavement widening, asphalt overlays and new line marking.

The M5 Motorway is one of the most heavily constrained roads in Sydney. It is characterised by very high traffic volumes, a relatively high percentage of freight, and constant traffic volumes throughout the day and on weekends. In the absence of additional capacity, travel times will continue to increase as congestion worsens, and more vehicles will seek alternate routes, including the use of local roads. The key need for the project has been identified to be:

- supporting growth in the South West Growth Centre;
- improving travel efficiency between key residential and employment areas in Sydney;
- improving freight transport capacity and efficiency along the M5 corridor;
- enhancing the strategic road network, which the M5 Motorway comprises part;
- removing heavy vehicle traffic from heavily congested arterial and sub-arterial roads; and
- improving road safety and incident management along the M5 Motorway.

The project has a capital cost of \$340 million and will generate employment for around 300 personnel on average during construction, peaking at 500 persons for short periods of time.

The proposal is subject to Part 3A of the *Environmental Planning and Assessment Act 1979* and is classified as critical infrastructure pursuant to section 75C of the *Environmental Planning and Assessment Act 1979*.

The environmental assessment for the project was placed on public exhibition from 22 September 2010 until 29 October 2010. During this period, 67 submissions were received: four from public authorities, five from local authorities and 58 from the general public, including community groups. The key issues raised in the submissions related to project justification, operational noise impacts and mitigation, traffic and transport, air quality and construction-related impacts.

In May 2011, the Proponent submitted a Submissions and Preferred Project Report for the project providing a response to issues raised in submissions, describing amendments made to the project since the exhibition of the environmental assessment, and providing additional assessment of relevant environmental impacts in response to issues raised in submissions and amendments made to the proposal. The amendments made to the project related to:

- widening of the M5 Motorway eastbound to provide three traffic lanes up to King Georges Road rather than up to Fairford Road (as originally proposed in the Environmental assessment);
- the reconfiguration of the Hammondville toll plaza layout to provide three free flow lanes and one to two cash lanes in each direction;
- the incorporation of four emergency crossover gates in the median to facilitate traffic management in the case of emergencies;
- the incorporation of over five kilometres of additional noise barriers and augmentation of over 15 kilometres of existing noise barriers, as well as provision of at-house architectural treatments to mitigate predicted noise impacts; and
- refinements to the design of drainage basins.

The environmental assessment and the Submissions and Preferred Project Report was placed on public exhibition from 18 May 2011 to 1 June 2011, to provide community members the opportunity to comment on changes made to the project since exhibition. A total of 56 submissions were received in response to the exhibition: three from public authorities, three from local authorities and 50 from the general public. The issues raised in the submissions largely reflected the key issues raised during the exhibition of the environmental assessment (i.e. operational noise, traffic and transport, air quality and construction-related impacts).

The Department has assessed the Proponent's environmental assessment, Submissions and Preferred Project Report and submissions on the project and considers that there are a number of constraints to the project that will need to be carefully managed. These include operational noise mitigation, biodiversity, and construction-related impacts (including construction traffic, noise and vibration, and air quality). These issues were reflected in submissions from the local community and were considered by the Department in its assessment. Based on its assessment, the Department is

satisfied that the impacts of the project can be managed and mitigated to achieve acceptable amenity and environmental standards. The Department has recommended conditions of approval to support and enhance the Proponent's Statement of Commitments.

The Department is satisfied that with the implementation of the recommended conditions of approval and Statement of Commitments, the project can proceed in a sustainable manner with overall benefits to the local community, and minimal long-term residual impacts to the wider community and environment. It is therefore recommended that the Minister for Planning and Infrastructure approve the M5 West Widening project, subject to conditions.

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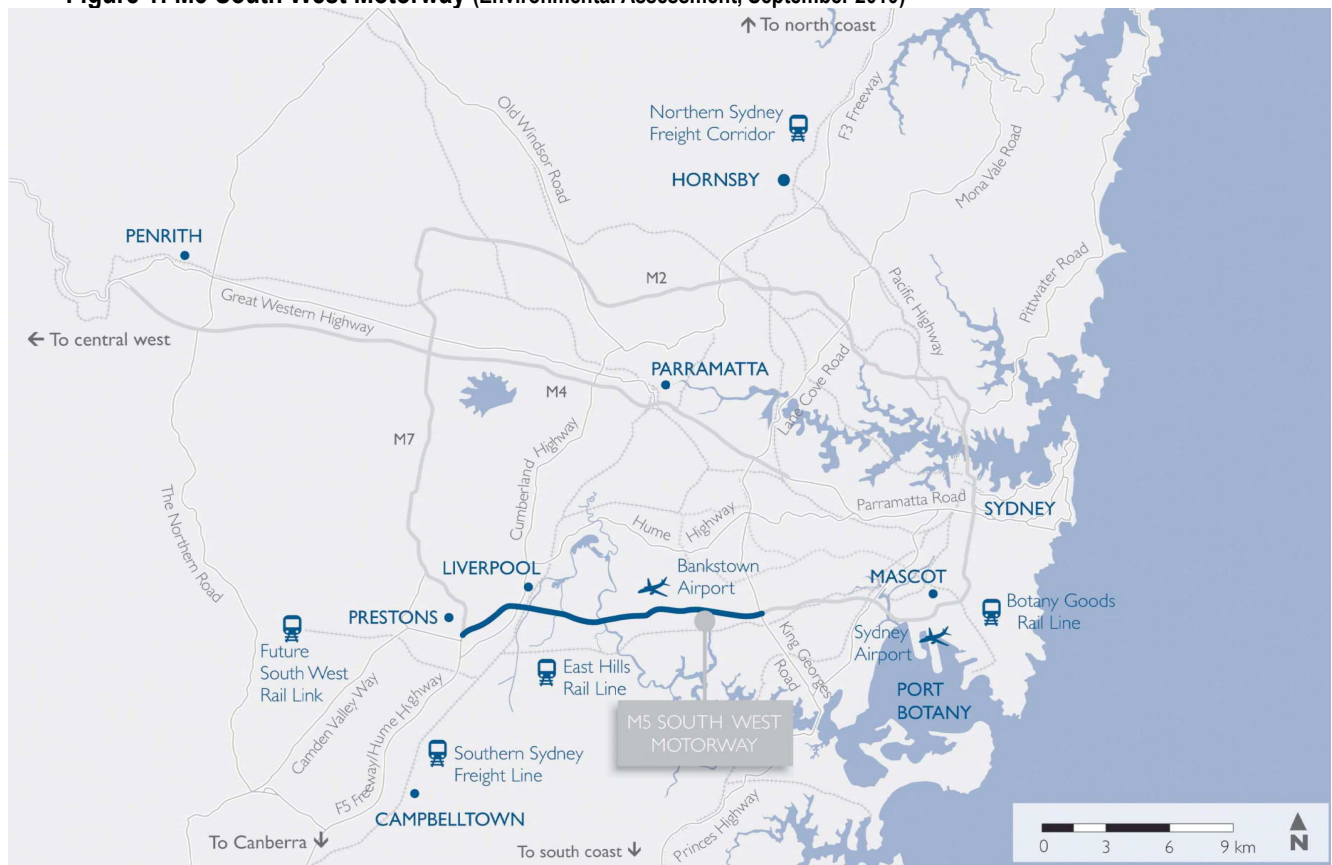
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1. BACKGROUND

The existing M5 South West Motorway (the M5 Motorway) extends for approximately 22 kilometres between King Georges Road at Beverly Hills and Camden Valley Way at Prestons, in south-western Sydney. The M5 Motorway generally comprises two lanes in each direction and traverses the Canterbury, Bankstown and Liverpool local government areas, with land use in the surrounding area comprising low- and medium-density residential development, commercial and industrial areas, educational institutions (including the University of Western Sydney and schools), and recreational and open space uses including parks, reserves, and golf courses.

The M5 Motorway forms a key component of the Sydney arterial road network and is part of the National Highway Network connecting Sydney, Canberra and Melbourne. Together with the M5 East Freeway, the M5 Motorway forms the M5 transport corridor which is the main freight, commercial and commuter travel route between the economic centres of Sydney's Central Business District, Sydney Airport, Port Botany and greater western Sydney. The corridor forms part of the Sydney Orbital Motorway connecting to the Westlink M7 at Prestons which links to the M4 at Eastern Creek and the M2 at Baulkham Hills. The M5 Motorway also connects with the F5 Freeway at Prestons, which extends south to Campbelltown and the Hume Highway. The location of the M5 Motorway in its regional context is shown in Figure 1.

Figure 1: M5 South West Motorway (Environmental Assessment, September 2010)



Principal arterial road routes parallel to the M5 Motorway include: Canterbury Road, Milperra Road and Newbridge Road (from Roselands to Liverpool); and Campbelltown Road and the Hume Highway (from Casula to Liverpool). Major arterial roads intersecting with the M5 Motorway include King Georges Road, Belmore Road, Fairford Road, The River Road, Henry Lawson Drive, Heathcote Road, Moorebank Avenue and Camden Valley Way.

The first stage of the M5 Motorway between Heathcote Road, Moorebank and King Georges Road, Beverly Hills was opened to traffic in 1992. In 1994, the link between the Cross Roads, near Liverpool, and Casula was completed. The M5 Motorway was designed and constructed to allow for future widening in the central median to provide for future traffic. The NSW Roads & Traffic Authority (the Proponent) now proposes to widen the M5 Motorway to provide three lanes in each direction between Prestons and Beverly Hills, in order to relieve congestion pressure, improve road network efficiency and cater for expected population growth in south-western Sydney.

Upgrading of the M5 Motorway has been identified as a priority project for managing travel demands on the Sydney road network in the *Metropolitan Plan for Sydney 2036* (Department of Planning, 2010). In addition, the project would:

- complement recent and proposed improvements to the Sydney motorway network (including the M7 Motorway, the widening of the F5 Freeway to Campbelltown, and the proposed M5 East Freeway Expansion between Beverly Hills and Mascot) and thereby improve overall road network functioning and efficiency for freight, commercial and commuter travel; and
- provide greater capacity to serve existing and future demand within the M5 corridor including land release areas in the South West Growth Centre, the Western Sydney Employment Hub, the development of Liverpool as one of five regional cities in Sydney, and future growth (including freight requirements) at Sydney Airport and Port Botany.

2. PROPOSED PROJECT

2.1. Project Description

The Proponent proposes to widen approximately 20 kilometres of the existing M5 Motorway, between King Georges Road at Beverly Hills and Camden Valley Way at Prestons, to provide three lanes in each direction for the majority of its length. Widening would generally be achieved through the construction of new lanes in the existing median space along the western section of the project and through new line marking in the eastern section of the project. No widening is proposed east or west of the toll plaza near the Georges River East, or between Moorebank Avenue and the western side of the Georges River West bridge, as these locations currently have either three or four lanes in each direction. The widening works would be contained entirely within the existing M5 Motorway corridor.

An overview of the proposal is shown in Figure 2, with greater detail on works proposed along each section (based on the amended project as described in the Submissions and Preferred Project Report and in Section 2.2 of this report), shown in Figures 3 to 6.

Other key components of the project (referred to as the “M5 West Widening”) include:

- an operations management control system including a new control building at Hammondville and variable message signs on the M5 Motorway and surrounding arterial roads;
- upgrade of the Hammondville toll plaza including pavement widening, relocation of cash lane booths, upgrade of concrete safety barriers and extension of the access walkways;
- bridge widening works where the M5 Motorway passes above Queen Street, Revesby and Nuwarra Road, Moorebank, through the placement of new infill decking between the east- and west-bound bridge lanes of the M5 Motorway at these locations. At other locations the existing M5 Motorway bridges can accommodate the proposed widening works without the need for structural modifications;
- noise attenuation measures at various locations comprising either augmentation of existing noise barriers, the construction of new noise barriers or at-residence architectural treatments;
- augmentation of existing drainage basins and construction of additional basins to capture operational runoff from the M5 Motorway;
- landscaping measures; and
- temporary ancillary facilities (construction compounds) and spoil reuse sites (as indicatively shown in Figures 3 to 6).

The project has an estimated capital cost of \$340 million and will generate employment for an average 300 personnel, peaking to 500 for short periods, during construction. Construction of the project is anticipated to take around two years to complete. The estimated construction timetable for each section of the M5 Motorway is set out in Table 1.

Table 1: Estimated Construction Period

Stage	Estimated completion time (months)
King Georges Road to Belmore Rd	6
Belmore Rd to Fairford Rd	7
Fairford Rd to The River Rd	11
The River Rd to Henry Lawson Dr	27
Henry Lawson Dr to East of Toll Plaza Area	7
Toll Plaza Area	3
West of Toll Plaza Area to Heathcote Rd	9
Heathcote Rd to East of Moorebank Ave	10
East of Moorebank Ave to East of Hume Hwy	4
East of Hume Hwy to Camden Valley Way	16

2.2. Changes since Exhibition

Subsequent to the exhibition of the environmental assessment for the project, the Proponent made a number of amendments to the project which were described in its Submissions and Preferred Project Report. The amendments related to:

- the widening of the M5 Motorway eastbound to provide three traffic lanes up to King Georges Road rather than up to Fairford Road (as originally proposed in the environmental assessment);
- the reconfiguration of the Hammondville toll plaza layout to provide three free flow lanes and one to two cash lanes in each direction;
- the incorporation of four emergency crossover gates in the median to facilitate traffic management in the case of emergencies;
- the incorporation of over five kilometres of additional noise barriers and augmentation of over 15 kilometres of existing noise barriers, as well as provision of at-house architectural treatments to mitigate predicted operational noise impacts; and
- refinements to the design of drainage basins.

2.3. Project Need and Justification

The Proponent has identified that the M5 Motorway caters for an average weekday traffic volume of approximately 91,000 vehicles per day, of which approximately eight percent comprises heavy vehicle traffic transporting local, regional and interstate freight, making the M5 Motorway one of the most dominant transport and freight corridors in Sydney. Traffic on the M5 Motorway has increased steadily since its opening in 1992, with the addition of the M5 East Freeway and M7 to the M5 Motorway contributing to traffic congestion. Traffic volumes on the M5 Motorway have increased by around three percent annually over the last five years, with current traffic volumes and travel times identified to exceed the optimal capacity of the M5 Motorway, particularly during peak times. In this regard, the Proponent has identified that the average travel speeds over the length of the M5 Motorway are currently around 49 kilometres per hour east bound in the morning peak and around 56 kilometres per hour west bound during the evening peak, compared to a posted speed limit of 110 kilometres per hour.

It is expected that population and economic growth in south-western Sydney will continue to place pressure on the capacity and performance of the M5 Motorway. This includes:

- land release in the South West Growth Centre, which is expected to accommodate approximately 110,000 new homes in the next 30 years, in greenfield areas including Leppington and Oran Park;
- the targeted development of Liverpool as part of the *draft South West Subregional Strategy* as one of five regional cities in Sydney over the next 25-30 years, including targets to double the number of jobs in Liverpool from 15,000 in 2001 to 30,000 by 2031 and to increase the number of homes from 11,800 to 22,000;
- the development of the Western Sydney Employment Hub as part of the *Metropolitan Plan for Sydney 2036*, at the junction of the M4 and M7 motorways which makes available some 1,500 hectares of employment lands for industrial and commercial use;

Figure 2: Overview of Project (Courtesy NSW Roads & Traffic Authority, August 2011)

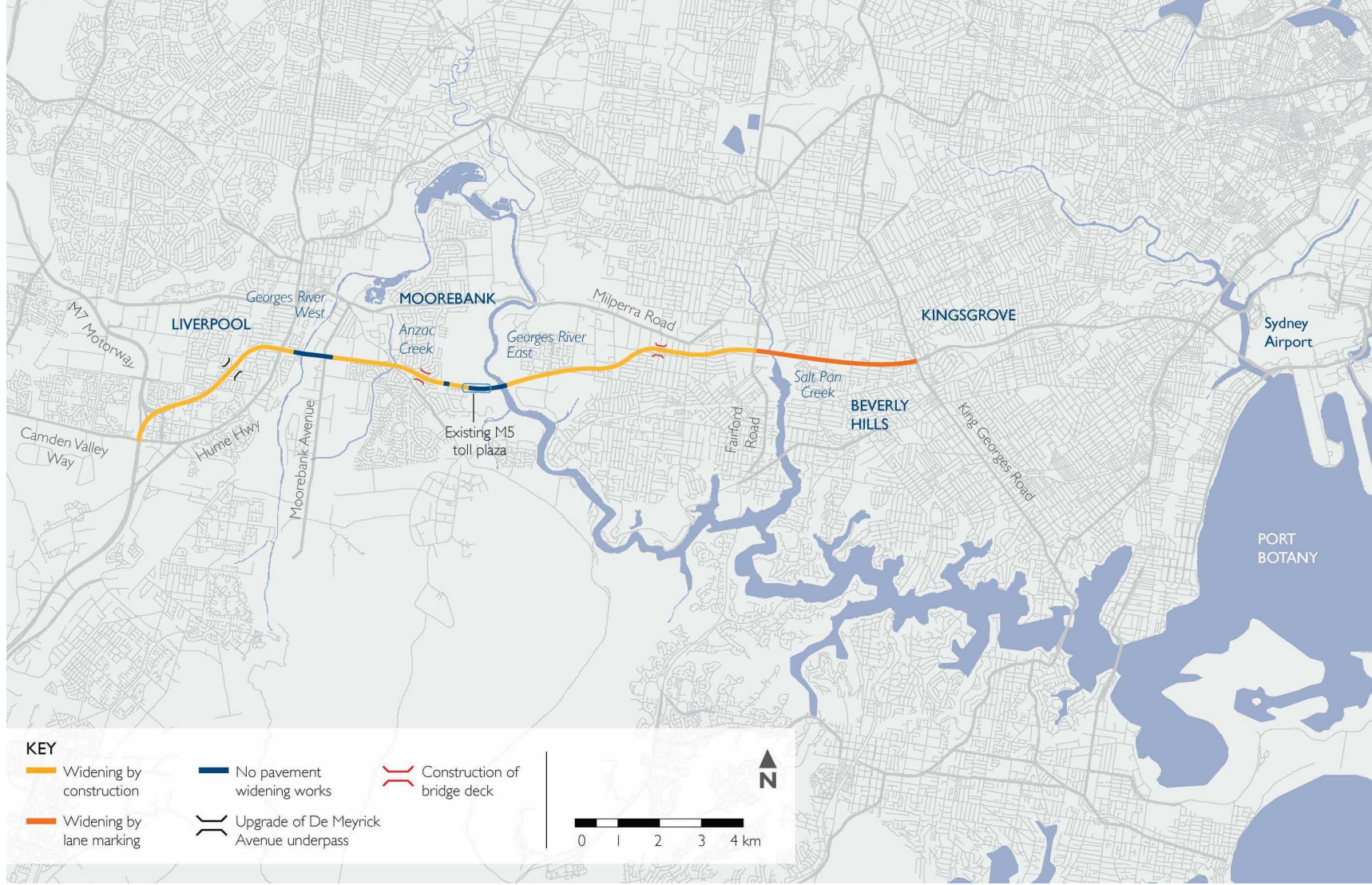


Figure 3: M5 West Widening - Camden Valley Way to Moorebank Avenue (Courtesy NSW Roads & Traffic Authority, July 2011)

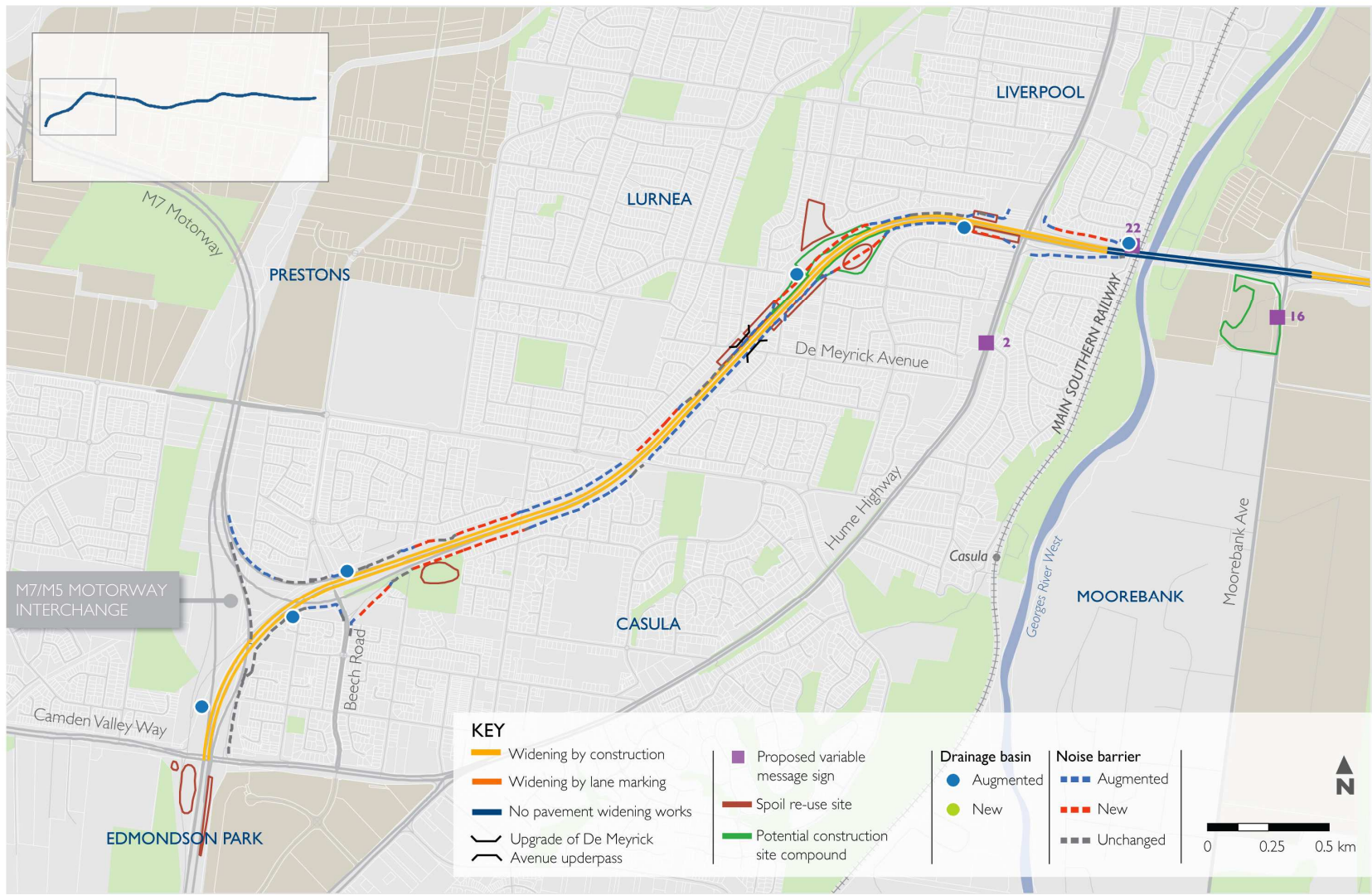


Figure 4: M5 West Widening - Moorebank Avenue to Georges River East (Courtesy NSW Roads & Traffic Authority, July 2011)

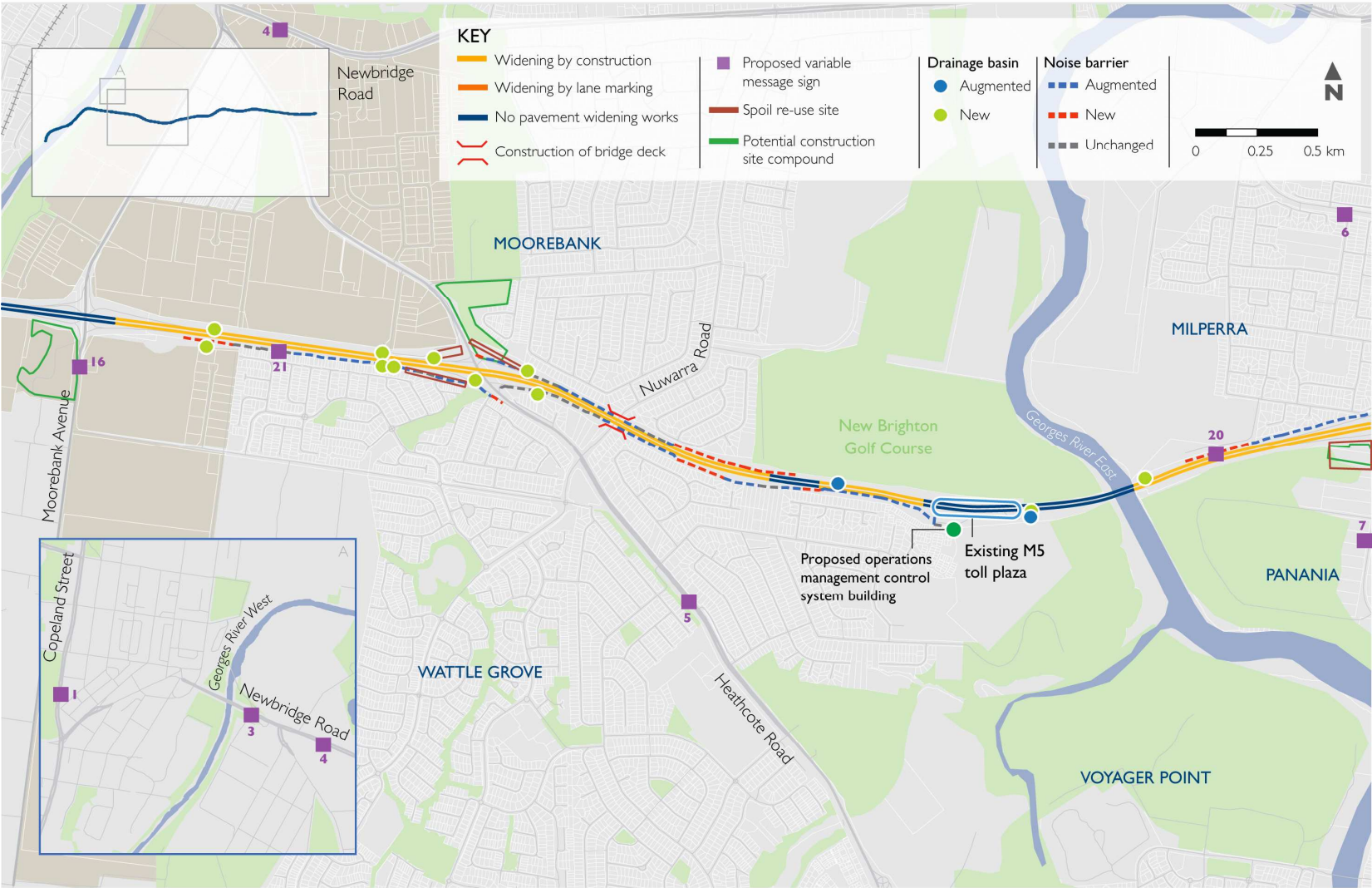


Figure 5: M5 West Widening - Georges River East to Fairfield Road (Courtesy NSW Roads & Traffic Authority, July 2011)

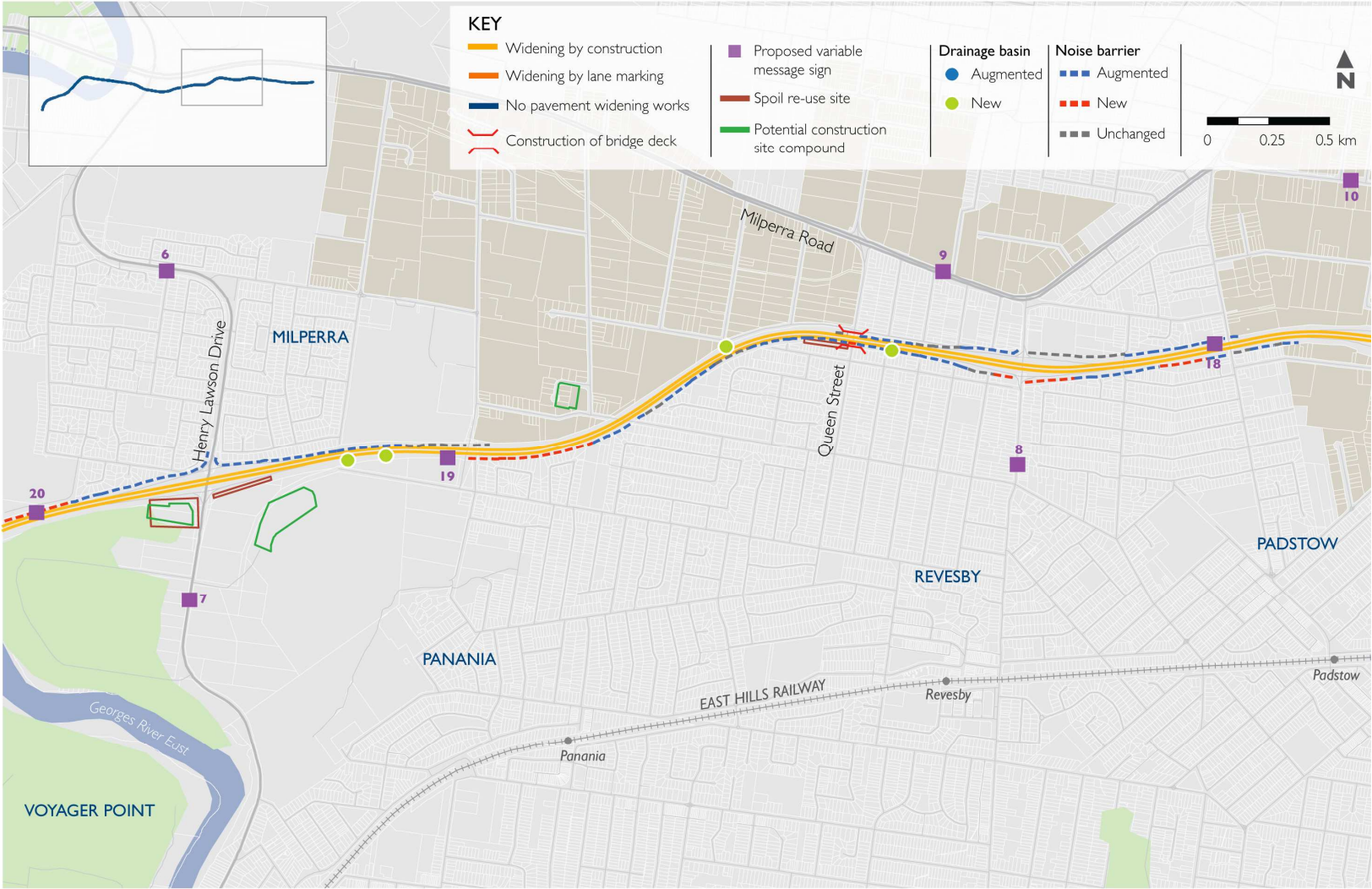
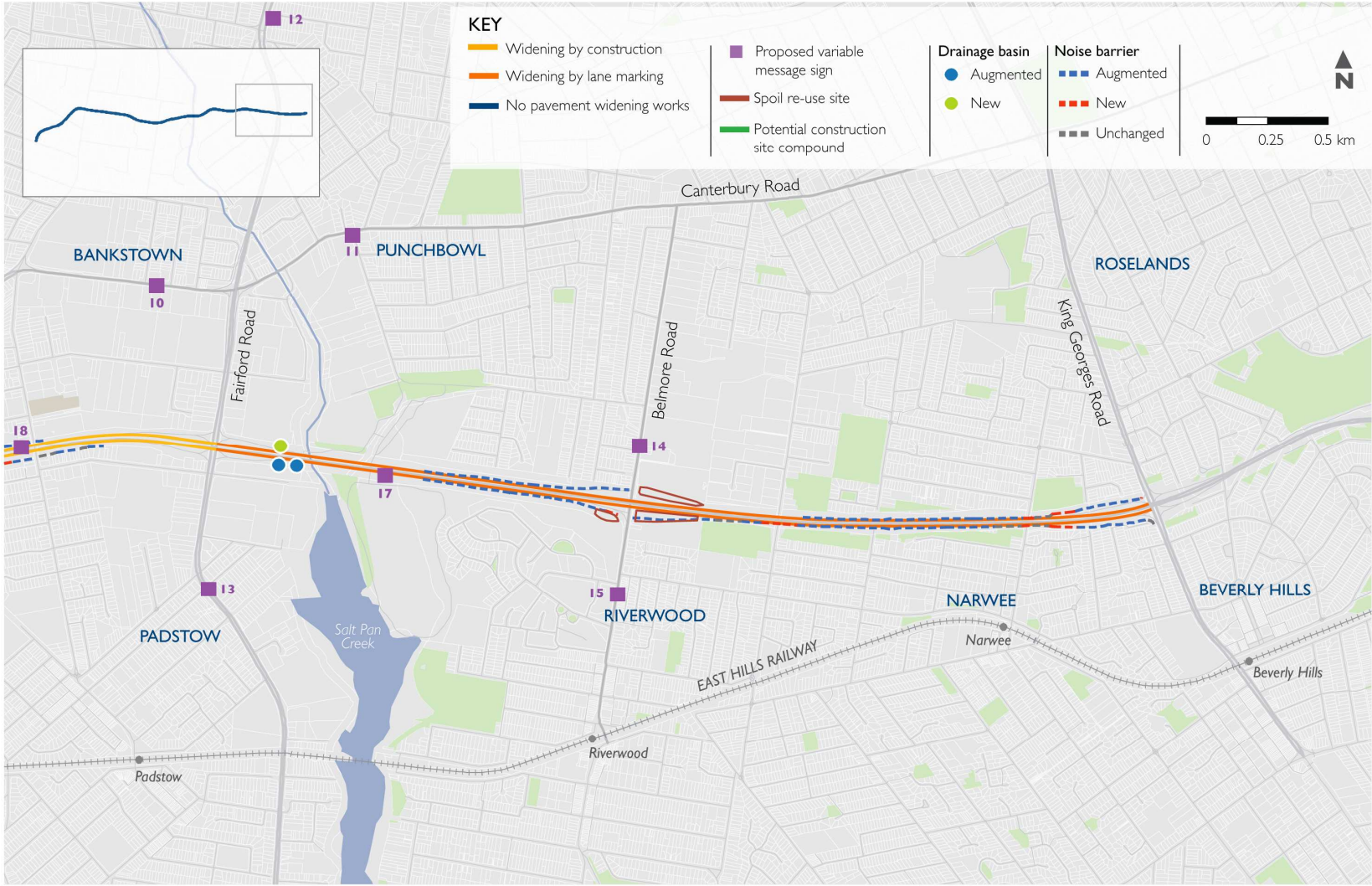


Figure 6: M5 West Widening - Fairford Road to King Georges Road (Courtesy NSW Roads & Traffic Authority, July 2011)



- the planned enhancement of employment lands at strategic areas along the M5 corridor including Milperra, Bankstown Airport, Moorebank, Ingleburn, Minto and Campbelltown as part of the *Metropolitan Plan for Sydney 2036*, to provide opportunity for the agglomeration of transport and distribution related land use along the M5 corridor to consolidate the M5 Motorway's existing function as a key transport/ freight corridor - providing access to Sydney Airport, Port Botany and intermodal facilities at Minto and Ingleburn;
- expected passenger and air freight growth at Sydney Airport from 33 million to 79 million passengers per year and 647,000 tonnes to 1,077,000 tonnes per year, respectively by 2029;
- the expected growth of container freight traffic at Port Botany from 1.8 million twenty-foot equivalent units to three million twenty-foot equivalent units per year by 2020; and
- planned intermodal freight facilities at Enfield and Moorebank.

In the absence of additional capacity, traffic congestion and travel times are expected to continue to worsen on the M5 Motorway with average morning peak period (between 7.00 am and 9.00 am) travel speeds falling to 38 kilometres per hour east bound and average evening peak period (3.00 pm to 6.00 pm) travel speeds falling to around 37 kilometres per hour west bound by 2026. In addition, traffic modelling has shown that, without improvement, morning peak period travel times eastbound would increase by 14 minutes in the period from 2006 to 2026. Further, without the proposed widening, Levels of Service for motorway traffic are forecast to deteriorate markedly, to the point where queues and congestion would be expected along almost the full length of the M5 Motorway, in both directions during the morning and evening peak periods.

The sub-optimal functioning of the M5 Motorway would have flow-on effects on the efficient functioning of the surrounding road network including the overall Orbital network and the parallel arterial roads. This would have direct and indirect impacts on the economic competitiveness of Sydney with respect to the efficient movement of freight and business functioning. The increased congestion of the M5 Motorway would also result in negative social outcomes, with the M5 Motorway being unable to effectively support existing and forecast population growth in south-western Sydney, as well as resulting in adverse environmental outcomes, with increased air quality and greenhouse gas outcomes from slower travel times and increased congestion on both the M5 Motorway and parallel arterial roads. Continued traffic congestion would also pose increased road safety risks including for emergency management.

In summary, the Proponent has identified the objectives of the M5 West Widening project to be:

- supporting growth in the South West Growth Centre;
- improving travel efficiency between key residential and employment areas in Sydney;
- enhancing the strategic road network;
- improving freight transport capacity and efficiency, particularly to Port Botany and Sydney Airport;
- removing heavy vehicle traffic from heavily congested arterial and sub-arterial roads; and
- improving incident management and road safety along the M5 Motorway.

The Department accepts the need and justification for the project as presented by the Proponent, including its aims of improving traffic efficiency in order to support forecast population growth, improve freight efficiency, enhance strategic road network efficiency and minimise adverse environmental and social externalities that would otherwise occur from traffic congestion and high travel times. In particular, the Department accepts that the M5 West Widening project is justified in itself compared to other feasible alternatives including improvements to surrounding support roads (such as King Georges Road, Canterbury Road, Fairford Road and Stacey Street) and enhancements to passenger and/ or freight rail networks.

With respect to improvements to the surrounding arterial road network, the Department accepts that whilst these would likely result in some local traffic improvements, they would unlikely (as a standalone response) result in the achievement of the stated objectives of the project, in particular increasing road capacity to cater for future traffic growth needs and to cater for freight traffic needs along the M5 transport corridor including from Sydney Airport and Port Botany.

Improvements to passenger rail line services (such as upgrades to the East Hills Line and the construction of the South West Rail Link), whilst helping to ease congestion pressure are unlikely to completely remove the need for road commuter travel, in particular to provide access to existing and proposed employment lands that are not currently well serviced by public transport links (e.g. Port Botany). Similarly, increasing the share of freight transported by rail is unlikely to sufficiently reduce road freight pressure along the M5 transport corridor, so as to completely remove the need for the project. In this context it is noted that in most cases rail freight alone is not able to transport goods from source to

destination and some level of road transport is required. Given the strategic importance of the M5 transport corridor for freight transport (including as part of the Sydney-Melbourne interstate corridor), the Department is satisfied that ongoing freight transport requirements along the M5 Motorway provides a strong justification for the project.

In summary, the Department is satisfied that whilst these alternatives would likely complement the traffic and transport objectives of the project, they would not remove the need for the M5 West Widening as a project in its own right.

The Department also notes that the project would be consistent with key strategic policy and objectives including:

- *NSW 2021* – a ten year plan for the state with goals including rebuilding the economy, providing quality services and renovating infrastructure. The Plan has as a transport target to improve the efficiency of the road network during peak times on Sydney's road corridors and priority actions of delivering road infrastructure to relieve congestion, improve safety and enhance and expand road capacity. The M5 West widening project would deliver this target by decreasing travel times through widening of the corridor to three lanes and relieving congestion during peak travel periods;
- the *Metropolitan Plan for Sydney 2036 (2010)* (and associated subregional strategies) – which provides the strategic framework to guide Sydney's growth and development to 2036. The project is consistent with the objectives of the Metropolitan Plan including -
 - developing Sydney's transport system to support its role as a global city - by improving access to and travel times between residential and employment areas and increasing traffic capacity to support planned population growth areas,
 - developing a transport system that supports productivity through access to jobs, efficient movement of freight and effective economic gateways - by increasing traffic capacity and network functioning to support freight and business function and commuter travel between the economic centres of Sydney's Central Business District, Sydney Airport, Port Botany and Greater Western Sydney, including planned employment lands. The upgrade project would specifically support the Strategy's objectives of improving connectivity between regional centres and economic gateways within the Greater Metropolitan Region and the provision of sufficient freight transport capacity in key corridors, and
 - implementing the Metropolitan Transport Plan to improve access to and travel times between residential and employment areas, and increasing traffic capacity and network functioning to support freight movement between the Central Business District, Sydney Airport, Port Botany and Greater Western Sydney employment lands; and
- the *Sydney-Melbourne Corridor Strategy (2007)* - the project is consistent with the key objectives of this Strategy which aims to improve transport efficiency, productivity and reliability of travel along the *Sydney-Melbourne* corridor (which the M5 Motorway comprises a part), which is identified as the busiest inter-capital road corridor in Australia.

In summary, the Department accepts that the project is justified and would provide significant traffic and transport benefits as well as associated social and environmental benefits to communities along the M5 Motorway corridor as well as to broader metropolitan Sydney, and thereby support the continued development of Sydney as a key economic centre.

3. STATUTORY CONTEXT

3.1. Major Project

On 10 March 2010, the then Minister for Planning declared the project to be a Major Project by order pursuant to section 75B(1)(b) of the *Environmental Planning and Assessment Act 1979* (the EP&A Act). The Minister for Planning and Infrastructure is therefore the approval authority for the project under Part 3A of the EP&A Act.

3.2. Critical Infrastructure

On 10 March 2010, the then Minister for Planning declared the project to be a critical infrastructure project pursuant to section 75C of the EP&A Act.

3.3. Continuing Operation of Part 3A

Part 3A of the the EP&A Act, as in force immediately before its repeal on 1 October 2011 and as modified by Schedule 6A to the EP&A Act, continues to apply to transitional Part 3A projects. Director General's environmental assessment requirements (DGRs) have been issued in respect of this project and the environmental assessment report was lodged prior to 1 October 2011. The project is therefore a transitional Part 3A project.

Consequently, this report has been prepared in accordance with the requirements of Part 3A and associated regulations, and the Minister for Planning and Infrastructure may approve or disapprove of the carrying out of the project under section 75J of the EP&A Act.

3.4. Permissibility

With the exception of some restrictions to land reserved under the *National Parks and Wildlife Act 1974*, clause 94(1) of *State Environmental Planning Policy (Infrastructure) 2007* permits development for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority on any land without consent. The project would not traverse any land reserved under the *National Parks and Wildlife Act 1974*. Consequently, the project is permissible on all subject land, in accordance with the provisions of *State Environmental Planning Policy (Infrastructure) 2007*.

3.5. Environmental Planning Instruments

Under section 75R(2) of the EP&A Act, only State Environmental Planning Policies apply to critical infrastructure projects and only where the relevant State Environmental Planning Policy expressly provides that it applies to a particular project. There are no State Environmental Planning Policies that expressly apply to the M5 West Widening project.

3.6. Objects of the EP&A Act

Decisions made under the EP&A Act must have regard to the objects of the EP&A Act, as set out in section 5 of the EP&A Act. The relevant objects are:

- (a) to encourage:
 - (i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,
 - (ii) the promotion and co-ordination of the orderly and economic use and development of land,
 - (iii) the protection, provision and co-ordination of communication and utility services,
 - (iv) the provision of land for public purposes,
 - (v) the provision and co-ordination of community services and facilities, and
 - (vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and
 - (vii) ecologically sustainable development, and
 - (viii) the provision and maintenance of affordable housing, and;
- (b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State; and
- (c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

Of particular relevance to the environmental impact assessment and eventual determination of the subject project application by the Minister, are those objects stipulated under section 5(a) of the EP&A Act. Relevantly, the objects stipulated under (i), (ii), (vi) and (vii) are significant factors informing determination of the application (noting that the proposal does not raise significant issues relating to communication and utility services, provision of land for public purposes, community services or affordable housing). With respect to ecologically sustainable development, the EP&A Act adopts the definition in the *Protection of the Environment Administration Act 1991*, including the precautionary principle (i.e. if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation), the principle of inter-generational equity, the principle of conservation of biological diversity and ecological integrity, and the principle of improved valuation, pricing and incentive mechanisms.

It is important to recognise that while the EP&A Act requires that the principles of ecologically sustainable development be encouraged, it provides other objects that must be equally included in the decision-making process for the subject proposal. The Department's assessment has given due consideration to the objects of the EP&A Act in its assessment including:

- the proper management and development of cities for the purpose of promoting the social and economic welfare of the community and a better environment – the Department's assessment of the need for the project (Section 2.3) has considered the traffic and transport benefits of the project in promoting the social and economic welfare of the community and a better environment, in particular improved access and travel times between residential and employment areas;
- the promotion and co-ordination of the orderly and economic use and development of land – this is considered in the Department's assessment of potential amenity impacts to surrounding land use and receptors (including visual amenity and noise – Section 5.4);
- the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats – the Department has considered potential impacts to flora and fauna in Section 5.3 of this report; and
- the need to encourage the principles of ecologically sustainable development –
 - the Department's assessment of the need for the project (Section 2.3) has considered the traffic and transport benefits of the project in supporting existing and future population growth consistent with the principles of inter-generational equity,
 - the Department notes that project impacts have been considered on the basis of 'worst case scenarios', consistent with the precautionary principle,
 - the Department's assessment of noise impacts (Section 5.2) has considered all feasible and reasonable measures to minimise impacts consistent with the principles of appropriate valuation and pricing mechanisms, and
 - the Department has assessed the biodiversity impacts of the project (Section 5.3), including appropriate offset requirements, consistent with the principle of conservation of biological diversity and ecological integrity.

In addition to the above, the agency and community consultation undertaken as part of the assessment process (see Section 4 of this report), address objects 5(b) and (c) of the EP&A Act.

3.7. Statement of Compliance

In accordance with section 75I(g) of the EP&A Act, the Department is satisfied that the Proponent's overall assessment has complied with the Director General's environmental assessment requirements issued for the project on 6 May 2010.

4. CONSULTATION AND SUBMISSIONS

4.1. Exhibition

Under section 75H(3) of the EP&A Act, the Director General is required to make the environmental assessment publicly available for at least 30 days. After accepting the Environmental assessment, the Department publicly exhibited it from 22 September 2010 until 29 October 2010 on the Department's website, the Department's head office in Sydney, at Bankstown and Canterbury Council offices and at the Liverpool City Library. Additional copies were also made available at the Proponent's head office at North Sydney and at the Nature Conservation Council, Newtown.

The Department also advertised the project in the *Sydney Morning Herald*, *Daily Telegraph*, *Liverpool Leader*, *Bankstown Canterbury Torch* and the *St George Sutherland Shire Leader – St George Edition*. The Department also notified relevant State and local government authorities of the proposal in writing.

The Department received 67 submissions: nine from public authorities (including two local government councils) and 58 from the general public. A summary of the issues raised in the submissions is provided below.

4.2. Public Authority Submissions

Four submissions were received from public authorities: the former Department of Environment, Climate Change and Water; the NSW Office of Water; the former Department of Industry and Investment and the former NSW Transport. Although none of the authorities objected to the project, they did raise a number of issues for the Department's consideration and assessment. Further, the former NSW Transport indicated qualified support for the project.

Department of Environment, Climate Change and Water (now the **NSW Office of Environment and Heritage**) indicated a number of concerns including:

- the technical veracity of the operational noise modelling undertaken, including the model validation process;
- the lack of sufficient detail on the construction noise assessment for works outside of standard construction hours; and
- the need for further detailed consideration of potential flooding and hydrological impacts of the project including under climate change scenarios.

In its submission, the former Department of Environment, Climate Change and Water recommended conditions of approval in relation to:

- translocation measures for the specimens of *Acacia pubescens* predicted to be impacted by the project;
- biodiversity offset requirements for predicted native vegetation impacts; and
- assessment requirements for ancillary facilities, which were not currently identified in the Environmental assessment.

Further, it supported opportunities for the M5 Motorway to be integrated with existing or proposed cycle and pedestrian networks in the vicinity of the M5 Motorway.

NSW Industry and Investment (I&I NSW) (now the **Department of Trade and Investment, Regional Infrastructure and Services – Department of Primary Industries Division**) indicated that it had no objection to the project provided that the measures outlined in the Proponent's Environmental assessment are implemented in relation to the mitigation of impacts on aquatic habitats. No issues relating to agricultural impacts or mineral resources were raised for the Department's consideration.

NSW Transport did not raise any objections to the project or any issues for the Department's assessment.

The **NSW Office of Water** recommended:

- that a 50 metre riparian buffer zone be provided on either side of the Georges River and a 30 metre wide riparian buffer zone be provided for the second order waterway Anzac Creek in relation to all construction works (including the location of detention basins, ancillary facilities and cycle paths) associated with the project; and
- where the above buffer zones cannot be met, works should be located in already cleared areas, or where any riparian vegetation is required to be disturbed that this vegetation be appropriately rehabilitated and/ or offset with locally indigenous species.

4.3. Local Authority Submissions

Five submissions were received from local authorities: the Southern Sydney Regional Organisation of Councils; Bankstown City Council; and three separate submissions from Liverpool City Council. Although none of the authorities objected to the project, they did raise a number of issues for the Department's consideration and assessment. Further, the Liverpool City Council and the South Sydney Regional Organisation of Councils indicated qualified support for the project.

South Sydney Regional Organisation of Councils commented on the strategic justification of the project in the context of other transport development in the *Metropolitan Transport Plan*, including bus and rail improvements. It noted that there is a need to ensure that traffic demand increases from the M5 West Widening project can be accommodated by the surrounding public road network, particularly around on and off ramps. It also indicated concern over the potential for the project to increase traffic congestion to the M5 East Freeway. Further, the

Organisation raised concern about road safety from the proposed narrowing of traffic lanes during construction and recommended that lane widths be increased where possible as part of the operational design.

The Organisation recommended that the proposed new lanes on the M5 Motorway be utilised as express transit-ways for buses and heavy vehicles during peak times, and suggested that cycleways should be included in the project design where possible.

Liverpool City Council identified operational noise as a key concern, in particular the current and future impact of traffic noise on residents in Casula, Liverpool and Moorebank. The Council raised concerns regarding the lack of noise monitoring undertaken at the Casula Links Estate and identified a need for noise barriers in this location. Improvements to noise barriers in the vicinity of the Hume Highway interchange were also requested. The Council also:

- recommended the monitoring of construction activities, specifically dust and noise impacts and the limitation of construction hours;
- recommended that the project design incorporate design break down areas for heavy vehicles and west facing ramps at the Hume Highway interchange;
- questioned why widening of the M5 Motorway (east bound) was proposed to terminate at Fairford Road; and
- recommended that the project take into account impacts arising from the Moorebank Intermodal proposal.

Conditions of approval relating to flooding design, pre-construction activities, ancillary facilities construction works and restoration were also recommended.

Bankstown City Council raised issues in relation to:

- the impacts associated with additional traffic using the M5 Motorway and the need to assess impacts in the context of the whole M5 corridor and consider an integrated transport solution;
- the need to upgrade the M5 East Freeway and investigate improvements to the local road network, including ramps at Beaconsfield Street, expansion of Henry Lawson Drive and grade separation of the Stacey Street/Hume Highway intersection;
- the potential for increased congestion on regional roads linked to the M5 Motorway, in particular Henry Lawson Drive, The River Road, King Georges Road and Stacey Street;
- the proposed use of concrete barriers to separate traffic lanes rather than wire rope barriers and associated road safety concerns;
- construction noise impacts, including from proposed ancillary facilities near residential areas;
- the need for further operational noise mitigation measures;
- flora and fauna impacts including the need for proposed drainage basins to be located away from identified endangered ecological communities and wetlands, and for appropriate surveys to be undertaken for the presence of Green and Gold Bell Frogs; and
- the implementation of effective stormwater and treatment systems.

The Council also recommended the incorporation of beautification measures at the exit to Fairford Road (which is an important gateway to the Bankstown local government area), and drainage improvement works at Beaconsfield Road, Milperra, into the project design.

4.4. Public Submissions

A total of 58 submissions were received from the public. Of these, 17 expressed support for the project, 21 objected to the project, and 20 did not state a specific position but raised issues for consideration. The key issues raised in public submissions are identified in Table 2.

Table 2: Summary of Issues Raised in Public Submissions

Issue	Proportion of Submissions
Noise - the key concern related to increases in operational noise impacts as a result of additional traffic generated by the project, the adequacy of existing noise barriers in	53 percent

Issue	Proportion of Submissions
mitigating operational noise, and requests for additional noise mitigation. Additional or upgraded noise barriers were requested for specific locations, including along the Georges River bridge in relation to the Casula Links Estate, Casula. A number of submissions also requested that the noise barriers be constructed prior to the commencement of construction to protect receivers from construction noise associated with the project.	
Traffic – this included various comments on proposed road network changes including why the widening was not proposed to extend to King Georges Road (eastbound), impacts of additional traffic on the M5 Motorway on the functioning of the M5 East Freeway and the surrounding local road network (including requests for local road improvements), the need for the M5 Motorway to incorporate cycle facilities, the capacity of the project to cater for the proposed Moorebank Intermodal, and tolling issues.	27 percent
Justification – comments related to the strategic need/ justification for the project in the context of rail alternatives, cross-regional public transport solutions and non-CBD alternatives.	10 percent
Air Quality – the key concern was reduced air quality due to vehicular emissions and associated health implications.	4 percent
Other – these included the adequacy of the community consultation undertaken on the project, visual and urban design considerations, and greenhouse gases and climate change implications of the project.	6 percent

4.5. Proponent's Response to Submissions

In May 2011, the Proponent submitted a Submissions and Preferred Project Report for the project which included a response to issues raised in agency and public submissions and a description of the amendments made to the project in response to issues raised in submissions, to minimise potential environmental impacts of the project. The key changes to the project (as described in Section 2.2 of this report) related to:

- the extension of lane widening east bound up to King Georges Road, rather than terminating at Fairford Road as originally proposed in the Environmental assessment;
- amendments to the Hammondville toll plaza layout to provide three free flow lanes and one to two cash lanes in each direction;
- the incorporation of four emergency crossover gates in the median to facilitate emergency use and serious incident management;
- the incorporation of over five kilometres of additional noise barriers and augmentation of over 15 kilometres of existing noise barriers, as well as provision of at-house architectural treatments to mitigate predicted noise impacts; and
- refinements to the design of drainage basins.

The Submissions and Preferred Project Report also included additional assessment of operational noise, traffic and transport, biodiversity, non-Aboriginal heritage and visual and urban design impacts. The additional assessments were undertaken to assess changes in the level of impact resulting from amendments made to the project and in response to issues raised in some submissions regarding the technical veracity of the original assessment of some issues presented in the environmental assessment (for example, the original noise modelling undertaken by the Proponent was questioned in the submission from the former Department of Environment, Climate Change and Water).

To provide the public with the opportunity to comment on the changes made to the proposal, the Department placed the environmental assessment and the Submissions and Preferred Project Report on public exhibition from 18 May to 1 June 2011. The exhibition was advertised in the same newspapers as during the exhibition of the Environmental assessment, and the Report was publicly exhibited at the same exhibition locations as for the

Environmental assessment, including on the Department's website. The Department also notified relevant State and local authorities of the Submissions and Preferred Project Report in writing.

The exhibition resulted in the receipt of 50 public submissions. Of these, four expressed support for the project, 10 objected to the project and 36 did not state a specific position but raised issues for the Department's consideration. A total of 46 of the 50 public submissions received reiterated concern regarding operational noise impacts and the adequacy of proposed mitigation measures, with 40 specifically requesting noise barriers along the Georges River West bridge. A small percentage of public submissions also reiterated comments in relation to traffic impacts, including the need for cycleway facilities along the M5 Motorway and the capacity of the project to cater for the proposed Moorebank Intermodal terminal.

Submissions were also made by three public authorities and three local authorities. The issues raised by the authorities are summarised below.

The **Department of Trade & Investment, Regional Infrastructure & Services** (agriculture, fisheries and minerals sections) indicated that it had no objections or any further comment to make on the proposed project.

The **Office of Environment and Heritage** indicated that the issues raised in its submission on the Environmental assessment have been largely addressed in the Submissions and Preferred Project Report. However, it noted that biodiversity is a key issue that should be addressed prior to the commencement of the project and that if it is not adequately resolved prior to project determination, appropriate conditions of approval should be developed to manage the issue. Consequently, the Office of Environment and Heritage recommended a number of conditions of approval including the development and implementation of a translocation program for *Acacia pubescens* and an offset strategy to compensate for the loss of native vegetation.

The **NSW Office of Water** recommended that the riparian setback along the Georges River be extended from 40 to 50 metres, as the waterway is a significant ecological corridor.

Liverpool City Council indicated general support for the proposal but indicated that its original concerns had not been taken into consideration, particularly the need to provide noise barriers for the full length of the M5 Motorway in urban areas including on the Georges River West bridge. In addition, Council urged the Proponent to re-consider its position and provide a dedicated off-road cycleway. It also recommended that the Proponent construct the full interchange at the Hume Highway to enable better access to Liverpool. Council also sought clarification of the impact of increased traffic flows associated with the proposal on the Hume Highway/Moorebank interchange.

Bankstown City Council raised concern that issues it had raised on the Environmental assessment had not been appropriately addressed in the Submissions and Preferred Project Report, in particular:

- the need to assess impacts in the context of the whole M5 corridor and for the Government to provide a firm timing commitment for expansion of the M5 East Freeway;
- the potential for increased congestion on regional roads linked to the M5 Motorway, in particular Henry Lawson Drive, The River Road, King Georges Road and Stacey Street;
- the need to investigate improvements to the local road network to overcome bottlenecks, including ramps at Beaconsfield Street, and the expansion of Henry Lawson Drive and grade separation of the Stacey Street/Hume Highway intersection;
- construction noise impacts, including those associated with proposed ancillary facilities near residential areas; and
- the need for further operational noise mitigation measures.

In addition, Council indicated that there is a need to protect all remnant native trees within the proposed construction compounds, enhance landscaping at the Fairford Road exit, as well as review drainage basin design to minimise the impact of discharge flows on receiving waterways.

The **M5 Taskforce** (comprising the local government areas of Bankstown, Botany, Camden, Campbelltown, Canterbury, Hurstville, Liverpool and Rockdale, and the Macarthur Regional Organisation of Councils and Western Sydney Regional Organisation of Councils) sought a firm timing commitment for the coordinated

expansion of the entire M5 corridor and commitment to wider freight and public transport strategies to complement the M5 East Freeway extension. The Taskforce also called for a commitment to address congestion on regional roads linked to the M5 Motorway indicating that the project, as currently proposed, does not adequately consider the growth that is to occur over the next 25 years in the region.

5. ASSESSMENT

After consideration of the Proponent's environmental assessment and Submissions and Preferred Project Report and issues raised in agency and public submissions, the Department considers the following to be the key environmental issues associated with the project:

- operational and construction traffic impacts and network changes;
- operational and construction noise and vibration; and
- biodiversity.

The Department's consideration of key issues associated with the project is provided in the following sections.

The Department has also considered other issues raised in submissions and in the Proponent's assessment including air quality, Aboriginal and non-Aboriginal heritage, greenhouse gas emissions, visual amenity, hydrology and community involvement. The Department considers that these matters generally pose a low environmental risk and that the Proponent has developed a range of commitments to manage or mitigate these impacts. Where no applicable commitment exists, or where the Department considers a commitment needs strengthening, specific conditions of approval have been recommended. The Department's consideration of these issues is addressed in Section 5.4.

5.1. Traffic Impacts and Network Changes

Issue

Operational Traffic

The existing M5 Motorway operates as a dual carriageway, motorway standard through south-western Sydney. The Proponent undertook a detailed traffic and transport assessment as part of its Environmental assessment and Submissions and Preferred Project Report, identifying existing traffic constraints within the M5 Motorway corridor.

Traffic counts undertaken by the Proponent in 2009 reveal an estimated 91,000 vehicles use the M5 Motorway each weekday. Of these, approximately eight percent comprises heavy vehicles. However, this proportion varies by the time of day with heavy vehicles accounting for approximately seven percent of the traffic in the morning (AM) peak period (i.e. between 7.00 am and 9.00 am), between four and six percent in the evening (PM) peak period (i.e. between 3.00 pm and 6.00 pm), reaching 12 percent in the inter-peak period (i.e. 11.00 am to 1.00 pm).

The maximum AM peak-hour flows occur in the section between the Hume Highway and Moorebank Avenue with approximately 4,800 vehicles travelling in the eastbound direction and 4,100 vehicles westbound. This level progressively declines to around 2,000 eastbound and 2,900 westbound vehicles by King Georges Road due to traffic entering and leaving the M5 Motorway at most interchanges and capacity limitations at the eastern end of the M5 Motorway. The counts also identified that even outside of peak hours, the M5 Motorway carries a constant volume of traffic throughout the weekdays that is close to the volumes carried during peak hours.

Current predictions suggest that there will be a strong growth in daily traffic with the most growth experienced during the AM peak period. The Annual Average Daily Traffic forecasts under the base case scenario (i.e. no widening) at the M5 Hammondville Toll Plaza are 99,300 vehicles in 2016, and 113,700 in 2026. The projected Annual Average Daily Traffic forecasts at the Toll Plaza with the project proceeding are 111,200 vehicles in 2016 and 136,100 in 2026.

The Proponent's assessment identified current travel speeds of around 49 kilometres per hour east bound in the AM peak period and around 56 kilometres per hour west bound during the PM peak period, compared to a posted speed limit of 110 kilometres per hour.

Operational conditions within a traffic stream (including for example, speed, travel time, and driver manoeuvrability) are defined in terms of "Level of Service". There are six Levels of Service, designated from A to F, with Level of Service A representing the best operating condition and Level of Service F, the worst. The Level of Service of the existing M5 Motorway during peak periods was identified to be:

- E (operations close to capacity) east bound between Camden Valley Way and the Hume Highway during the AM peak period and C (stable flow with some restrictions to driver manoeuvrability and speed) east bound for the remainder of the M5 Motorway during the AM peak period, with the exception of between Heathcote Road and Henry Lawson Drive which was D (close to the limit of stable flow and is approaching unstable flow); and
- between D and E, west bound along the M5 Motorway during the PM peak period.

The environmental assessment identifies that should the M5 Motorway remain in its current configuration, travel times would increase by about 10 minutes during both the AM peak period eastbound and PM peak period westbound between 2016 and 2026. In addition, the Level of Service would deteriorate to very poor levels for both directions of travel in the AM and PM peak periods, with queuing and congestion expected to occur along the length of the M5 Motorway.

Following analysis of private vehicle trips and public transport options within and adjacent to the M5 Motorway, the Proponent considered the upgrade of the M5 Motorway would provide the most optimal solution to cater for existing and future traffic growth (including freight) in the region. With the implementation of the project, the Proponent's assessment estimated that average travel times during the AM peak period would improve by around 16 percent in 2016 (in both the eastbound and westbound directions) compared to the base case (i.e. no widening) and by 9.8 percent (east bound) and 24.1 percent (west bound) compared to the base case during the PM peak period. By 2026, improvements to average travel times (compared to the base case) are expected to be in the order of 22 percent during the AM peak period (in both the eastbound and westbound directions) and between 19 percent (eastbound) and 25 percent (westbound) during the PM peak period.

The Proponent's assessment also considered traffic outcomes with and without the project on a parallel route comprising Newbridge Road, Milperra Road and Canterbury Road and determined that there would be limited scope for this alternative to cater for anticipated traffic growth with this route expected to operate at a Level of Service of E at a range of intersections in peak periods.

Construction Traffic and Access

The project will involve construction within the M5 Motorway corridor for a period of approximately two years. This will require the traffic speeds to be reduced to 80 kilometres per hour and for temporary modifications to existing lane alignments, including decreases in shoulder and lane widths and modifications to intersection features. The environmental assessment identified that construction would:

- increase travel time by two to three minutes and decrease travel speeds by 10 kilometres per hour in inter-peak hours;
- increase travel time by two minutes and reduce speeds by seven kilometres per hour in peak periods; and
- result in approximately five to 10 percent of traffic on the M5 Motorway diverting to alternative parallel roads during peak hours.

In addition, temporary lane closures will be required in certain locations as would temporary road closures and traffic diversions. The De Meyrick Avenue underpass at Casula may be required to be either partially or fully closed for short periods of time over a six month period to extend and reconstruct this structure. The project will also require the closure of one lane at Queen Street, Revesby and Nuwarra Road, Moorebank for the duration of bridge works.

To minimise traffic disruptions on the M5 Motorway, and the flow on effect of causing congestion on the orbital network, and minimise safety risks to construction personnel, it is proposed that certain works will be scheduled

during the night. These works include lane closures, removal of existing lane markings and new line markings, removal and replacement of noise barriers, re-surfacing works, certain bridge works and ramp tie-in works.

The Proponent is also seeking approval for 24 hour operation and vehicular movements at nominated construction compounds to facilitate the efficient construction of the project.

Department's Consideration

Operational Traffic Modelling

The Department is satisfied that the Proponent has undertaken a rigorous and comprehensive assessment of likely traffic conditions along the M5 Motorway, with and without the project. This includes detailed micro-simulation traffic modelling along each section of the M5 Motorway and modelling of traffic volumes, including consideration of vehicle trips generated across the Greater Metropolitan Area. The Department notes that the traffic modelling specifically took into consideration projected land use change, key development proposals and sites, trip demand and future transport infrastructure improvements to base predictions on traffic volumes, speeds and travel times. Based on the traffic modelling undertaken, the Department is satisfied that the Proponent has established the need for the project with respect to existing traffic constraints and traffic improvements likely to be achieved by the project.

Transport Planning and Modal Issues

A number of submissions questioned whether the project comprises the optimal solution to meet the transport needs of south-western Sydney, citing public transport alternatives such as rail and bus corridors and/ or the need for other network improvements along surrounding arterial roads (in conjunction with improvements to the M5) to achieve material benefits with respect to alleviating traffic congestion. Some submissions considered that the project would result in induced traffic and encourage modal shifts from public transport to road traffic. The Department has assessed the need for the project in the context of the NSW Government's "pinch point program" (a program to relieve traffic bottle necks on 23 major road corridors across Sydney) and strategic transport planning objectives for Metropolitan Sydney, including other modal alternatives, in Section 2.3 of this report, and is satisfied that the project is justified in itself and is needed to achieve the identified objectives of the project including relieving traffic congestion and providing capacity for future growth (including for freight) along a strategically important transport corridor.

Whilst the Department accepts that the Proponent's modelling has indicated that some induced traffic would occur (0.1 - 0.3 percent increase of private vehicle trips from areas such as Bankstown, Fairfield, Liverpool and Campbelltown, due to the improvements in travel time and speed provided by the project), the Department considers that this increase would not be significant and would not significantly detract from public transport modal alternatives, given that the M5 Motorway would continue to have utility in servicing trips/ employment destinations (e.g. Port Botany) which are not currently well serviced by public transport links. The Department considers that the M5 West Widening project would meet a specific identified traffic need and its development would not on the whole, detract from but rather complement other planned transport improvements in Sydney including improvements to surrounding arterial roads as part of the pinch point program and planned rail and bus corridor improvements, such as the South West Rail Link. The Department notes that limiting the scope of the project to three lanes in each direction would also serve to limit the possibility of induced traffic and mode shift.

A key limiting factor to traffic flows along the M5 Motorway is the capacity of the M5 East Freeway. The Department notes that under normal traffic conditions, traffic banks back to King Georges and Fairford Roads due to the M5 East tunnel. In their submissions, Bankstown City Council and the South Sydney Regional Organisation of Councils raised concern that upgrading of the M5 Motorway would simply redistribute the traffic delays from the western end of the M5 Motorway to its eastern end. Consequently, they both stated that there is a need for expansion of the entire M5 corridor (i.e. upgrading of the M5 East Freeway).

The NSW Roads & Traffic Authority has recognised this and has commenced preliminary investigations to improve the network in this area. A preferred route has yet to be selected. As such, it is appropriate to separate the M5 corridor into discrete projects to provide benefits to the community sooner. This approach is not dissimilar to other staged highway/ motorway developments, including the Pacific Highway Upgrade Program, the Hume Highway Duplication Project and F3 widening, where the corridors have been broken down into their own discrete

projects due to technical, social, environmental and constructability reasons. When each individual project is complete, an incremental benefit to the travelling community is achieved.

The Proponent's analysis identified that origins and destinations for traffic are unlikely to significantly change should the project not proceed. This would mean that in 2026, 40 percent of vehicles would utilise the M5 East Freeway. If the project proceeds and predicted traffic volumes realised, the Proponent identifies that only a third of traffic on the M5 Motorway would use the tunnel. The Department concurs with the Proponent's conclusion. On this basis, and the fact that the Proponent is investigating options for upgrading the M5 East Freeway, the Department is of the opinion that it is reasonable to proceed with the M5 West Widening project at this stage in time without the upgrade of the M5 East Freeway.

Network Issues

A number of submissions (including those from Bankstown and Liverpool City Councils, the South Sydney Regional Organisation of Councils and the M5 Taskforce) suggested additional network improvements that should be implemented as part of the M5 Widening project including suggestions for direct access from the M5 Motorway to the Milperra-Bankstown Airport Specialised Centre, the provision of an east bound on-ramp at Belmore Road and west-facing ramps at the Hume Highway Interchange, and various improvements to intersections and roads adjoining the M5 Motorway (such as Stacey Street and the Hume Highway intersection) to cater for likely increased demand at these interchanges and roads as a result of the project. In addition, several submissions supported the continuation of a third traffic lane eastbound up to King Georges Road rather than terminating at Fairford Road (as proposed in the Environmental assessment). Following additional traffic modelling, the Proponent has subsequently proposed the continuation of three lanes (eastbound) up to King Georges Road as part of its Submissions and Preferred Project Report.

The Department notes that the extent of works to be undertaken as part of the project has been determined on the basis of traffic modelling, focusing on those improvements that would offer optimal traffic benefits to achieve the stated objectives of the project. In this regard, the Proponent has identified that additional work such as a new eastbound ramp at Belmore Road has been excluded due to the modelling indicating sub-optimal traffic outcomes. The construction of a west-facing ramp (eastbound) at the Hume Highway Interchange was excluded as this would increase traffic along the Hume Highway, necessitating a capacity increase of the highway to accommodate anticipated additional traffic. Given the costs of widening the Hume Highway, this was not considered a priority for inclusion in the project. Although the provision of a west-facing (westbound) ramp would provide some benefit to traffic flows, the option was not considered a priority due to cost and in the context of the project objectives. However, it should be noted that the design of the M5 West Widening project does not preclude the construction of these ramps at some time in the future.

Additional access from the M5 Motorway to the Milperra-Bankstown Airport Specialised Centre has also been excluded due to existing access routes to the site, including Henry Lawson Drive and The River Road/ Milperra Road.

The Proponent has also identified that road improvements outside of the M5 Motorway corridor have generally been excluded as these are considered to be outside the scope of the project. Notwithstanding, the Proponent's traffic modelling identified that improvements to the M5 Motorway would have the potential to place additional pressure on surrounding streets, although this additional congestion is unlikely to be significantly higher than existing conditions. This is particularly the case for Stacey Street and King Georges Road. It is expected that delays on King Georges Road would increase due to additional queuing from the eastbound on ramp to the M5 East Freeway. Increased delay at intersections on Stacey Street is expected as a result of reduced congestion on the M5 Motorway, allowing more traffic to flow onto Fairford Road and then Stacey Street. The Department is of the opinion that the benefits derived from the widening of the M5 Motorway from Fairford Avenue to King Georges Road (relieving morning peak capacity constraints to the west of the Hammondville Toll Plaza, reducing the overall queue length for vehicles travelling to the M5 East Freeway, travel time savings for the peak directions in the morning and evening peak periods, relieving westbound queuing on the M5 Motorway in the section between King Georges Road and The River Road) outweigh the additional pressures that may be placed on a limited number of surrounding roads.

In addition, the project is predicted to be successful in diverting traffic away from the alternative route (Hume Highway, Newbridge Road, Milperra Road and Canterbury Road) in comparison to the base case (without widening) where future congested conditions on the M5 Motorway would result in traffic diverting away from the M5 Motorway.

The Department notes that the Proponent has committed to operational monitoring to compare actual versus predicted impacts and including opportunities to refine the project to optimise its performance. The Department considers such a commitment has merit, although is unclear on its scope. As such, the Department has recommended a condition requiring the Proponent to undertake an operational traffic review 12 months following the commencement of operation of the project. The review is to assess the adequacy of traffic performance in terms of the Level of Service at the intersections of the major roads crossing the M5 Motorway and the major intersections on the alternative route to the M5 Motorway. In addition, it is recommended that the review includes feasible and reasonable mitigation measures for improving traffic performance, especially where it is determined that there has been a significant decrease in the Level of Service due to the project. These measures could include changes to signage, adjustments to the phasing of traffic signals and provision of/ improvements to turning lanes, etc. The Department considers that this condition addresses the concerns raised by Bankstown City Council, the South Sydney Regional Organisation of Councils and the M5 Taskforce regarding potential increased congestion on regional roads linked to the M5 Motorway, in particular Henry Lawson Drive, The River Road, King Georges Road and Stacey Street.

Project Design

The National Roads and Motoring Association raised a number of issues relating to signage and recommended that the Proponent undertake a review of variable message sign locations, use, and display type and information in conjunction with the Association. It also recommended that the Proponent liaise with the Association in regards to the proposed road signage for the project, that all signage be in accordance with the requirements of the NSW Roads & Traffic Authority, and for all existing signage to be updated. The Department considers that the Proponent has adequately addressed the recommendations of the National Roads and Motoring Association in the Submissions and Preferred Project Report, noting that the location and design of signage is in accordance with NSW Roads & Traffic Authority guidelines.

A number of submissions suggested the provision of a truck-only lane. The Department concurs with the Proponent that any benefit that this may provide would not justify the dis-benefits to other vehicles that this would create, such as increased congestion in the non-truck lanes and consequent reduced travel times.

In regards to Bankstown City Council's concerns over traffic safety barriers, the Proponent has indicated that standard 'Type F' concrete barriers would be provided to separate the two carriageways throughout the length of the M5 Motorway. The existing wire rope barriers will be replaced by concrete barriers as the central median of the widened M5 Motorway will not be of sufficient width to safely allow the wire rope barriers to deflect on-vehicle impact without encroaching into the opposite carriageway.

Tolling System

The Department notes that a number of submissions questioned the lack of time of day and/ or section based tolling for the project, noting that the M7 uses section based tolling and the Harbour Bridge/ Tunnel time of day tolling. Further, submissions questioned the effectiveness of the cash back system, and the lack of a toll on the M5 East Freeway and King Georges Road interchange.

The commercial realities of the project mean that it requires an income stream for the operator, in this instance being vehicular traffic. In order to maintain and operate the project, appropriate tolling will remain for at least the nominated lease period as identified in the terms of the concession deed for the M5 Motorway. The decision to adjust tolling in accordance with traffic demand and reduction/ imposition of tolling for the project is outside the scope of this assessment and will ultimately be the Government's decision.

Pedestrian and Cyclist Facilities

The Traffic and Transport working paper considered the upgrade's impacts on pedestrian and cyclists along the M5 Motorway corridor and included an assessment of opportunities to integrate the M5 Motorway and on- and off-road bicycle and pedestrian networks in the area.

Due to safety reasons, there is no pedestrian access along the length of the M5 Motorway. Consequently, no recommendations are made in this regard. In addition, there are no separate cycleways along the M5 Motorway with cyclists confined to the shoulders of the motorway. The M5 Motorway is generally not suited to recreational or family groups due to conflicts between high-speed vehicular traffic and slower bicycles.

The Department notes that a number of submissions highlighted the need to encourage alternative modes of transport and the construction of an improved cyclist network would facilitate this. In addition, some submissions recommended the provisions of a dedicated cycleway along the length of the M5 Motorway. Whilst a dedicated system would be desirable, the Department accepts that it is not feasible or reasonable to provide a dedicated cycleway at this stage due to the costs associated with construction and maintenance, low demand and usage by cyclists, and the limited space available within the road corridor. The Department concurs with the Proponent that in this instance the preferable approach to deliver improvements to the bicycle network in areas surrounding the M5 Motorway corridor would be through the NSW Roads & Traffic Authority's "Bicycle Program". This Program assists local government through joint funding, to develop council bike plans and implement associated local bicycle networks.

To address submissions with regard to the use of the M5 Motorway by cyclists, the Department has recommended a condition of approval requiring the Proponent to maintain the existing levels of access for cyclists throughout construction and operation of the upgraded M5 Motorway.

The National Roads and Motorists Association recommended that the Proponent undertake a risk analysis of bicycles using Sydney motorways, including a comparison with the use of urban motorways in other Australian States. The Association also recommended that subsequent to the outcome of the risk analysis, where cyclists are expected to use the M5 Motorway, the Proponent should install a one metre wide buffer strip of chevron line markings within the road shoulder. The Department is of the opinion that such an analysis is a strategic matter and beyond the scope of the current project.

Construction Traffic

The Department notes that the M5 Motorway carries a significant volume of traffic during both peak and intra-peak periods. Further, it is satisfied that the Proponent has attempted as far as practicable to limit the impacts of construction on traffic flows. Due to the significance of the M5 Motorway corridor and the need to maintain flows, the Proponent proposes to minimise road closures through staged construction and to maintain the current number of traffic lanes particularly during the busier periods. However, closure of the M5 Motorway will be required on certain occasions. In order to reduce the impact of closures and construction activities on traffic, out-of-hours construction will be necessary. The Department is satisfied that this approach is required to deliver the project and protect the safety of both workers and the travelling public. In addition, night-time road closures are not dissimilar to that employed on other motorways in Sydney including the upgrade of the M2 Motorway. Amenity impacts would be short term and the redirection of vehicles onto the Hume Highway and surrounding road network would not significantly impact on traffic as these roads are capable of supporting the increased flows. The Department considers the Proponent has a sufficient traffic management framework available to deal with this concern.

In terms of the closure of the De Meyrick Bridge underpass, the Proponent has advised that full closure of the underpass for a six month period and full closure of the M5 Motorway for about 20 nights will not be required, as proposed in the Environmental assessment, as significant structural works are not necessary as originally thought. The bridge is wide enough to accommodate three lanes and the relocation of noise walls will be accommodated by pavement shoulder widening. The reduced scope of works at the underpass will significantly reduce the requirement for full closures of the M5 Motorway and underpass, and night works. The Department notes that a suitable underpass diversion, approximately four kilometres in length, exists nearby (Kurrajong Road, Old Kurrajong Road and Reserve Road) and considers that on balance, although short-term closures of the underpass would impact temporarily on connectivity and access within Casula, when completed, the upgrade would deliver an improved outcome by removing the narrow lanes, and slightly increasing heights thereby improving road safety through the underpass. Further, the Department acknowledges that the roads comprising the alternative route are capable of accommodating the traffic volumes with limited potential for adverse traffic impacts.

With respect to bridge widening works over Nuwarra Road, Moorebank and Queen Street, Revesby, the Department notes that construction will occur outside peak periods and two-way flow is proposed to remain, under traffic control. This is considered an acceptable management measure.

The installation of variable message signs may require lane closures at each installation site to allow excavation, concreting and the use of a crane to lift the sign into position. Where lane closures are required, the Proponent has indicated that this would occur during the night. The Department considers this a reasonable approach for minimising interruptions to road traffic, especially considering the work at any one location is expected to be completed in approximately two nights.

The projected volume of construction traffic on the road network would be small relative to existing levels of traffic on the M5 Motorway and surrounding arterial roads. Nevertheless, the Department has recommended that the Proponent prepare a Construction Traffic Management Plan as this is considered the most appropriate tool for the management of construction traffic impacts. The Plan is to identify traffic haulage routes, details of vehicle movements to construction sites and compounds, and measures to minimise disruption to local traffic. The Proponent is also required to prepare a Community Communication Strategy to facilitate consultation and communication with the community on construction related matters, including procedures and mechanisms to consult and notify sensitive receivers.

In terms of construction traffic impacts associated with the operation of construction compounds, Bankstown City Council raised concern that heavy vehicles accessing the Beaconsfield Street compound would impact on residences in the area. The Proponent has indicated that traffic to and from construction compounds is unlikely to have any significant impact on residential roads. The Department notes that the predicted movements outlined in the Environmental assessment and presented in Table 3 indicates that no more than 15 heavy vehicle movements are expected at the construction compounds over a night-time period. This equates to one vehicle an hour, two at worst. The Department considers this impact is acceptable as the compound is required to operate on a 24 hour basis in order to support construction activities which need to be undertaken outside of standard construction hours for safety reasons and to limit impacts on traffic.

Table 3: Predicted Vehicle Movements at Compound Locations

Compound	Proposed Use	Proposed Access Point	Average daily traffic movements		Night-time traffic movements (24 hour sites only)	
			Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles
Moorebank Avenue	Main Office	From Moorebank Avenue	368	80	50	10
M5/Graham Avenue (1)	Satellite Office	Direct from M5	60	20	10	15
M5/Graham Avenue (2)	Satellite Office Materials laydown	From M5/Angelo Avenue	20	20	n/a	n/a
M5/Graham Avenue (3)	Satellite Office Materials laydown	From M5/Angelo Avenue	20	20	n/a	n/a
Bransgrove Road	Satellite Office Materials laydown	From Bransgrove Road	40	40	10	10
Henry Lawson Drive	Satellite Office Materials laydown	From Henry Lawson Drive	20	20	n/a	n/a
Beaconsfield Road	Main office Materials laydown	From Marigold Street	180	80	10	10
Heathcote Road (north)	Satellite Office Materials laydown	From Heathcote Road	40	20	n/a	n/a

The construction compound sites will employ a traffic controller at the site access to manage vehicular traffic into and out of the site and pedestrian flows across the access to minimise pedestrian and vehicle conflict. Further, the Proponent has indicated that construction vehicle routes will be developed in the context of minimising impacts on local streets and maximising the use of arterial roads and avoiding sensitive communities especially schools, hospitals and places of worship.

Access to the M5/Graham Avenue (1) compound is currently proposed from the M5 Motorway, with investigations into the feasibility of accessing the M5/Graham Avenue (2) and (3) compounds directly from the M5 Motorway in progress as this is the preferred option. The Proponent has advised that there are currently no noise barriers along the length of the M5 Motorway in this location and that appropriate traffic control measures would be implemented to facilitate safe access to and from the compound(s) from the M5 Motorway, including the provision of slip lanes to and from the compound sites.

To offset construction impacts as far as practicable, the Proponent has committed to a range of mitigation and management measures as part of the project. The Department is satisfied with these commitments, although considers that they be supplemented by the following conditions:

- the preparation of dilapidation reports for local roads likely to be used by construction traffic (prior to use by construction heavy vehicles), with any damage resulting from the construction of the project being repaired at the cost of the Proponent;
- preparation of a Traffic Management Sub-plan as part of the Construction Environmental Management Plan, including an overview of mechanisms to deal with road closures/ diversions for vehicles, and maintenance of safe pedestrian and cyclist access during construction;
- limiting access to/ from ancillary facilities as far as practicable at night;
- limiting access to ancillary facilities from the M5 Motorway, interchanges and arterial roads where practicable;
- restricting access to Graham Avenue Compound 1 and 2 and 3 from local roads unless approved under the Traffic Management Sub-plan; and
- communication of any closures of De Meyrick Avenue to residents of Casula.

In summary, the Department is satisfied that the Proponent has undertaken a rigorous assessment of the traffic and access impacts associated with the construction and operation of the project, and that the concerns raised in the public submissions have been adequately addressed as part of the Proponent's Submissions and Preferred Project Report and through the Department's recommended conditions of approval.

5.2. Noise and Vibration

Issue

The M5 Motorway passes through predominantly residential areas (with a large number of residences close to the road corridor), interspersed with areas of industrial uses. A number of educational facilities (11 schools, 1 university and 1 child care centre), one church and outdoor recreation areas (parks, a golf course, tennis courts and playing fields) are also close to the M5 Motorway.

An assessment of ambient noise was undertaken at representative locations along the road corridor. The noise monitoring indicated that at several monitoring locations, noise levels of more than 60 dB(A) during the daytime and more than 55 dB(A) during the night time were recorded. Existing mitigation measures include noise walls and low noise pavement.

The noise assessment of the proposal was undertaken for 18 noise catchment areas (12 residential and 6 commercial), based on geographical location, land use, level of noise exposure and location of the ambient noise monitoring.

Operational Noise

An assessment of the operational noise of the project was undertaken in accordance with the *Environmental Criteria for Road and Traffic Noise Assessment* (Environment Protection Authority, 1999). This document sets out assessment criteria for different types of road developments. The Proponent adopted the noise criteria "redevelopment of existing freeway/ arterial road" for the assessment of potential operational noise impacts as set out in Table 4 and the road traffic noise criteria for sensitive land uses as set out in Table 5. The Proponent also utilised the *Environmental Noise Management Manual* (Roads & Traffic Authority, 2001) to guide the application of the noise criteria and establishment of feasible and reasonable noise mitigation measures.

Table 4: Road Traffic Noise Criteria

Type of Development	Daytime Noise Criterion (7.00 am to 10.00 pm)	Night-time Noise Criterion (10.00 pm to 7.00 am)	Where Criteria are already exceeded
Redevelopment of existing freeway/arterial road	L _{Aeq} (15 hour) 60 dB(A)	L _{Aeq} (9 hour) 55 dB(A)	In all cases, the redevelopment should be designed so as not to increase existing noise levels by more than 2 dB(A). Where feasible and reasonable, noise levels from existing roads should be reduced to meet the noise criteria.

The noise criteria in Table 4 applies to the predicted noise level at a time 10 years after opening of the project (design year), which in this case is 2023. The existing noise levels are described in the *Environmental Noise Management Manual* (NSW Roads & Traffic Authority, 2001) as “future existing” levels, being noise levels due to traffic on existing roads at a time immediately before opening of the project, which in this case is 2013.

Table 5: Road Traffic Criteria for Sensitive Land Uses

Type of Development	Daytime Noise Criterion (7.00 am to 10.00 pm)	Night-time Noise Criterion (10.00 pm to 7.00 am)	Where Criteria are already exceeded
Places of worship	L _{Aeq} (1 hour) 40 dB(A) (internal)	L _{Aeq} (1 hour) 40 dB(A) (internal)	Where existing levels of traffic noise exceed the criteria, all feasible and reasonable noise level control measures should be evaluated and applied. Where this has been done and internal criteria cannot be achieved, the proposed road should be designed so not to increase existing traffic noise levels by more than 2 dB(A).
Existing Classrooms	L _{Aeq} (1 hour) 45 dB(A) (internal)		
Passive recreation and school playgrounds	L _{Aeq} (15 hour) 55 dB(A)		
Active Recreation	L _{Aeq} (15 hour) 60 dB(A)		

The noise assessment concluded that future design 2023 night time noise levels at 286 sensitive receivers would either increase by more than 2 dB (existing noise levels already exceed the criteria) or would be subject to acute noise levels (i.e. equal to or above 60 dB(A)), or both, and therefore would require mitigation. Following the installation of new noise barriers, 180 of these residential receivers would require consideration of architectural treatment. The noise assessment also indicated that 28 non-residential sensitive receivers (12 educational establishments, one church, one child care facility and 14 recreational areas) located near the existing M5 Motorway are potentially affected by the development. The noise assessment indicated that of these, one educational facility (Hammondville Public School) would experience noise levels requiring mitigation as the daytime noise criteria would be exceeded and existing noise levels would be exceeded by more than 2 dB(A) (referred to as the allowance criterion) following the implementation of feasible and reasonable noise control measures. Operational noise levels would also exceed the daytime noise criterion and allowance criterion of 2 dB(A) at one outdoor recreational facility (New Brighton Golf Club). However, as the installation of a noise barrier at this location would provide limited noise reduction benefit, the Proponent concluded that such a measure was not feasible or reasonable.

The former Department of Environment, Climate Change and Water questioned the accuracy of the noise model validation and calibration in its submission, and requested that the Proponent provide additional justification that they were accurate and reflective of future traffic noise levels from the project. It also stated that the noise model should be validated using actual traffic counts taken during noise monitoring. Consequently, the Proponent undertook revised noise modelling using actual traffic counts to calibrate the model.

The revised noise modelling indicated that 944 sensitive receivers would experience future design 2023 night time noise levels that would require mitigation. To address potential operational noise impacts on these sensitive receivers, the Proponent proposes to install over five kilometres of new noise barriers and over 15 kilometres of

augmented noise barriers. However, 322 residences would still need to be considered for architectural treatment as the night time road traffic noise criteria are already exceeded and the predicted noise increases would increase by more than 2 dB(A) or the residence would be acutely affected (that is noise levels are predicted to be above $L_{Aeq(9 \text{ hour})}$ 60 dB(A)), or both.

The Proponent estimates that of the residences that require architectural treatment, 125 residences would be exposed to noise level increases over the 2 dB(A) allowance criteria, 178 residences would be exposed to acute noise levels, and 19 residences would be exposed to both acute noise levels and more than 2 dB(A) increase. Of the residences exposed to acute noise levels the majority would have noise levels between 60 dB(A) and 62 dB(A). It should also be noted that with the project, the number of residences exposed to acute noise levels is reduced, from 206 under future existing to 178 in the design year 2023. The Proponent states that architectural treatment of residences (such as fresh air ventilation, sealing of wall vents and upgrading of door and window sealing (where necessary)) typically provide up to 10 dB(A) reduction in internal noise levels. The provision of architectural treatment to residences would be determined following detailed design and in consultation with property owners.

The existing road surface is mostly surfaced with Open Graded Asphaltic Concrete (OGAC), however with degradation over time and lack of surface maintenance the surface is likely to have become clogged and behave more like Dense Graded Asphaltic Concrete. There are also sections on one side of the carriageway with a DGAC or a concrete (PCC) surface. The existing carriageways will be resurfaced with OGAC, however, for the purposes of noise modelling, this benefit (-2.5 dBA) has been applied to the new pavement only. The resurfacing of the existing carriageways would provide a significant noise benefit over the existing substantially degraded surface.

One educational facility (Sir Joseph Banks Public School, East) would experience noise levels requiring mitigation in that the noise level and allowance criteria will be exceeded as shown in Table 6. Potential mitigation measures are being reviewed as part of the detailed design. The noise criterion and allowance criteria would also be exceeded at three outdoor recreation areas as shown in Table 6.

Table 6: Noise Level Exceedences at Outdoor Recreation Areas

Location	Noise Level Criterion $L_{Aeq(15 \text{ hour})}$ dB(A)	Future Noise Level $L_{Aeq(15 \text{ hour})}$ dB(A)	Increase in Noise Level dB(A)
Sir Joseph Banks Public School, East	45 (internal)	48	2.4
Lieutenant Cantello Reserve	55 (passive recreation)	63	2.6
New Brighton Golf Club	60 (active recreation)	67	2.7
Riverland Golf Club	60 (active recreation)	64	2.1

The noise modelling has indicated that a nominal area of approximately 15 percent of the playable area of the New Brighton Golf Club lies above the noise criterion. The Proponent has concluded that it is not feasible or reasonable to construct 850 metres of noise barriers given the small portion of impacted area. The same applies at the Riverland Golf Club with the part of the course over the allowance criterion being only a small percentage. The Proponent also concluded that it is not feasible and reasonable to construct noise barriers to reduce noise impacts at Lieutenant Cantello Reserve.

Construction Noise and Vibration

Construction of the project will generally involve clearing, excavation, pavement construction, asphalt overlaying, line marking, drainage works, bridge widening, installation of signage and the replacement of and installation of new noise barriers. In addition, a new control building will be constructed at Hammondville and the existing Hammondville Toll Plaza modified. All of these activities will generate noise and while the majority would be

undertaken during standard construction hours, a number of noise-generating activities would need to be undertaken at night, including:

- removal of existing noise barriers and installation of new and augmented noise barriers;
- removal of existing traffic barriers and installation of temporary and permanent traffic barriers;
- removal of existing line markings and new line marking;
- removal of existing static signage and installation of new signs;
- road re-surfacing of the existing open grade asphalt pavement;
- ramp tie-in works;
- some bridge works including piling for abutments, construction of piers and installation of structures such as girders and concrete deck works and drainage works;
- some concreting works; and
- delivery of plant and material required outside of the standard hours of construction.

Any work planned outside standard construction hours would need to be undertaken in accordance with an Environment Protection Licence issued by the Environment Protection Authority (of the NSW Office of Environment and Heritage).

The Proponent considered potential noise impacts arising from the construction of the project in accordance with the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009). This Guideline sets out a range of qualitative and quantitative measures to assess, manage and mitigate noise impacts from a project and includes noise management levels for residential receivers potentially exposed to construction noise as set out in Table 7.

Table 7: Key Construction Noise Management Levels at Residential Receivers (Department of Environment and Climate Change, 2009)

Construction Hours	Noise Management Level L _{Aeq} (15 minute)
Recommended Standard Hours: Monday to Friday 7.00 am to 6.00 pm Saturday 8.00 am to 1.00 pm No work on Sundays or public holidays	Noise affected Rating Background Level + 10 dB
	Highly noise affected 75 dB(A)
Outside Recommended Standard Hours	Noise affected Rating Background Level + 5 dB

The Proponent's assessment of construction noise involved the development of construction noise objectives for twelve noise catchment areas containing residential receivers. The assessment concluded that the predicted construction noise levels during:

- the daytime (7.00 am to 6.00 pm) will exceed the Table 7 noise management level by up to 2 to 7 dB(A) in eight catchments, and by up to 10 dB(A) in one catchment. The highest exceedance is expected to be up to 12 dB(A) in the catchment between Horsley Road and Fairford Road (HR_FR_S);
- the evening (6.00 pm to 10.00 pm) the noise management level will be exceeded in all but one catchment (Camden Valley Way to the M7 West – CVW_M7_W) with predicted exceedances ranging between 2 dB(A) and 16 dB(A), with five catchments experiencing noise level exceedances under 10 dB(A); and
- the night-time (10.00 pm to 7.00 am) exceedances of the recommended noise management level are predicted to range from up to 7 dB(A) to 28 dB(A). Maximum night-time noise levels are predicted to be exceeded by between 1 and 22 dB(A).

Construction traffic noise impacts are predicted to be negligible as they would increase noise levels by less than 1 dB(A). Construction of the new control building at Hammondville is expected to generate noise in the order of 70 dB(A) at the nearest residential receivers. Noise arising from the installation of variable message signage is also likely to exceed construction noise management levels at residential receivers during the night. Night-time noise management levels at residential receivers are predicted to be exceeded at the M5/ Graham Avenue (1) site by up to 3 dB(A).

Construction vibration impacts on human comfort were assessed in accordance with *Assessing Vibration: A Technical Guideline* (Department of Environment and Climate Change, 2006). The impacts from vibration on

building structures were assessed in accordance with the British Standard 7385-2: 1993 *Evaluation and Measurement for Vibration in Buildings - Part 2: Guide to Damage Levels from Groundborne Vibration* and the German Standard DIN 4150-3:1999 *Structural Vibration Part 3 – Effects of Vibration on Structures* for heritage buildings. The assessment concluded that vibration levels from construction plant (under the worst case scenario) will comply with the relevant vibration criteria and consequently there is a low probability of damage to buildings from construction vibration. However, the use of vibratory rollers will exceed the human comfort criterion where residential receivers are located within 50 metres of where rollers are being used.

Department's Consideration

Adequacy of Operational Noise Assessment

As noted above, based on concerns raised by the former Department of Environment, Climate Change and Water, the Proponent amended the noise validation and calibration methodology and undertook revised modelling to assess the potential operational impacts of the project on sensitive receivers. The Department (and NSW Office of Environment and Heritage) is generally satisfied with the revised operational noise assessment. However, the Department acknowledges that the project may be subject to further refinement at detailed design and that this may marginally change the predicted noise outcomes. In addition, a number of submissions questioned the accuracy of monitored and predicted noise levels at their locality, including that there was a lack of noise monitoring at locations representative of their acoustic environment. Consequently, the Department has recommended a condition of approval requiring the Proponent to confirm the operational noise predictions and suitability of the operational noise mitigation measures based on detailed design and undertake additional noise monitoring at the Casula Links Estate to confirm the existing noise levels. The operational noise mitigation review is to be undertaken following the completion of detailed design and prior to the commencement of work on noise barriers.

Although the Department is generally satisfied with the noise assessment, it is of the opinion that additional noise monitoring should be undertaken to confirm existing noise levels and predicted operational noise impacts along the M5 Motorway between Camden Valley Way and Kurrajong Road, Prestons. Unattended noise monitoring was undertaken at 20 representative sensitive residential receiver locations along the length of the proposed project upgrade. However, monitoring at one location (45 Incense Place, Casula) was excluded from the traffic noise verification analysis as the measured levels were not considered to be representative. This was the only noise monitoring location between Camden Valley Way and Kurrajong Road, Prestons. Consequently, the Department is of the opinion that additional monitoring is required and has recommended that the operational noise mitigation review include monitoring at a representative location between Kurrajong Road and Camden Valley Way.

Operational Noise Mitigation

A number of submissions received on the project raised concern over the impact of the project on their acoustic amenity and the need to implement noise mitigation measures. The noise assessment concluded that if the proposal did not proceed (future existing 2013), 1155 properties would be exposed to noise levels that exceed 55 dB(A) $L_{\text{aeq}}(9 \text{ hour})$. With the proposal, in 2023 (future design year) the number of properties that would experience noise levels above the noise criteria would increase to 1947 with existing noise barriers. With the provision of noise mitigation measures, the number of properties with noise levels above the noise criteria would reduce to 1367. The Department notes that the number of properties at which unmitigated operational noise levels are predicted to be exceeded is high, however, this should be viewed in the wider context of the urban nature of the environment surrounding the project corridor and that existing noise levels are high. Of the properties that would be exposed to noise levels that exceed the criteria, the noise assessment predicted 944 properties along the M5 Motorway would experience noise levels increases of more than 2 dBA (criteria is already exceeded) and/ or predicted noise levels are acute (equal to or more than 60 dBA). To address operational noise impacts at these properties the Proponent has committed to implementing a suite of measures in order to mitigate noise to the greatest extent practicable including:

- source reduction methods to control noise at the source – the project design involves the use of a low noise pavement (open graded asphaltic concrete) on new lanes; and
- path controls involving the provision of a barrier (such as noise barriers) to break the line of sight between the noise source and the receptor. The Proponent has identified that the implementation of noise barriers is most cost effective where they can provide ameliorative benefit to multiple receptors at a given location

(rather than isolated receptors). Based on the project design to date, the Proponent intends to install over five kilometres of new noise barriers and over 15 kilometres of augmented noise barriers.

This would reduce the number of properties that require additional noise mitigation to 322, of which 125 would be exposed to noise level increases over the 2 dBA allowance, 178 to acute noise levels and 19 to both acute noise levels and greater than 2 dBA increase. The Proponent has committed to the provision of architectural treatment of these properties to meet the noise objectives.

Under the do nothing option, 207 properties would be subject to acute noise levels, reducing to 197 with the proposal. The predicted noise levels for these properties are shown in Table 8. The number of properties predicted to be exposed to noise levels equal to or greater than 64 dBA is reduced from 34 to 11.

Table 8: Count of Acute Noise Levels

Design Noise Level L _{Aeq} (9 hour)	Future Existing 2013	Future Design 2023
60	85	106
61	37	44
62	38	23
63	12	14
64	9	4
65	6	1
66	7	2
67	8	1
68	2	1
69	-	1
70	2	1
Total	206	197

The Department is aware that there is a perception that any increase in noise is unacceptable and that if noise can be heard, it should be mitigated. The need for noise mitigation measures has been based on noise criteria set out in the *Environmental Criteria for Road and Traffic Noise Assessment* and the *Environmental Noise Management Manual*. The Department acknowledges that the Proponent has undertaken a rigorous barrier optimisation process to assess the cost-effectiveness and reasonableness of installing noise barriers and it is the outcome of this process which has determined where new noise barriers will be installed, existing barriers augmented, and the residences considered eligible for architectural treatment. The Department is satisfied that the mitigation measures proposed (combination of at source measures such as pavement type and noise barriers, and at property architectural treatment) by the Proponent are appropriate and consistent with established guidelines and road traffic noise mitigation practices, and demonstrate that mitigation at affected residential receivers is achievable. The Department also notes that the noise assessment did not include the resurfacing of the existing carriageways with low noise OGAC. As this pavement type is expected to provide noise benefit over the existing surface in the vicinity of -2.5 dBA, the predicted noise levels for the proposal are considered to be conservative.

The Department notes that the Proponent does not intend to provide noise mitigation to reduce noise impacts at three recreational areas (New Brighton Golf Club, Riverland Golf Club and Lieutenant Cantello Reserve). The Department accepts the outcomes of the Proponent's modelling which demonstrates that it is not feasible and reasonable to construct noise barriers along the length of the motorway at these locations.

As previously noted, the Department has recommended a condition of approval requiring the review and confirmation of noise mitigation requirements based on detailed design prior to the commencement of construction. The Department has also recommended that the Proponent provide and fund architectural treatments at sensitive receivers identified as qualifying for noise treatment. This includes the Sir Joseph Banks Public School, East which has been identified as experiencing future noise levels requiring mitigation.

To ensure that the operational noise performance of the project is consistent with predicted performance, the Department has also recommended a condition requiring the Proponent to undertake operational noise reviews within 12 months of the commencement of the operation of the project and within 12 months of the operation of a

future M5 East Freeway upgrade. The noise review would assess the effectiveness of the applied noise mitigation measures and whether any additional mitigation measures are required.

Maple Road, Casula

One of the public submissions raised concern that the current operation of the M5 Motorway fails to comply with the original conditions of consent for the M5 Casula Link (the link between the Cross Roads, Liverpool and Casula which opened in 1994) in that existing noise barriers in the vicinity of Maple Road, Casula are lower than those recommended in the *Environmental Impact Statement – M5 Casula Link* (Maunsell Pty Ltd, 1993) for the construction of the link. The submission also raised concern over existing and future road traffic noise levels at this location due to inadequate noise mitigation measures.

In regards to compliance with the original conditions of consent, the Environmental Impact Statement for the M5 Casula Link recommended that six metre high noise barriers be installed. However, the Environmental Impact Statement noted that it may not be practicable to provide the recommended barrier heights in all areas and that lower height barriers would be provided to satisfy the NSW Road & Traffic Authority's *Interim Noise Policy* (the applicable guideline criteria applying at that time). In addition, the conditions of approval stated that noise mitigation barriers are to be constructed as shown so as to meet the objectives of the *Interim Noise Policy* and when practicable, to achieve the more stringent goals recommended in the Environmental Impact Statement. Four metre noise barriers were constructed with noise monitoring confirming that they satisfied the noise criteria set out in the *Interim Noise Policy*. Hence, the original conditions of approval have been complied with. The noise barriers in this vicinity were subsequently raised to five metres to ensure compliance with the noise criteria specified in the *Environmental Criteria for Road Traffic Noise* as part of the construction of the M7 Motorway. As predicted night-time noise levels are expected to comply with the noise criteria set out in the *Environmental Criteria for Road Traffic Noise*, the Proponent does not propose to implement any further noise management measures in this location.

However, the Department notes that the Proponent would install a new noise barrier along the southern side of the M5 between Maple Road and Beech Road, Casula, as recommended by the noise assessment, to mitigate residual traffic noise impacts of the proposal in the vicinity of Maple Road.

Casula Links Estate

A key concern raised by Liverpool City Council and in a number of submissions on the environmental assessment and the amended project was traffic noise emanating from the Georges River West bridge crossing. The majority of submissions called for the installation of a noise barrier across the Georges River West bridge to reduce potential traffic noise impacts. A number of the submissions also questioned the accuracy of the data used to determine existing noise levels and potential noise impacts within the Casula Links Estate (to the north and south of the M5 Motorway between the Hume Highway and the Georges River).

Although the Proponent is not obliged to assess operational noise impacts generated by traffic using the Georges River West Bridge on sensitive receivers in the Casula Links Estate, as the project does not involve any road widening works on the bridge, this has been undertaken for the western approach of the bridge. In addition, the Proponent has advised that although traffic volumes may increase along the bridge, the consequent increase in noise levels would be barely perceptible – traffic volumes would need to double to result in an increase of 3 dB(A) which is just perceptible. Furthermore, the Proponent has advised that traffic speeds (and hence potential noise generation) are unlikely to increase along this section of the M5 Motorway as the existing three traffic lanes in each direction allow for the traffic to flow more freely and hence at maximum speed.

The proposed project will involve road widening works up to approximately 100 metres before the Georges River West bridge crossing. Traffic generated from other parts of the project would traverse the bridge crossing. Therefore, the Department is of the opinion that the existing and predicted noise levels at sensitive receivers in the Estate should be confirmed as part of the operational noise mitigation review. Consequently, the Department has recommended that the Proponent undertake noise monitoring at representative locations to the north and south of the M5 Motorway in the Casula Links Estate and to incorporate the results in the noise mitigation review in order to confirm the predicted noise impacts.

In regards to noise mitigation, the Proponent intends to augment the two existing noise barriers and install a new noise barrier along the northern side of the M5 Motorway in this locality, and augment the existing noise barrier

Figure 7 – Proposed Noise Barriers between Hume Highway and Georges River West
(Courtesy NSW Roads & Traffic Authority, August 2011)



along the southern side in the vicinity of Casula Links Estate (refer Figure 7). The results of the modelling indicate that this measure will effectively reduce night-time operational noise levels at impacted residential receivers in the order of 2-3 dB(A) in design year 2023. In addition, the installation and augmentation of noise barriers is predicted to reduce the number of residential receivers categorised as being acutely impacted by night-time operational noise from 38 to 25, with no residential receivers predicted to experience night-time noise increases above future existing levels by more than 2 dB(A).

The Proponent has advised that the installation of noise barriers along the current bridge crossing is not feasible or reasonable due to engineering and cost constraints. To address noise issues the Proponent intends to extend the area to be considered for architectural treatments beyond the area of road widening works to align with the next cross street (Lakewood Crescent), an approach consistent with that adopted by the NSW Road & Traffic Authority's Noise Abatement Program. The Department considers this to be a reasonable approach.

A number of the submissions raised the issue of existing sleep disturbance from heavy vehicles (particularly engine brake noise) in the vicinity of the Casula Links Estate. In recognition of the concerns raised, the Department has recommended a condition of approval requiring the Proponent to develop, and submit for approval to the Director General, a Heavy Vehicle Compression Braking Strategy to identify and trial mitigation measures to minimise the noise impacts of heavy vehicle compression braking on sensitive receivers.

Construction Hours

To minimise potential noise impacts on residential receivers, the Department has recommended the following standard hours of construction: 7.00 am to 6.00 pm Mondays to Fridays; 8.00 am to 1.00 pm on Saturdays; and no works on Sundays or public holidays. These hours are consistent with the hours recommended by the former Department of Environment, Climate Change and Water in its submission.

The Proponent has indicated that for safety and traffic management reasons, certain construction activities would need to be undertaken at times where peak flows are at their lowest (that is, at night). The Department recognises that there will be circumstances where flexibility in working hours is warranted. Consequently, it has recommended a condition of approval which allows for works outside of the standard construction hours where works are in accordance with the conditions of an Environment Protection Licence for the project. In its submission, the former Department of Environment, Climate Change and Water acknowledged that out-of-hours activities are routinely required for major infrastructure projects and indicated that an approval process can be included through the Environment Protection Licence for out-of-hours works.

In addition, the Department has recommended that the Proponent be required to consult with and/ or notify potentially affected sensitive receivers prior to undertaking any construction activities outside of the standard hours of construction. The processes for consultation and notification are to be described in the Community Communication Strategy, recommended as a requirement of the Minister's conditions of approval.

Construction Noise

The Department notes that the predicted construction noise levels will exceed the noise management levels recommended in the *Interim Construction Noise Guideline*, however, these levels should be considered as triggers for the implementation of feasible and reasonable mitigation measures rather than strict criteria for compliance. The levels are also difficult to achieve for major infrastructure works in an urban environment and the exceedence levels are not unusual for such projects.

Although noise management levels will be exceeded for certain activities, the Department recognises that the noise levels identified in the assessment are conservative, represent a worst-case scenario and assume a range of high-noise generating activities occurring simultaneously in close proximity to sensitive receivers. Further, it is unlikely that the maximum noise generating activity would be experienced at any single sensitive receiver for the entire duration of the project as construction works would progressively move along the M5 Motorway corridor. The Department recognises that impacts under such a scenario can be lessened through scheduling and has recommended a condition of approval requiring respite periods for high-noise generating activities.

To manage construction noise impacts, the Proponent has committed to implementing a range of management and mitigation measures. The Department considers the range of measures acceptable and that the most

appropriate tool for the management of construction noise impacts would be through a construction noise (and vibration) management plan which details the proposed measures. The Department has therefore recommended a condition of approval requiring the development of a Construction Noise and Vibration Management Sub-plan, as part of the Construction Environmental Management Plan, which details the key noise (and vibration) generating activities, identifies all feasible and reasonable mitigation measures for managing construction noise (and vibration) impacts, and sets out a program for construction noise (and vibration) monitoring.

In addition, the Department has recommended conditions requiring the Proponent to:

- implement all feasible and reasonable measures, with the objective of achieving the construction noise management levels in the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009);
- consult with affected educational institutions in relation to disruptive noise generating construction works; and
- implement a construction complaints management system.

Implementation of the recommended conditions of approval will address the concerns raised in the submissions received from the former Department of Environment, Climate Change and Water, and Bankstown and Liverpool City Councils, regarding construction noise impacts on residential receivers.

The Proponent intends to operate four of the eight construction compounds on a 24 hour basis – Moorebank Avenue, M5/ Graham Avenue (1), Beaconsfield Road and Bransgrove Road. The noise assessment undertaken by the Proponent indicates that operations at the M5/ Graham Avenue (1) compound has the potential to impact on surrounding residential receivers with noise levels of up to 3 dB(A) above the night-time noise criterion predicted to occur at dwellings to the east and south of the compound. The other three compounds are located in industrial areas and hence will not impact on the acoustic amenity of residential receivers.

The Proponent's noise assessment recommends a number of potential noise management levels to minimise noise impacts from the compounds. To ensure that appropriate mitigation measures are implemented, the Department has recommended that the Construction Noise and Vibration Management Sub-plan for the project include measures for monitoring and managing the impacts associated with all ancillary facilities.

Bankstown City Council raised concern that activities at, and construction traffic to and from, two of the 24 hour ancillary facilities (Gibson Avenue and Beaconsfield Road construction compounds) would impact on the acoustic amenity of residents located adjacent to the compounds and along Gibson Avenue and Beaconsfield Road. The Proponent has advised that it no longer intends to establish a construction compound at Gibson Avenue, hence eliminating potential noise impacts associated with its construction and use.

In regards to the Beaconsfield Road construction compound, it is estimated that there would be approximately 10 heavy vehicle movements during the night time. This equates to approximately one vehicle movement per hour and an estimated increase in noise levels of 0.7 dB(A). The Department considers this an acceptable level of impact and has recommended a condition of approval requiring that heavy vehicle movements to and from ancillary facilities be limited as far as practicable at night in residential areas.

The original proposal also included the operation of a 24 hour construction compound at the intersection of Heathcote Road and Wattle Grove Drive, Hammondville. Operations at the compound were predicted to result in levels of up to 10 dB(A) above the night-time noise criterion at dwellings surrounding the compound. The Proponent has advised that it no longer intends to establish this compound, hence eliminating potential noise impacts associated with its use. An alternative site is proposed to the north of the M5 Motorway in the vicinity of the intersection of Heathcote Road and Junction Road. The compound will only operate during standard construction hours.

The Proponent estimates that approximately 60 percent of the existing barriers requiring augmentation will need to be removed and replaced (rather than increasing the height). This proportion may change pending finalisation of the detailed design. The Department recognises that removal of existing noise barriers, the installation of new barriers and augmentation of existing barriers all have the potential to generate noise. This noise source was expressed as a concern in some public submissions. In addition, removal of the barriers prior to replacement

with upgraded barriers has the potential to increase existing levels at sensitive receivers by up to 10 dB(A) in some locations. Consequently, the Proponent intends to adopt construction methods that would minimise noise increases such as the provision of new higher posts directly in front of or behind the existing wall and progressive swapping and addition of panels, where possible.

Due to the narrow width of the road reserve, the installation and augmentation of noise barriers will require lane closures. As previously discussed, lane closures are only possible during the evening and night-time period for safety reasons. Consequently, noise barrier work will be undertaken during these periods. The Department considers the increase in noise levels acceptable as gaps in the noise barriers would only exist during daytime periods, involve short sections and are unlikely to exceed two days at any panel location. In addition, the Proponent has advised that the noisiest work would be scheduled to occur as early as possible in the evening.

The installation of variable message signage would require the use of a crane which in turn would require the occupation of traffic lanes to safely perform the installation. This would need to occur at night to ensure the safety of all road users and minimise impacts on traffic flows. Although works associated with the installation of the signs would result in noise levels in excess of the noise management levels recommended in the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009), the Department considers this impact as acceptable as installation at any one location would be completed within two days and daytime construction is not a viable option.

Construction Vibration

With respect to construction-related vibration, the Department is satisfied that due to the distance of properties from the M5 Motorway corridor, structural damage to buildings is unlikely. However, the comfort criteria (which is more stringent than structural damage criteria) may be potentially exceeded as a result of vibratory rolling and impact piling. The Proponent has advised that once rollers and piling rigs are employed within 30 metres of a building, continuous vibration monitoring will occur. Should an exceedance be identified, the construction methodology will be varied to comply with the nominated limits. The Proponent has also committed to undertaking monitoring should a complaint be received. The Department accepts these approaches and has recommended a condition of approval requiring the Proponent to conduct representative vibration monitoring and review the construction methodology where vibration monitoring indicates an exceedance of the relevant criteria.

5.3. Biodiversity

Issue

The Proponent has identified that the preferred project would require the removal of approximately 19.09 hectares of vegetation, of which 17.36 hectares comprises landscape vegetation within the M5 Motorway corridor. The remaining 1.73 hectares of vegetation predicted to be impacted comprises:

- 1.11 hectares of Castlereagh Scribbly Gum Woodland – vulnerable community listed under the *NSW Threatened Species Conservation Act 1995*;
- 0.28 hectares of Cooks River/ Castlereagh Ironbark Forest - endangered ecological community listed under the *NSW Threatened Species Conservation Act 1995*;
- 0.14 hectares of River Flat Eucalypt Forest – endangered ecological community listed under the *NSW Threatened Species Conservation Act 1995*
- 0.18 hectares of Swamp Oak Floodplain Forest - endangered ecological community listed under the *NSW Threatened Species Conservation Act 1995*; and
- 0.02 hectares of Shale Gravel Transition Forest - endangered ecological community listed under the *NSW Threatened Species Conservation Act 1995* and the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*.

The Proponent has identified that as a result of changes to the project since the exhibition of the Environmental assessment, including amendments to noise barrier requirements and spoil reuse areas, drainage basins and widening works, the total vegetation clearing required for the project represents:

- an additional 0.45 hectares of Castlereagh Scribbly Gum Woodland clearance over that identified in the Environmental assessment;
- an additional 0.01 hectare of Cooks River/ Castlereagh Ironbark Forest clearance over that identified in the Environmental assessment;

- a reduction in the required amount of Cumberland Plain Woodland removal (endangered ecological community listed under the *NSW Threatened Species Conservation Act 1995* and the *Environment Protection and Biodiversity Conservation Act 1999*) from 0.33 hectares to no impact; and
- an additional 7.56 hectares of landscape vegetation clearing over that identified in the Environmental assessment.

Of the landscape vegetation to be removed, the Proponent has identified that two of the species to be impacted comprise species listed under the *NSW Threatened Species Conservation Act 1995* and the *Environment Protection and Biodiversity Conservation Act 1999*, which were planted as part of the original landscaping undertaken for the M5 Motorway. These comprise:

- the Giant Spear Lily (*Doryanthes palmeri* - listed as threatened under the *NSW Threatened Species Conservation Act 1995*) – whilst a number of individuals are proposed to be removed of this species, the Proponent has identified that this species is not native to the Sydney region but native to northern NSW; and
- the Downey Wattle (*Acacia pubescens* - listed as vulnerable under the *NSW Threatened Species Conservation Act 1995* and the *Environment Protection and Biodiversity Conservation Act 1999*) – approximately 76 individuals of this species, which is native to the Sydney region, are expected to require removal. The Proponent has proposed a program of translocation of this species to other sites within the M5 Motorway corridor to avoid the loss of these species as far as possible.

Two additional listed species (the Narrow-leafed Black Peppermint and Narrow-leafed *Wilsonia* - both listed under the *NSW Threatened Species Conservation Act 1995*) have also been identified to occur within the landscape planting along the M5 Motorway corridor. However, these species are not expected to require removal as part of the project.

With respect to threatened fauna species, the Proponent's assessment identified that suitable foraging habitat exists within the M5 Motorway corridor for three threatened bat species (Large-eared Pied Bat, Eastern Freetail Bat and Eastern Bentwing Bat – listed under the *NSW Threatened Species Conservation Act 1995* and the *Environment Protection and Biodiversity Conservation Act 1999*). However, the vegetation clearing associated with the project has limited potential to impact on available resources due to the relatively minor amount of habitat clearing. In addition, the Proponent's assessment identified two areas of potential habitat for the Green and Gold Bell Frog (*Litoria aurea* – listed as endangered under the *NSW Threatened Species Conservation Act 1995* and vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*) within the project corridor: wetland areas close to the Georges River on the southern side of the M5 Motorway near Panania and along Anzac Creek near Heathcote Road. The Proponent's assessment has identified that upgrades to drainage infrastructure in the vicinity of these locations have the potential to modify approximately 0.18 hectares of potential habitat for the Green and Gold Bell Frog. Targeted surveys for this species undertaken since the exhibition of the Environmental assessment did not identify any specimens of the species along the project corridor.

The project would not involve any works within waterways or require any changes to waterway crossings over Georges River East, Georges River West, Salt Pan Creek or Anzac Creek. However, new or amended drainage structures are proposed in the vicinity of a number of these waterways and a construction compound is proposed within an existing cleared site along both sides of Anzac Creek at Heathcote Road (Heathcote Road compound). The NSW Office of Water recommended that a minimum 30 metre wide riparian area be established either side of Anzac Creek. It also recommended that a 50 metre wide riparian area be established either side for the Georges River and that any riparian vegetation disturbed or removed by the proposal should be rehabilitated either at, or near the site, or offset by establishing native vegetation elsewhere along the Georges River.

Department's Consideration

The Department considers that the vegetation clearing associated with the project is unlikely to significantly impact on vegetation communities or flora species of conservation significance, given that the majority of vegetation to be cleared would be limited to landscape plantings within the verge or median of the existing M5 Motorway corridor, rather than remnant or existing indigenous populations of these species. In this regard, the Department considers that the removal of individual plantings of the Giant Spear Lily would not affect the survival of this species as it does not comprise an indigenous population to the area (being native to Northern NSW) and exists on site purely due to being planted as a landscape species.

With respect to the Downey Wattle, the Department accepts that whilst the specimens proposed to be removed comprise landscape plantings rather than an indigenous population within the M5 Motorway corridor, the species nevertheless comprises one of conservation significance to the Sydney region and the removal of even planted specimens would represent a net loss to this species. Consequently, the Department supports the Proponent's commitment to translocate each of the specimens removed, so as to ensure no net loss of biodiversity values for this species. The Department notes that the former Department of Environment, Climate Change and Water supported this approach in its submission on the Environmental assessment. Consistent with that agency's recommendations, the Department has recommended conditions of approval to reinforce the Proponent's commitments in relation to impact mitigation, management and translocation of this species.

With respect to predicted impacts to vegetation communities of conservation significance, the Department notes that the project's impacts would be small in scale (less than one hectare in most cases) and restricted to existing disturbed and isolated examples of these communities in the direct vicinity of, or within, the M5 Motorway corridor. In each case, the level of clearing associated with the project represents less than one percent of the regional distribution (within five kilometres) of these communities. On this basis, the Department is satisfied that the project is unlikely to significantly impact or affect the regional survival of these communities. However, the Department accepts that the project impacts would represent a net loss of biodiversity values with respect to endangered ecological communities and consequently, consistent with recommendations of the former Department of Environment, Climate Change and Water, has recommended a condition of approval requiring the Proponent to develop and implement an offset strategy for impacted vulnerable and endangered ecological communities.

In regards to threatened fauna species, the Department considers that the vegetation proposed to be cleared as part of the project (which mostly comprises landscape vegetation within the verges and medians of the existing M5 Motorway) is unlikely to pose a significant source of foraging habitat to the identified threatened bat species, given their mobile nature and the presence of better quality habitat in the region. Consequently, the Department is satisfied that the loss of vegetation associated with the project would not pose a significant impact or threaten the survival of these species. The Department also notes that the project would not involve significant works on structures that have the potential to provide roost sites for bat species (such as bridge works and culvert works – with the exception of bridge widening works over Nuwarra Road and Queens Street). To ensure that construction works do not cause disturbance to any occupied roost sites, the Department has recommended conditions of approval requiring pre-construction surveys of all potential roost structures and the development of a management strategy in the event that microbats or evidence of roosting are identified during pre-clearing surveys.

With respect to impacts to the Green and Gold Bell Frog, a targeted survey was undertaken over four non-consecutive nights in December 2010 and January 2011, consequent to the concerns raised by Bankstown City Council regarding potential impacts on the frog's habitat. The Department notes that whilst individuals of this species have not been recorded within the project corridor in targeted surveys, there is a potential that areas along the project (with suitable habitat attributes) could provide habitat for this species based on previous records of the species in the area and the relatively close proximity of the nearest known population of this species (some 800 metres away from the project corridor near Hammondville). Consequently, the Department considers that the project has potential to directly impact up to 0.18 hectares of Green and Gold Bell Frog habitat, which requires mitigation. Therefore, the Department has incorporated the requirement for impacts to threatened fauna habitat to be included in the offset requirements for the project.

The Department has also recommended a condition of approval requiring a specific Green and Gold Bell Frog management plan to be developed prior to the commencement of construction, to detail measures that would be undertaken to minimise impacts to Green and Gold Bell Frog habitat as far as practicable, including strategies to be implemented in the case that individuals of these species are detected on site during construction.

In regards to aquatic and riparian impacts, Bankstown City Council raised concern over the siting of drainage basins near wetlands and waterways and the consequent potential impacts on water quality and vegetation. The NSW Office of Water raised similar concerns and recommended set backs to waterways, and that any riparian vegetation disturbed during construction be appropriately rehabilitated and/ or offset with local indigenous

species. The Department notes that no direct impacts are anticipated to waterways or to riparian vegetation as no changes to waterway crossings or works directly adjacent to waterways are proposed. However, some construction activities (including drainage basins and construction compounds) are proposed in the vicinity of waterways and drainage lines and have the potential to indirectly impact on waterways through water quality impacts, if not appropriately managed. To ensure that potential risks to surrounding waterways are minimised during construction, the Department has recommended a condition of approval requiring the Proponent to develop a Construction Soil and Water Management Sub-plan, to detail erosion and sediment control and water quality protection measures (including appropriate setbacks to waterways) that would be implemented during construction in relation to works in the vicinity of waterways.

In regards to the setbacks recommended by the NSW Office of Water for Anzac Creek, the Department acknowledges that the vegetation has been disturbed (and is predominantly cleared) at the proposed construction compound site in this location. Consequently, the Department is of the opinion that the establishment of a construction compound within 30 metres from the top of the bank of the creek will not have a significant adverse impact on existing riparian vegetation. In addition, the Proponent has indicated that areas immediately either side of the creek would be protected during construction and rehabilitated following construction.

As noted above, the NSW Office of Water recommended that a 50 metre riparian zone should be maintained along the Georges River. The document *Controlled Activities – Guidelines for Riparian Corridors* recommends a 20 to 40 metre wide riparian corridor along third order or greater watercourses such as the Georges River. The Proponent's proposal to maintain a minimum 40 metre wide riparian zone is in keeping with the Guideline. Due to the existing industrial and urban development adjacent to the M5 Motorway corridor, the Department acknowledges that there is limited area available for ancillary facilities and therefore accepts that in some instances it will not be possible to provide a riparian setback of 50 metres.

To ensure that impacts to native vegetation (including riparian vegetation) are limited during construction, the Department has also recommended that the Proponent prepare a Construction Flora and Fauna Management Sub-plan which details the proposed management and mitigation measures to be implemented throughout the construction of the project. The Sub-plan is to include procedures for dealing with unexpected finds of threatened species and endangered ecological communities, maintenance strategies for nest boxes, details of riparian setbacks, and an adaptive ecological monitoring program.

5.4. Other Issues

The Proponent has assessed the potential impacts of the project on air quality, hydrology, visual amenity, and Aboriginal and non-Aboriginal heritage. In addition, an assessment has been undertaken of potential greenhouse gas emissions generated during construction and operation, and the impact of ancillary facilities and spoil reuse sites. The Proponent has committed to implementing a range of measures to minimise residual impacts associated with the construction and operation of the project. The Department is satisfied with the assessment and the management measures proposed by the Proponent and its consideration of these issues is provided in Table 9.

Table 9: Department's Consideration of Other Issues

Issue	Department's Consideration
Strategic Need and Justification	Section 2.3
Air Quality	<u>Operation</u> A number of submissions raised concern regarding the potential for the project to adversely affect existing air quality along the M5 corridor (through the generation of additional traffic along the M5 Motorway), and associated health implications to surrounding receptors. The Proponent undertook a specialist air quality assessment as part of the Environmental assessment, consistent with the <i>Approved Methods for the Modelling and Assessment of Air Pollutants in NSW</i> (Department of Environment and Conservation, 2005). The assessment predicted air quality at 10 metres from the M5 Motorway considering the impacts of the project in 2012 (prior to widening) and in 2021, against relevant Department of Environment and Conservation (2005) ground-level concentration goals for air pollutants associated with road traffic - carbon monoxide, nitrogen dioxide and particulate matter. The assessment indicated that the project would not result in any exceedence of air quality goals for any of

Air Quality (continued)	the pollutants or averaging periods assessed, even with the expected increase in traffic volumes over time (i.e. with the additional traffic lanes allowing for additional traffic growth). The Department is satisfied that the Proponent has undertaken a robust and conservative assessment of potential air quality impacts, including assessment of worst-case meteorological scenarios (low winds and high atmospheric stability) in conjunction with peak-time traffic conditions in the modelling, even though such meteorological conditions would occur during much earlier hours in the day which corresponded to much lower traffic volumes than the peak hour/ worst-case traffic volumes used in the modelling). Based on the Proponent's assessment, which predicts compliance with relevant air quality goals, the Department is satisfied that the project would not lead to unacceptable air quality (or associated health) outcomes along the M5 Motorway corridor, noting that the highly conservative modelling undertaken (including considering worst-case meteorological conditions in conjunction with peak flows) means that actual air quality impacts arising from the project are likely to be considerably lower than that predicted. It is also noted that air quality impacts have been predicted at 10 metres from the M5 Motorway although the closest residents are expected to be greater than this distance and consequently experience lower air emission levels than that predicted at the 10 metre distance. The Proponent's modelling has indicated that under a base case scenario (i.e. without the project proceeding), emission levels would be slightly lower for each modelled year (2012/2021) than with the project proceeding. The Department notes that this reflects the lower traffic volumes that would be expected under the base case scenario (where traffic growth would be restricted by the existing capacity of the M5 Motorway), compared to "with the project proceeding" which would provide additional capacity for traffic growth. In this regard, the Department notes that even with additional traffic volumes provided for by the project, the project is predicted to comply with all relevant air quality goals. Consequently, the Department is satisfied that the operation of the project would not lead to unacceptable air quality outcomes at surrounding receptors. The Department notes that the former Department of Environment, Climate Change and Water did not raise any concerns or issues with the modelling or outcomes of the Proponent's air quality assessment. <u>Construction</u> The Proponent has committed to implementing standard dust mitigation measures (such as wetting of disturbed surfaces, stabilising stockpiles, and cessation of dust generating activities where dust is being emitted outside the construction corridor) to minimise windblown, traffic and equipment generated dust and emissions during construction. The Department has also recommended conditions of approval requiring the Proponent to minimise dust generation and dust emissions from the site (including ancillary facilities and spoil reuse areas) during construction, and to detail the proposed measures for managing dust in a Construction Environmental Management Plan.
Greenhouse Gas Emissions	The Proponent undertook a greenhouse gas emission assessment to determine the net greenhouse gas emissions arising from the construction and operation of the project. This included a comparison of the projects greenhouse gas emissions with base case emissions. The estimated difference between the base case and the project is approximately an increase of 144 tonnes of carbon dioxide equivalent per annum. The assessment indicated the greatest contributor of operational greenhouse gas emissions is vehicle road use. A number of submissions from the public raised concern about carbon emissions, citing that the project favours the use of vehicles over public transport and cyclists facilities. The Proponent indicates that the upgrade would alleviate congestion, substantially reduce the number of vehicles travelling at speeds below 20 kilometres an hour, and improve travel times for motorists (particularly during the peak periods) in an existing transport corridor. The upgrade would result in reduced fuel consumption through a fall in congestion, slow speeds and stop-start driving on the M5 Motorway. This in turn would reduce greenhouse gas emissions from individual vehicles. However, the Department notes that the overall operational greenhouse gas emissions would progressively increase as a result of future increases in the overall traffic volume. The Proponent has committed to use energy efficient equipment during construction, where feasible and reasonable, to reduce greenhouse gas emissions. Other construction management measures include use of recycled construction materials where practicable, maintenance of equipment to retain optimal levels of energy efficiency, and undertaking vegetation planting that maximises opportunities to sequester carbon over the life of the project. The Proponent has also indicated that materials would be selected to maximise the durability of the infrastructure and minimise maintenance requirements. In addition, the Proponent intends to implement a range of operational management measures to achieve greenhouse gas emission reductions including the use of recycled maintenance materials

	where possible and the use of renewable energy sources to power control systems, lighting and signage.
Climate Change	Based on a qualitative sensitivity assessment, the Proponent concluded that drainage basin sizes for the project would need to be increased by approximately 10 to 15 percent to accommodate potential climate change rainfall scenarios. The Department acknowledges that constraints associated with the existing M5 Motorway and limited available land within and adjacent to the M5 Motorway corridor restrict increasing the size of the existing basin sizes to fully accommodate climate change scenarios. However, the existing pavement drainage system will be augmented (from a 1 in 5 year annual recurrence interval event) to cater for a 1 in 20 year annual recurrence interval rainfall event. The Proponent has advised that an adaptive management approach will be applied to manage any future climate change impacts with feasible and reasonable adjustments to infrastructure being made when climate change impacts are realised. The Department considers that this to be an appropriate response to future climate change impacts, which takes into account potential uncertainties in climate change predictions.
Aboriginal and Non-Aboriginal Heritage	The Department considers that the project would generally pose a low risk of impact to Aboriginal heritage values as the vast majority of the project would be confined to the existing disturbed motorway corridor or to other areas (such as construction compound locations) which have already been subject to disturbance by urban development. Nevertheless, the Proponent's Aboriginal heritage assessment has highlighted that relatively undisturbed areas containing remnant vegetation may yield items, particularly within landscapes that are associated with a higher potential for Aboriginal artefacts (such as near waterways). The Proponent has identified that the current design avoids areas of remnant vegetation and that no works are proposed within waterways. However, where detailed design confirms the need for works (such as drainage upgrades) outside of the existing disturbed motorway corridor or other already disturbed areas, within locations that have a higher archaeological potential, the Proponent has committed to undertaking additional archaeological survey in consultation with relevant Aboriginal stakeholders. The Department supports this approach and has recommended a condition of approval requiring the Proponent to prepare a Construction Heritage Management Sub-plan (as part of the Construction Environmental Management Plan) which describes the processes for managing the discovery of previously unidentified heritage items, including approvals. With respect to non-Aboriginal heritage items, the Proponent has identified that the project would not physically impact on any listed heritage items within or in the vicinity of the project site. The Proponent's assessment has identified that the eastern end of the project corridor traverses the Pallerma Parade Urban Conservation Area, which is listed on the Register of the National Estate. However as works are proposed to be confined to the existing road reserve at this location, the Proponent has identified that no impacts are expected to this heritage item. None of the proposed construction site compounds and variable message signs proposed as part of the project would be located on any heritage sites. However, four variable message signs, would be located in the vicinity of listed heritage items: • Variable Message Sign 1 - near Hoddle's Plan of the Town of Liverpool and Apex Park (the grid layout of certain streets laid out in 1827), a locally listed heritage place situated east of the Hume Highway between Memorial Avenue and the Main Southern Rail Line; • Variable Message Signs 3 and 4 – near Pirelli Power Cables and Systems Building, a locally listed heritage item situated along Newbridge Road, approaching Moorebank Avenue; and • Variable Message Sign 16 – near Kitchener House (a local and Register of the National Estate listed item) and the Defence National Storage and Distribution Centre (a Register of the National Estate and Commonwealth Heritage listed item), both situated along Moorebank Avenue approaching the M5 Motorway. The Proponent's assessment considered whether the visual impact of any of the variable message signs had the potential to detract from or affect the heritage values of the sites. The assessment concluded that the indicative locations of the signs were unlikely to impact on the heritage values of the sites, however recommended minimum buffer distances of 50 metres and 100 metres respectively, for the location of signs in the vicinity of Apex Park and Kitchener House, to avoid impact to the visual setting of these items as far as practicable. The Department has recommended a condition of approval to reinforce these requirements.

Visual and Urban Design	<u>Operation</u> The Department is satisfied that the project is unlikely to result in significant visual impact to surrounding receptors or land use, as the proposed development would be largely retained within the existing M5 Motorway corridor and would comprise works that are consistent with the existing function, nature and elements within the M5 Motorway corridor. Although noise barriers are a common element along the M5 Motorway, the provision of over five kilometres of new and 15 kilometres of augmented noise barriers has the potential to impact on the visual amenity of residents whose properties adjoin the M5 Motorway as well as road users. However, the overall level of impact associated with the increased length and height of the noise barriers is considered to be low at most locations. At present, the existing noise barriers along the M5 Motorway are varied in colour, materials and height and this inconsistency makes it difficult to achieve a linear identity for the M5 Motorway and compromises visual amenity. Consequently, the Proponent has proposed a noise barrier strategy which establishes a linear identity for the M5 Motorway and includes the use of lightweight concrete panels for new and replacement walls, and transparent panels when replacing or adding new walls to bridges or where overshadowing at residences may be an issue. The strategy also involves the provision of mounding to reduce wall heights and landscape screening where feasible and reasonable. In this regard, the Department is satisfied that the Proponent has identified appropriate design and landscape solutions that will assist towards mitigating the visual impacts of new and augmented noise barriers. However, the Department recognises that residual amenity impacts from the noise barriers may occur due to corridor constraints and the limited setback of buildings from the M5 Motorway. In this regard, the Department considers that the benefits gained by the noise barriers would outweigh any secondary impact on visual amenity and that consultation with directly affected property owners on the final design of the barriers (including height, colour, and solar access) and associated landscaping will assist in responding to these impacts. The Department concurs that urban design and landscaping for the project should focus on reinforcing a consistent design character along the M5 Motorway corridor, including the use of consistent colour palettes and treatments, appropriate integration with existing design elements and local landuse features, and the implementation of a consolidated landscaping strategy using species mix consistent with vegetation communities along the M5 Motorway corridor. Consequently, the Department has recommended a condition of approval requiring the Proponent to prepare an Urban Design and Landscape Plan to detail the design approach and measures to be implemented to minimise the visual impacts of the project to surrounding receptors (including screen planting as required and appropriate treatment of noise barriers) and ensure a streamlined and consistent corridor approach to urban design. To ensure that all visual elements of the project are adequately addressed, the Department has also recommended that the Urban Design and Landscape Plan describe the location and design treatments for all built elements of the project including retaining walls, cuttings, embankments, bridge modifications and signage. In its submission on the Environmental assessment, Bankstown City Council requested specific details on the plantings to be undertaken at the Fairford Road exit. In its submission on the Submissions and Preferred Project Report, the Council stated that the Department must seek a commitment from the Proponent to liaise with Council in the preparation of a Landscape Plan to enhance the gateway character of the Fairford Road intersection. The Proponent has advised that parkland style landscaping using Cumberland Plain Woodland species would be used at the intersection. The Department has recommended that the Proponent consult with the relevant councils in developing the Urban Design and Landscape Plan for the project. Spoil reuse sites also have the potential to impact on the visual amenity of residents adjoining the M5 Motorway. Consequently, the Department has recommended conditions of approval which require the Proponent to detail the location of the reuse sites, and describe the strategies to be implemented to progressively rehabilitate and revegetate the sites along with any other management measures for minimising adverse amenity impacts to surrounding residents. <u>Construction</u> The establishment of construction compounds has the potential to impact on the visual amenity of
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Visual and Urban Design (continued)	residents where the compounds are located in residential neighbourhoods. Due to the relatively short time frame (approximately two years) that the compounds will be in use, mitigation measures are limited to siting elements to reduce their impacts, minimising the loss of existing trees, and temporary screening using mesh on fences, which the Department considers to be an appropriate response. Following the construction period, the Proponent has committed to rehabilitate and revegetate all lands used for construction compounds (and other ancillary facilities) to at least their pre-construction state. The Department has reinforced this commitment through the recommended conditions of approval which require the Proponent to rehabilitate any areas temporarily used for construction to a standard better than or equal to the existing condition.
Hydrology	<u>Operational Impacts</u> Two principal drainage lines traverse the M5 Motorway corridor – the Georges River and Salt Pan Creek. The M5 Motorway crosses the Georges River in two locations (about 500 metres west of the Hume Highway at Liverpool and then again at about 500 metres to the east of Henry Lawson Drive at Hammondville) and Salt Pan Creek once about 200 metres to the east of Fairford Road. In addition, the M5 Motorway crosses Anzac Creek, a smaller watercourse, at Heathcote Road. The main risks to water quality from the project are increased runoff (containing suspended solids, heavy metals, oil and grease, hydrocarbons and litter) from the carriageway and accidental spills of fuel or chemicals during the transportation of dangerous goods or from traffic accidents. The existing M5 Motorway includes sedimentation control systems and drainage basins to capture and treat surface water runoff from the carriageway. In order to provide for increases in peak flows resulting from a larger impervious area (due to the widening of the M5 Motorway), the Proponent intends to augment a number of the existing drainage basins as well as provide a number of new drainage basins which incorporate “first flush” storage, accidental spillage storage and stormwater detention. The Proponent's assessment indicates that the drainage basins would provide appropriate protection of water quality in the surrounding catchment during the operational phase of the project. However, the potential impacts on the receiving environment at the final discharge points were not quantified. Consequently, the Department has recommended a condition of approval requiring the Proponent to undertake further hydrological and hydraulic assessment and modelling, including the potential for scour, flooding, water quality impacts, and impacts on riparian vegetation, aquatic ecology and property to inform detailed design and appropriate management measures. There is a network of approximately 30 kilometres of drainage lines directly associated with the M5 Motorway. However, in a number of locations, the pavement drainage from the M5 Motorway is not separated from cross drainage and flows directly into council stormwater drainage systems. Adequate assessment of the capacity of the existing motorway pavement drainage system to convey runoff from the M5 Motorway was undertaken. However, only limited preliminary modelling was undertaken of the adequacy of the existing cross-drainage systems to convey flows from the M5 Motorway. Although this modelling indicated that the existing cross-drainage is likely to be adequate in a 1 in 100 year annual recurrence interval event, it did not take into consideration increases in upstream and downstream flow inputs from the catchments which drain to the drainage systems. Consequently, the Department has recommended a condition of approval requiring the Proponent to undertake further hydraulic modelling to confirm the capacity of council cross-drainage systems to receive and convey stormwater flows from the M5 Motorway and identify any consequent upstream and downstream impacts on the capacity of the cross-drainage systems. The former Department of Environment, Conservation and Climate Change and Liverpool City Council raised concern regarding potential flooding impacts, including floods larger than a 1-in-100-year event. The Proponent has advised that the original motorway was designed to convey a 1-in-100-year event, consistent with requirements at that time, and that the drainage and water quality management design for the M5 West Widening project will be in accordance with current standards. <u>Construction Impacts</u> Construction of the project will involve clearing, excavation and stockpiling works in areas in close proximity to waterways and drainage systems. Consequently, there is a risk of erosion and sedimentation impacts. The Proponent has committed to implementing standard erosion and sediment controls in consultation with a soil conservation specialist, consistent with the principles set out in Landcom's (2006) <i>Managing Urban Stormwater: Soils and Construction</i> (the Blue Book) to mitigate this impact. The Department considers this an appropriate measure and has recommended it

Hydrology (continued)	as a condition of approval along with the requirement to detail the proposed measures for the control and management of erosion and sedimentation in the Construction Environmental Management Plan for the project. In addition, the Department has recommended that the Construction Environmental Management Plan for the project include measures for the management of acid sulfate soils and contaminated soils to minimise the potential for adverse water quality impacts arising during construction. No structural works are proposed at any of the watercourse crossings. However, it is proposed to locate an ancillary facility (construction compound) adjacent to Anzac Creek. Although the compound site is located within the 30 metre buffer zone recommended by the NSW Office of Water, it was selected as the site is predominantly cleared and no additional clearing would be required. The Proponent has committed to protecting the creek during construction, including implementing erosion and sedimentation controls, and fencing of the compound to prevent incursions into the buffer zone.
Ancillary Facilities	The construction of the project will involve the establishment of ancillary facilities, including construction compounds. Due to the narrow nature of the M5 Motorway corridor, the construction compounds will need to be established outside of the M5 Motorway corridor in residential and industrial areas. The former Department of Environment, Climate Change and Water and Bankstown City Council raised concern over the siting and impacts associated with ancillary facilities. The Department is satisfied that compound selection has resulted in locations with the least possible impacts to sensitive receivers and that in many instances impacts are unlikely to be noticed. Nevertheless, to ensure that the construction and operation of ancillary facilities do not adversely impact on the environment and sensitive receivers, the Department has recommended conditions of approval which set out criteria for the location and assessment of ancillary facilities, including consideration of noise, traffic, air quality, flora and fauna, and heritage. The conditions also require the Proponent to obtain the approval of the Director General where ancillary facilities do not meet the location criteria. The requirement for such an assessment is consistent with the recommendation of the former Department of Environment, Climate Change and Water in its submission on the Environmental assessment. An assessment of the traffic and noise impacts associated with ancillary facilities is provided in Sections 5.1 and 5.2, respectively.
Spoil Reuse Sites Spoil Reuse Sites (continued)	The Proponent intends to establish a series of spoil reuse sites generally within the M5 Motorway corridor. The reuse sites will comprise excess spoil from the construction of the project and may be accessed in the future. To ensure that the winning of spoil from the sites does not adversely impact on the environment and nearby residents, the Department has recommended a condition of approval requiring the Proponent to undertake an assessment of such operations if and when they occur. In addition, the Department has recommended that the Construction Environmental Management Plan for the project include a spoil reuse management protocol which details the management measures to be implemented to manage and/or minimise adverse amenity impacts to surrounding residents and environmental risks.
Community Involvement	The Department is satisfied that the consultation undertaken as part of the project has provided the community with sufficient opportunity to comment on the project consistent with statutory requirements (refer Section 4). The consultation undertaken by the Proponent during and since the preparation of the Environmental assessment is detailed in the Proponent's Submissions and Preferred Project Report and is considered to be acceptable. To ensure that effective consultation is undertaken with the community throughout the construction of the project, the Department has recommended a condition of approval requiring the Proponent to develop and implement a Community Communication Strategy.
Other matters	The Department is satisfied that all other matters are adequately addressed by the Proponent's Environmental assessment, Submissions and Preferred Project Report and final Statement of Commitments.

6. RECOMMENDATION

The Department considers that the traffic and transport improvements proposed as part of the M5 West Widening project would provide significant strategic and community benefits to communities along the M5 Motorway

corridor as well as to the broader Sydney region, by supporting forecast population and employment growth, improving freight efficiency, enhancing strategic road network efficiency and minimising adverse environmental and social externalities that would otherwise occur from traffic congestion and elevated travel times.

The Department has assessed the Proponent's environmental assessment, Submissions and Preferred Project Report, and Statement of Commitments as well as all the submissions received from public authorities and the general public on the proposal. Based on its assessment, the Department is satisfied that the project is justified and consistent with strategic government policy for Metropolitan Sydney, including the *Metropolitan Plan for Sydney 2036*. The Department is further satisfied that the Proponent has undertaken a robust and conservative assessment of the impacts of the proposal and that the impacts can be managed and/ or mitigated through design or other mitigation measures to an acceptable level.

The key environmental impacts associated with the proposal relate to traffic, noise and biodiversity. With regards to traffic, the Department is confident that the proposed upgrade will assist in alleviating the current congestion and delays experienced along the M5 Motorway, particularly during peak periods. The Department is also satisfied that the recommended conditions of approval, including the requirement for a Construction Traffic Management Sub-plan, will ensure any potential construction-related traffic impacts are minimised to an acceptable level.

The Department recognises that there will be both construction and residual operational noise impacts for the community. The Department accepts that these impacts are unavoidable due to the urban nature of the environment surrounding the M5 Motorway. The Proponent has however endeavoured to minimise the extent of the operational noise impacts as much as reasonably possible through the use of low noise pavements, noise barriers and architectural treatments at sensitive receivers. The Department considers the outcomes to be acceptable but has recommended conditions of approval aimed at measuring the effectiveness of the mitigation measures the Proponent has committed to, including noise monitoring and modelling. The Department has also recommended conditions aimed at managing and mitigating construction noise impacts, including limits on the hours of construction and construction noise monitoring.

In regards to ecological impacts, the Department acknowledges that the proposal will require the removal of approximately 19 hectares of vegetation, comprising about 1.7 hectares of vulnerable and endangered ecological communities and 17.3 hectares of landscaped vegetation. It will also require the removal of 76 specimens (landscape plantings) of the vulnerable plant species *Acacia pubescens*. The Department is confident that the corridor specific measures and proposed biodiversity offset strategy and package and translocation program for *Acacia pubescens* will effectively minimise and offset any impacts on native flora and fauna.

The recommended conditions of approval also provide for the mitigation and management of other impacts associated with the project including impacts on air quality, heritage, visual amenity, and hydrology, as well as general requirements for the overall environmental management of the project. These conditions would ensure the issues addressed in this report are appropriately addressed and managed to acceptable levels. The conditions will also ensure that commitments made in the Environmental assessment and Submissions and Preferred Project Report are implemented.

The Department considers that on balance the project is justified and in the public's interest. Consequently, the Department recommends that the project be approved subject to the recommended conditions of approval.



A/Deputy Director General
Infrastructure Projects
Development Assessment & Systems Performance

25.10.11



Director General

26/10/2011

APPENDIX A ENVIRONMENTAL ASSESSMENT

See the Department's website at http://majorprojects.planning.nsw.gov.au/page/project-sectors/transport--communications--energy---water/roads/?action=view_job&job_id=3924

APPENDIX B SUBMISSIONS

See the Department's website at: http://majorprojects.planning.nsw.gov.au/page/project-sectors/transport--communications--energy---water/roads/?action=view_job&job_id=3924

APPENDIX C PROPONENT'S RESPONSE TO SUBMISSIONS

See the Department's website at http://majorprojects.planning.nsw.gov.au/page/project-sectors/transport--communications--energy---water/roads/?action=view_job&job_id=3924

APPENDIX D RECOMMENDED CONDITIONS OF APPROVAL
