



# Planning & Infrastructure

**MAJOR PROJECT ASSESSMENT:  
Pacific Highway Upgrade -  
Oxley Highway to Kempsey  
(MP07\_0090)**



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

February 2012

## ABBREVIATIONS

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Department	Department of Planning and Infrastructure
Director General	Director General of the Department of Planning and Infrastructure
EA	Environmental Assessment
EEC	endangered ecologically communities
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
Minister	Minister for Planning and Infrastructure
Part 3A	Part 3A of the <i>Environmental Planning and Assessment Act 1979</i>
Proponent	Roads and Maritime Services
SoC	Statement of Commitment
TSC Act	<i>Threatened Species Conservation Act 1995</i>

Cover Photograph: View of existing Pacific Highway (RTA)

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Published February 2012  
Department of Planning & Infrastructure  
[www.planning.nsw.gov.au](http://www.planning.nsw.gov.au)

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## EXECUTIVE SUMMARY

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The Roads and Maritime Services (the Proponent) has sought the Minister's approval to upgrade the Pacific Highway between the Oxley Highway and Pacific Highway interchange near Port Macquarie and Stumpy Creek to the south of Kempsey, a distance of approximately 37 kilometres. The project, known as the Pacific Highway Upgrade – Oxley Highway to Kempsey, is a component of the Pacific Highway Upgrade Program, which is a joint commitment of the State and Commonwealth governments to upgrade the existing Pacific Highway between Hexham and the Queensland border. The program was established to eliminate accident blackspots, improve road safety conditions, and reduce overall travel times along the highway.

The road will be constructed as a dual carriageway highway with two lanes in each direction, with a wide median to allow for a future upgrade to six lanes. The major features of the proposal include:

- a new alignment across the Hastings River and Wilson River floodplains and minor realignment within Maria River State Forest;
- 100-year average recurrence interval flood immunity, with the exception of the Wilson River floodplain where the road embankment would be above the 20-year average recurrence interval flood level;
- a bypass of Telegraph Point with access to Telegraph Point provided by a grade separated interchange in the area of Blackmans Point Road to the south and a half interchange in the area of Haydons Wharf Road to the north;
- overbridges located to the south of Sancrox Road, at Bill Hill Road, Mingaletta Road, Wharf Road, Kundabung Road, and Middle Gate Road;
- the existing Pacific Highway near Blackmans Point Road and Yarrabee Road passing under the proposal;
- major cuttings through Cooperabung Hill;
- new major bridge structures for the Hastings River and Wilson River crossings, and the crossing of the North Coast Railway to the north of the Wilson River;
- smaller bridges for a number of creek crossings;
- provision of two new rest areas south of Mingaletta Road; and
- provision of a service road network using sections of existing highway, existing local roads, and new roads.

The Pacific Highway is considered to be one of the most critical roads in NSW, affecting the safety, wellbeing, and livelihoods of local residents and road users. The project would serve a growing population in the Mid North Coast region, and provide increased transport capacity to regional centres including Taree, Port Macquarie, Kempsey, Coffs Harbour, and Grafton. The region's population is expected to increase by 28 per cent by 2031, from a population of around 330,600 to 424,600. This growth will place increased pressure on existing transport infrastructure. Improvements to transport networks are required to meet community expectations for safe and efficient travel, and to accommodate current and projected travel demand. The project also aims to reduce the crash rate and increase safety along the highway.

Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as in force immediately before its repeal on 1 October 2011 continues to apply to Part 3A projects. The Director General's requirements have been issued in respect of the project and the environmental assessment report for the project was lodged prior to 1 October 2011. Therefore the project is a transitional Part 3A project. The project is also classified as critical infrastructure pursuant to section 75C of the EP&A Act.

The Environmental Assessment was placed on public exhibition between 15 September 2010 and 15 October 2010. During this period the Department received 147 submissions on the project. Six submissions were from public authorities, 2 from local authorities and 139 from the general public. Of the submissions from the general public, 92 were in the format of a form letter which supported the project.

The issues raised in submissions were:

- flora and fauna;
- noise and vibration;
- soils and water;
- flooding;
- property impacts and access;

- service road and traffic; and
- Aboriginal heritage.

These issues were addressed in detail by the Proponent in the Response to Submissions Report.

The Department has assessed the Proponent's Environmental Assessment, submissions from the general public and public authorities, the Response to Submissions Report and Statement of Commitments and considers there are a number of constraints to the project that will need to be carefully managed. These include construction noise impacts, the development and implementation of mitigation measures for operational noise, property impacts and land acquisition, biodiversity impacts and offsets (particularly fauna movement and alternative habitat provision) and soil, water and hydrology. These issues were reflected in submissions from the local community and were considered by the Department in its assessment.

Based on its assessment the Department is of the opinion that on balance the project is justified and in the public interest. The implementation of the Proponent's commitments and the recommended conditions of approval in parallel would ensure that the project is designed, constructed and operated to meet acceptable environmental performance and amenity limits. Therefore, the approval of the Pacific Highway Upgrade – Oxley Highway to Kempsey project, subject to conditions, is recommended.

## 1. BACKGROUND

The Pacific Highway Upgrade Program (PHUP) is one of the largest infrastructure projects in the state and is a joint commitment between the State and Federal governments to improve the safety and standard of the Pacific Highway between Hexham and the Queensland border. Both governments have been jointly upgrading the Pacific Highway since 1996 and currently have committed \$4.84 billion to continue the upgrade to 2014 under the National Partnership Agreement for the Building Australia Program. Currently 377 kilometres of the current 677 kilometre Pacific Highway have dual carriageways, with a further 69 kilometres currently under construction.

The Roads and Maritime Services (the Proponent) proposes to construct the Oxley Highway to Kempsey project as part of the PHUP on the Mid North Coast. An overview of the Program is shown in Figure 1.

The objectives of the Program are to:

- significantly reduce road accidents and injuries;
- improve transport efficiency by reducing travel times and freight costs;
- develop a route that involves the community and considers their interests;
- provide a route that supports economic development;
- manage the upgrading of the route in accordance with ecologically sustainable development (ESD) principles; and
- provide the best value for money.

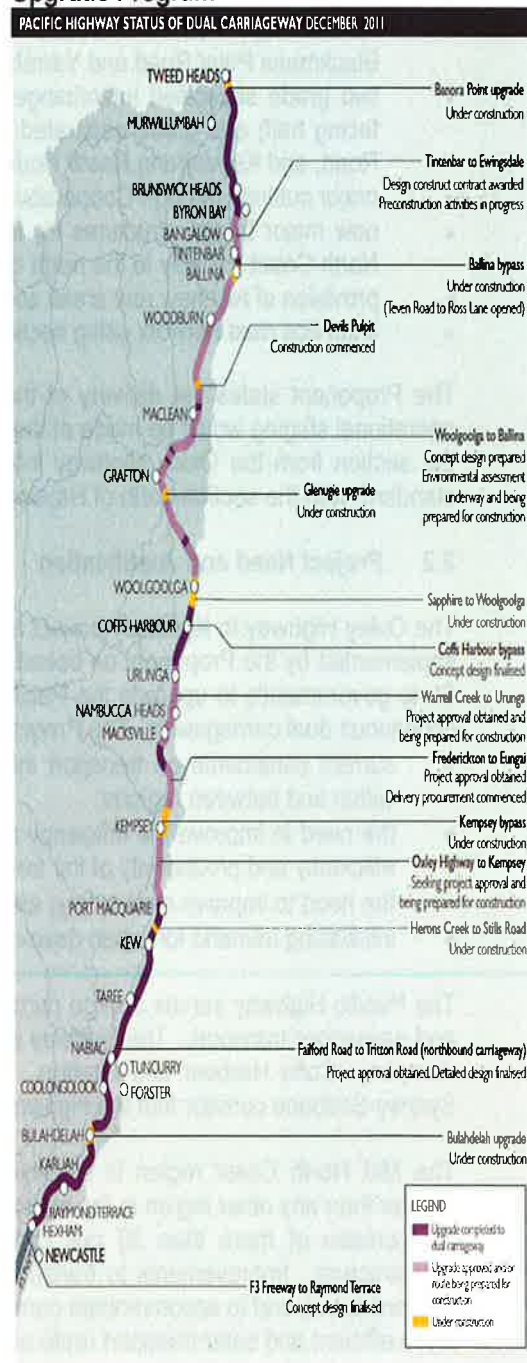
The project is located within the Port Macquarie Hastings and Kempsey local government areas and commences approximately 700 metres north of the Oxley Highway and Pacific Highway interchange and extends northwards to tie in with the dual carriageways of the proposed Kempsey to Eungai upgrade north of Stumpy Creek.

Land uses adjoining the project corridor generally consist of residential, rural, commercial, industrial, state forests, national parks and nature reserves. Rural land use, state forests and conservation areas are the dominant land uses. Residential areas are largely restricted to the villages of Telegraph Point and Kundabung with scattered residential and rural residential development in other parts of the area.

Commercial and industrial land uses are scattered along the existing highway, mainly to the south of Telegraph Point. Rural uses include grazing, aquaculture, orchards, tea tree plantations, vineyards, poultry farms and other agricultural activities. Oyster farming is carried out in the Hastings River. Two extractive industries are located in the area.

The Cairncross, Ballengarra and Maria River State Forests within the project area are scheduled for logging and support the regional forestry industry. Nature reserves located in the area include Rawdon Creek and Cooperabung Creek. The Kumbatine and Maria national parks are located in the north of the project area.

**Figure 1 – Overview of the Pacific Highway Upgrade Program**



## 2. PROPOSED PROJECT

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### 2.1 Project Description

The Oxley Highway to Kempsey project commences approximately 700 metres north of the Oxley Highway and Pacific Highway interchange for a length of 37 kilometres to Stumpy Creek (see Figure 2, Locality Map). The key components of the project are:

- four-lane dual carriageways (two lanes in each direction) largely adjacent to the existing highway with a wide median to allow a future upgrade to six lanes;
- a new alignment across the Hastings River and Wilson River floodplains and minor realignment within Maria River State Forest, and a bypass of Telegraph Point;
- the provision of 100-year average recurrence interval (ARI) flood immunity, with the exception of the Wilson River floodplain where the road embankment would be above the 20-year ARI flood level;
- overbridges located to the south of Sancrox Road, Bill Hill Road, Mingaletta Road, Wharf Road, Kundabung Road, and Middle Gate Road, and underpasses of the existing Pacific Highway near Blackmans Point Road and Yarrabee Road;
- two grade separated interchanges near Blackmans Point Road (full) and Haydons Wharf Road (north facing half) and grade separated on- and off-ramps at Sancrox Road/ Fernbank Creek Road, Yarrabee Road, and Kundabung Road/ Rodeo Drive/ Smiths Creek Road;
- major cuttings through Cooperabung Hill;
- new major bridge structures for the Hastings River and Wilson River crossings and the crossing of the North Coast Railway to the north of the Wilson River, and smaller bridges for a number of creek crossings;
- provision of two new rest areas south of Mingaletta Road; and
- a service road network using sections of the existing highway, existing local roads, and new roads.

The Proponent states the delivery of the project may be staged. The decision on potential construction and operational staging would be made at the detailed design stage. The staging options could involve an upgrade of the section from the Oxley Highway interchange to Haydons Wharf Road (Telegraph Point) to the motorway standard, with the section north of Haydons Wharf Road to Stumpy Creek upgraded to the arterial road standard.

### 2.2 Project Need and Justification

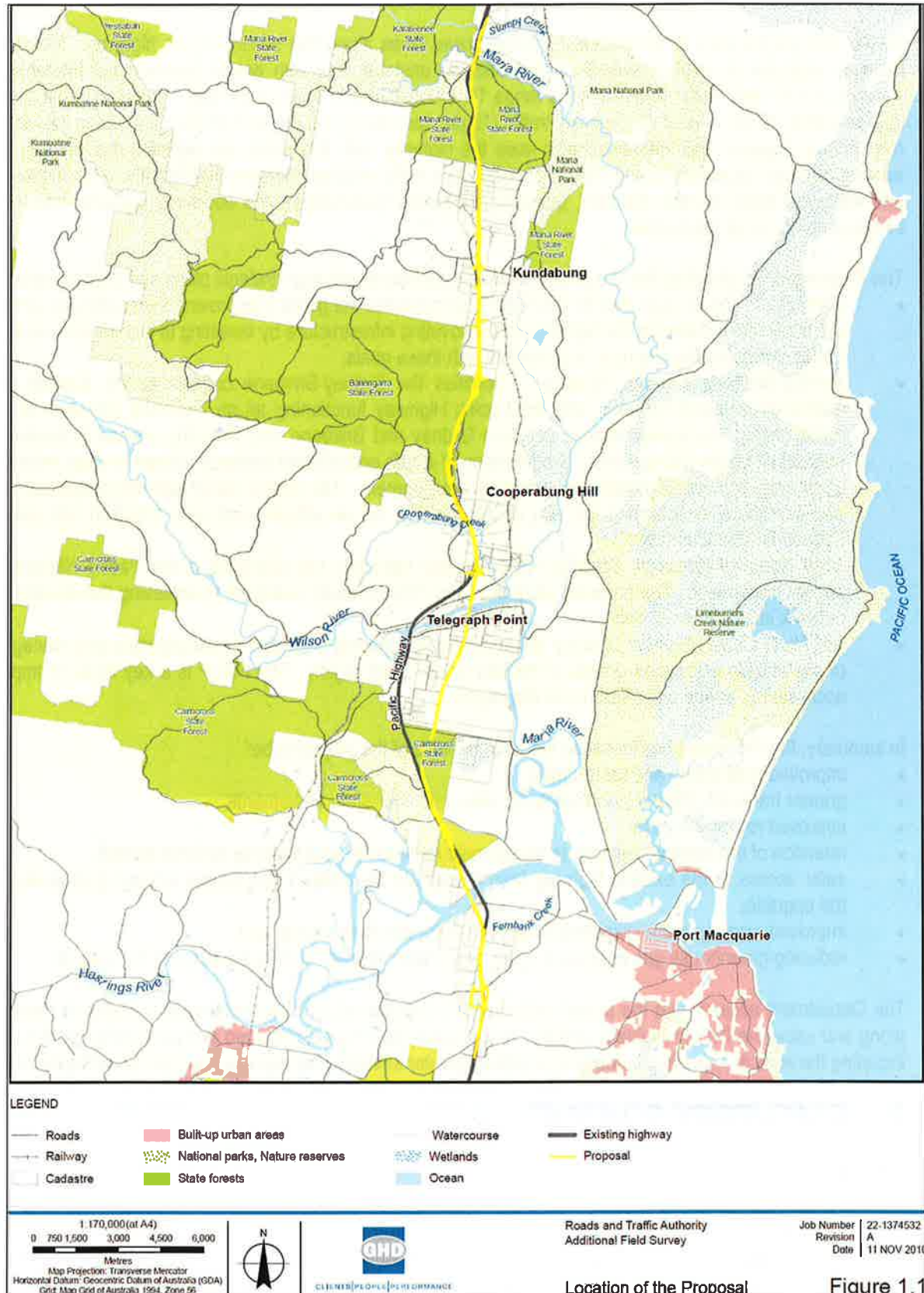
The Oxley Highway to Kempsey project is a part of the Pacific Highway Upgrade Program (PHUP) which is being implemented by the Proponent on behalf of the State. The Program is a commitment of the Commonwealth and State government's to upgrade the Pacific Highway between Hexham in NSW and the Queensland border to a continuous dual carriageway. The Program aims to address:

- current constraints on transport infrastructure and the need to improve accessibility and transport, both within and between regions;
- the need to improve the efficiency and integration of transport infrastructure, including improvements in the efficiency and productivity of the freight sector;
- the need to improve road safety; and
- increasing demand for urban development, especially on the Mid North Coast and North Coast of NSW.

The Pacific Highway serves a large number of regional centres and supports local, regional and through freight and passenger transport. The highway services the major urban centres of Bulahdelah, Taree, Port Macquarie, Kempsey, Coffs Harbour and Grafton. Approximately forty per cent of Australia's population lives along the Sydney-Brisbane corridor that the highway traverses.

The Mid North Coast region is predicted to experience significant population growth (through in-migration), greater than any other region in the state, with the population expected to grow from 330,600 to 424,600 by 2031, an increase of more than 28 per cent. This growth will place increased pressure on existing transport infrastructure. Improvements to transport networks are required to meet community expectations for safe and efficient travel, and to accommodate current and projected travel demand. The project would assist in providing a more efficient and safer transport route along the project corridor.

Figure 2- Locality Map



The existing section of the Pacific Highway between the Oxley Highway interchange and Kempsey is predominantly a single lane road in each direction with intermittent overtaking lanes. The current crash rate of 22.3 crashes per 100 million vehicle kilometres travelled, is almost twice the PHUP target of 15 crashes per 100 million vehicle kilometres travelled for upgraded dual-carriageway sections of the highway. In addition, conflicts

exist between highway and local traffic. The majority of crashes occur within the vicinity of Telegraph Point, Kundabung and the Hastings River Drive intersection.

Finally, the project aims to substantially improve travel times along this section of the highway. The existing highway operates at level of service D (approaching unstable flow with delays common but tolerable) with average annual daily traffic volumes in the range 12,300 and 14,900 vehicles per day. Heavy vehicles comprise approximately 20 per cent of the highway traffic (13 per cent during the day and 43 per cent during the night). A mix of local, regional and interstate traffic uses the highway, with this traffic mix affecting the capacity of the existing highway, especially during holiday periods when traffic volumes increase significantly. The project would add additional lanes in each direction, providing overtaking opportunities and additional capacity, which would increase safety for all road users.

The Proponent has identified that the project would be consistent with key strategic plans and policies including:

- *NSW 2021* - the 10-year plan for the State which includes the goals of improving road safety by continuing the duplication of the Pacific Highway and renovating infrastructure by investing in key infrastructure. The PHUP, including the proposal, is consistent with these goals;
- *Sydney-Brisbane Corridor Strategy* – identifies the Sydney-Brisbane corridor as the busiest on the Australian transport network, with the Pacific Highway functioning as an important interstate transport route, linking the coastal regions between Sydney and Brisbane and providing access to markets and sources of goods and services. The provision of a safe and efficient transport system is a key determinant of regional population growth and economic development. The project would address congestion issues and contribute to achieving the aim of the Strategy for an efficient and safe transport link along the Sydney-Brisbane corridor;
- *NSW State Infrastructure Strategy* – the Strategy highlights the upgrading of the Pacific Highway as a priority investment. The proposal (as part of the PHUP) would contribute to achieving the identified road network improvements; and
- *Mid North Coast Regional Strategy* which establishes guiding principles for the planning and management of sustainable population growth of the Mid North Coast region. The PHUP is a key factor in improving accessibility, safety and efficiency in this region.

In summary, the Proponent has identified the main benefits of the project to be:

- improved road safety and travel times;
- greater transport efficiency and safety for intra- and inter-state movements;
- improved regional access;
- retention of the existing highway as an alternate route to the new highway for local access;
- safer access to the existing highway from new grade separated interchanges located strategically along the upgrade;
- improved amenity in the villages of Telegraph Point and Kundabung; and
- reducing greenhouse gas emissions in the longer term, relative to the base case of 'no upgrade'.

The Department accepts that the project will provide a number of social and economic benefits to those living along and using the Pacific Highway corridor, and accepts the Proponent's need and justification for the project, including the aims of improving safety and providing greater efficiency for regional and inter-State transport.

### 3. STATUTORY CONTEXT

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#### 3.1 Major Project

On 5 December 2006 the then Minister for Planning declared the Pacific Highway Upgrade Planning Projects (PHUPP) to be subject to Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) under section 75B of the EP&A Act. The PHUPP included the Oxley Highway to Kempsey section. On 3 December 2010, the former Minister for Planning amended the Major Project Order for the PHUPP in relation to the parts of the Pacific Highway between Woolgoolga to Ballina. This amendment had no effect on the Oxley Highway to Kempsey section of the Pacific Highway which remains a project to which Part 3A of EP&A Act applies under the amended Order. The Minister for Planning and Infrastructure is therefore the approval authority for the project under Part 3A of the EP&A Act

### 3.2 Critical Infrastructure

On 8 December 2006, the then Minister for Planning declared the PHUPP to be a critical infrastructure project under section 75C of the EP&A Act, as it is considered to be essential to the State for economic and social reasons. The PHUPP included the Oxley Highway to Kempsey section. On 3 December 2010, the former Minister for Planning amended the Critical Infrastructure Declaration for the PHUPP in relation to the parts of the Pacific Highway between Woolgoolga to Ballina. This amendment had no effect on the Oxley Highway to Kempsey section of the Pacific Highway which remains a critical infrastructure project under the amended Order.

### 3.3 Continuing Operation of Part 3A

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

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

### 3.4 Permissibility

*State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) permits through clause 94(1), development for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority on any land, without consent. However, where land is reserved under the NPW Act, the Infrastructure SEPP identifies that road projects may be carried out without consent if the development is authorised by or under the NPW Act. As the project traverses the Cooperabung Creek Nature Reserve, development of the project within this land would also require an authorisation by or under the NPW Act. The Proponent has advised that it would seek the revocation of an area of the Nature Reserve under the NPW Act.

### 3.5 Environmental Planning Instruments

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

### 3.6 Objects of the EP&A Act

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

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

- (c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

Of particular relevance to the environmental assessment and eventual determination of the project application by the Minister for Planning and Infrastructure (or his delegate), are those objects stipulated under section 5(a) (i), (ii), (vi), and (vii) of the EP&A Act. With respect to ecologically sustainable development, the EP&A Act adopts the definition of the *Protection of the Environment Administration Act 1991*, including the precautionary principle (i.e. if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation), the principle of inter-generational equity, the principle of conservation of biological diversity and ecological integrity, and the principle of improved valuation, pricing, and incentive mechanisms.

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

- the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, water, towns and villages – the Department's assessment of the project has considered bio-physical impacts to natural areas including forests and water resources (Sections 5.1 and 5.3) as well as amenity and socio-economic impacts to agricultural land, towns and villages (Sections 4.4 and 5.2);
- the promotion and co-ordination of the orderly and economic use and development of land - the Department has assessed the biophysical and amenity constraints of the proposal in Section 5 and the strategic need for the project in Section 2.2;
- the protection of the environment including the protection and conservation of native animals and plants including threatened species, populations, and ecological communities and their habitats – the Department's assessment of flora and fauna issues is provided in Section 5.1; and
- ecologically sustainable development – the Department's assessment of the project has considered the principles of ecologically sustainable development, and the need to balance these principles with other social, economic, and environmental factors. In its assessment of the project against the principles of ecologically sustainable development, the Department has considered:
  - the Proponent's assessment which considered the 'worst case scenario' of the project impacts, consistent with the precautionary principle;
  - the Proponent's consideration of issues that have long-term term implications (such as consumption of non-renewable resources, waste disposal, greenhouse gas emissions, removal of vegetation, impacts on visual amenity and water quality), which has sought to avoid and minimise adverse impacts as far as possible through route selection and application of the proposed mitigation measures, consistent with the principle of inter-generational equity and the conservation of biological diversity and ecological integrity; and
  - the Proponent's commitment to appropriately value and offset residual impacts (such as biodiversity), consistent with the principle of improved valuation, pricing, and incentive mechanisms.

### 3.7 Statement of Compliance

In accordance with Section 75I(g) of the EP&A Act, the Department is satisfied that the Proponent's overall assessment has complied with the Director General's environmental assessment requirements issued for the project on 14 November 2008.

## 4. CONSULTATION AND SUBMISSIONS

### 4.1 Exhibition

Under section 75H(3) of the EP&A Act, the Director General is required to make the Environmental Assessment (EA) (copy attached in Appendix A) publicly available for at least 30 days. After accepting the EA, the Department publicly exhibited it from 15 September 2010 until 15 October 2010 (31 days) on the Department's website, and at the Department's Head Office, the then Roads and Traffic Authority's Head Office in North Sydney, the Kempsey Shire Council Office in Kempsey, the Port Macquarie Hastings Council Office in Port Macquarie, and the Nature Conservation Council Office in Sydney. The Department also advertised the public exhibition in the *Sydney Morning Herald*, *Daily Telegraph* and *Port Macquarie News* on 15 September 2010 and the *Kempsey Macleay Argus* on 17 September 2010, and notified relevant public and local government authorities of the exhibition of the EA in writing.

The Department received 147 submissions from the exhibition of the EA - 6 submissions from public authorities, 2 from local government authorities and 139 submissions from the general public. A copy of the submissions is available on the Department's website (refer to Appendix B). The general public submissions included eight from local businesses and three from special interest groups (Hastings S.E.S. Community Driver Reviver Centre; Koala Preservation Society NSW; and Kempsey Sporting Car Club).

15 public submissions (11%) objected to the project, 100 submissions (72%) supported the project and 24 submissions (17%) did not object but raised issues for consideration. Of the submissions that supported the project, 92 were in the format of a form letter from people employed near the Sancrox Road and Pacific Highway intersection. The form letter submissions raised concerns about the safety of the existing intersection and expressed support for the project.

### 4.2 Public Authority Submissions

Six submissions were received from public authorities, who raised the following issues:

- **Department of Environment, Climate Change and Water (DECCW) (now Environment Protection Authority of the Office of Environment and Heritage (EPA))** supported the proposal and commented on construction and operational noise, erosion and sediment control, groundwater and Aboriginal cultural heritage issues. The sizing and location of proposed fauna crossing structures, particularly in providing connectivity to vegetated areas was raised as an important issue.
- **Industry and Investment NSW (I&I NSW) (now Department of Primary Industries (DPI))** commented on agricultural impacts, waterway crossing structures and post approval consultation arrangements;
- **NSW Office of Water (NOW)** commented on groundwater impacts of the deep cuttings, works within the riparian zone of waterways and water licensing requirements during construction;
- **Transport NSW (now Transport for NSW)** requested consultation with public transport and school bus providers on construction management plans, provision of 2.5 metre wide shoulders on bridges and pinch points and investigation of cycleway connections;
- **Northern Rivers Catchment Management Authority (NRCMA)** noted potential conflicts with the Northern Rivers Catchment Action Plan targets for improvements to the condition of rivers and aquifers and terrestrial and aquatic ecosystems by 2016 and supported the proposed biodiversity mitigation and offset measures; and
- **Forests NSW (now Department of Primary Industries (DPI))** commented on the impact of the proposal on State forests, including the need for land offsetting, access to State forests and activities of existing State forest permit holders.

### 4.3 Local Government Authorities

Two submissions were received from local government authorities, who raised the following issues:

- **Port Macquarie Hastings Council** raised no issues of concern about the proposal; and
- **Kempsey Shire Council** raised issues related to property access, impacts on existing businesses and opportunities for business/ tourist signage, flooding, future road infrastructure maintenance, tie-in with the Kempsey to Eungai upgrade, koala and fauna crossing structures for further consideration. Council

considered the EA did not adequately address potential employment land in the area between Port Macquarie and Kempsey.

#### 4.4 Public Submissions

The issues raised in public submissions which objected to or had concerns about the proposal are shown in Table 1.

**Table 1 - Summary of Issues Raised in Public Submissions**

Issue	Number of times raised
Service road and traffic impacts	44
Noise and vibration	27
Property impacts and loss of farmland	21
Biodiversity – flora and fauna	17
Property access	16
Business impacts and signage	16
Visual impacts	15
Soil and water	12
Flooding	12
Route selection and consultation	5
Air quality and dust	4
Health impacts	4

#### 4.5 Proponent's Response to Submissions

The Proponent submitted a Response to Submissions Report (refer Appendix C), which identified additional assessment undertaken since the exhibition of the EA and included a response to the issues raised in submissions from the general public and public authorities. The Response to Submissions was made publicly available on the Department's website.

No amendments were made to the project, however the Proponent revised the table of fauna crossings to include information on the dimension of the proposed structures and the species likely to use the crossing structures. The Statement of Commitments was also revised to clarify/ address comments made in submissions.

The Response to Submissions included a supplementary flora and fauna assessment and Aboriginal cultural heritage assessment of five additional study areas potentially impacted by the project. These areas were not previously subject to an ecological survey and cultural heritage assessment as part of the original EA. The additional study areas consist of two properties for which access was not available for the original surveys and three local roads which would be upgraded as part of the service road network. The supplementary flora and fauna assessment noted that the impact of the project in the additional study areas would result in the following additional impacts:

- increase of 0.4 hectares of native vegetation clearing;
- net increase of clearing of Subtropical Coastal Floodplain Forest (0.8 hectares); and
- loss of foraging habitat for the Hoary Wattled Bat at Stumpy Creek.

The supplementary Aboriginal heritage assessment of the additional study areas was conducted using the same methodologies as that used in the original EA assessment. No additional Aboriginal heritage evidence was identified and no Aboriginal heritage sites were identified to have been recorded in these locations. The management and mitigation measures proposed in the EA, the results of the survey and subsurface investigations and consultation with the local Aboriginal community for the original cultural heritage assessment were not altered by the supplementary assessment.

The project included the provision for aerial fauna crossings (rope ladder crossings and glider poles) to assist arboreal fauna movements in key fauna corridors. The Response to Submissions indicated the Proponent would investigate the feasibility of widening the median at some of the fauna crossing locations. A three stage process would be undertaken comprising:

- preliminary scoping investigation – identifying potential aerial crossing sites and review of project information to determine the suitability of adopting median widening at the sites;
- detailed investigation of sites during the detailed design phase with the EPA; and
- finalisation and approval.

The Response to Submissions contained the preliminary scoping investigation report which recommended further detailed investigation of widened medians at three locations: Cairncross State Forest (Ch 10000 to 11160); Ballengarra State Forest (Ch 23200 to 23940) and Maria River State Forest (Ch 33760 to 34380).

## 5. ASSESSMENT

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After consideration of the EA, Response to Submissions and the final Statement of Commitments and issues raised in government authority and public submissions, the Department has identified the following key environmental issues associated with the proposal:

- flora and fauna;
- noise and vibration; and
- soil, water and hydrology.

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

The Department has also considered other issues raised in submissions and in the Proponent's assessment, including traffic and transport, land use, property and business impacts, visual impacts and heritage. The Department considers these issues generally pose a low environmental risk and that the Proponent has developed a range of commitments to manage or mitigate these impacts. Where no specific commitment exists, or where the Department considers a commitment needs strengthening, specific conditions of approval have been recommended. The Department's consideration of these issues is addressed in Section 5.4.

### 5.1 Flora and Fauna

#### Issue

The proposal is located in the North Coast Bioregion, along the east coast of NSW, which stretches from Raymond Terrace to the Queensland border. Within this bioregion, the proposal is located within the Macleay Hastings Catchment Management Authority sub-region. The area through which the proposal passes contains state forests (Cairncross, Ballengarra, Maria River and Kalateenee), nature reserves (Rawdon Creek and Cooperabung Creek) and wetlands, including *State Environmental Planning Policy No. 14 – Coastal Wetlands* (SEPP14). The Proponent undertook a biodiversity assessment including detailed field surveys of terrestrial and aquatic ecology throughout the study area (strip of land 150 metres wide along the length of the proposal).

The field surveys recorded 10 natural vegetation communities and three artificial or highly modified vegetation communities within the proposal footprint (includes the carriageways, service and access roads, plus a 6 metre clearing buffer for utilities, services and construction activities). Four endangered ecological communities (EEC) listed under the *Threatened Species Conservation Act, 1995* (the TSC Act) were recorded in the study area:

- Swamp Oak Floodplain Forest of the North Coast Sydney Basin and South East Corner Bioregions;
- Subtropical Coastal Floodplain Forest of the North Coast Bioregion;
- Swamp Sclerophyll Forest on Coastal Floodplains of the North Coast Sydney Basin and South East Corner Bioregions; and
- Freshwater Wetlands on Coastal Floodplains of the North Coast Sydney Basin and South East Corner Bioregions.

A total of 425 flora species were recorded in the study area, of which approximately 77% were native species. Targeted surveys were undertaken of 29 threatened flora species (previously recorded within 10 kilometres of the proposal or with distribution ranges within the study area), however no threatened flora species were identified in the study area.

The biodiversity assessment identified 46 threatened fauna species, listed as vulnerable or endangered under the *Environment Protection Biodiversity Conservation Act 1999* (the EPBC Act) and TSC Act, as likely to be present in the study area, based on previous records or habitat availability. Of these, 18 threatened fauna species were recorded in the study area during the field investigations and a further five species were considered highly likely to occur based on habitat preferences and habitat availability. Of the 50 migratory species listed under the EPBC Act predicted to occur in the study area, 15 species were either recorded or assessed as having some potential to occur within the study area based on known records or habitat availability.

The Proponent identified that an area of approximately 203.1 hectares of native vegetation would be cleared within the project footprint. Direct impacts on native vegetation and EEC are shown in **Table 2**. The clearing of native vegetation would result in the permanent loss of foraging habitat, including preferred food tree species and winter flowering trees that provide important seasonal food resources. The loss of roosting and nesting habitat such as hollow-bearing trees, hollow logs and fallen timber could impact on fauna breeding behaviour. Furthermore, there is an increased risk of fauna injury and mortality as a result of vehicle strike along the new highway. Habitat fragmentation would also restrict feeding resources for non-flying fauna.

**Table 2 - Natural Vegetation Clearing**

COMMUNITY NO	VEGETATION COMMUNITY	PREDICTED DIRECT IMPACT (ha)
1	Moist Floodplain Closed Forest with Rainforest Elements	3.9
2	Riparian Forest	7.8
3	Paperbark Swamp Forest	9.5
4	Swamp Mahogany Forest Red Gum Swamp Forest	10.4
5	Swamp Oak Forest	0.9
6	Wetland	3.8
7	Moist Floodplain Forest	27.8
8	Moist Gully Forest	25.8
9	Moist Slopes Forest	73.9
10	Dry Ridgetop Forest	39.3
<b>Total Natural Native Vegetation Loss</b>		<b>203.1</b>
<b>ENDANGERED ECOLOGICAL COMMUNITY (EEC)</b>		
Swamp Sclerophyll Forest (vegetation communities 3 and 4)		19.9
Swamp Oak Floodplain Forest (vegetation community 5)		0.9
Subtropical Coastal Floodplain Forest (vegetation communities 1 and 2)		11.7
Freshwater Wetlands (vegetation community 6)		3.8
<b>Total EEC Vegetation Loss</b>		<b>36.3</b>

Creek and river crossings have the potential to affect riparian habitat, particularly for the Giant-barred Frog, Stuttering Frog and Green-thighed Frog. The potential impacts include pollution and sediment runoff into waterways and loss and disturbance of riparian vegetation.

Concerns about flora and fauna impacts were raised in submissions from the general public, the EPA, NRCMA and Kempsey Council. The key concerns related to flora and fauna impacts, habitat corridors and adequacy of fauna crossings, compensatory offsets and mitigation measures.

## Department's Consideration

### Impacts on Terrestrial Flora and Fauna

The biodiversity assessment considered the loss of 36.3 hectares of EEC for the proposal in the context of the remaining EEC in the Mid-North Coast Region of NSW to be minor. Based on the 1999 *Comprehensive Regional Assessment of North Eastern NSW*, the clearing of EEC for the proposal represented less than 0.1% of the total area of any EEC in the region. The regional impact on Swamp Sclerophyll Forests would comprise a reduction of 0.07% of the estimated 29,155 hectares remaining, 0.02% of the 60,018 hectares of the remaining Subtropical Coastal Floodplain Forest, 0.003% of the remaining Swamp Oak Floodplain Forest (28,833 hectares) and 0.02% of the 24,118 hectares of Freshwater Wetlands remaining. The Department notes the assessment of significance under the TSC Act concluded that impacts on EEC would not be of such a magnitude that a significant proportion of each of the EEC would be affected on a regional basis. Although the proposal would contribute to the general fragmentation of natural vegetation, particularly Swamp Sclerophyll Forest on Coastal Floodplain EEC vegetation in Cairncross State Forest, the Department considers the remaining vegetation on either side of the deviation would be large enough to continue to be a functioning ecosystem.

A supplementary flora and fauna assessment was undertaken of five additional areas that would be impacted by the proposal. These areas were not surveyed as part of the original ecological assessment in the EA, however, these areas were identified in the EA as being located within the project or service road corridors. The additional surveyed areas were identified to comprise 5.8 hectares of native vegetation, including 3.8 hectares of vegetation classified as EEC under the TSC Act. These impacts were largely accounted for in the extent of clearing of vegetation communities identified in the EA, however some additional impacts (not previously accounted for) were identified:

- an increase of 0.4 hectares of Dry Ridgetop Forest vegetation clearing at Stumpy Creek;
- an increase of 0.8 hectares of Subtropical Coastal Floodplain Forest vegetation clearing (an EEC); and
- a net increase of 1.2 hectares of native vegetation required to be cleared for the proposal

The overall impact is a minor increase in the area of native vegetation required to be cleared for the proposal, from 203.1 to 204.3 hectares.

The Department accepts that the disturbance and removal of native vegetation for the proposal and the consequent impacts on native fauna, particularly threatened species is unavoidable. However, it is noted that the Proponent through the route selection process has identified a corridor which balances competing environmental, engineering, social and economic constraints. The Department recognises that this process may not result in an alignment with the least biodiversity impacts but would be a corridor where the biodiversity impacts are minimised as far as is feasible and reasonable taking into consideration other factors. The Proponent has selected the preferred route for the Oxley Highway to Kempsey upgrade to avoid residential areas to minimise amenity impacts as well as minimising impacts on state forests (Maria River and Ballengarra), nature reserves (Cooperabung Creek) and SEPP14 wetlands, as well as minimising the fragmentation of agricultural land and taking into account engineering design requirements to address flooding and hydrogeological constraints. The Department is satisfied the Proponent in designing the proposal has given due regard to the avoidance and minimisation of impacts on flora and fauna as far as is feasible and reasonable.

### Impacts on Habitat Corridors and Connectivity

The proposal would remove a long strip of remnant vegetation along the proposed alignment, including the removal of vegetation within key habitat areas associated with regional and subregional corridors (refer to Figure 3). These areas of key habitat are located:

- west of the existing highway, to the north and south of Sancrox Road;
- near Blackmans Point Road within Rawdon Creek Nature Reserve and Cairncross State Forest;
- east of the existing highway to the north of Telegraph Point;
- both sides of the existing highway in the vicinity of Cooperabung Creek Nature Reserve, Ballengarra State Forest and north of Mingaletta Road; and
- both sides of the existing highway in the vicinity of Kumbatine National Park and Maria River State Forest.

The Proponent has agreed that it would address the fragmentation of fauna habitat, the barrier effect of the road and road kill mortality by the provision of 67 fauna crossing locations to provide connectivity through structures such as dedicated fauna underpasses, combined drainage/ fauna movement culverts and aerial fauna crossings (rope bridges/ ladders and glider poles). The proposed fauna crossing measures would maintain linkages between vegetation communities and allow for the movement of fauna within the wildlife corridors. Fauna exclusion fencing would be used in conjunction with crossing structures to direct fauna to dedicated underpasses and combined culverts. The provision of fencing on both sides of the highway would reduce road kill mortality.

The EPA considered that the proposed fauna crossing structures would provide limited connectivity across the highway as it largely relied on infrequently placed combined structures along the alignment to facilitate fauna movement. It noted that the proposal traverses areas of intact vegetation with a wide variety of habitat types and considered the proposal for 9 dedicated fauna crossings (and several bridge crossings) over the length of the corridor would not cater for all habitat types (and associated range of fauna species). It recommended that combined structures in natural habitat areas and regional corridors should have minimum dimensions of 3.0 metres x 3.0 metres and be spaced at 500 metre intervals. In areas outside of regional corridors combined structures should have minimum dimensions of 2.4 metres x 2.4 metres. The EPA considered the retention of vegetation in the median and on road verges in areas of glider habitat was preferable to the provision of rope bridges and glider poles.

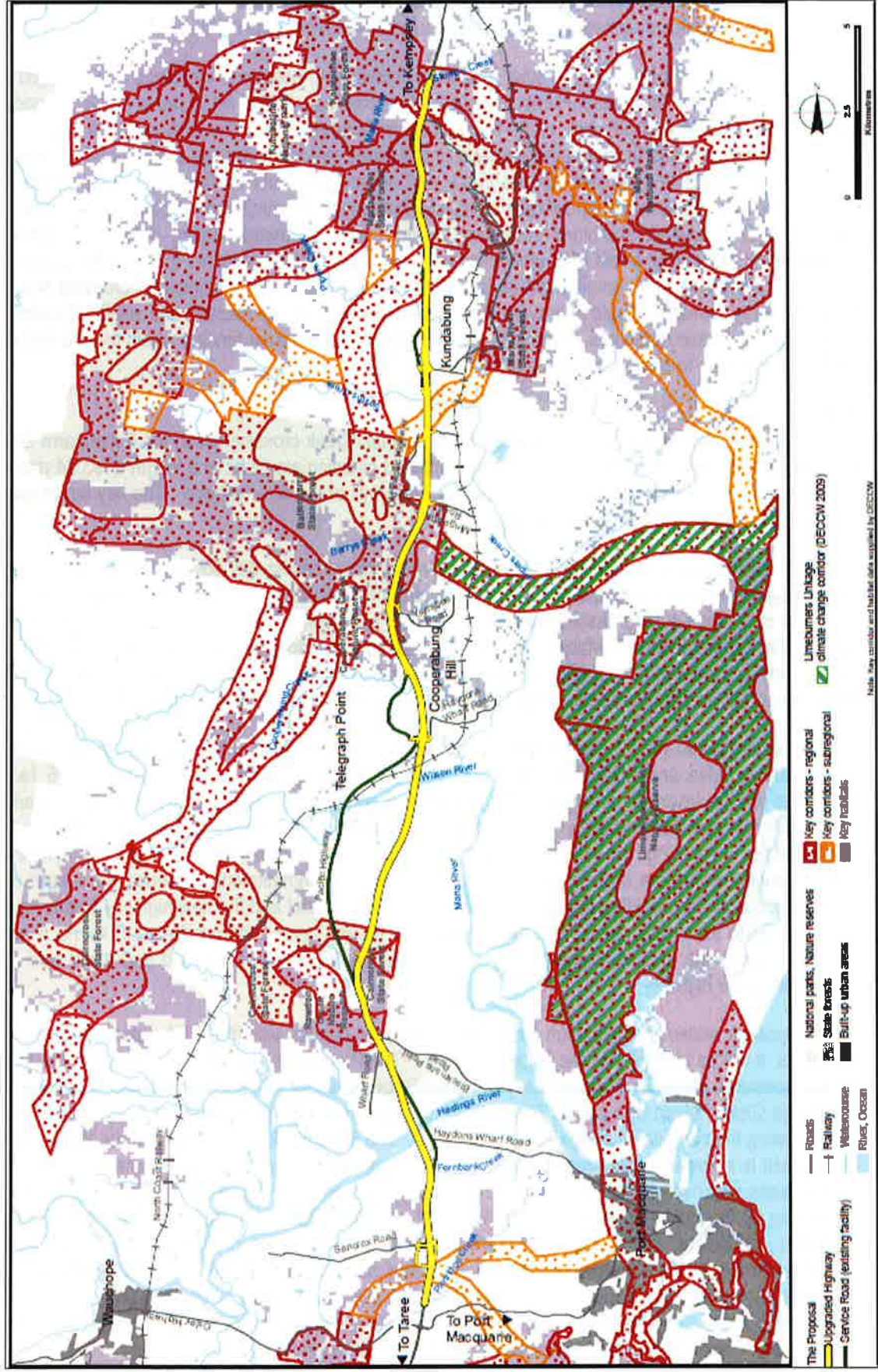
#### *Terrestrial Fauna*

In response to concerns about the adequacy of the proposed fauna crossing measures, the Proponent considered that it had maximised the size of crossings as far as possible within topographical constraints and engineering design requirements. The provision of culverts with minimum dimensions recommended by the EPA would result in a wider footprint, greater area of land impacted, more vegetation clearing, increased property acquisition, potentially greater heritage impacts, higher embankment levels, higher cost and potentially increased traffic noise and amenity impacts from alignment and grade changes that would be necessitated by changes to crossing designs. The Proponent states that of the 26 combined crossings proposed, 15 would have with minimum dimensions of 3.0 metres x 3.0 metres. Thirty eight fauna crossings would be located outside regional corridors of which 22 crossings meet or exceed the minimum dimensions recommended by the EPA. The Proponent indicated that it would further review the size of the crossing structures during detailed design in consultation with the EPA and DPI.

Following the lodgement of the Response to Submissions, the Proponent has undertaken additional investigation into the design of the fauna crossings in consultation with the EPA. As a result of these investigations, the Proponent has further refined the location and design of fauna crossings, particularly in areas of key regional habitat and wildlife corridors and with regard to the design principles recommended by the EPA. The Proponent has added 4 new dedicated fauna crossings in areas of key habitat and key regional/ sub regional corridors:

- Station 1030 in Sancrox Road sub-regional corridor;
- Station 9700 and 11670 – Rawdon Creek Nature Reserve and Cairncross State Forest key habitat and key regional corridor; and
- Station 23140 – Ballengarra State Forest key habitat and key regional corridor.

Figure 3 – Wildlife Corridors and Key Habitats



However, two dedicated crossings between Sancrox Road and Fernbank Creek would not be provided as development of land in the vicinity is proposed and the future viability of the crossings is uncertain. These crossings are not located in key habitat or wildlife corridors. Notwithstanding, the Proponent has changed two incidental crossings to combined crossings to maintain fauna connectivity in this area.

The Proponent has also changed 4 other incidental crossings to combined crossings and changed a combined crossing in the Maria River State Forest to a dedicated crossing. A final list of fauna crossings and dimensions agreed with the EPA was provided to the Department in October 2011. The EPA supports the revised designs, which include provisions for dry fauna passage in combined structures outside storm/ flood events, passage for fauna under bridges and commitments to implement design standards for fauna crossings where feasible and reasonable. The Department specifically notes the Proponent's commitment to consider measures to address the length of dedicated/ combined structures of more than 50 metres during detailed design by providing daylighting or excavation of old road embankments. The Department considers that the changes to the crossing designs, accompanied by commitments to implement the EPA's design principles for crossing structures where feasible and reasonable, would improve the overall connectivity of key habitats and wildlife corridors across the road corridor. These measures, along with the implementation of fauna fencing would ensure that opportunities for terrestrial fauna to cross the road corridor are maintained.

#### *Barrys Creek*

The Proponent proposed a 5 cell box culvert for the Barrys Creek crossing within the Ballengarra State Forest, a key habitat and regional wildlife corridor. The combined crossing would have a length of 93.24 metres, crossing both the existing Pacific Highway and the dual carriageways of the new highway. The key target species for this crossing are Koalas and Spotted-tailed Quoll.

The EPA raised concerns that the proposed design of the crossing did not guarantee dry passage and had minimal light penetration and aperture due to the length of the culvert. It noted the Proponent's response that the provision of additional underpasses located to the north and south of Barrys Creek, raising the outer cells of the culvert and the provision of surface ledges for dry passage was not possible. The EPA also acknowledged the Proponent's proposal to investigate the option of daylighting the culverts between the new carriageways and the service road but had reservations as to whether it was possible and if so whether it would be effective.

The Proponent subsequently reviewed the fauna crossing opportunities in the Ballengarra State Forest between Cooperabung Drive and Mingaletta Road. In this 5.3 kilometre section of the highway, 15 fauna crossing structures will be provided, consisting of 4 dedicated, 5 combined (including Barrys Creek), 1 overbridge and 5 incidental crossings (on average every 384 metres). In addition, in the area to the south of Barrys Creek a new dedicated fauna crossing has been added and an incidental crossing has been changed to a combined crossing. The Proponent considers that these changes, along with the commitment to reduce the length of the Barrys Creek box culvert by providing daylighting between the service road and the new highway (reducing the length of the crossing to 57 metres across the highway and 29 metres across the service road with a 6 metre daylight section between the two) will appropriately address the barrier effect of the road and allow safe movement of fauna across the highway.

The Proponent states that although the culvert does not comply with the EPA's design principles for fauna crossings, it will be effective for the targeted species. The Proponent has cited a draft report on an investigation by the Australian Museum Business Services (AMBS) of the impact of roads on Koalas to support the usage of the Barrys Creek culvert by Koalas. The AMBS investigation included monitoring of fauna crossings, both before and following the completion of the Bonville Upgrade. The Bonville Upgrade traversed the Bongil Bongil National Park which is a known koala area. The Bonville Upgrade included a number of fauna crossings: box culverts, underpasses and overpasses, including a 100 metre single cell box culvert of 3 metres x 3 metres at Raleigh. Monitoring of the culvert between December 2008 and April 2011 recorded 4 definite and 2 likely complete passages by Koalas and 7 records where complete passage was unlikely or the Koala returned. The investigation found that underpasses (both constructed culverts and natural underpasses) do work in providing safe dispersal routes for Koalas to cross the highway and that the length of underpasses may be a factor in determining whether Koalas make a successful crossing. However, the study did not determine whether natural landscape or constructed culvert underpasses work best, although both do work.

The EPA is concerned that the proposed length of the Barrys Creek culvert will not effectively facilitate fauna movement, particularly for Koalas and Quolls and is unconvinced that lengthy culverts, particularly those with lengths of more than 50 metres, would be effective for the target species. The EPA states that the location and design of fauna structures should be based on ecological data and values and incorporate designs that optimise effective fauna movement, which according to current research and literature, are bridge structures. The EPA has referenced a number of policies, management plans and guidelines which reinforces the importance of designing the highway to provide effective passage for koalas. The references have a key principle or objective of protecting wildlife from the adverse consequences of the presence of a road. The provision of safe crossing structures and barrier structures will ensure movement of fauna along wildlife corridors and access to habitats. The response of road authorities in Australia and overseas is to provide crossing structures in the form of underpasses (e.g. culverts, tunnels, bridges) and overpasses (e.g. land bridges, canopy bridges, glider poles). These are provided in conjunction with barriers and structures/ fences to guide fauna to safe crossing locations. The key design features of fauna underpass structures is the "openness ratio" of the underpass (i.e. length x width x height), presence of habitat and wildlife fencing. For culvert crossings they should be large enough and short enough to allow daylight to be viewed through the structure.

The Department notes that the design of the Barrys Creek culvert meets the EPA's minimum height and width dimensions of 3 metres x 3 metres for culverts, however, the length of 57 metres exceeds the recommended maximum culvert length of 50 metres. The Department considers the Proponent has demonstrated, through the investigation of the impact of roads on koalas, that a range of fauna species (including koalas) have been recorded making a complete passage of a 100 metre long box culvert in the Bonville Upgrade. The Department accepts that box culvert underpasses, including those up to 100 metres in length, have been proven to be used by fauna (including koalas) and would provide opportunities for fauna to access habitat on either side of a highway. The Bonville investigation has demonstrated that a lengthy culvert has been effective in enabling Koalas to cross a highway and that with the Proponent's commitment to provide daylighting between the service road and new carriageways, the shorter culverts would likely increase the effectiveness of the fauna crossing. The Department is satisfied that the Barrys Creek crossing is consistent with the references cited by the EPA in terms of providing opportunities for fauna to cross highways to access habitat and move along wildlife corridors.

The Proponent has also committed to investigate an area to the south of Barrys Creek for median widening as an alternative to aerial crossing structures for glider species. The Proponent has agreed to extend the median widening investigation area to include Barrys Creek and the feasibility of further reducing the length of the culverts across the new carriageways by providing a widened vegetated median between the new carriageways. The recommended conditions of approval require the Proponent to report the results of the median widening investigation to the Director General.

There are also a number of fauna crossings within the Ballengarra State Forest with lengths in excess of 50 metres. The Proponent has committed to investigate at the detailed design stage the provision of daylighting or excavation of old road embankments, to reduce the length of these culverts. The Department supports these commitments and has recommended a condition of approval to ensure that the Proponent, in reviewing the design of crossings that do not comply with the design principles agreed with the EPA and/or location of fauna crossings have changed, that the final design or location would result in an acceptable biodiversity outcome. The Proponent would be required to submit the final design of such crossings to the Director General.

#### *Arboreal Fauna*

The EA proposed a combination of rope ladders (for species such as possums and gliders) and glider poles (glider species) for arboreal species which do not use underpasses. Indicative locations for glider crossings were identified, with the actual number, location and design to be determined by an ecologist following vegetation clearing as part of detailed design. The EA also stated that further investigation of the potential for median widening at glider habitat locations would be undertaken and provided where it is feasible and reasonable.

In the Response to Submissions the Proponent committed to investigate the provision of vegetated medians as an alternative to the provision of glider poles to provide safe crossing opportunities for gliding species in glider habitat. The retention of mature vegetation between the carriageways would allow the highway to be crossed in a staged manner. The investigation would involve three steps:

- preliminary scoping investigation to identify potential glider crossing locations and the feasibility of median widening;

- detailed investigation into the suitability of the locations for widened median; and
- finalisation and approval of locations identified in the detailed investigation for median widening.

The preliminary scoping investigation (contained in the Response to Submissions) recommended detailed investigation of three locations (Cairncross station 10000 to 11600, Ballengarra station 23200 to 23940 and Maria River station 33760 to 34380) for the suitability of a widened and vegetated median. The detailed investigation of these locations for median widening would be carried out in consultation with the EPA and DPI (Forests).

The EPA supports the commitment and has recommended extension of the investigation area within Ballengarra State Forest to station 24600. The EPA states the extension is warranted as the area contains habitat for Yellow-bellied and Squirrel gliders. The Proponent states that the extension is not feasible due to the topography as the highway is in a cutting at this location. Notwithstanding, the Proponent has subsequently agreed to extend the median widening investigation to the north of Barrys Creek to station 24100. This would allow the investigation of an alternate fauna crossing design for Barrys Creek. The Department considers there is the potential for the length of the proposed culvert crossing of the new carriageways to be reduced with a widened median.

The Department supports the investigation of median widening to provide, where feasible and reasonable, and the retention of a widened vegetated medians as an alternative to the provision of arboreal crossing structures such as rope bridges and glider poles. The retention of mature vegetation on the edge of the carriageways and existing vegetation within a widened median would enable glider species to cross the highway in a staged manner. The Department has recommended a condition which requires the Proponent to submit a report on the investigation to the Director General and the final design of the glider crossing measures.

### *Conclusion*

The Department acknowledges that the provision of fauna crossing structures could adequately maintain connectivity between habitats on both sides of the alignment, particularly where the proposal deviates through key habitat and wildlife corridors. Monitoring of fauna on completed sections of the Pacific Highway Upgrade has shown usage of fauna underpasses by a diverse range of fauna species. However, the effectiveness of crossing structures is dependent on its location in terms of the range of fauna species in the adjacent habitat area and the design of the crossing point to optimise the opportunities for species to utilise the structure.

The Department is satisfied that the Proponent has given due regard to the incorporation of measures in the proposal to maximise the connectivity across the road corridor to key habitat and wildlife corridors, subject to further investigation of glider crossings and the Barrys Creek crossing. Notwithstanding these measures, the Department accepts that it would not be possible for the crossing structures to completely mitigate the barrier effect of the highway and there would be some residual impacts to fauna. Consequently the Department has recommended conditions which require the Proponent to:

- actively rehabilitate, regenerate and/ or revegetate areas impacted by construction works with native species appropriate to the area;
- implement a nest box strategy to provide replacement hollows for the clearing of hollow bearing trees; and
- develop and implement an ecological monitoring program to monitor the effectiveness of the fauna crossings.

### Biodiversity Offsets

The Proponent would develop an offset strategy to address the residual impacts of the proposal, being the loss and degradation of 204.3 hectares of native vegetation, including 37.1 hectares of EEC listed under the TSC Act. The offset strategy could include:

- securing additional native vegetation through land purchase and protection through a legal instrument for conservation purposes; and/ or
- additional revegetation of land in strategic locations; and/ or
- funding of research into the rehabilitation and protection of threatened species.

The quantum of the offset would be based on a set-ratio approach to offset impacts on EEC and broader native vegetation types on a like for like basis. Based on the offset ratios established for recent Pacific Highway Upgrade approvals, the Proponent would offset clearing of native vegetation at a ratio of 4:1 for clearing of areas of high conservation value, including EEC. The indicative offset requirements for the proposal are approximately 334 hectares of native vegetation and approximately 148 hectares of EEC. The offset requirements would be

located within the North Coast Bioregion and the Proponent would aim to provide like for like based on the broad vegetation types directly impacted by the proposal. Properties within a 30 kilometre radius of the project would be investigated, extending to a 100 kilometre radius with the agreement of the EPA and the Department if no suitable offset could be found within 30 kilometres.

The EPA supported the development of a biodiversity offset strategy and requested that the Proponent engage early in the process to develop the strategy.

The Department accepts that the Proponent has to date successfully achieved offsets for significant sections of the PHUP, however, given the extent and significance of vegetation clearing associated with the project (i.e. approximately 204 hectares of native vegetation including approximately 37 hectares of EECs), the Department required the Proponent to demonstrate that offset options were available for the project. The Proponent has submitted additional information, outlining land availability within a 30-100 kilometre radius of the project. Based on this information, the Department is satisfied that available vegetated land containing the required vegetation types/ habitat values exist in close proximity to the project and therefore could be used to offset the project's native vegetation impacts.

To ensure that any offset is commensurate with the potential impacts of the proposal, the Department recommends a two-staged approach to finalising the offset package. The first stage requires the Proponent to develop a strategy framework to be finalised and approved by the Director General before construction commences in areas that would affect threatened species or endangered ecological communities. This approach is consistent with the recent approvals for Pacific Highway Upgrade projects. The second stage requires implementation of the approved strategy to determine the final offset package. The composition of the final package, including any monitoring or other ameliorative or management measures must be submitted for the Director General's approval within 2 years of construction commencing.

## 5.2 Noise and Vibration

### Issue

The majority of the proposal follows the alignment of the existing highway, except for two sections (Hastings River and Telegraph Point) which deviate from the existing highway. In the vicinity of the Hasting River the proposal deviates to the west of the existing highway and further north, the village of Telegraph Point is bypassed with the proposal deviating to the east across the Wilson River floodplain. The main residential areas are the villages of Telegraph Point and Kundabung, with scattered residential/ rural residential development in other parts of the proposal area. Rural, state forest and conservation areas are the main land uses, with commercial and industrial uses scattered along the existing highway, mainly south of Telegraph Point. Traffic noise is the dominant day and night time noise environment along the existing highway. At locations distant to the highway, background noise levels are typical of rural areas. Most residences have exposure to existing traffic noise, except for a small number of residences in the Telegraph Point bypass section with little or no exposure to road traffic noise.

### Operational Noise

Operational noise levels have been assessed against the Environment Protection Authority's *Environmental Criteria for Road Traffic Noise* (ECRTN) criteria for a new freeway or redevelopment of an existing freeway. The relevant criterion for residential receivers is set out in Table 4. Where the criteria are already exceeded, then the proposal should not increase existing noise levels by more than 0.5 dB(A) for a new freeway and more than 2 dB(A) for the redevelopment of an existing freeway.

The ECRTN criterion applies to the predicted noise level at opening of the proposal and 10 years after opening. The application of the ECRTN criteria and establishment of feasible and reasonable noise mitigation measures are guided by the Road and Traffic Authority's *Environmental Noise Management Manual* (ENMM). The existing noise level is shown in Table 3 as future existing levels, being noise levels due to traffic on existing roads as predicted at a time immediately before opening of the proposal. For the purposes of the operational noise assessment, future existing levels have been adopted for year 2016.

**Table 3 – ECRTN Criteria for Operational Traffic Noise**

Type of development	Noise level criterion		Where criteria are already exceeded	Proposal section
	Day (7am-10pm) L <sub>Aeq</sub> (15 hour)	Night (10pm-7am) L <sub>Aeq</sub> (9 hour)		
New freeway or arterial road corridor	55 dB(A)	50 dB(A)	Not increase existing noise levels by more than 0.5 dB(A)	<ul style="list-style-type: none"> <li>Hastings River deviation</li> <li>Telegraph Point bypass</li> <li>Part of the northern upgrade within Maria River State Forest</li> </ul>
Redevelopment of existing freeway/ arterial road	60 dB(A)	55 dB(A)	Not increase existing noise levels by more than 2 dB(A)	<ul style="list-style-type: none"> <li>Southern upgrade section</li> <li>Part of the northern upgrade section (Haydons Wharf Road half interchange to Maria River State Forest)</li> </ul>

Operational noise level predictions for year 2016 (Future Existing) and year 2026 (Future Design) were made for 352 residences in 22 noise catchment areas. **Table 4** shows the number of residences in each noise catchment that are predicted to be exposed to noise levels that are equal to or exceed the relevant ECRTN night time noise criteria under Future Existing and Future Design scenarios and the number that would require noise mitigation in terms of the ENMM.

**Table 4 – Predicted Exceedance of ECRTN Levels**

Noise Catchment Area	Future Existing 2016	Future Design 2026	Future Design 2026 – require mitigation	Future Design 2026– acute noise levels
1	8	9	7	5
2	1	2	2	-
3	5	6	6	5
4	5	5	5	5
5	1	2	2	-
6	2	6	4	1
7	-	2	2	-
8	1	3	3	1
9	-	1	1	-
10	-	1	1	-
11	3	3	3	2
12	6	8	6	4
13	6	6	4	1
14	-	3	3	1
15	1	9	8	1
16	76	28	5	-
17	25	27	13	-
18	-	1	1	-
19	1	7	6	1
20	11	16	10	3
21	3	3	-	-
22	2	3	-	-
<b>TOTAL</b>	<b>157</b>	<b>151</b>	<b>92</b>	<b>30</b>

The noise assessment predicted that under the Future Existing scenario (i.e. without the proposed upgrade), 157 residences would be exposed to traffic noise levels (from expected traffic growth) equal to or above the relevant night time ECRTN criteria. Under the proposal, 5 noise catchment areas comprising approximately 31 residences will be subject to a major realignment of the highway.

With the proposal (Future Design), 151 residences are predicted to be exposed to noise levels that equal or above the ECRTN night time criteria. Of these, 92 residences would be considered for noise mitigation measures under the ENMM, with a maximum exceedance of up to 12.5 dB(A). 30 of these residences would experience acute noise levels, being levels equal to or greater than 60 dB(A) during the night. The Proponent has made a commitment to provide architectural treatment to manage predicted exceedances of the operational noise criteria.

#### Construction Noise and Vibration

The assessment of construction noise and vibration impacts on residences has considered the Department of Environment and Conservation's *Interim Construction Noise Guideline* (ICNG) and *Assessing Vibration: A Technical Guideline* and the Australian and New Zealand Environment and Conservation Council's (ANZECC) *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration*.

#### *Construction Noise Impacts*

The ICNG identifies noise management levels for construction noise at residential and other sensitive receivers, the relevant noise management goals for the proposal are shown in **Table 5**. The ICNG states that where the noise affected level is exceeded (i.e. greater than 10 dB(A) above background noise level) then all feasible and reasonable work practices to minimise noise should be applied and all potentially affected residents should be informed of the nature of the works, expected noise levels, duration of works and project contact details. Where noise levels exceed 75 dB(A), respite periods which restrict the hours when noisy activities can occur may be appropriate for highly noise affected receivers. The relevant criteria for educational facilities is an internal noise level of 50 dB(A)  $L_{Aeq(15\text{-minute})}$  and for places of worship an internal noise level of 45 dB(A)  $L_{Aeq(15\text{-minute})}$ .

**Table 5 - Construction Noise Management Levels for Residential Receivers**

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

The Proponent states the noise level experienced at any sensitive receiver along the alignment would depend on many factors, such as distance to the construction site, shielding between the site and the residence (topography and whether the activity was in a cutting) and the nature of the activity. **Table 6** shows the range of noise levels that could be expected from the different construction activities.

**Table 6 – Predicted Noise Levels of Construction Activities**

Activity	Expected Sound Power Level (SWL)	
	At 30 metres (dB(A))	At 150 metres (dB(A))
<b>Alignment corridor</b>		
Site establishment	64-74	39-49
Vegetation clearing	65-75	40-50
Bulk earthworks	68-78	43-53
	+ 6 dB(A) when using rock hammer/ air track drills	
Drainage works	65-75	40-50
Bridge and interchange works	69-79	44-54
	+5 dB(A) when driven piles	
Milling and paving	67-77	52-52
	+3 dB(A) when using jackhammers and concrete saws	
Landscaping	63-73	38-48
<b>Ancillary facilities</b>		
Concrete batch plants/ major compounds	67-77	42-52
Crushing plants	69-79	44-54
Minor compounds	up to 75	up to 49

The construction noise management levels for residences are shown in **Table 7**.

**Table 7 – Construction Noise Management Levels**

Location		Construction Noise Criteria dB(A) $L_{Aeq}$ (15- minute)		
		Day	Evening	Night
Southern upgrade section	Closer than 500 metres	55	45	45
	Further than 500 metres	46	41	41
Hastings River deviation section		55	45	45
Telegraph Point bypass section		46	41	41
Northern upgrade section	Closer than 500 metres	55	45	45
	Further than 500 metres	46	41	41

Based on the construction activities shown in Table 6 and the construction noise management levels shown in Table 7, the potential construction noise impacts on sensitive receivers are:

- southern upgrade section - compliance with the construction criteria would be achieved at residences more than 150 metres from the alignment corridor - there are no residences within 150 metres;
- Hastings River deviation section - the criteria would only be met for some construction activities (e.g. site establishment, vegetation clearing, drainage works) at residences more than 150-200 metres away - 7 residences are located within 200 metres;
- Telegraph Point bypass section – compliance with the criteria at residences located more than 150 metres away - 11 residences are located within 200 metres. The construction criteria (internal noise) for schools and churches are achieved at the Telegraph Point primary school (1.8 kilometres to the west) and

the Telegraph Point church (1.4 kilometres to the west). Compliance with the criteria for ancillary facilities is achieved at residences located more than 150-200 metres, with topographical shielding; and

- northern upgrade section – compliance with the criteria at residences more than 150 metres from the construction corridor - 40 residences are located within 150 metres. Compliance with the criteria for ancillary facilities is achieved at residences located more than 150-200 metres away.

Noise exceedances of up to 33 dB(A) could be expected at the nearest receiver during the day, and up to 23 dB(A) at receivers located between 30 and 150 metres from the project. No exceedances would be experienced at receivers more than 150 – 200 metres distant. Similarly, compliance with the noise goals would be achieved at receivers more than 150 metres from a batch plant, crushing plant and compound. The Proponent has committed to implement noise management and mitigation measures and prepare a construction noise management plan to manage construction noise impacts.

#### *Vibration Impacts*

Construction activities have the potential to generate vibration levels which could impact on nearby structures and buildings. These activities include concrete saw cutting, vibratory rollers, hydraulic hammers and impact pile driving. The relevant standards for assessment of vibration levels in human comfort and building damage are shown in **Table 8**. The human comfort ground vibration criteria for a residential receiver is 0.28 mm/s (daytime) and 5 mm/s for damage to a building/ structure.

**Table 8 – Vibration Criteria**

Receiver	Human Comfort Peak particle velocity (mm/s)	Building Damage Peak particle velocity (mm/s)
Residential building – daytime	0.28	5
Residential building – night-time	0.20	5
Office/ commercial building – daytime	0.56	-
Heritage building	-	2.5

The noise assessment states that ground vibration levels from the use of hydraulic hammers, vibratory rollers and impact driving would be perceptible and could exceed the criteria for human comfort at residential receivers close to the alignment. The vibration levels generated by several typical construction activities are shown in **Table 9**. In particular, hydraulic hammers, vibratory rollers and impact pile driving within 30 metres of any residence are expected to exceed the human comfort level criteria. The Proponent states that vibration generated by mobile equipment such as vibratory rollers is temporary and would reduce as construction activities move away from residences. However, for activities such as pile driving and hydraulic hammering, construction impacts may be experienced for the duration of the activity at that location.

**Table 9 – Typical Vibration Levels from Construction Equipment**

Construction equipment	Peak particle velocity (mm/s)		
	10 metres	20 metres	30 metres
Concrete saw cutting	0.5	0.3	0.2
Vibratory roller	2.0-2.4	0.4-1.2	0.2-0.8
Hydraulic hammer	3	1.5	0.4
Impact pile driver	3.3	0.95	0.45

The assessment concluded that it would be unlikely that the use of such construction equipment would result in vibration levels that could cause damage to buildings. Pile driving (the highest vibration generating activity) is predicted to generate vibration levels of up to 3.3 mm/s at a distance of 10 metres. This is much lower than the 5 mm/s vibration level which could cause damage to a building or structure. At a distance of 30 metres from the pile driver, the level of ground vibration reduces to 0.45 mm/s. There are approximately 22 residences within 50

metres of the alignment corridor. The vibration levels at this distance would be minimal and well below the relevant structural damage levels.

The proposal includes a number of cuttings through the Cooperabung Hill and Maria River State Forest which would require excavation, and which, depending on the type of rock, may require blasting. An assessment of blasting impacts has been carried out, which concluded that compliance with the ANZECC overpressure guidelines (no more than 5% of blasts in any one year should exceed 115 dBL (none to exceed 120 dBL)) would be achieved at residences more than 700 metres from the blast site. Approximately 11 residences are located between 75 to 570 metres from a potential blast site. In relation to the allowable ground vibration levels (no more than 5% of blasts in any one year should exceed 5 mm/s peak particle velocity (none to exceed 10 mm/s)) the assessment concluded the ANZECC ground vibration levels would be achievable at all residences more than 170 metres from the potential blast site (3 residences are located closer than 170 metres). The Proponent would implement specific blast management strategies to ensure compliance with the blasting criteria. Alternative rock removal methods such as rock hammering and non-explosive rock splitting may be considered where residences are close to blasting locations.

## Department's Consideration

### Operational Noise

The ENMM provides guidance for selecting and designing feasible and reasonable noise management measures to reduce the impact of road traffic noise. These measures could include low noise pavement surfaces, noise mounds/ barriers at the road side or architectural treatment of residences. The Proponent has undertaken an assessment of feasible and reasonable noise mitigation measures, which concluded that low noise pavements were not feasible or reasonable due to the isolated nature of the affected residences. Similarly, noise mounds/ barriers were considered to be not feasible and reasonable because of the isolated nature of the majority of the residences or difficulties because of topographical features or constraints along the corridor. The Proponent investigated the provision of a noise wall for a group of 13 residences to the south of the Wilson River, located between the existing highway and the proposal (noise catchment area 17). The investigations concluded a noise wall would need to be 4.5 metres in height, 2.2 kilometres long and located above the level of the pavement on the edge of the road embankment to provide the necessary reduction in noise levels. The Proponent considered a noise wall at this location was not feasible or reasonable because of the:

- potential adverse impacts the wall would cause to flooding and drainage in the area;
- potential for floodwater to scour the embankment which would damage the pavement and destabilise the noise wall on the embankment;
- significant visual impact; and
- difficulties in constructing and maintaining the noise wall.

The architectural treatment of residences was considered to be the only feasible and reasonable noise management measure to ensure compliance with the ECRTN noise goals and would be determined in consultation with property owners following detailed design. The Proponent states that architectural treatment of a residence (such as fresh air ventilation, sealing of wall vents and upgrading window and door seals) could provide reductions in internal noise levels of up to 10 dB(A).

The EPA requested further information to support the decision for the preference for receiver based mitigation measures rather than at source measures. The Proponent responded that the decision to proceed with receiver based mitigation was based on the scattered and isolated nature of residences along the alignment (92 residences spread over the 37 kilometre length of the proposal) and it would not be feasible and reasonable to provide at source measures for these receivers. The Proponent has committed to review the operational noise mitigation measures based on detailed design and undertake monitoring of operational noise levels 12 months after opening of the proposal to traffic.

The Department is satisfied that the provision of at property architectural treatment is appropriate in this instance given the isolated nature of the residences along the corridor and that this is consistent with established guidelines and road traffic noise mitigation practices. The Department acknowledges that the provision of low noise pavement for single receivers is not cost effective and therefore not feasible and reasonable and accepts that the provision of noise walls for a group of receivers to the south of Telegraph Point is not feasible and reasonable for visual and urban design reasons and the hydrological nature of the area (i.e. subject to flooding).

New rest areas are proposed near Mingaletta Road. One submission raised concerns about potential noise from trucks using the rest areas. The Proponent states the location of the rest areas has been selected to minimise impacts on residents. The northbound rest area is approximately 500 metres from the nearest residence and the southbound rest area approximately 700 metres. The noise assessment predicted noise levels of 53.6 dB(A) and 49.3 dB(A), respectively for these receivers, which are below the relevant operational noise criteria.

The proposal includes a new service road network, comprising sections of the existing highway, local roads and new roads. The noise environment of the sections of the service road which comprise the existing highway is dominated by high traffic noise levels. Traffic noise is predicted to decrease, particularly for receivers to the east of the existing highway between Fernbank Creek and Blackmans Point Road and in the bypassed section of Telegraph Point as a result of substantial decreases in the volume of traffic that would use the existing highway. However, receivers located between the existing highway and the upgrade highway would continue to be exposed to varying levels of road traffic noise. Between Haydons Wharf Road and Cooperabung Hill and in the vicinity of Kundabung, local roads are proposed to be used for the service road. The noise environment in these areas is dominated by the existing highway. Although there is likely to be a minor increase in traffic noise (less than 5 dB(A) increase) this needs to be considered in the context of the low volume of local traffic (around 500 vehicles per day). The noise assessment considered the minor increase in noise levels was not significant, particularly as the highway would be the dominant noise for the majority of residential receivers. Notwithstanding, the Proponent would implement noise mitigation measures during detailed design in consultation with affected receivers.

Based on the above, the Department is satisfied with the operational noise assessment and considers that it is sufficiently robust for the assessment of the proposal. Notwithstanding, the Department accepts that the project should be subject to further refinement at detailed design which has the potential to change current predicted noise outcomes. Consequently, the Department has recommended a two stage approach for the review of operational noise measures. The first stage requires the Proponent to prepare and submit to the Director General within six months of construction commencing, a review of the proposed operational noise mitigation measures based on the detailed design rather than those put forward in the EA. This investigation would confirm (based on detailed design) that architectural treatment remains the most feasible and reasonable mitigation measure, or whether other measures may be more suitable. The second stage would require the Proponent to undertake monitoring of actual noise levels twelve months after the opening of the proposal to traffic to confirm whether the noise mitigation measures applied to the potentially noise affected residences are effective and that predicted noise levels are being achieved. Should monitoring indicate that predicted noise levels are not being achieved, then the noise measures must be reviewed and further feasible and reasonable measures implemented where available and appropriate.

### Construction Noise

The Department notes that construction of linear infrastructure such as roads is such that activities would progressively move along the proposal route and that the predicted impacts would typically be for a limited time at any one receiver rather than continuous noise for the duration of the construction period. Exceptions would include the construction of bridges, interchanges and major cut and fill locations. 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). Although significant exceedances of the construction noise goals are predicted, it should be noted that these exceedances represent worst case maximum impact scenarios where:

- plant and equipment would be operating at maximum sound power levels;
- all plant and equipment would be operating at maximum power at the same time; and
- all plant and equipment would be present at a particular location at the same time.

The Department notes that the above scenarios are unlikely to occur and considers that the maximum predicted noise levels are unlikely to be experienced in reality. Although there may be short duration, high impact/ intensity events (such as pile driving or rock breaking), the Department recognises that these could be managed through scheduling of activities, the provision of respite periods and implementation of appropriate mitigation measures to minimise impacts on sensitive receivers. The Department considers that the proposed construction noise management measures are appropriate to manage noise impacts as the application of site specific management plans have proven to be effective for other large scale linear infrastructure projects and has recommended conditions to reinforce the Proponent's commitments in this regard.

### *Construction Hours*

The ICNG recommends the following standard construction hours: 7.00am to 6.00pm Monday to Friday, 8.00am to 1.00pm on Saturdays and no works on Sundays or public holidays. The Proponent has requested extended construction hours of 6.00am to 6.00pm Monday to Friday, 7.00am to 4.00pm on Saturdays and no works on Sundays and public holidays. The Proponent submits that longer construction hours would enable the proposal to be completed in a shorter time (potentially 3-6 month reduction in the total construction duration) which would provide benefits to the community through reduced exposure to construction noise impacts and improved safety to the travelling public through the earlier opening of the proposal.

The Proponent would implement a review procedure to ensure that the proposed construction hours do not impose unacceptable impacts on sensitive receivers. In the event that unacceptable noise impacts are confirmed, the Proponent would revert to the ICNG's construction hours in the area of concern for that particular construction activity.

The submission from the EPA noted that details of construction practices, work methods and compound designs were not known and that the community has not been consulted on the specifics of the construction process and it would be premature to agree to the proposed hours of construction. Furthermore, the ICNG provided a framework for consideration of out-of-hours construction work.

The Proponent states that the EA identified longer working hours and that no individual submissions were received raising concerns regarding the proposed construction hours during the exhibition of the proposal. In addition, a process to review the proposed construction hours would be developed as part of the noise and vibration management plan for the proposal, and where feasible, the implementation of operational noise mitigation measures would be considered prior to the commencement of construction to minimise noise impacts.

The Department does not consider that the proposed construction hours are sufficiently justified for the entire construction period as the Proponent has yet to finalise its construction methodology and that the proposal may change through design refinements. The Proponent has indicated the proposal may be staged which could result in impacts over a greater period of time at receivers near the interface between two stages. Notwithstanding, the Department notes that sections of the proposal traverse forested areas (Cairncross and Maria River state forests) or through areas where residential receivers are located a considerable distance from the proposed alignment. In these areas it would be appropriate for a trial of the proposed construction hours, subject to review should any complaints be received. The Proponent has committed to revert to standard hours should complaints be unresolved in an area for a particular activity. The Department supports this commitment, however, the basis for reversion to the standard construction hours should not be for a particular construction activity but for all subsequent construction work.

The Department has therefore recommended conditions which permit construction between 7.00am and 6.00pm Monday to Friday and 8.00am to 1.00pm on Saturdays and extended construction hours where the alignment traverses forested areas or is located more than 200 metres from the nearest sensitive receiver. The recommended conditions also include a process for the consideration of work outside the standard construction hours on an individual basis subject to justification and consultation with the EPA and potentially affected receivers.

### *Construction Vibration*

The Proponent has committed to implement best practice measures such as strict control of plugging explosives in blast holes to improve blast performance, adequate timing sequences for blasts and restriction of blasting under adverse weather conditions to ensure compliance with the ANZECC guidelines and develop a blasting management plan for the proposal. The Department is satisfied with this approach and has recommended conditions which require that any damage to structures or residences caused by blasting (and other construction related activities) would be repaired by the Proponent at no cost to the owner.

The blasting criteria for the project is based on the ground vibration and over pressure criteria outlined in the ANZECC *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration* (which are based on human comfort rather than structural damage considerations), being: 5 mm/s peak particle velocity for 95% of blasts and no blasts to exceed 10 mm/s, and 115 dBL air blast overpressure for 95% of blasts and no blasts to exceed 120 dBL. The Department has also introduced a degree of flexibility within

these requirements, based on recent projects, where landowner agreements have been reached to exceed the project's blasting criteria. Under the Department's recommended conditions, blast criteria applying at receiver could be increased with the agreement of the receiver, to a maximum ground vibration limit of 25 mm/s or a maximum air blast overpressure level of 125dB<sub>L</sub>. Such an increase would enable blasting to exceed the ANZECC human comfort levels (with the agreement of landowners) but not exceed levels that are likely to pose a risk of damage to a building, as recommended in Australia Standard AS 2187.2-2006 *Explosives – Storage, Transport and Use*. In the event that agreements are not reached, levels will remain at the conservative ANZECC levels which form the basis of the conditions.

### 5.3 Soil, Water and Hydrology

#### Issue

The proposal is located in the catchment of the Hastings River, which drains an area of approximately 3700 square kilometres and incorporates the tributaries of the Wilson and Maria rivers. The proposal traverses the Hastings River floodplain for approximately 2 kilometres and the Wilson River floodplain for approximately 3 kilometres. A number of smaller creeks and drainage lines are crossed by the proposal, including the Cooperabung, Fernbank, Smiths, Stumpy, Barrys and Pipers creeks. The waterways crossed by the proposal are shown in **Figure 4**.

The Hastings and Wilson rivers at the proposed bridge crossings are within the tidal influence of the Hastings River estuary. The water quality of the catchment is generally good and the Hastings River is used for commercial oyster production. Groundwater in the area is located in semi-confined bedrock aquifers which underlie the elevated Cooperabung Hill and Maria River State Forest areas and unconfined alluvial aquifers under the floodplains of the Hastings and Wilson rivers and the other smaller waterways. The groundwater quality of both aquifers is variable, with reported salinity concentrations ranging from fresh (350 milligrams per litre) to brackish (3000 milligrams per litre). Parts of the Hastings, Wilson and Maria river floodplains are impacted by acid sulfate soils.

The Hastings and Wilson rivers are characterised by extensive flooding across their respective floodplains. The floodplain of the Hastings River is located on both sides of the river and Fernbank Creek, located on the southern floodplain is hydraulically linked with the Hastings River. The Wilson River floodplain is located on the southern side of the river. The Wilson and Maria rivers merge to form a common floodplain approximately 3.5 kilometres downstream of the existing highway crossing. Flooding behaviour within the Maria River and Cooperabung, Pipers, Smiths and Stumpy creeks are influenced by narrow floodplains within confined valleys which are largely vegetated. Velocities tend to be higher than floodwaters on the river floodplain systems. Flood relief structures would be provided on the embankments across the Hastings and Wilson rivers to minimise impacts on drainage and floodwaters.

The Proponent has identified temporary impacts on waterways from construction of the proposal, particularly increased potential for erosion and release of sediments into rivers, creeks and wetlands, bed and bank erosion from bridge and culvert construction and release of acidic groundwater from disturbance to acid sulfate soils. Groundwater impacts could include drawdown of groundwater from cuttings, dewatering and extraction of groundwater during construction and impediments to groundwater flows. The Proponent would implement a range of best practice management and mitigation measures to manage construction impacts on water quality, including the preparation and implementation of a construction environmental management plan and the monitoring of water quality and levels.



**Table 10 – Predicted Impacts on Waterways**

Waterway	1:5 year ARI	1:20 year ARI	1:100 year ARI	Extreme Flood Event	Period of Inundation	Number of Properties Impacted	Floodwater Velocity
Hastings River: - floodplain	20 mm	30 mm	30 - 50 mm	290 mm	Currently 48 hours in 1:100 year ARI	Currently 17 properties in 1:100 year ARI	Currently 1.4 m/s
- Rawdon Island	10 mm	10 mm	20 mm	310 mm	+ 1 hour	No additional properties	1.7 m/s
- climate change	380 mm	240 – 580 mm	380 mm				
Wilson River: - river - upstream	10 mm	10 mm	-	30 mm	Currently 54 hours in 1:100 year ARI	Currently 53 properties in 1:100 year ARI	Currently 0.4 m/s
- floodplain	20 mm	20 mm	10 mm	30 mm	+ 2 hours	No additional properties	0.7 m/s
- upstream of existing highway	10 mm	10 mm	20 mm	30 mm			
- climate change	200 mm	60 – 390 mm	90 mm				

Seventeen residences upstream of the proposed Hastings River crossing (located on the southern floodplain and Rawdon Island) and 53 buildings (33 residential and tourist accommodation dwellings and 20 commercial buildings) on the Wilson River floodplain are subject to flooding. The flood assessment predicted no additional buildings on either floodplain would experience additional flooding as a result of the proposal.

The modelling predicted the bridge crossings of the Maria River and Cooperabung, Pipers, Smiths and Stumpy creeks would have minimal impact on the flood behaviour of these waterways. No additional dwellings would experience flooding as a result of the proposal. The proposed bridges are located above the 1 in 100 year flood event, thereby providing immunity for this flood event.

The Department is satisfied with the flood assessment of the proposal. Although flood levels are predicted to increase on the Hastings and Wilson rivers floodplains as a result of the proposal, the increased flood levels would not result in any additional dwellings being impacted by flooding. The Department considers the predicted flood level increases for the 1 in 100 year ARI for the Hastings and Wilson rivers floodplains (30-50 mm and 10-20 mm, respectively) are minor given that the area is subject to flooding, no additional properties are impacted and the duration of flooding is marginally increased (by 1 hour in a 48-hour flood on the Hastings River and by 2 hours in a 54-hour flood on the Wilson River).

The proposal would provide flood immunity for the 1 in 100 year ARI, except for the carriageways across the Wilson River floodplain which would be constructed to a 1 in 20 year flood event. The existing highway and Wilson River bridge (currently has immunity for flood events greater than 1 in 100 year ARI) would be used during larger magnitude flood events. The Department considers that the use of a section of the existing highway between the Blackmans Point Road interchange and Haydons Wharf Road interchange during flooding events that would close the Wilsons River floodplain deviation temporarily for up to 3 days (1 in 100 year ARI) would not significantly impact on traffic flows along the Telegraph Point section of the service road or the amenity of receivers in close proximity to the service road.

The Department notes that under climate change scenarios the carriageways across the floodplains would be overtopped in a 1 in 100 year ARI. The Proponent would adopt an adaptive management approach to manage future climate change impacts on the road level and drainage structures given the uncertainty in expected impacts. The measures could include the provision of flood immunity on one carriageway and augmentation of drainage structures as necessary based on an ongoing review of published climate data and the performance of the structures during flooding events. The Department considers this to be an appropriate response to future climate change impacts, which takes into account potential uncertainties in climate change predictions.

The Department has recommended conditions which would require the Proponent to confirm the flooding impacts of the proposal on properties based on detailed design, undertake a detailed floor level survey of buildings and determine appropriate hydrological mitigation measures for properties adversely affected by the proposal, if necessary.

#### Soils and Water Quality

The EPA noted that the project crossed some significant rivers and creeks and consequently would expect a high level of erosion and sediment control measures. The Proponent has committed to implementing erosion and sediment control measures to reduce the generation of pollutants during construction and minimise impacts on the receiving environment. A water quality monitoring program is proposed to be developed to assess the effects of construction until all disturbed areas have been fully stabilised and revegetation work has resulted in the establishment of sustainable vegetation cover.

The Proponent has identified the management of acid sulfate soils to be a key consideration during the construction program, particularly where the proposal deviates across the Hastings and Wilson rivers floodplains and in the Maria River area. The management of potential impacts from the disturbance of acid sulfate soils would be undertaken on a risk basis, particularly for works involving excavation adjacent to watercourses and drainage lines on the floodplains.

The proposal is likely to impact on groundwater, primarily through the use of fill material for embankments on the floodplains and for areas of soft soils and during the construction of cuttings through hills and higher elevations in the Cooperabung Hill and Maria River State Forest areas. Some localised drawdown of groundwater may occur along the floodplains as a result of soft soil treatments and dewatering. This may in turn expose acid sulfate soils which could impact on the quality of groundwater. The EA states that the excavation of four cuttings (2 at Cooperabung Hill and 2 in the Maria River State Forest) would likely intercept groundwater and may result in groundwater drawdown of between 1 to 5 metres in the bedrock aquifer. However, the drawdown is expected to be localised and impacts on existing groundwater users would be minimal as there are no existing bores in the vicinity of the cuttings.

The Proponent has committed to implement a range of management and mitigation measures to reduce the generation of pollutants and minimise impacts on receiving environments, including creeks and rivers during the construction of the proposal. The measures include:

- development of a water quality monitoring program for water quality basins and adjacent watercourses;
- implementation of temporary erosion and sediment control measures and sedimentation basins in accordance with *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom 2004) and *Managing Urban Stormwater: Soils and Construction Volume 2D Main Roads Construction* (DECC 2008);
- management of acid sulfate soils and potential acid sulfate soils in accordance with the *NSW Acid Sulfate Soils Manual*;
- development of a water management plan for both surface and groundwater; and
- further groundwater modelling at the detailed design stage to further assess and manage potential groundwater impacts.

The Department is of the opinion that these commitments are appropriate to ensure that potential impacts on surface water quality and groundwater are adequately managed. The proposed conditions of approval include requirements to implement measures consistent with Landcom's *Managing urban stormwater: soils and construction Volume 1* (the Blue Book) and the Department of Environment and Climate Change's *Managing Urban Stormwater – Soils and Construction Vol 2*, to prepare and implement a Construction Water Management Plan which includes the preparation of a contingency plan for acid sulfate soils, a protocol to deal with tannin leachate from stockpiling of mulch and the use of mulch and vegetation for erosion and sediment control. The Department's recommended conditions also require a groundwater management strategy and water quality monitoring program to be developed and implemented to ensure impacts on water quality and resources are minimised and mitigated where adverse impacts arise.

#### **5.4 Other Issues**

The Department's consideration of other issues is contained in **Table 11**.

Table 11 - Department's Consideration of Other Issues

Issue	Department's Consideration
Traffic and transport	<p>The proposed upgraded highway would be a controlled access road with direct access to the upgrade only via grade separated interchanges and modified grade separations (i.e. where the on- and off-ramps are separated from the overbridge or underpass structures). An alternative route would be provided for connection with the existing local road network and private properties. The proposed service road network would comprise sections of the existing highway, existing local roads and new roads.</p> <p>Several submissions from the general public raised concerns about the proposal to use existing local roads for the service road network, particularly in the Telegraph Point and Kundabung areas. The concerns included increased traffic, pedestrian safety and amenity impacts on local residents.</p> <p>In Telegraph Point, in the area north of the Haydons Wharf Road interchange, Cooperabung Drive and an extension of Wyndell Close would form the service road and provide access to local roads and private accesses. Traffic volumes on the southern section of Cooperabung Road between Wyndell Close and Federation Way is expected to increase from approximately 272 to 460 vehicles per day, and on the section between Federation Way and Sun Valley Road, from 130 to 220 vehicles per day. However, traffic volumes on the section between Sun Valley Road and the new service road near Cooperabung Range Road is expected to decrease from 175 to 50 vehicles per day. The traffic assessment predicted 25 vehicles per day using the service road between Cooperabung Range Road and Mingaletta Road. The majority of vehicles that would use the service road (Cooperabung Drive) would likely have origins and destinations in the local area rather than being through traffic.</p> <p>In the Kundabung area the new service road would connect with Rodeo Drive and Ravenswood Road to provide north – south movements for properties on the western side of the upgrade and linking, by an overpass, the communities on the western and eastern side of the existing highway. The EA estimated traffic volumes on the service road south of Kundabung Road would increase from approximately 55 to 245 vehicles per day and to the north of Kundabung Road from 25 to approximately 550. The Proponent considered several options for providing a continuous alternative service road network, including both eastern and western service roads. The eastern option was not considered to be feasible as the proposed road could not be located within the existing road corridor and would require additional property acquisition and have agricultural impacts and required complex traffic arrangements in relation to the upgrade overpass and Kundabung Road on- and off-ramps. The use of the existing sections of Rodeo Drive and Ravenswood Road would enable the service road to be located within existing road corridors, improve the connectivity between these two roads, minimises property acquisitions and provides value for money. The majority of the traffic using the service road in the Kundabung area would be local traffic with very low volumes of through traffic.</p> <p>The proposal would affect traffic and transport in the area due to the changes in the local and regional road network, however, the Proponent considers that most of the changes would be of a positive nature. The main exception would be the impact of the proposal on the road network during the construction phase. The Proponent would manage construction impacts through the implementation of a Traffic Management Plan, which would address haulage routes, road closures, safety and traffic management, and access to private property.</p> <p>The Department acknowledges the proposed use of local roads for the service road network would result in some changes for property owners and a potential increase in traffic volumes. Notwithstanding these changes, the Department considers that the proposal has positive net benefits for local/ regional motorists and that increases in traffic levels are well within the capacity of the road network. Traffic on the service road network would comprise local traffic rather than heavy vehicles and through/ interstate traffic. The service road network would maintain local connectivity and provide safe access to the upgraded highway by separating highway and local traffic. The separation of regional/ local traffic and through traffic improves safety by reducing potential conflicts at existing at-grade intersections and property access to the highway.</p>

Traffic and transport (continued)	<p>The construction of the proposal would result in traffic and transport impacts, however, these impacts are temporary and can be managed to minimise impacts on residents and motorists. To reinforce the Proponent's commitments to manage construction traffic impacts, the proposed conditions of approval requires the Proponent to prepare and implement a Construction Traffic Management Plan for the proposal.</p>
Land use, property and business impacts	<p>A number of submissions raised concerns about the impact of the proposal on individual properties, raising issues such as loss of agricultural land, severance of properties, property access arrangements and impacts on property infrastructure. Local businesses raised concerns about property/ business access during construction and the provision of signage to promote the area and attract passing traffic to use local businesses and services.</p> <p><i>Rural Landuse</i></p> <p>The proposal would have a direct impact on 106 hectares of rural land, predominantly used for cattle grazing. The farmland includes 49.4 hectares of land identified as regionally significant farmland under the Department's <i>Mid North Coast Farmland Mapping Project</i>. The objectives of the mapping project are to protect regionally significant farmland from urban and rural residential encroachment and land use conflict. Notwithstanding, the department notes that the proposal has been developed to avoid regionally significant farmland where possible and to minimise impacts on areas that cannot be avoided. The majority of impacts on regionally significant farmland would be restricted to small areas near watercourses and would have a minor impact on the overall productivity of the farmland.</p> <p>The deviation of the proposal across the floodplain of the Wilson and Hastings river will result in the fragmentation of some agricultural properties and would affect the operation of the businesses. However, the Proponent considers the overall viability of these properties would not be threatened. The majority of rural land requiring acquisition would be in the form of strip acquisition, following property boundaries where possible. The Department notes that impacts on rural land cannot be avoided and that the Proponent has designed the proposal to minimise impacts where possible and implement management measures to address operational impacts. Land acquisition would be undertaken in accordance with the <i>Land Acquisition (Just Terms Compensation) Act 1991</i>. The Department accepts that the proposal would result in some changes to agricultural operations, however, it is considered that overall the proposal is unlikely to detrimentally affect the viability and operational capacity of agricultural enterprises.</p> <p><i>Property Access and Infrastructure</i></p> <p>The construction of the proposal could affect property infrastructure and vehicular access to properties. The Proponent has committed to maintain access to properties, either at existing or new access points and replace existing property infrastructure (including fencing and water supply infrastructure) directly affected by the proposal. Local businesses that have direct access to the highway may be affected by temporary access changes during construction, particularly businesses in Kundabung and south of Telegraph Point. Temporary arrangements would be negotiated with local businesses to maintain access during construction and where current access would be permanently changed, alternative access to an equivalent standard would be provided where feasible. The Proponent considers that construction impacts would be minor due to the short duration of the disruptions and measures that would be implemented with affected property owners. The Department accepts there would be temporary property and land use impacts during construction and considers the Proponent's commitments to maintain property access and replace damaged infrastructure in consultation with property owners is appropriate to manage the impacts of the proposal.</p> <p><i>Business Impacts</i></p> <p>The Proponent considers the longer term impact on local businesses would depend on the degree of reliance of the business to passing trade from highway traffic. The upgrade would likely have a significant impact on businesses which derive a high proportion of trade from passing highway traffic, compared to businesses which predominantly serve the local community. The Proponent considers the bypass of Telegraph Point is unlikely to have a significant impact on local businesses as the existing highway bypasses the village and highway traffic must exit the highway to enter the village and access the range of shops and services. The proposed overpass at Kundabung Road would link the eastern and western parts of the area which would provide safe access to local businesses. The proposal includes on- and off-ramps at Kundabung Road which would enable highway traffic to use local services. The</p>

Land use, property and business impacts (continued)	<p>Proponent has committed to maintain access to the highway during the construction of the upgrade. The Department considers the proposal would have minimal impact on existing businesses in Telegraph Point and Kundabung as these villages are bypassed by the existing highway. Under the proposal motorists would need to leave the highway and enter the villages, similar to the existing situation.</p> <p><i>State Forests</i></p> <p>The Proponent would ensure that access to the State forests by logging trucks and other forestry vehicles is maintained during construction of the proposal. Where existing access to the highway would be permanently removed, alternative access and access tracks to the service road network would be provided in consultation with DPI (Forests).</p> <p>The Department is satisfied with the Proponent's response to issues raised on property and land use concerns. The Impacts of the proposal on property and property infrastructure are unavoidable, particularly where the alignment deviates through rural land and State forests. The Department notes the Proponent has committed to minimise impacts on property infrastructure, access and local businesses. To reinforce these commitments, the Department has recommended conditions of approval that require the Proponent to:</p> <ul style="list-style-type: none"> <li>• minimise the impact of the proposal on private property and public and private structures during detailed design and construction, and undertake repairs to infrastructure damaged by the construction of the proposal;</li> <li>• maintain or reinstate property access, including to State forests; and</li> <li>• develop a signage policy for the proposal to encourage visitation to bypassed towns.</li> </ul>
Visual impacts	<p>The existing landscape through which the proposal would pass is characterised by open agriculture, scattered forests, enclosed forest landscapes and a small area of industrial development. Where the proposal deviates from the existing highway, through Cairncross State Forest and across the Hastings and Wilson river floodplains, the existing landscape would be modified. The change in the landscape across the floodplains would be high with the road built on fill embankments (5 metres to the south and 6.5 metres to the north of the Hastings River and 2.5 metres to the south of the Wilson River) and new bridges across the two rivers. To the north of the Wilson River within a backwater area the road embankment would be up to 15.6 metres in height linking the two adjoining ridgelines for a length of approximately 200 metres. In the duplicated sections of the corridor the highway would be located closer to some rural residential developments.</p> <p>A number of submissions raised concerns about the visual impact of the proposal, in particular, views to and from the highway or service roads and clearing of roadside vegetation. The Proponent acknowledges that construction of the proposal would result in temporary visual impacts for some residents as well as permanent changes to the visual character of some areas following completion of the proposal. The Proponent has committed to include measures to minimise the visual impact by adopting urban design principles which would create an interesting but unobtrusive road design. A detailed urban and landscape design plan would be prepared for the proposal, and would include screen planting in the road corridor at appropriate locations to minimise views of the highway.</p> <p>The Department is satisfied with the Proponent's response to visual impact concerns and has recommended conditions of approval requiring the Proponent to prepare an Urban Design and Landscape Plan to address the visual impacts of the proposal and address issues such as existing vegetation and landscaping, treatment of built structures such as cuttings, bridges, embankments and retaining walls as well as monitoring and maintenance requirements.</p>
Aboriginal heritage	<p>An Aboriginal cultural heritage assessment of the proposal was undertaken in conjunction with the local Aboriginal community. The field survey of the project area identified five sites of cultural sensitivity (Sancrox Road ceremonial area, Hastings River, Maria River, Dalhunny Island and an ochre site) and eight Aboriginal heritage sites (OHK54/A, OHK90, OHK91/A, OHK91/B, OHK92/A, OHK92/B, OHK104/A and OHK219/A). All the Aboriginal heritage sites contained stone artefacts (between 1 and 8 artefacts at each site). In addition, three areas along the alignment were identified for further investigation as potential Aboriginal heritage sites containing Aboriginal artefacts (hill crests north of the Hastings and Wilson rivers). The sub-surface investigation resulted in the identification of two additional Aboriginal heritage sites in the Hastings River sub-surface investigation area (OHK46 and OHK47) which yielded 144 stone artefacts. The investigation of the Wilson River sub-surface investigation area yielded 1049</p>

Aboriginal heritage (continued)	<p>stone artefacts within heritage sites OHK90, OHK91/A, OHK91/B, OHK92/A and OHK92/B. Based on the artefacts uncovered at these two sub-surface investigation areas, the assessment considered these locations were used for hunting and/or gathering activities without camping, involving multiple short duration episodes. Sub-surface investigation of the third area (also to the north of the Wilson River) was not carried out due to its small area, high level of disturbance and similarity to the other Wilson River hill crest subsurface investigation area.</p> <p>An assessment of the significance of the Aboriginal heritage sites was undertaken, which concluded four sites had a low level of significance, one with low - moderate significance and five with moderate –high significance, in the local context. All the heritage sites were assessed as having low significance in the regional context. The EA states that the proposal would have a total or substantial impact on six of the ten Aboriginal heritage sites (OHK46, OHK47, OHK54/A, OHK90/A, OHK91/A and OHK219/A). Four of the sites directly impacted by the proposal had low to moderate significance and two sites, OHK90/A and OHK91/A, had moderate to high significance in the local context. Overall, the Aboriginal cultural heritage assessment concluded the proposal would have a low to moderate impact on Aboriginal heritage in the absence of appropriate management measures.</p> <p>Five areas with cultural sensitivity to the Aboriginal community are located in the project area. The cultural heritage assessment considered the cultural significance of the Sancrox Road ceremonial area to be high and the natural landscape features of the Hastings and Maria rivers and Dalhanty Island to be low in the local and regional context. The fifth area, the ochre site in the southern section of the proposal had contemporary significance, with ochre from a road cutting exposed in 1968 used for ceremonial purposes by the local Aboriginal community. The proposal would impact on four of the cultural areas – the widening of the cutting containing the ochre resource and the alignment traversing the landscape setting of the Hastings and Maria rivers and Dalhanty Island. The Department considers the proposal would not significantly detract from the broader landscape of the Hastings and Maria rivers and Dalhanty Island as the impact is confined to a narrow linear corridor. The cutting in which the ochre resource is located would be widened which would remove part of the ochre resource. Direct access to the ochre resource from the upgraded highway would not be possible because of road safety concerns. The Proponent would consult with the Birpai Local Aboriginal Land Council regarding future access to the ochre resource. This could include recovery of the ochre during construction and relocating it or providing alternative access to the ochre resource from the adjoining service road. The Department is satisfied that the ochre resource cannot be avoided and its recovery and/or the provision of alternative access are appropriate mitigation measures. The proposal does not directly impact on the Sancrox Road ceremonial area which is located several hundred metres to the west of the road alignment.</p> <p>The recommended conditions of approval require the Proponent to prepare a heritage management plan as part of the Construction Environmental Management Plan, undertake salvage of the identified Aboriginal heritage sites and implement a procedure to deal with the discovery of previously unidentified Aboriginal heritage items or remains.</p>
Non-Aboriginal heritage	<p>The Proponent identified 16 potential heritage items which are indicative of the settlement and development of the area. These include farming and agricultural relics (drainage channels, farm complexes and buildings and farm infrastructure) and road development/ infrastructure relics (survey markers, sandstone kerbs, remains of road pavement and road bridges). The potential heritage items are not listed as heritage items under Commonwealth heritage registers, the NSW State Heritage Register, or the heritage schedules of Local Environmental Plans.</p> <p>The heritage assessment concluded that five of the sixteen potential heritage items had heritage significance. These are:</p> <ul style="list-style-type: none"> <li>• the Maria River bridge (OHK14), a timber and concrete composite bridge which is listed on the Roads and Maritime Services Section 170 Register as an item of State significance; and</li> <li>• OHK4 (sandstone kerb stones), OHK9 (Hacks Ferry Road dairy complex), OHK11 (farm complex) and OHK12 (stockyards and timber mill) – items with local heritage significance.</li> </ul> <p>The remaining items had no heritage significance. The proposal would impact the majority of the heritage items by varying degrees, ranging from partial removal of relics to total removal of the item. Of the items with heritage significance, OHK11 would be totally removed by the</p>

Non-Aboriginal heritage (continued)	<p>proposal, OHK9 and OHK12 may be partially impacted by the removal of some relics and the sandstone kerb stones (OHK4) could be left in situ but fenced or removed and relocated. The Maria River bridge would remain as part of the service road network.</p> <p>The Proponent has committed to implement management measures to minimise indirect impacts on the Maria River bridge and explore opportunities to minimise impacts on OHK4, OHK9 and OHK12 during detailed design and undertake an archaeological excavation and further assessment of relics in the vicinity of OHK11 prior to construction commencing.</p> <p>The Proponent has provided additional information to address the Department's former Heritage Branch (now part of the Office of Environment and Heritage) comments on the archaeological survey and assessment of the heritage significance of potential heritage items. The Heritage Branch supported the Proponent's commitments to minimise impacts on the identified heritage items, prepare a non-Aboriginal heritage management plan, undertake training of construction personnel and implement procedures for the discovery of unidentified relics.</p> <p>The Department is satisfied that the non-Aboriginal heritage impact assessment has been carried out in accordance with heritage guidelines and considers the removal of one item with local heritage significance in full to be unavoidable. It is noted that the Proponent would review opportunities to minimise impacts on the other local heritage items during detailed design of the project. The Department is satisfied with the Proponent's commitments to minimise indirect impacts on the Maria River bridge, educate construction personnel on working close to heritage items and procedures for undiscovered relics are appropriate. The Department has recommended conditions which require the Proponent to prepare a non-Aboriginal heritage management plan as part of the Construction Environmental Management Plan, undertake an archaeological survey of OHK11 prior to construction and the development of a procedure to be implemented in the event that previously unidentified relics are uncovered.</p>
Other	All other issues are considered to be adequately addressed by the Proponent's Response to Submissions and/ or final Statement of Commitments.

## 6. RECOMMENDATION

The Department is satisfied that the proposal is justified as part of the Pacific Highway Upgrade Program which has been declared critical infrastructure because of its various benefits to the State and region. This is further supported by the Commonwealth Government's commitment to provide funding towards the upgrade works. The upgrade of the Pacific Highway between Hexham and the Queensland border and the Oxley Highway to Kempsey project specifically, are identified in a number of government policy documents as infrastructure which is necessary to improve services in and to the Mid North Coast and provide for the safe and efficient movement of inter- and intrastate passengers and goods.

Following a detailed assessment of the Environmental Assessment, submissions from the general public and public authorities, the Proponent's Response to Submissions and the final Statement of Commitments, the Department is satisfied the potential impacts of the proposal have been addressed and are acceptable subject to the implementation of the recommended conditions of approval.

The Department notes that there are a number of constraints which will need to be carefully managed, including construction and operational noise mitigation measures, soil and water impacts, biodiversity impacts (particularly fauna movement and habitat impacts) and the development of a comprehensive biodiversity offset package. These issues were reflected in submissions from the general public and public authorities. The Proponent has committed to develop and implement mitigation measures to address residual construction and operational impacts and develop biodiversity offset measures with the relevant public authorities. The Department has recommended conditions of approval to support and enhance the Proponent's commitments on the construction and operation of the proposal.

The proposal has direct and indirect impacts on native vegetation and fauna habitat, primarily by the clearing of approximately 204 hectares of native vegetation, including 37 hectares of various endangered ecologically communities. The proposal traverses areas of key habitat and regional fauna corridors, particularly in the deviation through Cairncross State Forest and minor realignment within the Maria River State Forest. The impacts



on native vegetation are unavoidable, however, the Proponent has committed to address impacts on native vegetation and removal of foraging, roosting and breeding habitats of native fauna, including threatened fauna species, by a range of mitigation measures. These include offsetting vegetation on a like for like basis and providing crossing structures to maintain connectivity between areas of key habitat and regional corridors. The Department has recommended that the Proponent prepare an appropriate biodiversity offset strategy and package, in consultation with the EPA. This approach has been successfully adopted on a number of other Pacific Highway Upgrade projects and significant benefits have been achieved in terms of biodiversity conservation.

The Department recognises that there will be both construction and, to a lesser degree, operational noise impacts for the community even with mitigation measures in place. Operational noise impacts were a key issue raised by the community in submissions. The Department acknowledges that some residents would experience noise at higher levels than previously experienced and some residents would experience noise from a different direction. The noise assessment predicted a total of ninety-two residences would be considered for noise mitigation. Given the scattered and isolated distribution of the impacted residences, the Proponent has identified architectural treatment of buildings rather than noise walls/ low noise pavements as the most appropriate method of addressing potential noise impacts, and the department accepts this position.


The Proponent has undertaken an assessment of the flooding impacts of the proposal which traverses two major floodplains and a number of minor watercourses. The assessment concluded the proposal would result in a minor increase in the level of flood waters in areas subject to existing flooding and that no additional residential and commercial buildings would experience flooding as a result of the proposal. A range of management and mitigation measures would be implemented to manage potential flooding impacts. These include the provision of bridges and flood relief structures across floodplains and measures to reduce scouring and bed and bank erosion at bridge abutments and culvert openings.

The recommended conditions of approval provide for the mitigation and management of other impacts associated with the proposal, including property, heritage, soil and water and general requirements for overall environmental management of the proposal. The Department believes that implementation of the mitigation measures proposed in the Environmental Assessment, Statement of Commitments, and conditions of approval would ensure that best management practices are applied throughout the construction and operation of the project. This would ensure that any potential impacts are minimised to an acceptable level and the proposal does not unduly impact on the amenity of surrounding residents, the community in general and the environment.

On balance, the Department considers that the project can be undertaken in an ecologically sustainable manner while also providing a much improved route for local and through traffic movement. Subsequently, the approval of the proposal would be in the public interest. The Department therefore recommends that the Minister for Planning and Infrastructure (or his delegate) approve the Pacific Highway Upgrade - Oxley Highway to Kempsey project, subject to the recommended conditions of approval.

  
2/2/12  
A/Director  
Infrastructure Projects

  
2/2/12  
Deputy Director General  
Development Assessment & Systems Performance

  
2.2.12  
Executive Director  
Major Projects Assessment

  
2/2/2012  
Director General



## **APPENDIX A ENVIRONMENTAL ASSESSMENT**

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See the Department's website at:

[http://majorprojects.planning.nsw.gov.au/page/project-sectors/transport--communications--energy---water/roads/?action=view\\_job&job\\_id=827](http://majorprojects.planning.nsw.gov.au/page/project-sectors/transport--communications--energy---water/roads/?action=view_job&job_id=827)



## **APPENDIX B SUBMISSIONS**

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See the Department's website at:

[http://majorprojects.planning.nsw.gov.au/page/project-sectors/transport--communications--energy---water/roads/?action=view\\_job&job\\_id=827](http://majorprojects.planning.nsw.gov.au/page/project-sectors/transport--communications--energy---water/roads/?action=view_job&job_id=827)

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## **APPENDIX C PROPONENT'S RESPONSE TO SUBMISSIONS**

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See the Department's website at:

[http://majorprojects.planning.nsw.gov.au/page/project-sectors/transport--communications--energy---water/roads/?action=view\\_job&job\\_id=827](http://majorprojects.planning.nsw.gov.au/page/project-sectors/transport--communications--energy---water/roads/?action=view_job&job_id=827)



**APPENDIX D RECOMMENDED CONDITIONS OF APPROVAL**

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