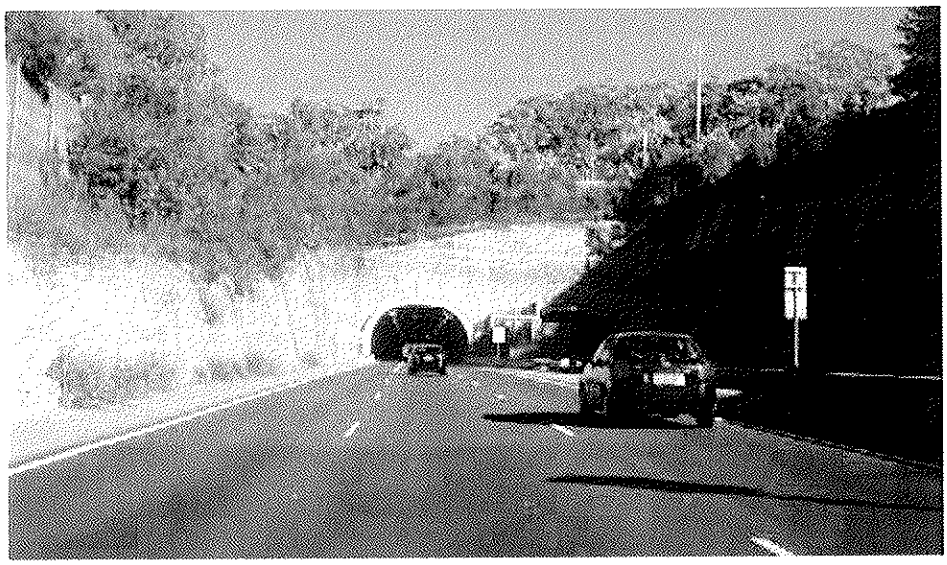
NSW GOVERNMENT | Planning

MAJOR PROJECT ASSESSMENT
M2 Upgrade



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

October 2010

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EXECUTIVE SUMMARY

The NSW Roads and Traffic Authority (the Proponent) has sought the Minister for Planning's approval for the upgrade and operation of the M2 Motorway Upgrade project. The proposal includes the widening and provision of a third lane along sections of the eastbound and westbound carriageways between Windsor Road, Baulkham Hills and Lane Cove Road, North Ryde and provision of new on/off-ramps.

The M2 Upgrade project would extend over 14.5 kilometres in length and involves construction works including:

- Widening and/or provision of a third lane along sections of the eastbound and westbound carriageways between Windsor Road, Baulkham Hills and Lane Cove Road, North Ryde;
- Provision of new on and off-ramps at Windsor Road, a new on-ramp at Christie Road, Macquarie Park, and a new off-ramp at Herring Road, Ryde;
- Widening and provision of a third lane eastbound and westbound in the Norfolk Tunnel;
- Restoration of the westbound breakdown lane and provision of 3.5 metre wide traffic lanes between Lane Cove Road and Beecroft Road;
- Removal of the Beecroft Road bus on and off-ramp;
- Upgrade to the intersection of the M2 Motorway and Windsor Road, and the Christie Road and Herring Road intersections with Talavera Road; and
- Upgrade to the M2 Motorway Intelligent Transport System.

The key benefits of the proposal include improved travel efficiency, travel speeds and travel time reliability. The Upgrade proposal is consistent with a range of State Government strategic planning documents to support the growth in the North West region, including the Metropolitan Transport Plan (2010), Sydney Metropolitan Strategy (2005) and NSW State Plan.

The capital cost of the proposal is approximately $550 million (2010 dollars) with a construction workforce of up to 550 engaged at any given time during the construction phase.

The Department received 910 submissions on the project including 900 from individuals, special interest groups or businesses (including petitions), and 10 from Government agencies and councils. Key issues raised included operational and construction noise and vibration, operational traffic, community consultation and biodiversity.

Following a thorough assessment of the Environmental Assessment and Submissions Report, the Department considers that the proposed alignment has been designed to minimise the impacts on the surrounding environment and local community, in the context of the proposed project being an upgrade of an existing alignment, and the governing road design and safety specifications that must be achieved. The Department is satisfied that an appropriate balance of these conflicting factors has been achieved and that the predicted impacts, including noise, have been minimised wherever possible through the proposed upgrade to the M2 motorway alignment. The Department is also satisfied that the mitigation, management and monitoring measures, as recommended in the conditions of approval and the Statement of Commitments, will ensure that these impacts are further minimised during detailed design, construction and operational phases of the projects. The Department has recommended conditions of approval which define performance standards and targets which the project must achieve as well as monitoring requirements which are chiefly aimed at measuring the effectiveness of the mitigation measures which the Proponent has committed to. This includes noise and vibration monitoring.

Notwithstanding the recommended conditions of approval, the Department acknowledges that residual impacts will occur, predominately during the construction phase of the project. The Department accepts that there will be construction impacts as a result of this project and that it is an unavoidable impact of major infrastructure construction. However, the Department has concluded that these residual impacts can be reduced to acceptable levels and are acceptable given the benefit that the total project would provide to the general public, through significant improvements and the benefits delivered to the region through improved road network capacity and performance for all motorists and the economic benefits delivered through improved travel efficiency, travel speeds and travel time reliability.

Consequently, the Department considers the proposal is in the public interest and recommends that the M2 Motorway project be approved subject to the recommended conditions of approval.

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1. BACKGROUND

1.1 Strategic Context

The M2 Motorway Upgrade project has been identified in various planning and strategy documents.

In February 2010, the Premier of NSW released the *Metropolitan Transport Plan*, prepared by NSW Transport and Infrastructure. The *Metropolitan Transport Plan* outlines a 25 year vision for land use planning in Sydney together with a ten year fully funded package of transport infrastructure to support it. The *Metropolitan Transport Plan's* vision is for commuting to work to be easy and quick, for transport and services to be accessible to all members of our community, for an efficient, integrated and customer focused public transport system, and for revitalised neighbourhoods with improved transport hubs. The *Metropolitan Transport Plan* specifically commits to the delivery of an extra lane each way on the M2 Motorway within the next ten years to meet travel demand generated by planned growth in the north west, and identifies the M2 Motorway as a strategic bus corridor.

Complementing the M2 Upgrade, was the Government commitment within the Metropolitan Transport Plan to commence construction of the North West Rail Link in 2017, which will see heavy rail services introduced into the Hills district for the first time.

The Sydney Metropolitan Strategy, titled *City of Cities: A Plan for Sydney's Future* (December 2005) (Metropolitan Strategy) predicts that over the next 25 to 30 years, 99,000 jobs will be created in Sydney's north west, with over 55,000 new jobs being created in the immediate vicinity of the M2 corridor. The Metropolitan Strategy describes the M2 Motorway as playing an important and strategic function in providing high quality access between Sydney's north west and the 'global arc', spanning from Macquarie Park, Chatswood, St Leonards, North Sydney, Sydney CBD, Sydney Airport and Port Botany. The project would provide better access to the employment hubs in Sydney's west and north west and improved accessibility to the specialised centre at Macquarie Park to the Sydney Orbital Motorway network.

The M2 Motorway Upgrade proposal is consistent with the *State Plan* priorities. It represents a significant investment in maintaining and improving transport infrastructure, it targets the reliability and efficiency of transport operations during peak periods, and it includes improvements to safety aspects of the road environment.

The NSW Government's *Urban Transport Statement* (November 2006b), complements the *Metropolitan Strategy* (NSW Government 2005) key transport initiatives to support the future growth of Sydney. The *Urban Transport Statement* identifies the efficient movement of people and goods in and around Sydney as a key transport objective and provides for the strategic importance of the Sydney Orbital Motorway network and identifies the M2 Motorway as a key part of the Macquarie Park to Port Botany Economic corridor, or Global Arc, with a total daily travel volume of 8.25 million passenger kilometres.

The M2 Motorway is a major bus corridor, being one of the key bus corridors identified in the *Review of Bus Services in NSW* (2004) - approximately 600 'Hillsbus' services use the M2 Motorway each weekday (travelling eastbound and westbound). Service levels and reliability of bus operations along M2 Motorway routes are dependent on traffic conditions on the M2 Motorway as well as on the surrounding sub-arterial and arterial road network. The project would improve bus travel times and reliability in the short term and into the future, because of the increased capacity on the M2 Motorway provided by the project.

Action for Air was prepared by DECCW and adopted in 1998 (updated 2009) as the State Government's 25 year plan for managing air quality in Sydney, the Illawarra and the Lower Hunter. The objectives of *Action for Air* include reducing vehicle emissions, making businesses cleaner, making homes and local environments cleaner, healthier and more liveable, reducing particle pollution in regional NSW and improved communication and air quality education.

The project would support the *Action for Air* through greater efficiency of traffic movement in the corridor. Reduced congestion following the upgrade of the M2 Motorway would provide driving conditions that result in lower vehicle emissions for each kilometre of travel. The project would improve access to new commercial

centres such as Norwest Business Park and Macquarie Business Park through new on and off ramps at Windsor Road, Christie Road and Herring Road. This improved motorway access would encourage the further development of these commercial precincts, reduce congestion on local roads and provide employment opportunities for the expanding residential areas in Sydney's north west. The location of jobs closer to residential areas would reduce the need to travel and the distance travelled.

1.2 The Existing M2 Motorway

The existing M2 Motorway is a four lane dual carriageway which extends 21 kilometres from the intersection of Epping Road and Pittwater Road, North Ryde to Abbott Road, Baulkham Hills and was opened to traffic in May 1997. A two-lane eight-kilometre busway operates from Beecroft Road to Windsor Road. The M2 Motorway passes through Ryde, Hornsby and Baulkham Hills local government areas and is in close proximity to the Blacktown and Parramatta local government areas.

The M2 Motorway forms part of the Sydney Orbital Motorway network and was constructed to serve residential and employment growth in Sydney's North West and is the principle transport link between the North West and the Global Arc. The M2 Motorway provides connectivity and capacity for commuter, commercial, freight and road based public transport, in the absence of a suburban rail line, and now functions primarily as a key freight route west of Pennant Hills Road and a key commuter route east of Pennant Hills Road. The section between the M7 Motorway (opened in 2005) and the Pennant Hills Road now functions as part of the Federal Auslink Network. The M2 Motorway is operated by Transurban, since acquiring the concession from Hills Motorway in June 2005.

For the purposes of description the M2 Motorway is divided into five precincts (see Figure 1), based on the key defining physical and operational characteristics (refer Table 1). The M2 Motorway precincts and their key operational attributes are as follows:

Table 1: The Existing M2 Motorway (adapted from M2 EA)

Precinct	Existing Road Environment
Precinct 1 Abbott Road to Windsor Road	This section extends for four kilometres from the intersection of the M2 Motorway, Abbott Road and Old Windsor Road. At the western end the M2 Motorway links with the M7 Motorway and east-facing ramps connect the M2 Motorway to the local road network at Old Windsor Road/Abbott Road. The M2 Motorway comprises two carriageways, each carriageway consisting of a breakdown lane and two traffic lanes. The carriageways are separated by grassed or concrete barrier medians. Cyclists are able to utilise the breakdown lanes. Bus stops are located along the M2 Motorway in this precinct with buses also using the breakdown lane.
Precinct 2 Windsor Road to Pennant Hills Road.	This section extends for five kilometres and is characterised by two carriageways, each one comprising a breakdown lane, two traffic lanes, plus a bus lane in each direction. The carriageways are separated by a concrete barrier median. Cyclists are able to utilise the breakdown lanes. Toll collection points are located on the west facing ramps at Pennant Hills Road. East facing ramps at Windsor Road provide access to and from this precinct and Windsor Road. West facing ramps at Pennant Hills Road provide access to and from this precinct and Pennant Hills Road.
Precinct 3 Pennant Hills Road to Beecroft Road.	This section of the M2 corridor extends for three kilometres and is characterised by two carriageways, each one comprising a breakdown lane, two traffic lanes plus a bus lane in each direction. The carriageways are separated by a concrete barrier median (although at Devlins Creek bridge the bridges are separated so there are two median barriers). Cyclists are able to utilise the breakdown lanes. The temporary cycleway detour from the westbound carriageway near Lane Cove Road connects to the westbound breakdown lane near Beecroft Road. The east facing ramps at Pennant Hills Road provide access to and from the M2 Motorway in this precinct. The bus only ramp near Beecroft Road allows bus access to and from the M2 Motorway from Epping (via an underpass at the main northern railway). Eastbound to southbound busses on the M2 Motorway can also access Beecroft Road.
Precinct 4 Beecroft Road to Terrys Creek (including Norfolk Tunnel).	This section extends from Beecroft Road to Terrys Creek. In the eastbound direction, this precinct features a breakdown lane and two traffic lanes. In the westbound direction, this precinct features three traffic lanes and no breakdown lane. The third lane was marked by removing the breakdown lane as part of an interim widening scheme implemented in 2007. The three lanes merge to two lanes immediately past the western tunnel portal. Eastbound cyclists are able to use the shoulder through this precinct. However, a temporary off-Motorway cycle path is provided for westbound cyclists, as there is no shoulder to use in this direction. The

	Norfolk Tunnel (sometimes referred to as the Epping Tunnel) is 460 metres in length and consists of two tunnel tubes separated by a wall of rock. There are two traffic lanes (plus breakdown lane) in the eastbound tube and three traffic lanes westbound (without breakdown lane) in the westbound tube. The tunnel is cut into the sandstone bedrock. Surrounding the tunnel is predominantly detached residential dwellings, interspersed with parklands. Directly above Norfolk Tunnel, there is a small cluster of detached dwellings and Epping Oval.
Precinct 5 Terrys Creek to Lane Cove Tunnel.	This section runs from Terrys Creek to the eastern extent of the M2 Motorway at the start of the Lane Cove Tunnel. The Terrys Creek to Herring Road section is approximately 2.5 kilometres in length and is characterised by two carriageways, the eastbound comprising a breakdown lane with two traffic lanes and westbound comprising three traffic lanes without breakdown lane. The carriageways are separated by a concrete barrier. The M2 Motorway Toll Plaza is located adjacent to the Macquarie University site, between Culloden Road and Christie Road. The westbound cycleway in this section is by way of temporary westbound detour, along Talavera Road. The west facing off ramp at Christie Road and overpass is located approximately 500 metres east of the M2 Motorway Toll Plaza. Traffic travelling westbound cannot access the M2 Motorway from Christie Road. Westbound traffic access M2 Motorway via the west facing ramp at Herring Road, which joins the M2 Motorway just east of the Christie Road local road crossing. The Herring Road to Lane Cove Road segment is approximately 1.3 kilometres in length consisting of two carriageways. The eastbound consists of a breakdown lane with two traffic lanes and the westbound three traffic lanes (without a breakdown lane). The carriageways are separated by a concrete barrier. West facing on- and off-ramps provide access to and from the M2 Motorway and Lane Cove Road. Lane Cove Road is a three lane dual carriageway major arterial road that crosses the M2 Motorway by a double span overbridge. The corridor in this section is dominated by large scale commercial buildings and low to medium density residential development. Shrimptons Creek crosses the M2 Motorway approximately 400 metres east of Christie Road.

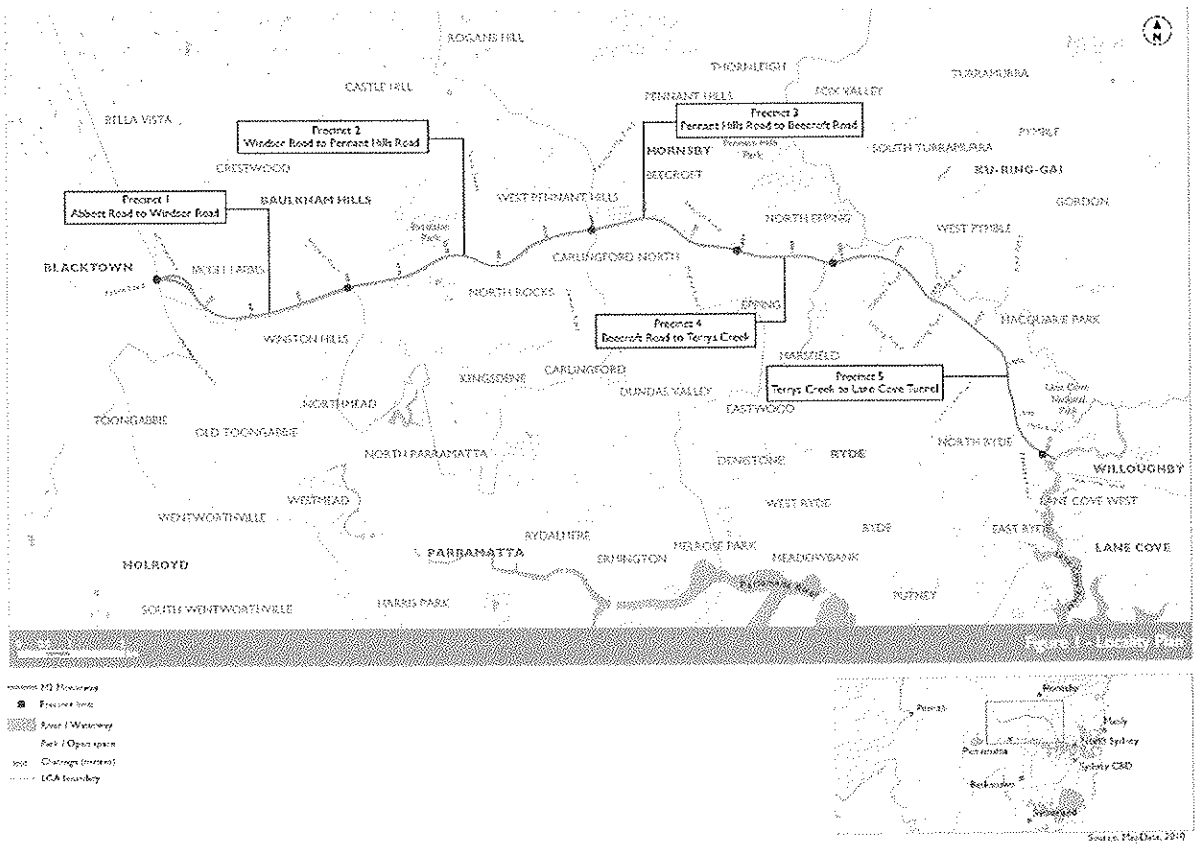


Figure 1 – Existing M2 Motorway (Source: *M2 Upgrade Environmental Assessment*, NSW Roads and Traffic Authority May 2010)

2. PROPOSED DEVELOPMENT

2.1 Project Description

The project involves the construction and operation of approximately 14.5 kilometres of four-lane dual carriageway, commencing to the west of Windsor Road to approximately half a kilometre to the east of Lane Cove Road, as depicted in Figure 2. Table 2 provides an overview of the key features associated with the project.

The capital investment value of the project is $550 million with an estimated construction workforce of 550 personnel. The project is estimated to take approximately two years to complete. Key objectives for the M2 Motorway Upgrade project are to:

- improve safety, traffic and travel efficiency;
- meet community needs for the long term;
- minimise adverse impacts on the environmental values of the area; and
- provide a cost effective and affordable outcome.

Table 2 - Key Components of the Project

Component	Description
Road footprint	- Widening and/or provision of a third lane along sections of the eastbound and westbound carriageways between Windsor Road and Lane Cove Road - Widening and provision of a third lane eastbound and westbound in the Norfolk Tunnel - Restoration of the westbound breakdown lane and provision of 3.5 metre wide traffic lanes between Lane Cove Road and Beecroft Road
On and Off Ramps	- Provision of new on and off-ramps at Windsor Road, Baulkham Hills - Provision of new on-ramp at Christie Road and new off-ramp at Herring Road, Macquarie Park; - The removal of the Beecroft Road bus on and off-ramp, Epping
Local and Regional Road Connections	- Upgrade to the intersection of the M2 Motorway/Windsor Road, and the Christie Road/Talavera Road and Herring Road/Talavera Road intersections.
Tolling	- Upgrade to the M2 Motorway Intelligent Transport System involving traffic control and monitoring equipment (closed circuit television, variable message signs and variable message speed limit signs), plant control and monitoring equipment, communications equipment (motorist emergency telephone network) and tolling equipment.
Property Access and Infrastructure	- The project would result in both temporary and permanent changes to property access arrangements the relocation of utilities and services (undertaken in consultation with the relevant providers)
Ancillary Facilities and Temporary Works	- The establishment of construction compound sites to store construction materials, equipment and plant and house site amenities and site offices - Formation of temporary roads to access construction compound sites and work sites - Traffic management measures, including temporary lane or carriageway closures during periods of low traffic flow, to allow pavement, demolition and bridge works - Diversion of pedestrian and cyclist access at bridges and intersections

The detailed works proposed as a result of the M2 Upgrade project are described below (in relation to the five precincts as previously described).

Route alignment and key features

Precinct 1 – Abbott Road to Windsor Road (chainage 3300 – 4000)

Within this section the proposed upgrade works include new west facing on and off-ramps between the M2 Motorway and Windsor Road and modifications to the current grade separated interchange. To accommodate the new west facing ramps, the M2 Motorway would be widened on the approach to the Windsor Road interchange. The Windsor Road overbridge would be widened on the western side and modified to provide additional through lanes at the intersection and accommodate adequate ramp turning lanes for the new ramps. Windsor Road would be widened between Woodlands Street and Oakland Avenue.

Precinct 2 – Windsor Road to Pennant Hills Road (chainage 4000 – 9000)
Within this section the proposed upgrade works include widening of the road pavement to create an additional 3.5 metre wide eastbound lane from the end of the Windsor Road entry ramp to the Pennant Hills Road exit ramp (resulting in the eastbound carriageway comprising three 3.5 metre wide lanes, a single 3.5 metre wide bus lane and a single 2.5 metre wide breakdown lane that could be used by bicycle users). Proposed works include modifications to Darling Mills Creek Bridge, Barclay Road overbridge and Yale Close Bridge.

Emergency stopping bays would be provided on the widened carriageways to match the existing locations and median barriers would be in place for the length of this section.

Precinct 3 – Pennant Hills Road to Beecroft Road (chainage 9000 – 11900)
Within this section the proposed upgrade works include widening to create an additional 3.5 metre wide lane eastbound and westbound. The additional eastbound lane would extend from the Pennant Hills Road entry ramp to the Beecroft Road entry ramp. As a result of the upgrade, the eastbound carriageway would provide three 3.5 metre wide lanes, a single 3.5 metre bus lane (ending approximately 1200 metres west of Beecroft Road interchange) and a single 2.5 metre breakdown lane.

The additional westbound lane would extend from the Beecroft Road interchange to the Pennant Hills Road exit ramp. As a result of the upgrade, the westbound carriageway would comprise three 3.5 metre wide lanes, a single 3.5 metre wide bus lane (commencing approximately 650 metres west of Beecroft Road interchange) and a single 2.5 metre wide breakdown lane.

Where the bus lanes would terminate, both eastbound and westbound carriageways would provide three 3.5 metre wide lanes and a single 2.5 metre wide breakdown lane. The M2 Motorway would be widened on the southern side to accommodate the additional westbound lane, being west of the Kent Street footbridge. From the commencement of Devlins Creek Bridge, the gap between the eastbound and westbound carriageway bridge structures over Devlins Creek would be closed to accommodate a third lane eastbound. Modifications would also be required to Kirkham Street Bridge to accommodate widening works.

Emergency stopping bays would be provided on the widened carriageways to match the existing locations and median barriers would be in place for the length of this section.

Precinct 4 – Beecroft Road to Terrys Creek (including Norfolk Tunnel) (chainage 11900 – 13500)
Within this section the Proposed upgrade works include widening of the road pavement to create an additional 3.5 metre wide lane eastbound from Beecroft Road to the Terrys Creek Bridge, including the Norfolk Tunnel. As a result of the upgrade, the eastbound carriageway would comprise three 3.5 metre wide lanes and a single 2.5 metre breakdown lane. Within this section works also include widening existing westbound lanes to 3.5 metres and reinstating the westbound breakdown lane from the Terrys Creek Bridge to the Beecroft Road interchange. As a result of the upgrade, the westbound carriageway would provide three 3.5 metre wide lanes and a single 2.5 metre wide breakdown lane.

The bus ramp bridge near the Beecroft Road bus bridge would be demolished and the existing eastbound bus lane would terminate west of Beecroft Road, convert to a normal traffic lane on the eastbound carriageway and the westbound bus lane would begin west of Beecroft Road. The outcome is the addition of a third lane in both directions without the need for widening of the carriageways.

The Norfolk Tunnel would be widened, including approaches, to accommodate a third lane in the eastbound tube (widened to the north) and accommodate lane widening in the westbound tube to reinstate the breakdown lane (widened to the south). East of the eastern tunnel portal, the M2 Motorway would be widened on the southern and northern sides, to accommodate a third lane eastbound and reinstatement of the breakdown lane westbound. Widening to the north would extend from the tunnel portal to approximately chainage 13350, whilst widening to the south would extend to west of Terrys Creek.

Emergency stopping bays would be provided on the widened carriageways to match the existing locations and median barriers would be in place for the length of this section.

6.2.5 Precinct 5 – Terrys Creek to Lane Cove Tunnel (chainage 13500 – 17700)
Within Precinct 5 the proposed upgrade works include widening to create an additional 3.5 metre wide lane eastbound from the Terrys Creek Bridge to Lane Cove Road. As a result of the upgrade, the eastbound mainline carriageway would comprise three 3.5 metre wide lanes and a single 2.5 metre breakdown lane, with one of the lanes marked as a T2 lane (east of Terrys Creek Bridge to near Lane Cove Road).

Proposed upgrade works within this section also include widening of existing westbound lanes to 3.5 metres and reinstatement of the westbound breakdown lane from Lane Cove Road to the Terrys Creek Bridge. As a result of the upgrade, the westbound carriageway would comprise three 3.5 metre wide lanes and a single 2.5 metre wide breakdown lane.

The M2 Motorway would be widened to the north from approximately just west of Terrys Creek, to the western approach to the toll plaza. At Culloden Road, west of the toll plaza, widening is proposed to north and south of the M2 Motorway. The toll plaza would be reconfigured to give greater priority to electronic toll collection, with one cash booth retained in either direction. There would be three eastbound lanes as well as a breakdown lane under the Christie Road bridge. The M2 Motorway west of the toll plaza, near Vimiera Road, would typically be widened on areas of fill.

A small section of median adjoining the eastbound Christie Road off-ramp would be modified to accommodate an additional lane eastbound beneath Christie Road Bridge. The M2 Motorway would be widened to the north from Christie Road, to east of Khartoum Road, to accommodate a new eastbound on-ramp at Christie Road and an additional eastbound lane. Traffic from the Christie Road ramp would merge with the left eastbound lane of the M2 Motorway.

The M2 Motorway would be widened to the south from west of the toll plaza, to accommodate the third westbound lane and the new Herring Road westbound off-ramp. Traffic on the westbound entry ramp merges with the left westbound lane. The intersections at Herring Road / Talavera Road and Christie Road / Talavera Road would be modified. Talavera Road would be widened to create five traffic lanes between the access to the School of Management (west of Christie Road) and Alma Road. There would be four through lanes and a dedicated right turn lane. Christie Road would be widened to five lanes (three southbound, two northbound) and there would be a new set of traffic signals provided at the northern ramps (the existing exit ramp and proposed new entry ramp).

Emergency stopping bays would be provided on the widened carriageways to match existing locations. Median barriers would be in place for the length of this section with the possible exclusion of the toll plaza. There would be no widening of or modification to the M2 Motorway between Lane Cove Road and the eastern end of the M2 Motorway near the Lane Cove River.

These key features are shown in Figures 3-8. Further details of the project can be found in the Proponent's Environmental Assessment.

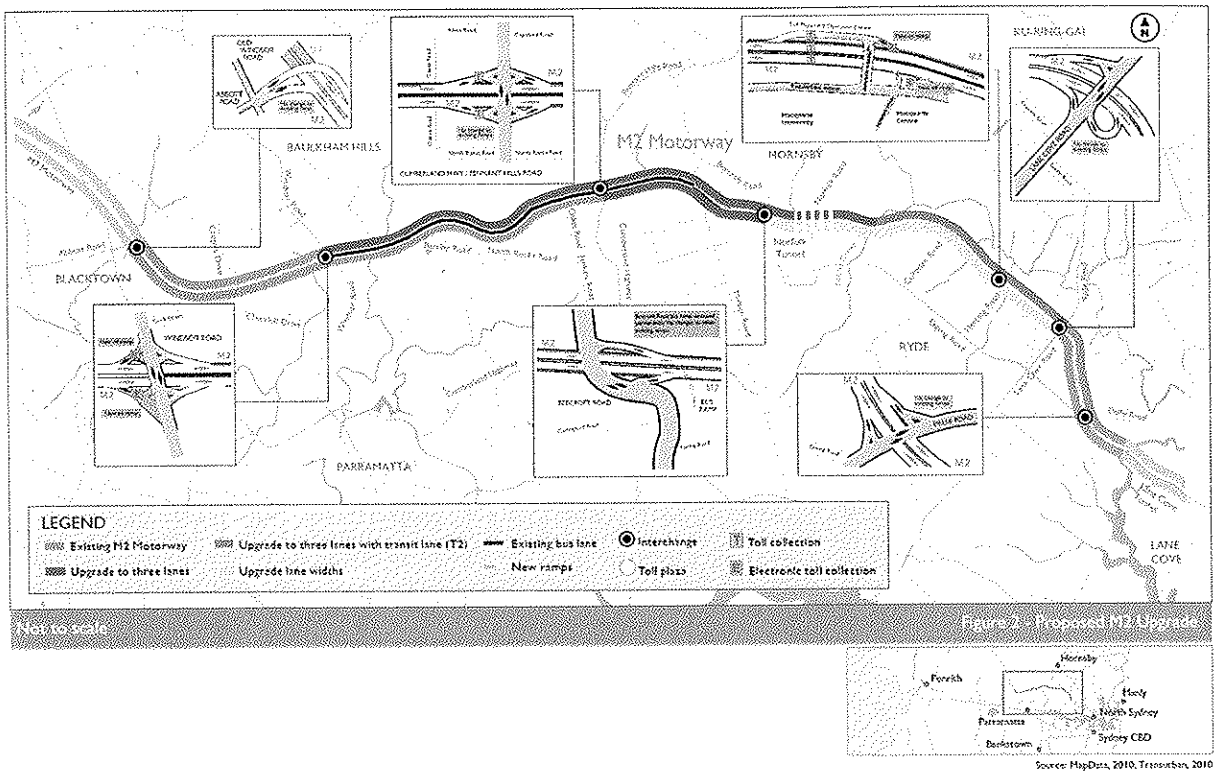


Figure 2 - M2 Motorway Upgrade (Source: *M2 Upgrade Environmental Assessment,* NSW Roads and Traffic Authority May 2010

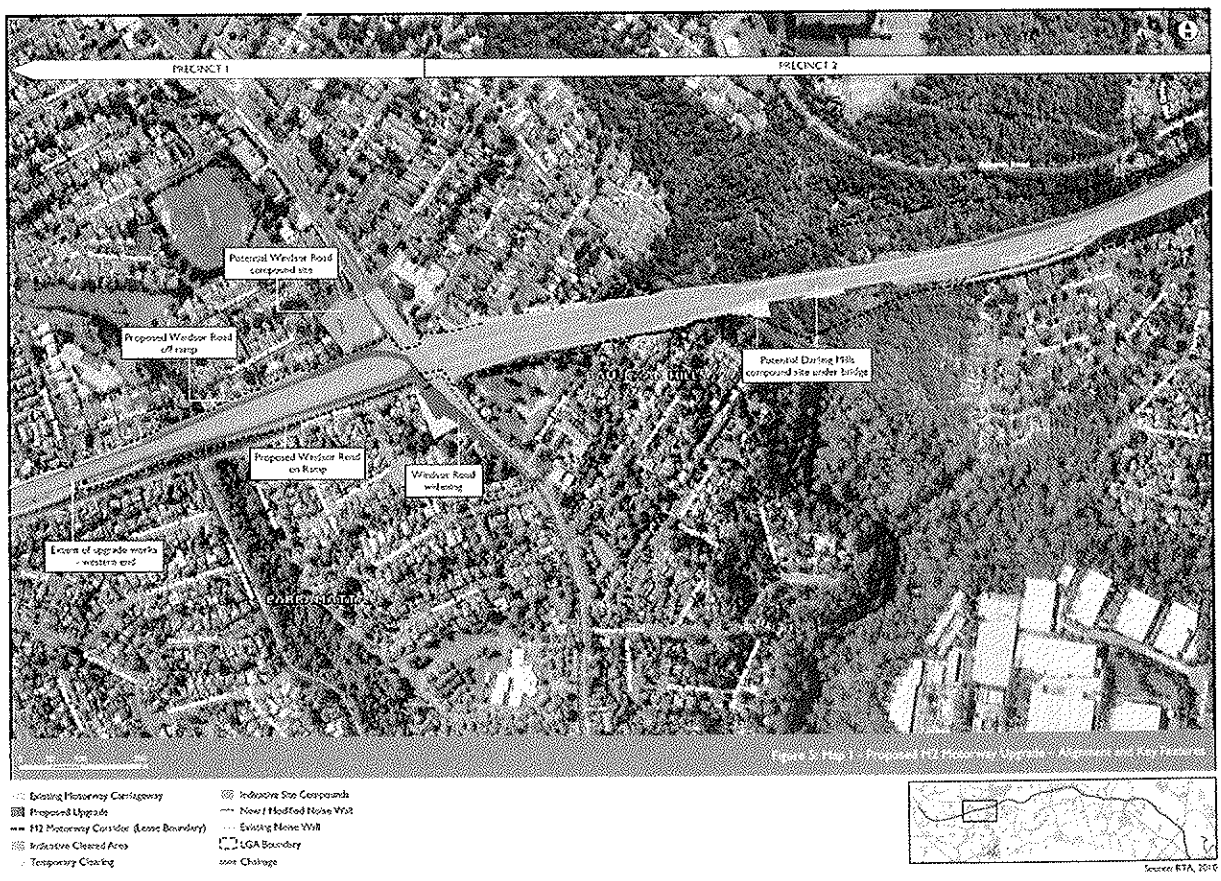


Figure 3 Map 1 – Precinct 1 and Precinct 2 Alignment and Key Features of the M2 Motorway Upgrade (Source: *M2 Upgrade Environmental Assessment,* NSW Roads and Traffic Authority May 2010)

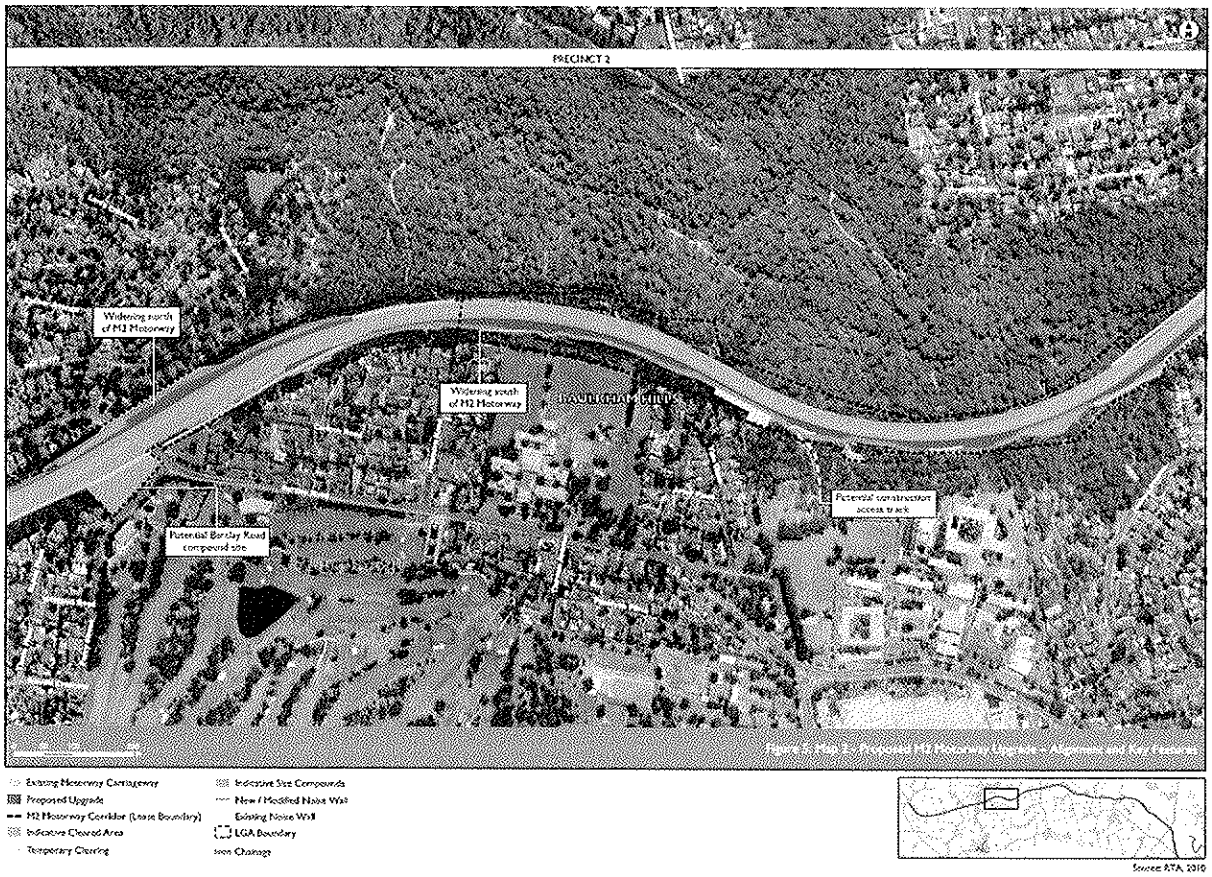


Figure 3 Map 2 – Precinct 2 Alignment and Key Features of the M2 Motorway Upgrade (Source: *M2 Upgrade Environmental Assessment*, NSW Roads and Traffic Authority May 2010)

Figure 3 Map 3 – Precinct 2 and Precinct 3 Alignment and Key Features of the M2 Motorway Upgrade (Source: *M2 Upgrade Environmental Assessment*, NSW Roads and Traffic Authority May 2010)

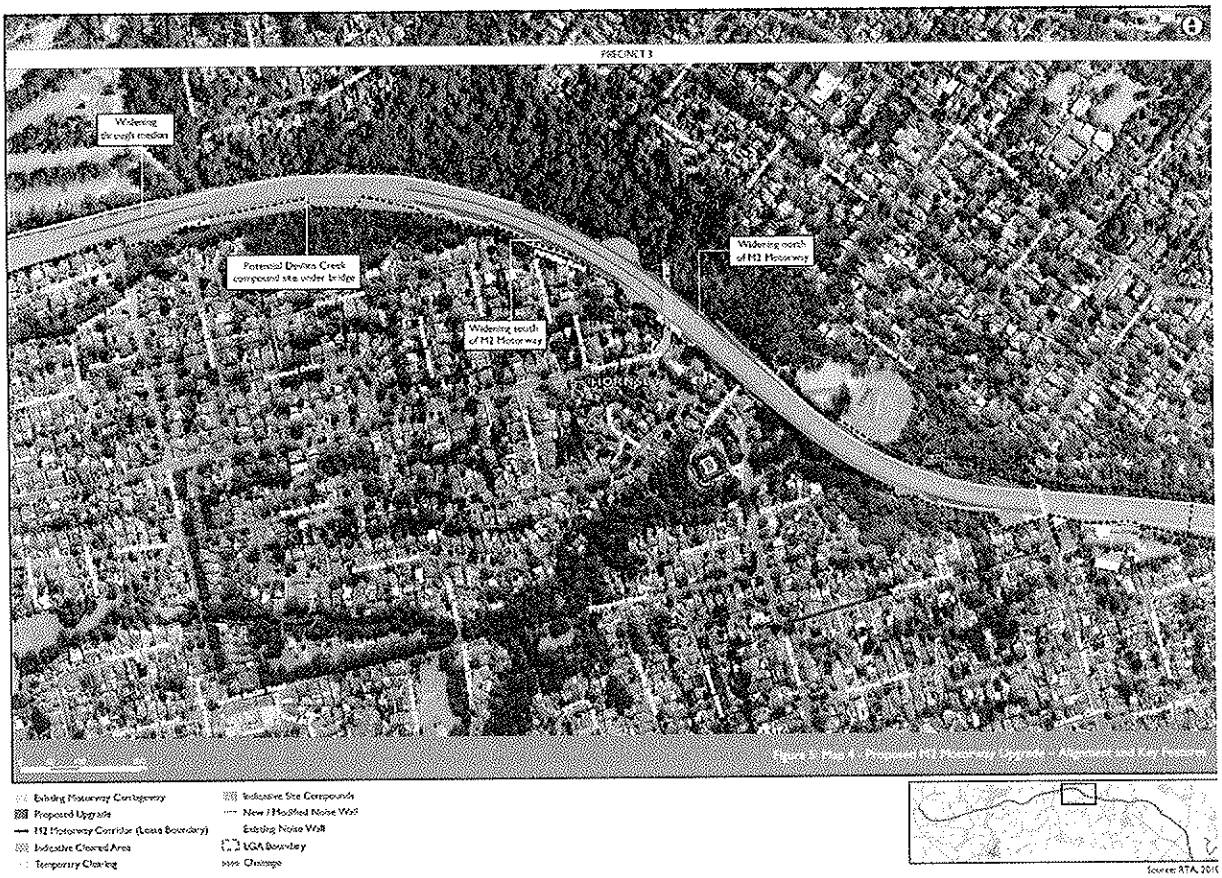


Figure 3 Map 4 – Precinct 3 Alignment and Key Features of the M2 Motorway Upgrade (Source: *M2 Upgrade Environmental Assessment*, NSW Roads and Traffic Authority May 2010)

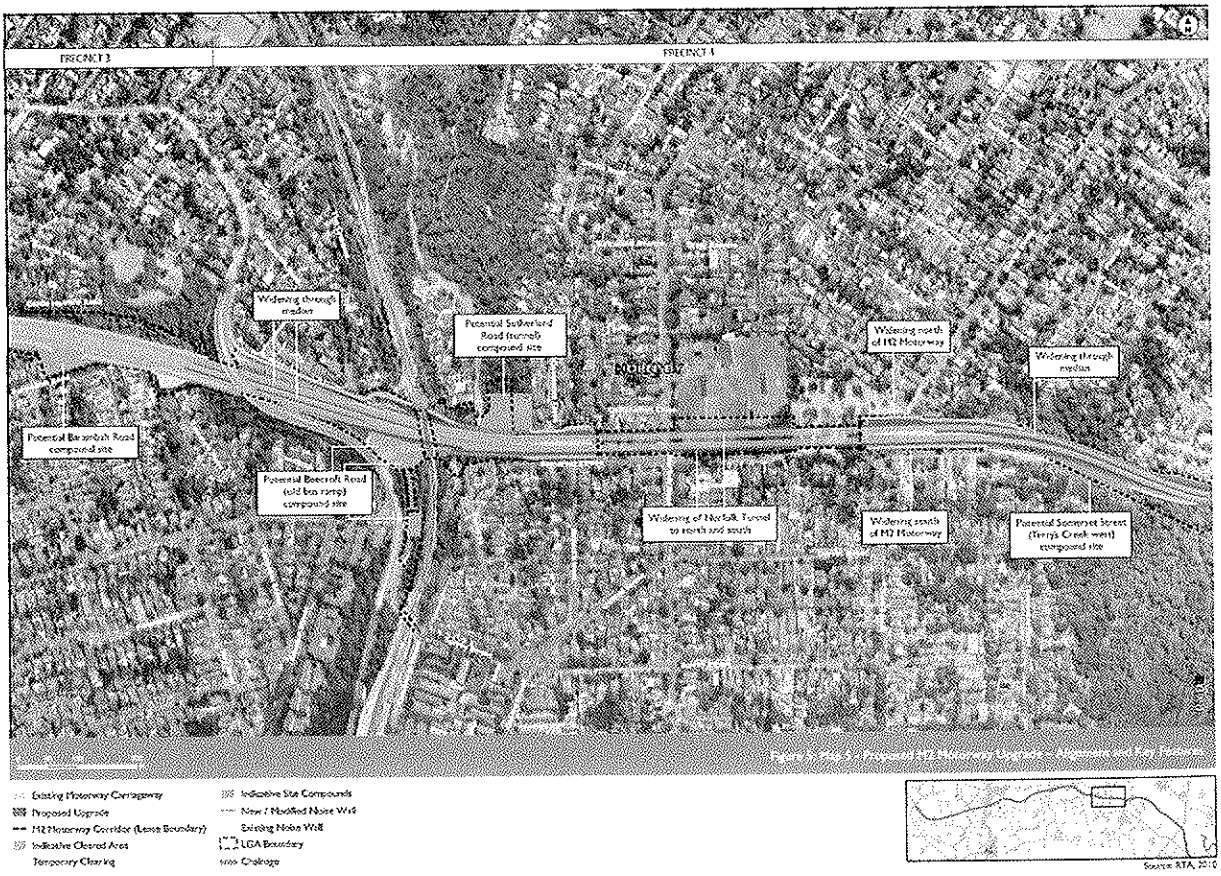


Figure 3 Map 5 – Precinct 3 and Precinct 4 Alignment and Key Features of the M2 Motorway Upgrade (Source: *M2 Upgrade Environmental Assessment*, NSW Roads and Traffic Authority May 2010)

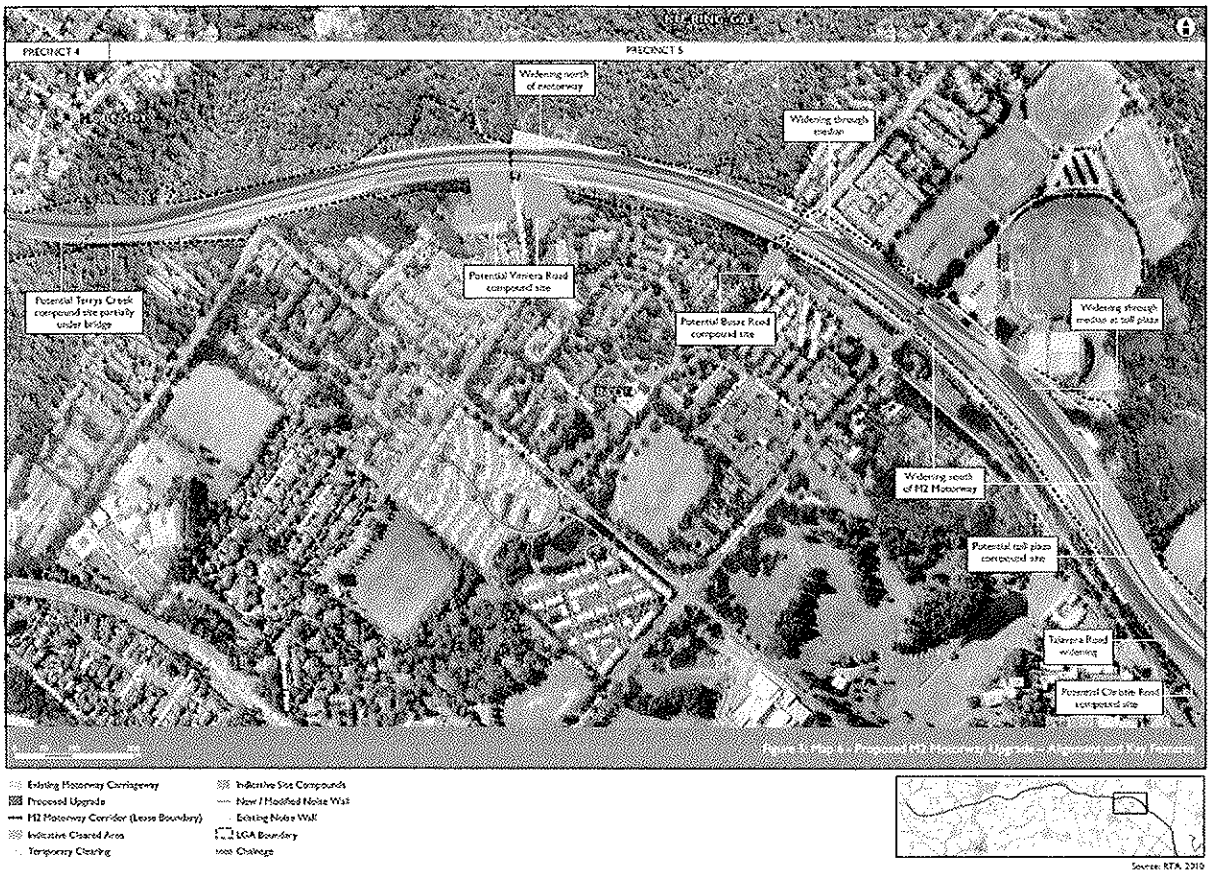


Figure 3 Map 6 – Precinct 4 and Precinct 5 Alignment and Key Features of the M2 Motorway Upgrade (Source: *M2 Upgrade Environmental Assessment,* NSW Roads and Traffic Authority May 2010)

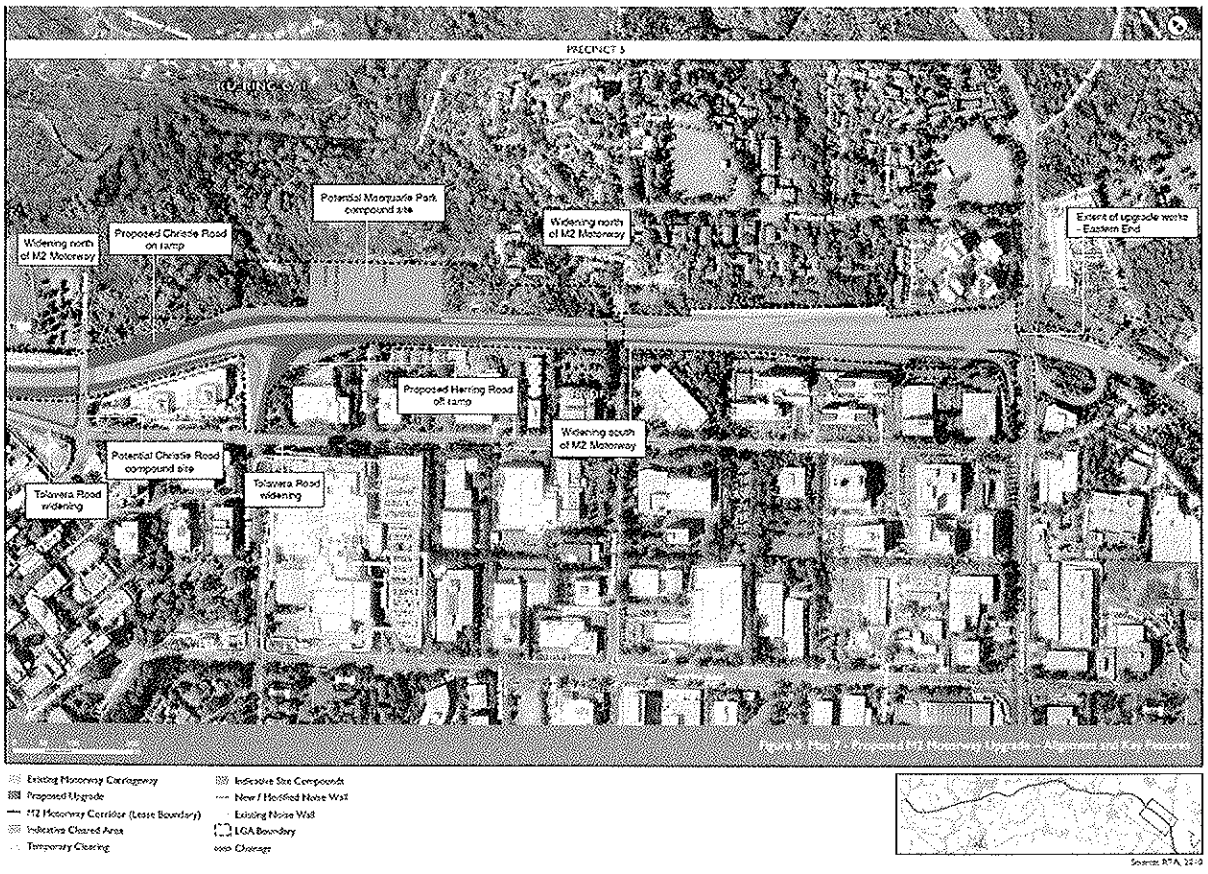


Figure 3 Map 7 – Precinct 5 Alignment and Key Features of the M2 Motorway Upgrade (Source: *M2 Upgrade Environmental Assessment,* NSW Roads and Traffic Authority May 2010)

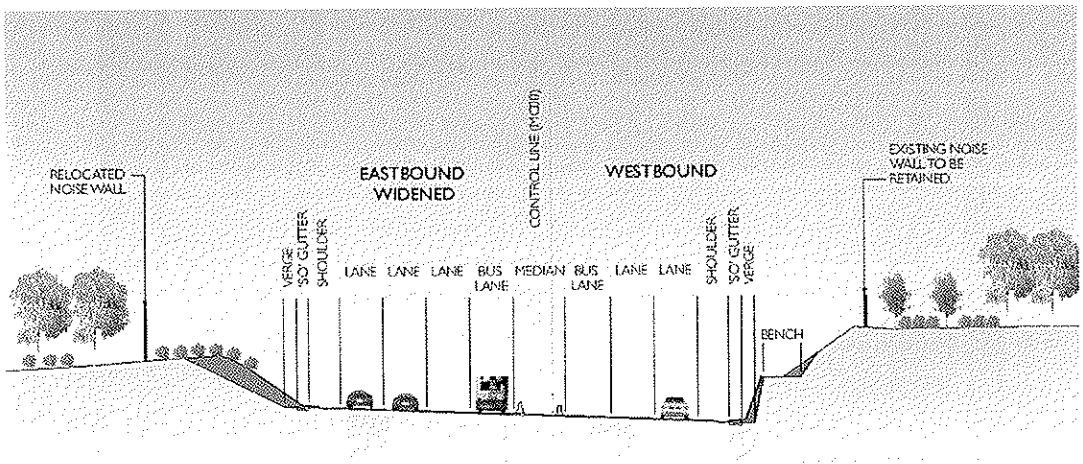


Figure 4 – Typical Cut Cross Section (Source: *M2 Upgrade Environmental Assessment,* NSW Roads and Traffic Authority May 2010)

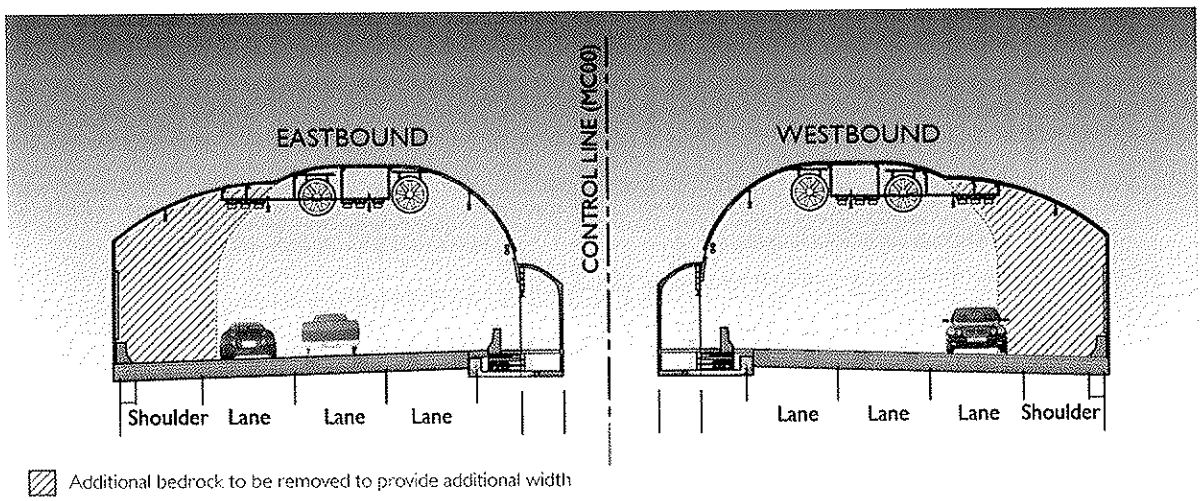


Figure 5 – Typical Norfolk Tunnel Cross Section (Source: *M2 Upgrade Environmental Assessment,* NSW Roads and Traffic Authority May 2010)

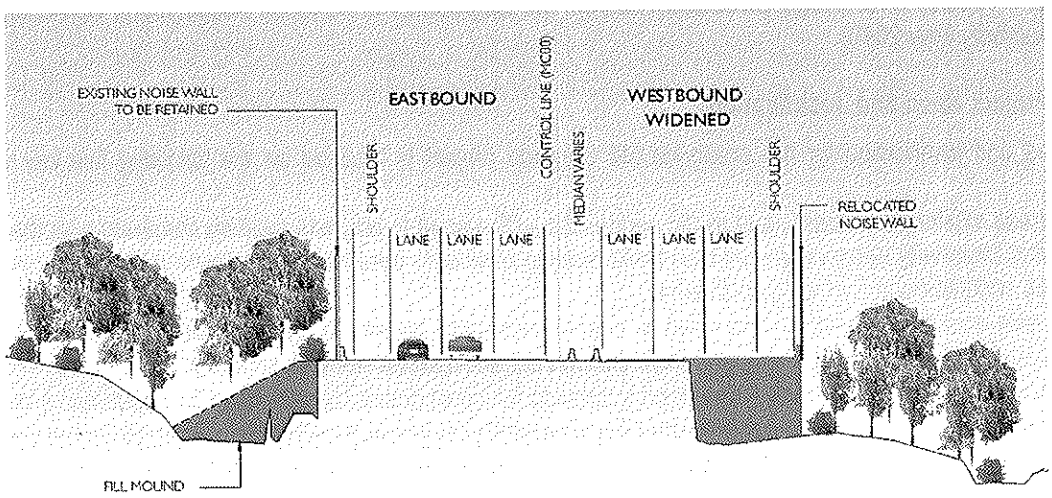


Figure 6 – Typical Fill Cross Section (Source: *M2 Upgrade Environmental Assessment,* NSW Roads and Traffic Authority May 2010)

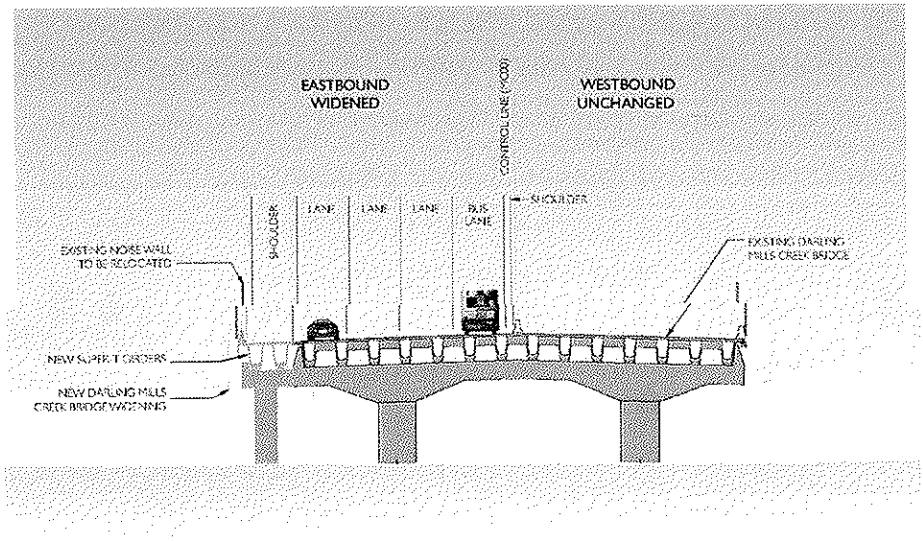


Figure 7 – Typical Bridge Super T-Structure (Source: *M2 Upgrade Environmental Assessment,* NSW Roads and Traffic Authority May 2010)

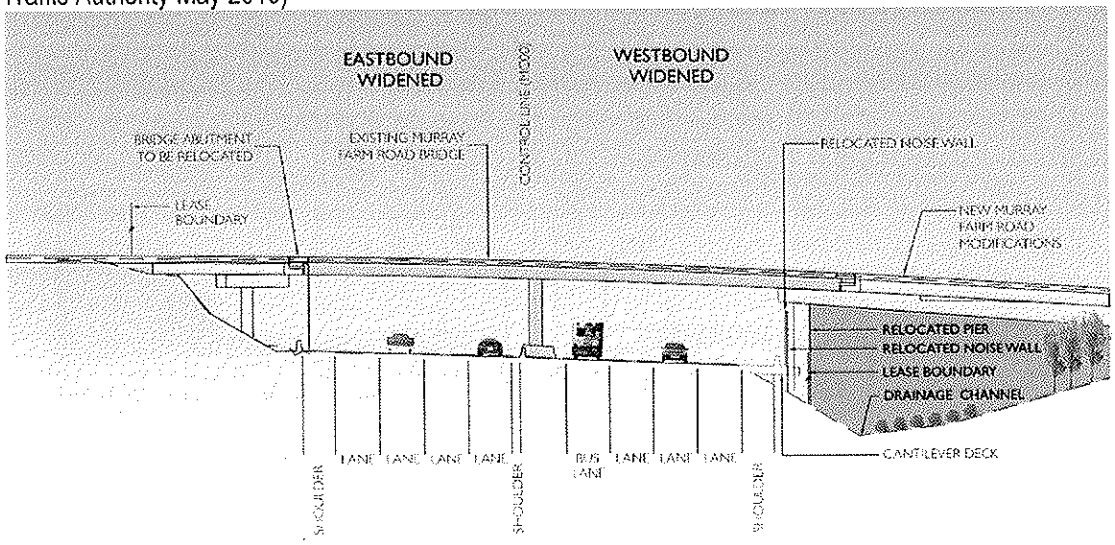


Figure 8 – Typical Overbridge Structure (Source: *M2 Upgrade Environmental Assessment,* NSW Roads and Traffic Authority May 2010)

2.2 Project Need and Justification

The need and justification for the proposed M2 Upgrade project is focused on the following five key strategic themes:

- Address existing constraints and traffic congestion – The need to address existing constraints on the Sydney Orbital Motorway network to minimise traffic spilling over onto parallel arterial roads and to provide relief to traffic congestion in Sydney's north west;
- Support economic growth – The need to support economic growth in Sydney's north west and to support industry agglomeration at Macquarie Park through enhancing road network capacity;
- Provide for population growth – The need to provide for travel demands generated by population growth;
- Enhance accessibility – The need to enhance accessibility to growing residential and employment areas; and
- Enhance public transport – The need to create opportunities to enhance public transport and support its growth.

The M2 Motorway is an important element of the Sydney Orbital Motorway network, servicing not only the north west but also enabling traffic from the south and west seeking to travel to Sydney's north, the Central Coast and the Hunter Valley. The section between the M7 Motorway and Pennant Hills Road now functions as part of the

Federal Auslink Network. In addition, bus use of the M2 Motorway has increased significantly in recent years, and is expected to grow as a result of increased development planned in the north west regions.

The project is consistent with the *NSW State Plan* Priorities of Safer Roads and Maintain and Invest in Infrastructure. Further, the project has been identified in the *NSW State Infrastructure Strategy* (2008-2018).

2.3 Project Options

The RTA analysed a range of options, based on both RTA investigations and stakeholder consultation. Four broad alternatives were initially identified and considered as part of the development of the project:

- Alternative one – Do nothing.
- Alternative two – Other road based improvement options, including:
  - Line marking to add additional lanes within the existing carriageway; and
  - Upgrade of the local sub-arterial and arterial road network.
- Alternative three – Provision of public transport – increase provision for public transport within the M2 Motorway catchment.
  - Rail based alternatives, including light rail and heavy rail; and
  - Enhancement of existing road based public transport (bus lane and park and ride facility).
- Alternative four – Demand management, including differential tolling and amended toll structures.

It is noted that the preferred strategic option was then further refined through an evaluation of project options, which included the need for and location of additional ramps, bridges and sections of the M2 Motorway requiring widening works.

The base case or 'do nothing' alternative

The base case (or do nothing) alternative involves retaining the existing M2 Motorway as a four lane dual carriageway motorway, with bus lanes in certain sections. This assumes that the interim widening that is currently in place between Lane Cove Road and Beecroft Road would remain, but that no other upgrade to the M2 Motorway would be undertaken. The 'do nothing' alternative would result in:

- the continued decline in level of service as traffic volumes increase (with new commercial and residential development planned in the north west of Sydney and proximate to the M2 Motorway);
- greater propensity for traffic to use alternative routes as a result of increased congestion on the M2; and
- continued reduced level of service for users as result of the current interim widening that is in place between Lane Cove Road and Beecroft Road (reduced lane widths, removal of the breakdown lane and reduction of the speed limit, reduced standard of facility for cyclists).

Road based improvement

Line Marking

The 'line marking' alternative is a very low cost alternative comprising the provision of an additional (third) lane along sections of the M2 Motorway through reallocation of existing road space and modification to existing lanes. This would involve narrowing of traffic lanes, loss of breakdown lanes and reduction of the speed limit from 100 kilometres per hour to 80/70 kilometres per hour. The outcome would have shortcomings similar to that of the interim widening (line marking) already described between Lane Cove Road and Beecroft Road.

Local sub-arterial and arterial road upgrade

The 'upgrading of the local sub-arterial and arterial road network' alternative would involve the provision of additional road capacity in the M2 Motorway catchment area, by widening existing sub-arterial and arterial roads and removing bottlenecks by introducing potential grade separations and the provision of new links with improvements to existing intersections.

The two local road widening alternatives provide the most direct routes via the local sub-arterial and arterial road network from Windsor Road through to Delhi Road. Notwithstanding, the feasibility of upgrading the local road network is challenged by the potential impacts such an upgrade would have on surrounding land use, community amenity, environmental impacts and property. Further, the widening of local roads is likely to be more costly than upgrading the M2 Motorway, resulting in comparatively low value for money.

Rail based public transport

The main public transport destinations for users within the M2 Motorway catchment are Macquarie Park and the CBD. In 2009, the rail line between Epping and Chatswood was completed with new train stations introduced at Macquarie University, Macquarie Park and North Ryde, increasing the accessibility of Macquarie Park and the CBD to commuters from Sydney's north west. However, the provision of the new line has not resolved congestion in the M2 corridor. The Department also notes the recent Federal Government announcement of funding of the Parramatta to Epping Rail link.

As part of the recently released Metropolitan Transport Plan, the NSW government has committed to the construction of the North West Rail Link, with construction due to commence in 2017 for completion in 2024. The M2 Upgrade project would not preclude construction of the North West Rail Link or other such enhancements to public transport networks. The 14 year timeframe for commissioning of the North West Rail Link means that it would not be operational in time to avoid further congestion on the M2 Motorway.

Additionally, with many trip origins and destinations of M2 Motorway users not effectively served by the selected route the M2 Motorway would still be subject to growth in traffic volumes over time. Several trip purposes are not suited to rail travel (for example, occupations that require transport of freight and goods, or travel between several locations throughout the workday).

Road based public transport

This alternative would involve establishing a dedicated bus lane along the M2 Motorway, comprising either a dedicated bus lane or a separated rapid transit route, to link with the Lane Cove Tunnel and Epping Road at Lane Cove West and the CBD. This option would necessitate continuation of the existing bus lanes and would likely involve widening for the sections of the M2 Motorway that currently do not provide a bus lane.

A bus lane along the M2 Motorway is not the preferred option for alleviating congestion, for the following reasons:

- A typical AM peak bus trip from Sydney's north west, such as from Castle Hill, to the Sydney CBD via the M2 Motorway takes over an hour. The travel time improvements expected from a bus lane for the full length of the M2 Motorway is estimated to be around five minutes (less than 10 percent).
- Buses would not generate sufficient patronage to alleviate peak hour congestion on the existing M2 Motorway as there would be little travel time improvement from the 'do nothing' case for buses. Consequently, the mode shift from car to bus would not be significant enough to reduce congestion on the M2 Motorway.

2.4 Preferred Project

As a result of the public exhibition process, the following design changes and minor modifications have been made around Kirkham Street/Murray Farm Road overbridge.

The M2 Upgrade project, as presented in the Proponent's environmental assessment, included widening works (for carriageway) around the Kirkham Street/ Murray Farm Road overbridge area generally to the south of the existing M2 Motorway (between CH 10150 to CH 11380). These works would require the relocation of approximately 930 metres of existing noise walls, the removal of approximately 0.79 hectares of vegetation, and construction works affecting Devlin Creek and surrounding riparian areas.

Submissions identified that extensive bush regeneration activities have been undertaken by the community over the last 13 years in the Midson Road Bushcare site (approximately CH 10900 to CH 11100) including hundreds of hours of volunteer work, funding including investment by Hornsby Shire Council of $252,000 for major rehabilitation works along Devlins Creek (including widening of the creek, forming wetlands and settling ponds, improving water quality, mitigating flooding and preventing further bank erosion).

Additionally submissions from Hornsby Shire Council and DECCW expressed a general concern about the disturbance of existing noise walls required during construction of the M2 Upgrade project. In particular, both agencies stated a preference for noise walls to be replaced prior to the commencement of construction works wherever possible to mitigate potential construction noise impacts on surrounding receivers.

As a consequence of these concerns, the design of the M2 Motorway Upgrade project around the Kirkham Street/Murray Farm Road overbridge was reviewed, and an alternative design developed to shift carriageway widening works from the south to the north of the M2 Motorway. Comparison between the original design (presented in the environmental assessment) and the alternative design (presented in the Submissions Report

and Preferred Project Report) demonstrates a significant reduction in vegetation clearing, a reduction in the length of noise walls affected during construction works, and removal of the need for works to be undertaken within Devlins Creek and surrounding riparian areas.

The original design and alternative design are shown in Figure 9 and Figure 10. A comparative summary of key features of the two designs is provided in Table 3.

Table 3 – Comparison of Design Changes Around the Kirkham Street/Murray Farm Road Overbridge Area

Original design (Environmental assessment)	Amended design
Murray Farm Road overbridge works	
New Southern Pier 1 located in Devlins Creek	New Central Pier 2 located in the existing M2 Motorway eastbound carriageway
Deck concrete works at existing northern abutment	Deck concrete works at existing northern abutment
Deck strengthening works at existing Central Pier, existing Pier 1, new Southern Pier 1 and southern abutment	Deck strengthening works around new Central Pier 2 and existing Pier 1
Eastbound (northern side of the M2 Motorway)	
300 m long colonnade structure to the west of Murray Farm Road from CH10250 to CH10550	300 m long cantilever structure to the west of Murray Farm Road from CH10250 to CH10550
330 m long cutting west and east of Murray Farm Road from CH10550 to CH10880	550 m long cutting west and east of Murray Farm Road from CH10550 to CH11100
Relocation of approximately 100 metres of noise walls from CH10700 to CH10800	Relocation of approximately 660 metres of noise walls from CH10220 to CH10300 and CH10700 to CH11280
One culvert extension at CH10550	Two culvert extensions at CH10550 and CH11550
Westbound (southern side of the M2 Motorway)	
400 m long high cutting to the west of Murray Farm Road from CH10150 to CH10550	430 m long cutting to the west of Murray Farm Road from CH10150 to CH10580
330 m long colonnade structure within Devlins Creek to the west and east of Murray Farm Road from CH10550 to CH10880	No works required from CH10580 to CH11000
300 m long gravity wall from CH10880 to CH11180	200 m long cantilever structure from CH11000 to CH11200
100 m long cutting from CH11180 to CH11280	100 m long cutting from CH11200 to CH11300
100 m long cantilever structure from CH11280 to CH11380	80 m long cantilever structure from CH11300 to CH11380
Relocation of approximately 830 m of noise walls from CH10450 to CH11200 and CH11300 to CH11380	Relocation to approximately 80 m of noise walls from CH11100 to CH11200
Two culvert extensions at CH10550 and CH11550	No culvert extensions

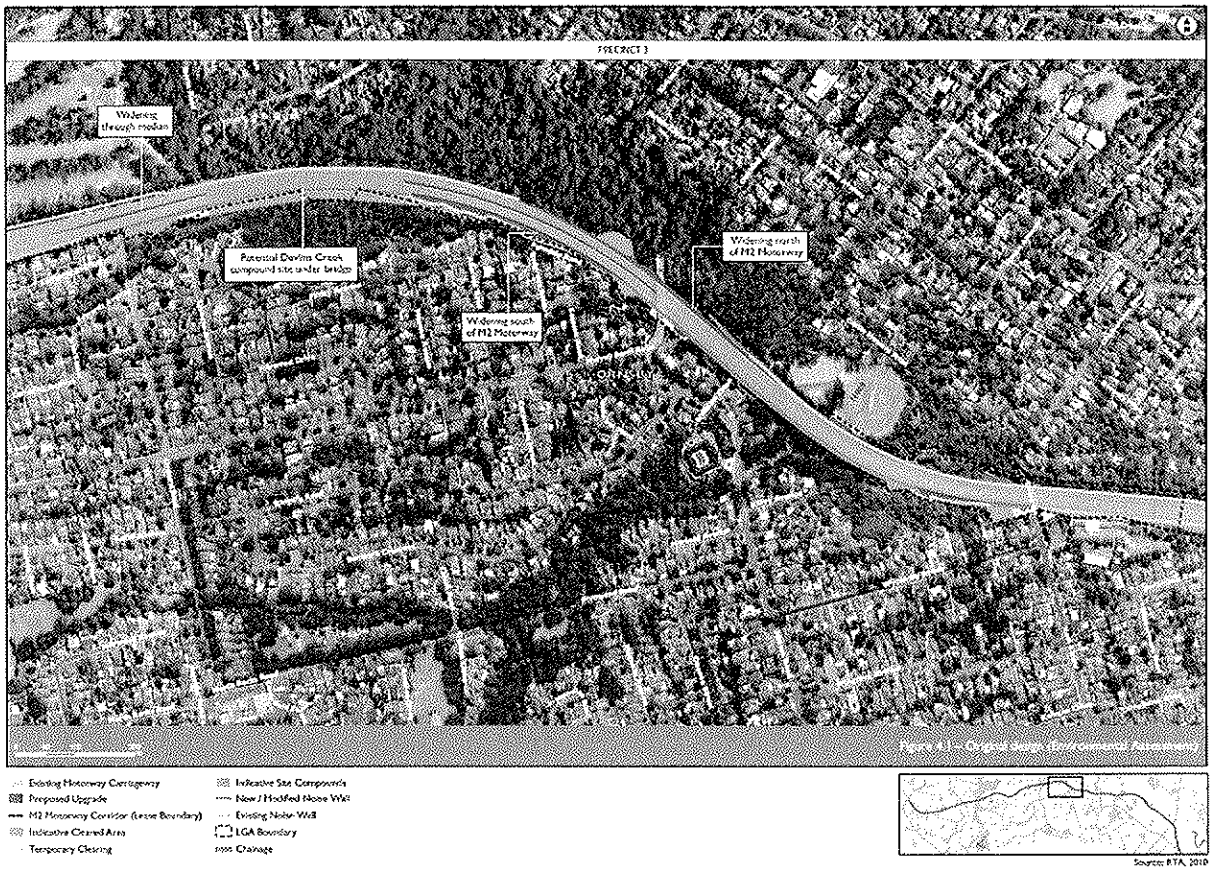


Figure 9 – Original Design of Kirkham Street/Murray Farm Road Overbridge Area (Source: *M2 Upgrade Submissions and Preferred Project Report*, NSW Roads and Traffic Authority August 2010)

Figure 10 – Amended Design of Kirkham Street/Murray Farm Road Overbridge Area (Source: *M2 Upgrade Submissions and Preferred Project Report*, NSW Roads and Traffic Authority August 2010)

3. STATUTORY CONTEXT

3.1 Major Project

On 24 February 2009, the M2 Motorway Upgrade proposal was declared a project to which Part 3A of the *Environmental Planning and Assessment Act, 1979* (the Act) applies by virtue of an Order made by the then Minister for Planning and was also declared a critical infrastructure project under section 75C of the Act.

On 7 July 2010, the Minister for Planning amended the schedule for the M2 Motorway Upgrade proposal to reflect changes to the proposal, being the removal of the park and ride facility and bus interchange facility at Herring Road and the Herring Road on-ramp and the addition of an eastbound on-ramp at Christie Road.

3.2 Critical Infrastructure Project

On 24 February 2009, the then Minister for Planning declared the M2 Motorway Upgrade to be a critical infrastructure project under Part 3A of the Act.

3.3 Relevant Environmental Planning Instruments

Pursuant to clause 94 of the *State Environmental Planning Policy (Infrastructure) (2007)*, development for the purpose of a road or road infrastructure facility may be carried out by or on behalf of a public authority without consent on any land. The project is therefore permissible.

3.4 Objects of the Environmental Planning and Assessment Act 1979

The Minister is required to consider the objects of the Act when decisions are made under the Act. These objects are detailed in Section 5 of the Act, and include:

'The objects of this Act 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.'

The objects of most relevance to the Minister's decision on whether or not to approve this project are those under section 5(a) (i), (ii), (vi) and (vii). The Department has given due consideration of these objects in its assessment of the proposal (see Table 4).

Table 4 – Objects of the EP&A Act and Relevance to the Project

Object	Consideration
5(a)(i)	The main object of the project is to improve accessibility to the economic growth areas of Sydney's north west and to support employment growth in the Macquarie Park precinct. The addition of a third lane would address existing capacity constraints and traffic congestion, on both the motorway and adjoining arterial roads. The project would enhance accessibility to growing residential and employment areas between the north west and the 'global arc'. The project includes measures to ensure the impact of the construction and operation of the upgrade on the natural and built environments is managed and minimised.
5(a)(ii)	The Metropolitan Strategy predicts that over the next 25 to 30 years 99,000 jobs will be created in

	Sydney's north west, with over 55,000 new jobs being created in the immediate vicinity of the M2 motorway corridor. The project would provide better access to the employment hubs in Sydney's west and north west and improve access to the Macquarie Park employment precinct. The project would improve the reliability and efficiency in the movement of people and goods and improve the safety of the road network, which would assist in the orderly and economic use and development of land.
5(a)vi)	The project has been designed to minimise the impacts on the environment. The proposed mitigation, management and monitoring measures outlined in the EA and commitments made in the Statement of Commitments and the conditions of approval for the project will ensure that the construction and operational impacts are minimised.
5(a)(vii)	The Act adopts the definition of Ecologically Sustainable Development (ESD) found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of: *(a) the precautionary principle,* *(b) inter-generational equity,* *(c) conservation of biological diversity and ecological integrity,* *(d) improved valuation, pricing and incentive mechanisms.* The Department has fully considered ESD, in its assessment of the proposal (see section 5 of this report). The assessment seeks to integrate all significant economic, social and environmental considerations and avoid any serious or irreversible damage to the environment, based on an assessment of risk-weighted consequences.

3.5 Minister's Approval Power

In accordance with section 75H(3) of the Act, the Environmental Assessment (EA) was placed on public exhibition from 21 May 2010 until 24 June 2010. Advertisements notifying of the exhibition of the EA were placed in the Sydney Morning Herald, Daily Telegraph, Blacktown Advocate, Northern District Times and Hills Shire Times.

The EA was made publicly available on the Department's website, the Department's Bridge Street office, the Proponent's head office, the offices of the Ryde, Hornsby, Baulkham Hills, Parramatta, Blacktown and Lane Cove councils and the Nature Conservation Council.

The Department considers that it is has met all applicable legal obligations so that the Minister can make a determination in relation to the project. It is also noted that the EA submitted in support of the subject application addressed the Director General's requirements issued for the project application.

4. CONSULTATION AND ISSUES RAISED

The RTA was required to consult with a range of stakeholders including government authorities and service providers, special interest groups and the public in the preparation of the environmental assessment. A range of consultation activities were undertaken during the development of the project which are commensurate with the scale and expected impacts of the project.

4.1 Submissions

The Department received a total of 910 submissions on the project, comprising:

- four submissions from public authorities;
- six submissions from local government authorities;
- 681 individual submissions from the public;
- ten petitions from the public with 401 signatures; and
- 219 form letters from the public.

4.2 Submissions from the Public

Of the 900 submissions received from the public (681 individually prepared submissions and 219 submissions of one of two types of form letters), 6 supported the project (0.7%), 85 supported the project but raised various issues (9.5%), 343 raised various concerns about the project without stating support or opposition (38.1%), and 466 objected to the proposal (51.7%).

The individually prepared submissions included 18 from special interest groups, 2 from businesses, 4 from State and Commonwealth Members of Parliament and 1 from a Ward Councillor. The NRMA and Our Lady of Lourdes Primary School also made submissions on the project.

A summary of issues raised in submissions from the public is shown in Figure 11 below.

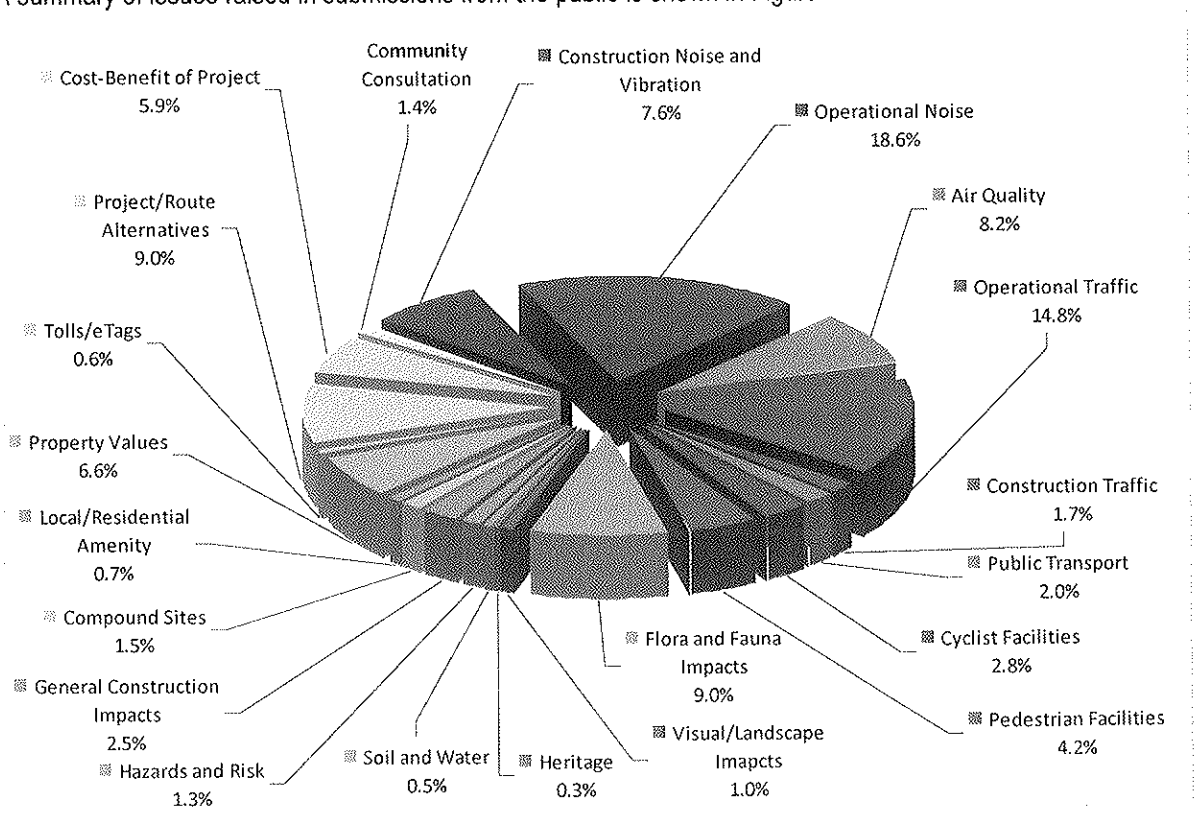


Figure 11 – Issues Raised in Submissions

Key issues raised in the individually prepared submissions from the public are summarised below and further addressed in the following chapter.

Noise and Vibration

Operational Noise

- the motorway upgrade will increase noise levels;
- existing traffic noise levels are high, particularly since the opening of the M7;
- the height of noise walls should be increased to reduce noise levels;
- the road surface should be repaved and regularly maintained; and
- residences should be architecturally treated to reduce noise levels.

Construction Noise and Vibration

- noise levels from construction work during the night time;
- residences adjoining the construction compounds/concrete batching plant will be subject to high noise levels;
- noise from construction traffic on local residential streets; and
- vibration/ structural damage to residences adjoining the motorway.

Traffic

Congestion and Management

- the upgrade will increase traffic congestion not solve it;
- traffic delays at Windsor Road intersection from the new ramps;
- increase in truck traffic;
- reduce speed limits and install speed cameras; and
- removal of the Beecroft bus ramp and motorway bus lanes will disadvantage bus users.

Pedestrian and Cyclist Facilities

- safety of children crossing Windsor Road to schools;
- build pedestrian bridge over Windsor Road;
- provide dedicated cycleway similar to the M7;
- existing temporary cycle access is inadequate; and
- pedestrian safety from construction traffic and equipment.

Flora and Fauna

- impact of road and bridge widening on bushland;
- loss of vegetation next to noise barriers;
- maintenance of landscaping;
- inadequate flora and fauna assessment; and
- impacts on community bush care improvement works.

Project Need and Alternatives

- improve public transport options rather than increase car travel;
- build North West Rail Link;
- investigate other transport links between M7 and F3; and
- remove tolls/introduce e-tags and distance tolls similar to M7.

Other Environmental Impacts

- air quality (dust and diesel fumes);
- visual amenity and urban design;
- water and soil erosion; and
- use and enjoyment and amenity of residences.

The form letters also raised the following issues:

- traffic congestion;
- construction and operational noise;
- air quality;
- flora and fauna;
- land use conflict;
- property values;

- cost/benefit;
- public transport; and
- pedestrian safety.

4.3 Submissions from Local Government Authorities

The Department received submissions from: City of Ryde; Parramatta City Council; Hornsby Shire Council; The Hills Shire Council; Ku-ring-gai Council; and Northern Sydney Regional Organisation of Councils. Issues raised by these authorities are summarised below:

City of Ryde

The City of Ryde generally supports the project and the proposed measures to address potential negative outcomes. However, Council raised the following:

- traffic - the project will have significant impacts on traffic within and through the council area (particularly in the Macquarie Park precinct) and will require traffic calming measures to support improved traffic movement in the precinct. This includes the reinstatement of the proposed park and ride car park facility on the northern side of the M2 near the Macquarie Shopping Centre and review of traffic movements in the vicinity of the proposed Herring Road bus interchange as the close proximity of the Herring Road ramps will cause congestion and raise the potential for accidents. Council also highlighted that east bound ramps at Lane Cove Road would provide a better opportunity to distribute traffic along the M2 and improve flows and congestion within Macquarie Park, in conjunction with that proposed at Christie Road. The use of regional and local roads by construction traffic will need to be managed, in relation to vehicular and pedestrian movements and damage to infrastructure;
- cycleways – the closure of the Vimiera Road underpass is not supported as the alternative route is an extremely long, difficult and potentially hazardous deviation and will likely result in a significant reduction in patronage, particularly commuting trips;
- street lighting – requested that the Proponent pay for the costs associated with lighting the extended underpasses.;
- construction compounds – highlighted that a detailed assessment for Council owned land be provided for consideration. Council highlighted that permission will only be granted if sustainability and amenity of the site can be guaranteed;
- Shrimpton Park culvert- Council requested that improvements to the culvert be undertaken to enhance connectivity to the Lane Cove National Park;
- biodiversity - minimisation of construction impacts on significant ecosystems and endangered species in the area;
- noise - management of construction and operational noise impacts on receivers adjacent to the M2;
- soil and water – use of water sensitive urban design, fish friendly culverts and surface water management systems to protect the water quality and riparian ecosystems of the creek catchments; and
- dust – management of dust emitted by construction activities, particularly tunnel entrance milling works.

Parramatta City Council

Parramatta City Council supports the project, but raised a number of issues and concerns in relation to the proposed Windsor Road westbound on-ramp and ancillary road widening and the likely impacts on the heritage qualities of the property at 266-268 Windsor Road. Council also raised concern about the impacts of road widening works, such as removal of mature trees, relocation/reinstatement of footpaths and bus stops, and proximity of construction activities to sensitive receivers.

Hornsby Shire Council

Hornsby Shire Council raised the following issues:

- traffic – does not support the removal of the Beecroft Road bus ramps as it limits future public transport options and requests distance tolling to encourage through traffic to use the M2 rather than Epping railway bridge;
- the flora and fauna assessment failed to identify the presence of the threatened Eastern Bentwing Bat.;
- details on vegetation clearing must be included in the Construction Environmental Management Plan and Biodiversity Offset Strategy;
- the degraded bushland, weeds and bank erosion under the Devlin's Creek Bridge and at the end of Allerton Road must be rehabilitated as part of the project; and
- objects to truck access through the Midson Road Bushcare Reserve to Devlin's Creek.

- noise – the noise measurements must be updated to determine current noise levels as noise levels have likely increased since 2008 and could be higher than the levels predicted for 2011. The noise mitigation measures must be revised accordingly. The Council recommends signage to remind drivers to limit compression braking and planned maintenance of the road surface to ensure that it is in good condition to maximise noise reductions.

The Hills Shire Council

The Hills Shire Council raised the following issues:

- noise – the existing motorway generates excessive noise and the project will increase these further (over 60 dBA at night). Council stated that the M7 achieves night time noise levels of 50dBA but proposed levels for the M2 are not proposed to meet the higher DECCW standard of 55dBA. Council supports an extensive assessment of noise attenuation measures along the full length of the motorway and particularly on the Darling Mills Creek Bridge
- traffic – vehicular access to the construction compound under the Darling Mills Creek Bridge should be direct from the M2 and not through the bushland from Ventura Road.
- commuter parking – the provision of parking spaces at the bus stops on the motorway is inadequate.

Ku-ring-gai Council

The Ku-ring-gai Council submitted that a lack of alternative transport options for the northwest sector had resulted in the current under capacity and congestion on the M2. If fast and alternative transport modes were available then the need for the upgrade could be deferred. Funding for the upgrade could be directed to the early commencement of the North West Rail Link.

Council submitted that noise impacts on residents in South Turramurra, West Pymble, West Killara and West Lindfield had not been assessed. The demand from travel in the north west has an indirect impact on parallel regional road routes in Ku-ring-gai (The Comenarra Parkway/Yanco Road and Lady Game Drive) which currently experience sustained heavy volumes and congestion during peak periods.

Northern Sydney Regional Organisation of Councils

The Northern Sydney Regional Organisation of Councils (NSROC) supports the project as an improvement to the regional infrastructure serving the Northern and North-West Sydney. However, the project should be complementary to a dedicated program of infrastructure and transport works across the whole region. The comments included a copy of NSROC's submission on the NSW Metropolitan Transport Plan which provided an overview of the region's key congestion an infrastructure issues and identified the regional transport priorities.

4.4 Submissions from NSW Government Agencies

The Department received submissions from: Department of Environment, Climate Change and Water; Industry and Investment NSW, NSW Office of Water; and NSW Police Service (The Hills Local Area Command). Issues raised by these authorities are summarised below.

Department of Environment, Climate Change and Water

The Department of Environment, Climate Change and Water (DECCW) raised the following issues:

- air quality – the project does not adequately encourage the modal shift to buses that will minimise congestion and deliver improvements in air quality. The added congestion during the morning peak in the eastern section of the motorway through to the Lane Cove Tunnel, use of a T2 lane rather than extension of the eastbound bus lane, removal of the Beecroft Road bus ramp, likely deterioration of future bus access at the Windsor Road interchange and removal of park and ride facilities, do not encourage a shift to public transport;
- noise and vibration – some of the proposed approaches to managing and mitigating construction noise and vibration are unlikely to deliver satisfactory outcomes for noise sensitive receivers. The removal of existing noise walls before temporary or permanent noise mitigation measures are implemented would expose sensitive receivers to both construction noise and operational traffic noise. DECCW recommends increasing the length of the respite period following high noise and vibration activities, conducting construction trials at the Norfolk Tunnel to verify predicted air and ground-borne noise and vibration levels for out-of-hours work, and noise impact assessment of construction site compounds to identify noise mitigation measures; and
- biodiversity – adequacy of the threatened species assessment and threatened species impact mitigation measures.

Industry and Investment NSW

Industry and Investment NSW (I&I NSW) supports the Proponent's commitments to manage potential construction environmental impacts, undertake works adjacent to waterways to minimise potential impacts on aquatic habitats, and implement erosion and sedimentation measures in accordance with the guideline Managing Urban Stormwater (Landcom). I&I NSW also notes that weed management during construction would be carried out in accordance with existing State, regional or local weed management strategies.

NSW Office of Water

The NSW Office of Water (NOW) recommended that:

- riparian vegetation disturbed or removed by the project should be rehabilitated on-site or offset by establishing riparian vegetation elsewhere;
- construction sites and other construction works should be setback a minimum 50 metres from Terry Creek, Devlin's Creek and Darling Mills Creek;
- bridge piers and foundations should avoid the main waterway channel where practical;
- new or enlarged water quality basins should avoid the removal of riparian vegetation and located a minimum of 50 metres from waterways; and
- the rehabilitation of riparian land should involve a two-step approach of initially stabilising disturbed land and secondly of establishing permanent vegetation.

NSW Police Service (The Hills Local Area Command)

The Hills Local Area Command generally supports the project, however raised the following issues:

- current inefficiencies of the Windsor Road interchange and safety concerns about the ability of Windsor Road to accommodate additional traffic generated by the new west facing ramps. Consider that a safety assessment and upgrade of Windsor Road is required before the project commences;
- lack of car parking facilities for commuters at the bus stops has resulted in illegal parking and safety concerns in local streets. The project has not considered additional car parking for commuters; and
- no future provision for cyclist – the Police Service does not support the use of breakdown lanes by cyclists and recommends the investigation of alternatives to bicycles on the motorway.

4.5 Submissions Report

On review of the issues identified in submissions, the Department required the Proponent to prepare a Submissions Report to address each of the issues raised in those submissions. As part of this process, the Proponent reviewed each submission and made specific comment in relation to each issue identified. Some changes to the Statement of Commitments were also made. The revised Statement of Commitments and the Response to Submissions are attached to this report as Appendix C and Appendix D respectively.

The DECCW and NOW were provided copies of the Submissions Report for review.

DECCW's submission raised the following issues:

- Increased public transport usage is not encouraged and that the project may not contribute to the achievement of air quality priorities and targets;
- The threatened species impact assessment does not provide enough information to evaluate the extent of the impacts. Consequently mitigation measures are not identified and only broad negotiations on biodiversity offsetting is possible;
- The environmental impacts of sandstone crushing and screening are likely to be significant and have not been adequately assessed;
- Project construction and construction related works are likely to generate significant noise and vibration impacts, particularly the Norfolk Tunnel 24 hours/6 days per week work and locations where operational noise walls are removed for the duration of construction works; and
- A number of approaches to erosion and sediment control, water conservation, waste minimisation and management and Aboriginal cultural heritage need to be addressed to ensure acceptable environmental outcomes.

NOW requested the Proponent consider alternative options for the provision of artificial moisture under bridge structures to allow for plant growth and improved riparian connectivity. The NOW considers the project should restore and rehabilitate watercourses impacted by the construction of the original M2 motorway, to prevent further

degradation of watercourses and riparian areas. NOW recommended the location of new bridge piers outside the bed and banks of the main watercourses.

5. ASSESSMENT OF ENVIRONMENTAL IMPACTS

After consideration of the EA, submissions, Submissions Report and the Government agency responses to the Submissions Report, the Department has identified the following key environmental issues associated with the proposal:

- noise and vibration;
- traffic;
- water and soil management;
- flora and fauna; and
- visual amenity.

5.1 Noise and Vibration Impacts

Issues

Construction Noise and Vibration

The Proponent undertook a construction noise impact assessment in accordance with the 2009 DECCW *Interim Construction Noise Guideline* (ICNG). A review of guidelines and current practices for the assessment and subsequent mitigation of construction noise was conducted.

Road construction for the M2 upgrade will generally involve clearing, excavation, piling, bridge works and pavement construction. Some of these activities generate significant noise emissions for extended periods of time. Other noise generating sources/ construction activities include:

- site/ construction compounds for office, facilities and storage of material, plant and equipment - primarily noise from vehicle movements;
- operation of rock crushing/ screening plant; and
- construction traffic over the whole project site and beyond the construction site itself - traffic noise would be greatest where there is a concentration of traffic, such as at compound and batching plant locations and where construction is occurring at a given time.

The urban nature of the M2 Upgrade project requires the entire length of the upgrade project to be constructed in close proximity to residential receivers. The most significant noise impacts are expected in the vicinity of the proposed new Windsor Road access ramps, representing the worst-case noise levels at the nearby properties when the existing noise barriers are removed to allow construction of the new ramps.

The project is expected to have a construction period of two years and the Proponent notes that, with the exception of the Norfolk tunnel, the majority of the proposed construction works associated with the M2 Upgrade Project would be undertaken during the standard daytime construction hours and that night-time works would be completed on an as-needed basis (noting that where evening and night-time works are required, they would not be a continuous noise source at any one location for the full duration of the works within that section and would progress along the road corridor during the construction period).

The construction activities associated with the widening of the Norfolk Tunnel and supporting works, including haulage of spoil to disposal, are proposed to occur continuously (24 hours a day, six days a week) over certain periods.

The Proponent has committed to a range of mitigation and management measures to minimise potential construction noise and vibration impacts, including:

- implementing all reasonable and feasible mitigation and management measures to minimise construction noise and vibration impacts at sensitive receivers;
- noise and vibration monitoring to assess noise levels and determine effectiveness of mitigation measures;
- site specific noise assessments where an existing noise wall needs to be removed prior to the construction of a new noise wall; and
- consideration of alternatives to 'beeper' type reversing or movement alarms prior to use on site.

Construction Vibration Impacts
Ground vibration generated by other construction activities would be site specific and would be dependent on the ground type, particular equipment used and proximity of the construction activity to the receiver. The Proponent does not expect construction activities associated with general road construction to generate perceptible levels of ground vibration at nearby residences due to the considerable setbacks. No levels of vibration that could cause architectural damage have been predicted for any dwelling.

Monitoring would be conducted to ensure compliance with the blast overpressure and vibration criteria.

Operational Noise
Operational noise assessment was undertaken in accordance with DECCW's *Environmental Criteria for Road and Traffic Noise* (ECRTN), which provides assessment criteria for different types of road development. The operation of the M2 Upgrade project has been assessed against the ECRTN criteria summarised in Table 5 and the results for the project using this criterion can be found in Table 7. The Proponent adopted the noise criteria for the "redevelopment of existing freeway/ arterial road" for the assessment of potential noise impacts of the project.

Table 5 - ECRTN Criteria for Operational Traffic Noise at Residences

Type of development	Noise level criterion		Where criteria are already exceeded
	Daytime (7.00am – 10.00pm) dB(A)	Night time (10.00pm – 7.00am) dB(A)	
Redevelopment of existing freeway/ arterial road	60 $L_{Aeq(15\text{-hour})}$	55 $L_{Aeq(9\text{-hour})}$	In all cases, the redevelopment should be designed so as not to increase existing noise levels by more than 2 dBA.

The Proponent has also adopted the RTA's *Environmental Noise Management Manual* (ENMM) to guide the assessment of operational road traffic noise. The Manual provides guidance to the application of the ECRTN noise criteria and the provision of feasible and reasonable noise mitigation measures.

For residential receivers, operational traffic noise from the M2 Motorway is currently mitigated through noise walls of various heights (ranging from approximately 1.8 metres to around 7 metres) along almost the entire motorway length. The M2 Upgrade project would therefore affect a large number of the existing noise walls along the corridor. All affected noise walls would be required to be taken down and relocated as part of the M2 Upgrade project, and in most cases new walls would be built. In some areas, including some where residential receivers are in close proximity to the M2 Motorway, the upgrade (widening) will bring the new (outer) lane (and therefore the overall noise emission source) closer to affected receivers.

There are seventeen non-residential receivers (7 educational establishments, 1 church, 9 recreational areas including reserves, ovals and golf courses) located near the existing Motorway alignment which will be impacted by the project. The noise assessment predicted all non-residential receivers except two, would experience noise levels below the noise goals.

The Proponent notes that the M2 Motorway is intersected at various points by a number of existing arterial/secondary roads. Residential receivers which are located close to these intersections are exposed to road traffic noise from both the M2 Motorway and the roads in question. Only those residential receivers which exceed the nominated criteria as a direct result of noise generated by the M2 motorway, M2 Motorway on- and off-ramps and associated upgrade works were included within the assessment of noise mitigation.

The Proponent has identified that at some locations where the noise criteria are exceeded as a result of the M2 Upgrade project, and where the construction or modification of noise walls and other at source mitigation is not feasible or reasonable, noise mitigation in the form of acoustic treatment for existing individual dwellings will be considered.

As part of the M2 Upgrade project the Proponent is re-sheeting the M2 Motorway road surface with open graded asphaltic concrete (OGA). This pavement type is expected to provide a significant noise benefit over the existing expansion cracked and substantially degraded surface. However, conservatively, the Proponent has not taken this into account in its assessment of noise levels for the project.

Vibration Impacts
The Proponents assessment noted that, subject to regular maintenance of the roadway, vibration generated from vehicles (particularly heavy vehicles) utilising the M2 Motorway, (including the main carriageway, on/off ramps and the Norfolk Tunnel) would not exceed the daytime or night-time human comfort criteria recommended in AS 2670 – *Evaluation of human exposure to whole body vibration.*

Submissions

DECCW stated that some of the proposed approaches to managing and mitigating construction noise and vibration are unlikely to deliver satisfactory outcomes for noise sensitive receivers. In particular, the removal of existing noise walls before temporary or permanent noise mitigation measures are implemented would expose sensitive receivers to both construction noise and operational traffic noise. DECCW recommends increasing the length of the respite period following high noise and vibration activities, conducting construction trials at the Norfolk Tunnel to verify predicted air and ground-borne noise and vibration levels for out-of-hours work, and noise impact assessment of construction site compounds to identify noise mitigation measures.

Ryde City Council and Parramatta City Council raised concerns with regard to the management of construction and operational noise impacts on receivers adjacent to the M2.

Hornsby Shire Council raised concerns with regard to the need to update noise measurements to determine current noise levels as noise levels have likely increased since 2008 and could be higher than the levels predicted for 2011. Additionally, the Council recommends signage to remind drivers to limit compression braking and planned maintenance of the road surface to ensure that it is in good condition to maximise noise reductions.

Hills Shire Council raised concerns that the existing motorway generates excessive noise and the project will increase these further (over 60 dBA at night). Council also raised concern that the project does not attempt to reduce noise to the DECCW standard of 55 dBA and noted the M7 achieves night time noise levels of 50 dBA. Additionally, Council supports an extensive assessment of noise attenuation measures along the full length of the motorway and particularly on the Darling Mills Creek Bridge.

Ku-ring-gai Council is concerned that noise impacts on residents in South Turramurra, West Pymble, West Killara and West Lindfield have not been assessed. The demand from travel in the north west has an indirect impact on parallel regional road routes in Ku-ring-gai (The Comenarra Parkway/Yanco Road and Lady Game Drive) which currently experience sustained heavy volumes and congestion during peak periods.

The NRMA recommended that the Proponent install profiled raised line markings on the upgrade to provide both a visual and audible alert to motorists.

Other issues raised in the submissions on noise include:
Operational Noise
- the motorway upgrade will increase operational noise levels generated by traffic using the new Motorway;
- existing traffic noise levels are high, particularly since the opening of the M7;
- criticism of the noise assessment methodology used by the Proponent;
- the height of noise walls should be increased to reduce noise levels;
- the road surface should be repaved and regularly maintained; and
- residences should be architecturally treated to reduce noise levels.

Construction Noise and Vibration
- noise generated by the construction compounds, crushing activities and batch plants in close proximity to residential areas and residences adjoining the construction compounds/concrete batching plant will be subject to high noise levels
- noise levels from construction work during the night time;
- noise from construction traffic on local residential streets; and
- vibration/ structural damage to residences adjoining the motorway.

Consideration

Independent Review

Given the level of community concern regarding noise (raised through submissions), the Department commissioned Marshall Day Acoustics to undertake an independent peer review of the noise assessment including a review of the noise model. The review is attached in Appendix E.

The review noted that the Proponent's noise model estimated noise levels that were on average, 1dBA higher than the measured noise levels and therefore had a good level of accuracy and with good degree of conservatism.

The key outcomes of the review were that:

- subject to the comments in section 6.2 of the Independent Review, the DECCW *Environmental Criteria for Road Traffic Noise* and the RTA's *Environmental Noise Management Manual,* are adequate for the project;
- the Proponent undertook a detailed construction and operational noise assessment in accordance with the relevant DECCW guidelines (for construction, the *Interim Construction Noise Guideline* and for operation the *Environmental Criteria for Road Traffic Noise)*; and
- the assessment of construction vibration impacts, carried-out with respect the DECCW's *Assessing Vibration: A Technical Guideline* was adequate.

The review concluded that if the recommendations contained within the RTA's assessment documents are implemented then the noise and vibration impacts can be adequately managed.

Construction Noise

The Department notes that the noise assessment of construction activities was undertaken in accordance with the *Interim Construction Noise Guideline* (INCG).

The construction noise assessment is based on construction activities occurring during the standard construction hours outlined in Table 6, in accordance with noise management objectives of the ICNG. Notwithstanding, the Proponent acknowledges that a number of activities will be required to take place outside these standard construction hours to reduce impacts on residents and road users. Any work planned outside the standard construction hours or on public holidays would be undertaken only after prior consultation with and/or notification of local residents, and in accordance with an environmental protection license (EPL) issued for the project by the DECCW.

Table 6 - Construction Noise Management Goals for Residential Receivers

Construction Hours	Noise Management Level $L_{Aeq\ (15\text{-}minute)}$
Standard Construction Hours: Monday to Friday 7.00am to 6.00pm Saturday 8.00am to 1.00pm No work on Sundays or public holidays	Noise affected RBL + 10 dB
	Highly noise affected 75 dB(A)
Outside standard construction hours	Noise affected RBL + 5 dB(A)

The Department recognises that there may be circumstances when flexibility in working hours is warranted and considers that a more appropriate approach is to permit the Proponent to seek exemptions from the standard construction hours on a case-by-case basis or activity specific basis. The Department has therefore recommended conditions of approval which:

- generally restricts construction hours to 7.00am to 6.00pm, Monday to Friday, and 8.00am to 1.00pm on Saturday; and
- allows for works outside these hours where works are in accordance with the conditions of an EPL for the project (including 24 hour tunnel excavation, six days a week).

The Department submits that construction of linear infrastructure such as roads is such that generally each activity would progress along the construction corridor meaning that a continuous noise source is not experienced at any single receiver for the duration of the construction period. The noise level experienced at any receiver along the construction corridor depends on factors such as distance to the construction site, shielding between the site and the receiver and the type of activity along the corridor. Different activities with different noise intensities would occur at different times throughout the construction period. (i.e. high and low noise periods

would be transient and temporary). This provides significant benefits in managing noise, enabling high noise periods to be tempered with respite periods for all receivers.

While the Proponent has predicted exceedances of construction noise goals along the M2 Upgrade corridor, it should be noted that these exceedances represent worst-case 'maximum impact' scenarios in close proximity to the works and where a range of high noise generating activities are assumed to be occurring simultaneously. In actuality, this is considered unlikely to occur, at least for long periods of time. Therefore the maximum predicted noise levels are unlikely to be experienced. Although there may be short duration, high impact/ intensity events (such as piling or rock breaking), the Department recognises these can be managed through scheduling (including respite periods) and implementation of appropriate mitigation measures to minimise impacts on receivers. It should also be noted that these impacts would cease once construction is complete.

The Proponent has committed to minimising construction noise and vibration impacts and developing and implementing reasonable and feasible mitigation and management measures to minimise construction noise at sensitive receivers.

The Department has considered the assessment of potential vibration impacts and the conclusion that the use of equipment such as vibratory rollers and hydraulic hammers would have minimal impact on human comfort levels and, is unlikely to result in damage to buildings. On the basis of advice from the independent review, the Department concluded the noise assessment demonstrated that vibration impacts were likely to be minor and could be adequately managed as part of the project. Notwithstanding, the Department has recommended conditions requiring the Proponent to:

- conduct vibration testing and monitoring to identify minimum working distances to residential dwellings with the objective of meeting the preferred values for vibration in the DECCW's Assessing Vibration: A Technical Guideline (February 2006). Where vibration testing and monitoring shows that the preferred values for vibration at any affected residential dwelling are likely to be exceeded the Proponent must review the construction methodology and, if necessary, where feasible and reasonable implement additional mitigation measures; and
- implement all reasonable and feasible mitigation measures with the aim of achieving the relevant construction vibration goals and ground-borne noise levels.

Concerns were raised both by the DECCW and in submissions from the community with regard to the location and impacts associated with ancillary facilities (such as site compounds, material processing sites and locations for rock crushing and screening). In response to these concerns, and given the highly urbanised nature of the project and its surrounds, the Department has recommended conditions requiring the Proponent to seek the Director General's approval for the establishment and management of these facilities and to exclude the high noise generating activities of rock crushing and screening except where they have been considered and approved as part of an ancillary facility approval. As part of seeking these approvals the Proponent is required to provide an assessment of the potential environmental impacts on the site and the surrounding environment, including consideration of noise, vibration, air quality, traffic, threatened species, heritage and light spill, and how any impacts would be minimised, managed and mitigated. Additionally the Proponent is to identify the duration for which the ancillary facility will be in operation and how the site will be decommissioned and rehabilitated (where necessary).

To ensure that the all reasonable and feasible measures to address construction noise impacts (including ground-bourne noise levels) are implemented and that the Proponent is held accountable to the impacts predicted in the assessment, and that construction noise impacts to sensitive receivers are mitigated as far as is practicable the Department has recommended conditions requiring the Proponent to:

- implement measures to achieve the construction noise management levels in the *Interim Construction Noise Guidelines*;
- prepare a Construction Noise and Vibration Management Plan, which would detail how construction and vibration impacts would be minimised and managed during construction of the project, including consideration of measures to manage and mitigate impacts on the acoustic environment during the removal and replacement of noise barriers, and how noise and the effectiveness of these measures would be monitored;
- manage potential impacts through the implementation of the Construction Noise and Vibration Management Plan;

- consult with affected educational institutions in relation to disruptive noise generating construction works; and
- implement a complaints handling and response program.

Operational Noise

As part of its assessment, the Department requested the proponent provide the predicted levels for all properties (this information detailed in Appendix F). Operational noise levels based on future existing 2011 (the 'do nothing option'), and noise levels, in 2021 with the upgrade were predicted for over 2000 residences (and other receivers) along the upgrade route (the results are summarised in Table 7). The Department notes that this information indicates that in 2011, on the existing M2 Motorway, 610 receivers exceed the base night-time criteria, and that with the upgrade this will increase, in 2021, to 771 receivers. The Department notes that of the 771 residential receivers, two will experience an increase of more than 2dBA, and these receivers are already acutely affected (exceed 60dBA). Of the 610 receivers predicted to exceed base night-time criteria (future existing 2011), 61 receivers are considered acute (over 65 dBA). Of the 771 receivers predicted to exceed the night time criteria in 2021 (with the Upgrade), 83 receivers are considered acute.

Table 7 – Application of ECRTN Criteria for Operational Traffic Noise at Residences (Night time)

ECRTN Criteria	**Future Existing 2011 (existing M2 Motorway)**	**Proposed Upgrade 2021 (with mitigation i.e. noise barriers but NOT including low noise pavement)**
Reasonable and feasible Redevelopment of existing freeway/ arterial road (60/ 55 $L_{Aeq(15\text{-}hour)}$ *or* where existing noise level exceed the criteria +2)	**Night** $L_{Aeq(9\text{-}hour)}$	**Night** $L_{Aeq(9\text{-}hour)}$
55 dBA (or less)	2216 receivers	2055 receivers
60 dBA (or less)	549 receivers	688 receivers
65 dBA (or less)	55 receivers	73 receivers
66 dBA (or more)	6 receivers	10 receivers
Where existing noise level exceed the criteria +2	-	2 receivers*

Note: where a residence has two floors that are counted separately in the figures presented.
*also counted under 66 dBA (or more)

It is important to note, consistent with the ECRTN, that for the majority of receivers, where properties exceed the criteria in 2021, the M2 Upgrade does not to increase existing noise levels by more than 2 dBA (except at 2 properties). Notwithstanding at least 83 residences are predicted to exceed the base night time criteria and require additional mitigation (such as architectural treatment) as a result. The Department is satisfied that the mitigation measures proposed by the Proponent are appropriate and consistent with established guidelines and road traffic noise practice.

Additionally, the Department notes that while the Proponent is utilising an OCG pavement, which is likely to provide significant noise benefits in the medium term, the Proponent has not taken this into account in its assessment of noise levels for the project. These benefits may be in the vicinity of +2dBa.

The Department notes that the noise assessment results show that in 2021 (with the Upgrade)

- 73% of residences are below the ECRTN criteria for night time; and
- 27% of residences would experience noise levels higher than the applicable ECRTN criteria for night time (i.e. exceeding 55 dBA). Of the 27%, 24.3% of residences would experience noise levels between 55 and 60 dBA and 2.7% of residences will exceed 65 dBA.

However, in order to ensure that all reasonable and feasible measures to address noise impacts are implemented and that the Proponent is held accountable to the impacts predicted in the assessment, the Department recommends a two staged approach. The first stage requires that the Proponent prepare and submit to the Director General for approval 6-months after commencing construction, a review of the proposed operational noise mitigation measures based on the detailed design, confirming or re-evaluating that put forward in the environmental assessment. This would include a review of predicted noise levels and feasible and reasonable noise mitigation based on design refinements. The second stage involves an audit monitoring of actual noise levels, which is required to be carried out 12 months after opening of the project to traffic, to confirm whether

noise mitigation applied to the project is effective and that predicted noise levels can be achieved. Should noise monitoring indicate any exceedance of the predicted noise levels, mitigation measures must be reviewed and further feasible and reasonable measures implemented where available and appropriate. These requirements are included in the recommended conditions of approval.

The Department has recommended a condition requiring the Proponent to provide (and fund), where requested, reasonable and feasible acoustic treatments to landowners identified by the Proponent (in Table 68 of the Environmental Assessment and/or as a result of the review recommended above) as likely to experience traffic noise above 60 dB(A) (as $L_{Aeq(9\text{-hour})}$) during the night in the design year 2021 to reduce the impact of traffic noise at the residential premises on that property. This is expected to be around 89 properties.
The Department is aware that there is a perception that any increase in noise is unacceptable, however it should be noted that the noise criteria established in the ECRTN is based on a review of international standards and what is considered an acceptable noise environment. Compared to the criteria adopted by many other countries, these criteria are considered relatively stringent.

The Department notes that with regard to the recommendation from the NRMA that profiled raised line markings be used on the upgrade, that the Proponents response indicates this is not current practice for urban roads in part due to the noise produced by errant vehicles crossing the markings and causing disturbance to nearby receivers.

The ongoing acoustic performance of the project will also be addressed through the recommended operational performance audit, which is to be carried out at 12 months and 5 years after completion of construction.

The Department further acknowledges that heavy vehicle compression braking is an issue along the M2 Motorway and similar roads, and in recognition of the concerns raised with regard to heavy vehicle compression braking, the Department has recommended a condition requiring the Proponent to develop a strategy to look into heavy vehicle compression braking. The intent behind the requirement for the study is to identify and trial mitigation measures to minimise the acoustic impacts on identified sensitive receivers at the *source*.

In summary, the Department acknowledges that operational noise along the M2 corridor is a key concern for the community. However, the Department's consideration of the issue, which included an independent review, found that the impacts with regard to operational noise are generally acceptable as:

1. they involve the upgrade of an existing road, which currently influences the existing acoustic environment;
2. they comply with the current NSW noise guidelines (with the exception of two residences);
3. the Department's independent review found that the Proponent's noise model was conservative and based on a robust methodology and, subject to the implementation of the recommendations contained in the Proponents assessment, noise and vibration impacts could be adequately managed; and
4. the Department has strengthened the Proponents commitment to those residents acutely impacted as a result of the upgrade, to further ensure the protection of residential receivers amenity, through the recommendation of a condition that requires acoustic treatment at the receiver.

As such, and subject to the commitments undertaken by the Proponent and the recommended conditions of the approval, the Department is satisfied that the project can be constructed and operated in a manner which adequately addresses noise and vibration impacts.

A key concern that was raised through the public exhibition process for the M2 Motorway Upgrade was the opening of the M7 Motorway in November 2005 and the resultant traffic and noise increases on the M2 Motorway. The Department acknowledges this issue, but considers that it is not an issue specific to the M2 Upgrade. Rather, it is a broader strategic issue that would best be addressed through further Government consideration. The Department of Planning therefore recommends further consideration by key government agencies including DECCW, RTA, Transport NSW and the Department, of the strategic management of future road network development in Greater Sydney, including consideration of impacts, with specific regard to traffic and noise, on the operation of the existing road network.

5.2 Traffic and Transport Impacts

Issues

The existing M2 Motorway is dual carriageway with two lanes in each direction for the majority of its length with the exception of the section between Lane Cove Road and Beecroft Road where three lanes are provided

westbound. In the past ten years, the Average Annual Daily Traffic (AADT) on the M2 Motorway has increased from approximately 60,000 to 95,000. The greatest traffic increase was experienced upon commissioning of the M7 Motorway in December 2005 and the Lane Cove Tunnel in March 2007.

Additionally, the proportion of heavy vehicles along the M2 Motorway has also risen. Prior to the opening of the M7 Motorway (November 2005), heavy vehicles accounted for 5.9 percent (at toll locations) of the total traffic volumes on the M2 Motorway. With the opening of the M7 Motorway, the proportion of heavy vehicles on the M2 Motorway has risen to above 7 percent.

Public transport, such as bus and rail infrastructure is located in the vicinity of the M2 Motorway, including a number of rail stations serving the Epping to Chatswood Rail Line (ECRL) and the Northern Line as well as the numerous bus routes operating along the M2 Motorway to serve Sydney's north west regions. The Proponent notes that the M2 Motorway forms part of the strategic bus corridor network, carrying over 17,000 passengers each weekday.

The Proponent's assessment states that project would result in a number of benefits to bus services including reduced traffic congestion pinch points on the M2 resulting from increased capacity and changes to bus access arrangements. This is in part delivered through the provision of a T2 lane, eastbound between Terrys Creek and Lane Cove Road, providing additional eastbound road capacity for both transit lane users and eastbound bus services along a section of the Motorway, that currently experiences regular congestion during the AM Peak. It is anticipated that this additional capacity would reduce traffic congestion for both buses (and motorists) to provide improved bus travel times and reliability. The widening of the carriageways would also allow the speed limit to be restored to 100 kilometres per hour and potentially resolve queuing issues upstream.

Traffic volumes vary between the interchanges along the Motorway. The busiest section, by direction, during both the AM and PM peak hours occurs between Beecroft Road and Herring Road. Considering daily traffic volumes, the busiest section is identified between Windsor Road and Pennant Hills Road. The Proponents analysis of the Level of Service (LoS) for the existing motorway shows:

- that during the AM peak hour, eastbound movement beyond Pennant Hills Road is near capacity with the section between Beecroft Road and Christie Road operating with peak traffic volumes above theoretical capacity.
- in the PM peak hour, the westbound movement, beyond Herring Road, operates at near capacity with the section between Beecroft Road and Pennant Hills Road operating at, or close to, capacity. Although a third traffic lane was recently designated by utilising the former emergency lane, the subsequent lane width reduction, reduced speed limits and lack of road shoulder has reduced the capacities.

Construction Traffic

Construction of the project is expected to result in a number of impacts upon traffic and access. To minimise the impact on the local road network, the Proponent has proposed (where possible), that worksites to be accessed directly via the M2 carriageways, with access arrangements detailed in the Traffic Management Plan. Nonetheless, temporary diversion of traffic will be required to facilitate construction.

The Proponent has identified work zones for construction and the potential surrounding roads accessed during construction in those zones (see Table 8)

Table 8 - Construction Work Zones and the Potential Access Roads

Work zone	Non Motorway roads used for access
Work zone1 – Abbott Road to Windsor Road	Junction Road, Torrs Street, Craig Avenue, Watkins Road, Windsor Road
Work zone 2 – Windsor Road to Pennant Hills Road	Windsor Road, Cook Street, Petrina Crescent, Russell Street, Dremeday Street, Renown Road, Perry Street, Barclay Road, North Rocks Road, Baden Powell Place, Carlton Road, Morton Avenue, Carmen Drive, Oakes Road, Coral Tree Drive, Pennant Hills Road
Work zone 3– Pennant Hills Road to Beecroft Road	Pennant Hills Road, Lamora Avenue, Orchard Road, Allerton Road, Kirkham Street, Kirkham Street, Meadow Close, Midson Road, Ray Road, Kent Street, Kandy Avenue, Barombah Road, Beecroft Road, Cheltenham Road, Sutherland Road
Work zone 4 – Norfolk Tunnel (including approaches) to Terrys Creek	Somerset Street, Norfolk Road, Grayson Road, Devon Street, Pembroke Street
Work zone 5 – Terrys Creek to Lane Cove Tunnel	Somerset Street, Crimea Road, Vimiera Road, Busaco Road, Talavera Road, Culloden Road, Christie Road, Alma Road, Khartoum Road, Lane Cove Road, Wicks Road, Epping Road, Delhi Road

During the construction phase, temporary amendments of the existing traffic configurations would be required at each of the work zones. These may include lane occupancies, including shoulders, road closures, speed reductions and contra flow configurations along both the M2 Motorway and the surrounding road network. To maintain the existing capacity of the M2 Motorway during peak hours, most of the network changes would be undertaken during off-peak periods.

Operational Traffic
Transurban's Strategic Traffic Model (TUSTM) was used to forecast traffic network volumes in the corridor, including on M2 Motorway, with and without the proposed M2 Upgrade project for years 2011 and 2021.

While there may be changes and increases in traffic numbers due to land use changes, population growth and/or changes in economic activity, it is noted that one of the project's objectives include:

- Enhance the strategic road network in Sydney's north-west to support economic growth; and
- Improve access to and accessibility between key residential, employment and educational precincts in Sydney's north-west.

A such, the increased activity that the M2 Motorway addresses is not considered to be a result of the project, but the need for an enhanced road network.

The Proponent has estimated the levels of service (eastbound and westbound) for current and future scenarios, both with and without the project, as shown in Tables 9 and 10.

Table 9 - Forecast Eastbound Peak Hour Level of Service Scenarios

From	To	AM				PM			
		2011 Base	2011 Up-grade	2021 Base	2021 Up-grade	2011 Base	2011 Up-grade	2021 Base	2021 Up-grade
Old Windsor Road	Windsor Road	C	C	D	D	C	C	D	D
Windsor Road	Pennant Hills Road	D+	C	F+	D	C+	C	D+	C
Pennant Hills Road	Beecroft Road	D+	D	F+	D	C+	B	C+	C
Beecroft Road	Christie Road	F+	D+	F+	F+	C+	B+	D+	C+
Christie Road	Lane Cove Road	D	C+	E	D+	C	B+	D	C+
Lane Cove Road	Delhi Road	C	D	D	E	B	C	D	D
Delhi Road	Epping Road	B	C	B	C	B	B	C	C

Note to table: '+' indicates LoS based on constraints at on-ramp merge point.

Table 10 - Forecast Westbound Peak Hour Level of Service Scenarios

From	To	AM				PM			
		2011 Base	2011 Up-grade	2021 Base	2021 Up-grade	2011 Base	2011 Up-grade	2021 Base	2021 Upgrade
Epping Road	Delhi Road	A	B	B	C	C	C	D	D
Delhi Road	Lane Cove Road	B+	B+	B+	C+	C+	D+	D+	D+
Lane Cove Road	Herring Road	B+	B+	C+	C+	C+	D+	D+	D+
Herring Road	Beecroft Road	B+	B+	C+	B+	D+	D+	D+	D+
Beecroft Road	Pennant Hills Road	C	B	D	C	F	D	F	D
Pennant Hills Road	Windsor Road	C+	C+	D+	D+	F+	F+	F+	F+
Windsor Road	Old Windsor Road	C	C+	C	D+	D	D	D	D

Note to table: '+' indicates LoS based on constraints at on-ramp merge point.

As indicated in the forecasts above, traffic volumes on the existing highway will continue to increase if the project is not implemented and would eventually reach unacceptable conditions (LoS E/F) during peak traffic times. With the implementation of the project, the majority of traffic would travel on the motorway, with levels being maintained at improved levels.

Generally, the Proponent has indicated that that the project would improve the level of service on the M2 Motorway eastbound during the AM and PM peak between Windsor Road and Beecroft Road. The westbound level of service would also improve during the AM and PM peak between Beecroft Road and Pennant Hills Road. However, the eastern end of the M2 Motorway is unlikely to experience improvements in level of service, and during the AM peak for east bound motorists between Lane Cove Road and Epping Road would be adversely affected as a result of traffic growth and improved access to the M2 Motorway resulting from the M2 Upgrade project. The LoS following the M2 Upgrade project are predicted to be generally no worse than LoS D (close to the limit of stable flow) by 2011.

By 2021, only the peak morning eastbound movement between Beecroft Road and Christie Road and the afternoon peak westbound movement between Pennant Hills and Windsor Road would operate at LoS F (as forced flow, where the amount of traffic approaching a point exceeds that which can pass it). This would be the case with or without the M2 Upgrade project.

With regard to local traffic impacts as a result of the M2 Upgrade the Proponents assessment states that the local road network surrounding the M2 Motorway is likely to experience reduced traffic volumes, with lower traffic volumes indicated along Windsor Road, between Norwest Boulevard and M2 Motorway, as well as Epping Road between Blaxland Road and Pittwater Road. However, traffic on the M7 Motorway east of Old Windsor Road, Abbot Road east of Old Windsor Road, Church Street south of Briens Road, Windsor Road north of the M2 Motorway and Renown Road east of Cook Street are likely to experience minor increases.

The provision of new ramps at the Windsor Road interchange as well as at Christie Road and Herring Roads would result in the re-distribution of traffic in the vicinity of M2 Motorway, with demand on roads leading to and from M2 Motorway entrances and exits likely to increase with the proposed ramps.

Submissions

The City of Ryde raised concerns that the project will have significant operational impacts on traffic within and through the Ryde LGA (particularly in the Macquarie Park precinct) and that the use of regional and local roads by construction traffic will need to be managed. Council also requested the reinstatement of the proposed park and ride car park facility on the northern side of the M2 near the Macquarie Shopping Centre and review of traffic movements in the vicinity of the proposed Herring Road bus interchange as the close proximity of the Herring Road ramps will cause congestion and raise the potential for accidents.

Hornsby Shire Council does not support the removal of the Beecroft Road bus ramps as in Council's view it limits future public transport options. Council requests distance tolling to encourage through traffic to use the M2 rather than Epping railway bridge.

The Hills Shire Council raised concerns with regard to construction traffic, particularly vehicular access to the construction compound under the Darling Mills Creek Bridge (and potential vegetation clearing). Council also stated that the provision of parking spaces (commuter parking) at the bus stops on the motorway is inadequate.

Ku-ring-gai Council considered a lack of alternative transport options for the northwest sector has resulted in the current under capacity and congestion on the M2. Council stated that if fast and alternative transport modes were available then the need for the upgrade could be deferred and has suggested funding for the upgrade could be directed to the early commencement of the North West Rail Link.

The NRMA made a number of recommendations with regard to cyclists and cycles, including that the on and off-ramp bicycle crossings are in accordance with the NSW RTA Bicycle Guidelines version 1.0, section 7.5.

Other issues raised in the public submissions on traffic include:

- Congestion and Management, including: concerns the upgrade will increase traffic congestion not solve it; that Windsor Road will experience traffic delays at the intersection from the new ramps; and increase in truck traffic.
- That the removal of the Beecroft bus ramp and motorway bus lanes will disadvantage bus users.
- Pedestrian and Cyclist Facilities, including concerns regarding the safety of children crossing Windsor Road to schools (and a request to build pedestrian bridge over Windsor Road), requests for a dedicated cycleway similar to the M7 (with concerns that the existing temporary cycle access is inadequate), and general concerns with regard to pedestrian safety from construction traffic and equipment.

Consideration

The Department considers that the key traffic and transport assessment issues for the project are the overall efficiency and level of service of the M2 Upgrade project, local traffic impacts (both during construction and operation of the project), the removal of the Beecroft Bus ramps, school safety (with relation the proposed off ramp at Windsor Road), and the operation of cycle ways (both during construction and operation of the project).

Construction Traffic

The Department notes that traffic generated by construction activities would utilise both local roads and the existing motorway, thus creating impacts on the existing access and the road network where travel times may consequently increase with potential delays. To mitigate construction traffic impacts, particularly during the peak periods most of the network changes, would be undertaken during off-peak periods. The Department is satisfied that the proposed traffic management measures as outlined in the environmental assessment and Statement of Commitments can adequately manage construction traffic impacts of the project and minimise potential conflicts with non-project related traffic. Notwithstanding, due to the urban environment in which the upgrade is proposed, the following requirements are incorporated into the recommended conditions of approval with relation construction traffic:

- the preparation of dilapidation reports for all 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 shall be repaired at the cost of the Proponent;
- preparation of Traffic Management Plan (as part of the Construction Environmental Management Plan); and
- maintenance of safe pedestrian and cyclist access during construction, including alternate routes access is restricted due to construction activities.

Operational Traffic

The Department is satisfied that the Proponent has undertaken a comprehensive operational traffic assessment. Through this assessment, the Proponent has demonstrated that the project would generally maintain an appropriate level of access and would result in benefits to roads users, including those utilising buses on the M2, by reducing congestion and generally decreasing travel times, which is consistent with the objectives of the project. Notwithstanding the Department acknowledges that over time, in some cases, the LoS provided by the upgrade would deteriorate.

Importantly, in relation to the efficiency and improved reliability (as a result of the Upgrade) the Proponent has committed to monitoring the operation of the M2 (following completion of the M2 Upgrade project) and comparing the results to outcomes predicted in the environmental assessment and, where feasible and reasonable, making operational refinements if required to optimise traffic conditions. To strengthen this commitment the ongoing traffic performance (including the predicted local traffic impacts and improvements to bus services utilising the M2) of the project would also be addressed through the recommended operational performance audit, which is to be carried out (at a minimum) at 12 months and 5 years after completion of construction.

The Department considers that Proponent's justification of the need to remove the Beecroft Road bus ramps is reasonable; that is, it is necessary in order to avoid additional environmental impacts through widening of the corridor. The Department notes that the removal of the bus ramps would require a change in the trip schedule for those commuters using bus routes 611 and 740 to access Epping or to connect with other services at Epping Railway Station and that those commuters departing Epping or connecting to other transport services would have alternative options, such as catching alternate buses and trains. Some trips for those commuters may result in longer travel times and/ or more transfers, while other trips are likely to result in fewer transfers and travel time savings.

With regard to safety concerns in relation to students at Our Lady of Lourdes primary school, Baulkham Hills, with the proposed off ramp at Windsor Road, the Department has recommended a condition of approval requiring the Proponent to investigate options to enhance the safety of students crossing at the Windsor Road, Torrs Street/ Oakland Avenue intersection, in consultation with the relevant Council and Our Lady of Lourdes Primary School. The Department believes that this can be managed through consideration of measures such as the timing of traffic lights signals and installation of pedestrian barriers/traffic guard rails.

To address submissions with regard to the use of the M2 Motorway by cyclists the Department has recommended a condition of approval requiring the Proponent maintain or improve existing cycleway facilities in the motorway corridor, including the provision of access to existing network facilities.

Additionally, the Department notes that the Park and Ride facility no longer forms part of this project, and the Proponents basis for not proceeding with the park and ride facility as originally proposed was based on analysis indicating that patronage of the facility would not be adequate to subsidise (reduce) the M2 Motorway toll (one of its objectives).

The Department considers that issues associated with construction and operational traffic and concerns raised in the public submission have been adequately addressed as part of the Proponent's Submissions Report and Statement of Commitments and through the Departments recommended conditions of approval.

5.3 Flora and Fauna

Issues

The project is located within a highly urbanised environment, consisting primarily of residential properties, park lands, riparian vegetation and weed infested areas. Several larger areas of remnant native vegetation exist within and adjacent to the areas proposed to be directly, or indirectly, affected by the proposed upgrade works. The main wildlife corridors within the M2 corridor include the bushland and disturbed vegetation surrounding Blue Gum Creek, Devlins Creek, Darling Mills Creek and Terrys Creek.

Seven vegetation community types were recorded in the assessment area, Coastal Sandstone Ridgetop Woodland, Coastal Sandstone Gully Forest, Hinterland Sandstone Gully Forest, Sydney Hinterland Transition Woodland, Sandstone Riparian Scrub, Blue Gum High Forest and Sydney Turpentine-Ironbark Forest. Of these, Sydney-Turpentine Ironbark Forest and Blue Gum High Forest are endangered ecological communities under the *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Proponent's field surveys found approximately 1.36 hectares of Blue Gum High Forest in moderate to poor condition within the M2 corridor, but recorded no Sydney-Turpentine Ironbark Forest present.

The construction of the project would result in the clearance of approximately 20.1 hectares of native and exotic vegetation, of which 10 hectares is considered to be in good condition. This clearing would comprise approximately:

- 0.4 hectares of Coastal Sandstone Ridgetop Woodland (of which the Proponent approximates 0.16 hectares is disturbed/ exotic);
- 16.6 hectares of Hinterland Sandstone Gully Forest (of which the Proponent approximates 9.3 hectares is disturbed/ exotic);
- 0.1 hectares of Sydney Hinterland Transition Woodland (of which the Proponent approximates 0.08 hectares is disturbed/ exotic); and
- 3 hectares of Sandstone Riparian Scrub (of which the Proponent approximates 1.3 hectares is disturbed/ exotic);

The Proponent's assessment identified 14 threatened species with a moderate to high likelihood of utilising the remnant vegetation occurring within the M2 corridor and surrounding bushland areas including Grey-headed Flying fox (*Pteropus poliocephalus*), Gang-gang Cockatoo (*Callocephalon fimbriatum*), Glossy Black Cockatoo (*Calyptorhynchus lathami*), Powerful Owl (*Ninox strenua*), Regent Honeyeater (*Anthochaera phrygia*), Swift Parrot (*Lathamus discolour*), Green and Golden Bell Frog (*Litoria aurea*), Red-crowned Toadlet (*Pseudophryne australis*), Eastern Freetail-bat (*Mormopterus norfolkensis*), Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*), Greater Broad-nosed Bat (*Scoteanax rueppellii*), Eastern Bentwing-Bat (*Miniopterus schreibersii oceanensis*), Large-footed Myotis (*Myotis adversus*), Large-eared Pied Bat (*Chalinolobus dwyeri*). Their current status is listed in Table 11.

The Proponent's assessment noted that no threatened or protected aquatic invertebrate or fish species have been recorded in the waterways of the M2 corridor. Introduced fish species, with the exception of the Plague Minnow, are not likely to be abundant in the small rocky streams of the study area. This species is listed as a Key Threatening Process due to its detrimental impacts upon tadpoles and frog eggs. The assessment indicates that a variety of disturbance tolerant frog species (such as Striped Marsh Frog (*Limnodynates peronii*), Common Eastern Froglet (*Crinia signifera*), Eastern Dwarf Tree-frog (*Litoria fallax*), Green Stream Frog (*Litoria phyllochroa*) and Peron's Tree Frog (*Litoria peronii*)) are likely to use these habitats. A number of native fish species are also likely to persist.

The Proponent has committed to a range of measure to minimise, mitigate and manage impacts on flora and fauna during construction, including:

- checking hollow-bearing trees for fauna prior to clearing;
- using endemic species for landscaping;
- undertaking ongoing management of weeds;

- clearly demarcating limits of clearing;
- works in waterways will be developed in accordance with the fish habitat classification of the waterway; and
- developing a biodiversity offset strategy.

Table 11 - Potential Threatened Fauna Species (Source: *M2 Upgrade Environmental Assessment*, NSW Roads and Traffic Authority May 2010)

Scientific name	Common name	Type of species	TSC Act status	EPBC Act status	Likelihood of occurrence
Anthochaera phrygia	Regent Honeyeater	Bird	E	E	Moderate
Callocephalon fimbriatum	Gang-gang Cockatoo	Bird	V	-	High - recorded
Callocephalon fimbriatum	Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas	Bird	E	-	High - recorded
Chalinolobus dwyeri	Large-eared Pied Bat	Mammal	V	V	Moderate
Calyptorhynchus lathami	Glossy Black-cockatoo	Bird	V	-	Moderate
Lathamus discolor	Swift Parrot	Bird	E	E	Moderate – seasonal migrant
Litoria aurea	Green and Golden Bell Frog	Frog	E		Moderate
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	Mammal	V	-	Moderate to High
Mormopterus norfolkensis	Eastern Freetail-bat	Mammal	V	-	Moderate to High
Myotis adversus	Large-footed Myotis	Mammal	V	-	Moderate to High
Ninox strenua	Powerful Owl	Bird	V	-	Moderate to High
Pseudophryne australis	Red-crowned Toadlet	Frog	V	-	Moderate to High
Pteropus poliocephalus	Grey-headed Flying-fox	Mammal	V	V	High - recorded
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Mammal	V	-	Moderate
Scoteanax rueppellii	Greater Broad-nosed bat	Mammal	V	-	Moderate to High

V = Vulnerable, E = Endangered, - = Not listed

Submissions

DECCW raised concerns with regard to the adequacy of the threatened species assessment and threatened species impact mitigation measures.

I&I NSW supports the Proponent's commitments to manage potential construction environmental impacts, undertake works adjacent to waterways to minimise potential impacts on aquatic habitats, and implement erosion and sedimentation measures in accordance with the guideline Managing Urban Stormwater (Landcom). I&I NSW also notes that weed management during construction would be carried out in accordance with existing State, regional or local weed management strategies.

NOW recommended that riparian vegetation disturbed or removed by the project should be rehabilitated on-site or offset by establishing riparian vegetation elsewhere; that new or enlarged water quality basins should avoid the removal of riparian vegetation and the rehabilitation of riparian land should involve a two-step approach of initially stabilising disturbed land and, secondly, establishing permanent vegetation.

Ryde City Council requested minimisation of construction impacts on significant ecosystems and endangered species in the area.

Hornsby Shire Council raised a number of issues about biodiversity including the flora and fauna assessment failed to identify the presence of the threatened Eastern Bentwing Bat. details on vegetation clearing must be included in the Construction Environmental Management Plan and Biodiversity Offset Strategy; and the degraded bushland, weeds and bank erosion under the Devlin's Creek Bridge and at the end of Allerton Road must be rehabilitated as part of the project. Council also objects to truck access through the Midson Road Bushcare Reserve to Devlin's Creek.

Other submissions raised concerns with regard to the impact of road and bridge widening on bushland, loss of vegetation next to noise barriers, maintenance of landscaping, inadequate flora and fauna assessment and impacts on community bush care improvement works.

Consideration

Terrestrial Flora and Fauna Impacts

The Department recognises that the project corridor is confined given other constraints associated with the project, specifically the existing M2 Motorway and road design and considers that the Proponent has reasonably endeavoured to avoid or minimise the extent of disturbance to the Blue Gum High Forest EEC, and key fauna habitat. Notwithstanding, the project may still have an adverse impact on EEC and threatened fauna species in the region, particularly with relation to habitat clearing.

The Department supports the proposed combination of corridor-specific mitigation measures, such as the use of endemic species for revegetation and the implementation of biodiversity offset measures. In general, the Department is satisfied that this approach would ensure that localised impacts are minimised wherever possible, and that cumulative and longer-term impacts on the EEC and the relevant threatened fauna species are appropriately addressed.

However, whilst the Department considers that the mitigation measures proposed by the Proponent are generally good practice, the Department recommends a number of conditions which aim to further ensure that impacts are kept to an absolute minimum. These conditions include requirements such as the following:

- minimising the amount of vegetation to be cleared and application of a comprehensive biodiversity offset strategy and package;
- verification of the identity and condition of the vegetation to be directly and indirectly impacted by the project by a qualified vegetation ecologist;
- targeted surveys of microbat roosting in bridges, culverts and hollow bearing trees, to be undertaken with advice from a qualified microbat specialist;
- installation of nest boxes and bat boxes; and
- preparation of a Construction Flora and Fauna Management Plan.

Whilst the Package would ensure that the delivery of offsets would address the project's impacts the Department considers that localised impacts would also need to be addressed through the implementation of management and mitigation measures. To ensure that due consideration is given to the biodiversity impact during the construction stage, the Department has recommended a condition of approval requiring the preparation of a Construction Flora and Fauna Environmental Management Plan to manage, mitigate and monitor construction impacts.

In conclusion, the Department is satisfied that the species specific mitigation and offset measures, in conjunction with a management, monitoring and review regime for both corridor specific and regional offset measures would ensure that the local and regional impacts are appropriately mitigated and that the desired ecological outcomes are achieved. Consequently, the terrestrial ecological impacts are considered to be acceptable.

Aquatic Flora and Fauna Impacts

The Department notes that there may be impacts on watercourses (including Darling Mills Creek), which may lead to impacts upon aquatic fauna. At the forefront of such concern is the removal and/or damage of riparian vegetation, which acts as a stabilising mechanism for river systems. However, given the nature of the existing environment (ranging from highly disturbed and modified to near natural), the existing vegetation reflects the condition of the waterways. The key impacts of the proposal on the aquatic ecosystem would occur as a result of

construction works within, or in proximity to watercourses, the Department is satisfied that any potential impacts to aquatic ecology could be effectively minimised through the implementation of construction management controls.

In order to ensure that project construction is undertaken in a manner that would minimise adverse impacts upon the aquatic ecology of the area, the Department recommends a number of conditions, including:

- the restoration and rehabilitation of riparian areas in consultation with NOW, I&I NSW and the relevant Council;
- design of watercourse crossings and culverts to be consistent with NOW's *Guidelines for Controlled Activities Watercourse Crossings* and I&I NSW's *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings;* and
- where watercourses affected by the proposal, where reasonable and feasible, should be rehabilitated to emulate a natural stream system.

The Department is satisfied that the above recommendations would ensure that any impact is appropriately mitigated and managed during all phases of the project ensuring that impacts are contained to acceptable levels.

5.4 Water and Soil Management

Surface Water Management

Issues

The motorway traverses three main catchment areas (Darling Mills Creek, Devlins Creek and Terrys Creek) and a number of smaller tributaries located towards the eastern end of the M2, which are within the Lane Cove River catchment. The condition of the watercourses varies from highly modified to near-natural (Darling Mills Creek). A network of 31 water quality basins treat low flow runoff draining from the road pavement via the existing motorway drainage system. The existing surface water collection and management system would be modified as part of the upgrade.

Soil is the most likely potential contaminant of water quality, particularly during the construction stage if runoff is allowed to mobilise exposed soils. This can result in increased erosion and sedimentation. An assessment of the potential for soil erosion along the corridor concluded the risk to be low or moderate. Areas of high erosion risk have been identified where bridge widening works occur in steep land or works are in or adjacent to watercourses. There is potential for erosion and sedimentation from the widening of existing cut batters/ faces which drain down to the motorway. The Proponent states that dirty water runoff from cuttings would be managed to reduce the risk of sediment transfer to downstream receiving environments. Other potential construction contaminants include:

- building waste and litter;
- acids and chemicals from washing processes; accidental spills of construction fuels or chemical materials; and
- disturbance of contaminated soils.

A number of construction compounds are proposed to be located in areas where the risk of erosion and sedimentation is considered to be high, near watercourses or on steep to moderate slopes. Activities such as vegetation clearing, earthworks and movement of plant and equipment would likely occur during the establishment of the sites. Surface water runoff from or within compound sites would have the potential to transport sediment and other contaminants, such as fuel and oil spills from vehicles and plant into adjacent watercourses.

The potential operational water quality impacts of the upgrade would be an increase in pollutants associated with changes in the catchment characteristics. An increase in the overall impervious surface area would result in larger volumes of surface runoff to be treated. The Proponent aims to minimise the transport and discharge of sediments, suspended solids, heavy metals and hydrocarbons. A number of water quality basins would be modified to provide increased capacity (in area or depth) to accommodate runoff from the increased impervious surface area of the widened road carriageways.

The upgrade would require a number of transverse culverts to be extended to accommodate the upgrade. Hydrologic modelling of the Devlins Creek, University and Shrimptons Creek catchments was undertaken to

assess the impacts of the upgrade on local flood conditions. The assessment concluded there would be no significant increases in flood levels that would potentially impact on upstream or adjoining properties.

Issues Raised in Submissions

A small number of submissions from the public raised concerns about water management and flooding issues. The key issues raised were:

- maintenance of stormwater drainage structures (such as culverts);
- accuracy of the flood assessment;
- location of a construction compound on flood prone land;
- soil erosion from construction access and activities on creek banks; and
- changes to stormwater and surface water flows.

DECCW recommended the Proponent implement and maintain erosion and sediment control measures in accordance with Landcom and DECCW guidelines, install control measures prior to vegetation clearing and construction commencing, and manage spoil stockpiles to prevent wind and water erosion. DECCW also requested the Proponent to explore opportunities for the reuse and recycling of stormwater and groundwater and to manage runoff from hydroblasting and concreting.

NOW recommended the implementation and maintenance of erosion and sediment control measures in accordance with Landcom and DECCW guidelines and avoidance where possible of works and structures within the watercourse or its riparian zone.

Ryde Council recommended water sensitive urban design approach be adopted for the design of stormwater and surface water management measures to minimise impacts on the water quality and riparian ecosystems of Ryde's water catchments. Council also stated the upgrade should incorporate fish friendly design features in culverts, ensure that gross pollutants are removed from the stormwater system prior to the first flush entering the existing basins and not increase flood effects upstream.

Consideration

The Proponent has committed to design and implement the erosion and sediment control measures in accordance with the guidelines *Managing Urban Stormwater: Soils and Construction* (Landcom 2004) and *Managing Urban Stormwater: Soils and Construction – Volume 2D Main Road Construction* (DECC 2008). The requirement to install erosion and sediment controls before commencing vegetation removal or earthworks and to inspect the controls, are included in these guidelines.

The project crosses a number of watercourses, the condition of which ranges from highly modified to near natural. A range of construction activities, including ancillary facilities, work sites, construction works and access tracks are located adjacent to or within the riparian zone or directly impact on the bed and banks of watercourses. NOW has requested the location of bridge piers outside the banks and beds of the main watercourses to maximise watercourse stability and reduce future maintenance. The Proponent has stated that new bridge columns would be required in or adjacent to the flow zone of Devlins Creek and Darling Mills Creek. The project involves modification of existing bridges and the design of the new bridge sections must be compatible with the existing structure. The existing piers already affect the bed and banks of the creeks and there is limited scope to relocate the new piers outside the bed and banks of the creeks. The Proponent has committed to prepare detailed and site specific erosion and sediment control plans to minimise the potential environmental impacts of these works.

The Department accepts that modification of bridge structures to avoid watercourses is limited, given the existing design of the bridges and the need for the new bridge sections to be compatible with the existing bridges, in terms of structural design, hydrological performance and visual appearance. The Department notes the Proponent has included in the Statement of Commitments measures to revegetate areas disturbed by construction activities and ensure watercourse crossings incorporate best practice principles. To reinforce these commitments, the recommended conditions require the Proponent to restore and rehabilitate riparian vegetation in consultation with NOW, I&I NSW and the relevant council.

In response to Ryde Council's recommendation that the design of the water management measures should adopt water sensitive urban design principles, the Proponent states that constraints of the M2 corridor and the varying topography with predominantly sandstone geology presents little opportunity to accommodate such design

principles in vegetated areas in a practical and cost effective manner. Similarly with the constraints of the existing culvert structures, there is little opportunity to provide fish friendly measures for the extended culverts. The Proponent has committed to provide permanent scour protection to protect the stability of watercourse bed and bank and therefore reduce erosion and sedimentation in downstream waters. The Department has included a condition requiring the design of watercourse crossings and culverts to be consistent with fish passage guidelines and require category 2 and 3 watercourse culvert replacements to incorporate a naturalised base.

The project will require the widening of 7 of the existing 26 transverse culvert structures. The length of the extensions vary from a minimum of 2.4 metres to a maximum of 17.1 metres (Culvert 35) with the remainder of the culvert extensions generally in the range of 4.9 metres to 8.5 metres. The Proponent has undertaken an assessment of the impact of the extended culvert structures on the 100 year ARI flood levels and velocities. The flood assessment noted that flood impacts in the creeks near the corridor are generally restricted to the riparian zone. The flood modelling concluded there are no significant increases in flood levels which would potentially affect upstream or downstream properties. Only one location (Culvert 26) is predicted to have potential impacts and this is limited to a maximum increase of 0.02m, which should not adversely affect surrounding properties. At University Creek (Culvert 35) the proposed channel works would reduce flood levels between 1.0 to 1.5m, which would improve an existing flood situation. The increase in the outlet velocities of the modified culverts are considered to be negligible, typically less than 0.1 metres/second. The Department is satisfied that the Proponent has properly assessed the operational flooding impacts of the proposal and notes the Statement of Commitment that there should be no increase in flood impacts upstream of the motorway as a result of the upgrade. In the event that flooding impacts from the proposal affects access, property or infrastructure, the department has recommended a condition which requires the Proponent to consult with affected property owners and identify and implement mitigation measures.

The main operational impacts of the project on the water quality of the receiving waters would be an increase in pollutants associated with changes to the water catchment (i.e. an increase in impervious surfaces). The Proponent has an objective of minimising the transfer and discharge of pollutants from the motorway to watercourses. Modelling of the contributing catchments, the increase in imperviousness and catchment area and existing and proposed water quality basins was undertaken by the Proponent. The modelling has demonstrated that except for Total Nitrogen (TN), the existing basins would still have sufficient capacity and performance to satisfy the stormwater treatment objectives of Australian Runoff Quality without any significant modification. Notwithstanding, the Proponent will modify existing water quality basins to accommodate an increase in impervious surfaces as a result of the project and meet the relevant stormwater target pollution reduction criteria.

The Department has recommended a condition which requires the Proponent to prepare a Construction Water Management Plan as part of the Construction Environmental Management Plan to manage residual surface water and water quality management issues.

Groundwater Management

Issues

The motorway alignment traverses ground comprising mostly Hawkesbury Sandstone, overlain by varying thickness of alluvium at creeks or residual soils on higher ground. The major aquifers comprise the Hawkesbury Sandstone and limited parts of the alluvium associated with the main drainage channels. Groundwater levels in the vicinity of the motorway vary between sea level at Lane Cove River to around 70 metres Australian Height Datum (AHD) on the higher ground further west.

Water seepage at the face of existing cuts and in the Norfolk Tunnel are not apparent from visual inspection, and is not expected following widening of cuts and the tunnel, based on the existing situation and groundwater level in the area. The groundwater in the Hawkesbury Sandstone is generally of good quality.

Groundwater may be encountered in excavations (for bridge footings) close to major watercourses or substantial subsurface works below existing ground level (for example Norfolk Tunnel widening). The Proponent does not anticipate there would be significant groundwater interception given the size of the footings or piles. Although the area of impervious surfaces would increase by approximately 20%, the reduction in groundwater recharge from the loss of less than 2% of the total catchment area is not expected to change significantly existing groundwater conditions.

Issues Raised in Submissions
None of the submissions received from the public raised concerns regarding the proposal.

Consideration
The Proponent expects that impacts to groundwater would be limited to widening of existing cuts and the Norfolk Tunnel. The interception of groundwater is not expected to be significant, given the low level of seepage at existing cut faces.

The Proponent would implement mitigation and management measures should groundwater be encountered during the construction of the upgrade. The Proponent considers that with the implementation of these measures the impact on groundwater would be negligible.

The Department is satisfied that appropriate consideration has been made of potential groundwater issues. To ensure that residual groundwater issues are managed, the Department recommends that the Proponent prepare a Construction Water Management Plan as part of the Construction Environmental Management Plan. The Water Management Plan would include measures to manage groundwater impacts should groundwater be encountered.

5.5 Urban Design and Visual Assessment

Issue
The varied topography and location of the existing M2 Motorway in a highly populated area of metropolitan Sydney influences the existing visual character, with built elements, such as noise walls and large cuttings, dominating much of the road corridor. The existing vegetation along the corridor is a mix of stands of remnant vegetation, weeds and re-vegetation works that were undertaken as part of the original construction of the M2 Motorway. Views of natural vegetation in national parks or reserves, along with isolated remnant stands within the adjoining residential areas occasionally open up as the road traverses ridges and valleys. However, the dominant views are confined to the motorway corridor, framed by the noise walls and sandstone cuttings.

There are limited views of the motorway from the public domain, because of the heavily vegetated nature of the adjoining suburbs and parkland and the topography of the terrain through which the road passes. The motorway elements visible are predominantly noise walls and cuttings/ retaining walls. Opportunities to view the road pavement or traffic are limited, with the exception of views from road bridges which cross the motorway.

The Proponent's visual assessment of the upgrade predicted the greatest visual impact would be experienced by road users and to a lesser degree, road viewers. The visual impacts within the corridor are associated with:

- construction and/or realignment of noise walls resulting in potential increases in scale and visual bulk of structures;
- changes to cut profiles and their treatment;
- changes to bridges involving the widening of existing structures and associated piers/ abutments; and
- widening of road pavement.

The visual impacts of the upgrade to road viewers are associated with:

- construction and/or realignment of noise walls;
- construction of retaining walls to fill embankments; and
- loss of vegetation cover, potentially revealing more of the road and its structures.

The upgrade has short term indirect visual impacts caused by the location of construction compounds within and/ or adjoining the road corridor. The visual impacts are associated with clearing of existing screening vegetation and construction of temporary structures with potential to overlook or be overlooked by adjacent properties.

The Proponent's desired future character and vision for the M2 Motorway is to capitalise on the bushland setting through which the road passes. This would be applied to future works on the motorway and implemented over time. The proposed upgrade presents an opportunity to commence the improvement of the presentation of the motorway. In designing the measures to mitigate the visual impacts of the upgrade, the key considerations are:

- visually screen the built form entirely where possible;
- reduce the apparent scale of motorway structures, particularly the noise walls; and
- add landscape elements to obscure or reduce views of the motorway.

Issues Raised in Submissions

A number of submissions raised issues related to the removal of existing vegetation which screen noise walls and retaining walls, clearing of vegetation generally for construction work or construction compounds, and the visibility of heavy vehicles above existing noise walls. These submissions raise concern that the upgrade works would detract from the bushland outlook of the residential areas by increasing the visibility of the motorway and its structures.

Consideration

The Department notes that the existing vegetation adjacent to noise walls and retaining walls were planted as part of the original development. The vegetation has established and become effective in screening, in particular noise walls, from adjacent properties, and complements the bushland character of the area. The removal of such screening vegetation would result in adverse visual impacts. However, the visual impacts are considered to be temporary as the Proponent's urban design concept proposes to visually screen built structures where possible and practicable from outside the motorway corridor. The provision of vegetation along noise walls would re-establish the screen as the vegetation grows.

Within the road corridor landscaped areas of varying widths are located between noise walls/ retaining walls and the road shoulder. The provision of an additional lane along certain sections of the motorway is likely to either reduce the width of the landscaped area, or where there is insufficient width, removal of the existing landscaped area. The Proponent would replace vegetation that has been removed where there is sufficient landscaped area. Where there is insufficient landscaped area the noise walls/ retaining walls would be adjacent to the road shoulder. The Proponent's urban design concept would implement the design objectives of improving the visual appearance and character of the road corridor and ensuring motorway elements complement the surrounding setting.

The noise wall strategy emphasises integration with existing walls with the panel design in each of the five landscape precincts to reflect and be sympathetic to the surrounding environment. The design of walls would take into account its location in relation to the motorway and the topography, material used (type, colour, texture), use of planting and architectural detailing. Similarly with retaining walls, colour and design would be used to minimise visual impacts and reinstatement of vegetation cover over the disturbed footprint would be undertaken where possible to mitigate its impacts and create a greener road corridor.

The Proponent has committed to develop and implement a landscape and urban design concept for the upgrade. This would implement the objective of improving the overall appearance and presentation of the M2 motorway and capitalise on the bushland setting of the corridor. The Proponent has identified seven urban design objectives for the upgrade.

1. upgrade works to improve the visual appearance and character of the road corridor and create a recognisable identity for the M2;
2. motorway elements are to complement the surrounding setting;
3. maintain a safe and accessible corridor;
4. improve connectivity;
5. revegetation strategies need to relate to scale, composition and colour of the adjacent built form;
6. protect and enhance the natural systems and ecology of the corridor; and
7. maintenance of hard and soft landscape elements must be accessible and maintainable with minimal resources.

The Department is satisfied the visual appearance of the upgrade from outside the corridor can be appropriately addressed through the implementation of these urban design objectives and principles, and that planting of vegetation would provide an effective screen, similar to that provided in the re-vegetation of the original development. The provision of a higher quality treatment of noise walls, retaining walls and cuttings within the road corridor would provide a positive appearance to the road user and assist in achieving the desired future character and identity of the motorway.

The Proponent has committed to rehabilitate and re-vegetate land used for construction compounds and ancillary facilities. The Department considers the use of land adjacent to the road corridor for these temporary purposes is appropriate and with the rehabilitation and re-vegetation of the land there would be no permanent adverse impacts on the surrounding community. The Department is satisfied that there would be no long term impact

following rehabilitation of land disturbed by construction of embankments, retaining walls and bridge piers and abutments.

The Department recognises that further improvements to the design and landscaping of the project can be undertaken to further mitigate impacts. To reflect this, the Department has recommended conditions of approval that require the Proponent to minimise visual impacts of built structures and hard landscaping elements, such as noise walls, retaining walls and cuttings and to prepare an Urban Design and Landscaping Plan, to be approved by the Director General. The Plan is to provide an integrated urban design for the project and provide for the ongoing rehabilitation and management of disturbed areas and to have as a guiding principal, the achievement of the urban design objectives for the upgrade.

5.6 Other Issues

Socio-Economic Impacts

The Proponent undertook an assessment of the likely socio-economic impacts arising from the project, through a Road User Cost Benefit Analysis (RUCBA). The assessment concluded that the project would provide $1.2 billion in net benefit and a benefit cost ratio value of 3.4. The Proponent contends that the findings demonstrate the Project is economically viable in its own right and would provide a benefit to the community.

Further, the Proponent noted that a range of negative socio-economic impacts had already been realised, as a result of the original construction of the existing M2 Motorway. These impacts included removing connectivity between suburbs, property severance and business impacts. The assessment for the M2 Upgrade focused on impacts arising from widening only with the key conclusion being that the M2 Upgrade would provide large travel time savings for road users, thereby providing overall economic benefit.

Key socio-economic concerns raised in submissions included:

- current tolling system for the motorway and associated costs;
- impacts to amenity and quality of life for residents adjoining the Motorway;
- the true benefits of the project to the community, specifically at adjoining residences; and
- increased costs associated with continuous operation of mitigation measures to offset the project (such as air-conditioning);

Ku-ring-gai Council highlighted that a lack of quality alternative transport operations in the area is likely to lead to the congestion on the Motorway. Hornsby Council suggested alternative tolling schemes should also be considered such as distance based tolling, as the current system is not considered equitable. DECCW was concerned that the project would negate any congestion reduction measures.

The M2 Upgrade project essentially involves an increase in the project footprint to accommodate an additional lane and the resultant negative impacts, from a socio-economic perspective, are likely to be minimal and manageable. The Proponent has identified that a number of areas surrounding the M2 are heavily car dependant, due to the absence of alternative transport options. The Department does not disagree with these observations or those submissions which highlight this fact. Notwithstanding, the Department considers that the implementation of these projects are outside the scope of this project and beyond the Proponent's direct responsibility. Rather, it will require a whole of Government approach to provide alternate options. In this regard the Department notes that the Metropolitan Transport Plan identifies that construction of the North West Rail Link will commence in 2017 which will provide a new transport alternative for residents in the area.
Furthermore, the Department considers the project would aid in providing mode choice for users in the North West in the long-term. Whilst it is desirable to invest in alternate transport infrastructure, the reality at least in the immediate term is that there is a lack of options to service the variety of work and destination locations in the region. Therefore, provision of additional capacity on the network would be in the economic interest of the community, as additional capacity for vehicles travelling in each direction is likely to lead to moderate increases in speeds, which would translate to journey time improvements. This would result in less time commuting, providing both an economic and social benefit. Additional capacity within the road corridor would also aid in improving bus journey times and allow for continuation of services following delivery of the North West Rail Link.

In terms of tolling, the Department notes that the issue is of great significance to the community, however, one which is outside the scope of the Department's environmental assessment of the proposed widening. The commercial nature of the project means that it requires an income stream, in this instance being through a toll

placed on vehicular traffic. To continuously maintain and operate the project, appropriate tolling will remain for the nominated lease period as identified in the terms of the concession deed for the M2. This is not dissimilar to other Motorways within Sydney, and interstate. At the conclusion of the lease, it will ultimately be a decision for Government on whether to continue or discontinue such regimes, a process recently undertaken at the conclusion of the M4 Motorway's private operations.

Land Use and Property

The Proponent has identified that the Project will occur primarily within the existing M2 lease boundary and therefore, property impacts would be minimal. Partial acquisition is expected around areas where new interchange ramps are required and along Talavera Road, where widening activities are proposed. Subsurface acquisition is also proposed at three locations. This would require the acquisition of private and public land by the NSW Roads and Traffic Authority in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991.*

A number of submissions raised concern in relation to direct and indirect impacts to property arising from the project including the use of current vacant land (Torrs Street) at the conclusion of the project, impacts to services running alongside or in the vicinity of the project and impacts to property values as a result of the project (primarily due to the motorway being shifted closer to homes, and a need for compensation as a result of changes in air quality, noise, overshadowing and visual impacts). The construction timeframe was also considered to detract from property values. Some submitters also requested that the RTA consider acquiring their properties.

All Local Government Authorities located along the corridor raised concerns of potential damage to Council infrastructure as a result of construction. In addition, Hornsby Shire Council noted that open space would need to be acquired for ancillary facilities and would need to be negotiated as such. Parramatta City Council questioned the need to resume land in the vicinity of the proposed Windsor Road off ramps, and requested consideration of alternatives. Parramatta Council also identified that owners should be suitably compensated.

The Department notes that the majority of works would occur within the confines of the boundaries of the existing Motorway. Notwithstanding, the Department acknowledges that there would be direct impacts to land use and property infrastructure at nominated locations where improvements to, or new interchanges would be constructed. The Department considers these impacts are unavoidable as a result of the need for the project and the location of existing infrastructure.

In terms of the interchanges themselves, the Department notes the majority of the landowners have raised concerns with regard to the justification and need. Having reviewed these submissions, the Department is of the opinion that these new interchanges are warranted in their own right, due to evolution of Sydney's regional Motorway network following completion of the M2. Prior to completion of the M7 and Lane Cove Tunnel, the proposed additional ramps at Windsor and Christie Roads would have been under-utilised, due to distances from alternate traffic routes and likely tolls imposed. Further, with respect to Windsor Road and alternatives, the Department accepts that there are limited suitable alternatives in the immediate area to alter the location of the new ramps due the location of the heritage listed former Baulkham Hills Primary School in relation to the project corridor.

In terms of property acquisition, The *Land Acquisition (Just Terms Compensation) Act 1991* would set clear parameters and requirements for Government to consider when purchasing property, under which the RTA is legally bound. Current investigations have revealed that only partial and substratum acquisition would be required and for the Project and negotiations will continue as such. The Department is satisfied with this approach.

With respect to property, land use and amenity impacts, the Proponent has identified that it has undertaken a range of assessments as part of the Project, for both construction and operation. Findings of these assessments note that impacts can generally be managed and/or mitigated. Further, the Department has reviewed these assessments and concludes that they are acceptable subject to the recommended conditions of approval with the aim of keeping the identified impacts within acceptable limits.

In response to submissions concerning damage to Council and private infrastructure, the Department has recommended conditions of approval requiring the Proponent to manage impacts on utilities and to construct the project in a manner that mitigates indirect and direct impacts to properties and property infrastructure. This

includes access and egress during construction and operation of the project. The Department considers that these conditions adequately address relevant Council and public concerns.

Air Quality

The Proponent has considered the impacts that construction and operation of the project would have on the air quality at surrounding residences. The assessment concluded that if managed appropriately, air quality was unlikely to be significant issue during construction.

In terms of operation, the Proponent modelled air quality in the vicinity of the corridor. Results identified that pollutant concentrations are likely to meet DECCW and National Environmental Protection Measure Guidelines.

A number of submissions raised concerns relating to both construction and operational air quality impacts. Those received in relation to construction impacts were generally concerned about the two year construction period and resultant impacts resulting from additional construction vehicles, removal of noise walls and dust. Ameliorative measures such as decreasing vehicle speeds, provision of air conditioning and washing properties were suggested.

Submissions questioning operational impacts broadly highlighted that the project would directly impact property and health as a result of additional traffic using the motorway. Removal of vegetation currently acting as a buffer and the duration and severity of impacts in low lying areas in and near Norfolk Tunnel were also identified. An independent air quality modelling program was also requested.

DECCW raised a number of issues in relation to the assessment, specifically:

- how the preferred option is consistent with the NSW State Plan and Action for Air, in terms of priorities targets and objectives for improving air quality and encouraging modal shift;
- clarification on whether the project will improve air quality generally, as it would be unlikely to alleviate congestion at the eastern end between Lane Cove and Epping Roads;
- sought advice on the forecasted decrease in Vehicle Kilometres Travelled (VKT) which contradicted DECCW predictions; and
- did not recognise short-term construction air quality impacts on receivers. DECCW also requested that the Proponent commit to dust quality monitoring during this period.

Ryde Council highlighted that dust impacts from construction was a major issue and recommended that dust shielding be mandatory for works at Norfolk Tunnel and other locations where continual dust emitting activities would occur. Compliance with the dust management plan was also expected. Ku-ring-gai Council raised concern that residents of South Turramurra, West Killara and West Lindfield would experience increased emissions and were not adequately addressed in the Environmental Assessment. The Northern Sydney Regional Organisation of Councils (NSROC) noted that all transport modes impact on local and regional air quality.

The Department notes that there is potential for air quality impacts to occur during construction of the project. To alleviate impacts as far as practicable, the Proponent has identified a range of mitigation measures which will be employed during construction, including:

- careful programming of construction activities to minimise windblown dust;
- limiting vehicular speeds on unsealed roads; and
- implementation of a dust management plan detailing project specific mitigation and management measures including a dust monitoring program.

Whilst the Department is satisfied with these commitments, it feels these be reinforced as part of a condition of approval requiring the Proponent to undertake all construction activities with the objective of preventing visible dust emissions and minimising dust impacts.

In relation to operational impacts, the Proponent has modelled air quality impacts at 65 locations along the Motorway corridor based on current vehicle mixes, and two scenarios, 2021 "do nothing" and 2021 "upgrade". Both scenarios identified that broadly, traffic flows were predicted to increase irrespective if the project proceeds and increased flows would lead to an incremental increase in pollutants.

However, the Proponent contends that based on data obtained across the regional air shed, including the former Lindfield and current Connector Motorways North Ryde monitoring station, the air shed is highly variable, reflective of an urbanised catchment. Further, modelled pollutants such as Nitrogen Dioxide, Carbon Monoxide, and Particulates (PM_{10}) were found to be within air quality goals established by the DECCW document *Approved Methods for Modelling and Assessment of Air Pollutants in NSW* (2005) and National Environmental Protection Measure (NEPM) Guidelines (Particulates - $PM_{2.5}$). As such, the Proponent has not proposed any operational mitigation measures for the Project.

The Proponent submits that levels are likely to be lower due to:

- improvements in vehicle emissions between now and 2021, through replacement of the vehicle fleet and historically, emission standards for both light and heavy vehicles have tightened;
- unobstructed flow of pollutants has been assumed, with topographical features and barriers not been considered;
- conversion of Nitrogen oxide to dioxide rates differ; and
- portal emissions distribution.

The Department acknowledges community concern in relation to air quality and notes the link between additional traffic and the incremental rise in pollutants around the area. Based on the information presented by the Proponent, the Department notes that it is unlikely to exceed recognised levels as defined by DECCW which were modelled on a range of climatic conditions. Notwithstanding, the Department also notes that the project may also contribute to a slight improvement at nominated locations along the Motorway due to extra capacity bringing about an improvement in vehicle speeds. Free flowing traffic is considered to be of better quality than congested situations.

With regard to the Norfolk Tunnel, the Proponent has modelled a 200m plume length from the tunnel based on similar projects of equivalent tunnel length (Pacific Highway Tintenbar to Ewingsdale). The results noted that under normal conditions, exposure to elevated levels of pollutants would occur for approximately one minute however, unlikely to exceed prescribed standards due to the presence of a ventilation system in the tunnel. Plume assumptions are also considered to be conservative.

In reference to DECCW's concerns regarding operational air quality impacts and consistency with both the State Plan and Action for Air, the Proponent responded that whilst the project is an infrastructure priority, it will still meet the intent of both documents through:

- the improvement of public transport reliability through increased capacity in the network by providing the transit lane eastbound and additional lanes along the project generally. This will facilitate bus trips along the corridor;
- improvements to emissions standards are also likely to improve air quality generally, consistent with Action for Air; and
- the Project will improve kilometres travelled by facilitating shorter trips of lesser duration and it will improve the regional air shed by encouraging traffic from the local and regional road network onto the Motorway.

Considering proposed traffic levels will still meet relevant guidelines, the Department accepts these arguments.

In response to Ku-ring-gai Council's submission and impacts on South Turramurra, West Killara and West Lindfield receivers, the Proponent contends that compliance would occur, due to distance between the Motorway and these locations. The Department accepts this advice, which is demonstrated through the Proponent's air quality assessment which shows air quality levels at source meeting State and Commonwealth air quality guidelines and a lack of evidence to suggest elevated impacts in these areas.

Whilst the Proponent has not proposed any operational mitigation measures for the Project, due to predicted compliance with relevant Guidelines, the Department considers there needs to be a framework to verify the Proponent's predictions. A recommended condition of approval requires the Proponent to undertake an operational audit of the Project, at commencement of operations and five years later. The audit is required to consider the Project's impacts against predictions and review the effectiveness of environmental management measures. It is envisaged air quality impacts would form part of this review.

Lighting Impacts

In order to minimise impacts on the operation of the M2 motorway as far as practicable, construction will be programmed when traffic levels are at their lowest, i.e. overnight. This has the potential to cause a range of amenity impacts, including light spill at adjoining receivers. Four construction compound sites were assessed as having potential for obtrusive light spill at neighbouring residential properties, two had no potential for light spill with the remainder (ten) showing limited potential for impacts. The Department notes that the motorway is illuminated around interchanges and access ramps. Norfolk Tunnel is also illuminated. Impacts are generally limited due to existing noise walls and vegetation screening.

Submissions from the local community identified that lighting required for overnight works would lead to loss of amenity. Compound lighting and the need to illuminate temporary pedestrian and cycle access were also of concern.

The Department considers that there is an overriding need to provide an appropriate level of lighting to facilitate construction of the project. This is required for operational, safety and security reasons. The Proponent has considered impacts by undertaking a lighting impact assessment for the project. This included likelihood of light spill at neighbouring properties, impacts from glare from road users and impacts arising from vehicles entering and exiting compounds. Additional permanent lighting would be required at the new interchanges along Windsor Road, Christie Road and Herring Road consistent with relevant standards. The Proponent concluded that there is already lighting present at these locations, impacts are likely to be negligible as it would only be an incremental increase.

The Department considers that, in terms of construction impacts, the Proponent has considered the potential for light spill on neighbouring properties, and on drivers. This is due to the assessment considering the key elements of *AS 4282-1997 Control of the Obtrusive Effect of Outdoor Lighting*, an accepted industry standard in this regard. The standard sets out general measures which range from general management right through to design considerations. The Proponent has committed to replicating these requirements as part of the project.

In addition to this standard, the Proponent has also committed to shielding headlight glare at temporary compounds through the use of non-translucent barriers and hessian matting around compound fencing. The Department considers this may be an appropriate approach, however, will require consultation with receivers, and consideration of design issues to ensure that residential amenity is protected as far as is reasonable and feasible, the Department requires the Proponent to undertake an assessment of the impacts from the construction and operation of an ancillary facility to the Director-General's satisfaction prior to commencing construction.

The Department notes that whilst the Proponent has committed to meeting the Australian Standards in terms of lighting, it notes that it has not been reflected in the statement of commitments. Therefore, the Department recommends a condition which requires the Proponent to install and operate all lighting for the project in accordance with *AS 4282-1997 Control of the Obtrusive Effect of Outdoor Lighting*.

Waste Minimisation and Management

The Proponent has considered the impacts arising from waste generation during the construction and operation of the project. The assessment concluded that if managed and disposed appropriately, it was unlikely to be significant issue throughout construction. Operational waste management impacts were found to be negligible as rubbish collection/ road sweeping and clean-up activities will continue as part of the operation systems for the project.

A number of submissions questioned waste generated from the ongoing operation of the project and how it would be managed. Construction waste was not identified as a concern in submissions, however, concerns about illegal dumping besides the road corridor near residential areas was raised. The Department considers illegal dumping unlikely to be directly caused by the project, rather on an opportunistic basis, not because of the existing road corridor. Therefore, it is beyond the scope of the project. NRMA recommended that the motorway shoulders are swept of debris once every two months. Hazardous materials are discussed elsewhere in this assessment.

DECCW also raised a number of concerns in relation to waste management, specifically clarification on how the waste hierarchy would be applied to spoil management, with a preference for disposal being a last resort option,

clarification of sandstone crushing options and stated that not all identified measures in the Environmental Assessment were reflected in the Statement of Commitments.

The Department is of the opinion that the proposed waste management plan is the appropriate mechanism to manage impacts arising from the Project. The Proponent has an obligation to dispose of wastes legally, throughout construction and operation of the project. As part of its assessment, the Proponent identified the likely different waste streams generated by the Project throughout the construction phase, estimated quantity, its classification (in accordance with DECCW guidelines), and options for reuse and/or disposal.

The Department notes DECCW's preference for materials to be utilised rather than disposed of, and generally agrees with this position. Notwithstanding this, it is likely that reuse within the corridor would not be completely possible for the Project. This is due to a range of constraints in the corridor, such as topography, the size of the corridor, and proximity of adjoining land uses. Offsite disposal therefore, remains a valid option. Whilst the Proponent has committed to the development of a waste management plan, which will detail identification, reuse and disposal options, the Department considers that the proposed plan should be supplemented with an additional condition, requiring the Proponent to assess, classify and dispose all waste and fill material in accordance with the *Waste Classification Guidelines* (DECC, 2008).

In response to DECCW's concerns, the Proponent has revised its Statement of Commitments to ensure that the "waste hierarchy" would be maximised during construction and in the procurement of materials for the site. The effectiveness of these strategies would be reviewed quarterly to ascertain whether there are opportunities for improvement. The Department considers this an appropriate approach to dealing with this issue.

With respect to operational Impacts, the Proponent has a pre-existing operational system, which provides detail on a range of likely day to day operational scenarios, including accidents and cleaning of rubbish and debris along the corridor. This will continue once the upgrade is commissioned.

Hazard and Risks

The Proponent has considered the impacts that construction and operation of the project will have on people and facilities in the surrounding area by undertaking a range of risk assessments, including *State Environmental Planning Policy No. 33 - Hazardous and Offensive Developments* (SEPP 33) and *Hazardous Industry Planning Advisory Paper 6*. The assessments generally considered that the quantities will be low and thresholds under SEPP 33 are unlikely to be exceeded. Construction risks are also considered to be negligible and could be managed as successfully demonstrated for a range of other road projects.

DECCW requested that the Proponent commit to ensuring waters are not polluted by runoff from blasting and concreting and that excavation spoil stockpiles are protected to prevent erosion by wind and water. NOW requested a minimum setback distance from watercourses in cleared areas, where compounds would be constructed. Ryde Council requested that a surface water management approach, combined with Water Sensitive Urban Design be employed to treat roadside runoff. NSROC also highlighted similar concerns, specifically sediment and erosion controls.

Some private submissions also indirectly questioned whether the proposal is a vehicle to allow hazardous materials to use tunnels along the motorway network. Others questioned why the risk of bushfires was not considered in the Environmental Assessment, and suggested that as part of the project, hazard reduction burns be undertaken and that noise walls should be designed to act as fire barriers. Availability of fire fighting equipment on-site and the need to ensure fire brigades have safe access and egress were also identified.

The Proponent's hazard and risk assessment focused on the likelihood of a major incident during the construction phase of the project, primarily due to a hazardous materials spill, associated with a vehicular accident or failure of the material storage facility. Other risks such as falling from height, collision or tunnel excavation have also been considered. The Department considers these other risks would need to be considered as part of the Proponent's obligations under the *Occupational Health and Safety Act 2000*.

The Department also understands that hazardous materials are not permitted on the Motorway network, where tunnels are involved. The proposal, as outlined in the EA, does not propose any change to this situation. Any change to this status would be subject to further investigation and assessment by the RTA, prior to these vehicles being permitted through the Norfolk Tunnel.

The Proponent has identified that quantities of dangerous goods stored on site would fall under the nominated thresholds, including bulk fuel quantities. Fuel would be delivered by tanker, and would be unlikely to exceed one delivery a week. Both the delivery vehicle and storage facilities are required to be transported and stored in appropriately designed facilities compliant with relevant Australian Standards. The Proponent has made three specific commitments with respect to hazards and risks. These includes appropriate location of hazardous materials, including away from watercourses, prevention of contamination and the appropriate training of staff and associated responsibilities surrounding the handling and storage of dangerous goods and hazardous materials. The Department considers these are acceptable measures which aim to limit impacts arising from a spill, including human error. The Department has also recommended a condition requiring the storage and handling of dangerous goods to be consistent with the relevant Australian Standards and DECCW's Bunding and Spill Management guidelines and provision of bunded storage for liquids.

In terms of bushfire risks, the Proponent contends that the management of this falls within the scope of the State Emergency Service, not the RTA. The Department agrees with this argument and considers that reduction burns would contradict the Proponent's commitment to limit direct impacts to biodiversity as part of the project. The Department also notes the Proponent has identified that no change to access for emergency services will occur, therefore the Department considers that the proposal would not increase the level of bushfire risk.

Contamination

A review of the DECCW contaminated land register indicated no registered contaminated sites within close proximity of the corridor. A review of past and present aerial photographs indicated that the land use surrounding the corridor comprised mainly bushland, farming properties and residential properties. The review of potential contamination indicates minimal potential for widespread contamination in the assessment area.

None of the submissions received from the public raised concerns regarding the proposal.

The project involves areas of cut and fill along the length of the motorway corridor and modification of a number of existing water quality basins. The potential for contamination associated with fill material sourced from cuttings is considered to be low, given the history of land use along the corridor. The sediment and detention basins collect surface water runoff from the motorway and are a potential source of contamination. The Proponent states a water quality assessment of the water quality basins was undertaken in 2008, which indicated that water samples of contaminant concentrations from 29 of 30 basins generally complied with ANZECC *Guidelines for Fresh and Marine Water Quality*. The potential for significant contamination of surface water or sediments within the basins is considered to be low.

The Department is satisfied with the assessment of contamination and notes the Proponent's commitments to:

- undertake testing and classification of sediments in water quality basins that will be modified;
- develop management strategies to mitigate potential adverse risks; and
- develop an Unexpected Finds Protocol which describes actions to be undertaken should the condition of material found differ from that expected.

Climate Change and Greenhouse Gas Emissions

The Proponent carried out a greenhouse gas emission assessment to determine the impact of the upgrade on the environment and climate change. Greenhouse gases would be generated during the construction and operation of the project. The assessment of greenhouse gas emissions found that the operational emission savings would balance out the construction emissions within the first few years of operation.
The climate change predictions for eastern Australia characterise the weather pattern trend between 2030 and 2070 to have warmer average temperatures, more extremely hot days, decreased precipitation, increased evapotranspiration and more frequent bushfires. Associated with these gradual changes in annual and seasonal temperature and rainfall conditions are large changes in extreme weather events, such as heatwaves, storms, stronger winds, increased lightning and higher intensity rainfall. The Proponent considers these extreme weather events are of greater significance to infrastructure design than changes in average conditions.

A small number of submissions from the public raised concerns about the carbon emissions on the basis that the project favours vehicle usage rather than promoting public transport and improving public transport infrastructure

and facilities for cyclists. Concern was also expressed about climate change and the increase in extreme weather events which could affect the stability of structures such as noise walls.

The greenhouse gas assessment noted that overall vehicle kilometres travelled (VKT) in Sydney are not expected to change significantly as a result of the project. The upgrade is necessary to alleviate congestion and improve travel times for motorists (particularly during the peak periods) in North West Sydney and the road network as a whole. The Proponent states that the upgrade would result in reduced fuel consumption through a fall in congestion and stop-start driving on the motorway. New ramps would allow for more direct routes, which would reduce trip distances and associated greenhouse gas emissions.

The upgrade aims to improve the efficiency and reduce congestion and improve travel times in an existing corridor. The M2 motorway is a major bus corridor serving North Western Sydney with routes to the CBD, North Sydney and to Lane Cove, Epping and Macquarie Park. The upgrade would benefit bus passengers through reduced travel time and improved service reliability. This would be achieved by the provision of bus lanes and an eastbound T2 lane between Terrys Creek and Lane Cove Road. Cyclist facilities would be improved by the reinstatement of cycle access to the breakdown lane for the length of the motorway.

The Proponent has committed to use energy efficient equipment and management measures during construction and operation, where feasible and reasonable, to reduce greenhouse gas emissions. To manage the impacts of climate change on the project the Proponent would review the design standards related to flooding and drainage, material selection and foundation materials and consider the adoption of more stringent standards. This would reduce potential degradation of materials used in road pavements, road foundations and bridge pilings/ footings and the cost of maintenance requirements and emergency repairs.

The upgrade is expected to generate operational emission savings of 46,000 tonnes $CO_{2\text{-}e}$ per year after the first few years of operation over a "do nothing" option. The operational emission savings would balance out the construction emissions within the first few years of operation.

The Department notes the benefits from improvements in the efficiency of the motorway in moving traffic, particularly during the peak periods, and additional ramps which increase accessibility to the road network, would reduce greenhouse gas emissions over the volumes emitted by the existing motorway. Consequently the Department accepts that he proposal has the potential to reduce the carbon footprint of the existing M2 motorway.

Aboriginal Heritage

The Proponent undertook a detailed Aboriginal heritage assessment including field inspections, and consultation to identify the relevant local Aboriginal groups. The assessment identified a total of 15 Aboriginal sites within 100 metres of the project corridor. Of these, one isolated artefact would be impacted by the proposal, and two may have indirect impacts during construction. These are summarised in Table 12.

Table 12 - Aboriginal Heritage Potentially Impacted by the Project

AHIMS #	Site Type	Significance	Impact and Mitigation Measure
45-5-1005	Isolated artefact	Low	Would be impacted. No work recommended.
45-6-2949	Grinding Grooves	Moderate to high	Indirect impact during construction. Protection during works.
45-5-2161	Rock shelter		Indirect impact vibration. Technical advice (vibration specialist) and monitoring during construction.

In addition to the design methods to minimise impacts, the Proponent has committed to measures to reduce the impacts, such as fencing sites, providing training to staff and ongoing consultation with Aboriginal stakeholders.

The DECCW supports the majority of measures proposed to mitigate or avoid impacts on Aboriginal cultural heritage.

The Department acknowledges the importance of Aboriginal heritage sites within the vicinity of the upgrade but notes that only one Aboriginal object (an isolated find) is proposed to be directly impacted by the upgrade. The Department is satisfied that the Proponent has adequately, through the proposed road design, minimised the

extent of the potential impacts on Aboriginal heritage and that the proposed mitigation and management measure detailed in Technical Paper 5 of the EA are adequate in minimising potential indigenous heritage impacts.

Nonetheless, the Department also recommends the imposition of a condition requiring the preparation of a Construction Heritage Management Plan prior to the commencement of construction, which requires the specific measures to be applied to works undertaken in close proximity to identified Aboriginal heritage items, to minimise and avoid impacts on these items. Additionally, to ensure appropriate ongoing assessment and management of Aboriginal heritage, the Department has recommended a condition requiring the Heritage Management Plan to outline the measures to consider and manage the discovery of heritage items during construction, including the requirement to stop work and contact an appropriately qualified heritage consultant.

Consequently, the Department is satisfied that appropriate design and management measures have been taken and/or will be implemented during construction and final design to ensure Aboriginal heritage across the corridor is appropriately protected and impacts minimised wherever possible. The Department believes that combined with the recommended conditions of approval this ensures that impacts to Aboriginal cultural heritage as a result of the project would be appropriately mitigated and managed.

Historic Heritage

The EA identified 16 historic heritage items in the vicinity of the project corridor through historical research and site inspections. Of the 16 historic heritage items, 9 have been identified as having the potential to be impacted by the project and are identified in Table 13 below:

Table 13 - Historic Heritage Potentially Impacted by the Project

Site #	Site Name	Significance/ Statutory Listing	Impact
H-04	266-268 Windsor Road, Model Farms	Local/ Parramatta LEP 1996	Physical and visual. Property impacts and links to Windsor Road.
H-06	No. 57 Norfolk Road, North Epping Residence	Local/ Hornsby LEP 1994	Indirect impacts – possible construction vibration as a result of the Norfolk Tunnel excavation.
H-07	61 Norfolk Road, North Epping Residence	Local/ Hornsby LEP 1994	Indirect impacts – possible construction vibration as a result of the Norfolk Tunnel excavation.
H-09	No. 70 Norfolk Road, North Epping Residence	Local/ Hornsby LEP 1994	Indirect impacts – possible construction vibration as a result of the Norfolk Tunnel excavation.
H-10	Beecroft/Cheltenham Conservation Area	Local/ Hornsby LEP 1994	Potential visual impacts managed by appropriate landscaping and revegetation measures.
H-11	Chilworth Recreation Reserve	Local/ Hornsby LEP 1994	Potential visual impacts managed by appropriate landscaping and revegetation measures.
H-12	Devlin Creek, Epping Stone Causeway	Local/ Hornsby LEP 1994	Indirect impacts – possible construction impacts as a result of the removal of the Beecroft bus ramp.
H-15	Baulkham Hills Public School (Former)	Local/ Baulkham Hills LEP 2005	Potential visual impacts.
H-16	Old Windsor Road and Windsor Road Heritage Precincts	State/ RTA s.170 register	Indirect Impact.

Eight of the nine items are listed as heritage items in the Council's Local Environmental Plan and one, the Old Windsor Road and Windsor Road Heritage Precinct is listed in the RTA's heritage register. The Proponent undertook a heritage assessment of the items in accordance with the NSW Heritage Council's assessment criteria, which concluded the items were of local heritage significance.

The widening of Windsor Road to accommodate the new M2 Motorway on-ramp would require the acquisition of land on the western side. Approximately 370m^2 of the frontage of the Model Farms property (266-268 Windsor Road) would be acquired for the new on-ramp. The Model Farms building would not be directly impacted by the proposal, however, existing garden plantings between Windsor Road and the building would be removed. The Proponent considered the widening of Windsor Road to the east, however, this would result in greater impacts on the former Baulkham Hills Public School property (listed as a local heritage item), potentially requiring the

demolition of some buildings. The Department acknowledges that due to the location of the existing M2 Motorway, impacts on the Model Farms property are unavoidable. However, the Department has recommended conditions requiring the Proponent to investigate design options to minimise the impacts on the property in the final design of the alignment. Additionally the Department has recommended conditions of approval requiring archival recording of the relationship between the property and Windsor Road.

The Department also recommends a condition requiring the preparation of an Construction Heritage Management Plan prior to the commencement of construction, which requires the specific measures to be applied to works undertaken in close proximity to identified heritage items (particularly the 1831 convict constructed rare stone causeway at Devlin's Creek), to minimise and avoid impacts on these items. Additionally, to ensure appropriate ongoing assessment and management of historic heritage, the Department has recommended a condition requiring the measures to consider and manage the discovery of heritage items during the construction should be detailed in the Heritage Management Plan. This will also ensure that in the event that human skeletal remains are discovered, the appropriate authorities are contacted in the first instance.

The Department is satisfied that an appropriate assessment of the heritage significance of the identified historic heritage items has been undertaken and that subject to the recommended conditions, impacts can be appropriately managed to acceptable levels..

6. CONCLUSIONS AND RECOMMENDATIONS

Following a detailed assessment of the Environmental Assessment, Submissions Report and the submissions received during the exhibition period for the project, the Department is satisfied that the project is justified and its impacts are acceptable.

The project will increase the capacity and enhance the efficiency of the Motorway, which is a major commuter and freight corridor within the Sydney Metropolitan transport network. The key benefits of the proposal include improved travel efficiency, travel speeds and travel time reliability. The Upgrade proposal is consistent with a range of State Government strategic planning documents to support the growth in the North West region, including the *Metropolitan Transport Plan* (2010), *Sydney Metropolitan Strategy* (2005) and *NSW State Plan*.

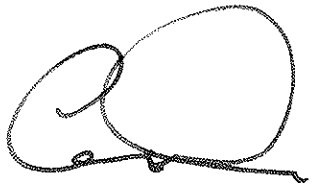
The importance of this corridor is expected to continue over the next 20 years, in conjunction with the expected growth in alternative modes of transport, with an increase in heavy vehicles forecasted to use the M2 Motorway. The project will also assist in achieving the *NSW State Plan* priorities, in particular, the transport priorities, as the project would improve the efficiency of the road network, maintain the road infrastructure and improve safety.

As reported there will be a range of noise, ecological, and traffic impacts. The Department accepts that this impact is unavoidable and that the extent of the impact has been minimised as much as reasonably possible through the proposed project alignments. The Department is confident that the corridor specific measures and the proposed biodiversity offset package will ensure that predicted impacts are appropriately minimised to acceptable levels, and that the required ongoing monitoring shall ensure that the ecological objectives of the corridor specific and wider offset measures are achieved.

The Department is satisfied that an appropriate balance of these conflicting factors has been achieved and that the predicted impacts, including noise, have been minimised wherever possible through the proposed upgrade to the M2 motorway alignment. The Department is also satisfied that the mitigation, management and monitoring measures including operational auditing, as recommended in the conditions of approval and the Statement of Commitments, will ensure that these impacts are further minimised during detailed design, construction and operational phases of the projects. The Department has recommended conditions of approval which define performance standards and targets which the project must achieve as well as monitoring requirements which are chiefly aimed at measuring the effectiveness of the mitigation measures which the Proponent has committed to. This includes noise and vibration monitoring.

The recommended conditions of approval for the project provide for the mitigation and management of key impacts associated with the project during the construction and operational phases of the project. These include specific environmental conditions for noise and vibration impacts, traffic and transport impacts, ecological impacts, urban design and landscaping, soil and water impacts, hazards and risk, heritage impacts, and air quality impacts. The Department has also recommended conditions of approval for environmental management, including the requirement for a Construction Traffic Management Plan, a Construction Noise and Vibration Management Plan, and a Construction Flora and Fauna Management Plan.

Consequently, the Department considers that the proposal is in the public interest and recommends that the Minister approve the M2 Upgrade project, subject to the recommended conditions of approval.



21.10.10

Chris Wilson
Executive Director
Major Projects Assessment

SHaddad

Sam Haddad
Director-General

21/10/2010.

APPENDIX A – RECOMMENDED CONDITIONS OF APPROVAL

APPENDIX B – STATEMENT OF COMMITMENTS

Note: copy in CD attached to Appendix C

APPENDIX C – RESPONSE TO SUBMISSIONS

Note: copy in attached CD.

APPENDIX D – ENVIRONMENTAL ASSESSMENT

Note: copy in attached CD.

APPENDIX E – INDEPENDENT REVIEW: NOISE

APPENDIX F – NOISE DATA (RECIEVERS)