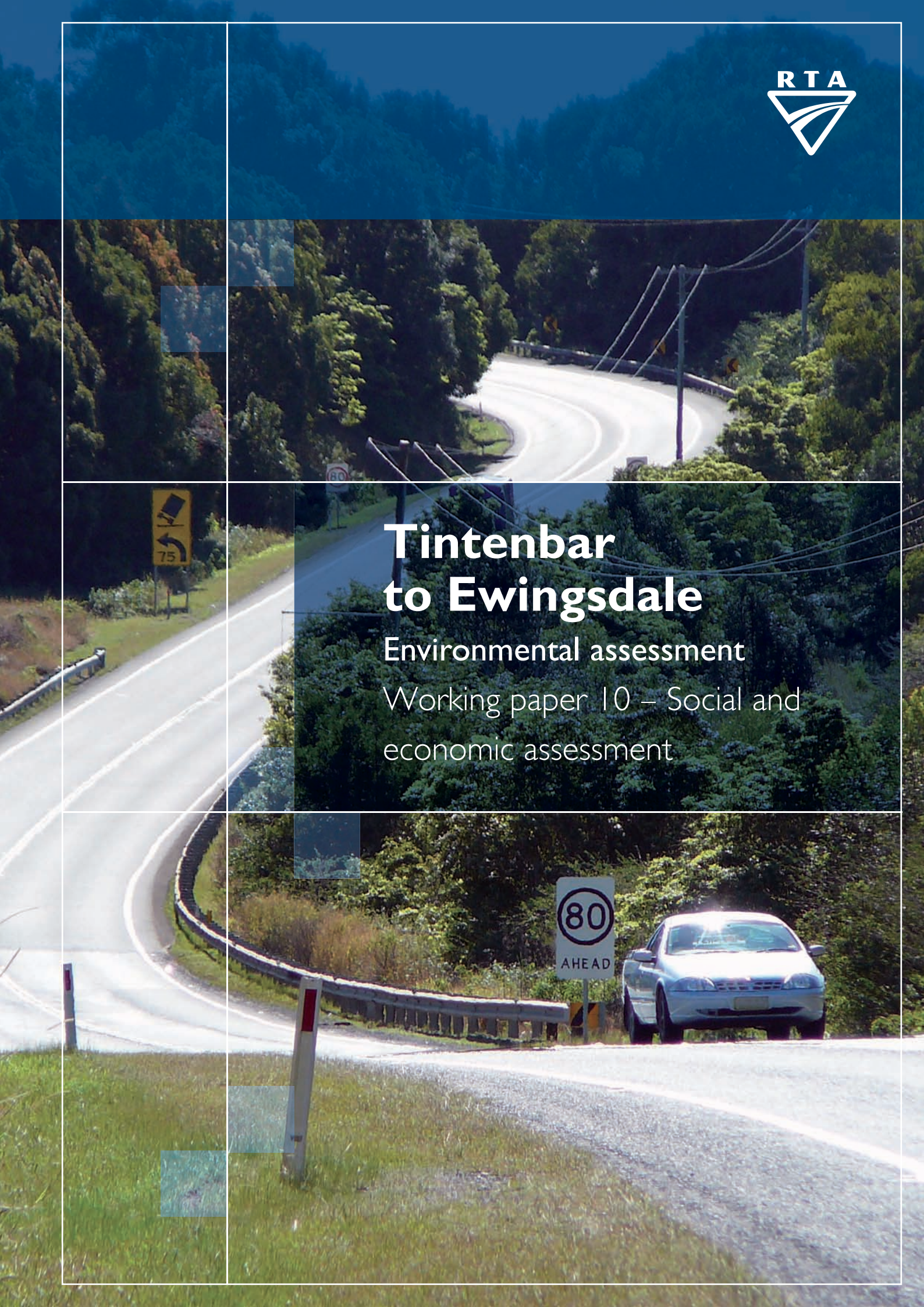




Tintenbar to Ewingsdale

Environmental assessment

Working paper 10 – Social and
economic assessment



Roads and Traffic
Authority

**Tintenbar to
Ewingsdale Pacific
Highway Upgrade**

Working Paper 10 -
Social and Economic
Assessment

June 2008

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This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party

Contents

	Page	
1	Introduction	1
	1.1 Project description	1
	1.2 Methodology	2
	1.3 Assumptions	3
	1.4 Scope of this report	4
	1.5 Study team	4
2	Existing characteristics	7
	2.1 Introduction	7
	2.2 Social characteristics	7
3	Key Demographic Characteristics	10
	3.1 Economic characteristics	12
	3.2 Land use and growth trends	14
	3.3 Tourism	23
4	Consultation	25
	4.1 Overview	25
	4.2 Key stakeholder issues	25
5	Impact Assessment	26
	5.1 Introduction	26
	5.2 Impacts related to property acquisition	26
	5.3 Impacts on community services and facilities	27
	5.4 Impacts on connectivity and contiguity	28
	5.5 Impacts on safety	29
	5.6 Impacts on amenity	30
	5.7 Impacts on the objectives of the Far North Coast Regional Strategy	32
	5.8 Impacts on the agriculture sector	34
	5.9 Regional impacts on the tourism sector	36
	5.10 Impacts on local businesses	37
	5.11 Economic impacts from construction	39
6	Summary / Recommendations	40
7	References	43

Tables

Table 1	Population within CCDs Covering the Pacific Highway upgrade area
Table 2	Land Use Classes (as shown in Figures 4 to Figure 6)
Table 3	Top three community responses to very important and not important issues
Table 4	Number of dwellings within 50 m, 150 m and 250 m of the proposed upgrade

Table 5	Foregone production for annual agricultural gross margin
Table 6	Summary of business impacts in adjacent towns and villages
Table 7	Assessment summary

Figures

Figure 1	The proposed upgrade
Figure 2	Community facilities inventory map
Figure 3	2006 Census Local Populations
Figure 4	Land use on affected properties (1 of 3)
Figure 5	Land use on affected properties (2 of 3)
Figure 6	Land use on affected properties (3 of 3)
Figure 7	Zonings within Byron Shire Council and Ballina Shire Council areas.
Figure 8	Identifies the urban footprint, employment lands and future release areas as depicted in the <i>Far North Coast Regional Strategy</i> .

Appendices

Appendix A

Demographic Analysis

Appendix B

Gross Margins

1 Introduction

1.1 Project description

Below is a brief description of the proposed upgrade between Tintenbar and Ewingsdale.

The length of the proposed upgrade would be approximately 17 km starting at Ross Lane in Tintenbar and extending to the north to the existing Ewingsdale interchange, near the settlement of Ewingsdale. At Ross Lane, the proposed upgrade would connect to the north end of the proposed Ballina bypass. Generally the proposed upgrade would be in close proximity to existing highway corridor from Ross Lane to the Bangalow bypass. The existing highway would be maintained for local and regional traffic.

From Bangalow, the proposed upgrade would diverge away from the Bangalow bypass to the northeast through Tinderbox valley. From there, the proposed upgrade would avoid the steep grades of St Helena Hill by way of a tunnel approximately 340 m long and 45 m below the ridge line. North of the tunnel, the proposed upgrade alignment is located immediately to the east of the existing highway before tying into the Ewingsdale interchange.

The general features of the proposed upgrade would be:

- Four-lane divided carriageways (two lanes in each direction), with a wide median allowing for the future addition of a third lane in each direction.
- Connection to the northern end of the Ballina bypass at the proposed Ross Lane interchange. A new northbound on-ramp and a new southbound off-ramp would be provided. The remainder of this interchange will be constructed as part of the Ballina bypass project.
- Upgrading of the existing Ewingsdale interchange to provide full access between the modified local and regional road network and the highway.
- A half interchange at Ivy Lane. North-facing ramps would provide access between the local road network and the proposed upgraded highway to the north.
- A half interchange at Bangalow. South-facing ramps would provide access between the local road network, including to Bangalow and Lismore, and the proposed upgrade to the south. This arrangement would replicate the arrangement with the existing Bangalow bypass which also has south-facing ramps only.
- Six twin bridges and four underpasses allowing roads and creeks to pass underneath the proposed upgrade. These would include twin bridges above Byron Creek and the existing Casino-Murwillumbah railway on the north side of Byron Creek.
- Two bridges carrying local roads over the proposed upgrade, one for Broken Head Road and one about 500 m north of Lawlers Lane providing access to several properties east of the upgrade. Protection screens would be provided on both bridges.
- Signage providing clear directions for traffic at the Ross Lane, Ivy Lane, Bangalow and Ewingsdale interchanges.
- Sedimentation basins to intercept run-off for treatment before discharging into the natural watercourses.
- Medians and outer verges, including safety barriers where required.
- Relatively flat gradients compared to the existing highway, with the maximum grade just south of Bangalow being approximately 5.4 per cent over 1300 metres. There would also be a 4.4 per cent grade over almost 2 km on the north side of the tunnel. An additional southbound climbing lane would be provided in both sections so that slow moving trucks would not be a significant safety hazard to other vehicles.
- The existing highway would be retained as a continuous road for local and regional traffic. It is further anticipated that between Ross Lane and Bangalow the existing

highway would be handed over to the councils. Between Bangalow and Ewingsdale the existing highway would continue to function as a regional link between Lismore/Bangalow and the north and would be retained by RTA.

- Two significant diversions of the existing highway are proposed to retain it as a continuous local road. The first is just north of Emigrant Creek where the existing highway would be diverted underneath the bridge taking the proposed upgrade over Emigrant Creek. The other diversion is where the existing highway south of the Ewingsdale interchange is being diverted to a roundabout on the western side of the interchange.
- Additional local roads and property access would be provided including:
 - safe access to all properties affected by the proposed upgrade, either directly to the existing highway or indirectly via a new local access road.
 - new local roads as required to link the proposed interchanges with the existing highway and other local access roads.
- The proposed upgrade would incorporate twin parallel tunnels under St Helena ridge. The tunnels would each be about 340 m long and about 45 m below St Helena Road. One tunnel would be provided for each carriageway, separated by a rock pillar. The northbound tunnel would be 11.5 m wide between barriers, providing sufficient width for linemarking as 3 lanes in each direction if required in the future. The southbound tunnel would be 12.5 m wide to incorporate the southbound climbing lane while still allowing 1 m wide shoulders on each side. In view of the additional southbound lane proposed initially, there is no provision for adding an additional lane to the southbound carriageway through the tunnel. The precise dimensions of the tunnel may be modified slightly during detailed design.
- Intersections and interchanges designed to achieve at least a level of service C, 20 years after opening for the 100th highest hourly volume.

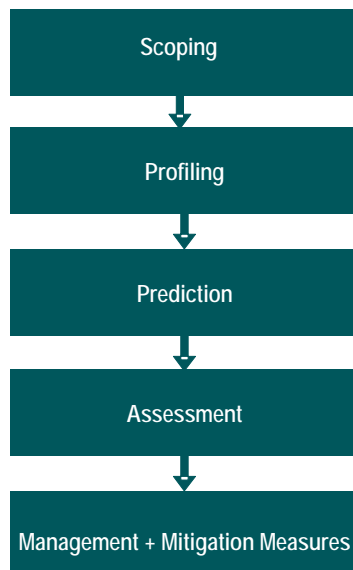
1.2 Methodology

This social and economic assessment seeks to identify the potential impacts arising as a result of the proposed upgrade.

Social impacts have been defined by the *NSW Office of Social Policy (1995)* as significant events experienced by people as changes in one or all of the following:

- People's way of life – how they live, work, play and interact with one another on a day to day basis.
- Their culture – shared beliefs, customs and values.
- Their community – its cohesion, stability, character, services and facilities.

An analysis of the social impacts and changes likely to occur as a result of the proposed upgrade has been undertaken in regard to the methodology established by the NSW Department of Urban Affairs and Planning's (now DoP) *EIS Guidelines* and included the following:



Economic impacts can be measured with a range of indicators and at various scales. Cost benefit analysis and its various derivatives are commonly used to assess the potential change in the wellbeing of the nation as a whole arising from a large public investment such as a road. This form of analysis would acknowledge the net costs and benefits to various sectors, be they local or non-local. Other forms of analysis include the consideration of change in regional income (or Gross Regional Product). These can be focused on a specific groups within a community that may be affected more, or more directly, than others and then applied to a regional economic model to consider the total regional impact after considering household and commercial flow on effects. This later approach was used to assess the impacts of the pacific highway upgrade on the agriculture sector and adjacent businesses. Importantly, such regional analyses are bound to the region and do not take account of net costs and benefits to the nation as a whole or to other directly affected businesses within the region, such as those that would benefit from improved transport infrastructure or expenditures arising from its construction and maintenance.

1.3 Assumptions

The following assumptions have been made:

- The community profile has been based on data from the 2006 Census of Population and Housing produced by the Australian Bureau of Statistics (ABS). Ballina Shire Council's Local Environment Plan (LEP) discussions papers addressing key issues such as population, culture and society, industry and commerce and community facilities and services and details from Byron Shire Council's LEP studies were not available at the time of writing this assessment.
- Social and economic issues are often considered throughout this assessment on a more regional level of the Ballina – Byron shires. The context of the proposed upgrade and its surrounds is shown on **Figure 1**.

- The regional economic assessment of the highway upgrade was limited to direct impacts on the agricultural sector from reductions in land available for cropping and grazing. Flow on effects, and the net total impact on the regional economy, was assessed using the Tweed Economic Development Corporation's tailored input-output model for the Byron-Ballina region. The assessment of regional economic impacts for this current assessment assumes that a direct gross margin impact of the same order of magnitude as a direct regional gross regional product would have a similar total effect on regional gross regional product.

1.4 Scope of this report

This social and economic assessment supports the environmental assessment report and provides background information and detailed analyses in the areas of social and economic issues. Closely related to this paper is *Working Paper 07 - Land Use and Property Assessment* (June 2008) prepared by Hassall and Associates which gives greater consideration to impacts on agricultural land.

A number of key issues were identified in the Director General's environmental assessment requirements. This report addresses the following environmental assessment requirements:

- Local community socio-economic impacts associated with land use, property and amenity related changes.
- Business (including agricultural producers) impacts on a case by case basis including impacts to the overall viability, profitability, productivity and sustainability of businesses.
- Regional economic impacts to the tourism sector taking into account agri-tourism impacts and impacts to local amenity, character and scenery.
- Consideration of project impacts on the attainment of the objectives of the Far North Coast Strategy.
- Impacts to the connectivity and contiguity of small settlements including Knockrow and Newrybar.

This impact assessment report includes the following:

- Overview of the baseline conditions in regard to social characteristics, economic characteristics, land use and growth trends and tourism.
- A summary of consultation activities.
- Assessment of the socio-economic impacts of the proposed upgrade including responding to the Director General's environmental assessment requirements and mitigation measures.
- Summary and recommendations.

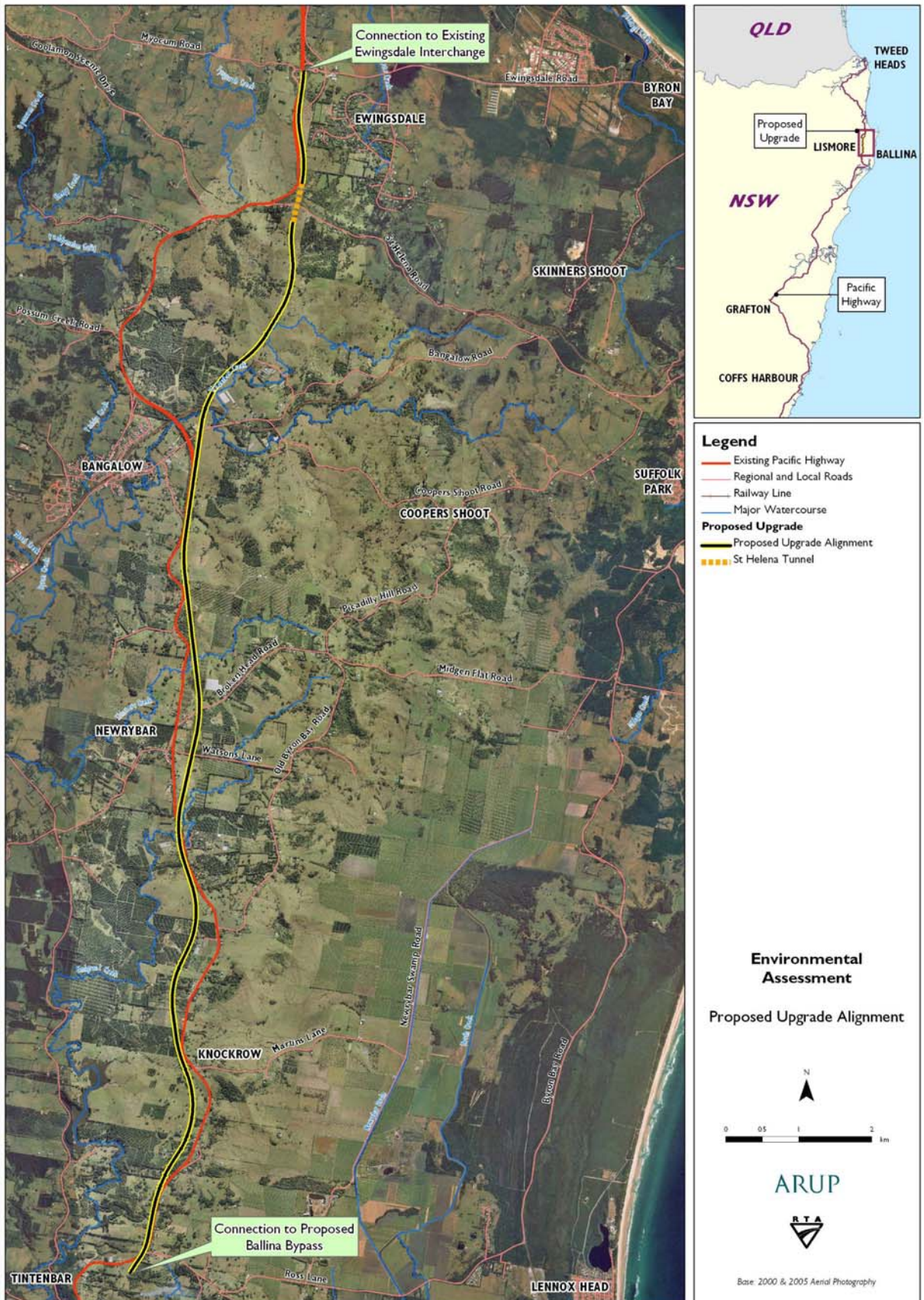
1.5 Study team

This socio-economic assessment has been prepared by Arup and Hassall & Associates. Given the broad nature of social and economic issues and their interrelationships with other issues, reference has been made to a number of other studies that have been undertaken as part of this project. Arup and Hassall & Associates have had access to the final reports of those listed to ensure consistency and up to date reliable information sources. Specifically, the findings of the following reports and correspondence have been considered and aspects have been incorporated in the preparation of this document:

- *Working Paper 06 - Traffic and Transport Assessment* (June 2008), Arup.
- *Working Paper 07 - Land Use and Property Assessment* (June 2008), Hassall & Associates

- *Working Paper 08 - Noise and Vibration Assessment* (June 2008), Arup
- *Working Paper 09 - Heritage Assessment* (June 2008), Navin Officer Heritage Consultants.
- *Working Paper 11 – Urban Design, Landscape and Visual Assessment* (June 2008), Spackman & Mossop.
- *Working Paper 12 Air Quality Assessment* (June 2008), Holmes Air Sciences.
- *Working Paper on Agricultural Considerations for Route Options* (August 2006), Hassall & Associates.
- *Working Paper on Regional Economic Impacts of Changes in Agricultural Land Use* (August 2006), Hassall & Associates.
- *Land Use, Planning and Socio-Economic Working Paper* (August 2006), Arup, Hassall & Associates, and Walsh EMS Pty Ltd.

Figure 1 The proposed upgrade



2 Existing characteristics

2.1 Introduction

Baseline conditions relevant to the Ballina and Byron shires have been compiled under the following categories:

- Social characteristics (demographic profile, community issues and attitudes, community facilities).
- Economic characteristics (labour force, agricultural industry).
- Land use and growth trends (existing and planned land use, zoning, growth trends and issues).
- Tourism.

2.2 Social characteristics

2.2.1 Overview

The proposed upgrade lies partly within both the local government areas (LGAs) of Ballina (southern half) and Byron (northern half). The pattern of land use in the general area of the proposed upgrade is a direct response to the physical features of the local and regional area (including climate, topography, hydrology, soils and vegetation). Land use is a mix of rural, rural residential and urban, however, the dominant land use is agriculture, including a range of horticulture production types, sugar cane and beef cattle grazing.

The main urban centres are the township of Bangalow, the village of Newrybar and the Ewingsdale residential area. There are rural residential clusters across the area as well as individual rural residential allotments located among larger rural land holdings. There are a number of community facilities such as schools, places of worship, local halls and a cemetery which tend to be co-located within existing urban areas (illustrated in Figure 2). Services infrastructure, while not occupying extensive land areas, is a key support system to land uses and includes the Rous Water supply network and Country Energy substations.

The community structure in the rural areas is a diverse mix of people including families who have been in the area for generations as well as more recent arrivals that have come to the area for commercial and/or lifestyle reasons. There is a strong interest in both environmental and development issues in the region. The interface between the two areas of interest, coupled with increasing property prices and a desire to protect and enhance the existing high levels of amenity, has resulted in a local population that is very involved in local matters.

Both Ballina and Byron shires are experiencing substantial social and economic change along with other areas of the Northern Rivers, defined by Northern Rivers Regional Development Board (NRRDB) as the area stretching from southern end of the Clarence Valley to the Queensland border and west to the Great Dividing Range. These changes are due to:

...population shifts, global competition and industry restructuring. The rapid increase in the region's population, together with changing land use is impacting on the Northern Rivers' natural environment, on infrastructure requirements of the region and on the business and industry needs of the future (NRRDB, 2003).

The region's population has grown by 17 per cent in the last 10 years which equates to 1.6 per cent compound annual growth (NRRDB, 2003). Both Ballina and Byron shires are experiencing rapid population growth and for the period 1991 to 2001, Ballina and Byron shires experienced 2.14 per cent and 2.86 per cent annual compound population growth respectively.

Between the 1996 and 2001 censuses, Ballina and Byron shires' population growth was 7.3 per cent and 9.7 per cent respectively. In addition Byron Bay has been labelled a 'baby boomer' town with a higher proportion of 'boomers', those born between 1946 and 1961, than any other town in Australia (Salt, 2004).

As described in the Byron Shire Social Plan (2004), the community is well known for being committed to community action to meet local needs. It is also characterised by alternative lifestyles¹, which have created a unique coastal rural area. There is a great deal of community cohesion as demonstrated by the sense of belonging to the far north coast, commitment to the community as evidenced by the level of community interaction and number of community groups, local participation (both within formal and informal networks and demonstrated during the consultation exercise for this project) and an affiliation with the identity of the local area.

With the increasing popularity of this region as a tourist destination², particularly Byron Bay, and improved access to the region through road upgrade projects, the wider North Coast region is expected to gain economic benefits. Demographic and social issues facing the region include rapid population growth, socio-economic disadvantage in terms of labour force and affordable housing and tourist influx (Byron Shire Council, 2004). According to the Ballina Shire Council Social Plan (2004), Ballina Shire is facing similar social and economic issues such as shortage of labour force and affordable housing, which is common to all expanding coastal areas in the region.

Data from the 2001 Census of Population and Housing (ABS) was analysed to provide an overview of the demographic structure of the proposed upgrade area (see Appendix A). As shown in Table 1 there are eight Census Collection Districts (CCDs) of interest (Figure 3).

Table 1 Population within CCDs Covering the Pacific Highway upgrade area

Census Collection District	Total persons	
	Number	Percentage
Within Byron Shire		
1071003	236	7.0
1071007	275	8.1
1071101	586	17.3
1071102	427	12.6
1071114	305	9.0
Subtotal	1829	54.0
Within Ballina Shire		
1071203	441	13.0
1071801	581	17.1
1071802	538	15.6
Subtotal	1560	46.0
Total	3389	100.0

Source: ABS 2006

Figure 2 Community facilities inventory map

¹ Alternative lifestyles are largely associated with a degree of self-sufficiency and rural lifestyle through to the more recent sea / tree change phenomenon.

² Drivers for tourism within the Northern Rivers are associated with the area's perception of being 'clean, unspoilt, underdeveloped, uncomplicated and uncrowded' (Draft Strategic Plan for the Rainforest Way as cited in Ballina Strategic Tourism Plan (2005))

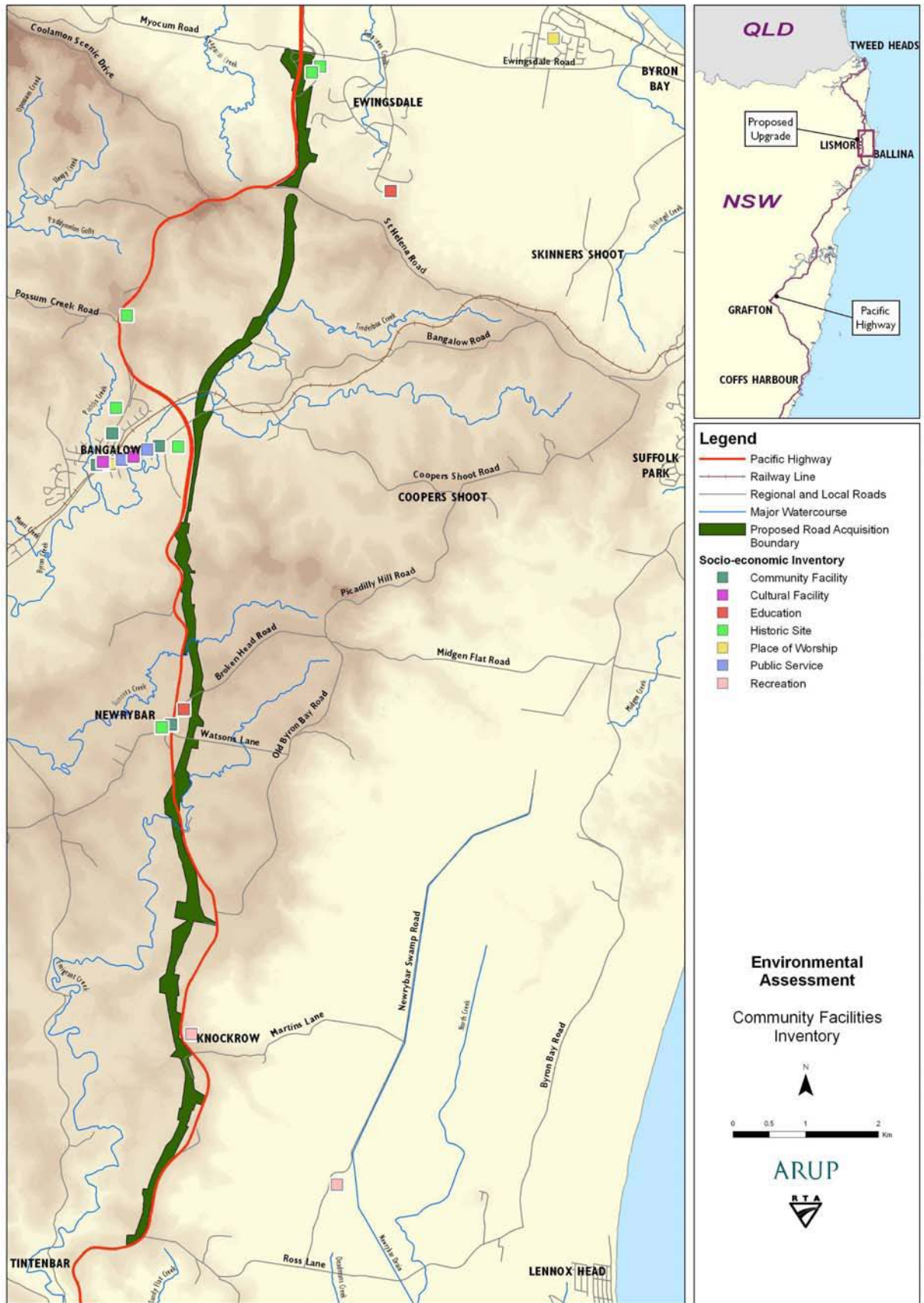


Figure 3 2006 Census Local Populations



3 Key Demographic Characteristics

The key demographic characteristics of the eight census collection districts affected by the proposed upgrade area are as follows:

- Within CCDs, there was a total **population** in 2006 of 3,389 persons with almost 55 per cent located within the northern half (within Byron Shire) and the remaining 45 per cent in the southern half (within Ballina Shire).
- The **age structure** of the population within the proposed upgrade area's CCDs was more closely aligned with the younger age of Byron Shire than with the older age structure of Ballina Shire. The age structure was fairly similar to the State average.
- There was only 0.9 per cent of the population that identified themselves as **indigenous**. This was lower than the proportions recorded in Ballina (2.7 per cent) and Byron (1.5 per cent) as well as the region (3.3 per cent) and the State (2.1 per cent).
- Within the eight CCDs, approximately 50 per cent of the **employed labour force** worked full time and 38 per cent part time. There is also a high level of unemployment and underemployment in both LGAs.
- Within the eight CCDs, the largest **industry occupational category** was the health care and social assistance sector (11.0 per cent) followed by retail trade (10.8 per cent), agriculture, forestry and fishing (10.0 per cent) and construction and accommodation and food services (both 9.6 per cent). This industry breakdown indicates both the important role of agriculture in the study area as well as job opportunities in the retail and service sectors located in nearby towns such as Byron Bay, Ballina and local townships.
- The proportion of couple **families** with children was 43.9 per cent for the CCDs which is close to the NSW average (46.2 per cent) and higher than both Ballina and Byron shires (37.7 per cent and 29.1 per cent respectively). One parent families in the eight CCDs (15.9 per cent) were similar to levels in Ballina (17.1 per cent) and NSW generally (16.1 per cent) but lower than in Byron (23.7 per cent) and Richmond Tweed (19.0 per cent).
- For **weekly household incomes** in the eight CCDs, the largest proportion of households in the study area (13.0 per cent) had a weekly household income of \$500-\$600. This is similar to Ballina Shire, Byron Shire, and the Richmond/Tweed district where the largest proportion of households also received a weekly household income of \$500 - \$600.
- The population in the eight CCDs and both Ballina and Byron generally had marginally higher levels of **educational attainment** in the bachelor degree and above categories than in the Richmond Tweed region or in the state overall.
- As would be expected in a rural area, **car ownership** levels (especially more than one car per dwelling) in the CCDs are generally higher than the rates recorded at the LGA, regional and state levels. Less than 5 per cent of dwellings in the eight CCDs did not have a motor vehicle. This reflects the lack of public transport generally available in rural areas and thus the higher reliance on private motor vehicle transport especially for journey to work travel.

3.1 Economic characteristics

3.1.1 Regional context

Approximately 1 in 8 working people on the North Coast are employed in primary production (NSW Department of Primary Industries, 2006). The North Coast region is defined by NSW DPI as all of the Tweed, Brunswick, Richmond, Bellinger, and Nambucca catchments, most of the Hastings catchment and large parts of Clarence and Macleay catchments. It also comprises the eastern half of the Northern Rivers Catchment Management Area, which extends westward across the New England Tableland to the Great Divide. Farm gate value of agricultural production on the North Coast is in excess of \$1 billion per annum, rising to about \$2 billion when processing is included, particularly in the agricultural and forest industries (NSW DPI, 2006).

Eight per cent of Northern Rivers residents, in the catchment areas of the Clarence, Richmond and Tweed Rivers, are employed in agriculture, fishing and forestry (NRRDB 2003), with 7.5 per cent in Ballina Shire and 4.4 per cent Byron Shire (ABS 2006). In Byron Shire, for example, agriculture provides the third largest source of income to the shire, after tourism and Centrelink payments.

Agriculture producers in the North Coast are a diverse mix of people with families who have been in the area for generations and more recent arrivals who come for commercial and/or lifestyle reasons. The 'new farmers' have often had previous occupations as professionals and are starting on a 2nd or 3rd career. Few farmers now receive 100 per cent of income from farm and many supplement income with off farm jobs (Baker et al 1999).

Agricultural enterprises in the North Coast region include:

- Beef cattle production which is the region's biggest single income earner - \$140 million annually (DPI, 2006).
- Bananas, dairying, vegetables and sugar cane which generally have been established for many years. There is a decline or consolidation and change in focus in some of these industries, such as a change in variety of bananas grown.
- Macadamias, which are now well established, and low chill stone fruit, which has been grown commercially in the area for 20 years.
- New and emerging industries such as coffee, native foods and herbs (culinary and medicinal).
- Organic production, which also continues to be established across the range of enterprises.

Some of these agricultural enterprises are discussed in more detail below.

Beef cattle

According to the Primary Industries in the North Coast Region of NSW Strategic Review, with an industry of more than 600,000 head, the North Coast is an important source of cattle for sale to the fattening areas of eastern Australia. The industry consists of most herds still producing store weaners, with the rest providing vealers and growing out or finishing steers. Most of the beef enterprises in the proposed upgrade area constitute breeding herds that produce store weaners and vealers or out/finish steers depending on the quality of agricultural land and pasture. Store weaners are produced on lower quality native pastures and are sold at 5 to 7 months (165 to 180 kg) whilst those on better pastures are sold at 7 to 9 months (200 to 260 kg). Store weaners are then moved to better conditions, usually west of the proposed upgrade, to be grown into prime condition before slaughter.

There has been a steady increase in the number of stock, traditionally sold in the store market, being grown to heavier market weights and sold for higher value, responding to the poor returns from selling weaner age animals. A key issue for the beef cattle industry in the North Coast region is the viability of the industry's returns. Returns for cattle breeders are highly variable due to seasonal conditions in the growing out and finishing areas.

Macadamias

The value Macadamia production within the region is expected to grow beyond \$70 million, with trees reaching their peak production. There are around 600 macadamia growers on the North Coast on approximately 7,000 ha (NSW DPI 2006). Farm sizes range from 3 to 150 ha with an average farm size of 15 ha and 'viable' size of 20 to 25 ha.

There are significant macadamia growing enterprises in the proposed upgrade area. Australian Macadamia Society estimates there are approximately 2,000 ha in the proposed upgrade area with 250 to 300 trees per hectare.

Macadamias are now also replacing some sugar cane production in the Newrybar swamp area.

Coffee

The coffee industry is currently in the developmental stages and is predicted to remain growing for a significant amount of time. Coffee plantations in the proposed upgrade area are relatively unique in terms of location and distance from the equator. Frost-free land in the region allows high quality coffee to be produced. Freshness, a lower caffeine content and 'pesticide free' or 'organically grown' are seen as attractive qualities for locally grown coffee (Baker et al, 1999). This is particularly so for those growers who are value-adding, for example, by roasting and grinding from local product and/or producing chocolate-coated coffee and selling to specialty outlets and the tourist market.

In the proposed upgrade area, there are significant production and processing holdings. It is estimated that there are 130,000 trees (conservative estimate) in the proposed upgrade area planted at approximately 3,000 trees per ha. Nirvana Coffee, located on Broken Head Road, Newrybar, has 55,000 trees - the largest single planting in the proposed upgrade area. There are a number of smaller growers with plantings between less than 1,000 trees to 4,000 trees. These smaller growers rely on the larger enterprises for the majority of processing, for example Zentvelds located on Broken Head Road, processes for about 25 growers some of which are located in the highway upgrade area. The coffee produced in the area is renowned for its quality and awards are regularly won by local growers.

Stone fruit

There are approximately 250 ha of low chill stone fruit in the North Coast region with an annual gross value of production at farm gate estimated at \$10M (NSW DPI, 2006). An average production area of a stone fruit orchard is 2 to 5 ha with 2 to 3 ha being the minimum size to be viable. Each hectare supports between 500 and 1,000 trees depending on the variety. Between 12 and 20 ha are required to support that level of production due to the area required for buffers, cool rooms and packing and machinery sheds.

Sugar

Sugar cane is one of the North Coast region's biggest employers and accounts for \$230 million of regional economic output per annum. The sugar grown in NSW occupies over 37,000 ha on the lower flood plains of the Tweed, Brunswick, Richmond and Clarence rivers (NSW DPI, 2006). Most of the landholdings within the proposed upgrade area are located on the coastal plains to the east of Knockrow and north to Broken Head.

Food manufacturing

The Richmond Valley, which includes the proposed upgrade area, is the food 'hub' of the Northern Rivers region and food manufacturing is seen as a comparative strength for the region (NRRDB, 2003). The region has a diverse range of businesses, including:

- Where the product (such as coffee or lemon myrtle) requires some form of modification to make it a saleable product.
- Where product (such as passionfruit or macadamias) is grown specifically for processing as part of a total product system.

Some of the regional products derived from the proposed upgrade area include: coffee, muesli, and macadamia products. Local business owners have named the regional brand being developed as the “food bowl”. The food bowl concept is linked to a “clean, green” image with minimal use of pesticides and herbicides in production. The food bowl extends from west of Ewingsdale, south to Knockrow and then west to Lismore. The food bowl concept represents an area of highly productive land growing mainly macadamias and coffee along with other market garden produce.

3.1.2 Local and regional economy

Immigration is seen as a major source of economic growth for the region, the natural amenity experienced in the locality providing a key attraction. The Northern Rivers Regional Development Board (NRRDB, 2005) assumes that 68 per cent of jobs would come from population growth linked to the “population driven sectors” such as education, retail, household services, personal services and about 7 per cent from the construction sector. Similarly, Ballina and Byron shires are estimated to have 27.3 per cent and 30.1 per cent of basic (export) sector jobs. These jobs form a key focus of the regional industry and economic plan. Long term economic growth would depend on the ability of the region to generate the export orientated jobs including tourism.

3.2 Land use and growth trends

3.2.1 Land use overview

Within the proposed upgrade area, land use is predominately of a rural nature with tree crops and cattle grazing being the principal agricultural uses. Within or adjacent to the upgraded highway area, the main urban settlements are Bangalow and Newrybar and the Ewingsdale residential area. There are also a number of rural residential clusters as well as individual rural residential allotments.

Table 2 shows the classes adopted for the land use on affected properties mapping (Figure 4 to Figure 6) and provides a definition for each class. It also identifies enterprises that have been grouped together for analysis and presentation.

Table 2 Land Use Classes (as shown in Figures 4 to Figure 6)

Land use class	Definition
Access roads	Includes driveways to house but does not include roads within or between paddocks.
Cleared and cultivated	Land that has been cropped annually or has been prepared for permanent planting but is not yet planted.
Coffee immature	Coffee plantations planted in or after 2000.
Coffee mature	Coffee plantations planted before 2000 (note that no mature coffee occurs on allotments that would be subject to acquisition).
Floriculture	Land used for cut flower production.
Grazing	Grazing land.
House Block	House and garden area on larger lots, including pool, tennis courts and garages.
Macadamias Immature	Macadamia plantations planted in or after 2000.
Macadamias Mature	Macadamia plantations planted before 2000.
Nursery	Land used for nursery production, including in-ground nursery plantations and fisheries activities.
Other fruits	Fruits including avocados, passion fruit, lychees, custard apples, guava, berries, tamarillos, bananas, exotic fruits and pecans. Excludes stone fruits.
Rural Residential	Lots less than 3 hectares.
Sheds	Sheds including animal shelters, processing facilities, machinery and storage sheds.
Stone fruit	Stone fruits including peaches, nectarines and plums.
Timber	Remnant native vegetation and planted vegetation, including substantial windbreaks.
Timber Plantation	Planted timber with harvest guarantee.
Vegetables	Market gardens including bamboo plantations, excluding home vegetable plots.
Water Course - cleared	Rivers and creeks on grazing land.
Water Course - timbered	Rivers and creeks timbered.
Water Supply	Dams.

Figure 4 Land use on affected properties (1 of 3)

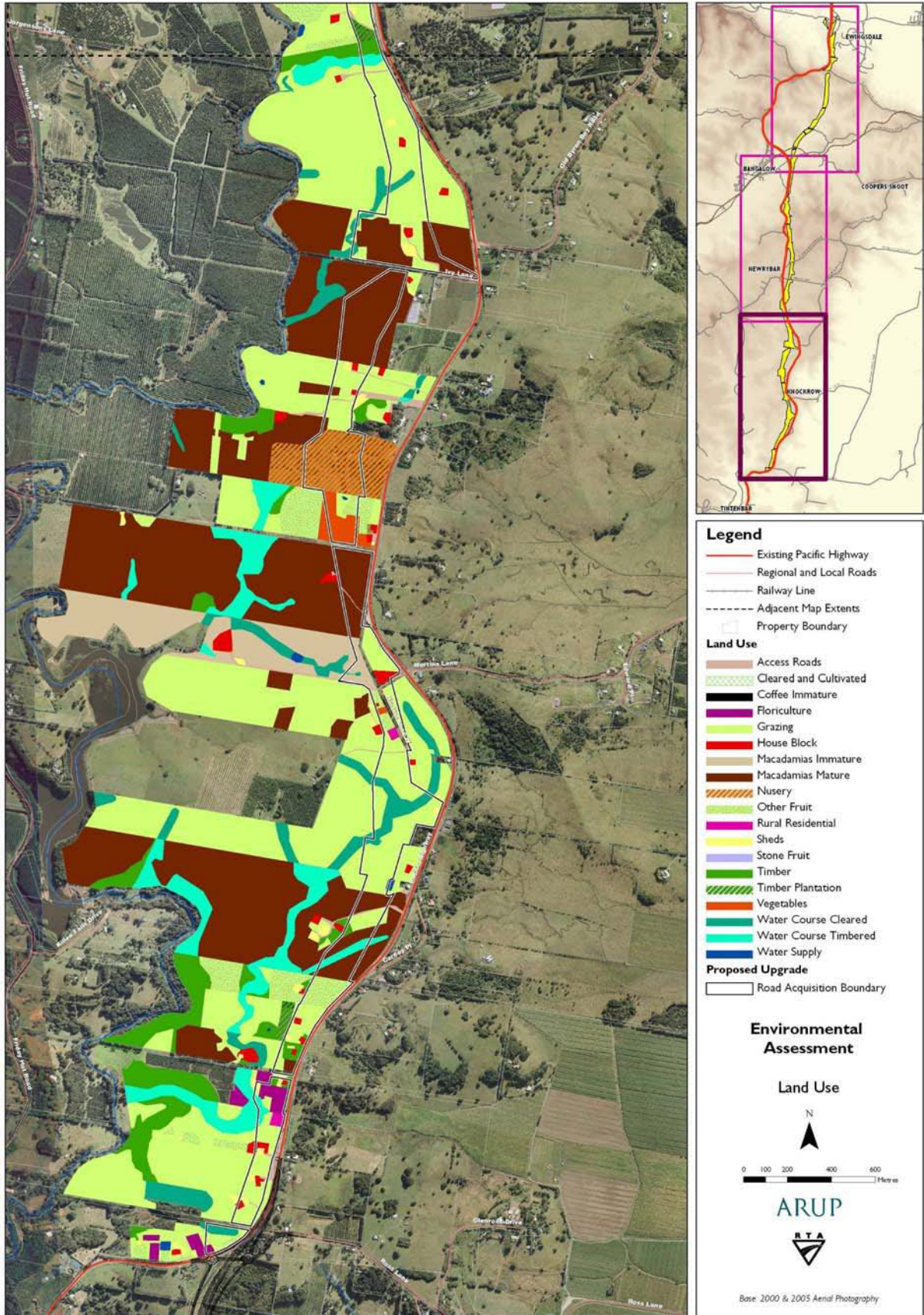


Figure 5 Land use on affected properties (2 of 3)

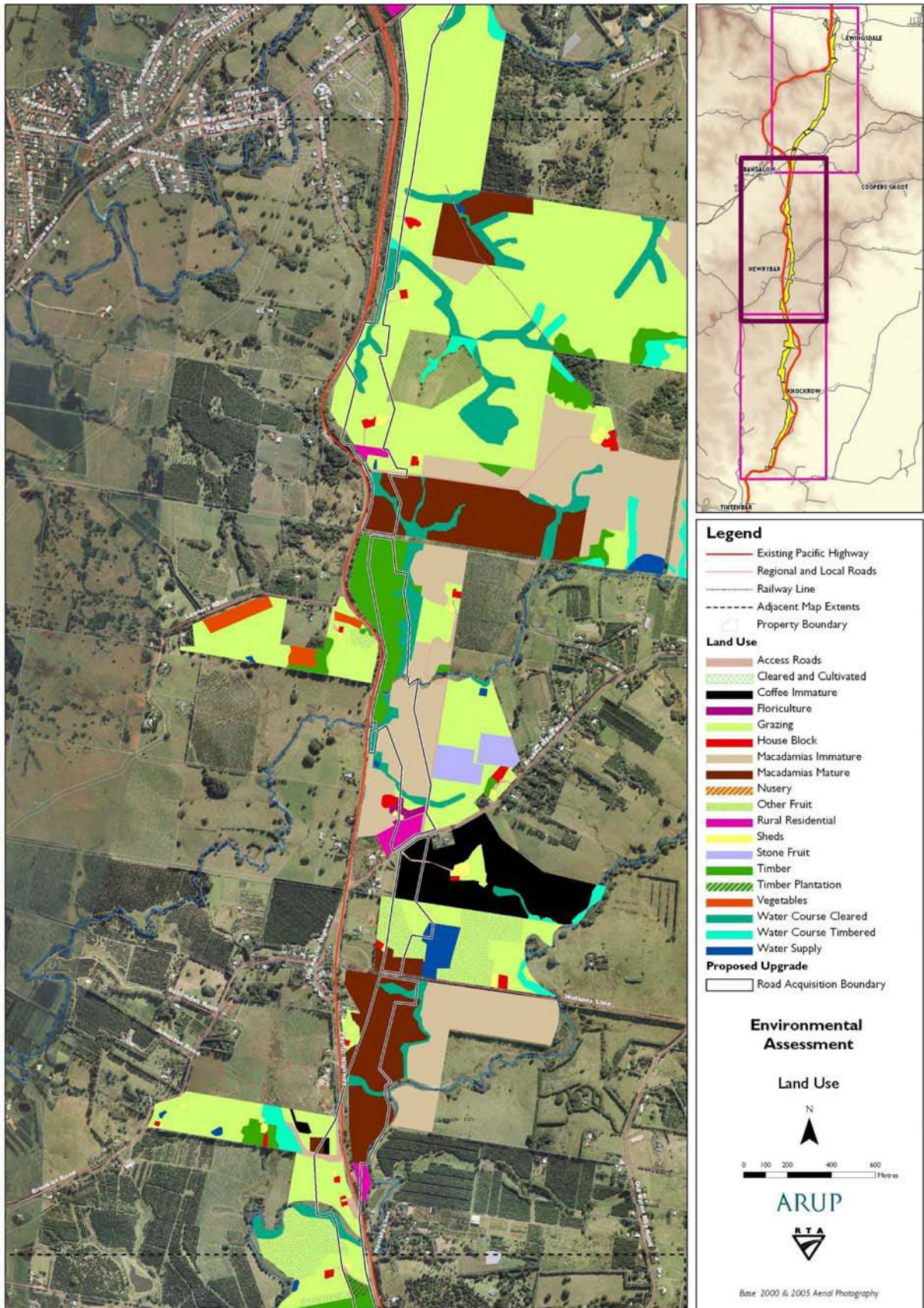
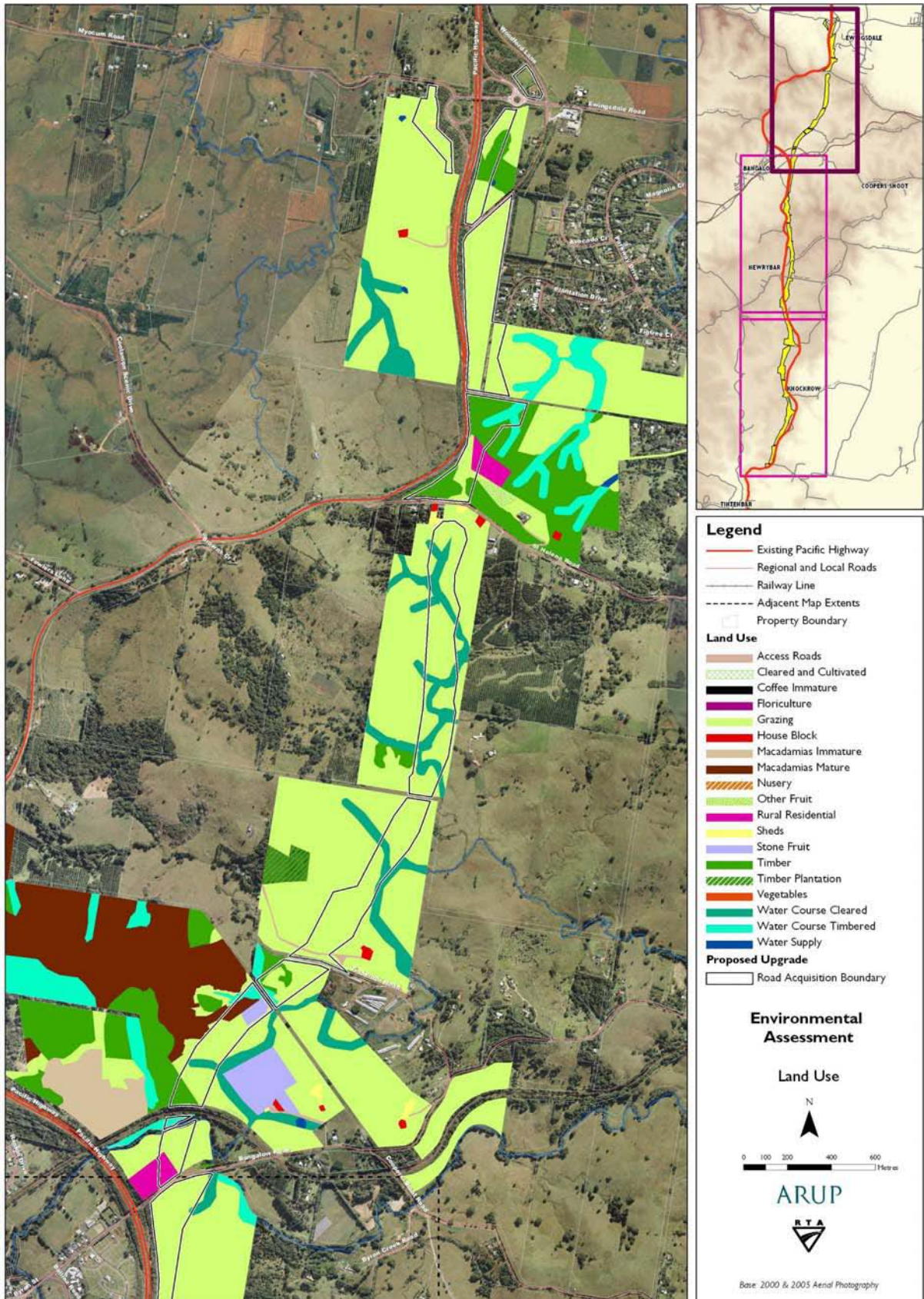


Figure 6 Land use on affected properties (3 of 3)



3.2.2 Townships and villages

Four main peri-urban areas have been identified within the proposed upgrade area:

- Bangalow.
- Newrybar.
- Ewingsdale.
- Knockrow.

In addition, there are a number of rural residential clusters. An overview of these areas (including existing businesses and their links to highway trade) is provided below. Business investigations previously carried out for Bangalow, Newrybar and Knockrow indicate that most businesses report less than 30 per cent of turnover linked to highway trade.

Bangalow

In 1997, the Pacific Highway was realigned to bypass the Bangalow township. The Bangalow interchange provides access to the township and is about 1 km east of Bangalow. Since that time Bangalow has undergone considerable change and is recognised in the region as a success story, changing its appearance and amenity to redefine its character from a stop off to a destination in its own right. The township has changed from a noisy, fast moving thoroughfare full of trucks, buses and cars to a quiet township and destination. Visitors are drawn to its range of cafes, boutique stores, antique stores, gift and souvenir shops.

The bypass of Bangalow has created new business opportunities for the village, and enhanced its sense of place, and community and historical values. Bangalow has a population of approximately 1200 people and serves as a local service and community centre for the northern part of the study area and surrounding rural areas. Based on postal statistics the surrounding rural population of the localities of St Helena, Coolamon Scenic Drive, Coorabell, Tintenbar, Possum Creek, Nashua, Fernleigh, Coopers Shoot, Newrybar and Knockrow use Bangalow as a postal address. This constitutes almost 1000 additional households or approximately 2500 additional people who use the services provided in Bangalow. The township also provides service centre functions for the surrounding farming communities (Byron Shire 2004).

A discussion with a local real estate agent (in 2005) indicated that there were no commercial vacancies in Bangalow and further, that there was limited scope for future development due to Byron Shire Council planning restrictions.

Bangalow has a range of local community facilities and services including Bangalow Primary School, Bangalow Community Health Centre, Bangalow Community Children's Centre and NSW Police. Higher order services and facilities such as hospitals, ambulance and a range of medical practitioners are generally provided in Byron Bay or Ballina.

A wide range of recreation activities and clubs are catered for in the town including the Bangalow Bowling Club, Country Women's Association, Bangalow Writers Group, Bangalow Historical Society, A&I Society Showground and Bangalow Agriculture Show, Garden Club, Masonic Lodge, Mufti Bowls, Bangalow Farmers Market, Progress Association, Scouts, various sporting associations and Landcare group.

Newrybar

The village centre of Newrybar is located immediately to the west of but not directly fronting the existing Pacific Highway. The Newrybar Public School is located to the east of the existing highway on Broken Head Road.

The business areas linked to Newrybar can be conceptually separated into two distinct areas. The first area, to the west of the existing highway, is the village centre. It runs along a former section of the Pacific Highway. The second, to the east of the existing highway, is along the Broken Head Road running past the school towards Suffolk Park and Byron Bay.

There are a number of established businesses in Newrybar:

- Harvest Café.
- General Store.
- Newrybar Saddlery and Produce.
- Camphor Cottage.
- Country House Antiques.
- A nursery located behind the main street.

Current business growth in Newrybar is strong with two recently opened businesses, an antique store and a souvenir gallery. These are located within the same area as the cafe and are well placed to leverage any trade from it. There is also an historic bakery and a new gallery that are businesses currently inactive but are approved for future development.

There are also dwellings on the main street, currently being used for residential purposes; that might be considered for business development in the future (subject to council approval).

Ewingsdale

The residential community of Ewingsdale is located at the northern end of the proposed upgrade and is a separate residential area 6 km inland from Byron Bay, surrounded by farmland to the east, the escarpment to the south, the existing highway to the west and Ewingsdale Road to the north. Ewingsdale has a community hall, church and a Steiner School located there. This area does not have any commercial facilities, besides the Fig Tree Restaurant and accommodation, Victoria's Guest House, Magnolia Drive and Planula B&B. Residents rely on nearby Byron Bay or Bangalow for commercial and community facilities and services.

Knockrow

The largest clustering of development at Knockrow is a cul-de-sac of rural residential lifestyle allotments which connects onto Martins Lane and Carney Place which is off the existing highway. Aside from these small clusters the surrounding allotments are generally large and of a rural nature. There is no commercial hub or village within Knockrow.

The Macadamia Castle, with direct access to the existing highway, is the primary business located at Knockrow and includes a café, retail outlet (souvenirs and outlet for local produce), playground, animal park and mini-golf park. It is used not only by passers by but also serves a function for locals who use it as a meeting point and as parkland. The Macadamia Castle has up to 30 employees with 12 full-time. Trade origin is approximately 80 per cent highway related and 20 per cent local (Source: Arup discussions with business owners and operators, September 2005).

Anecdotal evidence from local business owners suggests that there has been steady growth of the Macadamia Castle over the last few years. The retail shop provides access for local producers to the tourist trade with many local producers represented.

Rural residential clusters

There are also contiguous settlement areas across the upgraded highway area that have created neighbourhoods beyond the townships and villages. These clusters vary in the number of dwellings and size of allotments and they generally have well established social and community ties amongst the residents. As well as these clusters, there are 88 property driveways with direct access to the existing highway between Tintenbar and Ewingsdale.

There is a strong linkage of the local community and businesses and business along Broken Head Road. Businesses along Broken Head Road have an agricultural focus and are linked closely to the local production of coffee and other produce (market gardens).

Two of the top five coffee plantations in the Northern Rivers Region are located on the road, both with small retail outlets, and there are three existing farm gate stalls selling in season produce. Discussions with business owners along the road note that there is potential for an expansion of small retail and cafés linked to the local produce. It is considered that this potential is strongly linked to the visual amenity of the surrounding area and the linkage with the local 'food bowl'.

3.2.3 Growth trends

There is a number of planning growth strategies that are either in place or being developed for the area relating to the Tintenbar to Ewingsdale highway upgrade. Within the region, high population growth rates are expected.

Guiding much of the growth in the region is the *Far North Coast Regional Strategy 2006 - 2031* (NSW Department of Planning (DoP), 2006) which applies to the six local government areas (LGA) on the far north coast of NSW. It builds on previous planning work including the Northern Rivers Regional Strategy, the *North Coast Urban Planning Strategy* (DoP 1995) and local council settlement strategies and recognises the rapid growth of south-east Queensland.

Targets for further growth within the individual LGA are being driven by the *Far North Coast Regional Strategy* which requires local government plans to be consistent with the strategy.

The strategy anticipates that by 2031 the area will be:

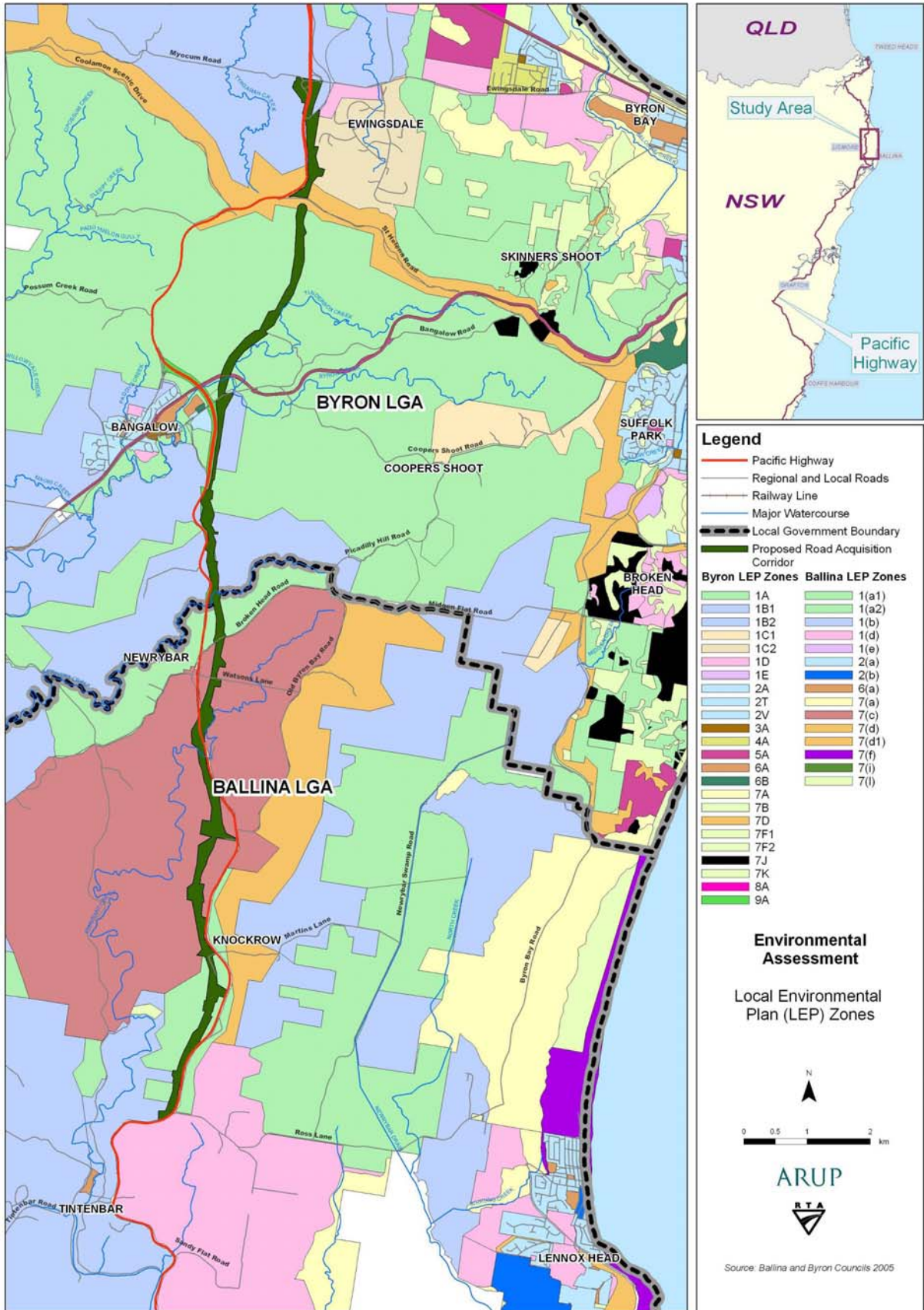
...expected to be characterised by a series of contained centres, a coastal area protected from inappropriate development, and growing towns and villages across the Region. A connected network of towns and villages would provide a choice of well designed housing and associated lifestyles (2006: 4).

The region is expected to cater for an extra 60,400 people over the next 25 years resulting in a population increase of more than a quarter. Within and proximate to the upgraded highway area, much of this housing (approximately 35 per cent) is to be accommodated around and within existing centres such as Ballina, or as infill development within existing villages, such as Bangalow. Approximately 60 per cent of the 51,000 new homes expected to be constructed during the period of the strategy are to be concentrated within the coastal area, east of the Pacific Highway's present alignment. The strategy anticipates that Ballina would emerge as a regional centre, while Byron Bay would retain its village character whilst acting as a gateway to other tourism assets and Bangalow's offering would remain as a village catering for alternate lifestyles reinforcing the village 'sense of place'.

3.2.4 Local environmental plan zoning

Land use zoning (Figure 7) designated by Byron Shire Council is largely reflective of the current land use. The majority of the proposed upgrade area in Byron Shire is land zoned for agriculture – 1(a) General Rural Zone, 1(b1) and 1(b2) Agriculture Protection Zones. Bangalow village is predominately covered by the 2(a) Residential Zone and the escarpment at St Helena is covered by the 7(d) Scenic Escarpment Zone. Near Ewingsdale, the land is zoned as either 1(c2) Small Holdings Zone or 1(d) Investigation Zone.

Figure 7 Zonings within Byron Shire Council and Ballina Shire Council areas.



Zoning designated by Ballina Shire Council and current land use are also largely consistent. The upgraded highway area within Ballina Shire includes Zones 1(a1) Rural (Plateau Lands Agriculture), 1(a2) Rural (Coastal Lands Agriculture), 1(b) Rural (Secondary Agricultural Land), 1(d) Rural (Urban Investigations), 6(a) Open Space, 7(a) Environmental Protection (Wetlands), 7(c) Environmental Protection (Water Catchment), 7(d1) Environmental Protection (Newrybar Scenic/Escarpment).

In Ballina Shire, the land zoned 1(d) to the south of the proposed upgrade area has been identified in the Ballina Urban Release Strategy (2000) as an area for investigation for future urban expansion. No rezoning has occurred for this area to date. The northern section of the 1(d) zone is known as the Cumbalum Ridge.

Both shires are presently undertaking a review of the local environmental plans which may result in the identification of additional areas for growth, however, it is not expected that either of the councils would release their respective draft LEPs until late 2008 / 2009.

3.3 Tourism

The proposed upgrade of the Pacific Highway from Tintenbar to Ewingsdale is located within the Northern Rivers region of NSW, which extends from just north of Coffs Harbour to the Queensland border. The region is characterised by a blend of rural and coastal cultures surrounded by a range of natural attractions. With its mild sub-tropical climate, stretches of coastline and rural amenity, the northern rivers region of New South Wales is a popular tourist destination particularly during the peak summer holiday months. Figure 6 displays some of the tourist attractions of the Ballina-Byron region.

Figure 6 Some of the tourism assets of the Byron-Ballina region



Data produced by Tourism NSW (2007) for the Northern Rivers region, for the year ending December 2007, indicate that the total number of visitors to the area was 4.7 million. Total expenditure from tourism for this time period was more than \$1 billion.

The Northern Rivers Tourism Plan identified that 85% of visitors to the region are domestic, and 86% of visitors travel to the region by car. The region also attracts the second highest

number of international visitors in NSW. There are a range of accommodation options including resorts, bed and breakfasts, hotels, hostels and camping grounds.

Byron Bay and its mixture of alternative lifestyles, surfing culture and village atmosphere is the focus of the region's tourism. The upgrade of the Pacific Highway to the north of Ewingsdale has reduced the travel time for traffic from Brisbane to Byron Bay to around two hours. This brings with it a large number of Queensland visitors out for the day together with those visiting the local coast and surrounding areas including Ballina, Lennox Head and Brunswick Heads. The largest proportion of domestic visitors however comes from the South, with over 50% of visitors travelling from NSW and Victoria.

Whilst tourism has grown steadily over the past decade, the area's natural assets have been retained. These include six of Australia's World Heritage listed areas, subtropical hinterland, quaint villages and renowned surfing beaches. Eco-tourism is one the fastest growing industry in the area, based on the range of natural attributes available to market. Tourism in alternative health has also been identified as having significant growth potential for the region, with a wide range of natural therapies, treatments and products accessible in the region.

There is a large agri-tourism industry in the region, based on the "food bowl" concept in the Byron-Ballina region. A number of farm operations sell produce direct from the farm gate while others offer pick your own produce. The hinterland region is renowned for this, where tourists can sample coffee, macadamias, stonefruits and bananas direct from the plantations.

Since the Pacific Highway bypassed the town of Bangalow it has become a significant attraction in its own right. Tourists are drawn to its range of cafés, galleries, antique stores and specialist retail outlets along the main street. The monthly Bangalow Markets are a regional attraction.

4 Consultation

4.1 Overview

This section provides an overview of community and stakeholder engagement and key issues raised. Many of the issues identified relate to social and economic considerations and as such are addressed as potential impacts in Section 5 of this report.

A comprehensive community and stakeholder involvement program was established for this project and community engagement carried out during key stages of the project.

The community has provided a wealth of local knowledge that has been reviewed and considered by the project team. Community submissions were received by email, fax and the project information line, as well as through individual property visits and meetings. These submissions were collected and analysed to achieve an understanding of the local community's concerns. Discussions were also held with government and regulatory bodies including Rous Water, Department of Environment and Climate Change, Department of Primary Industries, Department of Water and Energy, Department of State and Regional Development, Byron Shire Council, Ballina Shire Council, Department of Education and Training/ Newrybar School and the NSW Fire Brigade.

Specific groups were formed for key issues, such as a community liaison group, an agricultural focus group and an Aboriginal focus group.

Overall, there has been a high level of community interest and involvement in the project.

4.2 Key stakeholder issues

The groups and the broader community have raised a number of important issues. A total of 19,182 submissions were received during and after the route options display (18 November 2005 to 23 January 2006). Based on the findings of the community feedback forms, the top three issues raised during the submission process regarded as 'very important' and 'not important' were:

Table 3 Top three community responses to very important and not important issues

Top community responses	Very important	Not important
1	Improved safety	Flooding issues
2	Noise issues	Improved access
3	Impact on dwellings	Visual impact

The preferred route was announced on 26 September 2006 and was also the subject of community consultation. Consultation methods included: staffed displays; static displays; advertisements; brochures; website; and packages of information delivered to directly affected landowners, those affected by previous options and to the community liaison group and Aboriginal focus group. A total of 13 submissions were received from the community following the preferred route consultation. Most of these were specific to each landowner. Only one submission was received from a government agency, namely the NSW Department of Primary Industries.

Issues raised by the community and government bodies and general stakeholder involvements have driven a participatory approach to the prediction of potential social and economic effects and the identification of suitable mitigation measures. Of the issues that have been identified as being very important, improved safety, noise issues and impacts on dwellings are discussed in this report.

Ongoing consultation and negotiation is occurring as part of the land acquisition process with private landholders and with the Newrybar Public School to ameliorate potential impacts.

5 Impact Assessment

5.1 Introduction

The socio-economic impact assessment of the proposed Tintenbar to Ewingsdale Pacific Highway upgrade considers an analysis of the baseline conditions and trends, information raised during the stakeholder engagement process as well as the findings of other specialist studies that have been undertaken as part of the broader environmental assessment. Likely impacts are predicted (both positive and adverse) on the highway upgrade area's community and economic base and its immediate surrounds.

This impact assessment recognises that the development of major infrastructure such as a highway upgrade has the potential for impacts on the community both in general and on specific groups and properties. The upgraded highway would cater for a broad range of users travelling between Sydney and Brisbane on the Pacific Highway. They would enjoy the benefits of the proposed upgrade, while the deleterious impacts would be predominately experienced by the local community – particularly those immediately adjacent to the highway.

The potential for social and economic impacts (direct and indirect) from the proposed upgrade are considered in relation to:

- Property acquisition.
- Community services and facilities.
- Connectivity and contiguity.
- Safety.
- Amenity.
- Local and regional growth.
- Agriculture sector.
- Tourism sector.
- Local businesses.
- Construction.

The Director General's environmental assessment requirements addressed in this section are:

- Local community socio-economic impacts associated with land use, property and amenity related changes.
- Business (including agricultural producers) impacts on a case by case basis including impacts to the overall viability, profitability, productivity and sustainability of businesses.
- Regional economic impacts to the tourism sector taking into account agri-tourism impacts and impacts to local amenity, character and scenery.
- Consideration of project impacts on the attainment of the objectives of the Far North Coast Strategy.
- Impacts to the connectivity and contiguity of small settlements including Knockrow and Newrybar.

5.2 Impacts related to property acquisition

During the route selection process, there was a great deal of concern in the community over the uncertainty of which alignment would ultimately be chosen, particularly amongst those residents who were not already in proximity to the existing highway (identified as newly affected dwellings and included a number on the plateau and coastal plains). As the proposed upgrade would follow the existing highway relatively closely, the number of newly affected dwellings is minimised.

There are however, a total of 73 lots that would be directly affected by the proposed upgrade (in some cases the landholder owns more than one allotment), with a total of 22 houses within the proposed upgrade footprint. Consultation has been undertaken by the RTA with all directly affected landowners. The acquisition negotiation process and determination of compensation, is governed by the RTA's *Land Acquisition Policy* and the *Land Acquisition (Just Terms Compensation) Act 1991* respectively.

Throughout the options development and route selection process, and more recently during discussions with landowners, the RTA have developed an understanding of the typical concerns of landowners directly affected by the proposed upgrade in relation to property acquisition. The socio-economic impacts of property acquisition expressed by the community are listed as follows with a commentary on the likely impact:

- Limited number of properties to choose from in the area

Owing to the low density form of residential accommodation, there are limited numbers of properties within the proposed upgraded area. The expected decline in housing stock (22 dwellings are within the proposed upgrade footprint) would affect the ability of residents to find a suitable (and perhaps similar) property in the area, particularly with net migration growth pressures.

- Loss of local connections and community cohesion

Community involvement is a defining characteristic of many of the residents in the Ballina and Byron local government areas. Loss of connections and community cohesion would be a particular issue for those who relocate outside of the area. It is presently unknown what proportion of those who would have their dwelling acquired would stay within the locale or relocate elsewhere. For those who retain their building entitlement and construct away from the proposed upgrade on the remainder of the allotment, social networks would be sustained.

- Impacts on health and wellbeing owing to the possible upheaval of roots.

For many residents within the proposed upgrade area, impacts on health and wellbeing were associated with the uncertainty of which route would become the preferred option and the potential for it to result in the acquisition of their property. Negative impacts on health and wellbeing could potentially be experienced by those facing property acquisition.

Management of Impacts

Management measures and specific strategies related to property acquisition have been outlined in the Remnant Land Strategy which forms part of the *Land Use and Property Impacts Working Paper*.

5.3 Impacts on community services and facilities

The proposed upgrade would not result in the loss of any existing community services or facilities³. The proposed upgrade would run adjacent to the Newrybar Public School's eastern boundary. At this location, however, the proposed upgrade is much lower than the school. Although there is a perception amongst some members of the community that the school would be isolated between the new alignment and the old highway, it is unlikely the proposed upgrade would impede the ability of staff and students to access Newrybar Primary School. As the proposed upgrade would run below Broken Head Road (which would form an overpass), current accessibility along its primary frontage and school bus drop-off location would be maintained. The proposed upgrade would not affect the school's functionality.

The school's connection to Newrybar village is likely to be improved after the highway is upgraded as the existing highway would have:

³ A privately owned former cricket pitch on Watsons Lane, Newrybar is directly affected by the proposed upgrade. As it is no longer a community resource and nor is it being used as a sporting facility, its loss would not reduce the number of sporting facilities within the proposed upgrade area.

- A significant reduction in traffic volumes.
- Greater consistency in driver behaviour with the separation of high speed through highway traffic and lower speed local traffic.
- A reduction in the percentage and size of heavy vehicles.

Consultation has been undertaken with the school and a communications strategy has been prepared by Arup and the RTA with regard to the school's enrolment attractiveness. A number of mitigation measures are being investigated for Newrybar Public School in consultation with the school and NSW Department of Education and Training. An outline of possible treatments may include noise attenuation works to the building and a landscaped mound to obscure views from the school buildings to the cut for the proposed upgrade.

More generally, throughout the proposed upgrade area it is likely that during construction, access to the towns and villages in which community services and facilities are located may be hindered during specific periods.

Management of impacts

Implement noise attenuation and visual treatments for the eastern boundary of the Newrybar Public School in consultation with the school.

5.4 Impacts on connectivity and contiguity

5.4.1 Connectivity

Connectivity refers to the directness of travel routes between any two locations, and the number of alternative routes available for travelling between any two locations⁴. In consideration of the effects of the proposed upgrade on connectivity, the scale of network connectivity is considered between settlements.

As expected in a rural area, residents predominately move about their community and region by private vehicles. The existing highway in the proposed upgrade area currently has no specific facilities for pedestrians, cyclists or equestrians. As such, connectivity and contiguity are considered in relation to vehicular movement. The proposed upgrade would not affect the pedestrian movement within the urban areas.

The proposed upgrade would be a controlled access road. This means that it would only be accessed via the interchanges. A number of properties currently have direct access to the existing highway; this would change for some of these properties once the proposed upgrade is constructed. Where access to the existing highway would be altered as a result of the proposed upgrade, new local roads would provide a connection to the existing highway and then the interchanges. In some cases this would result in additional travel times for drivers who would have to follow the local road network to connect to the interchanges, rather than directly accessing the upgraded highway.

However, travel times on the proposed upgraded would be faster than the existing highway and the local road network is anticipated to create safer travel conditions.

Reduced access on the local road network and the existing Pacific Highway is expected during the construction period. Reduced access, however, is expected to be a temporary disadvantage.

Connectivity would be largely maintained throughout the area with the proposed upgrade:

- A tunnel of approximately 340m long located below St Helena Hill that would maintain the existing connection between St Helena Road and the existing Pacific Highway.
- Minimising the number of intersections to improve local road traffic flow and connectivity between settlements separate from the highway.

⁴ Pedshed.net

- Ross Lane interchange would continue to provide full access to local roads including the existing highway and Ross Lane.
- Ivy Lane half interchange would connect to Ivy Lane and would continue to provide access to properties in this area.
- Bangalow half interchange would provide access between the proposed upgrade to the south, the existing highway and Bangalow.
- Ewingsdale interchange would be modified however, connections would be maintained.

In addition to connectivity of the local road network, where the proposed upgrade severs existing property access to the existing highway or local roads, service roads would be provided to connect intersecting roads and property accesses, as well as providing local north / south connections.

An overview of local access arrangements is detailed in *Working Paper 06 -Traffic and Transport Assessment* (June 2008), Arup.

5.4.2 Contiguity

Contiguity refers to the degree to which a specific use has been allocated to land in an unbroken fashion⁵. For the purpose of this impact assessment, reduction in contiguity is taken to refer to community severance.

With any linear infrastructure project, there is the potential to create severance and impede the ability of residents to traverse through an area, by the creation of a physical and / or psychological barrier. The existing Pacific Highway forms an edge in some instances to settlement areas and concentrates movement in a north – south direction. By virtue of its design requirements connections to the proposed upgrade would be restricted.

Community severance is not expected to be a significant issue as the proposed upgrade avoids the settlements (that is, the villages and towns with relatively closely settled rural properties on the fringes). The settlement areas of both Knockrow and Newrybar are not directly affected. Some residential and rural properties outside of the urban areas (largely concentrated on local roads) may in some instances be disconnected from adjoining properties; however, this would not occur on a wider scale. By virtue of its greater width and restricted access points, the upgraded highway is likely to be perceived as a physical and psychological barrier to east – west movement in Ballina and Byron shires.

Further, local roads have been treated by either providing grade separation in the form of an overpass or underpass, or terminating the local road and providing an access road linking to another nearby local road with grade separation. This treatment would ensure that impacts on local access routes and connectivity are minimal.

Management of impacts

Appropriate signage would be provided prior to the interchanges to ensure drivers' understanding of access to the villages and townships.

5.5 Impacts on safety

One of the key RTA program objectives for the upgrade of the highway is to significantly reduce road accidents and injuries. If the proposed upgrade did not proceed there could be increases in:

- The number and severity of accidents.
- The number and severity of accidents at the numerous at-grade intersections.
- The level of risk for pedestrians when crossing the highway, particularly in the villages of Knockrow and Newrybar.

⁵ Aerts et al, 2003; Galster et al, 2001; Wouldiams, 2002; Wright et al, 1983

- The difficulty for residents adjacent to the highway to gain access to and from the highway.
- The level of risk for cyclists using the highway.

The following safety impacts have been summarised from *Working Paper 06 - Traffic and Transport Assessment* (June 2008). The overall accident rates on the upgraded highway are likely to meet the project target of no more than 15 accidents per 100 million VKT over the project length. Compared to the existing Pacific Highway, accidents would also be reduced through:

- A significant reduction in traffic volumes.
- Greater consistency in driver behaviour with the separation of high speed through highway traffic and lower speed local traffic.
- A reduction in the percentage and size of heavy vehicles.
- Greater consistency in the road environment and traffic conditions between Bangalow to Ewingsdale and Bangalow to Lismore.

It is expected that these factors would reduce the current accident rates to a level more consistent with a rural 2-lane undivided road.

5.6 Impacts on amenity

Potential impacts on amenity for residential properties in close proximity to the proposed upgrade would depend on how much the proposed upgrade deviates from the existing highway. That is, properties adjacent to the existing highway already have poor amenity, therefore, any minor shift towards those properties would not be as significant a change when compared to properties not presently near the existing highway.

The number of dwellings in proximity to the proposed upgrade is shown in **Table 4**.

Table 4 Number of dwellings within 50 m, 150 m and 250 m of the proposed upgrade

Number of dwellings within 50 m buffer	Number of dwellings within 150 m buffer	Number of dwellings within 250 m buffer
13	36	38

In consideration of amenity, potential air quality, noise and visual impacts (also known as lifestyle impacts) are identified below.

5.6.1 Air quality

Air quality roadside goals are not exceeded for carbon monoxide, nitrogen dioxide or particulate matter for the proposed upgrade. The proposed upgrade would also provide the benefit of splitting the traffic and therefore resulting in lower concentration of pollutants close to the existing highway. The predicted concentrations in the vicinity of the roadside and tunnel portals are all well within air quality goals, taking account of conservative estimates of background concentrations.

Dust would be generated from earthworks associated with the proposed upgrade. The total amount of dust would depend on the silt and moisture content in the soil and the types of activities being carried out. The major sources of dust would be bulldozers, excavators and wind erosion from the exposed surfaces⁶.

⁶ Working Paper 12 - Air Quality Impact Assessment (June 2008), Holmes Air Science

Management of impacts

Measures would be focused on the management of air quality during construction.

5.6.2 Noise

Noise and vibration impacts in the community, in order of increasing severity, relate to:

- Community / resident annoyance.
- Disturbance to community/resident activities (e.g. sleep disturbance).
- Adverse effects on human health (e.g. increased blood pressure, heart rate or impaired performance due to lack of sleep).

Due to large numbers of vehicles using the existing highway, existing noise levels are relatively high for residences close to the highway. As the proposed upgrade generally follows the existing highway route and traffic flows are not expected to change significantly, the noise exposure of most residences will only change marginally.

Management of impacts

Measures would be implemented as appropriate including noise attenuation barriers, low noise pavement and architectural treatment of dwellings.

5.6.3 Visual

The major visual change resulting from the proposed upgrade would be the introduction of the new dual carriageway highway into a highly scenic rural landscape. This landscape, while highly developed for agricultural purposes, has retained limited levels of development in general. In particular infrastructure development has been limited, with the majority of local roads retaining a low key rural road character.

Significant modifications are required to the landscape as part of the proposed upgrade. In particular, cut and fill embankments would be an almost continual feature along the proposed upgrade.

Temporary visual impacts during construction would include the short-term visual impacts of construction works themselves, and the short to medium impacts in the period immediately following construction until landscape design measures grow and take effect in ameliorating the impacts of construction works on the landscape.

Short-term visual impacts during construction would include:

- Prominence of construction machinery.
- Frequent construction vehicle movements along the local road system.
- Construction fencing.
- Temporary erosion and sediment control measures such as sedimentation basins and fences.
- Material stockpiling and construction yards in the area.

Temporary impacts remaining for a period of time following construction completion are expected and would include the visual impacts of bare cutting faces and fill embankments. Planting and revegetation works would modify the visual effects of the proposed upgrade to a degree, however the overall width and comparatively straight alignment would not enable it to be integrated into the landscape as the existing roads have done.

An urban and landscape design concept plan has been developed with specific recommendations for each section of the highway upgrade to:

- Minimise the visual impact of the upgraded highway.
- Provide an attractive driving experience and easy orientation for the motorist.

- respond to the existing landscape character⁷.

Management of impacts

Measures would be undertaken as detailed in the landscape strategy which seeks to visually integrate the road into the landscape (as detailed in the Urban Design, Landscape and Visual Impact Assessment Working Paper).

5.7 Impacts on the objectives of the Far North Coast Regional Strategy

Potential impacts on the region's future growth (with reference to the DoP *Far North Coast Regional Strategy*) are examined in consideration of the impacts of the highway upgrade not proceeding and socio-economic impacts of the proposed upgrade on growth targets.

An efficient, safe and reliable transport system is one of the key elements in the encouragement and support of regional population growth and economic development. The Pacific Highway is the most significant transport infrastructure element between Newcastle and Brisbane and it is an important contributor to the continued economic development of the NSW North Coast region. If the highway is not upgraded to provide an appropriate standard of service for existing and forecast levels, it is likely that both local and regional growth opportunities will be restricted by:

- Inefficiencies and cost increases would be experienced by existing businesses, agriculture, tourism and residents.
- The attractiveness of these regions for new economic development would reduce in response to diminishing road transport services.

Upgrading of the Pacific Highway to a dual carriageway standard is identified as a major infrastructure project in the Far North Coast Regional Strategy, being an initiative of the Commonwealth and State governments. The upgrade would be in line with retaining the Pacific Highway as the primary inter/intra-regional road corridor, as stated in the strategy.

As illustrated within the Far North Coast Regional Strategy, the existing Pacific Highway demarcates the coastal areas in the east with the environmental assets, rural land, national parks and state forests in the west in the local government areas of Ballina and Byron. The upgraded highway would avoid existing urban footprints as well as proposed future urban release areas, and therefore not restrict growth targets (refer to Figure 8).

In terms of economic impacts, the highway upgrade footprint does not affect any employment lands (noted as lands accommodating growth in existing and emerging businesses and industries) however, it does impact upon regionally significant farmland. This is addressed in Section 4.8.1.

Additional growth in Bangalow may be achieved as an outcome of the movement of the traffic away from a residential area to the east of the township resulting in a change of the zoning to accommodate higher density living⁸.

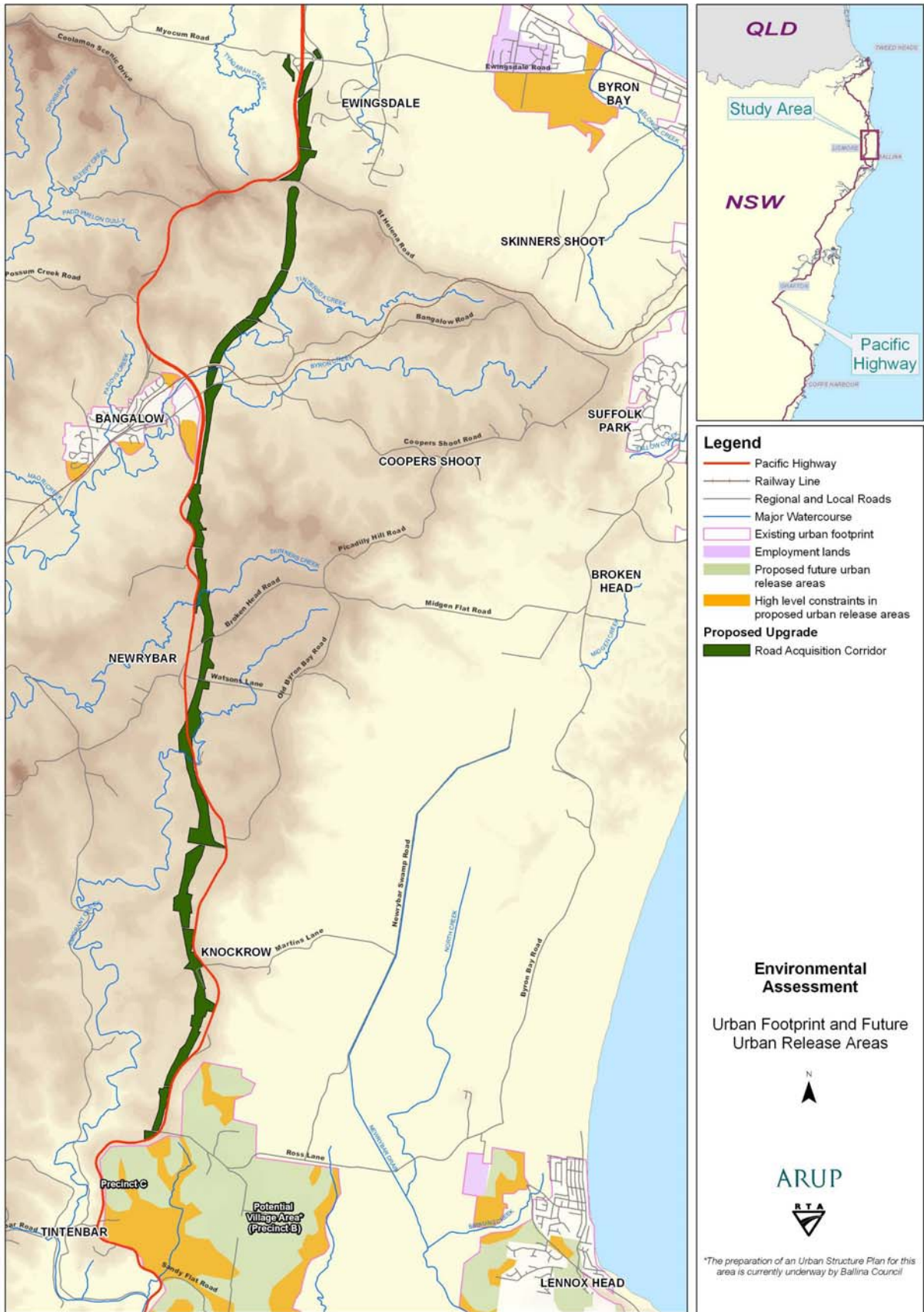
Management of impacts

Management measures and specific strategies related to property acquisition have been outlined in Remnant Land Strategy which forms part of *Working Paper 07 - Land Use and Property Assessment*, (June 2008), Hassall & Associates.

⁷ Working Paper 11 - Urban Design, Landscape and Visual Assessment (June 2008), Spackman and Mossop

⁸ Discussions with Byron Shire Council

Figure 8 Identifies the urban footprint, employment lands and future release areas as depicted in the *Far North Coast Regional Strategy*.



5.8 Impacts on the agriculture sector

The agricultural sector is subject to negative impacts arising from foregone production on land resumed or isolated by the proposed upgrade. Regional economic impacts to the agricultural sector, taking into account the total loss of regional and state significant farmland as identified in the Northern Rivers Farmland Protection Project (Department of Planning, 2005), are considered in this section.

Total gross regional product (GRP) in Byron-Ballina is expected to fall by less than 0.5 per cent as a result of foregone agricultural production land. Less than 1 per cent of the total 'significant farmland' in the region would be affected.

In 2006, Hassall and Associates in conjunction with the Tweed Economic Development Corporation (TEDC) estimated the change in GRP for the preferred route in 2006 (*Working Paper on Regional Economic Impacts of Changes in Agricultural Land Use* (August 2006), Hassall & Associates). The assessment used detailed mapping, consideration of assumptions used in previous related studies, published data on common prices and yields, feedback from members of the agricultural focus group and the TEDC input-output model.

Hassall and Associates has undertaken a more detailed analysis of the impact of the highway upgrade on agricultural land in the Land Use and Property Impacts report (2008). This estimates the likely change in the annual regional Gross Margin⁹, based on average yields, commodity prices and variable costs. The data provided in Appendix B has been sourced from the NSW DPI and modified in response to discussions with local DPI staff.

In determining the foregone production of agricultural land due to direct and indirect (severance) impacts of the upgraded highway, each affected lot was assessed on an individual basis. It was assumed that pre-construction conditions would be restored for drainage and services, however, access to the lot may be altered. The foregone gross margin was calculated for those land uses classified as agricultural land. That is, the annual value of farm gate production less any variable costs incurred in the process of production.

Foregone annual production from agriculture land directly and indirectly affected by the proposed upgrade is shown in Table 5. The net present value of a stream of foregone production over 30 years is also presented using three discount rates. The levels of foregone production assume that there would not be any beneficial development of low intensity land use following the construction of the upgrade.

An associated impact on loss of agricultural land is the potential loss of associated processing activity that is, the value of processing and adapting the raw produce for consumption/further processing. A local coffee processor has stated that the loss of prime land has the potential to affect future export orders through disrupted supply and potential loss of the clean green image. This was raised in discussions with three local business owners who stated that buyers visited the local farms to view local product. When visiting, the buyers stated that the image was very important in the selection of the product for market and this was a key differentiator of the Ballina / Byron area to other areas nationally and internationally.

⁹ A 'gross margin' can be defined as the gross income from an enterprise less the variable costs incurred in achieving it. Variable costs are those costs directly attributable to an enterprise and which vary in proportion to the size of an enterprise. A gross margin is not profit because it does not include fixed or overhead costs such as depreciation, interest payments, rates and permanent labour, which have to be met regardless of enterprise size (NSW Department of Primary Industries - <http://www.dpi.nsw.gov.au/agriculture/farm-business/budgets/about/intro>). Gross margins are sometimes used in regional economic appraisals as they are scaleable, regardless of which individual enterprises are being affected.

Table 5 Foregone production for annual agricultural gross margin

Impact	Foregone value of annual agricultural gross margin (\$M)	Net Present Values ¹⁰ (over 30 years) (\$M)		
		Discount Rate 4%	Discount Rate 7%	Discount Rate 10%
Directly affected	\$4.5	\$8.2	\$6.0	\$4.7
Indirectly affected	\$2.4	\$4.3	\$3.3	\$2.5
Total	\$6.9	\$12.5	\$9.2	\$7.2

Gross margin is somewhat comparable with direct Gross Regional Product (GRP). Whether it is higher or lower than GRP mainly depends on whether fixed costs are greater or less than salaries/wages. Gross margin and direct GRP are certainly of the same order of magnitude.

Annual foregone agricultural production for the:

- Preferred route was estimated at \$0.8 million direct GRP.
- Proposed upgrade is estimated at \$0.7 million gross margin.

The Byron-Ballina region has a total annual GRP of around \$170 million. The proposed upgrade was estimated to reduce this by \$1.4 million. This reflects both direct (\$0.8 million) and indirect (\$0.6 million) GRP effects.

Given the alignment of direct GRP and gross margin impacts it is reasonable to assume that the total regional economic effect of the proposed upgrade would be of a similar magnitude to that estimated for the preferred route (of less than half of one percent). Furthermore, given the range of assumptions used in the analysis, it is reasonable to assume that any difference would be less than the confidence limit surrounding either of these point estimates.

The impact of the highway upgrade on the availability of significant farmland is minor. The north western fringe of the significant farmland located to the north of Old Byron Bay Road would be marginally affected by the highway upgrade. It is estimated that less than 1 per cent of the total area of significant farmland currently available in the region would be lost to the proposed upgrade.

Management of impacts: The Remnant Land Strategy contained within *Working Paper 07 - Land Use and Property Assessment* (June 2008), Hassall & Associates provides mitigation measures which seek to maximise the amalgamation of residual parcels to avoid the creation of small isolated unproductive lots.

¹⁰ According to the theory of the 'time value of money,' future cash flows must be discounted to reflect their present value. A net present value represents the sum of future values, discounted to present values.

$$NPV = \sum_{t=1}^T \frac{NetCashFlow_t}{(1+r)^t}$$

where T is the period over which the cash flows (or in this case annual gross margins) occur, and r is the discount rate (which is assumed to be 7 per cent 'real' consistent with the mid point assumption recommended by NSW Treasury and the use of 'real' projected gross margins).

5.9 Regional impacts on the tourism sector

Impacts of a development on tourism are often very difficult to assess objectively because:

- Tourism is not a standard industry sector for which there are readily available industry statistics¹¹.
- Family, friends, business and recreation are all tourism drivers.
- Tourists visit areas for many varied and multiple reasons – destinations / activities.
- Demographic growth and other factors would affect the availability of accommodation and relative desirability of the area for tourists.
- Surveys of tourism expenditures in other regions or particular activities (such as public land uses) may not be transferable.

The only known economic model of the Byron-Ballina region is the input-output model owned by the Tweed Economic Development Corporation (TEDC). Its underlying transaction tables are based on the Input-Output Industrial Classifications which are, in turn, based on the Australian and New Zealand Standard Industrial Classification (1993). This classification does not include a distinct 'tourism' sector. Rather, economic activity in the tourism sector is reflected in 'household' expenditures and the provision of related services.

There are also difficulties associated with assessing the impacts to the agri-tourism industry as agri-tourism is a segment of hinterland tourism activities and opportunities. Research has revealed there is no specific database or collation of information on agri-tourism in the Byron-Ballina region.

When considering impacts on agri-tourism it should be noted that:

- Impacts of the proposed upgrade on agri-tourism are implicit in the regional GRP effects estimated by Hassall and Associates and the TEDC, albeit that analysis does not take into account specific agri-tourism activities on any particular properties.
- Agri-tourism is locally important but probably an ancillary, rather than primary, motivation for many tourists visiting the region.
- Agri-tourism opportunities that are affected by the proposed upgrade may be displaced within, rather than lost from, the region over the medium to long term unless there is a comprehensive and significant diminution of the character, scenery and amenity values of the hinterland.
- The proposed upgrade may facilitate and encourage regional visitation and hinterland tourism by improving road transport.

Although the proposed upgrade may result in a loss of the arcadian landscape feel, it is likely to be beneficial to the expanding self drive (touring by car) market. By upgrading the Pacific Highway there would be more local road networks which would provide additional off highway options within the scenic hinterland connecting with a number of villages. Local authorities and tourism associations may decide to initiate dedicated tourist signposting and the trails. This could take advantage of the additional local road network away from the through traffic to enhance tourist routes.

¹¹ "Standard industries are defined in the Australian and New Zealand Standard Industrial Classification (ANZSIC) (cat. no. 1292.0) on the basis of the primary goods and services that they produce. However, tourism is not a standard industry. Tourism is a component of many different standard industries and as such, is an alternative view of the economy in which the supply of goods and services either relates to visitors (this is tourism) or to residents (this is not tourism). This means that a proportion of data on standard or conventional industries will not relate to tourism. In some industries, a high proportion of industry output is associated with tourism. In others, the major share of industry output relates to the needs of residents, not visitors." Themes – Tourism: Using tourism statistics, <http://www.abs.gov.au> as at 14th February 2008.

In addition, the positive impacts on the local townships would be enhanced by the effective positioning of visitor information centres (or areas) and signage, highlighting local attractions and providing incentives for long stay or destination tourism.

The proposed upgrade may cause delays and traffic jams during construction, especially during peak holiday times. This may deter some tourists from visiting the region, given that the majority of visitors access the region by car. This has the potential to impact the local tourism industry, however any impact would be confined to the construction phase.

It is noted that improvements in the Pacific Highway outside the region may affect visitation levels within the region. Those improvements however, are exogenous and consistent with good practice their impacts do not form part of the consideration of impacts in this regional assessment.

Management of impacts

Local authority and tourism associations may decide to investigate dedicated tourist signposting and trails.

A range of mitigation measure (visual treatments) has been recommended in the Urban Design, Landscape and Visual Working Paper to lessen the impact of the upgrade on the visual amenity, scenery and character of the local area.

5.10 Impacts on local businesses

Impacts of the upgrade on the viability, profitability, productivity and sustainability of directly affected non-agricultural businesses would reflect the change in the physical operating environment (accessibility, visibility and operating amenity) and disruption of patronage (be it from through traffic on the existing highway, local patronage or whether the town or village is a 'destination' in its own right). Furthermore, those impacts would vary between the short term (during construction and adjustment within the local community) and the long term (as accessibility, visibility and operating amenity impacts become fully embedded).

The types of impacts on local non-agricultural businesses include:

- Accessibility
- Visibility
- Operating amenity.

These different impacts are discussed below in terms of impacts on businesses at Newrybar, Knockrow and Ballina.

5.10.1 Accessibility

Accessibility to business enterprises relates to the ease that potential patrons can gain access to the businesses within the proposed upgrade area. Visibility is relevant to

Some disruption to local and through traffic would be expected during the construction period. Traffic disruptions would potentially affect businesses at either Newrybar, Knockrow or Bangalow, however the overall impact on businesses would be expected to be minor due to the anticipated short duration of disruptions.

During operation, business enterprises with links to passing highway trade would be potentially subject to adverse effects as a result of the relocation of the highway and more restricted access that would result. The main potential impact in this regard is at Knockrow, where a proportion of the business received by the Macadamia Castle is related to its easy accessibility from the highway. Passing highway traffic is less important to businesses in Newrybar and Bangalow (although it is acknowledged that some business activity occurs in these locations from highway users stopping for a rest and/or refreshment).

Access arrangements for patrons of these businesses (other than passing highway traffic) would change due to local road reconfiguration, however it would be expected that access for local patrons would generally be easier.

5.10.2 Visibility

Visibility to passing traffic is important to some businesses, particularly any which are reliant on passing trade (as discussed above). Businesses in Newrybar and Bangalow currently have very limited visibility from the highway, other than signs indicating the presence of each town. The Macadamia Castle at Knockrow however, is highly visible from the existing highway, the facility would not be visible from the proposed upgrade, which may have some impact on patronage, but may be able to be mitigated through appropriate signage.

Construction would not be expected to impact on the visibility of businesses in the area.

5.10.3 Operating amenity

The proposed upgrade may affect the amenity of the townships by having an influence on the noise environment, air and visual quality.

The amenity of Newrybar is expected to be improved during the operational phase of the proposed upgrade. Reduced noise and improved safety associated with the lower traffic volumes on the existing highway are likely to enhance Newrybar's role as a destination village for tourists and to complement the types of businesses that currently occur in the town.

Amenity in Knockrow (at the Macadamia Castle) would also be improved, both in terms of noise and safety. This improved amenity would be beneficial to many of the components of this business, which has both outdoor and indoor activities and facilities.

Amenity may be reduced when construction is occurring in close proximity to businesses, particularly in terms of noise. Businesses in Newrybar are the most likely to experience amenity related impacts during construction. Construction activities would be approximately 500 metres from the centre of Newrybar when construction is at its closest point potentially resulting in minor impacts on business activities that are dependent on amenity.

Potential amenity related impacts during operation are summarised below:

- The potential operating amenity affects on businesses in Knockrow would be slightly negative owing to its location between the existing highway and the proposed upgrade.
- The proposed upgrade would be approximately 500m east of the existing Newrybar village which would be beneficial for both visual and acoustic amenity.
- Overall, the impact on Bangalow businesses' operating amenity is likely to be minimal as it is currently bypassed by the existing highway and this would continue for the proposed upgrade. Improved operating amenity is expected on the fringes of Bangalow due to traffic being significantly reduced on the existing highway between Granuaille Road and Bangalow Road.

An additional short term influence on businesses in the area would be revenue generated directly by construction workers. Businesses (particularly food outlets) in Newrybar and Bangalow are likely to benefit from this expenditure during the construction period, with the greatest benefit occurring when construction is occurring in close proximity to the respective town centres.

An overall assessment of the above factors is shown in Table 6.

Table 6 Summary of business impacts in adjacent towns and villages

Town / Village	Businesses	Construction Impacts	Operational Impacts
Bangalow	<ul style="list-style-type: none"> • Gift Shop • Mixed emporium • Service Station • Patisserie • Cafés • Hotel • Guest House and other accommodation • Various other general retail businesses 	<p>Neutral</p> <p>Some potential minor accessibility impacts. Some businesses would benefit from expenditure from construction workers.</p>	<p>Neutral</p> <p>No long term impacts anticipated.</p>
Newrybar	<ul style="list-style-type: none"> • General Store • Harvest Café • Newrybar Gallery • Camphor Cottage • Newrybar Saddlery and Produce • Country House Antiques 	<p>Negative</p> <p>Business is evenly mixed between local and tourism expenditure. Reduced connectivity is expected during construction. Some businesses would benefit from expenditure from construction workers.</p>	<p>Positive</p> <p>Ultimately improved amenity for a 'destination' village should offset connectivity impacts.</p>
Knockrow	<ul style="list-style-type: none"> • Macadamia Castle 	<p>Negative</p> <p>Business is dominated by existing highway related trade. Potential amenity and access impacts during construction.</p>	<p>Neutral</p> <p>Although less exposure, positive impacts are expected owing to improved amenity and safer access.</p>

The proposed upgrade would be expected to have some short term negative impacts on businesses located in Newrybar and Knockrow (Macadamia Castle) but should be neutral or positive over the long term.

Short term negative impacts in Newrybar and Knockrow would affect profitability of businesses and, if they are highly leveraged or otherwise financially vulnerable, their short term viability. However, over the long term, the net impacts of the highway upgrade are expected to be neutral to positive for the local trading environment in all three centres. This should, on balance, benefit the value of affected businesses by increasing profitability and productivity, and therefore their viability and sustainability.

5.11 Economic impacts from construction

A peak construction workforce of about 250 to 300 people is anticipated. The average size of the construction workforce on site would be approximately 150 people including management staff and contractors. It is expected that employment opportunities would be available for workers in the Ballina Shire and Byron Shire LGAs during the three year construction period.

Initial research of the local area indicates that there are some industrial mineral borrow areas or quarries in the vicinity of the proposed upgrade. These possible local sources for construction materials are heavily favoured due to the reduction in transport, haulage and logistical costs of their use and would generate local economic benefits.

6 Summary / Recommendations

This analysis of social and economic impacts has considered:

- Key issues identified during community engagement (top three important community concerns were improved safety, noise issues and impact on dwellings which are social and economic concerns).
- The Director General’s environmental assessment requirements.
- A range of social and economic changes and impacts (both positive and negative) that is likely to occur as a result of the proposed upgrade.

The impacts are generally considered to result in minor changes given the proposed upgrade largely follows the existing Pacific Highway with the exception of some diversions.

Table 6 provides a summary of the assessment impacts and identifies project specific management measures where appropriate.

Table 7 Assessment summary

Impact	Description of impact		Description of management of impacts
	Description	Significance	
Property acquisition	A total of 73 properties are directly affected by the upgraded highway, with 22 dwellings under the proposed upgrade footprint. General issues: inability to afford to buy back into the area; limited number of properties to choose from in the area; loss of local connections and community cohesion; impacts on health and wellbeing owing to possible upheaval of roots; loss of income through acquisition of agricultural land; and severance impacts on community and residential clusters.	Direct impact Negative	Acquisition and compensation pursuant to the RTA’s acquisition policy; measures identified in the Remnant Land Strategy within the <i>Land Use and Property Impacts Working Paper</i>
Community services and facilities	Only facility to be affected is the Newrybar Primary School.	Indirect impact Negative	Implement noise attenuation and visual treatments for the eastern boundary of the school in discussion with the school
Connectivity and contiguity	The upgraded highway is not expected to limit access or reduce mobility for pedestrians and vehicles in parts of the local area.	Direct Neutral	Appropriate signage would be provided prior to the interchanges to ensure drivers’ understanding of access to the villages and towns
Safety	Road safety is to be increased with the upgrade as there would be reductions in the frequency and severity of motor accidents as well as reducing the level of risk for pedestrians	Direct Positive	None

Impact	Description of impact		Description of management of impacts
	Description	Significance	
Amenity	Air quality – air quality goals roadside are not exceeded. Some benefits associated with splitting the traffic.	Indirect Neutral / Positive	Measures would be focused on the management of air quality during construction (as detailed in the <i>Air Quality Working Paper</i>)
	Noise and vibration impacts in the community, in order of increasing severity, relate to: Community / resident annoyance. Disturbance to community/resident activities (e.g. sleep disturbance). Adverse effects on human health (e.g. increased blood pressure, heart rate or impaired performance due to lack of sleep).	Indirect Negative	Measures would be implemented as appropriate including noise attenuation barriers, low noise pavement and architectural treatment of dwellings (as detailed in the <i>Noise Working Paper</i>)
	Visual – introduction of a new dual carriageway through a highly scenic landscape	Indirect Negative	Measures would be undertaken as detailed in the landscape strategy which seeks to visually integrate the road into the landscape (as detailed in the <i>Urban Design, Landscape and Visual Impact Assessment Working Paper</i>)
Local and regional growth	Upgrade is identified as a major infrastructure project in the <i>Far North Coast Regional Strategy</i>	Indirect Positive	Management measures and specific strategies related to property acquisition have been outlined in the Remnant Land Strategy which forms part of the <i>Land Use and Property Impacts Working Paper</i>

Impact	Description of impact		Description of management of impacts
	Description	Significance	
Agricultural sector	Total Gross Regional Product is expected to fall by less than 0.5 per cent as a result of foregone agricultural production and less than 1 per cent of the total 'significant farmland'.	Direct Slightly negative	The Remnant Land Strategy contained within the <i>Land Use and Property Impacts Working Paper</i> provides mitigation measures which seek to maximise the amalgamation of residual parcels to avoid the creation of small isolated unproductive lots
Tourism sector	Agri-tourism opportunities are likely to be displaced within, rather than lost from, the region over the medium to long term. Additional off highway options within the scenic hinterland for self drive tourist market.	Indirect Neutral	Local authority and tourism associations may decide to investigate dedicated tourist signposting and trails. A range of mitigation measure (visual treatments) has been recommended in the <i>Urban Design, Landscape and Visual Working Paper</i> to lessen the impact of the upgrade on the visual amenity, scenery and character of the local area.
Local businesses	Operating amenity, accessibility to business enterprises, connectivity to landscape and temporal impacts.	Direct and Indirect	None
Economic impacts from construction	Construction workforce of between 250 and 300 people is anticipated, potential for construction materials to be sourced locally.	Direct Positive	None

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Appendix A

Demographic Analysis

A1 Demographic Analysis

A1.1 Population

Within the eight census collection districts (CCDs), there was a total population in 2006 of 3389 persons with almost 55 per cent located within the northern half of the upgraded highway area within Byron Shire) and the remaining 45 per cent in the southern half of the upgraded highway area that falls within Ballina Shire. The most populous CCDs are 1071001 that includes the residential area of Bangalow, as well as to the south west (1071801) that covers the closely settled rural area between Tintenbar and Newrybar as shown in Table A1.

Table A1 Population within CDs covering the upgraded highway area

Census Collection District	Total persons	
	Number	Percentage
Within Byron Shire		
1071003	236	7.0
1071007	275	8.1
1071101	586	17.3
1071102	427	12.6
1071114	305	9.0
Subtotal	1829	54.0
Within Ballina Shire		
1071203	441	13.0
1071801	581	17.1
1071802	538	15.9
Subtotal	1560	46.0
Total	3389	100.0

Source: ABS 2006

A1.2 Age Structure

Table A2 shows the age structure for relevant areas. The upgraded highway area age structure more closely aligned with the younger age structure of Byron shire compared to the older age structure of Ballina and was fairly similar to the State average whereas the regional structure exhibited an older structure influenced by localities with a high proportion of retirees.

Notable differences in the age profile are that in Ballina has the highest proportion of 65+ year olds. This reflects the retirement nature of areas of the Shire generally south of that part of the upgraded highway area that falls within Ballina LGA.

Table A2 Age structure

Age group	Study area CDs (%)	Ballina (%)	Byron (%)	Richmond Tweed (%)	NSW (%)
0 - 4	5.5	5.2	5.5	5.6	6.4
5 - 14	14.4	13.5	13.9	13.8	13.4
15 - 24	9.6	11.2	11.5	11.7	13.3
25 - 54	43.7	37.7	44.7	38.5	42.0
55 - 64	12.5	12.8	12.2	12.3	11.0
65 +	14.1	19.6	12.1	18.0	13.8
Total	100.0	100.0	100.0	100.0	100.0

Source: ABS 2006

The median age in Byron Shire was 41 and in Ballina 43. It should be noted that demographic characteristics vary between localities across the shires. In CCD 1071101, which takes in the Bangalow area of the upgraded highway area, the median age is 37. CCD 1071007 within the same Byron Shire, is closer to Byron Bay where the median age is higher, 46.

A1.3 Indigenous population

Within the upgraded highway area CCDs, there was only 0.9 per cent of the population that identified themselves as indigenous. This was lower than proportions for both Ballina (2.7 per cent) and Byron (1.5 per cent) as well as the regional (3.3 per cent) and state levels (2.1 per cent).

A1.4 Employment

A1.4.1 Employment type

Within the upgraded highway area CCDs, approximately 49.8 per cent of the employed labour force worked full time and 38.1 per cent part time. This proportion of full time workers was lower than the Ballina (51.9 per cent), regional (51.4 per cent) and state (60.8 per cent) averages but higher than Byron (44.1 per cent). This data reflects, in part the economic and land use patterns dominated by agricultural and rural residential activities which tend to have higher proportions of part-time jobs and lifestyle reasons whereby people may not want a full-time job. There is also a high level of unemployment and underemployment

A1.4.2 Employment by industry

Within the upgraded highway area CCDs, the largest industry occupational category was the health care and social assistance sector (11.0 per cent) followed by retail trade (10.8 per cent), agriculture, forestry and fishing (10.0 per cent), construction and accommodation and food services (both 9.6 per cent). This industry breakdown suggests both the important role of health services and agriculture in the upgraded highway area as well as job opportunities in the retail and service sectors located in nearby towns such as Byron Bay, Ballina and local townships.

In CCD 1071801 which takes in the Newrybar area of the upgraded highway area, 16.7 per cent of the total labour force were employed in agriculture, forestry and fishing followed by health care and social assistance (11.8 per cent). In CCD 1071802, Newrybar swamp area and environs, highest employment type was retail trade (12.9 per cent), followed by health care and social assistance (11.8 per cent).

In CCD 1071007 which covers the Ewingsdale and Coopers Shoot areas closer to Byron Bay, the retail trade and accommodation and food services sectors together accounted for approximately 21.1 per cent of the workforce reflecting its closer location to employment opportunities in Byron Bay.

In Ballina Shire the top seven employment industries are retail trade (14.3 per cent), health care and social assistance (13.4 per cent), education and training (10.1 per cent), construction (9.1 per cent), accommodation and food services (8.4 per cent), manufacturing (6.3 per cent) and public administration and safety (5.5 per cent). In Byron Shire, retail trade (12.6 per cent) and accommodation and food services (12.2 per cent) were the top employment industries followed by health care and social assistance (11.6 per cent), construction (9.3 per cent), education and training (9.0 per cent), manufacturing (6.5 per cent), professional, scientific and technical services (6.1 per cent) and agriculture, forestry and fishing (4.4 per cent).

A1.5 Household structure

The proportion of couple families with children was 43.9 per cent for the upgraded highway area CCDs which was close to the NSW average (46.2 per cent) and higher than both Ballina and Byron Shires (37.7 per cent and 29.1 per cent respectively). The proportion of couple families in the study area without children was 40.2 per cent which was lower than Ballina (44.0 per cent) but higher than Byron (36.0 per cent). One parent families in the upgraded highway area CCDs (15.9 per cent) were similar to levels in Ballina (17.1 per cent) and NSW generally (16.1 per cent) but lower than in Byron (23.7 per cent) and Richmond Tweed (19.0 per cent).

In Ballina Shire, household and family profile differs from the state with more families without children (44.0 per cent) and fewer couple families with children (37.7 per cent) – reflective of the older age structure and retiree households. Ballina shire also has a higher proportion of single families (17.1 per cent) than the state average, but was similar to the Richmond/Tweed Region (19.0 per cent).

A1.6 Income patterns

Weekly household income levels are shown in Table A3. The largest proportion of households in the study area (13.0 per cent) had a weekly household income of \$500-\$600. This is similar to Ballina Shire, Byron Shire, and the Richmond/Tweed district where the largest proportion of households also received a weekly household income of \$500-\$600.

Table A3 Weekly Household Income

Area	Household income (\$) (%)														Total	
	Nil	1-149	150-249	250-349	350-499	500-649	650-799	800-999	1,000-1,199	1,200-1,399	1,400-1,699	1,700-1,999	2000+	Part stated		Not stated
Study area	2.3	1.3	4.8	7.9	4.6	13.0	6.1	7.6	9.1	6.6	6.1	3.9	11.0	9.7	3.9	100.0%
Ballina	0.9%	1.5	6.0	9.6	6.1	14.3	7.3	7.3	10.9	5.5	6.1	4.4	9.5	7.5	3.2	100.0%
Byron	1.4%	1.7	6.7	9.8	5.5	14.5	7.2	7.7	10.3	5.5	5.5	3.7	8.2	9.3	3.0	100.0%
Rich/Tw	0.9	1.6	6.8	10.2	7.3	14.7	7.2	7.5	10.7	5.4	5.6	4.0	7.4	7.4	3.2	100.0%
NSW	1.2	1.5	5.2	7.0	5.2	10.0	6.0	6.5	9.9	5.1	7.2	5.9	18.0	8.3	2.9	100.0%

Source: ABS 2006

A1.7 Highest level of educational attained

The population in the study area CCDs and both Ballina and Byron generally had higher levels of educational attainment in the Bachelor degree and above categories than in the Richmond Tweed region and state area (see Table A4).

Table A4 Highest level of educational attained

Area	Highest level of educational attained (per cent)							Total
	Post-graduate Degree	Graduate Diploma / Graduate Certificate	Bachelor Degree	Advanced Diploma / Diploma	Certificate	Not stated	N.A.	
Study area	3.9	2.7	24.0	15.1	29.3	15.7	10.6	100.0
Ballina	3.3	2.9	19.4	14.2	37.2	19.4	3.7	100.0
Byron	3.7	3.1	22.8	15.1	30.0	22.1	3.2	100.0
Rich/Tweed	2.7	2.5	17.0	13.0	38.1	23.1	3.6	100.0
NSW	5.7	2.3	22.2	13.6	30.9	22.3	3.1	100.0

Source: ABS 2006

A1.8 Car ownership and journey to work mode

As would be expected in a rural area, car ownership levels (especially more than one or more cars per dwelling) in the study area CCDs are generally higher than the rates recorded at the shire, regional and state levels (see Table A4). Only 3.6 per cent of dwellings in the CCDs did not have a motor vehicle on Census night. This reflects the type of industry of employment and lack of public transport generally available in rural areas resulting in a higher reliance on private motor vehicle transport especially for journey to work travel.

Table A4 Number of Motor Vehicles Per Dwelling

Area	No of motor vehicles per dwelling (per cent)					Total dwellings
	0	1	2	3+	Not stated	
Study area CCDs	3.6	33.3	43.2	16.7	3.5	100.0
Ballina	8.4	40.8	33.6	11.6	5.5	100.0
Byron	6.3	39.0	32.2	11.2	11.3	100.0
Richmond Tweed	8.5	40.9	31.6	11.6	7.3	100.0
NSW	11.2	36.7	31.4	12.3	8.3	100.00

Source: ABS 2006

Within the CCDs, 85.6 per cent of people who used one method of travel to work were either a car driver (77.8 per cent) or passenger (7.8 per cent) compared with 71.2 per cent and 7.2 per cent respectively at the state level. There was virtually no use of public transport (other than very small numbers by bus) for journey to work travel within the CCDs.

Appendix B

Gross Margins

B1 Gross Margins

B1.1 Gross margins used in the calculation of the value of foregone agricultural production

The gross margins used in **Table B1** have been adopted from the information supplied by DPI and are to be used only to assess the economic impacts of the project.

Table B1 Gross margins

Land Use	Gross Margins (\$ per ha)
Cleared and cultivated	\$179
Coffee mature	\$4,665
Coffee immature	\$2,333
Floriculture	\$44,000
Grazing	\$179
Macadamias immature	\$141
Macadamias mature	\$4,275
Nursery	\$18,000
Other fruit – bananas	\$18,000
Stone fruit	\$14,166
Timber plantation	\$1,500
Vegetables	\$18,429
Water course - grazing	\$53