Department of Planning

MAJOR PROJECT ASSESSMENT:
Pacific Highway Upgrade
Kempsey to Eungai

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

July 2008

Published July 2008
NSW Department of Planning
www.planning.nsw.gov.au

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EXECUTIVE SUMMARY

The NSW Roads and Traffic Authority has sought the Minister for Planning's approval for the Kempsey to Eungai upgrade of the Pacific Highway, a key component of the Government commitment to upgrade the existing highway between Hexham and the Queensland border. The proposal consists of approximately 40.8 kilometres of dual carriageway located to the east of Kempsey and Frederickton as an alternative to the existing highway through both towns.

The upgrade includes interchanges at South Kempsey, Frederickton and Stuarts Point Road, tying in with the proposed Oxley Highway to Kempsey upgrade to the south and the completed Eungai deviation to the north.

Key benefits of the proposal include:

- an expected reduction in accident rates on this section which are currently among the worst on the Pacific Highway;
- improvements to local and regional transport efficiency and traffic safety
- reduction in safety risks to pedestrians and cyclists; and
- significant improvement in connectivity and amenity for urban areas of Kempsey and Frederickton.

The capital cost of the proposal is approximately $727 million (2006 dollars) if constructed in a single stage with a construction workforce of up to 300 engaged at any given time.

The Department received 49 submissions on the project including 40 from individuals, community groups or businesses and nine from Government agencies and councils. Keys issues raised included route selection, hydrology, noise, flora and fauna, visual impact and impacts on community infrastructure.

The Department has assessed the Proponent's Environmental Assessment and Response to Submissions Report (including Statement of Commitments) and taken into consideration issues raised in private and public submissions. The Department is satisfied that the environmental assessment has considered the key issues to the greatest extent practicable, that mitigation measures are appropriate and that the residual impacts of the proposal are acceptable and manageable. Notwithstanding, it is understood that further refinement of the proposal will occur during detailed design which may result in reducing impacts further, in particular road traffic noise and flooding. For these reasons, the Department recommends approval of the project.

The Department has recommended conditions of approval which define performance standards and targets which the project must achieve as well as monitoring requirements which are chiefly aimed at measuring the effectiveness of the mitigation measures which the Proponent has committed to in order to minimise impacts. These include noise and vibration, ecological monitoring and biodiversity offsets. The Department has also recommended a number of further investigations, related to flooding and noise and vibration, which must be undertaken prior to construction commencing to provide further detail and confirm the mitigation measures (and their effectiveness) at the individual property scale. This is intended to provide the affected landholders with certainty prior to works commencing.

In summary, the Department is of the opinion that on balance the project is justified and in the public interest. It is anticipated that the Proponent's Statement of Commitments and the Recommended Conditions of Approval, implemented in parallel should ensure that the project is designed, constructed and operated to meet acceptable environmental and amenity limits.

1. BACKGROUND

1.1 Pacific Highway Upgrade Program

The NSW Roads and Traffic Authority (RTA) proposes to upgrade the Pacific Highway between Kempsey and Eungai. The project is part of the Pacific Highway Upgrade Program (refer figure 1) which is one the largest infrastructure projects in the State and is a bipartisan commitment between the State and Commonwealth governments to provide a continuous four lane carriageway from Hexham to the Queensland Border.

The objectives of this 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.

As of December 2007, approximately 40% of the Pacific Highway has been upgraded (254 kilometres) with recent construction activities concentrated south of Port Macquarie.

Adjoining the project to the south is the proposed upgrade of between the Oxley Highway and Kempsey, a section of approximately 45 kilometres. The Eungai Deviation Second Carriageway to the north was completed in 1998.

1.2 Location and Land Use

The project is located in the Macleay River Valley on the NSW Mid North Coast largely within the Kempsey Shire local government area, crossing into the Nambucca Shire local government area north of Stuarts River Road, near Eungai Rail. It is characterised by coastal settlements such as Crescent Head, South West Rocks and Stuart Point to the east, agricultural land use on the floodplains, inland townships such as Kempsey and Frederickton on the Macleay River and small settlements on the fringe of the Great Dividing Range in the west.

The Environmental Assessment states that although Kempsey is located in close proximity to other coastal towns, the town itself has not developed as a tourist destination and is considered a mid-journey service centre for those travelling further on the Pacific Highway. Kempsey is also an important employment centre for the region's forestry, agriculture, government, education and tourism industries with a population of 11,000 out of a total population of 28,000 that reside within the local government area.

Figure 1: Overview of the Pacific Highway Upgrade Program
(as at December 2007)

The majority of the proposed upgrade is located within the Kempsey local government area; however, a small section at its northern end would be located within the Nambucca local government area near the Eungai Rail Village.

The existing Pacific Highway passes through the town centre of Kempsey, the main commercial area of Frederickton and other residential areas, which cause conflict between local traffic, pedestrians and through traffic. Between Kempsey and Eungai, the highway is restricted to a two-lane single carriageway road with passing lanes and right-turn lanes marked at key intersections.

2. PROPOSED DEVELOPMENT

2.1 Project Description

The preferred route for the project is approximately 41 kilometres on a predominately new alignment, to replace the existing highway through Kempsey and Frederickton and has an estimated capital cost of $727 million ($2006). Construction is anticipated to take approximately four years due to the complexities of building on the Macleay River floodplain and could be constructed either in its entirety or in stages. Partial or total acquisition of 120 properties is required.

The proposed alignment for which project approval is sought is shown in Figure 2.

Key components of the proposal include:

- four lane divided carriageways (two 3.5 metre lanes in each direction, a shoulder of 2.5 metres and a 0.5 metre median) with provision for upgrade to six lanes;
- controlled access over the full length of the route;
- three full access, grade separated interchanges, one south of Kempsey, one to the north-east of Frederickton and one at Stuarts Point Road;
- use of the existing Pacific Highway at the southern and northern entrances to Kempsey;
- a bridge over the Macleay River and partial bridging of the Macleay River floodplain;
- 1 in 100 year flood immunity for the entire route with the exception of the Macleay River floodplain where the road embankment will be above the 1 in 20 year flood level;
- a levee along the Macleay River at Frederickton;
- rest area facilities for both northbound and southbound traffic south of Barraganyatti near Cooks Lane to service heavy vehicles and tourist traffic;
- reconnection of local road and property access and maintenance of pedestrian access where required; and throw-over protective screens on all highway overpass bridges; and
- the potential for delivery of the project in discrete stages or packages.

Relocation of a number of public utilities and services will be required.

2.1.1 Frederickton Levee

To protect properties on the western bank of the Macleay River at Frederickton, a 1,070 metres long flood levee is proposed as part of the project. The levee would run parallel to the Macleay River as shown in Figure 3 and has been generally designed as an earth structure with slopes battered at 4(horizontal):1(vertical). Where there is insufficient land to construct an earth structure, a concrete wall would be constructed. Floodgates on existing watercourses would ensure that drainage through the levee is maintained.

Removal of an existing recreational boat ramp at the site of the old ferry crossing will be required for levee construction. The ramp will be relocated to the east of the proposed Macleay River bridge. Access and parking would be provided via a service road off the existing Pacific Highway.

2.2 Project Need and Justification

The Pacific Highway Upgrade Program aims to improve the standard of the Pacific Highway, eliminate "black spots" and reduce overall journey times along its length. Although numerous improvements have been made in the past 10 years, the Kempsey to Eungai section of the highway remains a major bottleneck for road traffic.

The Mid North Coast extends from Bulahdelah to Coffs Harbour and includes the urban centres of Taree, Port Macquarie and Kempsey. Population in this area is expected to increase by 27% over the next 25 years predominately within the Coffs and Port Macquarie-Hastings Local Government Areas. This predicted growth results in increased pressure on the existing road network, which currently comprises a two lane single carriageway with passing lanes and right turn bays at nominated intersections. The existing alignment is further constrained by:

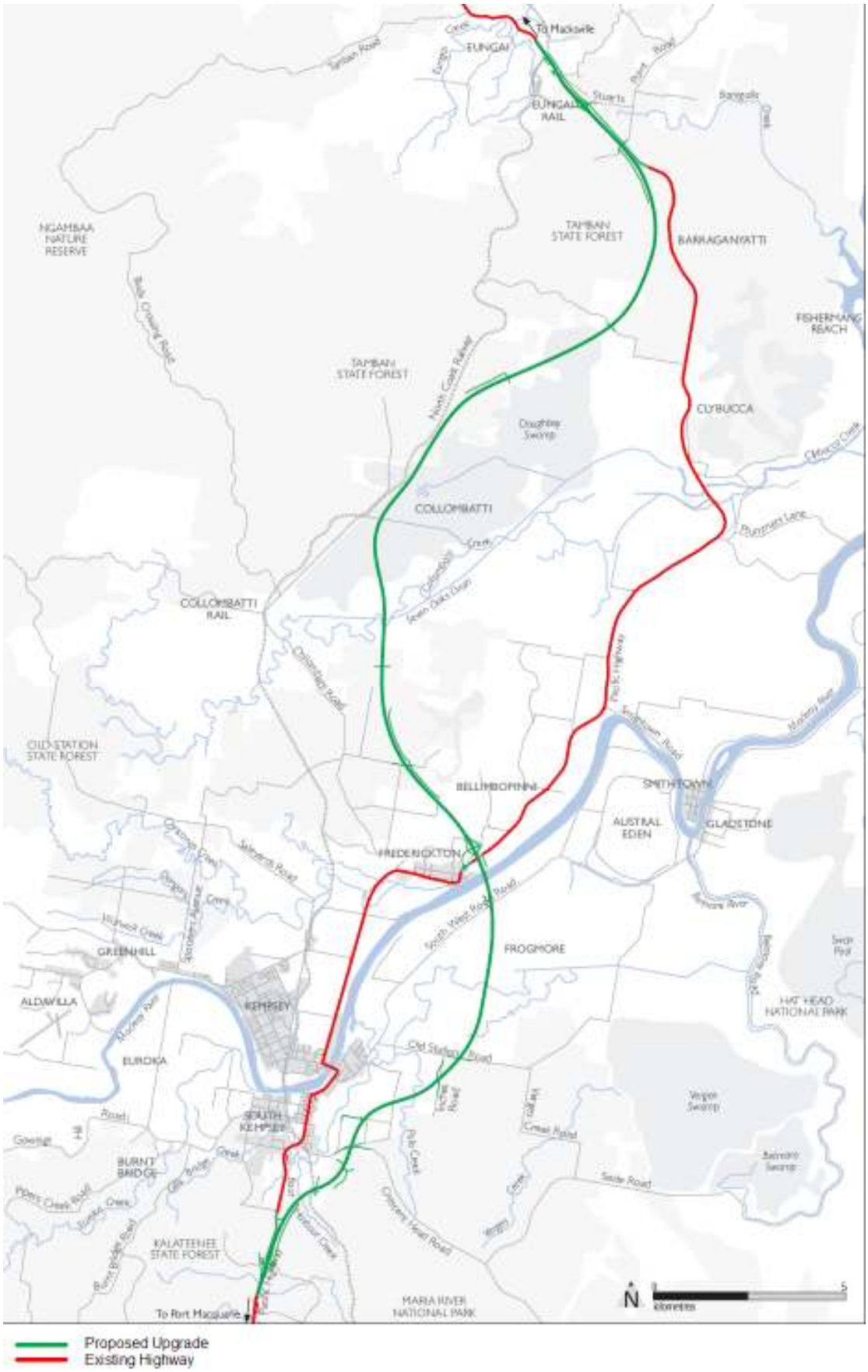
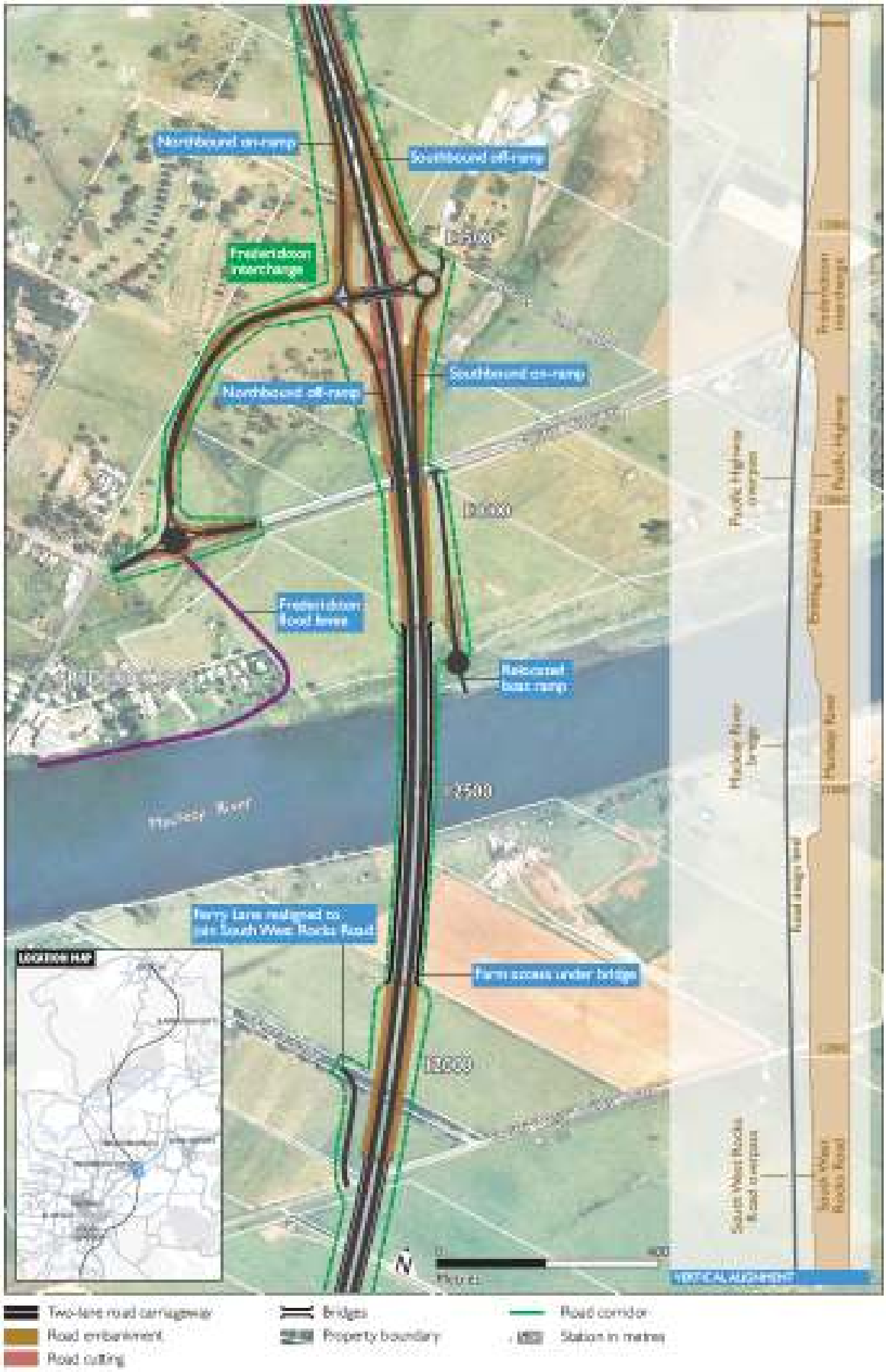


Figure 2: Proposed Upgrade Alignment



Source: Figure 6.1g of Proponents Environmental Assessment (PB, 2007).

Figure 3: Proposed Frederickton Flood Levee

- the narrow two lane Macleay River Bridge in Kempsey and tight geometry on approaches;
- the Smith Street and Belgrave Street intersection in Kempsey which is operating close to capacity;
- local and through traffic conflicts; and
- poor sight lines at intersections with local roads in Clybucca and Barraganyatti.

These constraints have in turn limited the existing road network capacity, with sections of the Pacific Highway in Kempsey operating at capacity and with excessive delay during non-holiday peak conditions. During holiday periods, levels of service deteriorate unsatisfactory as daily volumes double. Delays around the Macleay River bridge crossing are a primary source of congestion primarily due to the Smith and Belgrave Street intersection.

The section of the Pacific Highway between Kempsey and Eungai is a known accident black spot with 414 serious accidents resulting in 17 fatalities and 179 injuries occurring between 1996 and 2005. A key feature of the project is the physical separation of north and southbound traffic, which reduces the risk of high speed head on, or side on collisions and would result in significant improvements to road safety.

Heavy vehicles comprise 21-24 per cent of total vehicles during weekday, non-holiday periods and 50-60 per cent of night time (10pm-6am) traffic (2004 traffic data). The project would remove the majority of heavy vehicles from urban areas thus improving road safety for local traffic and community amenity.

2.2.1 State Government Policies

The proposal is consistent with NSW State Government policy and strategies. These include:

- the NSW State Plan 2006, which includes the key priorities of safer roads and maintaining and investing in infrastructure, with travel times between Hexham and the Queensland border as a key measure of the latter;
- the NSW State Infrastructure Strategy 2006-7 to 2015-16, which includes the Pacific Highway Upgrade Program; and
- the draft Mid North Coast Strategy 2006, which cites the Pacific Highway Upgrade Program as a key factor in improving regional accessibility.

3. STATUTORY CONTEXT

3.1 Major Project

The application was originally lodged in accordance with the Ministerial Order made under Section 75B(1) of the Act (gazetted on 29 July 2005) declaring projects that would otherwise have been subject to Part 5 Division 4 of the *Environmental Planning and Assessment Act 1979,* subject to Part 3A.

In addition, on 5 December 2006, the Minister for Planning declared that the Pacific Highway Upgrade (which included the Kempsey to Eungai segment) is a project to which Part 3A of the Act applies pursuant to Section 75B(1) of the *Environmental Planning and Assessment Act, 1979* (the Act).

3.2 Critical Infrastructure Project

On 5 December 2006, the Minister for Planning declared the Pacific Highway Upgrade as critical infrastructure under section 75C of the Act.

3.3 Statement of Compliance

The Director-General issued requirements for preparation of an Environmental Assessment for the proposed project on 22 September 2006. On 16 July 2007, the Director-General (or his delegate) advised the RTA that the Environmental Assessment complied with the Director-General's requirements for the purposes of section 75I(2)(g) of the Act and that the document was suitable for exhibition.

3.4 Environmental Assessment Exhibition

The Environmental Assessment was publicly exhibited for 30 days from 1 August 2007 until 31 August 2007. The exhibition was advertised in the Sydney Morning Herald, Daily Telegraph, Kempsey Macleay Argus, Mid Coast Observer and Nambucca Guardian News. The Environmental Assessment was exhibited on the Department's website, at the Department's head office in Bridge Street, Sydney, at the RTA's head office in Surry Hills, Sydney, RTA's Grafton Office, Port Macquarie, Nambucca Heads and Kempsey Motor Registries and Kempsey and Nambucca Shire Councils.

In addition to advertising of the Environmental Assessment exhibition, the RTA directly notified all affected properties via a community update in Barraganyatti, Clybucca, Crescent Head, Eungai Creek, Eungai Rail, Frederickton, Gladstone, Kempsey, Smithtown, South West Rocks and Stuarts Point and placed additional advertisements in the Port Macquarie News and Koori Mail.

A display, attended by members of the project team, was held in Kempsey for two weeks allowing interested parties to visit, provide feedback and make enquiries to the Proponent prior to making submissions.

4. CONSULTATION AND ISSUES RAISED

4.1 Issues Raised in Submissions

A total of 49 submissions were received in response to the public exhibition of the Environmental Assessment including nine from Government agencies. The Department has considered all issues raised in submissions in its assessment. Table 1 summarises the source of these submissions

Table 1: Submissions Summary

Submission Source	No of Submissions
Public • Individuals (35) • Community Groups (3) • Companies (3)	40
Public Authorities • Department of Environment and Climate Change (x2) • Department of Primary Industries including Forests NSW • Department of Planning (x2), Grafton Regional and Heritage Offices • Department of Water and Energy • Kempsey Rural Lands Protection Board • Kempsey Shire Council	9
Total	**49**

The majority of public submissions either objected to the proposal or raised issues of concern but acknowledged the need for the Pacific Highway to be upgraded generally. Many of these submissions were received from those whose properties would be directly affected. Two submissions were received in support of the project.

4.2 Submissions from Local and State Government

Submissions were received from six State government agencies and Kempsey Shire Council. The issues raised are summarised below and considered in more detail in Chapter 5:

- **Department of Primary Industries** – identified significant loss of agricultural land, absence of a suitable biodiversity offset strategy and lack of detailed flood mitigation measures for property as major concerns; **Forests NSW**- identified the need for suitable access/egress by B double vehicles and that the existing fire trail network should not be affected;
- **Department of Environment and Climate Change** – raised concerns in relation to construction and operational noise, lack of a biodiversity offset strategy, flora and fauna clearing and mitigation but were supportive of the project subject to these issues being resolved in the final design;
- **Department of Planning** – the Grafton regional office identified the need to consider the Draft Mid north Coast Strategy; **Heritage Office** (now part of the Department of Planning) - identified numerous indigenous and non-indigenous heritage items on or adjacent to the route which need to be managed during construction, including the Ferry Lane Memorial Avenue;
- **Department of Water and Energy** - identified issues associated with groundwater and watercourses, generally;
- **Kempsey Rural Lands Protection Board**- identified issues regarding productive agricultural land and acquisition of flood refuge land by the RTA; and
- **Kempsey Shire Council**- raised concerns regarding traffic management, flora and fauna impacts, habitat severance, flooding and impacts on infrastructure during construction.

4.3 Public Submissions

A summary of key issues raised in public submissions is outlined in Table 2 below and discussed in further detail in the following chapter. Issues raised but not expressly stated in this report are considered to have been appropriately addressed in the Environmental Assessment, Statement of Commitments and/or the recommended conditions of approval.

Table 2 Summary of Key Issues Raised in Public Submissions

Issue	Comments
Hydrology	• Structures on the floodplain will increase flooding risk to residents and animals in the event of flood emergency • Increased inundation periods, afflux and velocities due to embankments in floodplains which in turn would increase potential damage to property • Increased height and length of Fredericton levee will affect resident amenity
Noise	• Construction and operational noise impacts on properties currently not subjected to road noise • Sleep disturbance potential for residents in proximity to alignment
Route Selection	• Reasoning for selection of the eastern route option when other options were cheaper and impacted on fewer private landholdings
Visual Impact	• Introduction of new elements into views, particularly across the Macleay River floodplain
Flora and Fauna	• Clearing of existing vegetation on private and public land which is frequented by significant flora species • Increased potential for animal strikes from new highway

4.4 Submissions Report

The Department required the Proponent to prepare a Submissions Report to address each of the issues raised in submissions. As pare of this process the Proponent reviewed each submission and made specific comment in relation to each issue identified.

The Proponent provided responses to the submissions via a submissions report lodged with the Department in March 2008. No significant changes to the Project are proposed as a result of the issues raised in submissions though some minor changes to property access and to the Statement of Commitments are proposed and provided in Appendix B to this report. A Preferred Project Report was not considered necessary.

5. ASSESSMENT OF ENVIRONMENTAL IMPACTS

5.1 Route Selection

Issue

Route selection commenced with 18 feasible alignment options between Kempsey and Eungai. A 'do nothing' option was considered and dismissed as it was recognised that the existing and projected traffic congestion in Kempsey town centre and the high accident rate between Kempsey and Eungai necessitates a full upgrade and bypass of Kempsey.

Feasible route options were assessed against criteria which reflected the project objectives and resulted in an eastern, western and through town option being short listed. The through town option was subsequently eliminated from further consideration as it did not provide a viable solution to Kempsey's traffic problems and would not be supported by Council or, in Council's opinion, the broader community.

A Value Management Workshop involving relevant stakeholders recommended the eastern option be progressed on the basis that, relative to the western option, it would result in greater environmental benefit and less environmental cost but highlighted the need for further investigation of key issues.

Figure 4: Short-listed Route Options

Further investigations confirmed that an amended eastern option provided the best balance between social, environmental, engineering and cost factors while continuing to provide for the future transport needs of the local and wider community.

The preferred route was announced by the Minister for Roads and exhibited for public comment in July 2004. More than 57% of responses (questionnaires and written correspondence) during consultation after the Minister's announcement expressed a preference for the eastern route. An additional 10% did not identify a preference.

Submissions received on the Environmental Assessment objecting to or raising concerns questioned the selection of the eastern option based on the predicted noise and amenity impacts. Landholders along the proposed route expressed a preference for the western route (*i.e.* away from them).

Consideration

The project objectives were largely reflected in the assessment criteria developed and used in comparing the eastern and western options at the Value Management Workshop and against the existing highway. There was little difference between the two options for most criteria.

Both options would result in improved safety, travel time savings and consequently freight costs (though the western option performed better due to the slightly shorter route) and potential economic impacts on surrounding towns balanced out.

The objective to manage the upgrade in accordance with ecological sustainable development principles are considered to have been applied in the process of route selection and impact assessment. It is acknowledged that the western option performed better than the eastern option when certain environmental factors were considered in isolation; however, the converse is also true. Overall the western option was considered to have greater environmental and functional (*e.g.* access, congestion, construction) impacts than the eastern option. Table 3 provides a comparison of the respective advantages and disadvantages of the two short listed options where there are differences.

Table 3: Comparison of Western and Eastern Route Options

Option	Eastern Option (Preferred)	Western Option
Advantages	▪ Staged construction possible which brings forward benefits to community and enables funding flexibility ▪ good access to/for coastal communities ▪ fewer impacts on schools ▪ less community severance ▪ fewer impacts on South Kempsey industrial area ▪ reduced impacts on high productivity agricultural land and State Forests ▪ crosses three perennial waterways and one semi-perennial waterway ▪ reduced impacts on moderate quality vegetation ▪ fewer impacts on fauna ▪ less impact on areas of high/moderate archaeological sensitivity ▪ less impact on indigenous sites ▪ visual intrusion less than western option ▪ fewer properties exposed to noise requiring mitigation	▪ greater travel time savings than eastern option ▪ fewer impacts on agricultural land overall ▪ fewer impacts on high quality vegetation ▪ reduced fragmentation of habitats ▪ alignment located on smaller areas of soft soils decreasing construction timeframe
Disadvantages	▪ reduced travel time savings compared to western option ▪ greater impact on agricultural land generally ▪ greater impact on high quality vegetation ▪ greater habitat fragmentation ▪ alignment located on longer area of soft soils and potential acid sulfate soils increasing construction timeframe	▪ no ability to stage ▪ less direct access to/for coastal communities ▪ congestion remains, particularly in holiday periods ▪ greater impact on schools and nursing home ▪ greater community severance ▪ greater impact on private property holdings and communities ▪ greater impact on high yield agricultural land and State Forests ▪ crosses five perennial waterways and two semi-perennial waterways. ▪ greater impact on moderate quality vegetation ▪ greater impact on fauna ▪ greater impact on areas of high/moderate archaeological sensitivity ▪ significant impact on number of significant indigenous sites ▪ visually dominant for larger proportion of population ▪ more properties exposed to noise requiring mitigation

The issue of compensation for land acquisition is one commonly raised for public infrastructure projects. The *Land Acquisition (Just Terms Compensation) Act 1991* facilitates partial or full acquisition for land at market value prior to the upgrade announcement. The *RTA Land Acquisition Policy* reinforces the RTA's commitment to this process.

Conclusion

The Department is satisfied there is a need to upgrade the Pacific Highway generally to improve safety and reduce travel times with safety the overriding driver of this need. This is reflected in the Minister for Planning's declaration as critical infrastructure, those sections of the Pacific Highway for which planning approval has not been sought. The Kempsey to Eungai section is a key component of the overall Pacific Highway Upgrade Program.

Further, it is acknowledged that the RTA has undertaken a thorough and exhaustive route selection process to identify the preferred option. The route selection process included an appropriate level of assessment and consultation with the community and selection of the preferred option balanced the views of the community with the need to meet the project objectives.

The Department considers it appropriate that any new investment for infrastructure be considered on economic, environmental and technical merit, which facilitates an efficient use of resources. With any new infrastructure undertaking and associated route selection, there will always be affected landholders who will not directly benefit from the outcome and others who do not support the preferred route for various reasons. The selection process must consider overall community benefit and general attitudes as well as environmental and cultural impacts and obligations. It is noted that throughout the route selection process, the eastern option was more widely supported by the community than the western alternative.

The eastern alignment bypassing Kempsey is considered, on balance by the Department to best meet the project and program objectives based on:

- better access to Kempsey and Macleay Valley coastal communities which generate high holiday traffic and congestion;
- reduced ecological impacts;
- less impact to agricultural land (all classes including State Forests);
- less impact on indigenous sites of high spiritual value;
- reduced visual and noise impacts on existing properties; and
- the ability to stage construction, which will allow earlier delivery of project benefits to the community by providing for greater flexibility in securing funding.

5.2 Hydrology

Issue

The upgrade will be designed and constructed to provide flood protection up to the 100 year Average Recurrence Interval (ARI) flood event with the exception of the Macleay floodplain crossing, which will be flood free up to the 20 year ARI event. To achieve this level of flood protection across the floodplain, the road design will incorporate bridges and embankments up to six metres high.

Forty eight (48) commercial and residential properties in Frederickton and surrounding rural areas will be flood liable in the 100 year ARI event. Maximum changes in afflux in the 100 year ARI event of up to 0.16m are predicted at Frogmore and adjacent to the Macleay River crossing. Little change in the period of inundation on the floodplain is expected, though the critical time for evacuation is anticipated to be 30 minutes earlier than the existing situation based on the rate of rise in flood events.

None of the submissions questioned the flood modelling undertaken but did raise concern with the changes to flooding, specifically the potential for the embankment and bridging structures to exacerbate flooding impacts in Kempsey and on the floodplain at Frogmore. The effect of these changes on property and flood evacuation of people and stock was raised. Changes to existing flow patterns, afflux and velocities between the new highway and the Pacific Ocean were also of concern.

Consideration

Kempsey and its surrounds are considered one of the most flood affected regions in NSW being subject to substantial and regular flooding. The Macleay River floodplain is characterised by a series of levees, drains and control structures designed to mitigate flood impacts on residential, commercial and agricultural property during small floods of up to 10 year Average Recurrence Interval (ARI).

The Proponent acknowledged from the outset that flooding was a primary issue for the project and undertook detailed studies of the Macleay floodplain to ascertain if the proposal was likely to affect characteristics such as afflux, flow velocity and period of inundation in a range of flood events ranging from the March 2001 (approximately 1:13 ARI) to the 1:500 ARI and Probable Maximum Flood (PMF) events and what effect these would have on property.

A number of bridging design options across the floodplain were considered to aid natural flow in flood events and mitigate the impacts of the project. The proposed design performed best in terms of protection to property, economic return, providing the lowest floor level inundation (excluding full bridge or do nothing options), lowest number of properties exposed to flood increase and greatest number of properties where flood conditions would be improved.

It should be recognised that flood modelling is only a tool based on a set of assumptions to be used in guiding the reader in identifying the potential impacts and should not be treated as an infallible prediction of what will happen should a particular flood event occur. The Department recognises that further refinement of the model may indicate that additional measures may need to be implemented to preserve or maintain current drainage patterns upstream of the existing highway. To this end it is recommended that a condition be imposed which enables the RTA to alter or install drainage structures on the existing Pacific Highway to preserve or maintain hydrological flow paths and flood regimes upstream.

Residences
In selecting the preferred alignment around Kempsey, the river crossing was located away from the town centre and its flood paths to avoid influencing flood characteristics in the town up to and including the 100 year ARI event. The Frederickton community has stated a desire to locate the highway and interchange near to town to minimise any perceived economic impacts of a town bypass. This decision would result in pronounced flooding impacts in Frederickton without the implementation of substantial physical mitigation measures. Construction of a levee was considered a cost-effective and appropriate method to mitigate impacts in this regard by protecting 24 residential and commercial properties up to the 100y ARI event.

The scattered distribution of residences on the floodplain means that large scale flood control devices such as the levee proposed for Frederickton were not considered appropriate and that 'at residence' treatment is a more practical and cost effective mitigation strategy in this area. The RTA has proposed a range of flood mitigation measures that could be adopted for residences located on the floodplain including:

- raising houses so as to provide a minimum 0.5m between the floor height and the 100y ARI peak flood level;
- constructing ring embankments around the building;
- flood proofing lower levels of properties; or
- constructing small levees around properties where there is localised increase in flood velocity.

Overall, the Department is of the opinion that the level of project design refinement the RTA has undertaken to minimise the flooding impacts is appropriate and that the potential impacts are acceptable given that the area is highly susceptible to flooding. The increase in impacts is not considered significant in this context. Notwithstanding, the Department believes that the potential impacts should be limited wherever possible and therefore recommends a condition which requires that the project be designed and constructed with the aim of not exceeding the performance criteria stated in the Environmental Assessment and Submissions report.

In regards to 'at property' treatments, the range of measures proposed is considered appropriate but further investigation is required to determine which will be the most appropriate for each property. The application of any particular treatment should only be in consultation and negotiation with the landowner. The Department

recommends that a condition be imposed requiring that a schedule of mitigation works be prepared for each property and the final package of works agreed between the RTA and the landowner. It is also recommended that the RTA be required to appoint an independent hydrological engineer (*i.e.* not part of the design or construction team) to assist affected property owners in negotiating appropriate reasonable and feasible mitigation measures. Further, to minimise delays to the project over stalled negotiations, it is recommended that a condition be included which enables either party (RTA or affected property owner) to refer the matter to the Director-General for resolution.

The Department of Environment and Climate Change and Department of Primary Industries (Agriculture) have considered the impact of inundation on the surrounding area and indicated that should it be recommended that the Project be approved, mitigation measures as proposed by the Proponent and the Department's recommended conditions are appropriate.

Agricultural Land

Away from Frederickton, impacts are most pronounced around Frogmore and South West Rocks Road as this is the lowest point on the floodplain and the first place where access and egress would be restricted in a flood. Flood levels in this area are projected to increase by up to 160mm in a 100 year ARI event. Frogmore is an area of regionally significant farmland, which supports a number of cropping and grazing agricultural operations. Submissions from landholders in this area identified that the loss of productive land was a major issue particularly for holdings immediately surrounding the road footprint, as this would be changed forever, potentially reducing its productivity. Changes to flooding characteristics could affect:

- the availability of high ground for stock refuge;
- the time available to move stock to refuges; and
- pasture survival or viability or cover.

There are conflicting reports on the likely impact of pasture inundation. The Environmental Assessment indicates that there is likely to be damage regardless of the length of inundation and that smaller, more frequent flood events put pasture at significant risk of damage on a more frequent basis and at greater cost to the landowner than more infrequent but larger events. Earlier investigations by the RTA (Parsons Brinckerhoff, 2004) suggest that pasture will begin to die off after 36-48 hours of inundation and can take up to six weeks to recover. The Victorian Department of Primary Industries indicates that pasture usually recovers from short duration floods (defined as 1-4 days of water cover) if no erosion or substantial deposition has taken place. Factors other than duration of inundation, which may have a bearing on the damage to pasture, include inundation depth, flow velocity, water quality material deposition, pasture length, species and soil texture (Victorian DPI, 1997).

The predicted increase in inundation period due to the project is less than one hour for a 100yr ARI event. The RTA contends that this would not be noticeable. The Victorian DPI (1997) indicates that soil erosion where topsoil and/or pasture are lost is the most serious problem where inundation is less than four days. In the case of the floodplain, erodibillity and scour resulting from flow velocities greater than 1.5ms^{-1} may remove highly prized topsoil. Increases in flood velocities can be anticipated where structures are introduced to the floodplain, particularly around bridging or culverts openings and can damage farm infrastructure.

Increased flow velocity is predicted as a result of bridge crossings which could result in localised damage to pasture and topsoil. During a 100 year event, the expected increase at the bridge at South West Rocks Road would be from 0.7ms^{-1} to 0.9ms^{-1}. The RTA Road Design Guide (2006) specifies that flow velocity of less than 1.5ms^{-1} is not likely to cause erosion of average uniform crop cover. Installation of scour protection and energy dissipation devices is proposed to mitigate the potential impacts of increased flow velocity. These will be confirmed during the detailed design in consultation with the land owner but could include placement of rock material or vegetation adjacent to bridge openings. The Department concurs with this approach and recommends that the hydrological mitigation report, required prior to construction commencing on the floodplain, include measures to be implemented to minimise scour and dissipate energy at locations where increased velocities are anticipated as a result of the project which could result in soil erosion or pasture damage.

Emergency Flood Evacuation and Stock Refuge

Rate of rise refers to the total time available for parties to enact emergency evacuation procedures and remove individuals or stock from danger. The construction of embankment and other structures on the floodplain is unlikely to significantly affect the rate of rise or increase risk to safety. Notwithstanding, South West Rocks Road and Red Hill Lane are expected to become inundated approximately 30 minutes earlier than is currently experienced provided appropriate evacuation procedures are in place for affected properties, this is considered acceptable.

The Department recommends that construction not be allowed to commence in areas likely to alter flood conditions on the Macleay River floodplain until the mitigation works identified in the hydrological mitigation report have been completed. This condition does not necessarily preclude all works on the floodplain where it can be demonstrated to the Director-General's satisfaction that there is no effect on flooding or where any mitigation works for any particular aspect of construction have been installed.

Current stock protection plans rely on upstream flood monitoring and reporting and is carried out by walking or trucking stock to high ground. Evacuation by truck is the only practical option for some properties on the floodplain and this is constrained by the low point on South West Rocks Road. The Rural Lands Protection Board stock refuge on Old Station Road will remain available for temporary holding of stock prior to transportation but not as a medium to long term option. An existing evacuation route north of Frederickton will be closed; however, alternative routes further north and along the existing highway will remain open.

The Environmental Assessment states that raising of South West Rocks Road was considered to improve evacuation for residents and stock, however construction of mounds for stock refuge is proposed as this would have less impact on local flooding and would be more cost effective. It is proposed that these would serve as refuge areas during minor floods and as temporary holding areas prior to transportation in bigger flood events. The details of mounds and loading facilities would be determined during detailed design and affected farmers advised of which events they would be suitable for and how they will work in the context of any particular flood event. The Department supports this approach.

Frederickton and East Kempsey are currently cut off from emergency services during flood events greater than the 10 year ARI. Despite a 20 year ARI flood design for the project across the floodplain, Emergency Services would not be able to access accidents on the upgrade during events greater than the 10 year ARI event as Spooner Avenue is currently inundated at this event. Upgrading of Spooner Avenue was considered not cost effective and the improved driving conditions provided by the upgrade would reduce the likelihood of accidents between Kempsey and Frederickton requiring the attendance of the SES for events greater than the 10 year ARI and less than the 20 year ARI. The RTA also noted that the highway would most likely be accessible by other regional SES units in the event that an accident occurred at a time when floodwaters prevented access to the highway for the Kempsey SES.

The Department acknowledges that it is not the role of the RTA to resolve existing flood access issues not caused by the upgrade and that the upgrade in itself will improve safety, one of the key objectives of the Pacific Highway Upgrade Program. Despite this, it is considered inappropriate to absolve responsibility by relying on design objectives that do not directly take into account extreme weather and human nature, and the possibility that other regional SES units may be able to access any accidents without further investigation of the feasibility.

In addition to the Department's concerns, a number of agencies identified that evacuation procedures will need revision in light of the project itself, as well as the changes to flooding that will result. The Department concurs with this advice and recommends a condition requiring the Proponent to subsidise any new or necessary updates to existing flood evacuation plans and documents to reflect changes to flooding characteristics as a result of the project, in consultation with relevant stakeholders. It should be noted however, that the intention of this condition is not for the RTA to take responsibility for implementing evacuation or any actions (such as building new infrastructure) which might be covered by these plans and which do not directly relate to the construction or operation of the highway upgrade. These are intended to remain the responsibility of the key emergency service providers and Council.

Conclusion

The flood modelling undertaken included optimisation of bridge configurations and other stormwater infrastructure to minimise changes to the flood regime and land use in the area of the upgrade. The Department believes that this approach is appropriate and recognises that further refinement of the model will be undertaken during detailed design of the project with the aim to further optimise the design against potential impacts.

It has been identified that although changes to hydrology are minor, a precautionary approach should be taken with construction on the floodplain and in other areas such as Pola and Collombatti Creeks. This approach is supported by relevant Government agencies. The Department considers it appropriate that prior to commencing any work, which may affect flood conditions on the floodplain, works identified in the hydrological mitigation report have been completed or that it be demonstrated that any proposed works will not have any effect on flooding.

Further, any changes to flooding characteristics could affect the evacuation period for stock and residents and may risk safety. The Department considers it prudent that the RTA be required to subsidise the development or updating of evacuation plans with the Council and State Emergency Service where these are required as a result of the construction or operation of the highway.

5.3 Noise

Issue

The Kempsey to Eungai upgrade is classified as a freeway/arterial road in accordance with the NSW Environmental Criteria for Road Traffic noise (ECRTN). The majority of the upgrade is on a new road alignment, where criteria that are more stringent apply compared to redeveloped sections (the northern and southern areas) of the existing highway. Tie-in sections at the northern and southern ends of the upgrade will follow the existing alignment and will be subject to the redeveloped road criteria.

A catchment approach was adopted to assess the noise impacts of both construction and operation of the proposal. Thirty one noise catchments extending 300 metres from the centre line of the proposed route alignment were identified and monitoring undertaken at representative locations to determine existing background noise characteristics. One hundred and twenty (120) sensitive receivers were identified including the Kempsey Seventh Day Adventist church, Kempsey Adventist primary school, Frederickton Public School and Frederickton Golf Course.

Project construction is likely to take approximately four years, exposing residents to prolonged periods of construction noise. Significant noise generating activities and facilities for include clearing, bulk earthworks, bridge construction, pavement laying, concrete batching plants and site compounds. Background noise levels are expected to be exceeded at sensitive receivers in all catchments during construction. Bulk earthworks will be the longest duration activity at up to six months and is likely to generate the highest noise levels.

Residences located adjacent to the existing Pacific Highway are likely to receive a significant decrease in noise once the project opens to traffic. Conversely, a new set of sensitive receivers will be exposed to road traffic noise that would not have been previously.

Eighteen submissions raised noise during construction and operation, the use of acoustic barriers and at residence treatments to achieve noise levels. The Department of Environment and Climate Change indicated support for the project subject to further consideration of reasonable and feasible noise mitigation strategies.

Consideration

Construction Noise

Construction hours will largely occur within 'standard' construction hours between 7am to 6pm Monday to Friday and 8am to 1pm on Saturdays. This has been reinforced through the Department's recommended conditions of approval. Additional conditions identify a range of circumstances where construction is permitted outside the specified hours for specific activities in recognition that some activities must be undertaken out of hours due to

safety or road closure requirements. Any proposal to vary construction hours other than those necessary for safety or road closure requirements would be considered on its merits and will take into consideration the justification for undertaking the works outside standard hours, community desires and benefits, and management processes.

It is widely recognised that it is difficult for a Proponent to meet construction noise goals for many construction activities. Standard practice has been that the goals established in the Chapter 171 of the Environmental Noise Control Manual (SPCC, 1985) should be used by a Proponent as a noise objective or target for construction to ensure that all reasonable and feasible measures have been applied and not as a strict criterion for compliance. As the project would take more than 26 weeks to construct, the standard applicable criteria is that the L_{A10} noise level measured over a period of not less than 15 minutes should not exceed the background L_{A90} noise level by more than 5 dB(A) at any noise sensitive receiver. The Department therefore recommends specifying that the standard construction noise objectives be applied to construction activities and requiring the Proponent to identify and manage activities that are likely to exceed the objectives in accordance with measures to be set out in a Construction Noise and Vibration Management Plan.

To ensure that educational facilities are not unduly affected during critical periods, the Department also recommends that the RTA consult with affected facilities to schedule audible construction works so as not to coincide with formal half year or end of year exam periods of those schools unless an alternative agreement can be reached. This condition is intended to apply to formal examination periods such as end of term or end of year exams. It is not intended that any routine or informal 'pop' quizzes which the school/individual teachers may choose to hold would trigger this condition.

Road Traffic Noise

There are two distinct acoustic environments along the proposed upgrade – the low background noise area across the floodplain and Collombatti Rail and areas such as Frederickton, South and East Kempsey and Barrangyatti to Eungai Rail currently experience traffic noise of varying levels from the existing highway.

The Department notes that there will be a significant number of receivers currently affected by highway traffic noise that will directly benefit from the proposal and will experience an improved noise environment when much of the through town traffic switches to the upgrade and the existing highway through Kempsey and Frederickton reverts to a more local traffic function. Notwithstanding, predicted traffic noise levels resulting from the upgrade will exceed the relevant criteria by up to 11 dB(A) at 55 sensitive receivers in 2011 and by up to 146dB(A) at 85 sensitive receivers in 2021 if not mitigated. The RTA has considered a range of measures to mitigate noise impacts both during route selection which took into account the number of noise affected receivers (amongst other factors), alignment optimisation and physical mitigation measures such as noise barriers, low noise pavement and at residence treatments.

The Department notes the RTA design process has attempted to minimise grade changes and to introduce smooth curves to influence driver behaviour to reduce noise from vehicles as far as possible (such as exhaust braking by trucks). Despite this, it remains that a new noise source will be introduced or intensified for up to 85 receivers in 2021. For these receivers, the RTA has committed to reasonable and feasible mitigation to properties directly affected by road noise from highway traffic.

Reasonable and feasible 'at source' treatments generally includes the use of noise mounds, 'quiet' road pavements and barriers and are considered to be a cost effective solution in areas where residences are closely grouped, where the barriers do not affect property access and where they are accepted by residents from a visual or other personal perspective. In the Kempsey to Eungai context, barriers between 1.5 metres and 4.5 metres are proposed for the east Kempsey area near Crescent Head Road, shown in Figure 5.

The Department notes noise barriers higher than five metres from ground level may raise concern with residents due to their visual impact despite improving acoustic amenity. As part of the detailed design process, the final barrier heights along with other noise mitigation measures at the source, will be reviewed and optimised. The Department considers it appropriate that the directly affected community is consulted in regards to achieving an acceptable balance between reducing noise impacts and visual or other amenity.

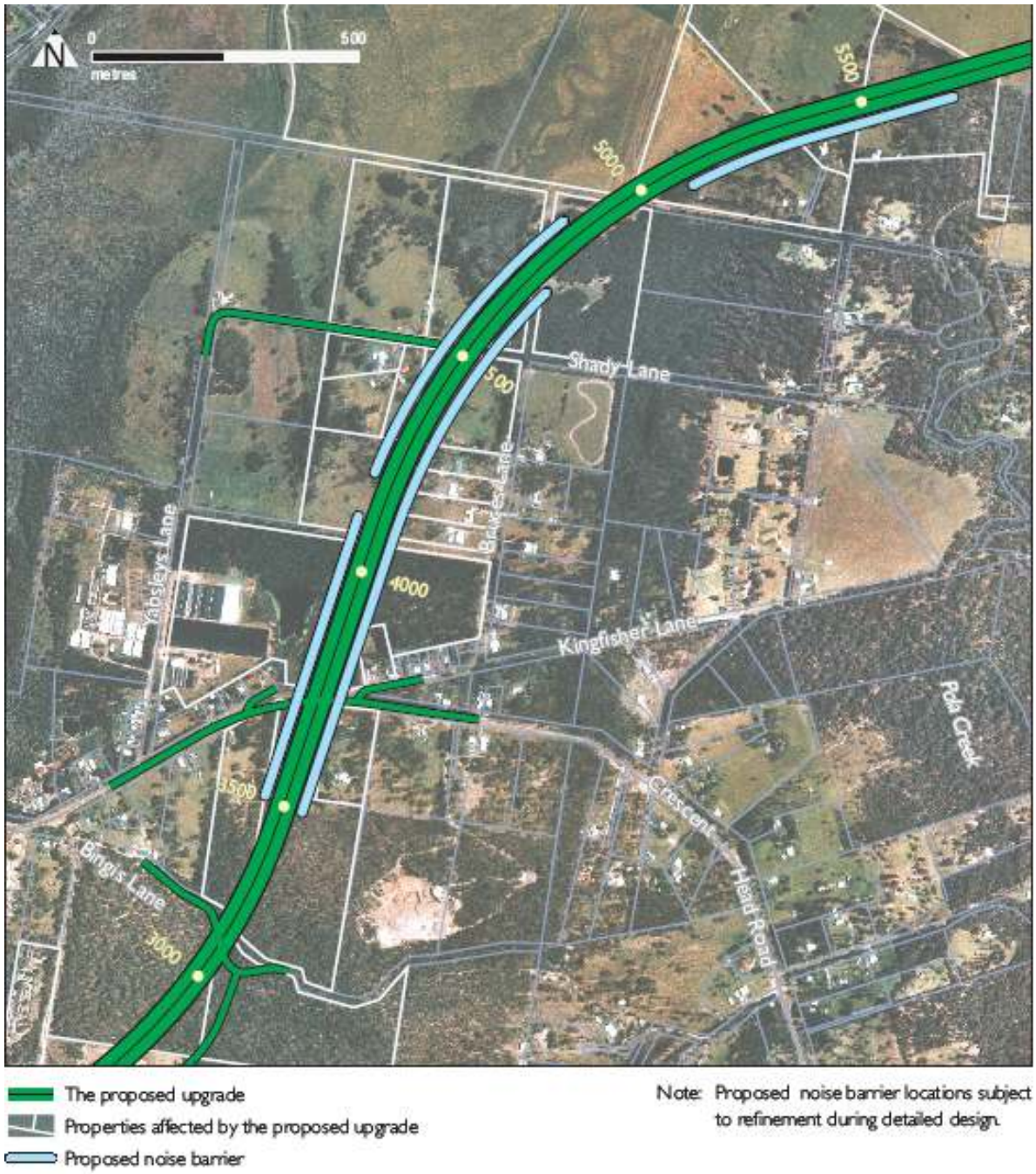


Figure 5: Indicative Noise Wall Locations

Where at source treatments are not sufficient or are not reasonable or feasible to reduce noise impacts to the criteria, at receiver or building treatments are considered. At receiver controls generally consist of a combination of measures including mechanical ventilation (ventilation systems or air conditioning to allow for fresh air with doors and windows closed), sealing of wall vents, upgraded windows, glazing and doors. The combination and effectiveness of these treatments is dependent on the required reduction in noise levels and the materials from which the structure (*i.e.* residence/building). Depending on the combination of measures applied, noise reductions of greater than 10dB(A) are possible.

Notwithstanding the above, the Department acknowledges the limitations of modelling and that the outputs are an estimate based on both the upgrade design put forward at the Environmental Assessment phase and predicted traffic volumes both of which may change to some degree during detailed design. Hydrological impacts from the Project as described in Section 5.3 are likely to occur which may involve properties being raised or other mitigation such as ring levees which could influence noise levels at a property and therefore, flexibility in the control of noise through a suite of mitigation measures is considered an appropriate approach.

To address possible changes to the upgrade during detailed design, the Department recommends a condition that the RTA prepare and submit for the Director-General's approval prior to construction, a review of the proposed operational noise mitigation measures based on the detailed design. This would include a review of predicted noise levels and reasonable and feasible noise mitigation methods based on the refined alignment.

The RTA has committed to monitoring actual noise levels 12 months after opening in order to confirm that noise mitigation measures are effective and predicted noise levels are achieved. Where substantial discrepancies are identified, mitigation measures will be reviewed and further reasonable and feasible measures implemented where possible,. In order to confirm this commitment, the Department recommends requiring the Proponent to undertake a program of monitoring to confirm the noise performance of the project within one year of operation commencing. It is recommended that the Proponent report on this monitoring to the Department and the DECC detailing any additional measures that may be required to ensure compliance with the predicted noise levels.

Conclusion

Overall, the Department is satisfied that the noise impact assessment is appropriate and a conservative prediction of potential noise impacts at sensitive receivers. The Proponent has demonstrated that the proposed highway could operate with a range of mitigation measures in place such that the relevant criteria could be met at most sensitive receivers.

To ensure that concerns raised in submissions regarding noise and vibration are addressed for both construction and operation noise impacts, and that there is flexibility to allow for changes as a result of detailed design, the Department has recommended a suite of conditions. These include preparation of a construction noise management plan, community consultation and complaints procedures, review of the operational noise impacts and mitigation measures based on detailed design and post opening monitoring to confirm the predictions made and to make rectifications where necessary and appropriate.

The Department is of the opinion that, with the implementation of these conditions and the Proponent's commitments, the potential noise and vibration impacts of the proposal could be mitigated to an acceptable level, such that the benefits of the proposal would outweigh any impacts.

5.4 Flora and Fauna

Issue

The route to the south of the Macleay River traverses largely cleared lands or the edge of remnant vegetation. North of the river, the route bisects a number of intact remnant vegetation areas. Eleven native vegetation communities, including four endangered ecological communities, a SEPP 14 wetland (Collombatti Swamp) and one regionally significant community were recorded on or adjacent to the proposed upgrade alignment. The condition of these communities varies from highly disturbed with high degree of weed infestation through to high quality, high value habitats.

Approximately 286.5 hectares of vegetation would be cleared for the road corridor and ancillary areas. A total of 514 plant species, including three threatened species were recorded. Two hundred and eleven (211) fauna species were recorded in the area comprising 17 amphibians, 15 reptiles, 47 mammals and 129 birds. Of these, 23 species are threatened.

A number of community submissions identified vegetation clearing and fauna displacement as a concern. Submissions from community members south of the Macleay River in particular identified the presence of both threatened and abundant fauna species that frequent the area. It was stated that construction would discourage their return, which was considered a factor for which residents and visitors are drawn to the area.

Government agencies noted the lack of a comprehensive offset package for the Project. Other issues raised included:

- the impact of vegetation fragmentation (specifically EECs) and significance of Mahogany Dry Sclerophyll forest;
- translocation of *Maundia triglochinoides;*
- fauna fencing, the number and functionality of crossings, and the potential for the upgrade to change behaviour in threatened fauna species post construction;
- the need to mitigate, minimise and manage impacts to waterways and crossings; and
- the need for a noxious weed management plan.

Consideration

Terrestrial Ecology

The Department notes that the RTA has reasonably attempted to avoid disturbance to native vegetation, threatened species and habitats through route selection and alignment refining process, which have minimised the direct impacts on endangered ecological communities to an acceptable degree. Table 4 shows the total area of vegetation in the study area and that which will be disturbed as a result of the upgrade. Refinements to the proposed alignment have resulted in one threatened species being avoided completely. The RTA has further committed to minimising the construction footprint in areas of known significant fauna populations, introduction of temporary fauna fencing along the route and the implementation of a flora and fauna sub-plan detailing procedures to minimise impacts on species during construction.

Four endangered ecological communities listed under the *Threatened Species Conservation Act 1995* comprising one regionally significant community will be affected by the upgrade. Mahogany Dry Sclerophyll populations are considered regionally significant due to the limited percentage (less than 15%) contained within conservation reserves. In areas of EECs the Proponent has identified that clearing will be confined to the road footprint. Areas outside the route alignment will be clearly marked so as to limit the impact of construction. It is accepted that complete avoidance of vegetated areas is not possible when considering other project objectives, design requirements and environmental constraints.

Table 4: Vegetation to be cleared during construction

Vegetation Community	Area occupied within study area (ha)	Area cleared for road corridor (ha)	Area cleared for ancillary areas (ha)	Total clearing (ha)	% removed from the study area
Blackbutt Dry Sclerophyll Forest	2494	130.0	19.3	149.3	6.0
Grey Gum/Tallowwood Dry Sclerophyll Forest	775	41.1	1.4	42.5	5.5
Freshwater Wetlands[1]	507	14.5.	0.0	14.5	2.9
Swamp Sclerophyll Forest[1]	445	17.4	0.0	17.4	3.9
Swamp Oak Floodplain Forest[1]	397	23.1	0.0	23.1	5.8
Stringybark/Ironbark/ Bloodwood Dry Sclerophyll Forest	165	2.5	1.3	3.8	2.3
Scribbly Gum Dry Sclerophyll Forest	165	12.0	3.4	15.4	9.3
River-flat Eucalypt Forest[1]	119	8.2	0.0	8.2	6.9
Plantation	24	6.8	<0.1	6.9	28.3
Mahogany Dry Sclerophyll Forest[2]	14	5.4	0.0	5.4	38.6
Total	5105	261.00	25.5	286.50	

The RTA identified that large tracts of continuous vegetated land in the area of the proposed upgrade alignment function as core habitat or corridors for a range of fauna species. Overall the land parcels affected are considered of sufficient size to be self-sustaining allowing fauna to continue to forage in the residual habitats

[1] Listed as an endangered ecological community under the Threatened Species Conservation Act 1995

[2] Regionally Significant

however, this does not take into account the home range of a specific individual and how these will be affected by fragmentation. The Department acknowledges that clearing of vegetation will have at least a short-term impact on fauna movement. The RTA has indicated that it will be 12 months from the start of construction at most before the installation of permanent fauna crossing points. Some fauna species may continue to cross in the interim, however given that most species are most active at dawn/dusk or at night and outside of standard construction hours it is considered that potential conflicts with construction equipment will be minimised. Notwithstanding, appropriate measures will need to be put in place to highlight potential areas where fauna crossing may be concentrated for both construction workers and drivers once the upgrade is opened to traffic.

Long-term, impacts are considered manageable with the introduction of fauna crossings to enable wildlife to cross unimpeded and separated from vehicular traffic at nominated points along the upgrade. This will maintain movement and habitat connectivity. Anecdotal evidence provided by the RTA on completed Pacific Highway Upgrades, such as Karuah Bypass, suggests that an array of endemic and introduced species use these structures if vegetation is continuous up to the crossing and this is combined with fauna fencing to encourage their use. Fauna fencing will be installed to direct wildlife into the crossing as experience has shown that fauna will cross the highway via the path of least resistance, increasing the risk of vehicle strike and mortality unless crossings and fencing are used in combination.

This experience was further reinforced through the 2003 CSIRO study that examined the usage of fauna crossings and fencing along the Brunswick Heads Bypass in 2000 and reached the conclusion that this form of mitigation facilitates the safe passage for a range of species and should be adopted widely. The Department further recommends that fauna crossings be designed in consultation with DECC to ensure best practice is incorporated into the project and complemented with fauna fencing to facilitate safe fauna movements and prevent or deter fauna movement across the project except at nominated locations.

It is recommended that a condition of approval be imposed requiring the RTA to undertake monitoring of threatened species in and adjacent to the upgrade footprint. The aim of the monitoring program is to set targets and assess the effectiveness of the mitigation measures identified in the offset strategy against those targets. It is proposed that monitoring have both a construction and post road opening element to it, identify changes to habitat usage adjacent to the footprint (by both flora and fauna) and indicate where possible whether these are attributable to the project. It is intended that monitoring continue until it can be demonstrated that the mitigation measures are effective over a minimum of three consecutive monitoring periods. This approach enables monitoring to be finalised on the basis of having achieved a particular outcome rather than on reaching an arbitrary time period which does not guarantee that the measures are successful or that the desired outcome has been achieved.

With respect to management of introduced species, the Proponent recognises that road construction has potential to introduce noxious species into areas which are currently undisturbed, or alternatively introducing species to previously unaffected properties. The Proponent has committed to the management of weeds through a strategy to mitigate or minimise potential for weed transfer during construction. The Department is satisfied with this approach.

Maundia triglochinoides

The proposed upgrade would disturb approximately 350 square metres of two populations (covering a total of 1000m^2) of *Maundia triglochinoides* in the vicinity of Seven Hills Road. The number of individuals in each population is not known, in part due to its growth characteristics (spread by rhizome) but also because the landowner would not allow access to the property during preparation of the Environmental Assessment. Only 35 known populations remain in NSW, of which 32 are located on the North Coast. The RTA has identified that the protection and expansion of known populations is critical. Indirect disturbance from the Project such as alteration to hydrology, water quality and weed invasion further increases the risk to these populations.

The RTA considered the impacts of removal of the species and assessed mitigation and monitoring options including translocation for the *Maundia triglochinoides*. Both populations occur in areas which are highly modified as a result of clearing for grazing and the overall conditions are unlikely to be changed significantly by the project but it is acknowledged that edge effects could occur on the remaining individuals. The RTA highlights that previous cultivation and translocation attempts of this particular species have been unsuccessful, raising

uncertainty of the likely success of this approach. The Department's preference is for avoidance rather than translocation - a measure that should be implemented as a last resort.

The RTA has well documented and successful experiences in the translocation of various threatened plant species on other Pacific Highway projects under the guidance of recognised flora and fauna experts and has committed to reducing individual loss by minimising the road footprint in areas where threatened species are located to the greatest extent practical, as well as to undertake research of the species to increase the chances of in-tact populations surviving. Should avoidance not be an option in this situation, the Department recommends that the proponent investigate the potential for translocation of individuals that will be directly affected by the proposal. If translocation is found to be feasible, the RTA will be required to prepare and implement a translocation plan for those individuals affected by the project. If translocation is not feasible or reasonable, an alternative offset must factored into the broader offsets strategy/package required as part of the upgrade.

The Department is satisfied that, with the recommended conditions of approval and the Proponent's commitments, appropriate measures are in place to maximise to the survival *of Maundia triglochinoides* populations in the local area in the longer term and that the direct impacts would be minimised. Further, the Proponent's commitments provide an opportunity to gain additional knowledge about the species biology which will have broader benefits than simply this project and which should aid in ensuring the ongoing survival of the species.

Aquatic Ecology

A number of waterways and creek crossings may be affected by the upgrade with permanent or temporary structures installed that may restrict fish passage. The DPI identified the need to consider crossings in accordance with migratory patterns of endemic species (*i.e.* Bass). No endangered aquatic species were recorded in the affected area.

Aquatic environments such as seagrasses, mangroves and salt mashes may be indirectly affected during construction with no impacts predicted once the upgrade is open to traffic. The nearest SEPP 14 wetland is located 100m to the east of the project. The RTA has committed to constructing creek crossings in consultation with the DPI and in accordance with the *DPI Policy and Guidelines for Aquatic Habitat Management and Fish Conservation* (1999). This Department considers this an appropriate approach to management of aquatic species and habitats.

Offset Strategy

Whilst no formal offset strategy was proposed as part of the proposal or submissions report, the Proponent has committed to implementing a package to compensate for the impacts of the upgrade to the satisfaction of agencies prior to completion of the Project. This includes a commitment to provide an offset for 382 hectares which includes vegetation directly affected by the construction of the proposal and that likely to be affected by edge effects.

The RTA has previously adopted to address biodiversity offsets on a regional basis in agreement with the Department of Environment and Climate Change (and its predecessor agencies). This has invovled a number of projects within a given section of the highway whereby the total impact is estimated and an offset area agreed. Agreements are in place and implemented for sections between Hexham and Port Macquarie, and Ballina and the Queensland border. The agreements for these two sections have resulted in offsets of approximately 1209 hectares to address 516 hectares of native vegetation directly and indirectly impacted (a ratio of 2.3:1). This approach is preferred by the RTA and the DECC as it is considered to ensure a better result by providing larger areas of land of greater interest to the relevant land management agencies and can better provide better links to land already conserved. Whilst a detailed offset is not in place for this project (or this section between Port Macquarie and Coffs Harbour), in principle agreement has been made between the RTA and the DECC to pursue this approach. The Department concurs with the potentially greater regional benefits that could be achieved by adopting this approach in preference to a piecement "project by project" appraoch and considers that as the key regulatory agency in relation to this matter that it should be involved in the development of future agreements.

The Department notes the concerns of the Department of Environment and Climate Change and the Department of Primary Industries that identify that the benefit of an offset determined after construction can be lower than that

which could be implemented prior to construction. The RTA's key argument for the lack of a concrete offset package is due to economic considerations and that it is not feasible to developing such a package without the certainty of having an approval.

Whilst the Department accepts the DECC and DPI position that a more desirable and a better overall outcome can often be achieved where offsets are incorporated into the project from an early stage, it is acknowledged that it is not always possible nor essential that offsets be finalised prior to construction. The Department considers it appropriate therefore to recommend a two staged approach to finalising the offset package for the project. The first stage requires the RTA to develop an offset strategy that provides a framework for developing the final offset package. The Department considers that this should be finalised and approved by the Director General prior to construction. This strategy must be prepared in consultation with the Department and DECC and clearly outline the areas of habitat that will be affected and require offsetting, sets objectives for the final package, considers the range of measures available and a decision-making framework to select the measures to achieve the objectives. The preparation of the strategy does not preclude the use of sectional agreements discussed above.

The Department also recognises that it is not necessary that an offset be comprised solely of land purchased for conservation purposes. Availability of land will be dependent on a number of factors including, but not limited to, the availability of land comprising the target communities (both vegetation and fauna), the quality of any available land and the willingness of the landholder to sell. To this end, the Department accepts that the offset strategy may involve a combination of measures, which in total provide a beneficial outcome to the region. These could include, amongst other options, additional management measures, translocation and funding of management or research.

The second stage requires the implementation of the strategy to determine a final offset package consistent with the offset strategy to be submitted within 12 months of construction starting for the Director-General's approval, including monitoring and other amelioration and management measures. The Department is satisfied that the potential impacts of the proposal can be mitigated with a comprehensive compensatory habitat package to complement other specific measures for flora and fauna management during construction and operation.

Conclusion

The 286.5 hectares of to be cleared for construction ranges from high quality through to weed infested communities. A number of submissions highlighted the existence of a wide array of native flora and fauna that will be affected which contributes to the rural amenity of the wider Macleay region. The Department recognises these concerns and acknowledges that the project will affect natural areas supporting native species, including endangered ecological communities and threatened species.

The imposition of a strategy to determine an appropriate offset for those communities and species affected by the project will ensure that communities at risk from development are protected and managed in the long-term. Dedicated fauna crossing points in areas of documented habitat and corridors will maximise fauna movement opportunities across the project and minimise mortality by directing them into identified crossing paths. The Department is satisfied that the recommended conditions of approval and the RTA's Statement of Commitments appropriately address the concerns raised in submissions including those by the Department of Environment and Climate Change and the Department of Primary Industries.

5.5 Visual Impact

Issue

The visual impact of the upgrade was initially considered in the route selection phase of the project. Measures proposed to mitigate impacts on visual amenity resulting from the proposed upgrade rely largely on the urban design of structures, embankments and on the landscape design. The Environmental Assessment outlined objectives with regard to visual and urban design for the overall Pacific Highway Upgrade Program.

Five visual precincts grouped were identified in the study area. These were:

- Southern Ridge (southern termination point to north of Old Station Road);
- Macleay River Floodplain (north of Old Station Road to north of Frederickton);
- Central Ridge (north of Frederickton to north of Kemps Access);
- Collombatti Floodplain (north of Kemps Access to south of Cooks Lane); and
- Northern Ridge (north of Cooks lane to northern termination point).

The carriageway would be located within a corridor ranging from 35-40m in width with the footprint of interchanges, cuttings and embankments much larger. The new road alignment will have a significant impact on existing views by introducing new elements into the environment. Vegetation would be cleared, embankments and cuttings formed, and bridges and other structures installed. Visual impacts associated with construction would be temporary; however, substantial permanent changes to the local visual character would also occur and are the prime focus of this assessment.

Thirteen submissions raised visual impact as an issue of concern. Some of these linked visual impact to property value and highlighted the need for compensation. Submissions were largely associated with properties east of Kempsey, and around Frogmore, Frederickton and the Macleay River crossing.

Consideration

The highway will comprise a number of built elements. Bridging structures, embankments and cuttings are considered the most significant. The Department notes that the visual assessment refers to the road user experience. User experience is considered a key objective of the Pacific Highway upgrade.

Whilst this is considered important, generally, these users will be subjected to views for a short duration (30 minutes) and this should be balanced against the long-term impacts on residents and the local community that would be exposed to permanent change.

Figure 6 shows the visual catchment of the upgrade with the extent of impact directly related to topography and in particular the wide viewing catchments across the Collombatti and Macleay floodplains. Although visual assessment concluded that there would be a considerable visual impact on the Collombatti floodplain, effects on properties would be minor due to State Forest plantations and existing vegetation that, will shield the highway.

Perceived impacts on property value as a result of the visual impacts of the proposal are difficult to prove. The RTA has committed to and is obliged to acquire property directly affected by the proposed upgrade under the *Land Acquisition (Just Terms) Compensation Act*. It is not the role of the Department to engage in issues of indirect impacts on property value, particularly where environmental impacts have been addressed and are considered acceptable. The Department notes that it is not RTA policy to compensate landholders for indirect impacts due to the proximity of new roads.

Bridging Structures

Three bridging structures ranging from approximately 650 to 800 metres are proposed for the Macleay floodplain and river crossing, where the visual catchment is largest. Whilst these are subject to detailed design, the location and size of these structures mean they are difficult to hide and the Department accepts there will be a form of visual impact. The design considers the *RTA Bridge Aesthetics Guidelines* (2003) which aim to design structures that are elegant and unobtrusive in order to minimise their visual impact. RTA experience identifies that a structure simple in form and continuous in design is more widely accepted by the community, as it tends to blend into the background as distance increases.

Embankments

Structures up to six metres in high are proposed for the floodplain between Frogmore and Frederickton, which will affect on views at properties on the floodplain and at Frederickton that range from river to distant views of the Pacific Ocean and Smoky Cape Lighthouse. Built elements will contrast against the flat topography of the area.

The Macleay River crossing in particular is difficult to blend into the surrounds. The RTA has identified it will minimise the intrusiveness of the batter slope of the embankments across the floodplain and design structures consistent with the 2004 RTA document *Beyond the Pavement* (simple, unobtrusive and elegant). Grasses and

scattered trees will be used to landscape completed embankments. The Department notes however, that few residential properties would suffer a loss in district views as due to the active nature of the floodplain, dwellings are generally located on higher ground and will either overlook the project or, are located at a distance, thereby reducing the road's dominance. For the few properties low-lying (to the west of the alignment), the bridging structures will still provide a filtered district view to the ocean with the Macleay River views not disturbed by the project. Properties east of the alignment will maintain views towards the ocean.

Frederickton Levee

A levee approximately two metres high, comprising a mix of wall and embankment is proposed to provide 100 year ARI event flood immunity to areas of Frederickton. The design of the levee would minimise impacts on the visual environment, particularly across the Macleay River as well as the heritage values of Frederickton generally. Endemic vegetation will be planted along the riverbank and integrated with existing native vegetation. Properties directly affected will have an opportunity to influence landscaping of the structure. This is considered appropriate.

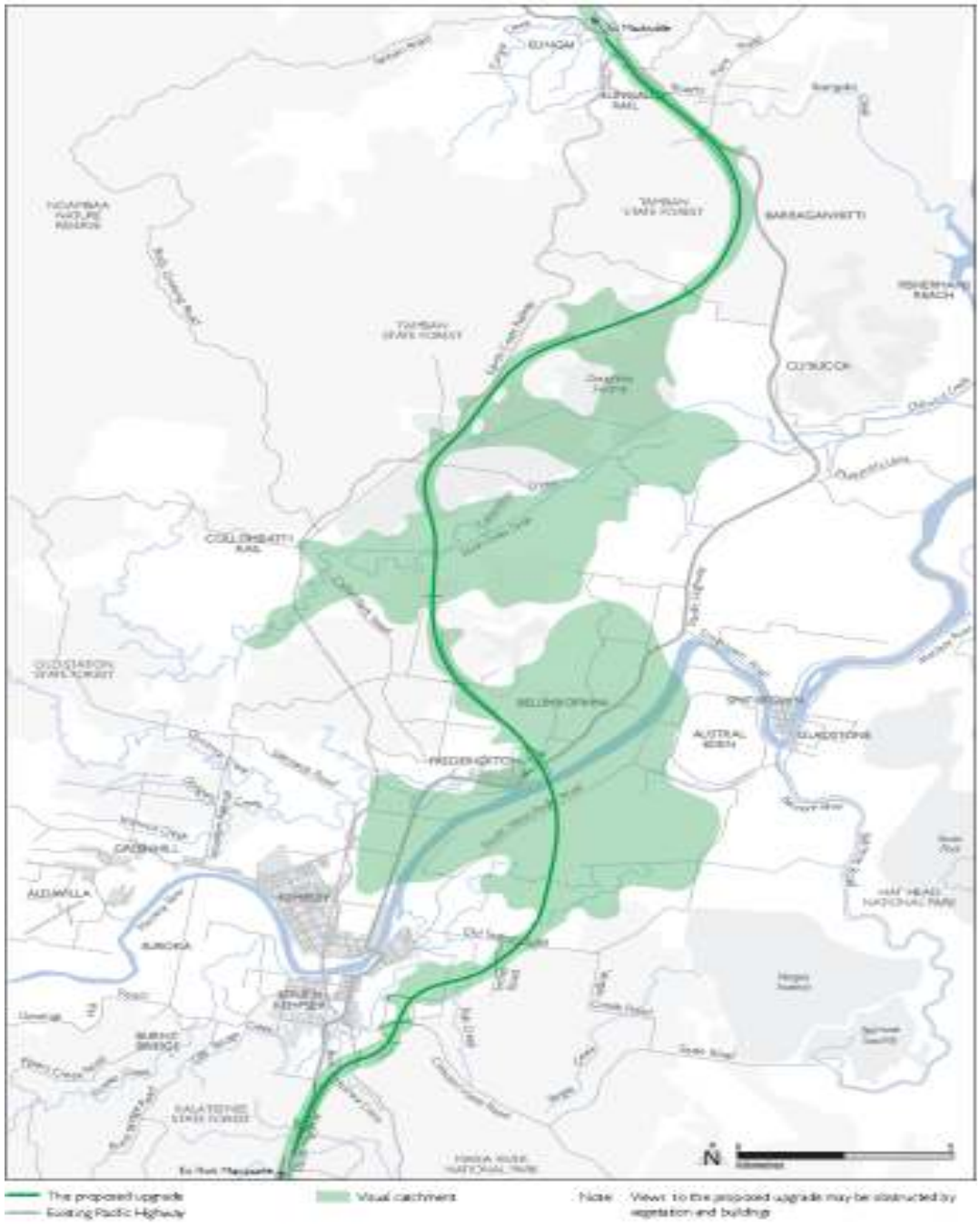


Figure 6: Visual Catchment of Proposed Upgrade

The Proponent's statement of commitments identifies that the general landscape design for the project, is for a rural highway that reflects the biophysical and cultural environment with the three interchanges each having a distinct character. Additionally, the Proponent has committed to an Urban Design and Landscape Plan to provide a blueprint for the permanent elements of the project including vegetation schedules and autochthonous plantings, design elements such as bridging, culverts, noise walls and retaining walls, 'gateway or interchange treatments' and pedestrian, cycleway and signage requirements. These will be designed in consultation with various State Agencies, relevant Councils and the Community Liaison Group (CLG).

This approach adopted for all upgrade projects is advocated by the Department as it has brought improvements to urban design and landscaping by minimising the intrusiveness of the infrastructure and provides an avenue for the local community to influence the deign and its context and the opportunity to address local concerns as they will ultimately live with the completed product.

With respect to community concerns, the Department acknowledges that the project will have an impact on views, for which any new element of this size must integrate into its immediate surroundings. Urban design generally in the context of a new highway has improved substantially over time and no longer simply comprises significant solid concrete masses in which form dominates. This is reflected in the use of a slender, elegant design proposed for the dominating bridge structures for example and the inclusion of extensive plantings in the initial concept design for the highway as illustrated in the EA. Further, the RTA has developed numerous best practice urban design guidelines for use on such projects, in conjunction with the Government Architect and key State agencies, to ensure high-quality design outcomes are achieved on any new project.

The Department considers that the visual impacts of the proposal are manageable but that mitigation should be developed in consultation with the local community including those specific to the proposal design as well as the urban improvement works. In particular, measures to minimise cutting requirements, noise barrier design and landscaping requirements should be developed in consultation with directly affected residents and the Community Liaison Group. This will provide amelioration at the point source (road) and negate the need for compensation to receivers. Further, the Department's recommended conditions of approval aim to keep the identified impacts within acceptable limits, to ensure that any property value effects are minimal.

Conclusion

The Department recognises the concerns of the potentially affected residents regarding visual amenity impacts but does not believe that the residual amenity impacts in the context of the Macleay Valley region are sufficient to negate the significant economic and safety benefits presented by the proposal.

Nevertheless, the Department recognises that the proposed project will alter the landscape and views of the area, in particular across the floodplain at Frogmore and across the Macleay generally. The acceptability of changes to the visual outlook will always be subject to debate because of the subjectivity of individual likes and dislikes. However, the Department considers that the eastern route generally as discussed in section 5.1 is the suitable setting for the new highway in a landscape dominated by European settlement and that the impacts are acceptable. The Department's recommended conditions of approval will serve to reduce the visual amenity impact of the proposal.

The Department agrees with this approach when balanced against the State and Regional benefits.

5.6 Community Infrastructure

Issue

The proposed alignment located in close proximity to Frederickton and Kempsey will directly affect a memorial to World War One veterans and the Frederickton boat ramp. The route selection process generally, considers impacts to private and public landholdings including infrastructure however, at times direct impact is unavoidable.

Whilst the *Land Acquisition (Just Terms) Act 1991* provides due process for property holders, there is also an obligation on the proponent to replace or improve items that will be affected to provide an indirect benefit to the community.

Consideration

Frederickton Boat Ramp and Amenities
As part of the Frederickton levee construction the existing boat ramp in Frederickton would be removed. Retention of the boat ramp was deemed inappropriate by the RTA as this would require an opening in the levee, which would compromise its purpose and functioning.

The Macleay is a navigable watercourse that is utilised primarily for recreational purposes including the local Kempsey Bass fishing club, one of the largest such groups in the State. Replacement facilities are proposed to the east of the existing road alignment. The Department considers any opportunity to enhance boating facilities in the area to increase the River's attractiveness and its recreational qualities are to be encouraged. The Proponent identified the potential at this stage, for new facilities to the east of the Macleay crossing. Currently the facilities in Frederickton are in a degraded state and as an asset, are not used to their potential. The Department considers that new facilities will encourage increased use with aim to uniform demand across such facilities in the Kempsey Shire, particularly in holiday periods.

The Department has reinforced the commitment to replace the boat ramp by recommending a condition requiring the Proponent to provide a replacement facility, access road, parking and amenities in a suitable location (consulting with NSW Maritime and Council).

Ferry Lane Memorial Avenue
Construction of the upgrade across the floodplain will fragment the Ferry Lane Memorial Avenue located between the Macleay River and South West Rocks Road. Ferry Lane Memorial Avenue comprises a number of Camphor Laurel trees along the original river ferry road planted in 1919 to honour the area's World War One veterans.

The Memorial Avenue is considered to be of local significance and the Department's Heritage Branch noted that memorial avenues in the State are a rare phenomenon and should be considered with respect and due consideration of its values. The proposal will require the removal of three original tree plantings (one of which has died), affect views of the memorial avenue and involve a realignment of Ferry Lane south to join South West Rocks Road alongside the embankment separating Ferry Lane. Currently, the Memorial Avenue is considered in a degraded condition with a number of the original plantings dead or missing with others affected by weeds such as strangler figs. Additionally, no signage of facilities exists within the immediate area to identify the Avenues significance, thus reducing awareness of its importance within the immediate community. The Department considers that this presents an opportunity to rehabilitate this area and increase awareness of the Memorial's importance.

The RTA identified that a management plan would be developed for the Avenue, which would involve rehabilitation works (such as pruning, weed management and planting replacement trees), archival recording and provision of pedestrian access between the separated portions of the existing lane. Additional considerations were identified including provision of interpretive facilities and commitment by the RTA to facilitate long term management of the site in consultation with the Kempsey Returned Services League Sub Branch. The Department has reinforced these commitments and considerations into a condition that requires the development of a Management Plan during construction and operation. This requires at a minimum, interpretive facilities and improvement of the existing site including weed management, a tree replacement strategy, appropriate signage and plantings to complement Ferry Lane.

Long term management and procedures are also required for future maintenance works in the area to respect its importance in accordance with the Department of Planning's Heritage Office recommendations. This plan will be developed in accordance with the Heritage Office, the local RSL and Council.

Conclusion

The construction of the new highway in close proximity to Kempsey and Frederickton has been identified to impact on social, recreational and memorial infrastructure for which the community either relies on or has attachment. The Department is satisfied that the highway upgrade is required within the wider State and Regional context to improve existing highway conditions, which, in cases, requires the acquisition of private and public lands that involve disturbance of structures and specified infrastructure.

The Proponent has identified that direct impacts will occur to the Frederickton Boat Ramp and Ferry Lane Memorial Avenue and committed to mitigation involving the replacement of these with new or improved facilities thus increasing the net benefit to the community. The Department agrees with these sentiments however, to ensure a number of considerations are carried out, has recommended these be reinforced as conditions of approval for clarity and certainty.

6. CONCLUSION AND RECOMMENDATIONS

There is recognition at all levels of Government and within the community that the Pacific Highway is a major transport node for the country, which in its current form is no longer fit for purpose. The community and motoring groups consider the highway to be one of the worst in Australia in terms of injury and mortality rates which would likely increase as a result of population, tourism and economic growth in the region should the upgrade not proceed.

The section in and around Kempsey remains one of the worst sections of the highway in terms of accident rates due to conflicts between local and regional traffic and the existing highway alignment. These conditions further deteriorate during holiday periods when traffic volumes double resulting in an unsatisfactory level of service and delays.

The Department has assessed the Environmental Assessment, Statement of Commitments, Submissions Report and submissions to the proposal having regard to the objects and principles of the *Environmental Planning and Assessment Act 1979* and is satisfied that the likely impacts of the proposal can be mitigated or managed to an acceptable level of environmental performance.

Potential flooding and noise impacts associated with the project can be adequately managed through the design of the final alignment and through further investigations required prior to construction commencing. Required changes to flood evacuation and emergency response plans will be undertaken to reflect changes attributable to the upgrade. Construction noise is an unavoidable consequence and that the current construction noise criteria are difficult to achieve for a construction over a long period (greater than 26 weeks), however the Department recommends noise goals that the RTA must aim to achieve using all reasonable and feasible measures. There is greater opportunity to mitigate road traffic noise, a factor considered in road design and which will be finalised with input from directly affected receivers and the Department is of the opinion that the proposed approach to managing this is appropriate.

Flora and fauna impacts have been avoided during route selection planning to the greatest extent practicable. Notwithstanding, the RTA will be required to prepare a significant biodiversity offset package after investigation various options including land acquisition, additional mitigation measures, funding for management and research. Uncertainty regarding the feasibility to translocate individuals of *Maundia triglochinoides* will be further researched and will provide a valuable source of information for management of the species generally. Notwithstanding, the RTA will need to develop a contingency in the event that translocation is not a viable option.

The Department recognises that there is potential for visual impact of the proposal and this is a subjective matter. The design of project elements, which integrate into the wider landscape, supported by appropriate endemic vegetation in consultation with the community, is considered in this instance to be an appropriate balance in the context of the need for the upgrade generally.

Overall, the Department is satisfied that with the implementation of the mitigation measures proposed as part of the Proponent's Statement of Commitments as well as additional measures outlined as part of the recommended conditions of approval, potential impacts from the Project can be mitigated or managed to an acceptable level. Accordingly, the Department recommends that the Minister approve the project, subject to the conditions in the recommended conditions of approval provided in Appendix A.

APPENDIX A – RECOMMENDED CONDITIONS OF APPROVAL

APPENDIX B – STATEMENT OF COMMITMENTS

CONTAINED IN THE ATTACHED SUBMISSIONS REPORT (ON CD ROM)

APPENDIX C – RESPONSE TO SUBMISSIONS

CONTAINED IN THE ATTACHED SUBMISSIONS REPORT (ON CD ROM)

APPENDIX D – ENVIRONMENTAL ASSESSMENT

ON THE ATTACHED CD ROM