



A New South Wales Government Initiative



# Warrell Creek to Urunga upgrade

(Incorporating Warrell Creek and Macksville to Urunga projects)

Upgrading the Pacific Highway

**PART 3A PROJECT APPLICATION REPORT**

**SEPTEMBER 2007**



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# 1 Introduction

## 1.1 Background

In January 1996 the NSW and Australian Governments announced their joint commitment to a 10-year program to upgrade the Pacific Highway between Hexham and the Queensland border. As of the end of July 2007, 263 kilometres of the highway are now double-lane divided road. A further 78 kilometres of highway is under construction or has had a construction contract awarded, with the remaining kilometres either approved for construction or have had a preferred route identified.

The Pacific Highway is an AusLink National Network road. Its upgrading is jointly funded by NSW and Australian Governments. For the 10 years to June 2006, some \$2.3 billion has been invested. The NSW Government has contributed around \$1.66 billion and the Australian Government has contributed around \$660 million.

In December 2005, the NSW and Australian Governments announced a jointly funded program of \$960 million for the three years to 2009. In May 2006, the NSW and Australian Governments announced an additional \$320 million in joint funding for the period to the end of 2009.

Both governments are jointly examining how the entire length of the highway can be upgraded to dual carriageway by the end of 2016.

As part of the Pacific Highway Upgrading Program, the NSW Roads and Traffic Authority (RTA) is undertaking project development activities for the upgrade of a 45 kilometre section of the Pacific Highway between the northern end of the existing Allomera deviation, south of Warrell Creek and the southern end of the existing Raleigh deviation, north of Urunga. The project (hereafter referred to as the 'Warrell Creek to Urunga Upgrade') combines the Warrell Creek and Macksville to Urunga Upgrades. The study team involved in the project is outlined in **Appendix A**.

Since planning for the upgrade of the Macksville to Urunga section of the highway began in June 2003, a wide range of potential route options have been investigated. These have included options developed by the project team and options put forward by the community. Details of the route options considered are contained in the *Macksville to Urunga Draft Route Options Development Report* (RTA November 2004).

In November 2005, the NSW Minister for Roads announced the preferred route for the upgrade of the Pacific Highway between Macksville and Urunga. The announced preferred route involves:

- Options 1c and 2a to the east of Macksville.
- An upgrade of the existing highway between Nambucca Heads and Mines Road south of Urunga.
- The Option 4b bypass of Urunga.

Details of the announced preferred route are contained in the *Macksville to Urunga Preferred Route Report* (RTA November 2005).

Following the announcement of the preferred route for the upgrade of the highway between Macksville and Urunga, a review was carried out on the 5 kilometre section of highway between the southern end of the upgrade and the northern end of the Allomera deviation (the 5 kilometre section is referred to in this report as the Warrell Creek section).

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The preferred route for the Warrell Creek section was selected and designed in the 1990s to an earlier standard than that proposed for current upgrades of the Pacific Highway. The route and design for the Warrell Creek section was reviewed in 2006 to determine if it provides an appropriate connection between the existing Allgomera deviation and the Macksville to Urunga Upgrade, as well as meeting current design and environmental standards. The review found that the 1990s route and design for the upgrade would need to be modified to meet current design standards for the Pacific Highway. The review also found that the design would have significant noise impacts on the village of Warrell Creek and would need to be substantially modified to meet current noise guidelines.

In response to the outcomes of the review, a number of options for the Warrell Creek section were developed. The new route options were assessed against a range of functional, environmental, social, economic and cost considerations. Comments received from government agencies, Nambucca Shire Council and the community were considered during the identification of the options.

The assessment identified a shortlist of the four most feasible options. Based on the investigations undertaken to date, one of the four options (the Purple Option) is considered to be one of the best performing options overall and provides the best value for money. On balance, the Purple Option is considered to have more merit than the other options developed.

Details of the review of the Warrell Creek section, including the community consultation undertaken and the issues raised, are provided in the *Draft Warrell Creek Review Report* (RTA July 2007).

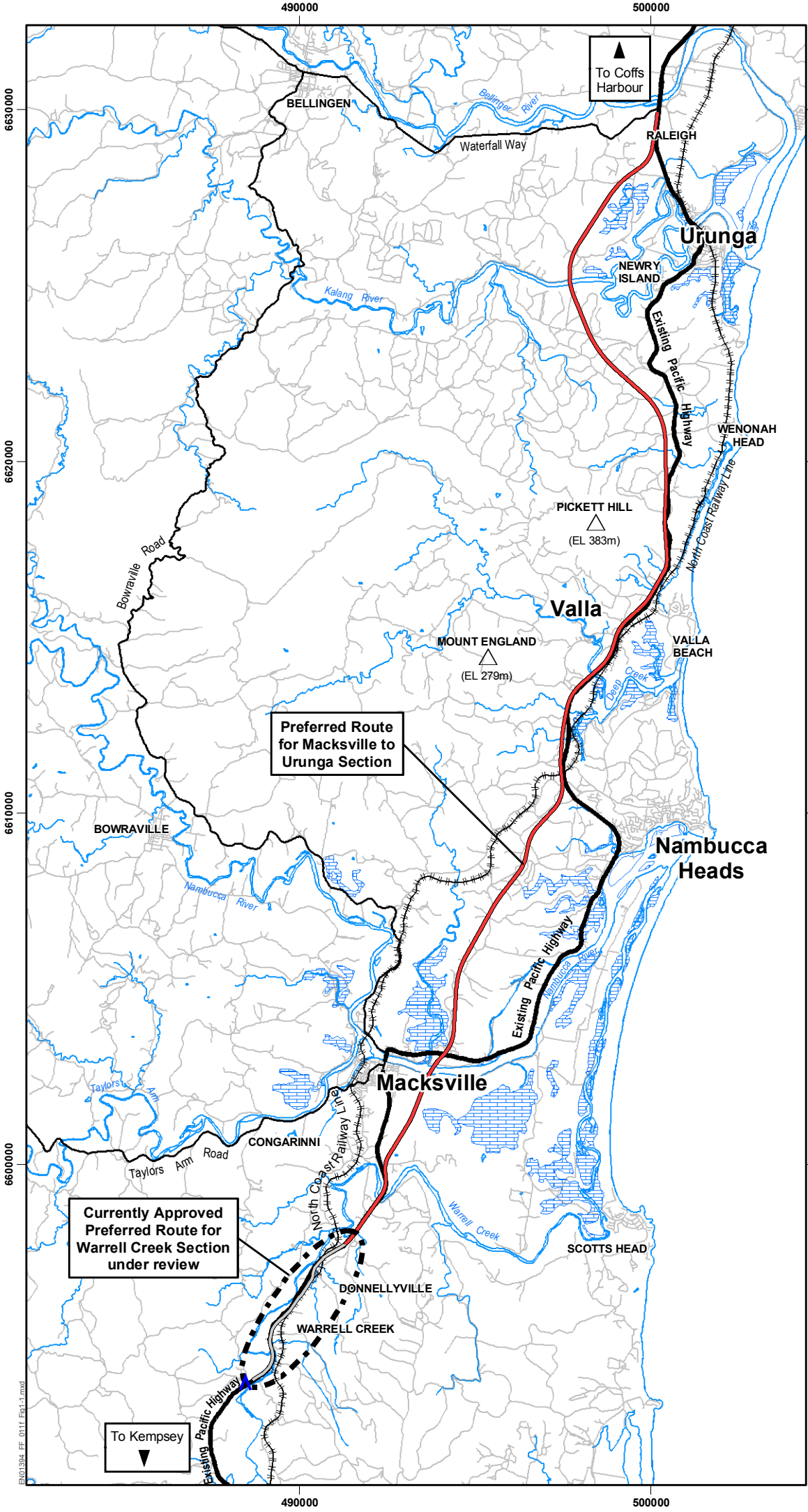
The RTA is seeking community comment on the new options before making a final decision on the outcomes of the review of the Warrell Creek Upgrade.

The environmental assessment (EA) for the Warrell Creek to Urunga Upgrade Project will assess the combined outcomes of the review of the Warrell Creek Upgrade and the preferred route for the Macksville to Urunga Upgrade. The location of the proposed upgrade is shown in Figure 1-1.

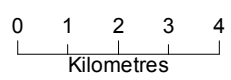
### **1.2 Purpose of the report**

This Project Application Report has been prepared for the Director-General of the Department of Planning (DoP) under Section 75E of Part 3A of the *Environmental Planning and Assessment Act, 1979 (EP&A Act)*. The Report accompanies a project application and includes the following information:

- Identification of the Proposal as a project to be assessed under Part 3A of the EP&A Act and declared to be Critical Infrastructure under Section 75C of the EP&A Act.
- Need for and description of the Proposal.
- A summary of the studies, investigations and stakeholder involvement that has been conducted to date as part of the project development and the rationale for the selection of the preferred route.
- A preliminary assessment of key environmental issues associated with the Proposal.
- A preliminary list of environmental management measures that are expected to form part of the Proposal.
- The proposed scope of further design and investigations that the RTA would complete as part of the subsequent environmental assessment for the Proposal.



- Legend**
- ▨ SEPP14 Wetlands
  - Preferred Route for Macksville to Urunga Section
  - Currently Approved Preferred Route
  - Existing Pacific Highway
  - Other Existing Major Roads
  - + + North Coast Railway Line
  - Creeks/Rivers



**Figure 1-1**  
Proposed Warrell Creek to Urunga Upgrade

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In accordance with Section 75F(2) of the *EP&A Act*, it is anticipated that the information in this Project Application Report will be used by the DoP to prepare formal requirements for the environmental assessment for the Proposal.

As the RTA intends to proceed to implementation of the Warrell Creek to Urunga Upgrade as soon as funding is committed, a Project Approval (as distinct from a Concept Approval) is being sought.

### 1.3 Planning and development process

#### 1.3.1 Project development process

Planning for this section of the Pacific Highway commenced in June 2003. Ongoing community and stakeholder consultation has strongly influenced the area investigated as part of the project and has resulted in the identification and assessment of additional route options. A summary of the key milestones in the project development process is presented in Table 1-1.

Table 1-1: Project milestones

Date	Milestone
2001	RTA identifies a broad study area for the proposed upgrading of the Pacific Highway between Macksville and Urunga.
August 2002	RTA holds a planning workshop with representatives from Bellingen and Nambucca Shire Councils and NSW Government agencies to discuss key constraints to the development of route options. The key objective of the workshop was to "refine the study area based on the interests and issues of the participants". The refined study area formed the Investigation Area for the project.
September 2002	RTA calls for proposals for the development of the upgrading of the Pacific Highway between Macksville and Urunga.
March 2003	Contract awarded to Sinclair Knight Merz (SKM) to assist RTA with the development and assessment of feasible route options.
June 2003	Planning focus meeting No. 1 held with representatives of NSW Government agencies and the two councils to outline the project objectives and characteristics of the investigation area.
July 2003	Community Update No. 1 released: <ul style="list-style-type: none"> <li>■ Pacific Highway Upgrading Program outlined.</li> <li>■ Study area identified.</li> <li>■ Community comment invited.</li> </ul>
July 2003	Advertisements placed in local newspapers inviting community to Community Information Sessions. Three sessions held in Macksville, Nambucca Heads and Urunga during July 2003.
July 2003	Advertisements placed in local newspapers inviting community representatives to form community liaison groups for the duration of the project. Three community liaison groups established based in Macksville, Nambucca Heads and Urunga.
July 2003	An Aboriginal Sub-committee is formed with representatives from Coffs Harbour, Nambucca and Unkya Local Aboriginal Land Councils and Aboriginal Elders. The first meeting is held to discuss the project and to obtain an understanding of Aboriginal cultural heritage issues.
August 2003	Each community liaison group meets for the first time. The meetings outlined: <ul style="list-style-type: none"> <li>■ Background to project.</li> <li>■ Role of community liaison groups in overall consultation process.</li> <li>■ Project objectives and design criteria.</li> <li>■ Constraints mapping.</li> <li>■ Issues for discussion at subsequent meetings.</li> </ul>

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Date	Milestone
November 2003	Community liaison group meeting No. 2 held with each of the three groups. The meetings outlined: <ul style="list-style-type: none"> <li>■ Issues raised at last meeting.</li> <li>■ Study progress.</li> <li>■ Constraints mapping completed.</li> <li>■ Initial field investigation.</li> <li>■ Traffic counts and accident statistics.</li> </ul>
December 2003	RTA agrees to investigate options to the west of Macksville in response to requests from sections of the Macksville community.
March 2004	Community liaison group meeting No. 3. The meetings outlined: <ul style="list-style-type: none"> <li>■ Issues raised at the last meeting.</li> <li>■ Study progress.</li> <li>■ Assessment and selection criteria.</li> <li>■ Noise impact assessment.</li> </ul>
June 2004	Planning focus meeting No. 2 held with key stakeholders from government agencies, Nambucca and Bellingen Shire Councils and representatives of local community organisations to discuss potential route options (including west of Macksville options) and key constraints.
August 2004	Meetings held with representatives of each Local Aboriginal Land Council and Elder groups to provide an update on the progress of the study and identify any additional issues of concern.
November 2004	Community Update No. 2 released: <ul style="list-style-type: none"> <li>■ Options to the east and west of Macksville identified.</li> <li>■ Options to the west of Urunga identified.</li> <li>■ Comparison of short-listed options.</li> <li>■ Announced that the option of upgrading the existing highway through Macksville, Nambucca Heads and Urunga would not be considered further due to the impacts on these townships.</li> <li>■ Community comment invited.</li> </ul>
November 2004 to February 2005	Route options displayed at various locations within the Investigation Area between 30 November 2004 and 2 February 2005. Staffed displays and meetings with owners of properties potentially directly affected by the route options held.
December 2004	Community liaison group meeting No. 4. The meetings outlined: <ul style="list-style-type: none"> <li>■ Updates on study progress.</li> <li>■ Update on release of route options.</li> <li>■ More detailed field investigations undertaken for biodiversity and heritage.</li> <li>■ Future CLG membership.</li> <li>■ Route selection process.</li> </ul>
March 2005	Community liaison group meeting No. 5. The meetings outlined: <ul style="list-style-type: none"> <li>■ Introduction of new CLG members</li> <li>■ Route options display and submission update.</li> <li>■ Key issues raised.</li> <li>■ Social impacts.</li> <li>■ Review of selection criteria.</li> <li>■ Value management process and CLG representation.</li> </ul>
March 2005	Meeting held with representatives of each Local Aboriginal Land Council and Elders to discuss short-listed route options east and west of Macksville.
April 2005	Value management workshop held 12, 13 and 14 April 2005 for the Macksville to Urunga section. Participants included nominated CLG members and representatives of community groups, NSW Government agencies, the two councils, Aboriginal community and the project team.
April 2005	Internal project team workshop held to review the recommended preferred route and to discuss refinements requested as a result of recommendations made at the value management workshop.
June 2005	Community liaison group meeting No. 6 held – combined meeting of the three groups. The meeting outlined: <ul style="list-style-type: none"> <li>■ Value management workshop process and recommendations.</li> <li>■ RTA property acquisition process.</li> <li>■ Next steps in the development of the project.</li> </ul>
November 2005	Preferred Route for the Macksville to Urunga Upgrade announced. The Preferred Route involves options 1c and 2a to the east of Macksville, an upgrade of the existing highway between Nambucca

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Date	Milestone
	Heads and Mines Road south of Urunga and the option 4b bypass of Urunga. Review of the previously approved preferred route for the Warrell Creek Upgrade announced.
November 2005	Macksville to Urunga Preferred Route display at various locations throughout the investigation area between 30 November 2005 and 31 January 2006. Staffed displays and meetings held with property owners potentially affected by the preferred route for the Macksville to Urunga Upgrade. November 2005 Community Update published
December 2005	Information evening held with residents in the Warrell Creek area to inform them of the review of the Warrell Creek Upgrade and enable community members to obtain additional information from the study team and to provide input to the review.
February 2006	Planning focus meeting for Review of Warrell Creek Upgrade.
February 2006	Workshop held with representatives of Nambucca and Bellingen Shire Councils to consider options for highway interchange locations and layouts.
March 2006	Letters sent to residents within the Warrell Creek area to inform them of progress with the review.
March 2006 to February 2007	Review of Warrell Creek Upgrade – including development and assessment of new route options. Review of submissions received following announcement of preferred route for the Macksville to Urunga Upgrade. Preparation of project application report for Warrell Creek to Urunga Upgrade.
December 2006	The Minister for Planning under 75B(1) of the <i>Environmental Planning and Assessment (EP&amp;A) Act 1979</i> ordered that 13 projects on the Pacific Highway, including the Warrell Creek and Macksville to Urunga Upgrades, be projects to which Part 3A of the EP&A Act applies.  Having formed the opinion that the 13 projects, including the Warrell Creek and Macksville to Urunga Upgrades, were essential for the State for economic and social reasons, the Minister for Planning also declared the projects to be Critical Infrastructure under Section 75C of the <i>Environmental Planning and Assessment (EP&amp;A) Act 1979</i> .
July 2007	Project application report for Warrell Creek to Urunga Upgrade lodged with Department of Planning. Display of project application report for Warrell Creek to Urunga Upgrade, Macksville to Urunga Preferred Route Submissions Report and Draft Warrell Creek Review Report.

### 1.3.2 Project approval process

Under the provisions of the *Environmental Planning and Assessment (EP&A) Act 1979* the RTA is required to undertake an environmental assessment (EA) of highway upgrade projects. The *Environmental Planning and Assessment Amendment [Infrastructure and other Planning Reform] Act 2005* amends the EP&A Act to require major infrastructure projects (including major road infrastructure projects) to be assessed under Part 3A of the EP&A Act. Part 3A applies to all infrastructure projects that would have otherwise required an environmental impact statement (under Part 5 of the EP&A Act, most development previously classified as State significant and other projects, plans or programs of works as ordered by the Minister for Planning.

On 5 December 2006, the Minister for Planning under 75B(1) of the *Environmental Planning and Assessment (EP&A) Act 1979* ordered that 13 projects on the Pacific Highway, including the Warrell Creek and Macksville to Urunga Upgrades, be projects to which Part 3A of the EP&A Act applies.

Having formed the opinion that the 13 projects, including the Warrell Creek and Macksville to Urunga Upgrades, were essential for the State for economic and social reasons, the Minister for Planning also declared on 5 December 2006, the projects to be Critical Infrastructure under Section 75C of the *Environmental Planning and Assessment (EP&A) Act 1979*.

The order and declaration were gazetted in the NSW Government Gazette No. 175 on 8 December 2006.

The Project is located within the Nambucca Shire and Bellingen Shire local government areas. The principal local environmental plans under the EP&A Act controlling development in these local government areas are:

- Nambucca local environmental plan 1995.
- Bellingen local environmental plan 2003.

However, Section 75R of the EP&A Act excludes Critical Infrastructure Projects from the provisions of all environmental planning instruments (other than State Environmental Planning Policy [SEPP]) that specifically relate to the project) and council orders under Division 2A Part 6 of the Act. As no SEPPs that specifically relate to the Warrell Creek to Urunga Upgrade of the highway have been identified, the RTA is of the opinion that the development of the project is not prohibited under any relevant planning instrument.

Consequently, the RTA proposes to submit the Warrell Creek to Urunga Project to the DoP for Project Approval under Part 3A of the Act.

### *1.3.3 Other project approvals*

#### *1.3.3.1 New South Wales legislation*

Section 75U of the EP&A Act identifies the legislation and approvals that do not apply to a project approved under Part 3A of the Act and Section 75V identifies the legislation and approvals that cannot be refused if they are necessary for the carrying out of an approved project. For an approved project, the following authorisations are not required and accordingly the provisions of any Act that prohibit an activity without such an authority do not apply:

- The concurrence under Part 3 of the *Coastal Protection Act 1979* of the Minister administering that Part of the Act.
- A permit under Section 201, 205 or 219 of the *Fisheries Management Act 1994*.
- An approval under Part 4, or an excavation permit under Section 139, of the *Heritage Act 1977*.
- A permit under Section 87 or a consent under Section 90 of the *National Parks and Wildlife Act 1974*.
- An authorisation referred to in section 12 of the *Native Vegetation Act 2003* (or under any Act to be repealed by that Act) to clear native vegetation.
- A permit under Part 3A of the *Rivers and Foreshores Improvement Act 1948*.
- A bush fire safety authority under section 100B of the *Rural Fires Act 1997*.
- A water use approval under Section 89, a water management work approval under section 90 or an activity approval under section 91 of the *Water Management Act 2000*.

In accordance with the provisions of the *Environmental Planning Legislation Amendment Act 2006* a reference in Section 75U of the EP&A Act to an approved project includes a reference to any investigative or other activities that are required to be carried out for the purpose of complying with any environmental assessment requirements under that Part of the Act in connection with an application for approval to carry out the project or of a concept plan for the project.

Other approvals, including licences under Chapter 3 of the *Protection of the Environment Operations Act 1997* and the *Roads Act 1993* will continue to be required and cannot be refused if they are necessary for the carrying out of an approved Part 3A project. These approvals must be substantially consistent with the Part 3A approval.

### 1.3.3.2 Commonwealth legislation

Under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, a proposal that is likely to result in a significant impact on a matter of National Environmental Significance must be referred to the Department of Environment and Water Resources. If the Proposal is subsequently determined to be a "Controlled Action", then approval from the Commonwealth Environment Minister is required. Matters of National Environmental Significance that are potentially relevant to the Warrell Creek to Urunga Proposal include:

- Nationally threatened species and ecological communities.
- Migratory species protected under international agreements.
- Ramsar wetlands.

Based on investigations completed by the RTA to date, the most likely trigger for a referral to the Department of Environment and Water Resources would be a significant impact on nationally listed threatened species or migratory species. If it is determined that a significant impact is likely, the Proposal will be referred to the Department of Environment and Water Resources.

## 1.4 Consultation

### 1.4.1 Consultation with the community

From the commencement of investigations for the upgrading of the Pacific Highway between Macksville and Urunga in June 2003, the study team has implemented a variety of actions and initiatives to enable extensive and ongoing two-way communication with communities and stakeholders. Communities and stakeholders included landholders, general community, government agencies, councils and businesses.

A community and stakeholder involvement plan was developed for the project. It involved the implementation of a range of different communication mechanisms to facilitate effective two-way flow of information between the study team and the community. The key aspects of the consultation program included:

- Formation of a contact database on which members of the public were able to register to receive community updates.
- Provision of a freecall telephone enquiry line (1800 800 612) for direct enquiries to the project team.
- Advertised open information sessions and public displays (both staffed and unstaffed).
- Three Community Update Newsletters were widely distributed in July 2003, November 2004 and November 2005. Additionally, a Community Update focusing on the Warrell Creek section was also distributed in November 2005.
- Invitations for written submissions and completion of survey forms by individuals and interest groups.
- A business survey was mailed to 85 businesses in Macksville, Nambucca Heads and Urunga during 2003 to identify socio-economic data and consult businesses over potential impacts.
- Formation of and meetings with three community liaison groups (Macksville, Nambucca/Bellwood and Urunga).
- Formation of and meetings with Aboriginal Sub-committee formed with representatives from Coffs Harbour, Nambucca and Unkya Local Aboriginal Land Councils and Aboriginal Elders.
- Value management workshop with diverse agency and community representation.
- Meetings with and presentations to individuals and local interest groups.
- Interviews / meetings with relevant stakeholders including property owners and local businesses.

- Public notices and media coverage (print and electronic).
- Website updates at: [www.rta.nsw.gov.au/pacific.htm](http://www.rta.nsw.gov.au/pacific.htm).

The consultation process has provided the study team with important insight into the key issues raised by the community and other stakeholders. This consultation then became part of the options assessment and route selection processes and has been integral to the development and refinement of the Proposal.

For the review of the Warrell Creek Upgrade section an information evening was held with residents in the area in December 2005 to inform them of the review and enable community members to ask the study team questions and provide input to the review. A Community Update was also published in November 2005 to inform community members about the review. In March 2006, letters were sent to residents within the study area to inform them of progress with the review.

#### *1.4.2 Consultation with government agencies*

Consultation with local and NSW Government agencies has been ongoing throughout the project. At the commencement of the project (June 2003) a planning focus meeting was held to provide information about the Macksville to Urunga section of the project to representatives of these agencies and to identify their issues and requirements. A second planning focus meeting was held with representatives of these agencies prior to the display of the route options for the Macksville to Urunga section in November 2004. Submissions relating to issues and requirements were requested from all agencies following planning focus meetings and the display of the route options. In addition, a number of separate meetings have been held with representatives of NSW Government agencies to discuss specific issues relating to their areas of interest and responsibility.

In April 2005, a value management workshop for the Macksville to Urunga section was held, including key government agencies to consider the feasible options and recommend a preferred route.

At the commencement of the Review of Warrell Creek Upgrade (February 2006) a planning focus meeting was held with representatives of NSW Government agencies and Nambucca Shire Council to provide information about the review to and to identify the issues and requirements.

The study team has also had the opportunity to address meetings of Nambucca and Bellingen Councils several times during the course of the study. Meetings have also been held with the executive and staff of both councils to discuss specific issues and council staff have participated as members of the community liaison groups.

#### *1.4.3 Key issues*

A number of common issues were raised during community consultation activities for the proposed upgrade between Warrell Creek and Urunga. The key issues raised by respondents included:

- Landuse and property impacts, e.g. area of land required for the Proposal, acquisition arrangements and access arrangements.
- Biodiversity impacts.
- Amenity impacts, e.g. traffic noise, vibration and visual impacts and options to mitigate these impacts.
- Road safety impacts of the proposed upgrade.
- Impacts of the Proposal on flooding of the Nambucca and Kalang River floodplains.

- Impacts on the local economy.
- Impacts on Aboriginal heritage.
- Timing and staging of construction.

#### ***1.4.4 How the community influenced the preliminary design***

Throughout the consideration of the options and development of the preliminary design, issues, concerns and suggestions raised by the community were considered by the project team and, where considered appropriate, incorporated into the project. The submissions received from the community are documented and addressed in the *Macksville to Urunga Draft Route Options Submissions Report* (RTA April 2005) and the *Macksville to Urunga Preferred Route Submissions Report* (RTA July 2007).

Key influences of the community consultation on the development of the Proposal include:

- Refinement of the Study Area at a planning workshop held with representatives of Bellingen and Nambucca Councils and State government agencies in August 2002. The refined study area identified at the workshop formed the initial investigation area for the project.
- Examination of options to the west of Macksville (outside the original investigation area) in response to requests from sections of the Macksville community.
- Identification of flooding behaviour and drainage issues.
- Identification of a number of significant Aboriginal and non-Aboriginal sites.
- Identification of potential land use and individual property and farm operation impacts.
- An increased understanding of Aboriginal heritage and culture in the area.
- Information in regard to the potential presence and location of threatened flora and fauna species.
- Identification of local road networks and access issues.

Submissions received from the display of the *Draft Warrell Creek Review Report* (RTA July 2007) will be considered before a final decision is made on the outcomes of the review.

The environmental assessment for the Warrell Creek to Urunga Upgrade Project will assess the combined outcomes of the review of the Warrell Creek Upgrade and the preferred route for the Macksville to Urunga Upgrade.

## 2 Need for the Proposal

### 2.1 Need

The Pacific Highway is one of the most important strategic corridors within the Australian road network. It acts as a vital link between Sydney and Brisbane as well as providing regional connections along the North Coast of NSW. The highway carries significant traffic volumes, especially during the holiday periods.

There is substantial freight movement (with the majority non-containerised) along the Pacific Highway to ports located in Brisbane, Sydney and Newcastle. Local and intra-state road freight destined for the major cities and major markets is generated through agriculture, manufacturing and other local industries. This freight movement has led to conflicts between local traffic and heavy vehicles in several locations along the highway. The Pacific Highway carries approximately 8 million tonnes of freight every year.

The Pacific Highway is part of the AusLink National Network.

The upgrade of the Pacific Highway is essential for the State for economic, environmental or social reasons having regard to the following:

- The Pacific Highway between the F3 Freeway (near Beresfield) and the NSW, Queensland state border is a key strategic link between Sydney and Brisbane and for servicing the rapidly developing coastal communities on the North Coast and Mid-North Coast of NSW.
- With the \$2.2 billion Pacific Highway Upgrade Program in place since 1996, a total of 254 kilometres are now double-lane divided road. Projects to complete the upgrade of the Pacific Highway are either under construction, have been approved for construction or have had a preferred upgrade route identified.
- There is a need for safety, traffic, transport and economic reasons to ensure that the Pacific Highway is a four-lane divided carriageway for its entire length.
- In December 2005, the NSW and Australian Governments announced a jointly funded program of \$960 million for the three years to 2009. In May 2006, the Federal Budget announced an additional \$160 million matched by NSW for the period to the end of 2009, thereby increasing the total value of the joint investment program from \$960 million to \$1.3 billion.
- Both governments are jointly examining how the entire length of highway can be upgraded to dual carriageway by the end of 2016.

The Sydney–Brisbane corridor is expected to experience significant growth in both population and economic activity over the next 20 years. Improvements to the efficiency, safety and capacity of existing rail and road transport links (including the Pacific Highway) will facilitate the expected population growth and increase in economic activity along the corridor.

The *State Infrastructure Strategy – New South Wales 2006/07 to 2015/16* provided the direction for planning and delivery of infrastructure in New South Wales. The *State Infrastructure Strategy* investment priorities identified the Pacific Highway as a critical route supporting economic development which requires upgrading as soon as possible.

The *Draft Mid-North Coast Regional Strategy* aims to support sustainable growth of the region by ensuring adequate land is available and appropriately located to accommodate projected housing and employment needs. It also



## Upgrading the Pacific Highway Warrell Creek to Urunga Project Application Report

incorporates the specific regional infrastructure requirements identified in the *State Infrastructure Strategy* – including the upgrade of the Pacific Highway.

Both the *State Infrastructure Strategy* and *Draft Mid- North Coast Regional Strategy* identify the Macksville to Urunga project as a key component of the Pacific Highway Upgrade.

The Warrell Creek to Urunga section is a key link in the overall framework of the Pacific Highway corridor. It is also a significant link for the region, particularly in terms of economic growth and tourism. The section of the Pacific Highway between Warrell Creek and Urunga services the townships of Macksville, Nambucca Heads and Urunga, as well as other smaller villages.

Traffic volumes on the highway have approximately doubled in the 18 years between 1986 and 2004. There are significant seasonal variations through the year as is expected of coastal tourist areas, with weekly traffic during the Christmas holiday period some 45 per cent more than during August. Traffic volumes are predicted to continue to increase due to increases in the population both along the eastern seaboard and within the region, and in tourism within the North Coast area.

Road safety is a community concern and one of the Pacific Highway Upgrade objectives is to significantly reduce road accidents and the associated costs. Upgrading of the Pacific Highway has significantly reduced the number and severity of road crashes on the completed dual carriageway sections and eliminated a number of accident blackspots.

The existing Pacific Highway through the investigation area is primarily a two-lane road with occasional overtaking lanes. RTA crash data indicates that a total of 269 crashes occurred on the Pacific Highway in the study area in the five-year period between 1 April 2001 and 31 March 2006. These included 13 fatal crashes resulting in 16 fatalities, 122 injury crashes and 134 non-injury crashes. As the crash rates on the single carriageway sections of the Pacific Highway are higher in all categories (fatal, injury and total) than the adjacent dual carriageway sections, upgrading this section of the highway to dual carriageway is expected to significantly reduce road accidents and costs.

Two other objectives of the Pacific Highway Upgrade are to reduce travel times and freight transport costs. The Warrell Creek to Urunga Upgrade would reduce travel time along the highway through the investigation area by approximately 25 per cent at signposted speed limits from 32 minutes to 23 minutes. Reductions in travel times, together with the benefits provided by an efficient high standard dual-carriageway highway, will result in decreased freight transport costs. Duplication of the highway has the potential to significantly improve freight competitiveness for existing vehicles.

With the completion of other Pacific Highway Upgrades attention will focus on uncompleted lengths. Travelling conditions on these lower standard sections will provide a stark contrast to the completed sections of the highway.

The Proposal would make an important contribution to road safety for motorists, cyclists and pedestrians; improved efficiency of freight transport, better access for rural communities; and meeting community expectations. A delay to the delivery of the Proposal will result in a delay in delivering these benefits to the community.

## 2.2 Proposal objectives and design principles

### 2.2.1 Pacific Highway Upgrade program objectives

The Pacific Highway is an AusLink National Network road. Its upgrade is funded by the NSW and Australian Governments. For the 10 years to June 2006, the NSW Government has contributed \$1.66 billion and the Australian Government has invested \$660 million. Both governments have committed a further \$1.3 billion to 2009.

The objectives of the Pacific Highway Upgrade Program are to:

- Significantly reduce road accidents and injuries.
- Reduce travel times.
- Reduce freight transport 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 principles.
- Provide the best value for money.

### 2.2.2 Warrell Creek to Urunga Project objectives

The proposed Warrell Creek to Urunga Upgrade would form an essential part of the overall upgrade of the Pacific Highway between Hexham and the Queensland border.

As well as contributing to the objectives of the Pacific Highway Upgrading Program, specific objectives of the Warrell Creek to Urunga Upgrade are to:

- Achieve safe driving conditions on the highway for travel speeds of 110 kilometres per hour in rural areas and 80 kilometres per hour in urban areas.
- Provide connections from the upgraded highway to the key centres of Macksville, Nambucca Heads and Urunga.
- Have acceptable roadway capacity for traffic volumes 30 years after opening.
- Develop a dual carriageway road that accommodates all vehicles up to and including B-Doubles.
- Provide acceptable access to properties.
- Maintain highway access during flood conditions.
- Integrate input from local communities into the development of the project.
- Develop delay management strategies to minimise disruption to local and through traffic and maintain access to affected properties and land during construction.
- Develop solutions that facilitate the staged construction of the project.
- Develop solutions for the ultimate grade separation of the Pacific Highway and local road intersections including consolidation of accesses by the use of local access roads.
- Provide rest areas within the investigation area.
- Provide transport infrastructure that is complementary with surround land use.
- Ensure the project outcomes achieve value for money.

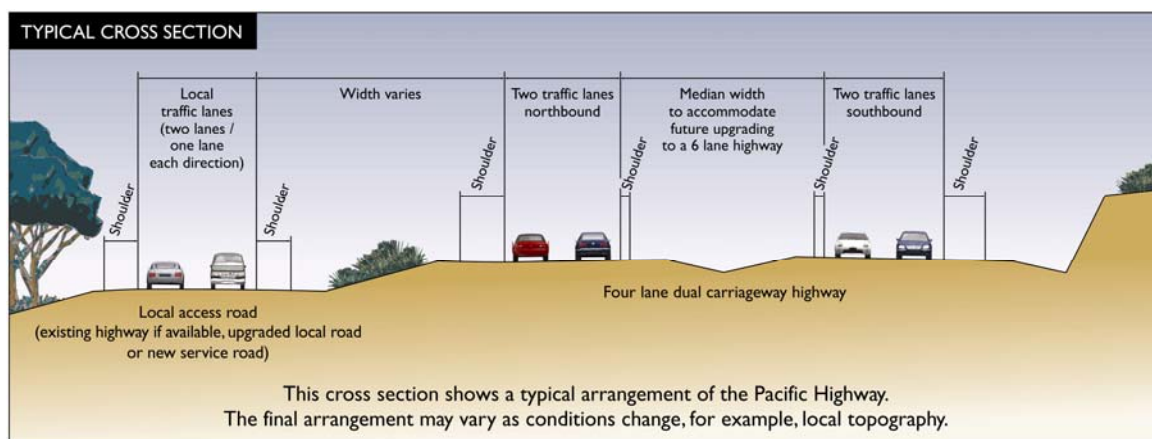
### 2.2.3 Design principles

The Warrell Creek to Urunga Upgrade has been developed as a motorway standard (or Class M) project as designated in the *Draft Pacific Highway Design Guidelines (RTA 2005)*. Key characteristics of Class M standard projects include:

- Project designed to a standard that would enable an ultimate signposted speed limit of 110 km/h to be adopted.
- 4-lane dual carriageway highway with median width to accommodate future upgrading to 6 lanes (desirable minimum width 12metres).
- Each carriageway comprising two 3.5metre lanes, a 2.5metre left-hand shoulder and 0.5metre right-hand shoulder.
- Access to the highway provided at grade separated interchanges.
- Alternative routes provided for access to townships, communities and properties. Where required, these access roads will pass over or under the new highway.

A typical cross section of the upgraded highway is shown in Figure 2-1.

Figure 2-1: Typical cross-section of the upgraded highway



## 3 Route options development and assessment

### 3.1 Key characteristics of the study area

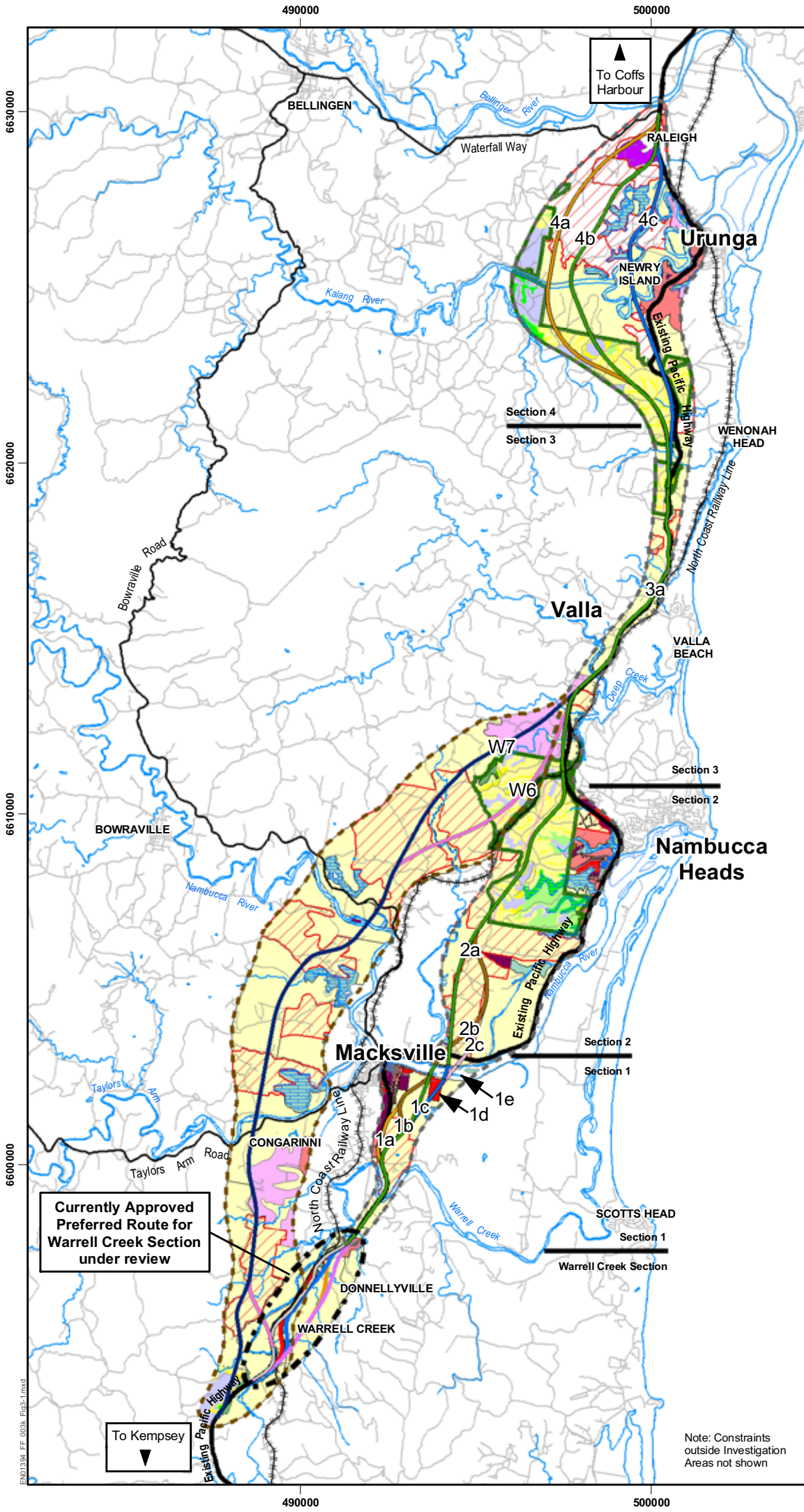
#### 3.1.1 General

A summary of the key characteristics of the study area and the major constraints to highway planning and development is presented below. The study area identified for the project extends from the northern end of the existing Allgoma deviation south of Warrell Creek to the existing Waterfall Way interchange at Raleigh.

Key engineering, planning and environmental considerations and constraints to highway planning and development included:

- The need to provide a connection to the existing highway at each end of the Proposal and service existing population centres.
- The need to provide opportunities to stage construction of the proposed Upgrade.
- The Nambucca and Kalang Rivers and associated flooding and drainage issues.
- The towns of Macksville, Nambucca Heads and Urunga.
- Urban land use development.
- Rural land use.
- Local council road strategies.
- Geological conditions.
- Topography and earthworks.
- Visual impacts.
- Flora and fauna.
- Heritage.
- Connections to surrounding areas, including coastal towns.
- The North Coast Railway.

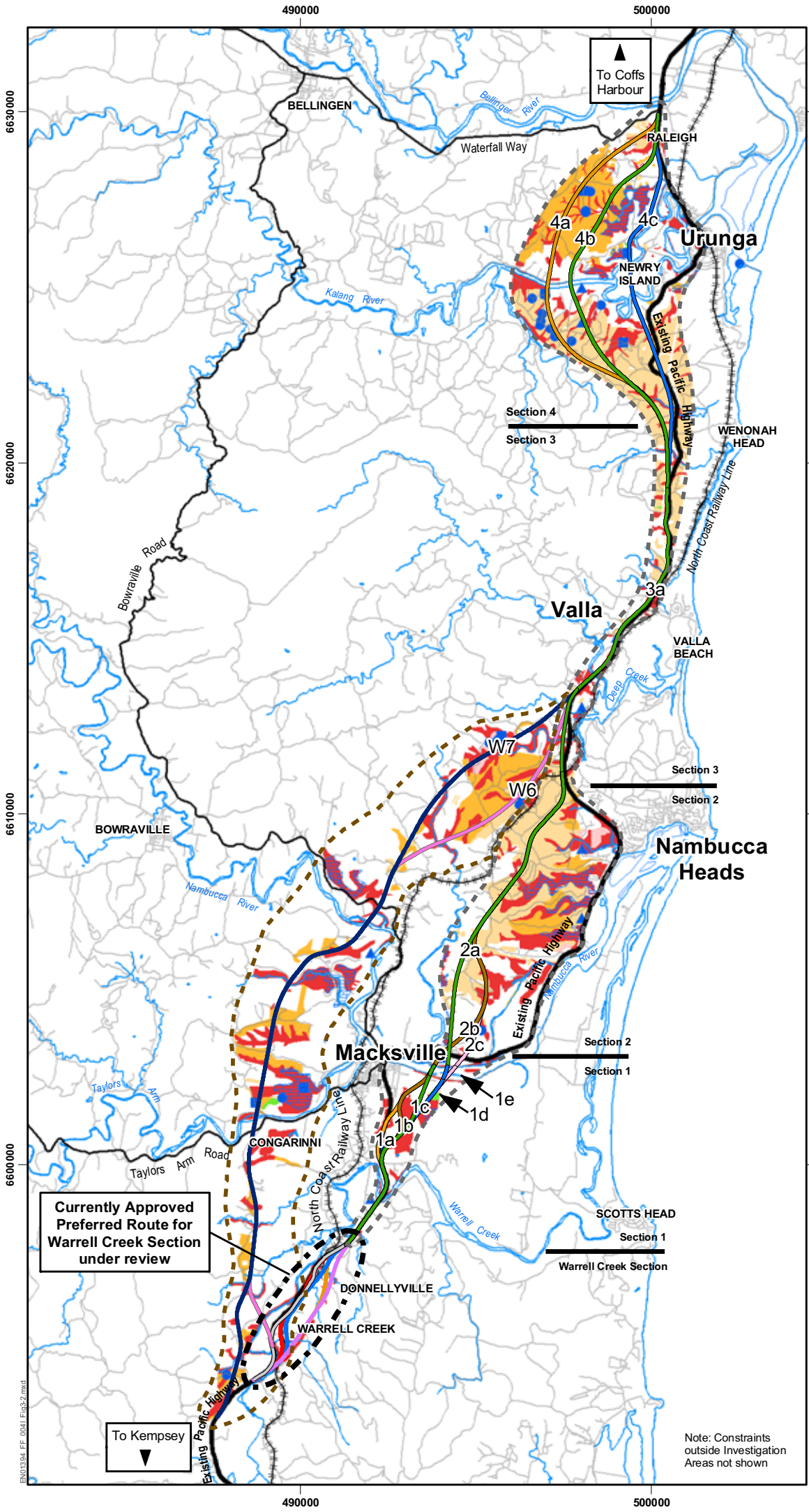
The key planning and ecological constraints influencing the development of the project are illustrated in **Figure 3-1** and **Figure 3-2**, respectively.



- Legend**
- Original Macksville to Urunga Investigation Area
  - West of Macksville Investigation Area
- Generalised Zoning**
- Rural
  - Future Urban
  - Rural Residential
  - State Forest Boundary
  - Residential / Tourism
  - General Business
  - Industrial
  - Special Use
  - General Open Space
  - Environmental Protection
  - Proposed Road
- State Forest Management Zones**
- Special Protection (Zone 1)
  - Special Management (Z 2)
  - Harvesting Exclusion (Z 3A)
  - Special Prescription (Z 3)
  - General Management (Z 4)
  - Hardwood Plantations (Z 5)
  - Non Forestry Use (Z 7)
  - Further Assessment (Z 8)
  - SEPP14 Wetlands
- Macksville to Urunga Section**
- Route Options**
- Section 1**
- 1a
  - 1b
  - 1c
  - 1d
  - 1e
- Section 2**
- 2a
  - 2b
  - 2c
- Section 3**
- 3a
- Section 4**
- 4a
  - 4b
  - 4c
- West of Macksville Options**
- W6
  - W7
- Warrell Creek Section**
- Currently Approved Preferred Route
- Route Options**
- Purple
  - Blue
  - Orange
  - Red
- Existing Pacific Highway  
Other Existing Major Roads  
North Coast Railway Line  
Creeks/Rivers

**Figure 3-1**  
Planning Constraints to the Development of the Project

Note: Constraints outside Investigation Areas not shown



- Legend**
- Original Macksville to Urunga Investigation Area
  - West of Macksville Investigation Area
- Fauna**
- Significant Fauna Habitat Areas
  - Threatened Fauna (from field investigation)
  - DEC Threatened Fauna Records
- Habitat Quality**
- Endangered Ecological Communities (EEC)
  - Very High (Non EEC)
  - High
  - Medium
  - Low
- SEPP14 Wetlands
- Macksville to Urunga Section**
- Route Options**
- Section 1**
- 1a
  - 1b
  - 1c
  - 1d
  - 1e
- Section 2**
- 2a
  - 2b
  - 2c
- Section 3**
- 3a
- Section 4**
- 4a
  - 4b
  - 4c
- West of Macksville Options**
- W6
  - W7
- Warrell Creek Section**
- Currently Approved Preferred Route
- Route Options**
- Purple
  - Blue
  - Orange
  - Red
- Existing Pacific Highway
- Other Existing Major Roads
- North Coast Railway Line
- Creeks/Rivers

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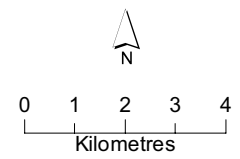
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Currently Approved Preferred Route for Warrell Creek Section under review

To Kempsey

To Coffs Harbour

Note: Constraints outside Investigation Areas not shown



**Figure 3-2**  
Ecological Constraints to the Development of the Project

### **3.1.2 Traffic and transportation**

Traffic issues associated with the development of the project included:

- Provision of an acceptable roadway capacity for through and local traffic volumes at least 30 years after opening.
- Travel time savings.
- Reduction of vehicle accident rates by providing a higher standard roadway and a more direct route.
- Provision of appropriate local access through interchanges and local access roads.
- Provision of rest areas and “Driver Reviver” rest areas.
- Provision of truck stopping bays to suit B-Doubles located approximately every 5 kilometres.

### **3.1.3 Land use constraints and issues**

Assessment of current land use and potential future changes within the investigation area identified a number of land use constraints to the development and assessment of route options for further investigation. A hierarchy of land use constraints was identified and provided an input into the development and assessment of feasible route options.

### **3.1.4 Economic considerations**

The upgrade of the Pacific Highway between Warrell Creek and Urunga could have a direct negative impact on businesses that are significantly dependent on highway through traffic, e.g. accommodation services, motor vehicle services, cafes and restaurants and specialised food retailers. However, the overall economic impact of the highway upgrade on businesses is likely to be small as through traffic dependent business does not represent a major component of the economic base of the area.

A survey undertaken in 2003 of businesses in the Macksville to Urunga section found that the number of persons directly dependent on highway through traffic for employment represents only about 3 per cent of persons employed in the study area. Details of the survey can be found in the *Business Impact Survey Report* (SKM, February 2004).

Possible indirect economic impacts of the highway upgrade include:

- Impacts on local businesses providing inputs to businesses that are significantly dependent on highway through traffic.
- Reduction in consumption expenditure by local residents as a result of loss of employment in through traffic dependent businesses.

As through-traffic-dependent business does not represent a major component of the economic base of the area, the indirect economic impacts of the highway upgrade are also likely to be small. Consequently, any losses of turnover and employment in through traffic-related businesses are unlikely to have a significant cumulative effect on the economic viability of the study area.

Studies undertaken elsewhere on the Pacific Highway and on the Hume Highway indicate that the impact of bypass roads on local businesses is short term and that economic growth recovered in the towns surveyed in the medium to long term. Useful references are:

## Upgrading the Pacific Highway Warrell Creek to Urunga Project Application Report

- Bureau of Transport and Communication Economics, *The Effect on Small Towns of Being Bypassed by a Highway: A Case Study of Berrima and Mittagong*, Working Paper 11, 1994.
- School of Geography, University of New South Wales, *Evaluation of the Economic Impacts of Bypass Roads on Country Towns*, Final Project Report, prepared for NSW RTA, 1996.
- Urban and Regional Planning Program, University of Sydney, *The Karuah Highway Bypass – Economic and Social Impacts, the 1- year report*, prepared for NSW RTA, November 2005.

### 3.1.5 Environmental issues

#### Biodiversity

##### Terrestrial ecology

The ecological issues that were considered important to the development of the project included:

- Minimising the clearing of areas of high-quality native vegetation.
- Minimising the direct impact to areas identified as comprising endangered ecological communities.
- Minimising direct impact to threatened species habitat.
- Maintenance of fauna movement corridors.

##### Aquatic ecology

The aquatic ecological issues that were of particular importance to the development of the project included:

- The location and design of watercourse crossings to meet NSW Fisheries Guidelines.
- Minimising the extent of loss of riparian vegetation.
- Minimising disturbance to surrounding fish habitat and areas of oyster leases.
- Minimising the extent of local flooding and drainage changes that could impact on floodplain habitat and ecological processes.
- Minimising disturbance to potential acid sulphate soils during construction which, if not properly managed, could have an adverse impact on water quality and hence on aquatic ecology.
- Minimising impact to threatened species such as black cod (*Epinephelus daemeli*) and green sawfish (*Pristis zijsron*) which may occur in, or encroach on, the investigation area.

#### Heritage

##### Aboriginal heritage

The investigation area lies within the Unkya, Bowraville, Nambucca Heads and Coffs Harbour Local Aboriginal Land Council areas. Other relevant groups include the Gumbular Juliri and Gumbangerii Elders groups. A number of sites and areas of significance or sensitivity for Aboriginal cultural heritage occur in the investigation area. The majority of these sites are located to the west of Macksville. An objective in the development of route options within the study area was to avoid and/or minimise direct impact on significant Aboriginal sites and areas.

##### Non-Aboriginal heritage

A number of non-Aboriginal heritage sites occur in the study area. Two items at Macksville are listed on the Nambucca local environmental plan Schedules. There are no heritage items listed on the local environmental plan Schedules of Bellingen Shire Council, although a number of items have been identified by the council as Conservation Areas and nine of these are located within the investigation area. Congarinni Village, to the west of Macksville was identified as potentially significant with three sites (two of local and one of potential State significance) identified in this area. These sites were considered as constraints in the development and assessment of route options for the project.



## **Upgrading the Pacific Highway Warrell Creek to Urunga Project Application Report**

### **Water quality**

The investigation area is characterised by two major water courses, the Nambucca and the Kalang Rivers and their associated tributaries. The majority of the waterways are estuarine, dominated by saline conditions. Water quality investigations indicated that waterways in the study area have water quality characteristics consistent with predominantly rural catchments. The investigations did not identify any parameters that would particularly influence route selection.

### **Flooding and drainage**

The Nambucca and Kalang Rivers and Warrell Creek are broad systems with extensive floodplains. Deep Creek is also an important waterway, although with a significantly smaller catchment area.

### ***Nambucca River***

The Nambucca River and floodplain has experienced significant flooding with 20 flood events recorded in the past 100 years. Investigations into the assessment of route options concluded that the maximum increase in 1 in 100 year ARI flood levels due to any of the route options to the east of Macksville would be less than 50 millimetres in the Nambucca River downstream of Macksville and less than 30 millimetres in Gumma swamp. These increases occur immediately upstream of the route options and would not affect flood flows or flood levels in Macksville.

### ***Warrell Creek***

Warrell Creek is a major tributary of the Nambucca River. The two watercourses meet immediately upstream of the Nambucca River entrance near the town of Nambucca Heads. During concept design any proposed crossings of the Warrell Creek floodplain would be designed with the objective of achieving a maximum increase in flood levels upstream of the Proposal of less than 50 millimetres.

### ***Kalang River***

The Kalang River is the major tributary of the Bellinger River and the two rivers meet near the town of Urunga. Investigations found that any of the proposed crossings of the Kalang River floodplain could be designed to achieve maximum increases in flood levels upstream of the route options of approximately 50 millimetres.

### **Air quality**

While residents adjacent to the Proposal would potentially experience a decrease in air quality, residences adjacent to bypassed sections of the existing highway would potentially experience an improvement in air quality.

In late 2005 and early 2006, the RTA undertook air quality monitoring adjacent to the highway at Korora, north of Coffs Harbour. This was the first air quality monitoring conducted for the Pacific Highway Upgrade program and is understood to be the first air quality monitoring conducted on the NSW North Coast. The monitoring conformed to Australian Standards.

As outlined in the Department of Environment and Climate Change's (DECC) (previously Department of Environment and Conservation) *Action for Air: 2006 Update*, NSW has adopted the national standards and goals in the National Environment Protection Measure for Ambient Air Quality (Air NEPM) which was issued in 1998.

For the key parameters measured at the Korora monitoring site (carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>)), the recorded air quality was better than the NSW goals for ambient air quality.

## **Upgrading the Pacific Highway Warrell Creek to Urunga Project Application Report**

The air quality monitoring station was located approx 20metres from the edge of the existing 4-lane dual-carriageway highway. The signposted speed limit on this section of the highway is 100 km/h. This section of the highway is on a gradient of 5.2 per cent. While 2006 Annual Average Daily Traffic of this section of the highway is approximately 20,500 vehicles per day, the air quality monitoring at Korora included the 2005/06 Christmas/New Year holiday period when traffic volumes were significantly higher than annual average traffic volumes.

In terms of traffic volumes, signposted speed limit and gradient, the highway opposite the Korora monitoring site represents a “worst-case” scenario for the proposed upgrade of the highway. Consequently, air quality at the Korora monitoring site represents the expected “worst-case” scenario for air quality along the proposed highway corridor.

The results of the air quality monitoring at the Korora monitoring site indicate that ambient air quality along the Proposal would meet or exceed the NSW goals for ambient air quality.

### **Noise**

The acoustic amenity of the investigation area is influenced by the Pacific Highway where existing traffic noise levels at the closest residential receivers are predicted to already exceed DECC base criteria for “new” or “redeveloped roads”. Noise levels away from the existing highway and within towns and villages would generally be low, particularly at night.

The investigation area has a large number of residential buildings, some of which are clustered together in developments, while those in rural areas are generally more widely dispersed. Any option to upgrade the Pacific Highway within the investigation area would result in potential new or increased noise impacts to nearby residences and to other sensitive receptors such as schools, churches and hospitals. The development of the route options was undertaken with this in mind and aimed to avoid large areas of residential development as much as practicable.

### **Geology and soils**

Two major geological terrain units occur in the investigation area and include significant areas of floodplains as well as hills.

Floodplains dominate the southern and northern parts of the investigation area. In this type of terrain the road would probably be carried on fill embankments. A key geotechnical issue for the proposed upgrade is the presence of low strength and highly compressible soils of alluvial and estuarine origin that underlie the relatively low-lying floodplains. The embankments will cause settlement of the compressible foundation soils during and following construction. These soils would impact on the design of the upgrade, the time that is needed to construct the road, the cost of its construction and the techniques required to manage the embankment fill materials during construction.

The construction of the pavement on the top of the embankment will not commence until there is a low risk of future settlement of the foundation soils causing damage to the pavement. This will require the selection of a suitable pavement type and may mean that additional time is needed after completion of construction of the embankment for additional foundation settlement to occur.

Deep compressible, alluvial and estuarine soils are expected at most of the river crossings. Bridges will most likely be supported on piles founded on rock. As fill embankments on the highly compressible soils on the floodplains will settle, bridge approach treatment will be needed to provide a smooth transition between the bridges and embankments on floodplains.

## **Upgrading the Pacific Highway Warrell Creek to Urunga Project Application Report**

The soils underlying the floodplains are expected to be potential acid sulphate soils. Techniques are available to manage these soils during construction.

Roads in hilly terrain would require cuts through soil and rock. Most material excavated from cuttings is expected to be relatively low quality, but suitable for general embankment fill.

### **3.2 Route options development and assessment**

This section of the Application summarises the development and assessment of route options for the project. Details of the process involved in the identification of the study area, selection of route options and the selection of the preferred route for the Macksville to Urunga section of the project are contained in *Macksville to Urunga, Upgrading the Pacific Highway – Preferred Route Report* published in November 2005. Details of the review of the preferred route for the Warrell Creek section of the project are contained in the *Draft Warrell Creek Review Report* published in July 2007. Both reports are available on the project website.

#### **3.2.1 Macksville to Urunga section**

The investigation area for the Macksville to Urunga section was notionally divided into four sections to allow more detailed assessment of constraints and identification of route options to be undertaken. Based on the initial constraints analysis, up to six possible route options were identified in each section. Feasible route options in each were short-listed for further investigation and displayed for community comment. The option of upgrading the existing highway through Macksville, Nambucca Heads and Urunga is not acceptable due to the impacts on these towns.

##### **3.2.1.1 Description of route options**

The short-listed options that were identified and evaluated as part of the project are shown on **Figure 3-3** and are briefly outlined below.

#### **Section 1 – Albert Drive, Donnellyville to Nambucca River**

Five options were developed in this section (1a, 1b, 1c, 1d and 1e). All were located to the east of Macksville's main commercial and residential areas and provide a new dual-carriageway bypass of Macksville.

#### **Section 2 – Nambucca River to North Coast Railway Line west of Nambucca Heads**

Three options were identified in this section (2a, 2b and 2c). These converge to a common alignment in the vicinity of Old Coast Road south of Nambucca State Forest. All options provide a new dual carriageway bypass of Nambucca Heads.

#### **Section 3 – North Coast Railway Line west of Nambucca Heads to Mines Road, south of Urunga**

As the area between Nambucca Heads and South Urunga is highly constrained by wetlands to the east and significant forested areas to the west, Section 3 of the investigation area is narrow and the only option in this section (Route 3a) involves upgrading the existing highway alignment.

#### **Section 4 – Mines Road, south of Urunga to Raleigh deviation**

Three options were developed in this section of the investigation area (4a, 4b and 4c). All would provide a new dual-carriageway bypass of Urunga.

### **Options to the west of Macksville**

During the initial public information days, some sections of the community suggested that options to the west of Macksville should also be investigated due to concerns associated with potential flooding impacts in the areas to the east. The RTA decided to undertake a desk-top study of an option west of Macksville, as part of the overall project investigation.

The desk top study progressed to the development of two options to the west of Macksville (W6 and W7) to be considered as part of the route option assessment process. A number of preliminary environmental studies were also undertaken to assess the potential impacts of these options.

#### **3.2.1.2 Evaluation of route options**

Detailed analyses of engineering, environmental, social and economic considerations were undertaken to establish which route options best met the needs of road users and the community. Geotechnical investigations and field investigations for terrestrial ecology, aquatic ecology, Aboriginal and non-Aboriginal heritage, flooding and drainage studies were also carried out.

The information gathered enabled a comparison to be made between the corridors to the east and west of Macksville.

The route options are documented in a number of key reports. These include the *Draft Route Options Development Report* (RTA 2004) and *Draft West of Macksville Options* (RTA, 2004). Another document, *Route Options Submissions Report* (RTA 2005) outlines the main issues raised by the community as a result of the public display of the route options.

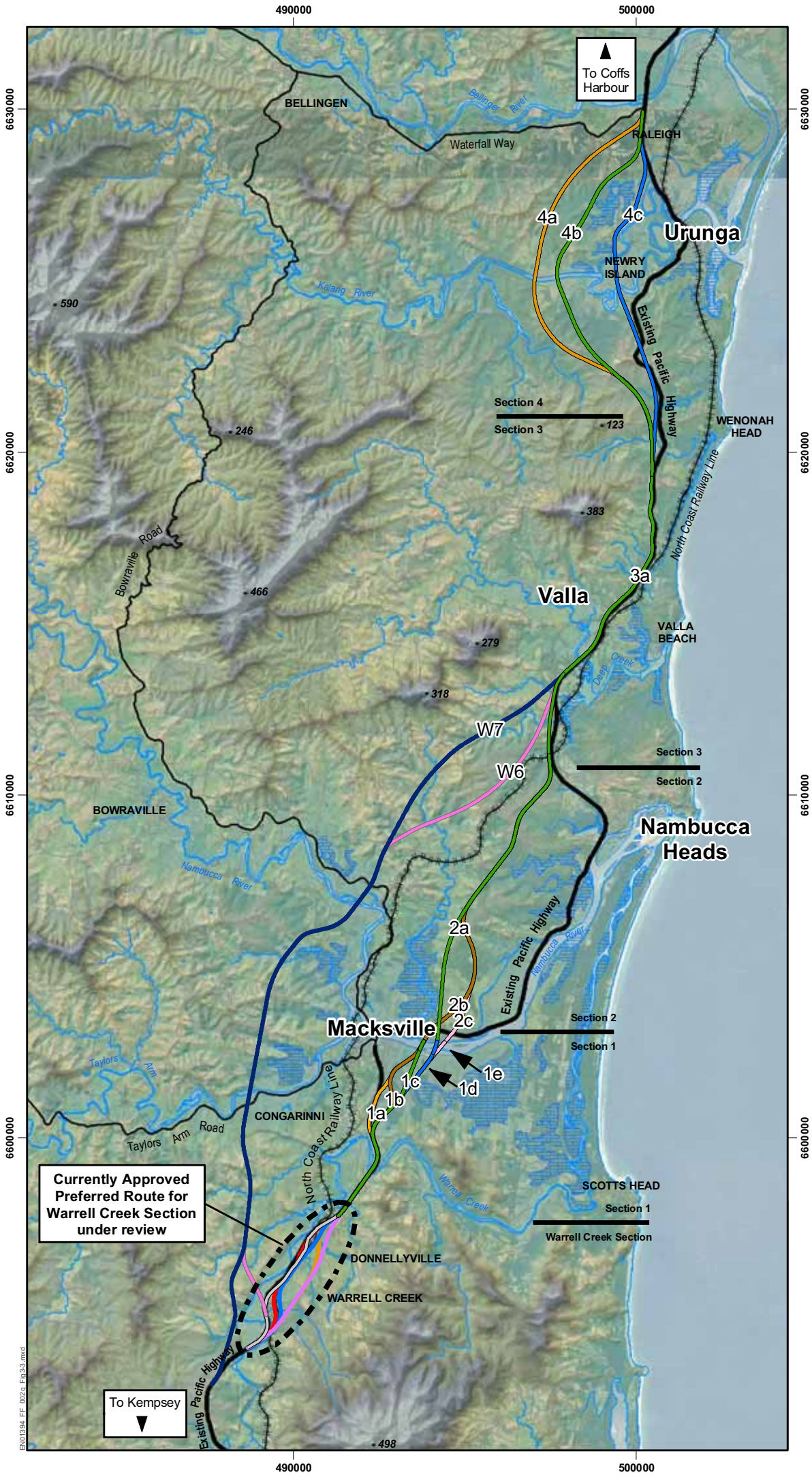
A value management workshop was held in April 2005 to consider the options. The workshop participants represented a broad range of community areas and organisations, Nambucca and Bellingen Shire Councils, government agencies and members of the project team. The workshop assessed the feasible options against the project objectives and agreed functional, social, economic and environmental criteria. The findings of the value management workshop were reported in Appendix A of the *Macksville to Urunga Preferred Route Report* (RTA, 2005).

The workshop process was highly structured in order to deliver the required outcomes within the time available. The focus for the first day of the workshop was to provide an understanding of the various viewpoints and opinions held by the workshop participants, develop a series of selection criteria for the evaluation of the options and to weight the criteria according to the agreed relative importance or priority of each criterion. A sensitivity analysis of some of the scores was undertaken to determine the impact of the relative weightings.

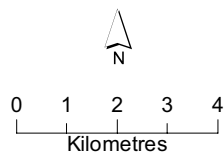
The second and third days were used for decision making. The second day focused on the available options for the southern part of the study area - Sections 1 and 2 of the original investigation area and the options to the west of Macksville. The third and final day of the workshop was dedicated to the analysis of the options in Section 4. Section 3 was not considered at the workshop as the only feasible option for that section is Option 3a which involves upgrading along the existing highway.

The key outcomes of the workshop were:

- Consensus that options located in the original study area to the east of Macksville were preferred over options to the west of Macksville.



- Legend**
- SEPP14 Wetlands
  - Macksville to Urunga Section**
  - Route Options**
  - Section 1**
    - 1a
    - 1b
    - 1c
    - 1d
    - 1e
  - Section 2**
    - 2a
    - 2b
    - 2c
  - Section 3**
    - 3a
  - Section 4**
    - 4a
    - 4b
    - 4c
  - West of Macksville Options**
    - W6
    - W7
  - Warrell Creek Section**
    - Currently Approved Preferred Route
  - Route Options**
    - Purple
    - Blue
    - Orange
    - Red
  - Existing Pacific Highway
  - Other Existing Major Roads
  - North Coast Railway Line
  - Creeks/Rivers
  - Spot Heights (metres, ASL)
  - Elevation**
    - High
    - Low



**Figure 3-3**  
Route Options for Macksville to Urunga Section

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## **Upgrading the Pacific Highway Warrell Creek to Urunga Project Application Report**

- Recommendation of Option 1c, 2a, 3a and 4b as the preferred route for the project.

An important outcome of the value management workshop was the identification of a number of suggested refinements to the recommended route. These suggestions were considered as part of the refinements undertaken for the recommended route and are discussed in Section 4 of this Report.

### **3.2.1.3 Selection of the preferred route**

After an extensive period of route planning and assessment the preferred route for the Macksville to Urunga section of the project was identified and publicly exhibited as a combination of Options 1c, 2a, 3a and 4b on the basis that it:

- Is the route recommended by the value management workshop and subsequent reviews.
- Best meets the objectives of both the Pacific Highway Upgrade Program and the Warrell Creek to Urunga project.
- Provides the best outcome in terms of road safety and transport efficiency.
- Provides for the ultimate grade separation of the Pacific Highway and local road intersections including consolidation of accesses by the use of local access roads.
- Provides efficient connections from the upgraded highway to the key centres of Macksville, Nambucca Heads and Urunga through the construction of interchanges.
- Provides the best overall balance across functional, ecological, social and economic considerations.
- Provides reasonable physical separation from existing and proposed residential areas so that, with sensitive urban design, acceptable visual and traffic noise outcomes could be achieved.
- Can be designed to minimise property impacts.
- Has minimal impact on existing flooding and drainage flows.
- Has relatively minor biodiversity impacts compared to other options considered – the impacts are expected to be at a level that can be effectively managed.
- Has minimal impacts on Aboriginal heritage sites/areas and non-Aboriginal heritage items.
- Enables construction staging opportunities to be realised.
- Is the lowest cost option and provides a benefit – cost ratio at or near the upper end of the range achievable from the route options available.

### **3.2.2 Warrell Creek section**

#### **3.2.2.1 Review of the Warrell Creek section**

Following the announcement of the preferred route for the upgrade of the highway between Macksville and Urunga in November 2005, a review was carried out on the 5 kilometre section of highway between the southern end of the upgrade and the northern end of the Allomera deviation (the 5 kilometre section is referred to in this report as the Warrell Creek section).

The preferred route for the Warrell Creek section was selected and designed in the late 1990s to a standard earlier than that proposed for current upgrades of the Pacific Highway. The route and design for the Warrell Creek section was reviewed to determine if it provides an appropriate connection between the existing Allomera deviation and the Macksville to Urunga Upgrade, as well as meeting current design and environmental standards. The review found that the late 1990s route and design for the upgrade would need to be modified to meet current design standards for the

## **Upgrading the Pacific Highway Warrell Creek to Urunga Project Application Report**

Pacific Highway. The review also found that the design would have significant noise impacts on the village of Warrell Creek and would need to be substantially modified to meet current noise guidelines.

In response to the outcomes of the review, a number of options for the Warrell Creek section were developed. The new route options were assessed against a range of functional, environmental, social, economic and cost considerations. Comments received from government agencies, Nambucca Shire Council and the community were considered during the identification of the options.

### **3.2.2.2 Review process**

The review of the Warrell Creek section has involved the following steps:

- Review of currently approved design for the Warrell Creek section.
- Assessment of the adequacy of the currently approved design.
- Stakeholder consultation including a community information evening to identify community interests, issues and concerns and a planning focus meeting with government agencies and Nambucca Shire Council.
- Site visits and preliminary ecological, heritage, traffic, geotechnical and other investigations.
- Development of feasible route options.
- Shortlisting of route options.
- Assessment of shortlisted route options.

### **3.2.2.3 Development of route options**

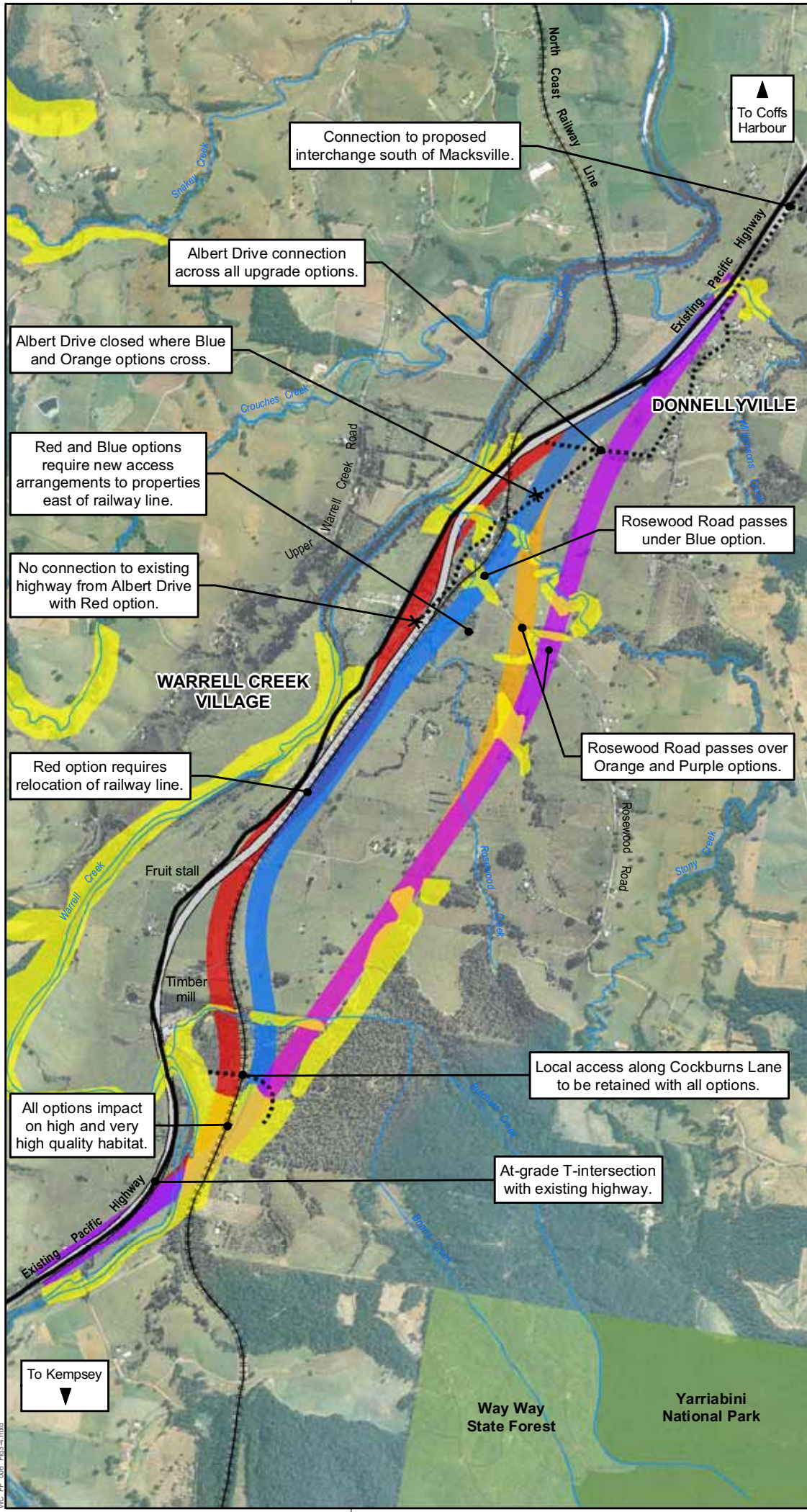
Desktop studies and field investigations were undertaken to identify possible constraints to building a highway through the study area. Comments received from government agencies, Nambucca Shire Council and the community were considered during the identification of route options.

A value management methodology was adopted to assess the route options against a range of functional, environmental, social, economic and cost considerations. The assessment identified a shortlist of the four most feasible routes. The options are summarised in **Appendix B** and shown in **Figure 3-4** below.

### **3.2.2.4 Assessment of short-listed options**

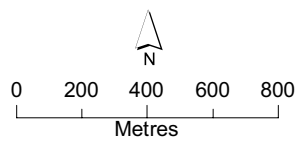
A workshop was held to assess the merits of the four short-listed route options. The key conclusions of the assessment were:

- As the study area is primarily used for residential and farming purposes, the extent of very high and high quality habitat is limited. Most of the native flora and fauna located on the eastern side of Warrell Creek is in the south of the study area.
- Overall, the Red Option (a modification of the 1990s route) was the poorest performing option as it provides little change to existing noise levels at Warrell Creek village, requires the most acquisition of houses, would require new arrangements to provide access to properties east of the upgrade at Warrell Creek village and has the most construction difficulties. The Red Option is also the most expensive.



- Legend**
- Warrell Creek Section**
- ▬ Currently Approved Preferred Route
- Route Options**
- Blue Option
  - Orange Option
  - Red Option
  - Purple Option
  - High quality and very high quality habitat
  - National Park
  - State Forest
  - Local Access Route
  - Existing Pacific Highway
  - Other Existing Major Roads
  - North Coast Railway Line
  - Creeks/Rivers

Aerial Photography:  
Date Flown - 5th March 2006



**Figure 3-4**  
Short Listed Route Options from Review of the Warrell Creek Upgrade

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## **Upgrading the Pacific Highway Warrell Creek to Urunga Project Application Report**

- While the western (Red and Blue) options would have less impact on farming properties than the eastern (Orange and Yellow) options, they would provide little change to existing noise levels at Warrell Creek village, would require new arrangements to provide access to properties east of the upgrade and have more construction difficulties than the eastern options.
- Of the two eastern options, the Purple Option was assessed as performing better than the Orange Option as Albert Drive would continue to connect Warrell Creek village and Donnellyville, it would have fewer construction difficulties and slightly lower noise impacts than the Orange Option. The Orange Option is also more expensive than the Purple option.
- The Purple Option would have the least noise impacts of any of the options. It would result in the least change to access arrangements and would have the least construction difficulties. The Purple Option is also the least expensive.

The Purple Option was considered to be one of the best performing options overall and provided the best value for money. On balance, it was considered to have more merit than the other options.

### **3.2.2.5 Next steps**

The proposed next steps for the Warrell Creek Upgrade are to:

- Seek and consider community comments on the route option considered to have the most merit.
- Determine and announce the outcomes of the review of the Warrell Creek section.
- Include the outcomes of the review in the environmental assessment of the upgrade of the highway between Warrell Creek and Urunga.

## 4 Design development

### 4.1 Alignment design issues and responses

A review of the recommended route for the Macksville to Urunga section of the project was undertaken following the value management workshop to investigate a number of refinements that were suggested by workshop participants and also as a result of an internal review by the project team.

Criteria used for assessment of design alternatives proposed were based on the project objectives outlined in *Section 2.2* of this report. A number of refinements have been made to the design of the route as outlined below and shown in Figures 4-1 to 4-4.

- Immediately north of Warrell Creek, the alignment of Option 1c was modified to increase the curve radii to 750metres and to provide the opportunity for an interchange where the Proposal would pass under Bald Hill Road (See **Figure 4-1**).
- The alignment of the crossing of the Nambucca River was modified to provide an effective connection between the northern end of Option 1c and the southern end of Option 2a. The proposed new alignment has been located so as to provide a minimum 100 metre offset between the alignment and the edge of SEPP 14 wetland No. 383 adjacent to Newee Creek (See **Figure 4-2**).
- The alignment of Option 2a was moved to the eastern side of Old Coast Road to allow the existing road to be maintained as a local access road and to limit property impacts. Within the Nambucca State Forest, minor modifications were also undertaken to reduce impacts on the special forest management zones within the forest and endangered ecological communities (See **Figure 4-2**).
- The alignment of Option 3a was modified in the vicinity of Boggy Creek to provide the opportunity for an interchange without the need to realign the existing Pacific Highway (See **Figure 4-3**).
- The alignment of Option 3a was modified in the vicinity of Cow Creek to minimize potential impacts on a site of significance to the Aboriginal community (See **Figure 4-3**).
- The alignment of Option 3a was modified in the vicinity of Oyster Creek Road to increase the curve radii to 750metres and provide an improved alignment for the crossing of the high voltage electrical transmission line (See **Figure 4-3**).
- North of the Kalang River, the alignment of Option 4b was moved slightly west to increase the separation between it and the adjacent SEPP 14 wetlands (See **Figure 4-4**).

Further refinement of the alignment would be considered during the development of the design and environmental assessment of the Proposal.

### 4.2 Interchange design issues

Access to the Macksville to Urunga section of the Proposal will be provided at the existing interchange at Raleigh and at proposed new interchanges located south of Macksville and west of Nambucca Heads. Alternative locations for the new interchanges were shown in the November 2005 community update and the November 2005 *Macksville to Urunga, Upgrading the Pacific Highway – Preferred Route Report* (RTA, November 2005).

## **Upgrading the Pacific Highway Warrell Creek to Urunga Project Application Report**

Following further investigations, a workshop attended by representatives of Bellingen and Nambucca Shire Councils and consideration of the submissions received following the announcement of the preferred route, the preferred locations and layouts of the interchanges have been identified. They are described below and shown in Figures 4-1 to 4-4.

### **Interchange south of Macksville**

The preferred location for the south Macksville interchange is at Bald Hill Road (see **Figure 4-1**). This option was seen to perform better than the alternative location as it:

- Is closer to Macksville.
- Provides improved access to Scotts Head, Warrell Creek and Donnellyville from both the highway and Macksville.
- Has less direct and indirect impacts on adjacent properties.

### **Interchange west of Nambucca Heads**

The preferred location for the Nambucca interchange is near Boggy Creek (see **Figure 4-3**). This option was seen to perform better than the alternative location as it provides improved access to:

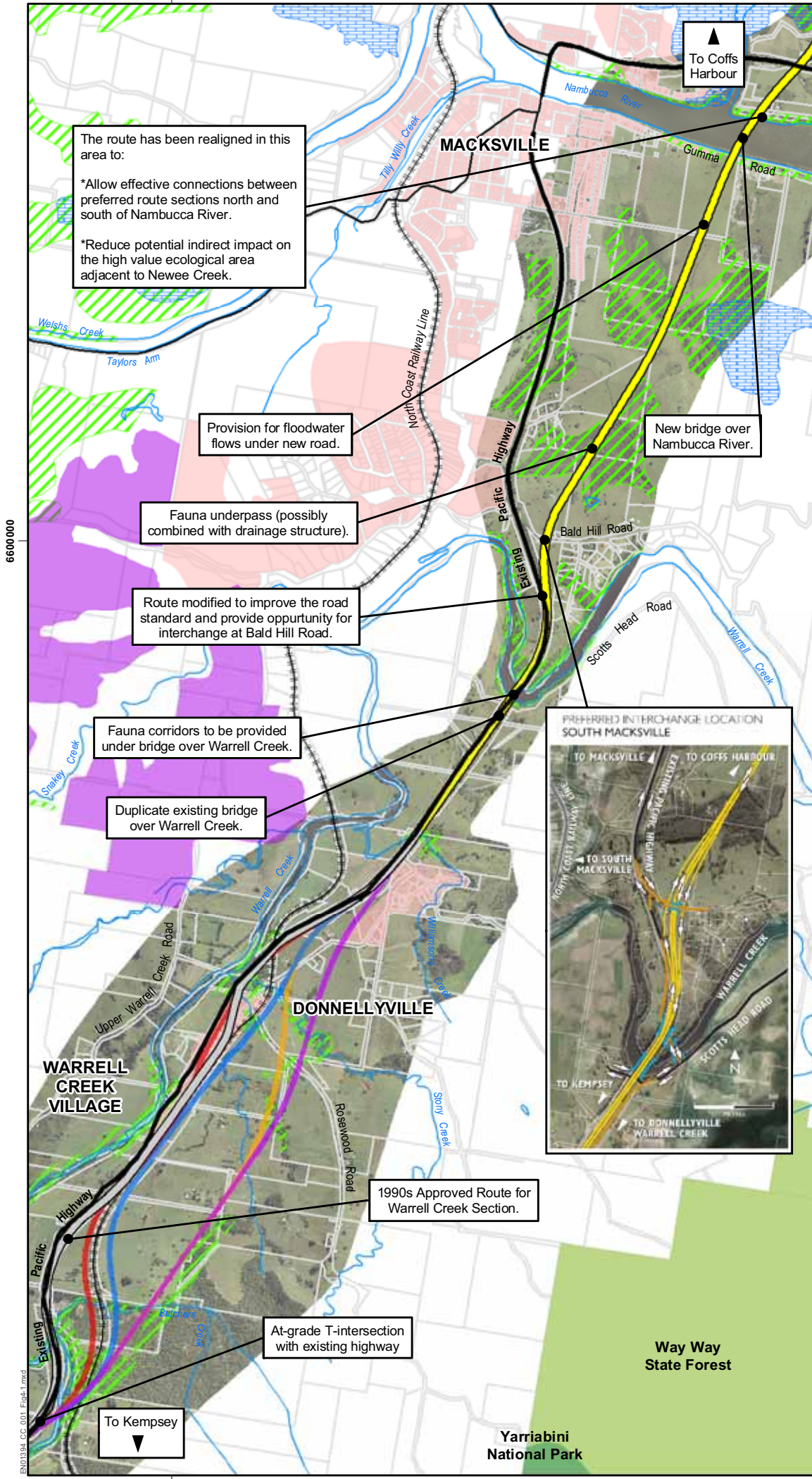
- Nambucca Heads, Valla / Valla Beach and adjacent areas and South Urunga.
- The Boggy Creek future urban area west of Nambucca Heads.

### **Raleigh interchange**

The existing Waterfall Way interchange at Raleigh will be modified to tie in with the Proposal. The proposed layout for the modified interchange is shown in **Figure 4-4**.

### **Local access arrangements**

In general, access between townships would not be affected as the existing highway and other local roads would be retained for access to townships, communities and properties. Where required, these roads would pass over or under the Proposal. Local access arrangements would be further investigated during the development of the design for the Proposal.



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**Legend**

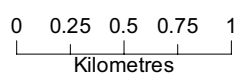
- Urban Areas (Nambucca LEP 2003)
- Proposed Future Urban Areas (From Nambucca Shire Council Draft 20 year Structure Plan 2006)
- Endangered Ecological Communities (EEC's)
- National Parks
- State Forest
- SEPP14 Wetlands
- Preferred Route for Macksville to Urunga Section
- Warrell Creek Section**
- Currently Approved
- Preferred Route
- Route Options**
- Blue Option
- Orange Option
- Red Option
- Purple Option
- Existing Pacific Highway
- Other Existing Major Roads
- North Coast
- Railway Line
- Creeks/Rivers

**Inset Map**

- Proposed New Road
- New Local Access Road
- Existing Pacific Highway
- Other Existing Major Roads
- Bridge

Source: Topographic data supplied by Department of Lands

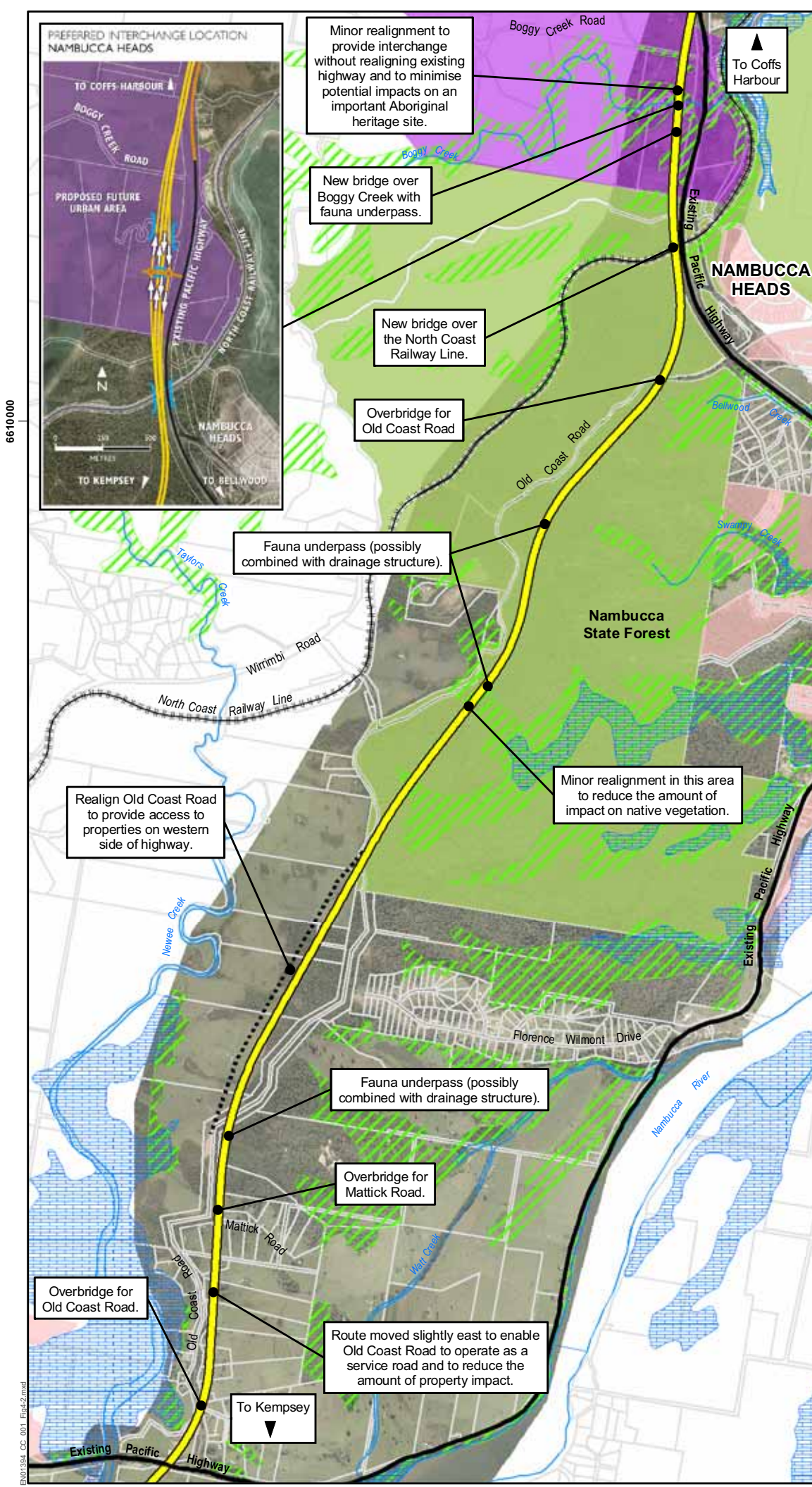
Aerial Photography: Date Flown - May 2003



**Figure 4-1**

Preliminary Design Warrell Creek to Urunga Upgrade. Donnellyville to Nambucca River

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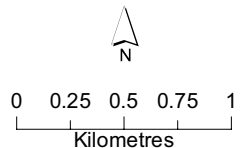


- Legend**
- Urban Areas (Nambucca LEP 2003)
  - Proposed Future Urban Areas (From Nambucca Shire Council Draft 20 year Structure Plan 2006)
  - Endangered Ecological Communities (EEC's)
  - State Forest
  - SEPP14 Wetlands
  - Preferred Route for Macksville to Urunga Section
  - Existing Pacific Highway
  - Other Existing Major Roads
  - Local Access Road
  - North Coast Railway Line
  - Creeks/Rivers
- Inset Map**
- Proposed New Road
  - New Local Access Road
  - Existing Pacific Highway
  - Other Existing Major Roads
  - Bridge

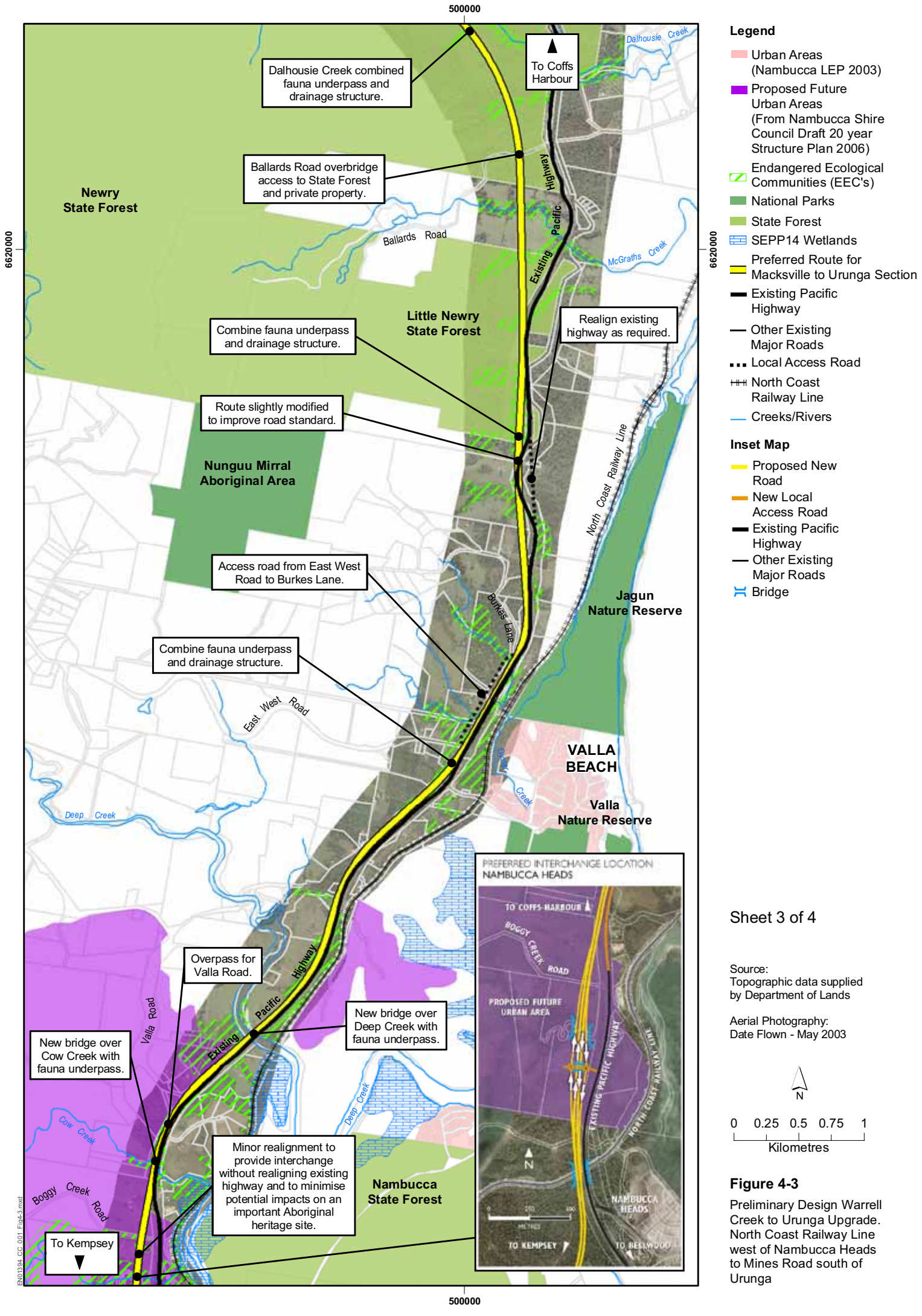
Sheet 2 of 4

Source: Topographic data supplied by Department of Lands

Aerial Photography: Date Flown - May 2003



**Figure 4-2**  
 Preliminary Design Warrell Creek to Urunga Upgrade. Nambucca River to North Coast Railway Line west of Nambucca Heads

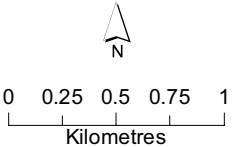


- Legend**
- Urban Areas (Nambucca LEP 2003)
  - Proposed Future Urban Areas (From Nambucca Shire Council Draft 20 year Structure Plan 2006)
  - Endangered Ecological Communities (EEC's)
  - National Parks
  - State Forest
  - SEPP14 Wetlands
  - Preferred Route for Macksville to Urunga Section
  - Existing Pacific Highway
  - Other Existing Major Roads
  - Local Access Road
  - North Coast Railway Line
  - Creeks/Rivers
- Inset Map**
- Proposed New Road
  - New Local Access Road
  - Existing Pacific Highway
  - Other Existing Major Roads
  - Bridge

Sheet 3 of 4

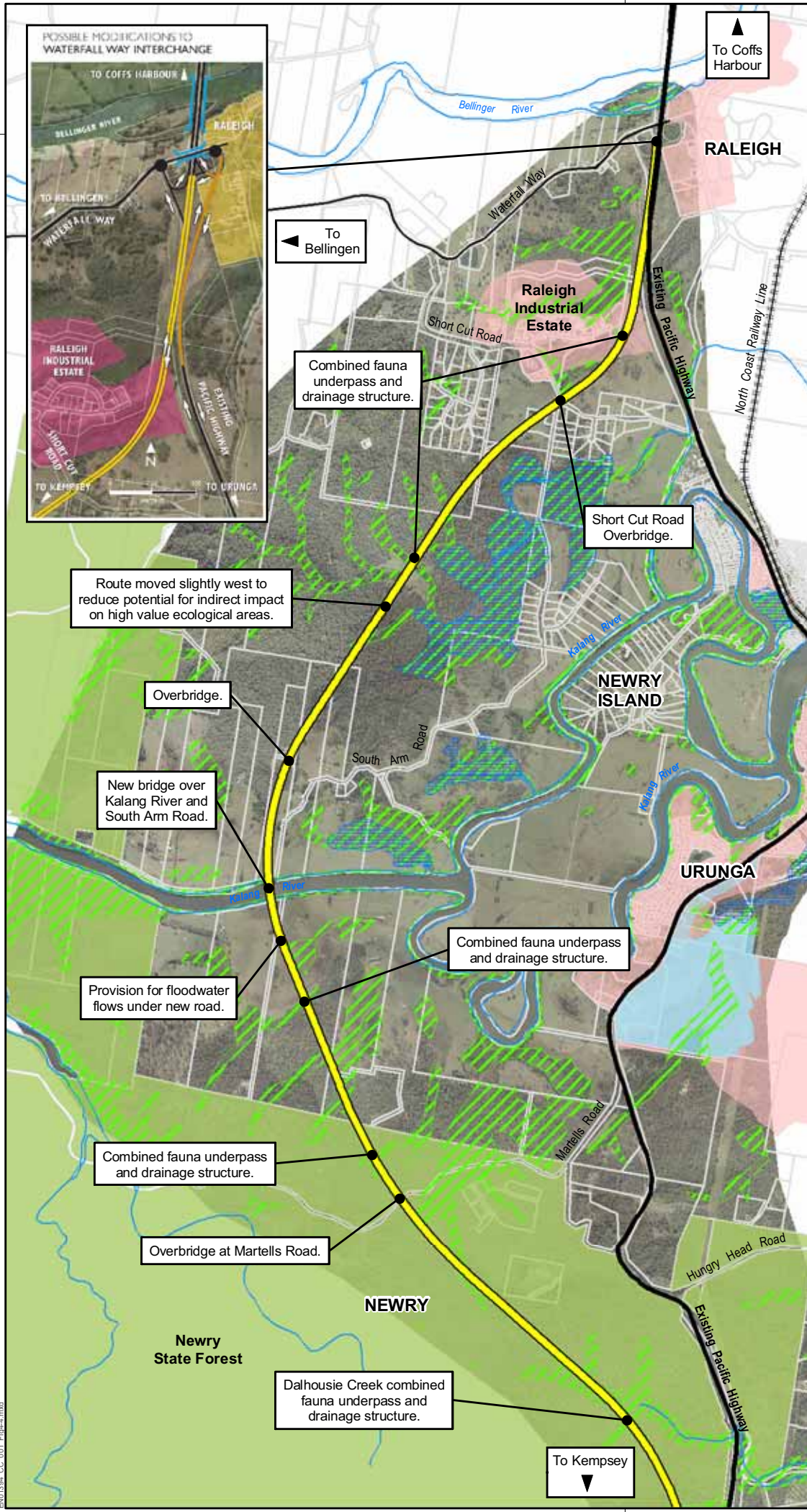
Source:  
Topographic data supplied by Department of Lands

Aerial Photography:  
Date Flown - May 2003



**Figure 4-3**  
Preliminary Design Warrell Creek to Urunga Upgrade. North Coast Railway Line west of Nambucca Heads to Mines Road south of Urunga

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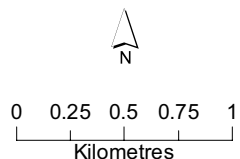
- Legend**
- Urban Areas (Nambucca LEP 2003)
  - Proposed Future Urban Areas (From Nambucca Shire Council Draft 20 year Structure Plan 2006)
  - Proposed Investigation Areas (From Bellingen Shire Council Growth Management Strategy 2006-2026)
  - Endangered Ecological Communities (EEC's)
  - National Parks
  - State Forest
  - SEPP14 Wetlands
  - Preferred Route for Macksville to Urunga Section
  - Existing Pacific Highway
  - Other Existing Major Roads
  - Local Access Road
  - North Coast Railway Line
  - Creeks/Rivers

- Inset Map**
- Proposed New Road
  - New Local Access Road
  - Existing Pacific Highway
  - Other Existing Major Roads
  - Bridge
  - Roundabout and Ramp
  - Residential
  - Commercial / Industrial

Sheet 4 of 4

Source: Topographic data supplied by Department of Lands

Aerial Photography: Date Flown - May 2003



**Figure 4-4**  
 Preliminary Design Warrell Creek to Urunga Upgrade. Mines Road south of Urunga to Raleigh Deviation

## 5 Proposal description

### 5.1 Overview

The Proposal subject to this application comprises a bypass to the east of the village of Warrell Creek and the preferred route for the upgrade of the Pacific Highway between Macksville and Urunga announced in November 2005. The Proposal includes site investigations and ancillary facilities required for the further development and construction of the project.

The total length of the project between the northern end of the existing Allgomera deviation, south of Warrell Creek and the southern end of the existing Raleigh deviation, north of Urunga is approximately 45 kilometres.

The upgrade has been developed as a motorway standard (or Class M) project with a separate access road for local traffic (see Section 2.2.3). Access to the highway will be provided at a proposed new at-grade intersection south of Warrell Creek village, proposed new grade-separated interchanges located south of Macksville and west of Nambucca Heads and at the existing grade separated interchange at Raleigh. Access to townships, communities and properties will be provided by the existing highway and new and existing local roads. Where required, these access roads will pass over or under the new highway.

The Proposal was shown in detail in Figures 4-1 to 4-4. A brief description of the Warrell Creek and Macksville to Urunga sections of the Proposal is provided below.

#### Warrell Creek section

The Proposal will include the outcomes of the review of the Warrell Creek section. The review has identified a shortlist of four feasible options. The four options commence at the northern end of the existing Allgomera deviation and deviate to the east of the existing highway through the village of Warrell Creek before reconnecting with the highway west of Donnellyville.

Based on the investigations undertaken to date, one of the four options (the Purple Option) is considered to be one of the best performing options overall and to provide the best value for money and is considered, on balance, to have more merit than the other options developed.

The RTA is seeking community comment on the new options before making a final decision on the outcomes of the review of the Warrell Creek Upgrade.

#### Macksville to Urunga section

The announced preferred route for the Macksville to Urunga section involves:

- Options 1c and 2a to the east of Macksville.
- An upgrade of the existing highway between Nambucca Heads and Mines Road south of Urunga.
- The Option 4b bypass of Urunga.

A brief description of the Macksville to Urunga section of the Proposal is provided below:

- North of Warrell Creek, the Proposal diverts to the east of the existing highway in the vicinity of Bald Hill Road and crosses the Nambucca River immediately downstream of the confluence with Newee Creek. The bridge crossing the Nambucca River would be approximately 350 metres long.



- North of the Nambucca River, the route generally follows the ridgeline in the vicinity of Old Coast Road before rejoining the existing highway west of Nambucca Heads. The route avoids direct impact on the Newee Creek wetland (SEPP 14 wetland No. 383) and has been located to allow Old Coast Road to be reconstructed as an access road for adjoining properties.
- Between Nambucca Heads and Mines Road south of Urunga, the Proposal would be located on the western side of the existing highway which would be utilised as a local access road, with some realignment and modifications north of Valla Beach. A new bridge would be required to be constructed across Deep Creek.
- North of Mines Road, the route diverts to the west of the existing highway to traverse through Newry State Forest and cross the Kalang River in the vicinity of South Arm Road before passing to the east of Ridgewood Drive and the Raleigh Industrial Area to rejoin the existing highway at Raleigh. The route would require the construction of a new bridge of approximately 155 metres over the Kalang River. Floodplain culverts and/or bridges would also be required.

## 5.2 Highway design standards

The general standard for design of the Proposal is based on the *Draft Pacific Highway Design Guidelines* (RTA, 2005) to ensure that a consistent form and quality of road asset is delivered along the whole Pacific Highway corridor from the F3 to the Queensland border.

The design development process for the Proposal was ongoing at the time of preparation of this report. While the overall alignment is expected to remain, essentially, as shown and described above, it is likely that further localised refinements will be made in response to the findings that will become available from a range of investigations now under way (eg. survey, geotechnical, urban design development, assorted environmental studies) as well as consideration of local development proposals and ongoing property owner consultations.

Data provided by these and other investigations will be used to further refine the concept design for the Proposal during the preparation of the environmental assessment. The refined design will be assessed in the environmental assessment for the project.

Matters to be addressed during the refinement of the design include:

- Refinement of intersection and interchange layouts.
- Possible development of rest area facilities as part of the RTA's Rest Area Strategy for the overall Pacific Highway.
- Refinement of property access arrangements.
- Refinement of property boundaries for the proposed upgrade and, hence, definition of land acquisition.
- Completion of hydrological and hydraulic studies to enable sizing and preliminary design of bridges and culverts over watercourses and floodways along the route and also to influence the siting, layout and sizing of both temporary and permanent drainage, water retention and water quality control basins / ponds.
- Refinement of the road design to integrate a variety of environmental mitigation and improvement features. This will include acoustic attenuation measures, urban design (including revegetation and landscaping) arrangements and features that respond to local ecological conditions such as protection of key habitat and specific provisions for fauna movement across the corridor.

### **5.3 Staged construction**

While the RTA is seeking approval for the whole highway upgrade Proposal as summarised above, there is clearly potential for the Warrell Creek to Urunga project to be delivered in discrete stages or packages. At this time, there are no specific staging proposals and the possible arrangements will be addressed in more detail in the environmental assessment. The assessment will address the related benefits of any staging plans and establish mechanisms to effectively manage the potential environmental impacts.

A decision on any staging Proposal would be influenced by factors such as funding availability and the expected benefits arising from the staged work. It is anticipated that staging proposals could be implemented in a manner that delivers substantial early benefits for the travelling public.

In general terms it is noted that the Warrell Creek to Urunga project is particularly conducive to staged implementation when compared to many other highway projects as the Proposal connects with or crosses the existing highway at five locations within the 45 kilometres length of the project and runs parallel with and adjacent to the existing highway for 9 kilometres between Nambucca Heads and Mines Road south of Urunga (Macksville to Urunga Section 3).

## 6 Preliminary assessment of impacts and potential management measures

### 6.1 Preliminary assessment of impacts

A preliminary assessment of the potential environmental impacts of the proposed Warrell Creek to Urunga Highway Upgrade is summarised below. This assessment is based on the comprehensive investigations undertaken through the route planning stage and, where relevant, the findings from more recent studies.

#### 6.1.1 Community impacts

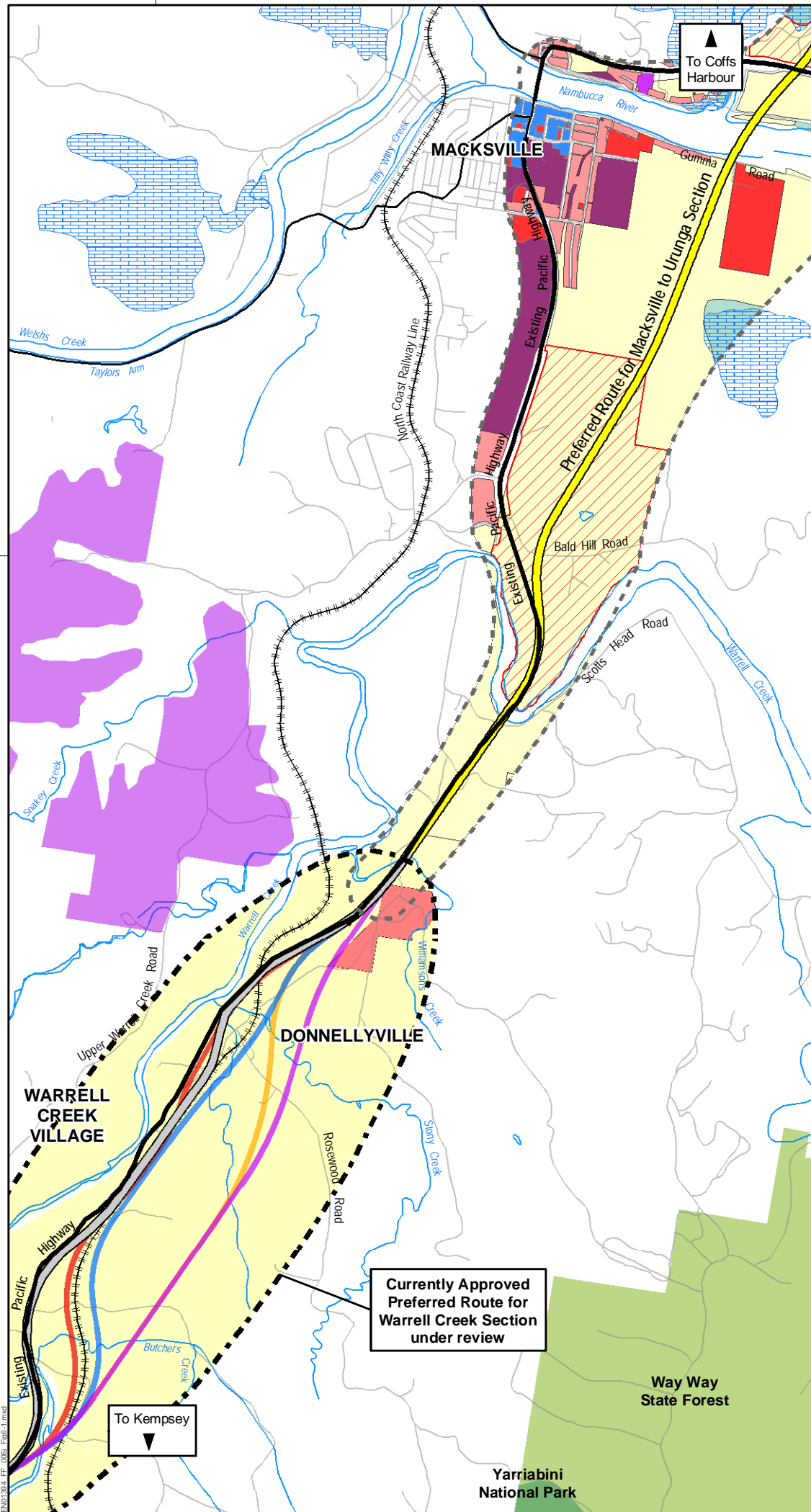
##### Land use considerations

Figures 6-1 to 6-4 show the Proposal in relation to land use constraints. Table 6-1 provides a summary of the key quantifiable land use impacts of the Proposal. Impacts have been considered in terms of area of land directly affected (typically measured in hectares) and (where relevant) the length of the route through various land uses (to provide an indication of severance impacts).

It should be noted that a corridor width of 200 metres was used to determine the number of dwellings shown as directly affected by the Proposal in Table 6-1. All other land use impacts were calculated on a corridor 100 metres wide.

**Table 6-1: Summary of land use impacts of the Proposal**

Land use	Impact	Comment
Number of dwellings directly impacted	78-84 structures	Urban areas are avoided, impacts are on rural dwellings and rural residential areas
Area of rural residential zoned land directly impacted	114–123 ha	Primarily around Bald Hill Road, Old Coast Road and Short Cut Road
Length of route through rural residential zoned land	10.2-11.2 km	As above
Area of prime agricultural zoned land directly impacted	170–182 ha	Primarily within the Nambucca River floodplain
Length of route through prime agricultural zoned land	18.2-19.3 km	As above
Area of productive state forest land directly impacted (forest management zones 4, 5 and 8)	91 ha	Substantial land take within both the Nambucca and Newry State Forests
Length of route through productive forest management zones	8.9 km	Substantial length of route through both Nambucca and Newry State Forests, likely to result in significant fragmentation of forest resources and changes to forestry operations
Area of conservation land within state forests directly impacted (zones 1, 2, 3 and 3A)	4 ha	Minimal impacts only on a small area of conservation zoned land in Nambucca State Forest
Area of SEPP 14 wetlands directly affected	Nil	Proposal avoids all SEPP 14 wetlands in the investigation area
Area of industrial zoned land directly affected	5 ha	Impacts are within the Raleigh industrial area zone; existing industrial land uses are not impacted



**Legend**

- Original Macksville to Urunga Investigation Area
- Proposed Future Urban Areas (From Nambucca Shire Council Draft 20 year Structure Plan 2006)
- National Parks
- State Forest
- SEPP14 Wetlands

**Generalised Zoning**

- Rural
- Future Urban
- State Forest Boundary
- Rural Residential
- Residential / Tourism
- General Business
- Industrial
- Special Use
- General Open Space
- Environmental Protection
- Proposed Road

**State Forest Management Zones**

- Special Protection (Zone 1)
- Special Management (Z 2)
- Harvesting Exclusion (Z 3A)
- Special Prescription (Z 3)
- General Management (Z 4)
- Hardwood Plantations (Z 5)
- Non Forestry Use (Z 7)
- Further Assessment (Z 8)

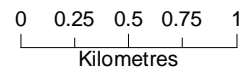
Preferred Route for Macksville to Urunga Section

**Warrell Creek Section**

- Currently Approved Preferred Route
- Preferred Route

**Route Options**

- Blue Option
- Orange Option
- Red Option
- Purple Option
- Existing Pacific Highway
- Other Existing Major Roads
- North Coast Railway Line
- Creeks/Rivers



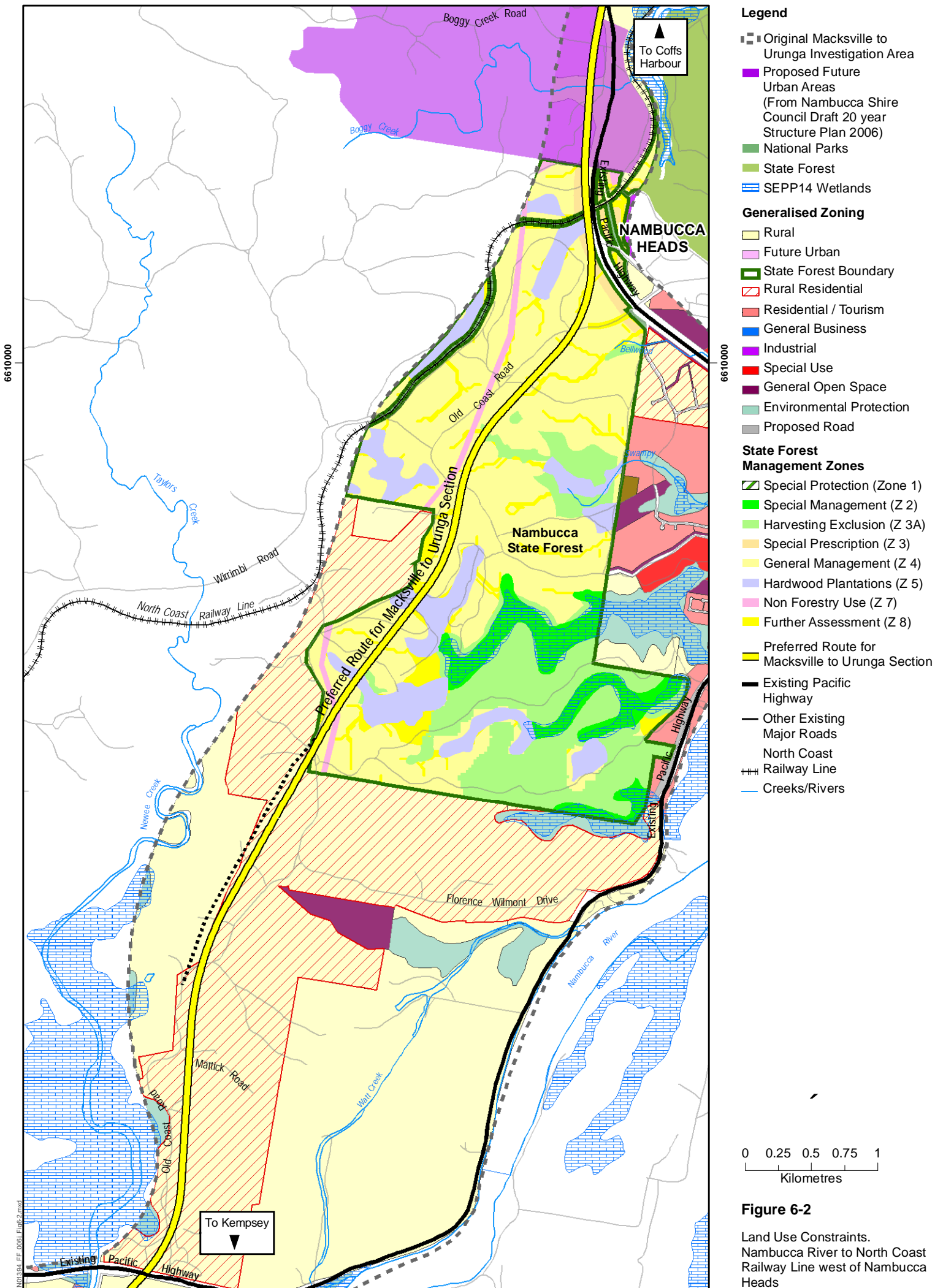
Currently Approved Preferred Route for Warrell Creek Section under review

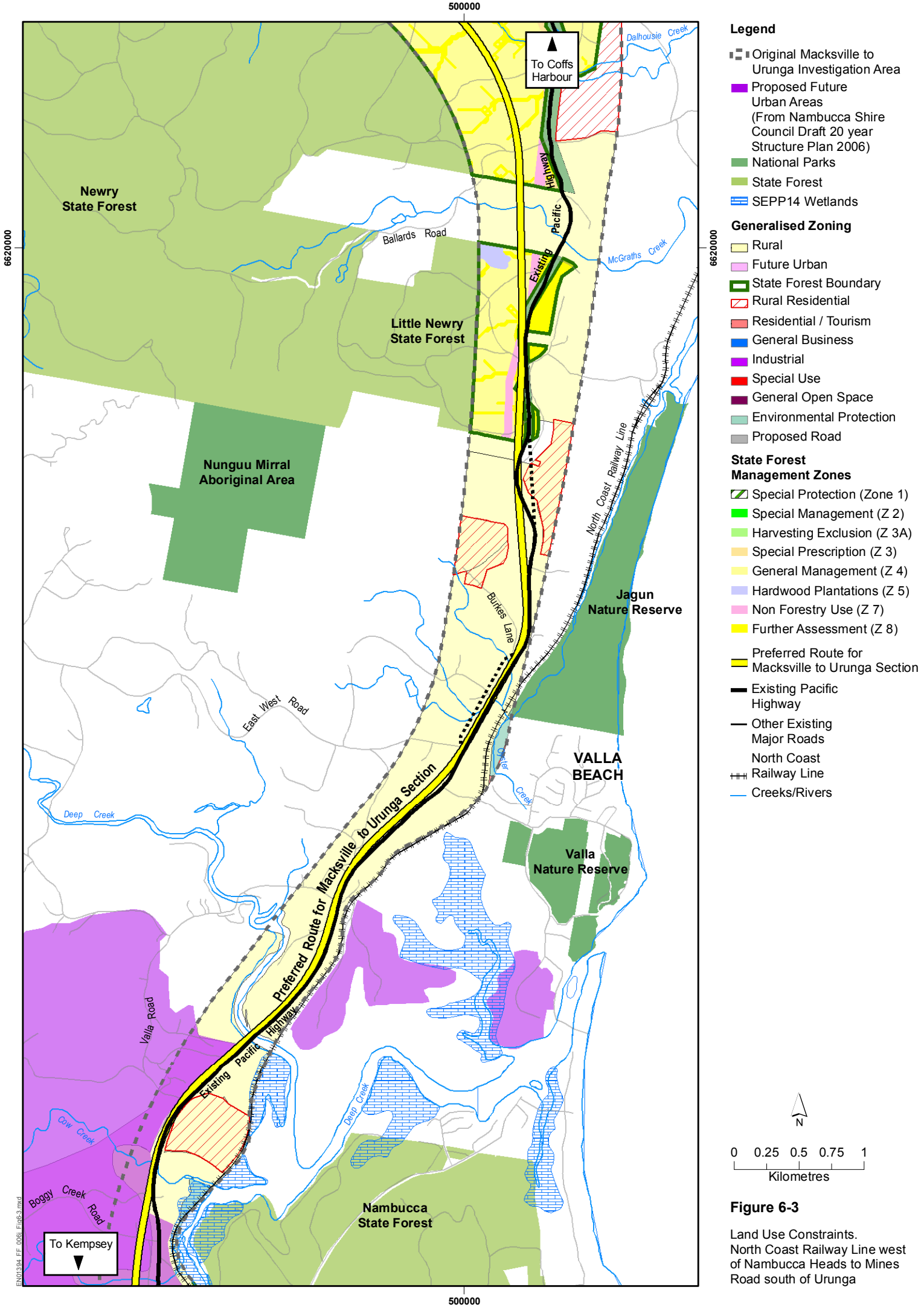
To Kempsey

To Coffs Harbour

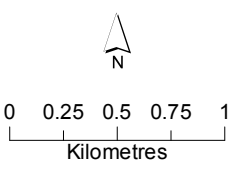
**Figure 6-1**

Land Use Constraints. Donnellyville to Nambucca River



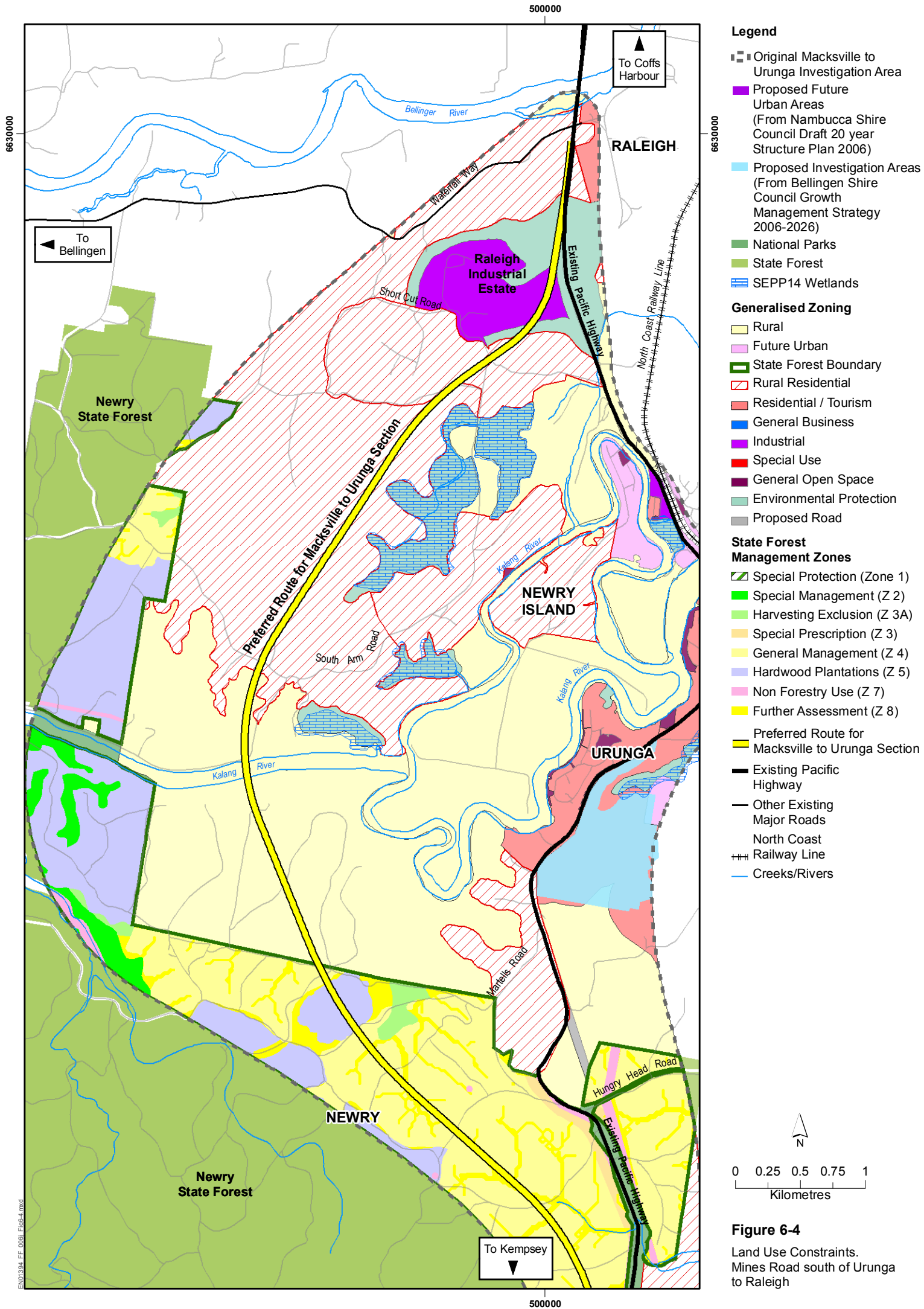


- Legend**
- Original Macksville to Urunga Investigation Area
  - Proposed Future Urban Areas (From Nambucca Shire Council Draft 20 year Structure Plan 2006)
  - National Parks
  - State Forest
  - SEPP14 Wetlands
- Generalised Zoning**
- Rural
  - Future Urban
  - State Forest Boundary
  - Rural Residential
  - Residential / Tourism
  - General Business
  - Industrial
  - Special Use
  - General Open Space
  - Environmental Protection
  - Proposed Road
- State Forest Management Zones**
- Special Protection (Zone 1)
  - Special Management (Z 2)
  - Harvesting Exclusion (Z 3A)
  - Special Prescription (Z 3)
  - General Management (Z 4)
  - Hardwood Plantations (Z 5)
  - Non Forestry Use (Z 7)
  - Further Assessment (Z 8)
- Preferred Route for Macksville to Urunga Section
  - Existing Pacific Highway
  - Other Existing Major Roads
  - North Coast Railway Line
  - Creeks/Rivers

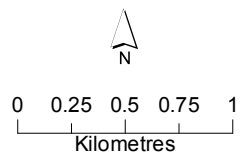


**Figure 6-3**  
 Land Use Constraints. North Coast Railway Line west of Nambucca Heads to Mines Road south of Urunga

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- Legend**
- Original Macksville to Urunga Investigation Area
  - Proposed Future Urban Areas (From Nambucca Shire Council Draft 20 year Structure Plan 2006)
  - Proposed Investigation Areas (From Bellingen Shire Council Growth Management Strategy 2006-2026)
  - National Parks
  - State Forest
  - SEPP14 Wetlands
- Generalised Zoning**
- Rural
  - Future Urban
  - State Forest Boundary
  - Rural Residential
  - Residential / Tourism
  - General Business
  - Industrial
  - Special Use
  - General Open Space
  - Environmental Protection
  - Proposed Road
- State Forest Management Zones**
- Special Protection (Zone 1)
  - Special Management (Z 2)
  - Harvesting Exclusion (Z 3A)
  - Special Prescription (Z 3)
  - General Management (Z 4)
  - Hardwood Plantations (Z 5)
  - Non Forestry Use (Z 7)
  - Further Assessment (Z 8)
- Preferred Route for Macksville to Urunga Section
- Existing Pacific Highway
  - Other Existing Major Roads
  - North Coast Railway Line
  - Railway Line
  - Creeks/Rivers



**Figure 6-4**  
 Land Use Constraints.  
 Mines Road south of Urunga to Raleigh

### **Social issues**

During the community consultation program, a number of social issues were raised in relation to the project. The community was most concerned about reducing accidents and injuries, minimising severance and impacts to properties and communities, providing effective and safe connections to/from the upgraded Highway and support for local businesses, tourism and agriculture.

The Proposal introduces a new highway, with its associated impacts, into developing rural residential areas east of Warrell Creek village, near Bald Hill Road, along Old Coast Road north of Macksville and to the west of Urunga.

While an upgraded Pacific Highway in the investigation area may result in localised social impacts, the Proposal would provide many social benefits to the region as a result of a safer upgraded highway with fewer accidents and reduced travel times.

### **Road safety**

The existing Pacific Highway through the investigation area is primarily a two-lane road with occasional overtaking lanes. RTA crash data indicates that a total of 269 crashes occurred on the Pacific Highway in the study area in the five-year period between 1 April 2001 and 31 March 2006. These included 13 fatal crashes resulting in 16 fatalities, 122 injury crashes and 134 non-injury crashes. As the crash rates on the single carriageway sections of the Pacific Highway are higher in all categories (fatal, injury and total) than the adjacent dual carriageway sections, the Proposal will significantly reduce road accidents and costs.

### **Traffic and transport**

The Proposal would result in a high-standard dual-carriageway road alignment in accordance with the Pacific Highway Upgrade Program objectives. The Proposal would reduce travel time along the highway through the investigation area by approximately 25 per cent at signposted speed limits from 32 minutes to 23 minutes. The provision of a higher standard dual-carriageway road, combined with a reduced overall length and travel time savings is expected to reduce present accident numbers on this section of the highway by at least 50 per cent.

Access between townships would not be adversely affected due to the retention of the existing highway and other local roads for access to townships, communities and properties. Where required, these roads would pass over or under the Proposal.

Rest areas for both heavy and light vehicles would be provided within the area to meet specific Pacific Highway requirements. Truck stopping bays are required to suit B-Doubles (one vehicle only needed) and be located approximately every 5 kilometres.

### **Landscape, visual and urban design**

The visual impact of the Proposal varies along its length. However, it was assessed as either moderate to high or high in the vicinity of Wedgewood Drive, Bald Hill Road and Kerr Drive in the southern portion of the investigation area and in the vicinity of Letitia Close and Mattick Road north of the Nambucca River.

A number of measures could be implemented during the design stage of the project to provide an integrated urban design with landscape treatments to minimise negative impacts.



### Noise impacts

A preliminary assessment of potential noise impacts of the Proposal was undertaken. Potential noise impacts in the village of Warrell Creek are subject to the outcomes of the review of the Warrell Creek Upgrade. As the route deviates to the east of the existing Pacific Highway north of Warrell Creek village, there is expected to be a decrease in traffic noise for residences located within Macksville. North of the Nambucca River, the topography through which the route passes would provide some shielding from road traffic noise although noise level increases would be expected for residences located on the western side of Old Coast Road and within the Letitia Close / Mattick Road area.

North of the crossing of the North Coast Railway Line, the route is expected to result in increased noise impacts to some adjacent residences as a result of the duplication of the highway to the west of its current alignment and the retention of the existing highway as a local access road for local traffic. The new alignment would be closer to residences located on the western side of the current highway in this area. While traffic noise levels may increase as a result of the duplication, these increases may be offset by the improved alignment and higher road standard. There are few identified residences south of the Kalang River and the benefit of topographic shielding is expected to be high in this area. Residential dwellings just north of the Kalang River are substantially removed from the existing highway and with little shielding expected to be provided by the topography, these residences are expected to experience an increase in traffic noise levels.

The Proposal bypasses Macksville, Nambucca Heads, Urunga and Warrell Creek village and would result in a significant reduction in road traffic noise for the many residences located in the vicinity of the existing highway in these townships. Subject to the outcomes of the review of the Warrell Creek Upgrade, many residences located in the vicinity of the existing highway at Warrell Creek village may also experience a significant reduction in road traffic noise. A preliminary estimate of the total number of dwellings predicted to experience night time road traffic noise, without mitigation, in the ranges 50 to 55 dB(A), 55 to 60 dB(A) and  $\geq 60$  dB(A) shown in Table 6-2.

**Table 6-2: Assessment of night time noise impacts without mitigation**

Number of dwellings predicted to experience road traffic noise without mitigation			
Section	Noise level range dB(A)		
	50 to 55 dB(A)	55 to 60 dB(A)	≥ 60 dB(A)
Warrell Creek	16-30	7-31	2-11
Albert Drive to Nambucca River	50	46	19
Nambucca River to North Coast Railway	89	27	0
North Coast Railway to Mines Road	28	59	8
Mines Road to Raleigh deviation	49	24	6
Total	232- 246	163- 187	35- 44

Notes:

- The above calculations were based on the route options for the Warrell Creek section displayed in July 2007 and the Preferred Route for Macksville to Urunga section displayed between November 2004 and February 2005 and do not take into consideration modifications made to the alignment, location of interchanges and/or local access roads.
- Calculations of dwellings relied on aerial photography dated May 2003 and therefore residences constructed since then are not included.
- Any residences located within 100 m of the proposed centreline have not been included as it has been assumed that these buildings would be acquired for the road.

Where road traffic noise impacts exceed the noise guidelines for the project, possible mitigation measures would be investigated by the RTA. The cost effectiveness and practicality of providing mitigation would also be taken into consideration at this time.

### Air quality

Measures to reduce dust emissions associated with the construction of the Proposal would need to be considered. Also progressive revegetation of disturbed areas would help reduce dust generation. Once operational, emissions from the upgraded highway would comprise hydrocarbons, carbon monoxide, carbon dioxide, oxides of nitrogen and particulate matter. The level of concentration of vehicle emissions and their subsequent impacts in the immediate vicinity of the Proposal depends on the volume, speed and type of traffic and on the ability of the local environment to disperse emissions. Carbon dioxide is a greenhouse gas and total emissions would be related to fuel use and vehicle kilometres travelled. The Proposal corresponds with one of the shortest route options investigated as part of the study and would therefore provide the lowest vehicle kilometres travelled and therefore the lowest carbon dioxide emissions. Anticipated improvement in traffic flow, reduced travel distances and travel times and decreased road grades would result in greater fuel efficiency and reduced particulate and gaseous emissions.

## Heritage impacts

### *Non-Aboriginal heritage*

A total of six non-Aboriginal heritage items were identified in the immediate vicinity of the Proposal. None of the items are currently listed on the Register of the National Estate or the State Heritage Register. Two items (South Arm Road Scenic Landscape and Remnant Forest 0280) are listed on the Conservation Register of Bellingen Shire Council. Two items (a farmhouse off Old Coast Road and the South Arm Road Scenic Landscape) would be directly affected by the Proposal. The preliminary heritage assessment concluded that the farmhouse has low heritage significance, although the South Arm Road Scenic Landscape was assessed as having potential local heritage significance.

### *Aboriginal heritage*

The predictive model undertaken as part of the Aboriginal heritage assessment identified the crests of spurlines and raised areas within the Warrell Creek and Nambucca and Kalang River floodplains as having the potential to contain archaeological evidence. In summary, 20 areas of potential archaeological sensitivity were identified by the predictive model as being directly affected by the alignment of the Proposal. All of these areas have the potential to contain archaeological deposit and would be investigated in detail as part of a detailed investigation undertaken as part of the environmental assessment for the Proposal.

North of the crossing of the North Coast Railway Line west of Nambucca Heads, the Proposal is located on the western side of the existing highway. The Cow Creek Aboriginal Reserve, a site of high cultural significance, is located in this area and the alignment of this section of the Proposal has been adjusted to avoid any direct impact on the Aboriginal Reserve.

An area of high cultural significance to the local Aboriginal community is located on either side of the existing highway alignment to the north of Valla, although the eastern area is of far greater significance than the more disturbed western section. As the alignment of the Proposal runs parallel to and west of the current Pacific Highway alignment in an area of previous disturbance, there would be no direct impact on the highly sensitive area to the east of the current highway.

Further consultation with representatives from the Local Aboriginal Land Council as well as Elders and other Aboriginal community members would continue during the refinement of the design and environmental assessment of the Proposal.

### **6.1.2 Biological and physical impacts**

#### **Biodiversity**

Figures 6-5 to 6-8 show the Proposal in relation to ecological constraints.

#### *Fauna*

The alignment for the Proposal between Warrell Creek and the Nambucca River potentially affects fragments of swamp forest and wetland vegetation. An important feature of these habitats is the presence of swamp mahogany (*Eucalyptus robusta*). This species is listed under Schedule 2 of SEPP 44 as a significant koala feed-tree species. As one of the few eucalypts to flower in winter it also provides an important foraging habitat in coastal areas for the swift parrot (*Lathamus discolor*) and regent honeyeater (*Xanthomyza phrygia*), both of which are listed as endangered under the *Environmental Protection and Biodiversity Conservation Act*.

The alignment north of the Nambucca River would affect fauna habitat located in the Nambucca State Forest. While much of this habitat has been identified as medium to low quality open forest, resulting from past logging activities, the

State Forest does provide an important link between the SEPP 14 wetlands in the Nambucca State Forest to the east of the route and forest habitats to the west. Koalas are likely to move through Nambucca State Forest to access the extensive Swamp Mahogany resources associated with the SEPP 14 wetlands in the forest to the east of the alignment. The provision of koala crossing opportunities in the vicinity of the Nambucca State Forest and measures to minimise road mortality would be considered during the further development of the Proposal.

East-west fauna movement opportunities north of Nambucca Heads have been hindered by the presence of the existing Pacific Highway. The development of the Proposal in this area presents an opportunity to improve this situation by reducing the volume of traffic on the existing highway providing fauna crossing structures (possibly combined with drainage structures) where appropriate under the new highway. The route alignment north of Mines Road, south of Urunga has been selected to avoid the larger fragments of swamp sclerophyll forest identified through flora and fauna investigations and significant habitat for the Glossy Black-Cockatoo located on the southern side of the Kalang River.

The Proposal in the northern section of the investigation area would result in the removal of areas of high-quality fauna habitat particularly to the north of the Kalang River. This may affect several fauna species, in particular. The loss of some large and mature trees in this area is expected which may affect hollow-dependent fauna.

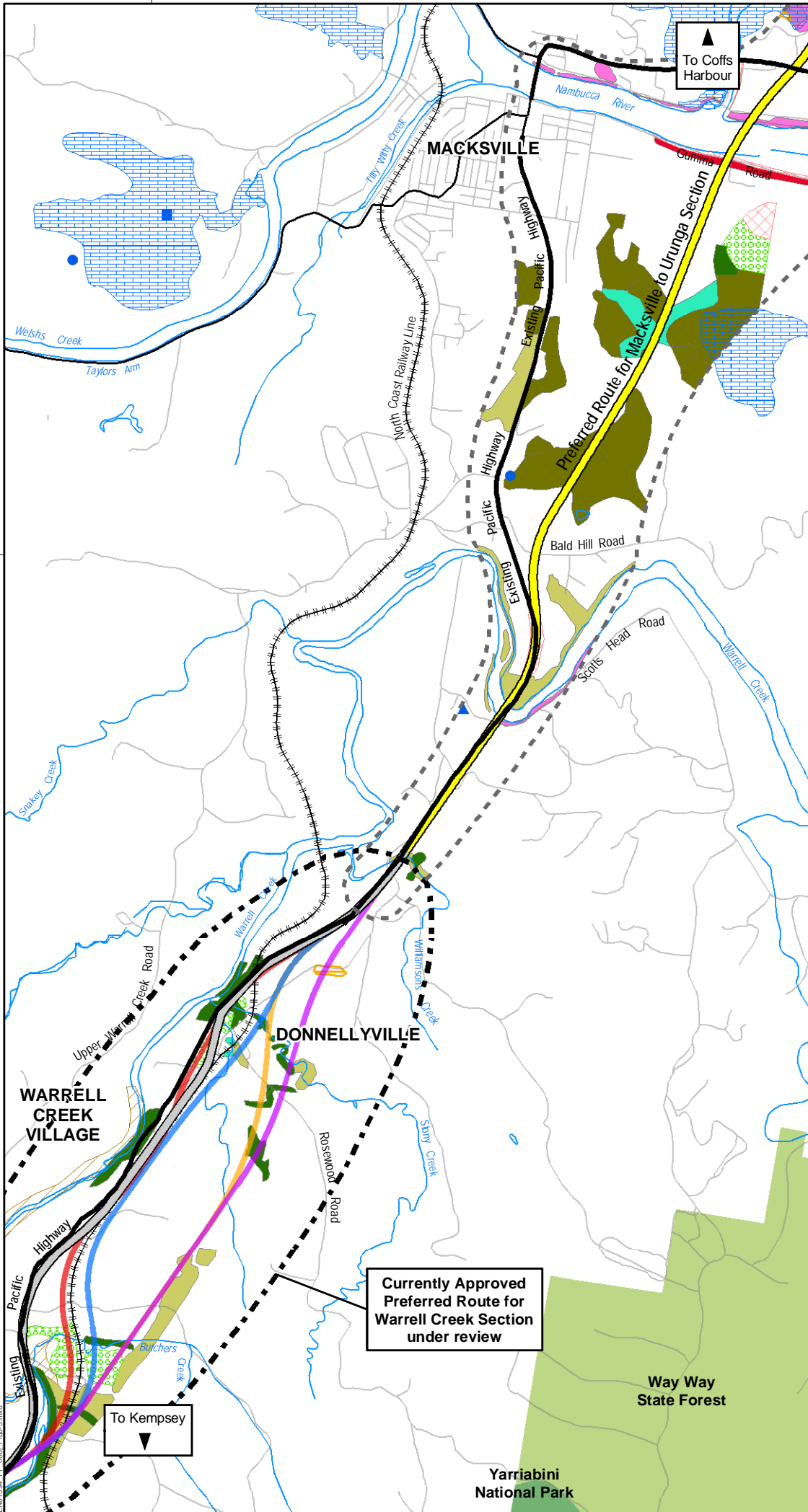
### *Flora*

No threatened flora species, as currently listed under the NSW *Threatened Species Conservation Act* or the Commonwealth *Environmental Protection and Biodiversity Conservation Act* were recorded within the investigation area for the project. There is however, potential for threatened flora species to occur in the areas of better quality vegetation within the road corridor. Additional flora surveys will be undertaken to assess the presence of threatened flora species within the road corridor.

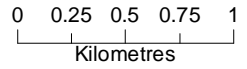
Several stands of at least five different endangered ecological communities, as listed under the NSW *Threatened Species Conservation Act*, would be directly impacted as a result of the Proposal as indicated in Figures 6-5 to 6-8. The impact of the Proposal on these communities is summarised in Table 6-3 (based on a 100metre corridor width).

**Table 6-3: Total area of endangered ecological communities potentially affected by Proposal**

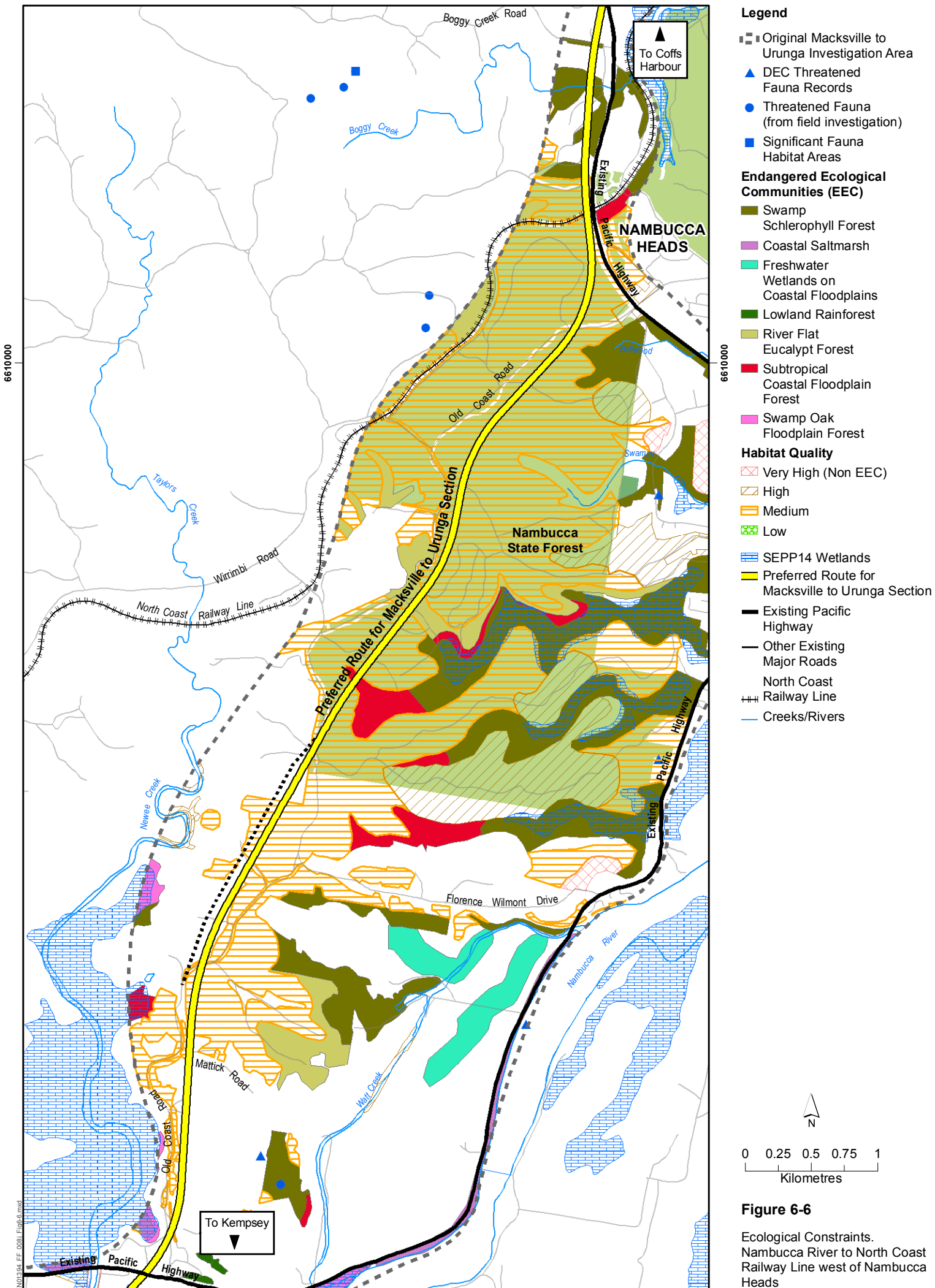
<b>Community</b>	<b>Total EEC Area (ha)</b>
Swamp sclerophyll forest of the NSW North Coast, Sydney basin and south east corner bioregions	35.4
Swamp oak floodplain forest of the NSW North Coast, Sydney basin and south-east corner bioregions	1.2
River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney basin and south-east corner bioregions	17.5
Freshwater wetlands on coastal floodplains of the NSW north coast, Sydney basin and south east corner bioregions	2.6 – 2.7
Subtropical coastal floodplain forest of the NSW north coast bioregion.	14.0
Lowland rainforest	2.8 - 4.7
Moist blue gum	2.0 - 5.6
<b>Total EEC area affected by Proposal</b>	<b>75.5–81.1</b>



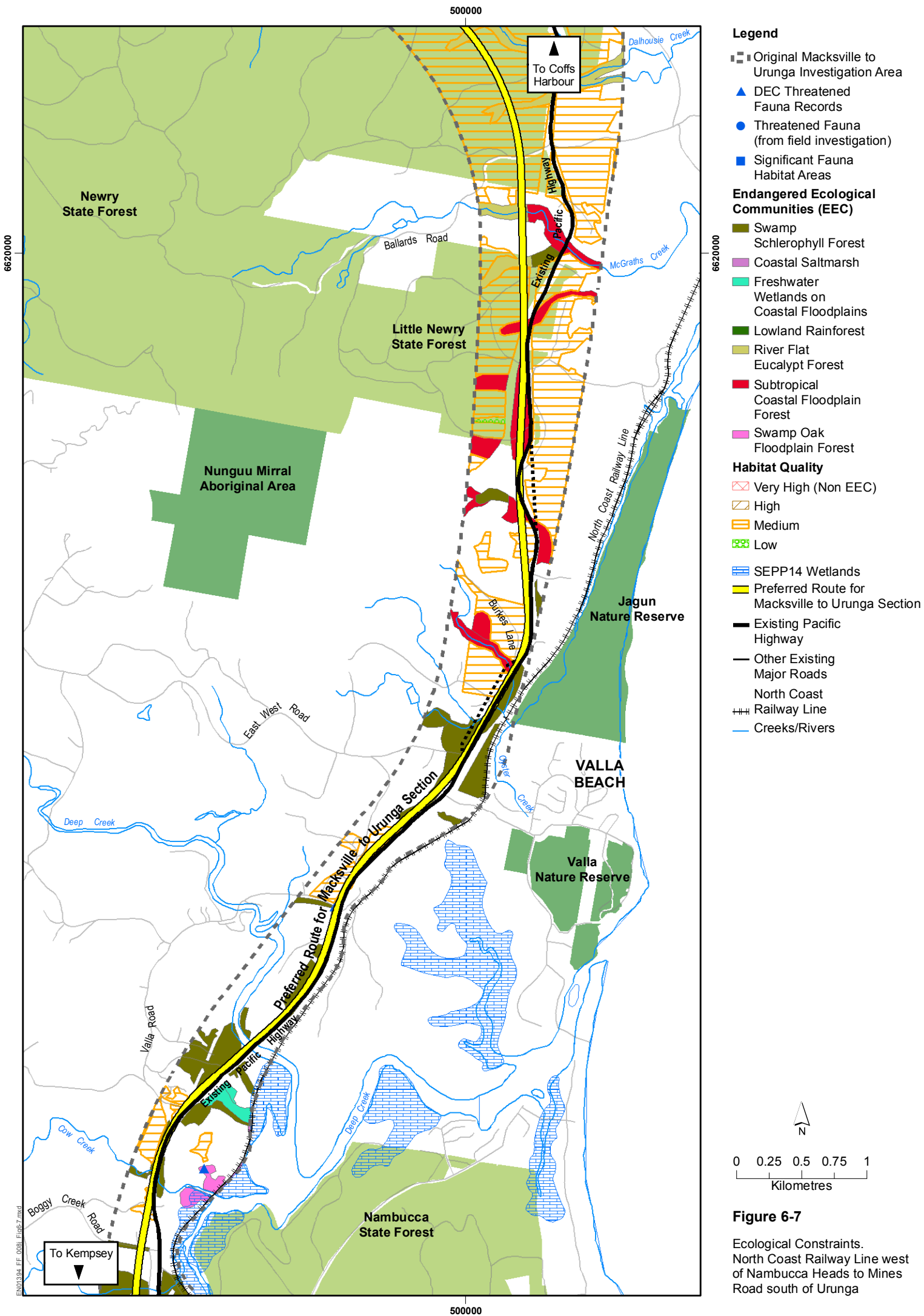
- Legend**
- Original Macksville to Urunga Investigation Area
  - # DEC Threatened Fauna Records
  - ! Threatened Fauna (from field investigation)
  - ⋯ Significant Fauna Habitat Areas
- Endangered Ecological Communities (EEC)**
- Swamp Schlerophyll Forest
  - Coastal Saltmarsh
  - Freshwater Wetlands on Coastal Floodplains
  - Lowland Rainforest
  - River Flat Eucalypt Forest
  - Subtropical Coastal Floodplain Forest
  - Swamp Oak Floodplain Forest
- Habitat Quality**
- Very High (Non EEC)
  - High
  - Medium
  - Low
- SEPP14 Wetlands
- Preferred Route for Macksville to Urunga Section**
- Currently Approved Preferred Route
- Route Options**
- Blue Option
  - Orange Option
  - Red Option
  - Purple Option
  - Existing Pacific Highway
  - Other Existing Major Roads
  - ⋯ North Coast Railway Line
  - Creeks/Rivers

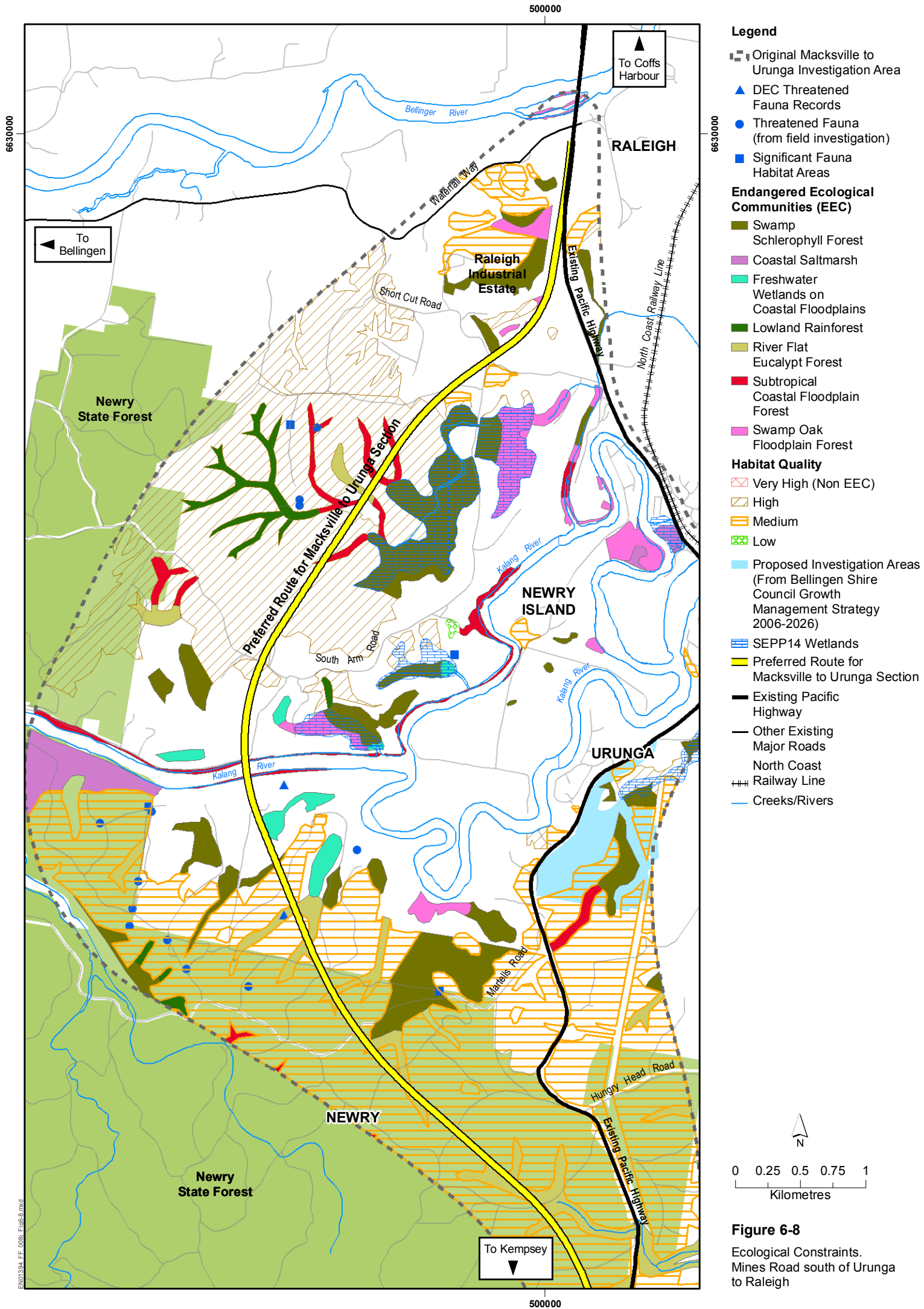


**Figure 6-5**  
Ecological Constraints.  
Donnellyville to Nambucca River



**Figure 6-6**  
 Ecological Constraints.  
 Nambucca River to North Coast  
 Railway Line west of Nambucca  
 Heads





**Figure 6-8**  
Ecological Constraints. Mines Road south of Urunga to Raleigh

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Additional threatened flora and fauna species and/or communities may be listed under the *Threatened Species Conservation Act* or the *Environmental Protection and Biodiversity Conservation Act* during the further development of the Proposal. Listings under these Acts will be monitored and the potential impact of the Proposal on additional listed species and / or communities assessed.

### Geotechnical considerations

The crossing of the floodplain south of the Nambucca River is approximately 2 km wide and has moderately and highly compressible soils to depths in excess of 20 metres. Preliminary embankment stability analysis suggests that 5 metre high embankments could be constructed on the floodplain without the need for staging. Measures may be required in some sections of the embankment to accelerate settlement conditions and / or to reduce the risk of instability.

Foundation conditions on the floodplain on the northern side of the Nambucca River are similar to those across the floodplain on the southern side.

The total thickness of compressible soils in the vicinity of the Proposal on either side of the Kalang River was found to be variable and ranged up to 18.5 metres to the north of the river. Preliminary settlement analysis for floodplain embankments suggests that a 5-metre high embankment, away from the bridge approaches (without foundation treatment) would experience primary settlement of up to 700 millimetres over a period of 3.5 to 4 years under worst-case conditions.

Compressible soils are also likely to be encountered in the vicinity of the crossings of Warrell and Deep Creeks.

Additional geotechnical investigations will be required for the further development and construction of the project. These additional investigations are included in the Proposal.

### Flooding and drainage

The hydrology and hydraulics study concentrated on the flooding impacts of the Nambucca River and Kalang River floodplains.

#### *Nambucca River*

The Proposal crosses the Gumma Swamp floodplain downstream of Macksville. The route would result in a reduction in the storage volume of Gumma Swamp of approximately 275,000m<sup>3</sup> or 1.8 per cent. This decrease would have a negligible impact on flood levels.

A flood model was prepared to assess the potential impacts on flood flow patterns. The investigations indicated that the majority of floodplain flow occurs east (downstream) of the Proposal. The number and size of culverts that would be required for the maximum of upstream or downstream flow is outlined in Table 6-4. The culverts have been sized to conservatively pass the peak flow at a velocity of 0.5m/s and drainage patterns and flood levels in either Macksville or the floodplain are not expected to be significantly altered by the Proposal.

**Table 6-4: Hydraulic structures required (Nambucca River)**

Details of structures	Approximate culvert area	Approximate required bridge length	Actual bridge length
Nambucca River Crossing		280m	340m
Equalising culvert	3m <sup>2</sup>		
Passes flows from town drain	90m <sup>2</sup>		
Floodplain	20m <sup>2</sup>		
Floodplain	100m <sup>2</sup>		
Floodplain	100m <sup>2</sup>		
<b>Total culvert area</b>	<b>313m<sup>2</sup></b>		

#### *Deep Creek*

An additional bridge would be required to be constructed over Deep Creek. Existing houses are clear of the floodplain and would not be impacted by the predicted 100mm increase in flood levels in the 100 year ARI flood event.

#### *Kalang River*

The Proposal crosses a number of inundated side branches of the Kalang River and each crossing would require a structure to allow for local drainage as outlined in Table 6-5.

**Table 6-5: Hydraulic structures required (Kalang River)**

Details of structures	Approximate culvert area	Approximate required bridge length	Actual bridge length
Kalang River Crossing		130m	155m
Balancing	20m <sup>2</sup>		
Floodplain	238m <sup>2</sup>		
Floodplain	96m <sup>2</sup>		
Balancing	51m <sup>2</sup>		
Balancing	101m <sup>2</sup>		
Balancing	55m <sup>2</sup>		
<b>Total culvert area</b>	<b>590m<sup>2</sup></b>		

The area of impact would not affect any existing dwellings and extends approximately 1000metres upstream of the Kalang River crossing. The affected area is a combination of dense natural vegetation and cleared agricultural lands.

More detailed hydrologic and hydraulic studies, including studies for Warrell Creek, are proposed to be undertaken for the refinement of the concept design and environmental assessment of the Proposal.

#### **Water quality**

The Proposal crosses a number of significant water courses including Crouches Creek, Warrell Creek, Nambucca River, Deep Creek and the Kalang River. Overall, the water quality of creeks and rivers crossed by the Proposal generally met

the ANZECC / ARMCANZ (2000) guidelines for the protection of aquatic ecosystems during dry weather. However, water quality deteriorated following wet weather with one or more water quality parameters exceeding the guidelines.

The proposed upgrade of the Pacific Highway between Warrell Creek and Urunga has the potential to affect the water quality through erosion and sedimentation during the construction phase and by the generation of additional pollutants directly attributable to the highway.

The *RTA's Water Policy* identifies a set of objectives for the management of water issues and seeks to ensure that the RTA, and its contractors and sub-contractors, consistently apply the most appropriate water management practices. The *RTA's Water Policy* objectives are achieved through compliance with the environmental principles outlined in the *RTA Code of Practice for Water Management, Road Development and Maintenance (April 1999)*. The Code of Practice provides water management principles for RTA staff and contractors involved in activities that may affect water-flow patterns and water quality.

Road construction works are subject to various controls to minimise the potential for adverse water quality impacts. These are documented prior to commencement of the works in a soil and water management plan (SWMP). The plan documents the controls that limit movement of sediment (erosion controls) and controls that remove sediment from runoff prior to discharge to downstream creeks and waterways (sediment controls). Erosion and sedimentation controls for the Proposal would be prepared with reference to the 4th edition of *Managing Urban Stormwater: Soils and Construction* (the "Blue Book").

### 6.1.3 Proposal assessment

A preliminary assessment of the potential environmental impacts of the proposed Warrell Creek to Urunga Highway Upgrade Proposal and likely significance of these impacts is summarised in Table 6-6. The table also identifies possible environmental management and mitigation measures that the RTA currently proposes to incorporate in finalising the concept development of the Warrell Creek to Urunga Proposal.

The proposed measures represent a combination of best practice designs, techniques, systems and methods that the RTA has implemented on many recent and current highway projects. It is possible that some of these measures will be supplemented and refined as the technical design is advanced and the concurrent planned environmental impact assessments are completed over the coming months.

In considering each environmental planning issue, a level of "Proposed Assessment and Management" was assigned. This indicates whether additional environmental assessment is required or whether standard management measures are sufficient to address the issue. These Proposed Assessment and Management levels are defined as follows:

- *Issues manageable – no further assessment proposed*

No further assessment proposed on this issue as the RTA considers that the issue can be adequately managed using standard or previously approved procedures that are accepted within the industry. The proposed procedures will be identified in the relevant environmental management plan for the project. These measures will also be summarised in the environmental assessment.

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■ *Define management measures – design / environmental management plan*

The issue is not routine and may have some site-specific or project peculiarities but the RTA has assessed that the standard or proven management measures can be readily adapted or tailored to address the specific circumstances to achieve an effective outcome. The proposed measures will be detailed as necessary in the refined design and / or the relevant environmental management plan (EMP) for the project. As well as being subject to a preliminary environmental assessment (as identified in Table 6-6), proposed future actions for these issues are identified in Table 6-8.

■ *Further environmental assessment proposed*

The RTA considers that this issue requires further assessment during the refined design / environmental assessment phase. Proposed measures to manage this issue will be detailed in the refined design and the environmental assessment. As well as being subject to a preliminary environmental assessment (as identified in Table 6-6), proposed future actions for these issues are identified in Table 6-7.

Appendix C provides a Draft Statement of Commitments, which will be developed further and presented in the environmental assessment.

Table 6-6 provides a summary of the environmental assessment issues of interest for the construction and operation of the Warrell Creek to Urunga Proposal. Further details are provided in the main body of this report and in a series of Reports and Working Papers developed during the route option identification stage. The purpose of this table is to identify those issues which are expected to be most important in the final decision process, as well as those more routine issues which can be readily managed through standard environmental management measures. In the case of the latter, this has been based in on the findings of extensive previous studies and / or design changes to the project in order to eliminate or significantly reduce environmental risks associated with the issue. Furthermore, to ensure the level of residual impacts remain acceptable and that there is a consistent approach to managing issues, the RTA includes a commitment to adopt standard conditions of approval (as developed by the Department of Planning). It is expected that this commitment would be carried through to the environmental assessment and ultimately to the final conditions of approval as issued by the Minister for Planning. It is noted that the level of potential impact, the judgement as to importance of an issue and the proposed assessment and management level will be confirmed during the detailed environmental assessment process and that the evaluation at this time is based on the results of the technical studies undertaken to date.

**Table 6-6: Investigations, assessment and management measures**

Issue	Previous investigations and assessment	Potential impact and level of significance)	Proposed assessment and management level	Scope of assessment or management
<b>CONSTRUCTION PHASE</b>				
<b>Community</b>				
<b>Land use, property and access</b>	A qualitative assessment of impacts on external and internal access to private properties was carried out during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.  This assessment included one-on-one and small group meetings with land owners and field assessment. The objective of the design was to maintain access and current land uses on private properties. Preliminary access arrangements have been incorporated into the design.	Changes to internal and external access arrangements for private properties. Changes to configuration of allotments. Interruptions to agricultural, commercial and other land use activities during construction.  <i>Level of significance – Moderate</i>	Define management measures – Design / environmental management plan.	Where feasible and practical, road alignment and concept design to be refined to minimise potential impacts on properties.  Where feasible and practical, new access to be provided to severed parcels and/or possible consolidation of severed parcels to be pursued.  Acquisition would be undertaken in accordance with the provisions of the <i>Land Acquisitions (Just Terms Compensation) Act 1991</i> .  Residual impacts expected to be manageable through the application of appropriate management plans,

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				controls, mitigation measures and safeguards. Refer to <i>Section 16.3</i> of the Draft Statement of Commitments ( <i>Appendix C</i> ).
<b>Traffic and transport</b>	A traffic and transport assessment was undertaken by suitably qualified specialist / experts during the route options investigation phase for the Macksville to Urunga section. Local road network changes have been incorporated into the design in consultation with council and the local community. Impacts of construction of the project on the local road network have been considered during the design development.	Construction of the proposed upgrade would result in temporary disruptions to local traffic and some disruptions to existing highway traffic. Temporary road closures will be required on occasions.  <i>Level of significance – Moderate</i>	Define Management Measures – Design / environmental management plan	Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards. Management measures would be outlined in a construction traffic management plan. Refer to <i>Section 4</i> in the Draft statement of Commitments ( <i>Appendix C</i> ).
<b>Landscape, visual and urban design</b>	Assessment of visual impacts of the road on the landscape and views was undertaken by suitably qualified specialist / experts during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.	Visual impacts of construction would be mostly short -term and intermittent. Impacts on visual amenity would include stockpiling of raw materials, removal of vegetation and exposure of soils, construction waste and vehicles and machinery.  <i>Level of impact – Low</i>	Issues Manageable – no further assessment proposed	Suitable urban design and landscape management strategies/plans to be developed and incorporated into the project design. Management measures to be included in the construction environmental management plan. Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards. Refer to <i>Section 13</i> of the Draft Statement of Commitments ( <i>Appendix C</i> ).
<b>Noise and vibration impacts</b>	Preliminary noise impact assessments have been carried out by suitably qualified specialist / experts during the route options investigation phase for	Noise from machinery during the construction of the proposed Upgrade may exceed the criteria contained in the RTA's Environmental Noise Management	Issues Manageable – no further assessment proposed	Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and

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	both the Warrell Creek and Macksville to Urunga sections.	Manual and the Construction Noise Guideline in the NSW Environment Protection Authority Noise Control Manual for short and irregular periods of construction activities.  <i>Level of significance – Low</i>		safeguards. Management measures would be included in the construction environmental management plan construction environmental management plan. Refer to <i>Section 5</i> in the Draft Statement of Commitments ( <i>Appendix C</i> ).
<b>Air quality</b>	A qualitative assessment of the air quality impacts was carried out during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.	Local air quality impacts resulting from vehicle/machinery emissions and dust, particularly during earthworks.  <i>Level of significance – Low</i>	Issues Manageable – no further assessment proposed	Management measures would be included in the construction environmental management plan Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards. Refer to <i>Section 11</i> in the Draft Statement of Commitments ( <i>Appendix C</i> ).
<b>Aboriginal heritage</b>	An Aboriginal heritage assessment was undertaken by suitably qualified specialist / experts in consultation with the Department of Environment and Climate Change (DECC), the local Aboriginal community, Land Councils and Elders groups during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.  This assessment included desk-top and field surveys.	Direct impacts on 20 areas of potential archaeological sensitivity. Discovery of new sites / areas of Aboriginal heritage significance / during construction Adverse impacts on items of archaeological significance.  <i>Level of significance – Moderate to high</i>	Further environmental assessment proposed	The scope of the environmental assessment is outlined in <i>Table 6-7</i> . Further consultation with DECC and the Aboriginal community based on the <i>DECC Interim Community Consultation Requirements for Applicants (December 2004)</i> during the further refinement of the concept design for the Proposal and during the development of the Aboriginal cultural heritage management plan.  Where feasible and practical, concept design to be refined to avoid and / or minimise potential impacts on Aboriginal heritage items. Where not feasible and practical to avoid and/or minimise potential impacts, concept

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				<p>design to be refined to include Aboriginal heritage protection measures.</p> <p>Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.</p> <p>Refer to <i>Section 8</i> of the Draft Statement of Commitments (<i>Appendix C</i>).</p>
<b>Non-Aboriginal heritage</b>	<p>A non-Aboriginal heritage assessment was undertaken by suitably qualified specialist / experts during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.</p> <p>This assessment involved a review of available archival information, discussions with councils, local heritage groups and field surveys.</p>	<p>Direct impacts on 2 of 6 heritage items in the immediate vicinity. These include: Farmhouse, corner of Pacific Highway and Old Coast Road, Macksville South Arm Road Scenic Landscape listed on Conservation register of Bellingen Council</p> <p>Additional 2 items (Boulton Hotel and early ferry / punt crossing from Macksville) located adjacent to the route may be impacted.</p> <p><i>Level of significance – Low</i></p>	Issues Manageable – no further assessment required	<p>Relevant statutory controls would be complied with by the RTA.</p> <p>Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.</p> <p>Refer to <i>Section 9</i> of the Draft Statement of Commitments (<i>Appendix C</i>).</p>
<b>Local and regional economy</b>	<p>An assessment of the potential impacts on local businesses was undertaken during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.</p> <p>This assessment involved consultation with existing businesses and local councils.</p>	<p>Potential benefits to the economy are expected during construction including employment, use of local contractors and general stimulus for commerce. There may be some impacts on local businesses directly impacted by construction activity.</p> <p><i>Level of significance – Moderate</i></p>	Issues Manageable – no further assessment required	Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.
<b>Utilities and services</b>	<p>An assessment of the potential impacts on key utility services was undertaken during the route options investigation phase for both the Warrell Creek and</p>	<p>Construction of the proposed upgrade would require the relocation of some utilities and possible temporary disruption to some services.</p>	Issues Manageable – no further assessment required	Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and



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	<p>Macksville to Urunga sections.</p> <p>This assessment involved consultation with utility service authorities and local councils.</p> <p>Further detailed discussions with service providers and councils will be undertaken as part of the concept design phase.</p>	<p><i>Level of significance – Low</i></p>		<p>safeguards.</p> <p>Refer to <i>Section 16.1</i> of the Draft Statement of Commitments (<i>Appendix C</i>).</p>
<b>Hazards and risks</b>		<p>Hazards and risks associated with construction of a major highway upgrade generally include activities such as the storage of hazardous materials and use of heavy machinery. Exposure to extreme weather events, such as flooding, also poses a risk.</p> <p><i>Level of significance – Low</i></p>	<p>Issues Manageable – no further assessment required</p>	<p>Management measures would be included in a Hazards and Risk Management Sub Plan(s).</p> <p>Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.</p> <p>Refer to <i>Section 14</i> in the draft statement of commitments (<i>Appendix C</i>).</p>
<b>Biological and physical</b>				
<b>Terrestrial flora and fauna</b>	<p>A preliminary ecological impact assessment including flora survey and terrestrial fauna investigations was undertaken by suitably qualified specialist / experts during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.</p> <p>The route alignment and design of the proposed upgrade considered opportunities to avoid and / or minimise ecological impacts.</p> <p>Where not feasible and practical to avoid and / or minimise potential impacts, concept design has been refined to include flora and fauna</p>	<p>Direct and indirect impacts on the following endangered ecological communities (EECs):</p> <ul style="list-style-type: none"> <li>■ Freshwater wetlands on coastal floodplains.</li> <li>■ Subtropical coastal floodplain forest.</li> <li>■ Swamp oak floodplain forest.</li> <li>■ Swamp sclerophyll forest</li> <li>■ River-flat eucalypt forest.</li> <li>■ Lowland rainforest on floodplains</li> <li>■ Coastal saltmarsh.</li> </ul> <p>Based on a corridor width of 100metres,</p>	<p>Further environmental assessment required.</p>	<p>The scope of the environmental assessment is outlined in <i>Table 6-7</i>. Where feasible and practical, concept design to be further refined to avoid and/or minimise potential impacts on threatened / endangered flora and fauna species and endangered ecological communities. Where not feasible and practical to avoid and/or minimise potential impacts, concept design to be refined to include flora and fauna protection measures – including fauna underpasses and fencing. Commitment to implement compensatory habitat proposals based on findings of supplementary</p>

	<p>protection measures.</p>	<p>total area of EECs affected is 75.5 to 81.1ha.</p> <p>Potential indirect impacts on SEPP 14 wetlands adjacent to the route.</p> <p>The Proposal would impact on fauna habitat, particularly within the Nambucca State Forest and north of the Kalang River.</p> <p><i>Level of significance – High</i></p>		<p>investigations if not feasible or practical to refine concept design to avoid and/or minimise potential impacts or to include flora and fauna protection measures.</p> <p>Residual impacts expected to be manageable through the application of measures detailed in a Flora and Fauna Management Sub Plan.</p> <p>Refer to <i>Section 7</i> in the Draft statement of commitments (<i>Appendix A</i>).</p> <p>Based on investigations to date, the Proposal is not perceived to have a significant impact on threatened and migratory species or require a referral under the EPBC Act to the Department of Environment and Water Resources (DEWR). However, a referral will be made if identified as required by further investigations.</p>
<p><b>Aquatic ecology</b></p>	<p>A preliminary ecological impact assessment including flora survey and aquatic fauna investigations was undertaken by suitably qualified specialist / experts during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.</p> <p>The route alignment and design of the proposed upgrade considered opportunities to avoid and / or minimise ecological impacts.</p> <p>Where not feasible and practical to avoid and/or minimise potential impacts, concept design has been refined to include flora and fauna protection measures.</p>	<p>Potential direct impacts on aquatic vegetation and potential habitat for:</p> <p>Black cod (<i>Epinephelus daemeli</i>).</p> <p>Green sawfish (<i>Pristis zijsron</i>).</p> <p>Potential indirect impacts on SEPP 14 wetlands adjacent to the route.</p> <p><i>Level of significance – Moderate</i></p>	<p>Further environmental assessment required</p>	<p>The scope of the environmental assessment is outlined in <i>Table 6-7</i>.</p> <p>Where feasible and practical, concept design to be further refined to avoid and/or minimise potential impacts on aquatic vegetation and habitat. Where not feasible and practical to avoid and/or minimise potential impacts, concept design to be refined to include protection measures.</p> <p>Design to be undertaken in accordance with Department of Primary Industries Fisheries Guidelines.</p> <p>Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and</p>

				<p>safeguards.</p> <p>Refer to <i>Section 7</i> in the Draft Statement of Commitments (<i>Appendix A</i>).</p> <p>Based on investigations to date, the Proposal is not perceived to have a significant impact on threatened and migratory species or require a referral under the EPBC Act to the Department of Environment and Water Resources. However, a referral will be made if identified as required by further investigations.</p>
<b>Geotechnical, soils and contamination</b>	<p>Geotechnical investigations incorporating subsurface assessment, preliminary soil and groundwater contamination assessment and acid sulphate soil assessment were undertaken by suitably qualified specialist / experts during the route options investigation phase for the Macksville to Urunga section.</p> <p>A preliminary geotechnical assessment of the proposed upgrade corridor was undertaken by suitably qualified specialist / experts during the route options investigation phase for the Warrell Creek section. The assessment included a desktop review and a two day field investigation of the study area. The soils underlying the floodplains are expected to be potential Acid Sulphate Soils.</p>	<p>Potential impacts include sedimentation of waterways, soil and water contamination due to run-off during construction, presence of soft soils and exposure of potential acid sulphate soils.</p> <p>A key geotechnical issue is the presence of low strength and highly compressible soils of alluvial and estuarine origin that underlie the relatively low-lying floodplains.</p> <p><i>Level of significance – Moderate</i></p>	Define Management Measures – Design / environmental management plan	<p>Adequate protection of both cut batters and fill embankments to be provided. Measures would include grassing and the provision of cut-off drains and landscaping to divert water away from the cut and fill batters. Sediment traps to be implemented. Removal of vegetation to be minimised during construction.</p> <p>Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.</p> <p>Refer to <i>Section 10</i> in the Draft Statement of Commitments (<i>Appendix A</i>).</p>
<b>Groundwater</b>	A desktop assessment and targeted field investigations were carried out by suitably qualified specialist / experts during the route options investigation	<p>Potential to encounter groundwater in deep cuts in Section 4 – Urunga Bypass section.</p> <p>Deep cuts may locally lower the water</p>	Issues Manageable – no further assessment required.	<p>Bore holes to be monitored during and post-construction.</p> <p>Residual impacts expected to be manageable through the application of</p>

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	<p>phase for the Macksville to Urunga section.</p> <p>A desktop assessment was carried out by suitably qualified specialist / experts during the route options investigation phase for the Warrell Creek section. Investigations included a preliminary soil and groundwater contamination assessment as well as groundwater bore information received from the Department of Natural Resources.</p>	<p>table and may have adverse affects on water levels and yields in existing water bores. Low / minimal risk of groundwater contamination.</p> <p><i>Level of significance – Low</i></p>		<p>appropriate management plans, controls, mitigation measures and safeguards.</p> <p>Refer to <i>Section 10</i> of the Draft Statement of Commitments (<i>Appendix A</i>).</p>
<b>Hydrology and flooding</b>	<p>Hydrologic and hydraulic investigations were undertaken by suitably qualified specialist / experts during the route options investigation phase for the Macksville to Urunga section.</p>	<p>During concept design any proposed crossings of the Warrell Creek floodplain would be designed with the objective of achieving a maximum increase in flood levels upstream of the Proposal of less than 50millimetres.</p> <p>Investigations into the assessment of route options for the Macksville to Urunga section concluded that the maximum increase in 1 in 100 year ARI flood levels in the Nambucca would be less than 50millimetres downstream of Macksville and less than 30millimetres in Gumma swamp. These increases occur immediately upstream of the route options and would not affect flood flows or flood levels in Macksville.</p> <p>Investigations also found that any of the proposed crossings of the Kalang River floodplain could be designed to achieve maximum increases in flood levels upstream of the route options of approximately 50millimetres.</p> <p>Deep Creek is also an important waterway, although with a significantly smaller catchment area than the</p>	Further environmental assessment required	<p>The scope of the environmental assessment is outlined in <i>Table 6-7</i>. Further hydraulic modelling to be undertaken to refine predictions of impact on proposed flooding characteristics. Concept design to be refined to incorporate identified management / mitigation measures.</p> <p>Predicted impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.</p> <p>Refer to <i>Section 10</i> in the Draft Statement of Commitments (<i>Appendix A</i>).</p>

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		Nambucca or Kalang Rivers or Warrell Creek.  <i>Level of significance – Moderate</i>		
<b>Water quality</b>	A qualitative assessment of potential water quality impacts during construction was undertaken by suitably qualified specialist / experts during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.	Water quality in the Nambucca and Kalang Rivers and creeks generally met Australian and New Zealand Environment Council / Agriculture and Resource Management Council of Australia and New Zealand (ANZECC/ARMCANZ) (2000) guidelines.  Potential for impact upon the turbidity, pH, DO, concentration of ions and TDS of these local waterways.  <i>Level of significance – Low to moderate</i>	Define management measures – Design / environmental management plan	Waterways to be monitored during and post construction.  Measures to minimise risk to the environment to be implemented. Special emphasis would be placed on gully and watercourse crossings, vehicle set down and repair areas, fuel storage and waste disposal areas.  Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.  Refer to <i>Section 10</i> in the Draft Statement of Commitments ( <i>Appendix A</i> ).
<b>Regional and cumulative</b>				
<b>Wastes, energy &amp; resources</b>	The concept design for the project minimised the earthworks requirements and achieved a balance of earthworks within sections of the Proposal.	Generation of construction wastes. Increased energy use. Increased demand on local and regional resources. Water use.  <i>Level of significance – Low</i>	Issues Manageable – no further assessment required	Measures to minimise waste and the usage of energy and resources to be included in the construction environmental management plan.  Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.  Refer to <i>Section 15</i> in the Draft Statement of Commitments ( <i>Appendix A</i> ).

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<b>Cumulative impacts</b>	Cumulative impacts of the Pacific Highway Upgrade program and interactions with other major activities in the region were considered during route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.	Impacts associated with the simultaneous construction of road projects such as traffic, air quality, noise and visual amenity.  <i>Level of significance – Low</i>	Issues Manageable – no further assessment required	Consideration will be given to the potential cumulative impacts associated with the simultaneous construction of the project and other road projects during identification of the staging and / or timing of construction of the project.
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**OPERATIONAL PHASE**

<b>Community</b>				
<b>Land use, property and access</b>	<p>A survey of land uses within and surrounding the corridor has been completed and mapped during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.</p> <p>Existing zoning and development permissibility and strategic planning direction for land affected by the proposed upgrade has been assessed. Bellingen and Nambucca Shire Council and landholders with interests in future development of land in the vicinity of the proposed upgrade have been consulted during the design development. Provision for access to strategic and future development areas from interchanges has been included in the design.</p>	<p>Potential land use, property and access impacts of the Proposal include:</p> <ul style="list-style-type: none"> <li>• Agricultural: <ul style="list-style-type: none"> <li>▪ Loss of farm viability.</li> <li>▪ Loss of pasture/cultivable land.</li> <li>▪ Fragmentation.</li> </ul> </li> <li>• Residential: <ul style="list-style-type: none"> <li>▪ Amenity related impacts (e.g. noise, air and visual impacts).</li> <li>▪ Uncertainty about property access / acquisition.</li> </ul> </li> <li>• Commercial: <ul style="list-style-type: none"> <li>▪ Impacts on macadamia farms, service station and accommodation adjacent to highway.</li> </ul> </li> <li>• Utilities and infrastructure: <ul style="list-style-type: none"> <li>▪ North Coast Railway. Other utility services.</li> </ul> </li> <li>• Industrial: <ul style="list-style-type: none"> <li>▪ Impact on timber mill/manufacturers.</li> </ul> </li> </ul> <p>Possible changes in zoning/ land use</p>	Further environmental assessment required.	<p>The scope of the environmental assessment is outlined in <i>Table 6-7</i>. Impacts on existing and future land uses to be assessed. This would include field assessment and meetings with councils, small groups and individuals. One objective of the design development is to maintain, where possible, current activities on affected private properties. Arrangements would be discussed with individual land owners and incorporated into the design.</p> <p>Access arrangements to be further defined and incorporated into the concept design.</p> <p>Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.</p>

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		<p>surrounding the corridor, e.g. land surrounding the Nambucca Heads interchange.</p> <p>Benefits to Macksville and Urunga economy through provision of access to strategic industrial land.</p> <p>Benefits to adjoining communities from improved access and / or removal of highway traffic (e.g. Warrell Creek village, Macksville, Nambucca Heads and the Urunga urban areas).</p> <p><i>Level of significance – Moderate</i></p>		
<b>Traffic and transport</b>	<p>A traffic and transport assessment was undertaken by suitably qualified specialist / experts during the route options investigation phase for the Macksville to Urunga section.</p> <p>The traffic and transport assessment included assessment of impacts of changes in the local road network.</p> <p>The objective of design development and traffic management assessment was to achieve an acceptable level of service and provide alternative access arrangements for local traffic.</p> <p>Interchanges and local road network changes have been incorporated into the design in consultation with council and the local community.</p>	<p>Changes to the local road network and access to the Pacific Highway.</p> <p><i>Level of significance – Moderate</i></p>	<p>Define Management Measures – Design / environmental management plan</p>	<p>Adopt standards in the Pacific Highway Design Guidelines.</p> <p>Design to provide for off-highway local road along full length of corridor with controlled access to the highway at strategic locations.</p> <p>Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.</p> <p>Refer to <i>Section 4</i> in the Draft Statement of Commitments (<i>Appendix A</i>)</p>
<b>Visual landscape</b>	<p>An assessment of visual impacts of the road on the rural landscape character and views was undertaken by suitably qualified specialist / experts during route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.</p>	<p>Proposal has the potential to have visual impacts on residents with views to new highway.</p> <p>Impact on views and landscape character including:</p> <ul style="list-style-type: none"> <li>▪ District views across floodplain south</li> </ul>	<p>Define Management measures – Design / environmental management plan</p>	<p>The RTA would implement measures outlined in an Urban Design and Landscape Report.</p> <p>Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and</p>

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	<p>Potential visual impacts have been identified and urban design principles developed.</p>	<p>of Nambucca and Kalang Rivers and across low lying areas north east of Ridgewood Drive.</p> <ul style="list-style-type: none"> <li>▪ Visual impacts at Letitia Close and Mattick Road.</li> <li>▪ Impact on views across the Nambucca and Kalang Rivers.</li> </ul> <p>Alterations to natural landscape features including vegetation and topographical features.</p> <p><i>Level of significance – Moderate</i></p>		<p>safeguards.</p> <p>Refer to <i>Section 13</i> of the Draft Statement of Commitments (<i>Appendix A</i>).</p>
<p><b>Noise and vibration</b></p>	<p>A comparative assessment of the number of noise sensitive receivers was carried out by suitably qualified specialist / experts during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.</p> <p>Preliminary noise modelling undertaken during the route options investigation phase has predicted operational noise levels based on traffic forecasts.</p>	<p>Adjacent residents adversely affected by operational traffic noise. Some sensitive receivers would experience noise levels (<math>L_{Aeq}</math>) above the noise goals specified in the DECC <i>Environmental Criteria for Road Traffic Noise</i> (1999) without noise mitigation measures.</p> <p><i>Expected level of impact – Moderate negative</i></p>	<p>Define Management Measures – Design / environmental management plan</p>	<p>Noise assessment to be undertaken. Assessment would identify potential noise impacts of the Proposal and proposed mitigation measures.</p> <p>Proposed mitigation measures to be incorporated into refined concept for the Proposal.</p> <p>Proposed mitigation measures to be detailed in an Operational Noise Management Report and incorporated into the refined design for the Proposal.</p> <p>Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.</p> <p>Refer to Section 6 of the Draft Statement of Commitments (<i>Appendix A</i>).</p>



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<b>Air quality</b>	A qualitative air quality assessment was undertaken during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.	Some community concern about local air pollution from vehicle emissions. Minor improvement in regional air quality with localised reduction in air quality adjacent to the Proposal.  <i>Level of significance – Low</i>	Issues Manageable – no further assessment proposed	Adopt the Draft Pacific Highway Design Guidelines with minimal gradients and curves to facilitate free flow traffic conditions.  Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.
<b>Aboriginal heritage</b>	An Aboriginal heritage assessment was undertaken by suitably qualified specialist / experts in consultation with the Department of Environment and Climate Change, the local aboriginal community, Land Councils and Elders groups during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.  This assessment included desk top and field surveys.	<i>Level of significance – Nil</i>	Issues Manageable – no further assessment proposed.	No management measures required.
<b>Non-Aboriginal heritage</b>	A non-Aboriginal heritage assessment was undertaken by suitably qualified specialist / experts during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.  This assessment included desktop and field surveys.	<i>Level of significance – Nil</i>	Issues Manageable – no further assessment proposed.	No management measure required.
<b>Local and regional economy</b>	A local Business Impacts survey of the study area was undertaken during the route options investigation phase for the Macksville to Urunga section.  Individual property owners with commercial operations within the proposed corridor have been consulted.	Potential loss of trade for highway-based businesses. Reduction in size of agricultural properties may impact on viability of farm business. Potential stimulus for growth due to improved transport links and improved planning/economic outcomes for local	Further environmental assessment proposed.	The scope of the environmental assessment is outlined in <i>Table 7.1</i> . In conjunction with councils and Chambers of Commerce, identify possible schemes to attract motorists into existing townships and businesses, e.g. signposting and gateway

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	Nambucca and Bellingen Councils have been involved in discussions with regard to potential economic impacts.	communities. Reduction in heavy vehicle through-traffic in Warrell Creek village, Macksville, Nambucca heads and Urunga. Potential impacts on accommodation businesses along existing highway.  <i>Level of significance – Low to moderate</i>		treatments. Design to provide for off-highway local road along full length of corridor with controlled access to the highway at strategic locations. Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards. Raised as a key issue by community.
<b>Utilities and services</b>	An assessment of the potential impacts on key utility services was undertaken during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections. This assessment involved consultation with utility service authorities and local councils. Further detailed discussions with service providers and councils will be undertaken as part of the concept design phase.	<i>Level of significance – Nil</i>	Issues Manageable – no further assessment proposed	No management measures required.
<b>Hazards and risks</b>	Criteria to achieve an acceptable level of risk in operation of the proposed upgrade were developed during the route options investigation and design development phases for both the Warrell Creek and Macksville to Urunga sections.	Reduced potential of hazard and risk associated with travel on the Pacific Highway with higher standard road.  <i>Level of significance – Low</i>	Issues Manageable – no further assessment proposed	Spill containment measures / facilities for incidents near sensitive environments to be incorporated into the design. A Road Safety Audit of the concept design to be undertaken. Consultation will occur during the refinement of the design and development of the hazards and risks sub-plan. Environmental management measures would be included in the operational environmental management plan to be

				<p>prepared prior to opening of the Proposal to traffic.</p> <p>The RTA will implement hazards and risk management sub plan(s).</p> <p>Refer to <i>Section 14</i> in the Draft Statement of Commitments (<i>Appendix A</i>).</p>
<b>Biological and physical</b>				
<p><b>Terrestrial flora and fauna</b></p>	<p>The potential for long term impacts on habitat corridors and fauna movements in the area were considered during route options development and route selection.</p>	<p>Direct and indirect impacts on the following EECs:</p> <ul style="list-style-type: none"> <li>▪ Freshwater wetlands on coastal floodplains.</li> <li>▪ Subtropical coastal floodplain forest.</li> <li>▪ Swamp oak floodplain forest.</li> <li>▪ Swamp sclerophyll forest.</li> <li>▪ River-flat eucalypt forest.</li> <li>▪ Lowland rainforest on floodplains.</li> <li>▪ Coastal saltmarsh.</li> </ul> <p>Potential indirect impacts in terms of noise, water quality and increased edge effect on flora, fauna and the SEPP 14 wetlands adjacent to the route.</p> <p>The provision of fauna crossings and fencing to be investigated and developed as part of the concept and detailed design phase to mitigate any habitat severance issues and to prevent injury or death to fauna on the road.</p> <p><i>Level of significance – Moderate</i></p>	<p>Define Management measures – Design / environmental management plan</p>	<p>Environmental management measures would be included in the operational environmental management plan to be prepared prior to opening of the Proposal to traffic. The operational environmental management plan will include procedures to monitor and manage weed invasion and to inspect and maintain fencing and fauna crossings.</p> <p>Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.</p> <p>Refer to <i>Section 7</i> in the Draft Statement of Commitments (<i>Appendix A</i>).</p>

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<p><b>Aquatic ecology</b></p>	<p>The route alignment and design of the proposed upgrade considered the long term impacts on water courses, wetlands and the associated ecosystems.</p>	<p>Potential direct impacts on aquatic vegetation and potential habitat for:</p> <ul style="list-style-type: none"> <li>▪ Black cod (<i>Epinephelus daemeli</i>)</li> <li>▪ Green sawfish (<i>Pristis zijsron</i>)</li> </ul> <p>Potential indirect impacts on water quality as a result of runoff from the road or spills on creeks and SEPP 14 wetlands adjacent to the route. The stormwater drainage and incident management facilities will be designed to incorporate measures to prevent impacts resulting from contaminated runoff or from spill incidents.</p> <p><i>Level of significance – Moderate</i></p>	<p>Define Management Measures – Design / environmental management plan</p>	<p>Environmental management measures would be included in the operational environmental management plan to be prepared prior to opening of the Proposal to traffic. This would include incident management procedures to protect adjacent wetlands in the event of a spill and for the ongoing monitoring and maintenance of stormwater infrastructure.</p> <p>Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.</p> <p>Refer to <i>Section 7</i> in the Draft Statement of Commitments (<i>Appendix A</i>).</p>
<p><b>Geotechnical, soils and contamination</b></p>	<p>Geotechnical investigations incorporating subsurface assessment, preliminary soil and groundwater contamination assessment and acid sulphate soil assessment were undertaken by suitably qualified specialist / experts during the route options investigation phase for the Macksville to Urunga section.</p> <p>A preliminary geotechnical assessment of the proposed upgrade corridor was undertaken by suitably qualified specialist / experts during the route options investigation phase for the Warrell Creek section. The assessment included a desktop review and a two day field investigation of the study area.</p> <p>The soils underlying the floodplains are expected to be potential acid sulphate</p>	<p>Potential for deep soft soils and resulting long term settlement – primarily across floodplains.</p> <p>Potential batter slope and stability impacts.</p> <p>Potential impact on footprint and location of Road Reserve boundary.</p> <p>Potential impact on the management of construction materials.</p> <p>Potential impact of foundation conditions for bridges and other structures.</p> <p><i>Level of significance – Moderate</i></p>	<p>Define Management Measures – Design / environmental management plan</p>	<p>Targeted geotechnical investigations and further design refinement proposed.</p> <p>Management measures would be included in the operational environmental management plan to be prepared prior to opening of the Proposal to traffic.</p> <p>Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.</p> <p>Refer to <i>Section 10</i> in the Draft Statement of Commitments (<i>Appendix A</i>).</p>

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	soils (ASS).			
<b>Groundwater</b>	<p>A desktop assessment and targeted field investigations were carried out by suitably qualified specialist / experts during the route options investigation phase for the Macksville to Urunga section.</p> <p>A desktop assessment was carried out by suitably qualified specialist / experts during the route options investigation phase for the Warrell Creek section.</p> <p>Investigations included a preliminary soil and groundwater contamination assessment as well as groundwater bore information received from the Department of Natural Resources.</p>	<p>Potential to encounter groundwater in deep cuts in Section 4.</p> <p><i>Level of significance – Low</i></p>	<p>Issues Manageable – no further assessment proposed</p>	<p>Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.</p> <p>Refer to <i>Section 10</i> in the draft statement of commitments (<i>Appendix A</i>).</p>
<b>Hydrology and flooding</b>	<p>Hydrologic and hydraulic investigations were undertaken by suitably qualified specialist / experts during the route options investigation phase for the Macksville to Urunga section.</p>	<p>Further investigation required to ensure concept design does not cause significant adverse flooding and drainage impacts. Concept design to be refined to provide higher level of confidence in flooding impacts and proposed structures.</p> <p><i>Level of significance – Moderate</i></p>	<p>Define Management Measures – Design / environmental management plan</p>	<p>Further hydrologic and hydraulic investigations and design refinement proposed.</p> <p>All waterway crossings to be located and sized so as not to cause significant adverse flooding and drainage impacts.</p> <p>Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards as well as monitoring and maintenance.</p> <p>Refer to <i>Section 10</i> in the Draft Statement of Commitments (<i>Appendix A</i>).</p>

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<b>Water quality</b>	<p>A qualitative assessment of potential water quality impacts during operation of the Proposal was undertaken by suitably qualified specialist / experts during the route options investigation phase for both the Warrell Creek and Macksville to Urunga sections. Baseline surface and ground water conditions were determined.</p>	<p>Potential for impacts on water quality of sensitive waterways and wetland areas. Impacts on water quality would include sedimentation and contamination from road run-off.</p> <p><i>Level of significance – Low</i></p>	<p>Issues Manageable – no further assessment proposed.</p>	<p>Measures to manage accidental spills during the operation of the project to be identified. Management measures would generally be in the form of detention structures or contingency plans or a combination of both. Areas considered having particularly high conservation and sensitivity values would be identified and additional management measures instigated. Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards.</p> <p>Refer to <i>Section 10</i> in the Draft Statement of Commitments (<i>Appendix A</i>).</p>
<b>Regional and cumulative</b>				
<b>Wastes, energy and resources</b>		<p>Reduced potential for hazardous material spillage or incident with higher standard road.</p> <p>Reduced consumption and resources with shorter, more efficient road.</p> <p><i>Level of significance – Low</i></p>	<p>Issues Manageable – no further assessment proposed</p>	<p>Residual impacts expected to be manageable through the application of appropriate management plans, controls, mitigation measures and safeguards incorporated in the operational environmental management plan.</p>
<b>Cumulative impacts</b>	<p>Cumulative impacts of the Pacific Highway Upgrade program and interactions with other major activities in the region were considered during route options investigation phase for both the Warrell Creek and Macksville to Urunga sections.</p>	<p>The overall Pacific Highway Upgrade Program is expected to generate cumulative impacts (both beneficial and adverse) with issues related to traffic growth (especially in heavy vehicles) being of particular community concern due to potential traffic noise and road safety concerns.</p> <p><i>Level of significance – Low to moderate.</i></p>	<p>Issues Manageable – no further assessment proposed</p>	<p>Adopt design standard and capacity of the Proposal that provides acceptable safety outcomes and level of service for the life of the project.</p>

## 6.2 Proposed scope of environmental assessment

### 6.2.1 Key issues for environmental assessment

One of the objectives of the new planning approvals process under Part 3A of the *Environmental Planning and Assessment Act 1979* is to encourage proponents to prepare more focused environmental assessments to ensure that appropriate weight is given to addressing the more significant environmental issues in detail. In order to focus the environmental assessment documents, impacts that can be mitigated through the use of standard environmental management measures can be addressed through the preparation of a Draft Statement of Commitments.

As identified in Table 6-6, there would be a number of relatively minor impacts associated with the construction and operation of the Proposal that could be effectively managed and / or adequately mitigated through the application of standard or tailored mitigation measures (including standard conditions of approval developed by the DoP) addressed through a draft statement of commitments. A draft statement of commitments for the Warrell Creek to Urunga Project is shown in Appendix C.

There are also a number of other environmental impacts which require further investigation and assessment.

The environmental assessment for the proposed Upgrade will focus on those key issues for which further environmental assessment is proposed. This approach recognises the substantial amount of environmental assessment undertaken during the route investigation and selection process by technical experts / specialists in their relevant fields and that the preliminary design for the proposed Upgrade has considered and addressed key issues through refinements to the alignment and design of the highway to avoid / minimise impacts and include measures to mitigate potential impacts.

The key issues that have been identified as requiring further assessment during the environmental assessment stage are shown in Table 6-7 and the suggested scope of those further assessments has been summarised. The proposed scope of the environmental assessment has been based on the assessment of the issues in Section 6.

**Table 6-7: Key issues for environmental assessment**

Key Issue	Proposed scope of environmental assessment
<b>CONSTRUCTION PHASE</b>	
<b>Community</b>	
<b>Aboriginal heritage</b>	Further consultation with the DECC and the Aboriginal community (including Buchanan descendents) based on the <i>DECC Interim Community Consultation Requirements for Applicants</i> (December 2004) during the environmental assessment of the Proposal and further refinement of the concept design and during the development of the Aboriginal cultural heritage management plan. Undertake targeted heritage surveys with Local Aboriginal Land Council and Elders including Buchanan descendents. More accurately identify likely impacts on identified sites / areas of significance (including the Cow Creek Aboriginal Reserve) and, if appropriate, evaluate modifications to the Proposal to minimise impacts.

<b>Biological and physical</b>	
<b>Terrestrial flora and fauna</b>	<p>Undertake targeted flora and fauna surveys to augment earlier investigations and identify threatened species and populations / communities likely to be affected by the Proposal.</p> <p>Assess significance of Proposal on threatened species and populations / communities likely to be affected.</p> <p>Where feasible and practical, refine concept design to avoid and / or minimise potential impacts on threatened species and populations / communities. Where not feasible and practical to avoid and/or minimise potential impacts, refine concept design to include flora and fauna protection measures – including fauna underpasses and fencing. Implement compensatory habitat proposals based on findings of supplementary investigations if not feasible or practical to refine concept design to avoid and / or minimise potential impacts or to include flora and fauna protection measures.</p>
<b>Aquatic ecology</b>	<p>Undertake targeted surveys to augment earlier investigations and identify aquatic vegetation and habitat likely to be affected by the Proposal.</p> <p>Assess significance of the Proposal on aquatic vegetation and habitat likely to be affected.</p> <p>Where feasible and practical, refine concept design to avoid and/or minimise potential impacts on aquatic vegetation and habitat. Where not feasible and practical to avoid and/or minimise potential impacts, refine concept design to include protection measures.</p>
<b>Hydrology and flooding</b>	<p>Undertake further flood assessment, including ongoing liaison with council(s) (including Floodplain Management Committee) and the Department of Water and Energy (previously the Department of Natural Resources), to refine predictions of impact on proposed flooding characteristics.</p> <p>Waterway crossings to be located and sized so as not to cause significant adverse flooding and drainage impacts.</p> <p>Refine concept design to incorporate identified management / mitigation measures.</p> <p>Review existing hydro surveys and/or undertake new surveys to confirm location of navigable channel.</p>
<b>OPERATIONAL PHASE</b>	
<b>Community</b>	
<b>Land use, property and access</b>	<p>Ongoing liaison with Nambucca and Bellingen Shire Councils, Department of Primary Industries (State Forests), local bushfire and emergency services agencies/groups and property owners</p> <p>Assess impacts of Proposal on existing and future land uses – including field assessment and meetings with councils, small groups and individuals.</p> <p>In consultation with individual land owners, consider refinements of the concept design to minimise impacts on current activities on affected private properties.</p> <p>Refine concept design to further define property access arrangements.</p>
<b>Local and regional economy</b>	<p>Assess impacts of Proposal on existing and future businesses – including additional business survey, field assessment and meetings with councils and Chambers of Commerce.</p> <p>In conjunction with councils and chambers of commerce, identify possible schemes to attract motorists into existing townships and businesses, e.g. signposting and gateway treatments.</p> <p>Design to provide for off-highway local road along full length of corridor with controlled access to the highway at strategic locations.</p>



The relevant management measures for the issues shown in Table 6-8 will be identified during the design refinement / environmental assessment phase. Those measures will be summarised in the environmental assessment and detailed in the refined design or the relevant environmental management plan for the project.

### 6.2.2 Other issues for environmental investigations

The issues identified in Table 6-6 as requiring further consideration to identify or locate suitable mitigation / management measures are shown in Table 6-8.

**Table 6.8: Other issues for further environmental investigations**

Issue	Proposed actions
<b>CONSTRUCTION PHASE</b>	
<b>Community</b>	
<b>Land use, property and access</b>	<p>Ongoing liaison with Nambucca and Bellingen Shire Councils, Department of Primary Industry (State Forests), local bushfire and emergency services agencies / groups and property owners</p> <p>Ongoing liaison with Nambucca and Bellingen Shire Councils regarding new development proposals and future landuse.</p> <p>Where feasible and practical, refine road alignment and concept design to minimise potential impacts on properties.</p> <p>Where feasible and practical, provide new access to severed parcels and/or consolidate severed parcels.</p> <p>Acquisition would be undertaken in accordance with the provisions of the <i>Land Acquisitions (Just Terms Compensation) Act 1991</i>.</p> <p>If required, take planning action to protect the corridor.</p>
<b>Traffic and transport</b>	<p>Identify and describe local road network changes during construction.</p> <p>Outline traffic management measures to be included in the construction traffic management plan.</p>
<b>Biological and physical</b>	
<b>Geotechnical, soils and contamination</b>	<p>Undertake targeted geotechnical investigations and refine design.</p> <p>Identify erosion and sedimentation control measures prepared with reference to the 4th edition of <i>Managing Urban Stormwater: Soils and Construction</i> (the "Blue Book").</p> <p>Measures could include grassing and the provision of cut-off drains and landscaping to divert water away from the cut and fill batters, sediment basins and minimisation of vegetation removal during construction.</p>
<b>Water quality</b>	<p>Monitor waterways during and post construction.</p> <p>Implement measures to minimise risk to the environment. Special emphasis to be placed on gully and watercourse crossings, vehicle set-down and repair areas, fuel storage and waste disposal areas.</p>

<b>OPERATIONAL PHASE</b>	
<b>Community</b>	
<b>Traffic and transport</b>	<p>Adopt standards in the Pacific Highway Design Guidelines.</p> <p>Design to provide for off-highway local road along full length of corridor with controlled access to the highway at strategic locations.</p>

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	<p>Identify benefits of Proposal and estimate crash reduction potential.</p> <p>Describe and quantify local road network changes including benefits and disbenefits. Prepare local traffic access strategy.</p> <p>Finalise location and design of interchanges.</p> <p>Describe existing and possible future bus routes (including school bus routes) and assess the potential benefits and disbenefits of the Proposal.</p>
<b>Visual landscape</b>	<p>Assess visual impact of Proposal.</p> <p>Describe how urban design and landscape management strategies / plans have been developed and incorporated into the design for the Proposal.</p> <p>Prepare an Urban Design and Landscape Report and implement proposed mitigation measures.</p>
<b>Noise and vibration</b>	<p>Undertake noise assessment to identify potential noise impacts of Proposal and proposed mitigation measures.</p> <p>Incorporate proposed mitigation measures into refined concept design for the Proposal.</p> <p>Proposed mitigation measures to be detailed in an Operational Noise Management Report and incorporated into the refined design for the Proposal.</p>
<b>Biological and physical</b>	
<b>Terrestrial flora and fauna</b>	Identify environmental management measures and include in the operational environmental management plan.
<b>Aquatic ecology</b>	Identify environmental management measures and include in the operational environmental management plan.
<b>Geotechnical, soils and contamination</b>	Identify environmental management measures and include in the operational environmental management plan.
<b>Hydrology and flooding</b>	<p>Undertake further hydrologic and hydraulic investigations and design refinement.</p> <p>Locate and size waterway crossings so as not to cause significant adverse flooding and drainage impacts.</p>

## 7 References

ANZECC/ARMCANZ (2000), *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand.

Bureau of Transport and Communication Economics, *The Effect on Small Towns of Being Bypassed by a Highway. A Case Study of Berrima and Mittagong*, Working Paper 11, 1994.

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School of Geography, University of New South Wales, *Evaluation of the Economic Impacts of Bypass Roads on Country Towns, Final Project Report*, prepared for the RTA (1996),

Urban and Regional Planning Program, University of Sydney (2005), *The Karuah Highway Bypass – Economic and Social Impacts, the 1 year report*, prepared for the RTA.

## **Appendix A Study team**

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RTA Team

General Manager, Pacific Highway Office – Robert (Bob) Higgins

Project Development Manager– Chris Clark

Project Development Officer – Adam Cameron

Environmental Services Manager– John O'Donnell

Aboriginal Liaison Officer – Mary Lou Buck

SKM Team

Project Manager – Ross Jones

Project Director – Jo Moss

Community Liaison Manager – Ross Jones

Design Team Leader – Richard Davies

Environmental Studies Team Leader – Ingrid Ilias

Traffic and Economics Team Leader – Keith Pettigrew

Sub-Consultants

Geotechnical Considerations – Golder Associates Pty Ltd

Urban Design and Landscape – DEM (Aust) Pty Ltd

Heritage – Robynne Mills Archaeological and Heritage Services

Value Management – Tierney Page Kirkland

Aquatic Ecology – The Ecology Lab

Community Consultation Support – Pramax Communications

## **Appendix B Route options for Warrell Creek section**

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Option	Description
Red	<p>The Red Option largely follows the route of the 1990s approved upgrade but has been modified to meet the current design criteria for upgrades of the Pacific Highway. It is located on the western side of the North Coast Railway Line and follows the existing highway through the township of Warrell Creek. Sections of the existing highway would need to be reconstructed.</p> <p><i>Construction issues:</i></p> <ul style="list-style-type: none"> <li>■ Would require relocation of the railway line at the Warrell Creek village.</li> <li>■ Northern section is located close to the existing highway. Construction would cause disruption and delays to road users.</li> <li>■ Longer crossing of the poorer quality soils on the Warrell Creek floodplain than the Orange and Purple options.</li> <li>■ Increased cost due to need to import material to construct embankment across the Warrell Creek floodplain.</li> </ul> <p><i>Social issues:</i></p> <ul style="list-style-type: none"> <li>■ Little change to existing noise levels at Warrell Creek village.</li> <li>■ Least impact on farms to the east of the village.</li> <li>■ Requires the most acquisition of houses.</li> </ul> <p><i>Access issues:</i></p> <ul style="list-style-type: none"> <li>■ Would include new arrangements to provide access to properties east of the upgrade at Warrell Creek village.</li> </ul> <p><i>Environmental issues:</i></p> <ul style="list-style-type: none"> <li>■ Least impact on high and very high-quality habitat.</li> </ul> <p><i>Preliminary cost (\$2006):</i>    \$122 million</p>
Blue	<p>The Blue Option was designed to create a transport corridor in the Warrell Creek area. The Pacific Highway Upgrade would be constructed on the eastern side of the North Coast Railway Line and along the western edge of farm properties to minimise impacts on rural enterprises. This option would pass over Rosewood Road immediately east of the railway line.</p> <p><i>Construction issues:</i></p> <ul style="list-style-type: none"> <li>■ Longer crossing of the poorer quality soils on the Warrell Creek floodplain than the Orange and Purple options.</li> <li>■ Increased cost due to need to import material to construct embankment across the Warrell Creek floodplain.</li> <li>■ Would require high embankment (up to 15metres high) to cross Rosewood Road and Stony Creek.</li> </ul> <p><i>Social issues:</i></p> <ul style="list-style-type: none"> <li>■ Little change to existing noise levels at Warrell Creek village.</li> <li>■ Would require strip acquisition of farms to the east of the village.</li> </ul> <p><i>Access issues:</i></p> <ul style="list-style-type: none"> <li>■ Albert Drive would be severed by the upgrade north of the railway line.</li> </ul>

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Option	Description
	<ul style="list-style-type: none"> <li>■ Would include new arrangements to provide access to properties east of the upgrade at Warrell Creek village.</li> </ul> <p><i>Environmental issues:</i></p> <ul style="list-style-type: none"> <li>■ Less impact on high and very high quality habitat than Orange and Purple options.</li> </ul> <p><i>Preliminary cost (\$2006):</i> \$102 million</p>
Orange	<p>In the south, the Orange and Purple options are identical. They have been located to run generally along the boundaries of the farms to the east and south east of Warrell Creek village. In the north, the Orange Option would veer to the west of the Purple Option to pass under Rosewood Road before joining the Blue Option near Albert Drive.</p> <p><i>Construction issues:</i></p> <ul style="list-style-type: none"> <li>■ Shorter crossing of the poorer quality soils on the Warrell Creek floodplain than the Red and Blue options.</li> <li>■ Would pass under Rosewood Road.</li> </ul> <p><i>Social issues:</i></p> <ul style="list-style-type: none"> <li>■ Would reduce noise levels at Warrell Creek village.</li> <li>■ Would increase noise at a few farms to the east of Warrell Creek village.</li> <li>■ Would require strip acquisition of farms to the east of the village.</li> </ul> <p><i>Access issues:</i></p> <ul style="list-style-type: none"> <li>■ Albert Drive would be severed by the upgrade north of the railway line.</li> <li>■ Rosewood Road and Warrell Creek residents would continue to use the existing access arrangements.</li> </ul> <p><i>Environmental issues:</i></p> <ul style="list-style-type: none"> <li>■ Greater impact on high and very high quality habitat than Red and Blue options.</li> </ul> <p><i>Preliminary cost (\$2006):</i> \$91 million</p>
Purple	<p>In the south, the Orange and Purple options are identical. They have been located to run generally along the boundaries of the farms to the east and south east of Warrell Creek village. In the north, the Purple Option would pass under Rosewood Road and Albert Drive, to the west of Donnellyville, to rejoin the highway at McGraths Creek.</p> <p><i>Construction issues:</i></p> <ul style="list-style-type: none"> <li>■ Shortest crossing of the poorer quality soils on the Warrell Creek floodplain.</li> <li>■ Would pass under Rosewood Road.</li> </ul> <p><i>Social issues:</i></p> <ul style="list-style-type: none"> <li>■ Would reduce noise levels at Warrell Creek village.</li> <li>■ Would increase noise at a few farms to the east of Warrell Creek village.</li> <li>■ Would require strip acquisition of farms to the east of the village.</li> </ul> <p><i>Access issues:</i></p> <ul style="list-style-type: none"> <li>■ Albert Drive would continue to connect Warrell Creek village and Donnellyville.</li> <li>■ Rosewood Road and Warrell Creek residents would continue to use the existing access arrangements.</li> </ul> <p><i>Environmental issues:</i></p> <ul style="list-style-type: none"> <li>■ Greater impact on high and very-high quality habitat than Red and Blue options.</li> </ul> <p><i>Preliminary cost (\$2006):</i> \$88 million</p>



## Appendix C Draft Statement of Commitments

The draft statement of commitments has been presented with the project application and provides a base for the development of a statement of commitments during the environmental assessment process. The statement of commitments will be refined during the environmental assessment phase. In some cases, commitments stated here provide a management response to environmental issues identified in Table 6-6.

These commitments would be carried forward into the environmental assessment, which is yet to be completed. The activity, the Upgrade of the Pacific Highway from Warrell Creek to Urunga, will be considered under Part 3A of the *Environmental Planning and Assessment Act 1979*.

<b>This Statement of Commitments prevails in the event of any inconsistency with the requirements for the construction and operation of the Project arising out of the environmental assessment and submissions report.</b>		
	<b>Implementation plan and deliverables</b>	<b>Phase</b>
1.	<b>Desired environmental outcome – compliance and auditing</b> – To implement a system for audit and inspection that ensures the successful performance of environmental management plans and this statement of commitments.	
1.1	The RTA will carry out the Project consistent with: <ul style="list-style-type: none"> <li>a) the procedures, safeguards and mitigation measures identified in the environmental assessment as modified by the submissions report,</li> <li>b) additional measures identified in the submissions report,</li> <li>c) this Statement of Commitments,</li> <li>d) the conditions of approval.</li> </ul>	All
1.2	The RTA will notify in writing the Director-General, Department of Planning, relevant government departments and relevant councils of the start of the Project’s construction and operation. Such notification will be provided at least four weeks before the relevant start date unless otherwise agreed to by the Director-General, Department of Planning.	
1.3	The RTA will prepare a <b>pre-construction compliance report</b> and submit it to the Director-General, Department of Planning at least four weeks before construction commences (or within any other time agreed to by the Director-General, Department of Planning). The pre-construction compliance report will include: <ul style="list-style-type: none"> <li>a) details of how the conditions of approval and commitments required to be addressed before construction were complied with,</li> <li>b) the time when each relevant condition of approval or commitment was complied with, including dates of submission of any required reports and / or approval dates,</li> <li>c) details of any approvals or licences required to be issued by relevant government departments before construction commences.</li> </ul>	
1.4	The RTA will prepare and implement an audit and inspection plan. The audit and inspection plan may be incorporated in the construction environmental management plan.	All

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	Implementation plan and deliverables	Phase
1.5	<p><b>Construction compliance report</b></p> <p>The RTA will provide the Director-General, Department of Planning, relevant councils and any other relevant government department nominated by the Director-General Department of Planning with construction compliance reports. The construction compliance reports will include information on:</p> <ul style="list-style-type: none"> <li>a) compliance with the construction environmental management plan , the conditions of approval and relevant commitments,</li> <li>b) compliance with any approvals or licences issued by relevant government departments for construction,</li> <li>c) the implementation and effectiveness of environmental controls. The assessment of effectiveness should be based on a comparison of actual impacts against performance criteria identified in the construction environmental management plan,</li> <li>d) environmental monitoring results, presented as a results summary and analysis,</li> <li>e) the number and details of any complaints, including a summary of main areas of complaint, action taken, response given and intended strategies to reduce recurring complaints,</li> <li>f) details of any review and amendments to the construction environmental management plan resulting from construction during the reporting period,</li> <li>g) any innovations in construction methodology used to improve environmental management,</li> <li>h) the lessons learnt during construction, including recommendations for future activities,</li> <li>i) any other matter relating to compliance with the conditions of approval or as requested by the Director-General Department of Planning.</li> </ul> <p>The final construction compliance report must include a summary of all recommendations made under (h) in the previous compliance reports.</p>	Construction
1.6	<p>The RTA will prepare a <b>pre-operation compliance report</b> and submit it to the Director-General Department of Planning at least four weeks before operation commences (or within any other time agreed to by the Director-General Department of Planning). The pre-operation compliance report includes:</p> <ul style="list-style-type: none"> <li>a) details of how the conditions of approval and commitments required to be addressed before operation were complied with,</li> <li>b) the time when each relevant condition of approval or commitment was complied with, including dates of submission of any required reports and / or approval dates,</li> <li>c) details of any approvals or licences issued by relevant government departments for the Project's operation.</li> </ul>	Construction
1.7	<p>The RTA will submit an <b>environmental impact audit report - operations</b> to the Director-General Department of Planning a maximum 24 months after the Project begins operation and at any additional periods that the Director-General Department of Planning may require. The environmental impact audit report - operation will also be submitted to other relevant government departments upon the request of the Director-General Department of Planning.</p> <p>The environmental impact audit report - operation will:</p> <ul style="list-style-type: none"> <li>a) be certified by an independent person at the RTA's expense. The certifier's details will be provided to the Director-General Department of Planning before the environmental impact audit report – operation is prepared,</li> <li>b) compare the operation impact predictions made in the environmental assessment, submissions report and any supplementary studies with the actual impacts,</li> <li>c) assess the effectiveness of implemented mitigation measures and safeguards,</li> </ul>	Operation

	<b>Implementation plan and deliverables</b>	<b>Phase</b>
	<ul style="list-style-type: none"> <li>d) assess compliance with the systems for operation maintenance and monitoring,</li> <li>e) discuss the results of consultation with the local community particularly any feedback or complaints,</li> <li>f) be made publicly available.</li> </ul>	
2.	<b>Desired environmental outcome – environmental management:</b> To manage the potential environmental impacts of the Project in order to meet the requirements identified in the environmental assessment and submissions report.	
2.1	<p><b>Construction environmental management plan</b> The RTA will:</p> <ul style="list-style-type: none"> <li>a) prepare a construction environmental management plan construction environmental management plan consistent with the Department of Planning guidelines for construction environmental management plan preparation,</li> </ul>	Pre-construction
	<ul style="list-style-type: none"> <li>b) ensure that the mitigation measures identified in the environmental assessment, submissions report and this statement of commitments are incorporated into the construction environmental management plan. The construction environmental management plan will: <ul style="list-style-type: none"> <li>i. state how the mitigation measures identified in the submissions report will be implemented,</li> <li>ii. include a construction program, identifying construction activities and their location and timing,</li> <li>iii. cover any relevant environmental elements identified by the RTA, or its contractor, from their environmental due diligence investigations;</li> <li>iv. contain the construction sub plans required by these commitments,</li> <li>v. be prepared following consultation with relevant government departments and Nambucca and Bellingen Shire Councils,</li> <li>vi. be publicly available,</li> <li>vii. include a community consultation and notification strategy (including local community, relevant government departments, Nambucca and Bellingen Shire Councils and complaints management system,</li> <li>viii. include environmental management details such as: <ul style="list-style-type: none"> <li>- identification of statutory obligations which the RTA is required to fulfil during construction, including all approvals and licences,</li> <li>- an environmental management structure indicating the responsibility, authority and accountability for personnel relevant to the construction environmental management plan,</li> <li>- details of the construction personnel induction and training program,</li> <li>- emergency response procedures,</li> </ul> </li> <li>ix. include implementation details such as: <ul style="list-style-type: none"> <li>- identification of relevant environmental elements,</li> <li>- measures to avoid and/or control environmental impacts,</li> <li>- the tools to be used to implement the construction environmental management plan such as plans, schedules and work instructions,</li> </ul> </li> <li>x. include monitoring and review details such as: <ul style="list-style-type: none"> <li>- performance criteria,</li> <li>- performance monitoring methods,</li> <li>- auditing and corrective actions procedures,</li> <li>- contingency planning for potential exceedences of applicable criteria,</li> </ul> </li> </ul> </li> </ul>	Pre-construction

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	- construction environmental management plan review procedures.	
	c) obtain the Director-General, Department of Planning's approval for the construction environmental management plan before construction commences or within any other time agreed to by the Director-General Department of Planning.	Pre-construction
2.2	The RTA will: a) implement the construction environmental management plan in accordance with this statement of commitments and all relevant Acts and Regulations.	Construction
	b) periodically review the construction environmental management plan with the aim of continuous improvement.	Construction
3.	<b>Desired environmental outcome – communication and consultation.</b> To maintain clear and open communication with the local community and road users throughout all phases of the Project.	
3.1	<b>Community involvement plan</b> The RTA will: a) prepare a <b>community involvement plan</b> . The Plan will: i. include measures to meet the requirements of the Warrell Creek to Urunga Upgrade environmental assessment, ii. specifically address the requirements of the commitments for community liaison groups, complaints management and display centre(s), iii. include: - identification of the community likely to be affected by the Project including sensitive receivers and commercial and industrial land uses, - procedures for informing the local community of investigation and construction activities, - procedures for informing affected road users of temporary traffic changes, - identification of training needs for Proponent employees and contractors on implementing the community involvement plan.	Pre-construction
	b) provide a copy of the <b>community involvement plan</b> to the Director-General Department of Planning before construction commences.	Pre-construction
3.2	The RTA will form a <b>community liaison group</b> for the Project and ensure the first meeting is held prior to construction commencing.	Pre-construction

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3.3	<p>The RTA will:</p> <p>a) ensure that the local community and businesses are advised of construction activities that could cause disruption. Methods to disseminate this information will be identified in the construction environmental management plan. Information to be provided will include:</p> <ul style="list-style-type: none"> <li>i. details of any traffic disruptions and controls,</li> <li>ii. construction of temporary detours,</li> <li>iii. work approved to be undertaken outside standard construction hours, in particular noisy works, before such works are undertaken.</li> </ul> <p>b) establish a <b>Project internet site</b> before construction commences and maintain the internet site until construction ends. This internet site will contain:</p> <ul style="list-style-type: none"> <li>i. periodic updates of work progress, consultation activities and planned work schedules. The site will indicate the date of the last update and the frequency of the internet site updates,</li> <li>ii. a description of relevant approval authorities and their areas of responsibility,</li> <li>iii. a list of reports and plans that are publicly available under this approval and details of how these can be accessed,</li> <li>iv. contact names and phone numbers of relevant communications staff,</li> <li>v. the 24 hour toll-free complaints contact telephone number,</li> <li>vi. updates of work progress, construction activities and planned work schedules where significant changes in noise or traffic impacts are expected.</li> </ul>	<p>Construction</p> <p>Pre-construction</p>
3.3	<p>c) prepare a <b>construction complaints management system</b> as part of the <b>community involvement plan</b>, before construction commences and maintain the system for the duration of construction. The <b>construction complaints management system</b> will be consistent with AS 4269 "Complaints Handling" and include:</p> <ul style="list-style-type: none"> <li>i. a 24-hour, toll-free telephone number listed with a telephone company and advertised,</li> <li>ii. a system to receive, record, track and respond to complaints within a specified timeframe. When a complaint cannot be responded to immediately, a follow-up verbal response on what action is proposed will be provided to the complainant within two hours during night-time works and 24-hours at other times,</li> <li>iii. a process for the provision of a written response to the complainant within 10 days, if the complaint cannot be resolved by the initial or follow-up verbal response; and</li> <li>iv. a mediation system for complaints unable to be resolved.</li> </ul> <p>d) include information on all complaints received, including the means by which they were addressed and whether resolution was reached with or without mediation, in the construction compliance reports.</p>	<p>Pre-construction / Construction</p> <p>Pre-construction</p>

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	<b>Implementation plan and deliverables</b>	<b>Phase</b>
	<p>e) establish <b>display centre(s)</b>, staffed and maintained as identified in the <b>community involvement plan</b>. Where required, the display centre(s) may:</p> <ul style="list-style-type: none"> <li>i. provide facilities to enable members of the community to obtain information about the Project,</li> <li>ii. be open during times identified in the community involvement plan and advised to the community,</li> <li>iii. contain information (written and/or graphics) covering at least: <ul style="list-style-type: none"> <li>- construction activities and programs including temporary works that will affect Sensitive Receivers, commercial and industrial land uses, pedestrians and public transport users,</li> <li>- overall architectural and landscape designs with graphics, such as sections, sketches, perspective views etc, for key elements,</li> </ul> </li> <li>iv. provide a computer with internet access to the Project's internet site,</li> <li>v. provide a phone line that allows the community to contact the Proponent.</li> </ul> <p>f) <b>advertise in relevant newspapers</b> before construction commences, and then at maximum three-monthly intervals, the:</p> <ul style="list-style-type: none"> <li>v. nature of the works proposed for the next three months,</li> <li>vi. areas in which these works are proposed,</li> <li>vii. construction hours,</li> <li>viii. a contact telephone number.</li> </ul>	<p>Pre-construction / Construction</p> <p>All</p>
3.4	The RTA will consult property owners about implementing mitigation measures that affect their property. Mitigation measures will be implemented according to a program derived from that consultation, if consistent with the Conditions of Approval.	All
4.	<b>Desired environmental outcome – traffic and access:</b> To maintain access to property and maintain traffic movements on the road network through all phases of the Project.	
4.1	<p>The RTA will:</p> <p>a) prepare <b>pre-construction road dilapidation reports</b> for all roads likely to be used by construction traffic. These reports will be prepared before construction commences,</p>	Pre-construction
	<p>b) prepare <b>post construction road dilapidation reports</b> for the roads assessed prior to construction following the completion of construction by the RTA. Any damage resulting from construction, except that resulting from normal wear and tear, will be repaired at the RTA's cost. Alternatively, the RTA may negotiate an alternative arrangement for road damage with the relevant roads authority,</p>	Operation
	<p>c) provide copies of the dilapidation reports to the relevant roads authority.</p>	All
4.2	<p>The RTA will prepare a <b>construction traffic management sub-plan</b> as part of the <b>construction environmental management plan</b>. The sub-plan will include:</p> <ul style="list-style-type: none"> <li>a) measures to meet the requirements included in the Warrell Creek to Urunga Upgrade environmental assessment,</li> <li>b) identification of all public roads to be used by construction traffic, in particular roads proposed to transport large quantities of construction</li> </ul>	Pre-construction

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	<b>Implementation plan and deliverables</b>	<b>Phase</b>
	<p>materials. The expected timing and duration of road usage will be stated,</p> <p>c) management methods to ensure construction traffic uses identified roads,</p> <p>d) identification of all public roads that may be partially or completely closed during construction and the expected timing and duration of these closures. Consideration will be given to programming construction works to minimise road closures during peak hours and/or holiday periods,</p> <p>e) impacts on existing traffic (including pedestrians, vehicles, cyclists and disabled persons),</p> <p>f) temporary traffic arrangements including property access,</p> <p>g) access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads,</p> <p>h) a response plan for any construction traffic incident,</p> <p>i) monitoring, review and amendment mechanisms.</p>	
4.3	The RTA will implement the <b>construction traffic management sub-plan</b> .	Construction
4.4	<p>The RTA will:</p> <p>a) ensure that <b>access to properties</b> is maintained during construction and, where necessary and feasible, provide temporary alternative access,</p> <p>b) ensure that where any legal property access is permanently affected by the Project, that alternative access to an equivalent standard to and from a public road is provided where a property has no other legal means of access and where such alternative access is feasible and practical. Alternatively, where alternative access arrangements are not feasible or practical and a property is left with no access to a public road, ensure that negotiations are undertaken with the relevant property owner for the acquisition of the property in accordance with the provisions of the <i>Land Acquisition (Just Terms Compensation) Act 1991</i>.</p>	<p>Construction</p> <p>Construction</p>
4.5	The RTA will undertake the traffic monitoring required to meet the requirements set out in the Warrell Creek to Urunga Upgrade environmental assessment.	Operation
5.	<b>Desired environmental outcome – construction noise and vibration:</b> To manage noise and vibration generated during the construction and minimise the affects of construction noise and vibration on the community.	
5.1	<p>The RTA will:</p> <p>a) Consult with education institutions and minimise the impact of noise generated during construction works in their vicinity. The RTA will ensure that construction works audible at an institution are not timetabled during important events, such as examination periods, unless arrangements acceptable to the affected institutions are made at no cost to the affected institutions.</p>	Pre-construction



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	<p>b) prepare a <b>construction noise and vibration management sub plan</b>. The sub plan will be prepared in consultation with the Nambucca and Bellingen Shire Councils and the community liaison group and assign responsibility and timing of mitigation and monitoring measures. The Sub Plan will include:</p> <ul style="list-style-type: none"> <li>i. Noise and Vibration Management measures listed in the Warrell Creek to Urunga Upgrade environmental assessment,</li> <li>ii. an education program for construction personnel about noise minimisation,</li> <li>iii. identification of each construction activity, including ancillary facilities and their associated noise sources,</li> <li>iv. identification of all potentially affected sensitive receivers,</li> <li>v. the appropriate construction vibration criteria identified within these statement of commitments,</li> <li>vi. determination of appropriate noise and vibration objectives for each identified sensitive Receiver,</li> <li>vii. noise and vibration monitoring, reporting and response procedures,</li> <li>viii. assessment of potential noise and vibration from each construction activity including noise from construction vehicles and any traffic diversions,</li> <li>ix. a description of management methods and procedures and specific noise mitigation treatments that will be implemented to control noise and vibration during construction,</li> <li>x. justification for any activities outside the construction hours specified in the Statement of Commitments. This includes identifying areas where construction noise will not be audible at any sensitive receiver,</li> <li>xi. procedures for notifying residents of construction activities that are likely to affect their noise and vibration amenity,</li> <li>xii. contingency plans to be implemented in the event of non-compliances and/or noise complaints.</li> </ul>	
	<p>c) seek approval from Director-General Department of Planning for the construction noise and vibration management sub plan as part of the construction environmental management plan.</p>	Pre-construction
	<p>d) where reasonable and feasible, implement operation noise mitigation measures at the start of construction (or at other times during construction) to minimise construction noise impacts.</p>	
5.2	<p>The RTA will undertake <b>pre – construction noise monitoring</b> as required by the Noise and Vibration Management measures listed in the Warrell Creek to Urunga Upgrade environmental assessment.</p>	Pre-construction
5.3	<p>The RTA will:</p> <ul style="list-style-type: none"> <li>a) implement measures as identified in the <b>noise and vibration management sub-plan</b> to reduce noise impact of construction activities including blasting to nearby residences.</li> <li>b) ensure that public address systems used at any construction site are not used outside the normal construction hours listed in the Warrell Creek to Urunga Upgrade environmental assessment unless otherwise approved through the noise and vibration management sub plan. Public address systems will be designed to minimise noise spillage off-site.</li> </ul>	<p>Construction</p> <p>Construction</p>

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	<b>Implementation plan and deliverables</b>	<b>Phase</b>
5.3	<p>c) schedule rock breaking, rock hammering, sheet piling, pile driving and any similar activity only between the following hours unless otherwise approved in the noise and vibration management sub-plan:</p> <ul style="list-style-type: none"> <li>i. 9 am to 12 pm and 2 pm to 5 pm, Monday to Friday,</li> <li>ii. 9 am to 12 pm, Saturday.</li> </ul> <p>d) ensure that wherever practical and where sensitive receivers may be affected, driven piles are not used. If driven piles are required they will only be installed where approved in the <b>noise and vibration management sub-plan</b>.</p>	<p>Construction</p> <p>Construction</p>
5.3	<p>e) limit vibration caused by construction and received at any Structure outside the Project to the following unless, otherwise approved in the noise and vibration management sub plan:</p> <ul style="list-style-type: none"> <li>i. German Standard DIN 4150 Part 3 Structural Vibration in Buildings. Effects on Structures; and</li> <li>ii. the evaluation criteria presented in British Standard BS 6472 - Guide to Evaluate Human Exposure to Vibration in Buildings (1Hz to 80 Hz) for low probability of adverse comment.</li> </ul> <p>f) undertake <b>blasting</b> between the hours of 9:00 am and 3:00 pm, Monday to Friday and 9:00 am to 12:00 pm on Saturday, unless otherwise approved in the noise and vibration management sub plan.</p> <p>g) ensure that the <b>vibration level due to blasting activities</b> will meet the requirements of any relevant the DECC Licence. The guideline "Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration" prepared by the Australian and New Zealand Environment and Conservation Council (ANZECC) would generally apply to blasting.</p> <p>h) undertake <b>blasting trials</b> if blasting is to be used. Results from the trials will be used to determine site-specific blast designs that will enable the performance criteria specified in the construction <b>noise and vibration management sub-plan</b> to be satisfied.</p> <p>i) make all reasonable attempts to <b>contact sensitive receivers</b> located within 500 metres of a blast location. The contact will be made at least 48 hours before a blast and advice given to the receiver will include a schedule of blast time(s) and a telephone number and contact name.</p> <p>j) undertake the <b>noise monitoring</b> requirements as per the noise and vibration management measures listed in the Warrell Creek to Urunga Upgrade environmental assessment.</p>	<p>Construction</p> <p>Construction</p> <p>Construction</p> <p>Construction</p> <p>Construction</p> <p>Construction</p>

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	Implementation plan and deliverables	Phase
6.	<b>Desired environmental outcome – operational noise:</b> The RTA will design and construct operational noise treatments on the Warrell Creek to Urunga Upgrade to achieve the goals established in the NSW Government's "Environmental Criteria for Road Traffic Noise".	
6.1	<p>The RTA will:</p> <p>a) prepare an <b>operation noise management report</b> in consultation with the DECC, detailing the RTA's investigation of "Reasonable and Feasible" operation noise mitigation methods. The operation noise management report will:</p> <ol style="list-style-type: none"> <li>i. be prepared in accordance with the NSW Government's "<i>Environmental Criteria for Road Traffic Noise</i>" and the RTA's "<i>Environmental Noise Management Manual</i>",</li> <li>ii. use up to date traffic data for any modelling,</li> <li>iii. identify the operation noise criteria,</li> <li>iv. identify sensitive receivers,</li> <li>v. predict noise levels at all sensitive receivers,</li> <li>vi. detail "Reasonable and Feasible" noise mitigation measures, physical and managerial. An analysis for the entire Project will be undertaken in accordance with Practice Note IV of the RTA's "Environmental Noise Management Manual",</li> <li>vii. consider urban design issues relating to noise control measures,</li> <li>viii. identify which noise mitigation measures will be implemented, including their location, type and when they would be implemented,</li> <li>ix. detail noise monitoring, reporting and complaint response procedures.</li> </ol> <p>The noise mitigation measures identified in the Report will be selected in consultation with affected property owners.</p>	Construction
	b) obtain the approval of the Director-General Department of Planning for the operation noise management report prior to the commencement of construction or within any other time agreed to by the Director-General Department of Planning.	
	c) implement the requirements of the <b>operational noise management report</b> .	Construction / Operation
6.2	<p>The RTA will:</p> <p>a) undertake the monitoring of operation noise in accordance with Practice Note VIII of the RTA's ENMM.</p>	Operation
6.3	<p>b) assess the adequacy of the implemented traffic noise mitigation measures between six months and one year after opening the Project. Should the assessment indicate traffic noise levels exceeding those predicted in the <b>operation noise management report</b>, the RTA will</p> <ol style="list-style-type: none"> <li>i. advise the Director-General Department of Planning,</li> <li>ii. investigate and implement further "reasonable and feasible" mitigation measures in accordance with the NSW Government's <i>Environmental Criteria for Road Traffic Noise</i> and RTA's <i>Environmental Noise Management Manual</i>. The selection of these measures will be undertaken in consultation with affected property owners and be consistent with the operation noise management report.</li> </ol>	Operation

	Implementation plan and deliverables	Phase
7.	<b>Desired environmental outcome – flora and fauna:</b> To manage adverse impacts on native vegetation, fauna and their habitats, and threatened flora and fauna in accordance with the strategies contained in the environmental assessment.	
7.1	<p>The RTA will:</p> <p>a) prepare a <b>flora and fauna management sub-plan</b>. The sub plan will be prepared in consultation with relevant government departments, Nambucca and Bellingen Shire Councils and include:</p> <ul style="list-style-type: none"> <li>i. Flora and fauna mitigation measures listed in the Warrell Creek to Urunga Upgrade environmental assessment.</li> <li>ii. plans showing: <ul style="list-style-type: none"> <li>- terrestrial vegetation communities; important flora and fauna habitat areas; locations where threatened species, populations or ecological communities were recorded; and areas to be cleared. The plans will also identify vegetation adjoining the Project where this contains important habitat areas and/or threatened species, populations or ecological communities,</li> <li>- aquatic vegetation communities; important habitat areas; locations where threatened species, populations or ecological communities were recorded; and areas to be cleared. The plans will also identify vegetation adjoining the Project where this contains important habitat areas and/or threatened species, populations or ecological communities,</li> </ul> </li> <li>iii. methods to manage impacts on flora and fauna species (terrestrial and aquatic) and their habitat which may be directly or indirectly affected by the Project. These will include: <ul style="list-style-type: none"> <li>- procedures for vegetation clearing, soil management and managing other habitat damage (terrestrial and aquatic) during construction,</li> <li>- methods to protect vegetation both retained within and also adjoining, the Project from damage during construction,</li> <li>- a habitat tree management program including fauna recovery procedures and habitat maintenance (e.g. relocating hollows or installing nesting boxes),</li> <li>- methods to minimise damage to aquatic habitats,</li> <li>- where possible and where consistent with DECC or Department of Primary Industries Fisheries requirements, strategies for re-using in rehabilitation works individuals of any threatened plant species that would be otherwise be destroyed by the Project,</li> <li>- performance criteria against which to measure the success of the methods</li> </ul> </li> <li>iv. rehabilitation details including: <ul style="list-style-type: none"> <li>- identification of locally native species to be used in rehabilitation and landscaping works, including flora species suitable as a food resource for threatened fauna species,</li> <li>- methods to remediate affected aquatic habitats or fish passages,</li> <li>- the source of all seed or tube stock to be used in rehabilitation and landscaping works including the identification of seed sources within the Project. Seed of locally native species within the Project should be collected before construction commences to provide seed stock for revegetation,</li> <li>- methods to re-use topsoil (and where relevant subsoils) and cleared vegetation,</li> <li>- measures for the management and maintenance of all preserved, planted and rehabilitated vegetation (including aquatic vegetation),</li> </ul> </li> </ul>	Pre-construction

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	<b>Implementation plan and deliverables</b>	<b>Phase</b>
7.1	<ul style="list-style-type: none"> <li>v. a weed management strategy including:               <ul style="list-style-type: none"> <li>- identification of weeds within the Project and adjoining areas,</li> <li>- weed eradication methods and protocols for the use of herbicides,</li> <li>- methods to treat and re-use weed infested topsoil,</li> <li>- strategies to control the spread of weeds during construction,</li> </ul> </li> <li>vi. a program for reporting on the effectiveness of terrestrial and aquatic flora and fauna management measures against the identified performance criteria. Management methods will be reviewed where found to be ineffective.</li> <li>b) seek approval from the Director-General Department of Planning for the flora and fauna management sub plan.</li> <li>c) undertake the design and construction of bridges and culverts in consultation with the Department of Environment and Climate Change and Department of Primary Industries Fisheries as relevant. The consultation process and outcomes will be reported in the <b>pre-construction compliance report</b> or as otherwise agreed by the Director-General Department of Planning. The RTA will ensure the design and construction of bridges and culverts are consistent with Department of Primary Industries Fisheries Guidelines.</li> </ul>	<p>Pre-construction</p> <p>Pre-construction</p>
7.2	<p>The RTA will:</p> <ul style="list-style-type: none"> <li>a) implement all construction requirements of the <b>flora and fauna management sub-plan</b>.</li> <li>b) establish contractual systems for the construction contractor to conduct inspections and monitor compliance with plan requirements.</li> <li>c) conduct inspections as detailed in the Warrell Creek to Urunga Upgrade environmental assessment.</li> </ul>	<p>Construction</p> <p>Pre-construction</p> <p>Construction</p>
7.3	<p>The RTA will:</p> <ul style="list-style-type: none"> <li>a) implement post construction requirements of the <b>flora and fauna management sub-plan</b>.</li> <li>b) implement operation phase requirements included in the Warrell Creek to Urunga Upgrade environmental assessment.</li> </ul>	<p>Operation</p> <p>Operation</p>
8.	<p><b>Desired environmental outcome – Aboriginal heritage</b> – To manage adverse impacts on Aboriginal heritage in accordance with the strategies contained in the environmental assessment.</p>	

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	<b>Implementation plan and deliverables</b>	<b>Phase</b>
8.1	<p>The RTA will:</p> <p>a) Prepare a <b>cultural heritage conservation management plan</b>. The cultural heritage conservation management plan will be prepared following consultation with the local Aboriginal community and the Department of Environment and Climate Change. The cultural heritage conservation management plan will include the details of:</p> <ul style="list-style-type: none"> <li>i. The procedures that will be used when investigating potential archaeological deposits (PADs) and landforms of potentially high archaeological sensitivity (PAS) that may be impacted by the project,</li> <li>ii. The protocol that will be implemented should any human skeletal remains be encountered during construction works on the project,</li> <li>iii. Aboriginal heritage induction training strategy to be implemented for the project.</li> </ul>	Pre-construction
	<p>b) prepare an <b>Aboriginal heritage management sub-plan</b> as part of the construction environmental management plan. The RTA will consult with all relevant Aboriginal groups and the DECC when preparing the sub plan. The sub plan will include:</p> <ul style="list-style-type: none"> <li>i. Aboriginal heritage measures listed in the Warrell Creek to Urunga Upgrade environmental assessment,</li> <li>ii. details of the archaeological investigations to be undertaken and any associated licences or approvals required,</li> <li>iii. procedures for notification of Aboriginal groups prior to construction commencement to ensure attendance of qualified member of Aboriginal Groups where necessary during surface works,</li> <li>iv. procedures to be implemented if previously unidentified Aboriginal objects are discovered during construction,</li> <li>v. an education program for construction and project supervision personnel on their obligations for Aboriginal cultural materials,</li> <li>vi. those procedures detailed in the cultural heritage conservation management plan.</li> </ul>	Pre-construction
8.2	<p>The RTA will:</p> <p>a) implement the <b>Aboriginal heritage management sub-plan</b>.</p>	Construction
	<p>b) should it become aware of any unexpected Aboriginal heritage object(s) during the course of construction, immediately cease all work likely to affect the object(s) and inform the DECC in accordance with the <i>National Parks and Wildlife Act 1974</i>.</p>	Construction
9.	<b>Desired environmental outcome – non-Aboriginal heritage:</b> To manage adverse impacts on heritage items and structures in accordance with the strategies contained in the environmental assessment.	
9.1	<p>The RTA will:</p> <p>a) prepare a <b>non-Aboriginal heritage management sub-plan</b> as part of the construction environmental management plan. The sub-plan will be prepared in consultation with the Heritage Office, Nambucca and Bellingen Shire Councils and include:</p> <ul style="list-style-type: none"> <li>i. “European Heritage” measures listed in the Warrell Creek to Urunga Upgrade environmental assessment,</li> <li>ii. details of additional mitigation measures proposed to address impacts identified in statement of heritage impact prepared for impacted non-Aboriginal heritage items and sites,</li> <li>iii. details of any investigations to be undertaken and any approvals required,</li> <li>iv. procedures to be implemented if previously unidentified non-Aboriginal relics are discovered during construction,</li> <li>v. an education program for construction personnel on their obligations for non-Aboriginal relics.</li> </ul>	Pre-construction

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	<p>b) prepare statement of heritage significance for the following non-Aboriginal heritage items identified in the environmental assessment. The Statement of Heritage Significance will be prepared in accordance with the guideline <i>Assessing Heritage Significance</i> published by the NSW Heritage Office in 2001.</p> <ul style="list-style-type: none"> <li>i. Boulton Hotel, 7 River Road Macksville</li> <li>ii. Ferry/Punt crossing at the Boulton Hotel in Macksville</li> <li>iii. Post and rail fencing on Bellevue Drive west from the Caravan Park on the northern side of the road</li> <li>iv. Farm house at the junction of the Pacific Highway and the Old Coast Road, North Macksville</li> <li>v. Valla Gold Mine, Pacific Highway south of Mines Road</li> </ul>	Pre-construction
	<p>c) prepare <b>statement of heritage impact</b> for those non-Aboriginal heritage items which have been identified as having heritage significance and are likely to be directly impacted by the project. The statement of heritage impact will be prepared in accordance with the guideline Statements of Heritage Impact published on the NSW Heritage Office website.</p> <ul style="list-style-type: none"> <li>i. South Arm Road Scenic Road Landscape (Bellingen Local Environmental Plan ref 0298) forming the scenic road and landscape along the Kalang River.</li> </ul>	Pre-construction
9.2	<p>The RTA will:</p> <ul style="list-style-type: none"> <li>a) implement the non-Aboriginal heritage management sub plan.</li> </ul>	Construction
	<ul style="list-style-type: none"> <li>b) should it become aware of any unexpected non-Aboriginal heritage object(s) during the course of construction, immediately cease all work likely to affect the object(s) and inform the Heritage Council in accordance with the <i>Heritage Act 1977</i>.</li> </ul>	Construction
9.3	The RTA will implement "European Heritage" mitigation measures listed in the Warrell Creek to Urunga Upgrade environmental assessment.	Operation
10.	<b>Desired environmental outcome – soil and water management:</b> To manage soil and water impacts to achieve the objectives of Landcom's guideline "Managing Urban Stormwater - Soils and Construction" (2004), the Acid Sulphate Soils Manual (1998), the RTA's Code of Practice for Water Management (1999).	
10.1	<p>The RTA will prepare a <b>soil and water management sub plan</b> in consultation with relevant government departments, Nambucca and Bellingen Shire Councils as part of the construction environmental management plan. The sub-plan will:</p> <ul style="list-style-type: none"> <li>i. Include the hydrology, water quality and soil measures listed in the Warrell Creek to Urunga Upgrade environmental assessment;</li> <li>ii. where relevant, be consistent with the Landcom's guideline <i>Managing Urban Stormwater – Soils and Construction</i>, the RTA's <i>Guidelines for the Control of Erosion and Sedimentation in Roadworks</i> and the Department of Planning's <i>Constructed Wetlands Manual</i>;</li> <li>iii. identify the construction activities that could cause soil erosion or discharge sediment or water pollutants from the site,</li> <li>iv. describe management methods to minimise soil erosion or discharge of sediment or water pollutants from the site including a strategy to minimise the area of bare surfaces during construction,</li> <li>v. describe the location and capacity of erosion and sediment control measures,</li> <li>vi. identify the timing and conditions under which construction stage controls will be decommissioned,</li> </ul>	Pre-construction

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	<ul style="list-style-type: none"> <li>vii. include contingency plans to be implemented for events such as fuel spills,</li> <li>viii. identify how the effectiveness of the sediment and erosion control system will be monitored, reviewed and updated.</li> </ul>	
10.2	<p>The RTA will prepare an <b>acid sulphate soil management sub-plan</b> in consultation with relevant government departments as part of the construction environmental management plan. The sub plan will:</p> <ul style="list-style-type: none"> <li>i. be consistent with the “<i>Acid Sulphate Soils Manual</i>” (Acid Sulphate Soil Management Advisory Committee 1998) or update;</li> <li>ii. include a contingency plan to deal with the unexpected discovery of actual or potential acid sulphate soils; and</li> <li>iii. include a water quality monitoring program.</li> </ul>	Pre-construction
10.3	<p>The RTA will prepare a <b>spoil and fill management sub-plan</b> as part of the construction environmental management plan. The sub plan will include:</p> <ul style="list-style-type: none"> <li>i. the locations of major (defined as a volume greater than 500 cubic metres) spoil stockpiles,</li> <li>ii. the source of imported fill material and where it will be stockpiled and used,</li> <li>iii. methods to re-use or dispose excess or unsuitable spoil material including estimated volumes and disposal sites.</li> </ul>	Pre-construction
10.4	<p>The RTA will investigate the potential for changes in the <b>groundwater</b> table before any major earthworks (defined as a cut or fill area with depth or height exceeding five metres). Where a potential for change is identified the RTA will:</p> <ul style="list-style-type: none"> <li>i. assess the significance of the change and any resultant effects within and outside the road reserve; and</li> <li>ii. where necessary, design and implement measures to manage the changes. Management measures will be determined in consultation with the regional office of the Department of Water and Energy (previously the Department of Natural Resources).</li> </ul>	Pre-construction
10.5	<p>The RTA will implement a <b>water monitoring program</b> before construction in accordance with the Warrell Creek to Urunga Upgrade environmental assessment.</p>	Pre-construction
	<b>Implementation plan and deliverables</b>	<b>Phase</b>
10.6	<p>The RTA will ensure all operation stage controls for stormwater drainage and water pollution are located, designed, constructed, operated and maintained to meet the requirements of the RTA’s “<i>Code of Practice for Water Management – Road Development and Management</i>”. These controls will be designed in consultation with relevant government departments, Nambucca and Bellingen Shire Councils.</p>	All
10.7	<p>The RTA will:</p> <ul style="list-style-type: none"> <li>a) implement the <b>soil and water management sub plan</b>, the <b>acid sulphate soil management sub-plan</b> and the <b>spoil and fill management sub-plan</b>.</li> </ul>	Construction
	<ul style="list-style-type: none"> <li>b) consult an appropriately qualified soil conservationist according to a schedule identified in the soil and water management sub-plan to: <ul style="list-style-type: none"> <li>- undertake inspections of temporary and permanent erosion and sedimentation control devices,</li> <li>- ensure that the most appropriate controls are being implemented</li> <li>- check that controls are being maintained in an efficient condition,</li> </ul> </li> </ul>	Construction



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	- check that controls meet the requirements of any relevant approval and/or licence condition.	
	c) implement a monitoring program during construction in accordance with the Warrell Creek to Urunga Upgrade environmental assessment.	Construction
	d) report the results of inspections undertaken by the <b>soil conservator</b> and any follow-up actions in the construction compliance reports required by this statement of commitments	Construction
10.8	The RTA will: a) implement <b>operational water management controls</b> as listed in the Warrell Creek to Urunga Upgrade environmental assessment.	Operation
	b) implement a <b>maintenance and inspection program</b> for operational controls as listed in the Warrell Creek to Urunga Upgrade environmental assessment.	Operation
11.	<b>Desired environmental outcome – air quality:</b> To manage adverse air quality impacts on the community to meet air quality targets identified in the environmental assessment.	
11.1	The RTA will prepare an <b>air quality management sub-plan</b> as part of the construction environmental management plan. The sub plan will identify and include: a) the air quality mitigation measures listed in the Warrell Creek to Urunga Upgrade environmental assessment. b) potential sources of dust; c) dust management objectives consistent with the Department of Environment and Climate Change guidelines, d) a monitoring program to assess compliance with the identified objectives. Monitoring for dust deposition and particulate concentration will be undertaken according to the Department of Environment and Climate Change guideline “ <i>Approved Methods for Sampling and Analysis of Air Pollutants in New South Wales</i> ”, e) mitigation measures to be implemented, including measures during weather conditions where high level dust episodes are probable (such as strong winds in dry weather), f) a progressive rehabilitation strategy for exposed surfaces with the aim of minimising exposed surfaces.	Pre-construction
11.2	The RTA will: a) implement the <b>air quality management sub-plan</b> .  b) ensure that all plant and equipment used in connection with the Project are: i. maintained in a proper and efficient condition, ii. operated in a proper and efficient manner,  c) ensure that construction vehicles using public roads are maintained to prevent any loss of load, whether dust, liquid or soils. Facilities will be provided at exit points of all construction sites / compounds to minimise tracking mud, dirt or other material onto a public road or footpath. In the event of any spillage, the RTA will remove the spilled material as soon as practicable within the working day of the spillage,	Construction  Construction  Construction

	<b>Implementation plan and deliverables</b>	<b>Phase</b>
	d) implement a dust monitoring program in accordance with the Warrell Creek to Urunga Upgrade environmental assessment.	Construction
12.	<b>Desired environmental outcome – green house gases and energy:</b> To manage energy consumption and greenhouse gas generation during construction in accordance with the strategies contained in the environmental assessment.	
12.1	The RTA will: a) promote the reduction of greenhouse gases by adopting energy efficient work practices including: i. developing and implementing procedures to minimise energy use, ii. conducting awareness programs for all site personnel regarding energy conservation methods.  b) conduct energy audits during the Project to identify and address energy waste.	Pre-construction     Construction
12.2	The RTA will: a) use electrical energy derived from a renewable energy source accredited by the National Green Power Accreditation Steering Group (or equivalent) for the supply of at least 50 per cent of the on-site electrical energy requirements for the Project's construction unless otherwise agreed by the Director-General Department of Planning,  b) report on the power consumption (green power or other) in the construction compliance reports.	Construction    Construction
13.	<b>Desired environmental outcome – urban design and landscaping:</b> To minimise the visual impact of the Warrell Creek to Urunga Upgrade.	
13.1	<b>Urban design and landscape plan</b> The RTA will: a) prepare an <b>urban design and landscape plan</b> before construction commences in consultation with Nambucca and Bellingen Shire Councils and the community liaison group unless otherwise agreed to by the Director-General Department of Planning. The plan will present an integrated urban design for the Project, applying design principles established in the environmental assessment and this submissions report. The plan will include design treatments for: i. location and identification of existing vegetation and proposed landscaped areas, ii. built elements including retaining walls, bridges and noise walls, iii. pedestrian and cyclist elements including footpath location, paving types and pedestrian crossings, iv. fixtures such as seating, lighting, fencing and signs.	Pre-construction

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	<p>b) also include the following information in the plan:</p> <ul style="list-style-type: none"> <li>i. the visual and landscape measures listed in the Warrell Creek to Urunga Upgrade environmental assessment.</li> <li>ii. graphics for key elements such as sections, sketches, perspective views etc,</li> <li>iii. a schedule of species to be used in landscaping. The derivation of the schedule will be explained including its relationship with the Project's ecological studies,</li> <li>iv. details of the timing and progressive implementation of landscape works considering related environmental controls such as erosion and sedimentation controls and drainage,</li> <li>v. procedures and methods to monitor and maintain landscaped or rehabilitated areas both inside and outside the project.</li> </ul> <p><b>Implementation plan and deliverables</b></p>	<p>Pre-construction</p> <p><b>Phase</b></p>
	<p>c) obtain the approval of the Director-General Department of Planning for the urban design and landscape plan before construction commences or within any other time agreed to by the Director-General Department of Planning.</p>	<p>Pre-construction</p>
13.2	The RTA will implement the <b>urban design and landscape plan</b> .	Construction / Operation
13.3	The RTA will implement any required remedial measures to maintain landscaping works to the design standard established in the <b>urban design and landscape plan</b> .	Construction / Operation
13.4	The RTA will monitor and maintain landscape or rehabilitation works which, following construction, are not the responsibility of the RTA. The monitoring and maintenance will be carried out by a landscape specialist for a period of three years following completion of any landscaping stage or as otherwise identified in the urban design and landscape plan.	Construction / Operation
14.	<b>Desired environmental outcome – hazard and risk:</b> To manage potential for hazards and reduce the risks associated with the Project.	
14.1	<p><b>Hazard and risk management sub plan</b></p> <p>The RTA will prepare hazards and risk management sub plan as part of the construction and operation environmental management plans. The sub plan will include:</p> <ul style="list-style-type: none"> <li>i. the hazard and risk measures listed in the Warrell Creek to Urunga Upgrade environmental assessment.</li> <li>ii. details of the hazards and risks associated with the Project; and</li> <li>iii. mitigation measures including contingency plans.</li> </ul>	Pre-construction / Construction
14.2	The RTA will implement the <b>hazard and risk management sub plan – construction</b> .	Construction
14.3	The RTA will implement the <b>hazard and risk management sub plan – operation</b> .	Operation
15.	<b>Desired environmental outcome – waste</b> – To manage waste in accordance with the principles of the waste management hierarchy referred to in the <i>Waste Avoidance and Resource Recovery Act 2001</i> and the NSW Government's Waste Reduction and Purchasing Policy.	

	<b>Implementation plan and deliverables</b>	<b>Phase</b>
15.1	<p><b>Waste management and re-use sub-plan</b></p> <p>The RTA will prepare <b>waste management and re-use sub plan(s)</b>. The sub plan(s) will address the management of wastes during the construction and operation stages respectively in accordance with the NSW Government's Waste Reduction and Purchasing Policy. The sub plan(s) will identify requirements for:</p> <ul style="list-style-type: none"> <li>a) all waste measures contained in the Warrell Creek to Urunga Upgrade environmental assessment,</li> <li>b) the application of the waste minimisation hierarchy principles of avoid / reduce / re-use / recycle / dispose,</li> <li>c) waste handling and storage,</li> <li>d) disposal of wastes; specific details will be provided for cleared vegetation, contaminated materials, glass, metals and plastics, hydrocarbons (lubricants and fuels) and sanitary wastes,</li> <li>e) any waste material that is unable to be re-used, re-processed or recycled will be disposed at a facility approved to receive that type of waste.</li> </ul>	Pre-construction / Construction
	<b>Implementation plan and deliverables</b>	<b>Phase</b>
15.2	<p>The RTA will:</p> <ul style="list-style-type: none"> <li>a) implement the <b>waste management and re-use sub-plan – construction</b>.</li> <li>b) ensure that the re-use of material generated from construction is maximised in preference to importing fill. All material excavated from construction will be re-used or recycled unless otherwise approved in the <b>spoil and fill management sub-plan</b>.</li> </ul>	Construction Construction
15.3	The RTA will implement the <b>waste management and re-use sub-plan – operation</b> .	Operation
16.	<b>Miscellaneous issues</b>	
	<b>Utilities and services</b>	
16.1	The RTA will identify the utilities and services (hereafter "services") potentially affected by construction to determine requirements for diversion, protection and/or support. Alterations to services will be determined by negotiation between the RTA and the service providers. The RTA in consultation with service providers will ensure that disruption to services resulting from the Project are minimised and customers advised of any disruptions.	Pre-construction / Construction
16.2	<p><b>Ancillary construction facilities</b></p> <p>The RTA will:</p> <ul style="list-style-type: none"> <li>a) ensure that the sites for ancillary construction facilities will satisfy the following location criteria unless otherwise approved through the <b>construction environmental management plan</b>: <ul style="list-style-type: none"> <li>i. be located within the Project or in the location/s identified in the Warrell Creek to Urunga Upgrade environmental assessment,</li> <li>ii. be assessed against the location criteria contained in the Warrell Creek to Urunga Upgrade environmental assessment,</li> <li>iii. be located to minimise the need for heavy vehicles to travel through residential areas,</li> <li>iv. be located above the 20 average recurrence interval (ARI) flood level unless a contingency plan to manage flooding is prepared and implemented,</li> <li>v. not affect the land use of adjacent properties.</li> </ul> </li> </ul>	Pre-construction

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	<b>Implementation plan and deliverables</b>	<b>Phase</b>
	b) ensure that the locations of the ancillary construction facilities are identified in the <b>construction environmental management plan</b> and include an analysis against the above criteria. Where these criteria cannot be met the <b>construction environmental management plan</b> will contain details of the environmental management measures implemented to address potential impacts from the ancillary construction facility's construction or operation.	Pre-construction
	<b>Property impacts</b> The RTA will reinstate a water supply of equivalent quality and quantity where a licensed bore, dam or other property water supply is adversely affected by the Project or alternatively negotiate compensation for the loss with the landowner.	All