



Pacific Highway Upgrade - Moorland to Herons Creek

Environmental Impact Statement

Prepared by
Arup
for
NSW Roads and Traffic Authority

June 2005

ARUP

Ove Arup Pty Ltd
ACN 000 966 165

Acknowledgements

On behalf of the RTA, Arup wishes to acknowledge the cooperation and assistance of property owners who facilitated access by the study team to land along the preferred route. Input from the community in the Moorland to Herons Creek study area is acknowledged in all stages of Project development to date.

Arup also wishes to thank the Government agencies, Councils, community groups and other interested parties who assisted the study team during route investigations and the preparation of the EIS.

Limitations Statement

This Environmental Impact Statement (EIS) has been prepared by Arup for the NSW Roads and Traffic Authority (RTA). To the best of Arup's knowledge, the proposal presented herein represents the intentions of the RTA at the time of printing of the EIS. However, the passage of time, manifestation of latent conditions or impacts of future events may result in the actual project and its impact being modified from that described in this EIS. In preparing this EIS, Arup has relied upon data, surveys, analyses, designs, plans and other information provided by RTA and other individuals and organisations referenced herein."

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prepared under the *Environmental Planning and Assessment Act 1979* Section 112

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In respect of Proposed Upgrade of the Pacific Highway between Moorland and Herons Creek

Part 5 Activity

Proponent name NSW Roads and Traffic Authority
Proponent address 21 Prince Street
GRAFTON NSW 2460
Address of the land on which activity to be carried out All lands required for the construction and operation of the proposed highway, as shown in Figures 6-1A to 6-1N and described in Table 6-13.
Proposed development Construction and operation of a four-lane dual carriageway highway from 2.4 km south of Johns River to the existing dual carriageway at Bobs Creek Road, north of Herons Creek as described in Chapter 6 of Volume I and Working Paper No. 2 – Concept Design.
or map(s) attached - see Figures 6-1A to 6-1N in the EIS.

Environmental impact statement

an Environmental Impact Statement (EIS) is attached.

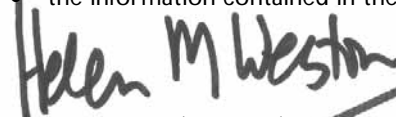
Certificate I certify that I have prepared the contents of this Statement and to the best of my knowledge:

- it has been prepared in accordance with clauses 230 and 231 of the *Environmental Planning and Assessment Regulation 2000*
- the statement contains all available information that is relevant to the environmental assessment of the activity to which the statement relates, and
- the information contained in the statement is neither false nor misleading.

signature

name

date



Helen Weston (for Arup)

June 2005

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 - 2 - Concept Design
 - 3 - Noise and Vibration Assessment
 - 4 - Hydrology and Flooding
 - 5 - Cultural Heritage
- Volume 3
 - 6 - Aquatic Ecology
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Summary

Summary

The \$2.2 billion Pacific Highway Upgrading Program, which is jointly funded by the New South Wales (NSW) and Commonwealth Governments, will result in the upgrading of the Pacific Highway between Hexham and the Queensland border. The NSW Roads and Traffic Authority is proposing to upgrade a 22.2 kilometre section of the Pacific Highway between Moorland and Herons Creek (the Proposal) as part of this program. This work would extend from 2.4 km south of Johns River to the existing dual carriageway at Bobs Creek Road just north of Herons Creek. The Proposal would include highway bypasses of the townships of Johns River and Kew.

The overall objective of upgrading the highway between Moorland and Herons Creek is to improve the efficiency and safety of this section of the Pacific Highway. An integrated design process has resulted in a Proposal that incorporates environmental, social, economic, transport planning and engineering factors and provides value for money.

Consultation with the local communities was a key feature of the route selection process and environmental assessment of the Proposal.

This Environmental Impact Statement (EIS) examines and assesses the potential environmental impacts of the proposed construction and operation of the Proposal and sets out the environmental management measures which should be adopted, should the Proposal proceed.

Need for the Proposal

The Pacific Highway between Sydney and Brisbane is part of Australia's national highway system and links two State capitals as well as passing through coastal regions which are recording high rates of population and economic growth, particularly through the development of tourism. The highway carries significant traffic volumes, especially during holiday periods, and an increasing proportion of long distance heavy vehicle traffic.

In addition to meeting the overall objectives for the Pacific Highway Upgrading Program, the Proposal would eliminate traffic congestion and delays that occur in Kew and, to a lesser extent, Johns River for highway traffic and local traffic during peak holiday periods. These delays are caused by a combination of the speed restrictions through the townships, local traffic volumes and, in the case of Kew, the operation of the traffic signals at the intersection of Kendall Road and Ocean Drive with the highway.

The projected traffic growth rates for the Pacific Highway overall (based on forecast population growth in the North Coast Region) and traffic projections in the vicinity of the Proposal both indicate that the level of service provided by the highway would continue to deteriorate unless additional road capacity is provided and the standard of road is improved.

With the existing or planned provision of dual carriageways on either side of the Proposal, and completion of other highway upgrade projects in the mid North Coast Region, the completion of the 22.2 kilometre Proposal would provide a consistently high standard of road for a distance of approximately 120 kilometres from just north of Bulahdelah to the junction with the Oxley Highway to the west of Port Macquarie. The proposed bypasses of Johns River and Kew present opportunities to increase road safety for both highway users and the local communities. Travel times and transport costs for highway users would also be reduced.

Route selection

Extensive investigations were undertaken to identify a preferred option for the upgrade of the Pacific Highway between Moorland and Herons Creek. North of Johns River to the Camden Haven River, upgrading options were severely restricted by the presence of areas of high conservation significance such as Middle Brother National Park and Watson Taylors Lake as well as the location of the Main Northern Railway line which essentially runs parallel and close to the existing highway.

Options for upgrading the highway in the vicinity of the townships of Johns River and Kew involved consideration of routes to both the west and east of the urban areas as well as upgrading the highway along the existing alignment through the centre of these townships. From the north of Kew to Herons Creek, the highway upgrading is proposed to occur as duplication of the existing highway within the existing road reserve.

When compared with other upgrading options, it was found that the preferred option would:

- have minimal impacts on the natural landscape because for a considerable proportion of the Proposal's length, the upgrading would be achieved through duplication of the existing highway largely within the existing road reserve
- achieve appropriate urban and regional design outcomes, particularly in the enhancement and future retention of residential amenity for the majority of residents of Johns River and Kew
- provide opportunities for the townships of Johns River and Kew to be promoted to highway travellers as service towns.

Community involvement

An extensive community and stakeholder consultation program was undertaken throughout the route options phase, Proposal development and environmental assessment. Community and stakeholder input was important in the identification of local issues and considerations, defining and refining route options, and in developing environmental mitigation measures.

Community involvement activities included:

- a Planning Focus meeting
- Community Update newsletters
- Community Focus Group meetings
- public displays of route options, the preferred option and the refined concept design
- on-site meetings with potentially affected property owners and stakeholder groups
- a telephone enquiry line
- community database and mailing list
- public submissions in response to displays
- community representation at the Value Management Workshop
- survey of business operators and highway users in Johns River and Kew.

The issues raised by the community were a key consideration during the route development stage with the proposed grade-separation at Stewarts River Road being introduced specifically in response to community suggestions. Concerns of potentially affected property owners were considered while developing an integrated engineering, urban design and landscape concept design as part of the environmental assessment of the Proposal.

The Proposal design

The key features of the Proposal design are:

- **Johns River bypass:** South of Johns River, the Proposal would link with the proposed Highway duplication between Coopernook and Moorland at the southern boundary of Camp Obadiah. The existing highway would then be duplicated to the point where the proposed western bypass of Johns River diverges away from the existing highway. A 2.5 kilometre western bypass of Johns River would run approximately 250 metres from the township with a grade-separated junction provided at Stewarts River Road with a half-diamond interchange. Northbound off and on ramps would connect with a roundabout on Stewarts River Road. Southbound traffic would be catered for by southbound ramps to and from the existing highway at each end of the bypass using the existing highway through Johns River.
- **Lake section:** The highway would be duplicated to the west of the existing highway from north of the Stewarts River to the north of the Camden Haven River. To avoid any requirement for land acquisition from Middle Brother National Park and to reduce the impact on vegetation, a narrow median (3 metres) with a barrier would be adopted for a 1 kilometre section adjacent to the boundary of the National Park. New bridges would be built over the Main Northern Railway line and the Camden Haven River to the west of the existing bridges. The new Camden Haven River bridge would have length and span arrangements similar to the existing bridge.
- **Kew bypass:** About 1.5 kilometres north of the Camden Haven River, the proposed eastern bypass of Kew would diverge away from the existing highway. The Kew bypass would be about 2.5 kilometres long and would pass about 250 metres east of the Kew township. A grade-separated junction would be provided at Ocean Drive with on and off ramps to cater for southbound traffic entering and leaving the highway to access Kew or destinations to the east of the highway. Access for northbound traffic entering or leaving Kew would be provided on the existing highway.
- **Herons Creek section:** North of Kew, the highway would be duplicated largely to the east of the existing highway from approximately 700 metres north of Ocean Drive to just north of Herons Creek Public School.

Other key features of the Proposal are:

- Ten new bridges are proposed in addition to the retention of some existing bridges.
- Median openings would be provided at 3 to 5 kilometre intervals but the minimum spacing has been reduced in some instances for the convenience of local residents. The median openings have been combined with at-grade intersections where possible to reduce the additional local travel distances.
- Environmental measures would be included that would meet relevant guidelines for runoff discharge. Surface runoff from the road upstream of these areas would undergo sufficient treatment using a system of water quality control ponds incorporating chemical traps to contain spills of hazardous materials and ensure that runoff meets relevant guidelines for discharge into wetlands or watercourses.
- A range of design features would provide for safe fauna movement across the highway reserve.

The existing Pacific Highway route, which runs through the centre of Johns River and Kew, would be retained to provide local access to, from and within these townships.

The construction of the Proposal

Due to the length of the Proposal, construction could be undertaken in four sections - Johns River bypass, Lake section, Kew bypass and Herons Creek. The construction of the Proposal would generally involve the following broad sequence of activities:

- acquisition and site establishment
- bulk earthworks, bridge construction, and road construction
- topsoil rehabilitation and revegetation of batters and berms
- landscaping, installation of off-site noise mitigation measures and other finishing works.

As the delivery method and construction staging for the Proposal have not yet been detailed, there may be some variation to this sequence and the preferred method of undertaking particular works. However, the construction method would have to comply with the construction concepts and environmental management requirements presented in this EIS and the Construction Environmental Management Plan to be prepared by the relevant contractor(s).

The likely environmental impacts of ancillary construction facilities to be used during construction of the Proposal and related mitigation measures have been identified in this EIS. While a number of suitable sites for facilities such as site compounds, concrete or asphalt batching plants, crushing plants and stockpile areas have been assessed, the contractor(s) would have the option of using other areas within the footprint of the permanent works for the Proposal subject to satisfying the relevant locational criteria, complying with the works program, and implementing environmental mitigation measures. If other potential ancillary construction sites were identified by the contractor(s), a separate environmental impact assessment process would be required.

Environmental assessment

Key findings of the environmental assessment of the Proposal are:

Geotechnical and soil conditions

The solid geology and topography of the study area has given rise to varied ground conditions along the route of the Proposal, particularly the floodplain areas of Stewarts River, Passionfruit Creek and Stony Creek, the Camden Haven River, Herons Creek, and the footslopes of Middle Brother Mountain. Topsoil depths vary considerably along the route of the proposed upgrade ranging in depth from 0.1 to 1.0 metre below ground level. The depth to bedrock also varies considerably ranging between less than 1 metre to over 24 metres.

Potential Acid Sulfate Soils have been identified in the area north and south of Stewarts River and the areas north and south of the Camden Haven River. This represents 6% of the route of the Proposal and, in these areas, special precautions would be taken to ensure construction activities such as earthworks, piling and other forms of ground disturbance do not generate acid sulfates. These measures would be detailed in an Acid Sulfate Management Plan which would form part of the Environmental Management Plan for the Proposal.

Hydrology, flooding and water quality

Hydrology and flooding

The Proposal passes through three major catchments – Stewarts River, Camden Haven River and Herons Creek – and a series of minor sub-catchments. These waterways flow predominantly eastwards across the Proposal area to their confluences with Watson Taylors Lake or Queens Lake.

The existing bridge crossing at Stewarts River has a minimum road height level of 8.5 metres Australian Height Datum (AHD) (which will be approximately matched by the new bridge) which is well above the 100 year annual recurrence interval peak flood level of 3.4 metres AHD at this location. Hydraulic modelling of the proposed bridge duplication showed that there would be negligible impact on peak flood levels and time of inundation for the Stewarts River floodplain.

The Proposal in the vicinity of the Camden Haven River involves locating the northbound carriageway above the predicted 100 year annual recurrence interval peak flood level and the replacement of the sunken culvert to the north of the river crossing. As a result, the Proposal would be immune to flooding by the predicted 100 year flood event. The Proposal would be immune to flooding across the Herons Creek floodplain during the predicted 100 year Average Recurrence Interval flood event, and would not have a significant effect on the predicted flood levels upstream of the bridge crossing.

Water quality

A program of water quality sampling and analysis for key waterways crossed by the Proposal was undertaken during wet and dry conditions during the preparation of the EIS to characterise baseline water quality. Results indicated that most parameters complied with relevant guidelines but salinity and conductivity levels were high enough on several occasions in Stewarts River and the Camden Haven River for these waterways to be classified as marine waters, while Total Phosphorous levels for several waterways (not the Camden Haven River) exceeded the guideline – such exceedences are often related to agricultural activities.

As water quality can change over time, a comprehensive surface water quality monitoring program would be implemented to establish baseline conditions for the major watercourses crossed by the Proposal prior to the start of construction. Water quality in all watercourses would be protected during construction and after the Proposal is operational. Sedimentation basins, through which all runoff from the road would pass, are integral to the Proposal's design. These measures would ensure that surface waters crossed by the Proposal or downstream – including the wetlands protected by *State Environmental Planning Policy No. 14 – Coastal Wetlands* – do not suffer any deterioration in water quality as a result of the construction and operation of the Proposal.

It is unlikely that the Proposal would have any effect on groundwater quality.

Terrestrial ecology

Flora and fauna resources

The Proposal would pass through five main native vegetation communities – Coastal Blackbutt Forest, Dry Tallowood Forest, Flooded Gum Forest, Sedgeland and Swamp Forest – as well modified areas.

In New South Wales, threatened flora and fauna species are identified under Schedule 1 (Endangered) and Schedule 2 (Vulnerable) of the New South Wales *Threatened Species Conservation Act 1995* (TSC Act). Under this Act, threatened species are defined as 'of conservation concern due to restricted distributions or habitat requirements, population or distribution range decline and where there may be a threat to the survival of the species.'

The principal fauna habitat types located within the study area are:

- open forest, woodlands, understorey vegetation
- tree hollows, fallen timber and bark
- rivers, creeks, drainage lines and wetlands
- cleared areas.

Fifteen threatened flora species listed under the TSC Act were identified as having potential habitat within the study area but no threatened species were recorded for the study area. As potential habitat exists, Eight Part Tests (under the TSC/EP&A Acts) were conducted for each

of the threatened species. Eleven threatened species also listed under the Commonwealth *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act) were considered according to the EPBC Significance Assessment requirements.

Under the TSC Act, 38 species of threatened fauna were considered relevant to the study area and, under the EPBC Act, 17 threatened and/or migratory species were considered. A further 22 species were required for consideration under both Acts. Also recorded in the study area were 5 migratory species, not included in the EPBC Act. Consequently, Eight Part Tests and/or assessment under the EPBC Act Guidelines on Significance were undertaken for a total of 81 fauna species. Six threatened species listed in the schedules of the TSC Act were recorded in the study area including two birds (Glossy Black-cockatoo and Black-necked Stork) and four species of bat (three microchiropterans and one megachiropteran).

Impact assessment

It was concluded that, providing suitable mitigation measures are implemented in all phases of the Proposal, no significant impact to the threatened flora or fauna species would occur. It was also concluded that neither a Species Impact Statement nor a referral to the Commonwealth Department of Environment and Heritage was required.

The principal potential impacts on native fauna and flora associated with the construction and operation of the Proposal are:

- disturbance, loss or change in habitat associated with vegetation clearing
- fragmentation and delineation of habitat
- introduction of barriers that impede wildlife passage
- wildlife mortality (i.e. road-kill)
- edge effects
- alteration to natural drainage regimes and water quality
- habitat creation and management.

Vegetation lost to accommodate the Proposal would constitute a relatively small proportion of the vegetation communities in the study area with much of the vegetation likely to be removed already in poor to moderate condition. Whilst relevant in a local sense, it is unlikely to be significant in terms of the overall distribution and conservation status of protected flora species.

Mitigation measures consistent with the policy principles presented in the RTA's *Road Development and Impact on Habitat Amelioration Measures* would be developed and implemented for the Proposal.

Aquatic ecology

Fisheries resources

Three watercourses in the Proposal area – Stewarts River, Camden Haven River and Herons Creek - are classified as major fish habitats while Stony Creek and Walkers Creek are classified as moderate fish habitats. Twenty species of fish and three species of mobile invertebrates inhabit the coastal estuaries and creeks in the vicinity of the Proposal. None of the species caught during field investigations was listed as endangered or vulnerable under the *Fisheries Management Act 1994*. Literature and database searches revealed that it is unlikely any threatened species occurred within or their habitat encroached upon the study area.

Commercial and recreational fishing

Within the vicinity of the existing and proposed Proposal crossing of the Camden Haven River, commercial fishing activities are undertaken including trapping for mud crab along riverbanks, mesh netting for mullet and hauling for prawns. The Camden Haven estuary is ranked as the tenth most important estuary in NSW for the value of finfish landed. Over fifty oyster leases exist within the Camden Haven estuary with the majority situated downstream of Watson Taylors Lake.

Recreational fishing also occurs in the Camden Haven River, above Watson Taylors Lake but is primarily restricted to boat access. Prawning and crabbing is also undertaken on the shallow banks of Watson Taylors Lake.

Impact assessment

Potential impacts on aquatic ecology associated with construction of the Proposal include:

- changes in sediment and contaminant loading
- disturbance to Acid Sulfate Soils areas
- removal or physical alteration of habitat (including bridge piles and rubble)
- impacts on threatened species and fisheries.

Operation of the Proposal may result in impacts including sediment and contaminant loading, shading of waterways by proposed bridges, and alterations to waterway flows and fish passage.

With the incorporation of mitigation measures into the detailed design of the Proposal to reduce adverse impacts on aquatic habitats and biota, the identified construction or operational impacts are not considered to be significant.

Air quality

An air quality assessment based on computer modelling was undertaken to determine the dispersion of traffic emissions and likely ground-level concentrations of the relevant vehicle exhaust components in the area close to the Proposal. Pollutants that were modelled include carbon monoxide, hydrocarbons, nitrogen oxides, and particulate matter. Pollutants were modelled for the years 2011 and 2021.

Existing air quality monitoring was undertaken close to the existing highway in peak traffic conditions in Johns River and Kew. Recorded levels were well below Australian goals.

Construction impacts

During construction of the Proposal, there is potential for wind-blown dust to affect nearby residents. Existing dust deposition levels in the Proposal area are likely to be relatively low, less than 2 g/m² per month. An increase of 2 g/m² per month could occur before air quality degradation is likely.

Deposition monitors would be installed to determine levels of dust at sensitive receptors such as residences (including those reliant on rainwater tanks for potable water supply) within 250m of major cut or fill activities. Actual dust generated would be significantly reduced by regular water spraying of works areas. Under extreme wind conditions, construction activities would be stopped or relocated away from sensitive receptors. Monitoring would be carried out during construction to assess compliance with relevant criteria.

Operational impacts

Analysis of predicted air quality impacts indicates that, when operational, the Proposal would not result in levels of any pollutant that would breach the relevant guidelines. The Proposal is not expected to have any impact on the health of residents within the vicinity of the Proposal.

Visual assessment, urban design and landscape

The Proposal passes through a highly scenic and attractive natural landscape, incorporating water features, regionally significant natural landmarks, forests, National Parks and picturesque rural landscapes. Middle Brother Mountain, the major visual element in the study area, with its backdrop of forested hills contrasts with the adjacent low-lying coastal plains and large water bodies such as Watson Taylors Lake.

An urban design and landscape strategy has been prepared to integrate the Proposal into this diverse landscape. As much of the upgrade would be implemented through duplication of the existing highway, there would be relatively minor change to the setting of the highway in those locations. The principal visual impacts would be associated with the proposed highway bypasses of Johns River and Kew. These bypasses are relatively close to residential development and include new overbridges for local roads and a major cutting east of Kew. Particular attention has been given to integrating the proposed bypasses and related noise mitigation measures into the local landscapes in these areas.

Hazard and risk

Construction impacts

The contractor(s) would manage the majority of hazards that could potentially occur during construction, by undertaking a specific risk assessment and through the implementation of appropriate controls documented in management plans and procedures. The RTA would require that the contractor(s) comply with all relevant legislative and standards for the safe handling of hazardous substances and dangerous goods and meets all relevant occupational health and safety requirements.

Operational impacts

The proposed Proposal would significantly reduce the levels of hazard and risk associated with traffic using the existing highway through Johns River and Kew. This includes risks associated with the transport of hazardous and dangerous goods.

Measures to mitigate dangerous goods spills and associated incidents on the Proposal include road design measures, design measures incorporated in vessels containing dangerous goods, and active emergency response procedures.

Twenty permanent water quality ponds have been included in the concept design for the Proposal, which have been designed to retain chemicals such as hydrocarbons that are non-soluble and less dense than water. These water quality ponds would have a capacity to contain emergency spillage of up to a volume of 20 m³, which is the volume of a typical road tanker.

The NSW Fire Service has overall responsibility for site coordination where fire or chemical incidents occur. The Service's functions include containment and suppression of any chemical fire, spillage or other hazardous incident. The RTA also has a standing operational emergency procedures plan for its roads that would be implemented in the event of a dangerous goods incident.

Cultural heritage

A cultural heritage assessment was undertaken with regard to relevant legislation, historical and archaeological research, and technical investigation and survey. Consultation with the Bunyah and Purfleet Taree Aboriginal Land Councils was undertaken at all relevant stages.

In total, eight Aboriginal sites, six areas of potential archaeological deposits and eleven European sites were identified within, or in relative proximity to, the Proposal.

Subject to detail design, two of the Aboriginal sites may be impacted by the Proposal – one of these sites is a scarred tree and further assessment by a botanist is required before a fully informed assessment of cultural significance can be made. The other site – an isolated artefact site - is considered to have low significance, based on the low potential for the site to be larger than recorded, to contain more artefacts, or to be associated with in situ subsurface material.

Proposed mitigation measures to protect Aboriginal sites include:

- consultation with the Bunyah and Purfleet Taree Aboriginal Land Councils and community representative would continue during the pre-construction and construction periods for the Proposal

- application would be made to the DEC for a permit pursuant to section 90 of the *National Parks and Wildlife Act 1974* to disturb the Aboriginal isolated find
- if there is an assessed risk of accidental impact from adjacent earthworks or machinery movements to three sites not directly affected, then temporary fencing would be erected between the site and the zone of construction activity to define no-go and no-disturbance areas
- temporary fencing would be installed between one of the potential archaeological deposits and the zone of construction activity.
- in order to minimise impact to the Aboriginal cultural values of Middle Brother Mountain, the extent of all earthworks, ancillary works, and vegetation clearance along its basal landforms would be minimised where feasible and, where possible, located within areas of previous disturbance.

Six European sites would be affected by the Proposal – of these, four are either sections of the former Pacific Highway or existing bridges on the highway. Three of these sites are relics as defined by the *Heritage Act 1977*, but are not assessed as having local or State level significance. Due to this significance assessment, a section 139 (excavation) permit under the *Heritage Act 1977* may not be required as a prerequisite for construction. One section of the former Pacific Highway falls within the definition of a relic and is assessed as having local significance. An excavation permit under section 139 of the *Heritage Act* will be required.

Both concrete beam highway bridges would be replaced as part of the Proposal. These sites have not been assessed in this EIS, pending the results of a heritage assessment of all RTA pre-1948 concrete beam bridges in the Northern Region.

Land use

Apart from the proposed by passes of the townships of Johns River and Kew, most of the Proposal route traverses land that is within the existing Highway reserve. Land acquisition totalling almost 70 ha would be required from 69 private landowners and 8 government departments or agencies including Department of Lands, RTA, RailCorp, and Forests NSW. A total of four residences would be acquired – two in Kew and two in the Herons Creek section.

Proposed developments in the vicinity of the Proposal have also been considered, namely:

- A recently approved 17 lot rural residential estate just to the north of Johns River township on Stewarts River Road would be bisected by the Proposal with six lots being severed or directly impacted and the remainder of the subdivision layout likely to require modifications.
- The Proposal would impact land on the western side of the Taylors Quarry property which is situated to the east of Kew on Ocean Drive identified for possible future use as industrial land or as a future waste transfer station development by Hastings Council.

Rossglen would not be directly affected, but improvements to access arrangements to the highway are proposed. Kendall is located approximately 1.5 km to the west of the Proposal and no direct impacts would be experienced. Land acquisition for the Proposal would be required from 24 properties in and around Herons Creek (including two dwellings). The distance between the highway and the Herons Creek Primary School would also be reduced.

The Proposal would have minor impacts on three agricultural enterprises. The only loss to farming infrastructure on all agricultural properties affected would be fences and these would be replaced both during construction and permanently in accordance with RTA's replacement policy. All impacts to farms would be insignificant in terms of regional agricultural production.

The proposed construction of waterway crossings is unlikely to have any effect on commercial and recreational fishing activities providing mitigation measures are implemented.

Economic impacts

The heavy reliance of many businesses in Kew and Johns River on the Pacific Highway in its present location means that there would be impacts, some significant, as a result of the proposed bypasses of these townships. Those businesses with a high reliance on highway trade are likely to experience negative long-term impacts from the Proposal potentially including closure of some businesses or loss of trade for other businesses. Some components of the Camden Haven tourism industry may be adversely affected if visitation to tourist accommodation and facilities is reduced as a result of the Proposal.

Short-term positive economic impacts are likely to occur in both Johns River and Kew due to increased patronage from workers during the construction phase of the Proposal.

Some mitigation measures would be undertaken by the RTA such as the provision of advance advisory signage at appropriate intervals on the highway to ensure travellers are aware of their stopping options and the facilities offered in both townships. There is no legal requirement for the RTA to compensate for loss of business income in localities that have been bypassed.

A range of opportunities exist that the local community, Councils and/or the private sector could undertake to offset the potential loss of highway-related trade and employment. An opportunity exists for the local community and Councils to develop new economic roles for Johns River and Kew, whilst seeking to maintain a highway servicing role.

Social impacts

Social impacts associated with the Proposal relate to the following key aspects:

- Acquisition of four dwellings - This loss of dwellings must be expected to have adverse impacts for the people involved. However, the collective impact would not adversely affect the nature and supply of the housing stock in the study area or its overall demographic structure.
- Improvements to residential amenity in Johns River and Kew (particularly for properties that front the existing highway) through reduced levels of traffic noise and vehicle emissions. Amenity for some residents not currently located directly adjacent to the existing highway may be adversely affected both during construction (temporary episodes of dust, construction noise, and vibration) and post construction (increase in exposure to vehicle emissions, visual impacts, and traffic noise).
- Changes to the amenity of several community activities and facilities may result. The Johns River Community Markets may be affected by the loss of highway-related trade but consideration would be given to opportunities for on-going promotion of the market into planning activities for landscape improvements along the former highway alignment in Johns River.
- Vehicular access to the Herons Creek Public School would be amended as a result of the Proposal to provide improved safety for cars and buses.
- The Proposal would change local access arrangement for most properties which continue to front it with left-in, left-out access only available with direction change available at U-turn facilities. However, overall, the Proposal would improve road safety and local and regional travel times for the majority of residents. However, some property owners would need to travel longer distances because of the requirement to use a U-turn facility.
- As a result of the Proposal, no adverse health effects arising from noise or vehicular engine emissions are expected.

Noise

Traffic noise criteria have been based on the Environment Protection Authority (EPA) *Environmental Criteria for Road Traffic Noise*. Construction noise and vibration criteria have been based on EPA guidelines and Australian and New Zealand Standards.

Ambient noise surveys were conducted adjacent to the existing highway, and the resulting noise levels were used to calibrate the noise prediction model.

Construction impacts

The extensive earthworks and construction of the bridges would generate significant noise levels. However, the noise would be temporary and limited in its extent at any one time.

The level of construction noise and vibration depends on the construction methodology and construction equipment used on the site. However, construction noise and vibration is expected to have some impact on residences near to the Proposal, and suitable mitigation would be required to reduce the impacts.

Operational impacts

The noise model demonstrates that noise mitigation is required for residences along much of the Proposal, when completed. This should comprise noise barriers near Johns River, Kew and Herons Creek Public School, and low-noise road surfacing near Johns River, Kew and Herons Creek. Many residences near to the route would need to be provided with architectural acoustic treatment.

When completed, the Proposal would remove large volumes of traffic from the townships of Johns River and Kew (especially heavy vehicles at night). This would result in substantial reductions in traffic noise for many residences in these townships for the assumed year of opening (2011) and ten years after opening.

Proposal justification

In transport terms, upgrading of the Pacific Highway between Moorland and Herons Creek can be justified on the basis of the:

- savings in travel time
- savings in vehicle operating costs
- reductions in accident rates

that would result from the provision of a continuous high standard road for a distance of approximately 120 kilometres from just north of Bulahdelah to the junction with the Oxley Highway to the west of Port Macquarie in the medium term.

The communities of Johns River and Kew would experience significant social benefits from greater personal safety and amenity and thus pleasant lifestyle resulting from the removal of large volumes of through traffic, especially heavy vehicle traffic at night.

Finally, this Environmental Impact Statement demonstrates that the proposal is consistent with Ecologically Sustainable Development principles in that it would:

- improve the social well-being of the community within the Proposal area and the wider community
- enhance economic vitality at the State and regional levels
- maintain the integrity of ecological processes through the sensitivity of the design to environmental issues and the implementation of extensive mitigation and compensatory habitat measures
- integrate social, economic and environmental issues in decision-making.

Environmental management

An Environmental Management Plan would be developed as an integral part of the detail design phase and implemented as appropriate during the construction and operation of the bypass. The Roads and Traffic Authority would prepare a Project Environmental Management Plan that would specify all relevant environmental management obligations, nominate the party responsible for fulfilling each obligation, and the time when the obligation would be addressed.

The Environmental Management Plan would be prepared in accordance relevant Roads and Traffic Authority guidelines. The Construction Environmental Management Plan would be prepared by the selected contractor(s), based on the conditions and guidelines outlined in this Environmental Impact Statement, the Project Environmental Management Plan, relevant Roads and Traffic Authority contract specifications and through liaison with relevant agencies and stakeholders.

All approvals and licences required under State legislation for the construction and operation of the Proposal are documented in this Environmental Impact Statement.

Conclusions

The proposed upgrading of the Pacific Highway from Moorland to Herons Creek would meet the objectives of the Pacific Highway Upgrading Program and result in a number of environmental and social improvements.

The major conclusions of this assessment are that:

- The Proposal would result in substantial transport benefits including:
 - improved road safety for highway users and local residents
 - an improved level of service to road users through increased traffic capacity
 - reduced congestion on the highway during peak holiday periods and within the townships of Kew and Johns River
 - reduced travel times and journey costs.
- The Proposal would result in substantial improvement in the amenity of the townships of Johns River and Kew, through the removal of increasing levels of through traffic, particularly heavy vehicles at night. This would result in:
 - improved lifestyle with greater amenity and accessibility within Johns River and Kew
 - greater physical integration of the community of the two townships
 - improved air quality for residents
 - lower noise levels for residents, especially at night.
- The continued movement of local and regional fauna would be facilitated by the integration in the concept design of features that would allow continued safe movement patterns for fauna.
- The reduction in local employment levels in Johns River and Kew resulting from the loss of trade for existing highway-related businesses could be mitigated by the development of other economic activities.
- The visual integration of the Proposal into its landscape setting would be facilitated by the implementation of the detailed Urban Design and Landscape strategy developed in response to the environmental and land use characteristics of the area.

The Proposal would have some adverse impacts on the local community and the natural environment including:

- loss of approximately 64 hectares of native vegetation, of which 38 hectares are within the existing road reserve
- loss of highway-related trade for some existing businesses
- noise impacts to some residences
- local access limitations to the highway for some residents
- location of new bypass sections near residential and rural residential areas
- property acquisition and the loss of four houses.

The design of the Proposal has incorporated appropriate measures to reduce these impacts, in particular the impacts on the natural environment and on the economic structure of Kew and Johns River. With the implementation of the proposed mitigation measures, the Proposal would result in a net benefit for the community as a whole.