2 Strategic and project need

2.1 Strategic outcomes of Pacific Highway Upgrade Program

The proposed upgrade is an important component of the wider Pacific Highway Upgrade Program (**Figure 2.1**) , which is needed to meet the NSW and Commonwealth governments' commitments to upgrade the Pacific Highway between Hexham in NSW and the Queensland border in response to:

> Current constraints on transport infrastructure and the related need to improve accessibility and transport, both within individual regions and between regions.

> The need to improve the efficiency and integration of transport infrastructure, including improvements in the efficiency and productivity of the freight sector.

> The need to improve road safety.

> Increasing demand for urban development, especially in the relatively narrow coastal strip of NSW.

The objectives of the program are to:

> Significantly reduce road crashes and injuries.

> Reduce travel times.

> Reduce freight transport costs.

> Develop a route that involves the community and considers its interests.

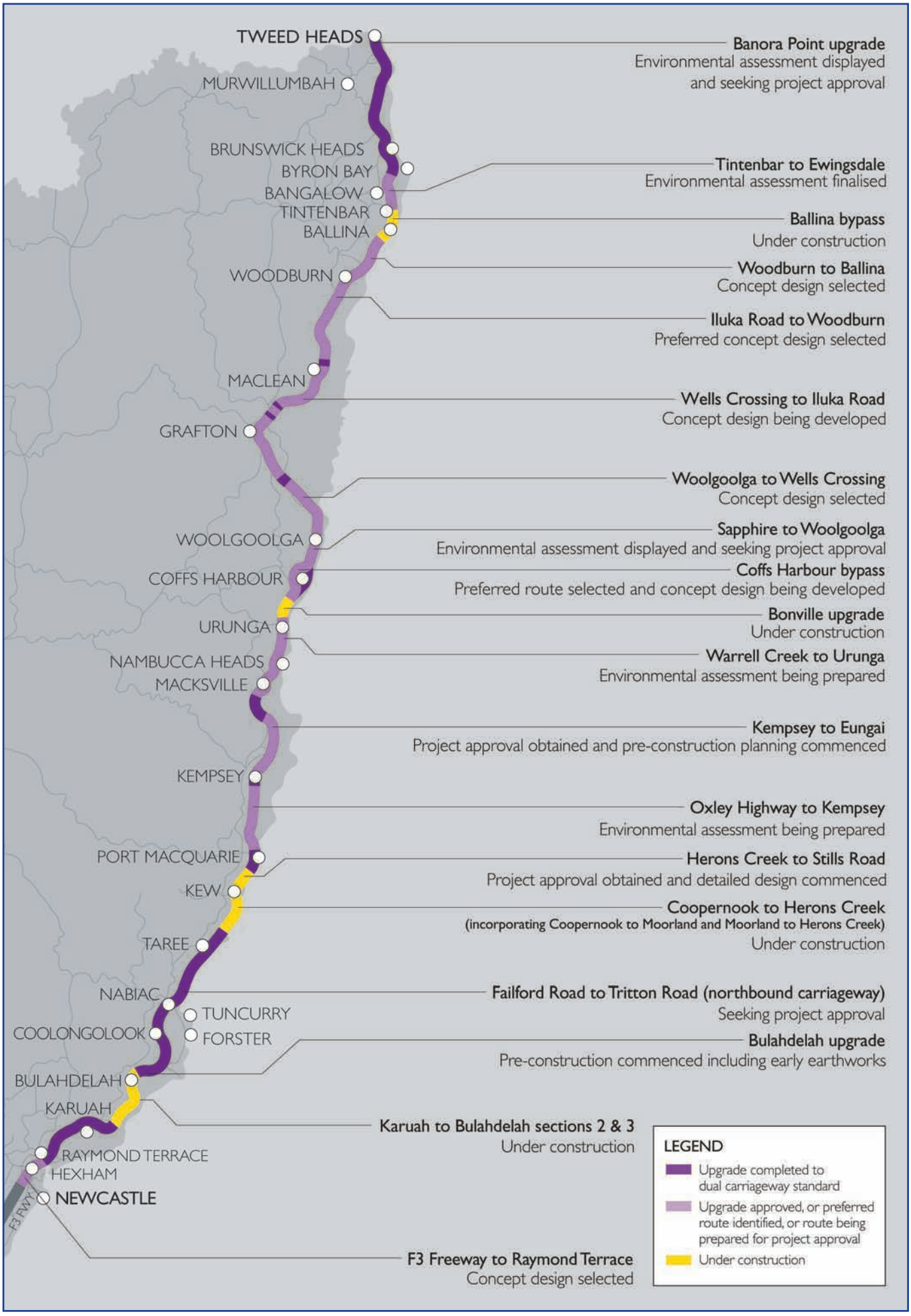
> Provide a route that supports economic development.

> Manage the upgrading of the route in accordance with ecologically sustainable development principles.

> Provide the best value for money (RTA 1997).

The Pacific Highway Upgrade Program is needed in part because of population growth and the associated pressures that places on transport infrastructure. However, the program itself also plays a role in facilitating that population growth. The proposed upgrade has been developed to be consistent with the strategic outcomes of the program. The strategic outcomes of the program, how the proposed Tintenbar to Ewingsdale upgrade fits within these strategic outcomes, and how impacts associated with the project will be considered and managed to achieve acceptable environmental outcomes across the program are discussed in **Chapter 21 – Strategic and project justification.**

Figure 2.1 - Pacific Highway Upgrade Program current status



2.2 Growth context

The following sections present the strategic need for the proposed upgrade in context of the Pacific Highway Upgrade Program.

2.2.1 Planning for growth

AusLink White Paper

The AusLink White Paper *Building our National Transport Future* (the White Paper) (Commonwealth of Australia 2004) is the Australian Government's formal policy statement on land transport that identifies national objectives for the AusLink investment program.

The White Paper seeks to promote sustainable national and regional economic growth, development and connectivity by contributing to the development of an integrated national transportation network. The Pacific Highway is identified as part of the national network defined in the National Land Transport Plan under the AusLink investment program and is also the key road in the Sydney-Brisbane transport corridor. The overall Pacific Highway Upgrade Program and the proposed upgrade would help to achieve the key objectives of the AusLink investment program by improving connectivity within and between communities in the growing region, enhancing road safety, incorporating ecologically sustainable development principles, and assisting in promoting economic growth and development.

Sydney-Brisbane Draft Corridor Strategy

The *Sydney-Brisbane Draft Corridor Strategy* is a joint publication by the Commonwealth Department of Infrastructure, Transport, Regional Development and Local Government Queensland Main Roads, NSW Department of Planning, NSW Ministry of Transport, Queensland Transport and the RTA. The strategy identifies the Sydney-Brisbane corridor as the busiest on the Australian transport network. In addition to the Pacific Highway's role as a major interstate transport route, the strategy identifies Pacific Highway in the Far North Coast/Northern Rivers region as a key component in linking populations in multiple regional centres with diversified rural and tourism economies and many small to medium sized manufacturing industries.

Deficiencies in the transport corridor are highlighted by the strategy and include safety, amenity, infrastructure capacity, road geometry and aging pavement. To overcome the deficiencies the strategy identifies the achievement of substantial completion of the duplication of the Pacific Highway as a short term priority and completion of the entire Pacific Highway duplication as a long-term priority.

NSW State Infrastructure Strategy

The *State Infrastructure Strategy– New South Wales* 2006-07 to 2015-16 (NSW Treasury 2006) provides strategic direction for planning and delivery of infrastructure in NSW. The strategy lists roadwork initiatives planned throughout NSW, including the Pacific Highway Upgrade Program.

The strategy highlights that the upgrading of the Pacific Highway will continue under the AusLink agreement and that in a recent agreement both governments have each contributed $160 million in addition to the previously agreed funding under the AusLink

agreement. The proposed Tintenbar to Ewingsdale upgrade (along with other Pacific Highway Upgrade projects) are identified in the strategy.

The strategy also identifies that the Pacific Highway requires upgrading as soon as possible. The NSW Government will continue to work in partnership with the Australian Government to investigate potential timing, financing and delivery options to accelerate the upgrade of the Pacific Highway.

The NSW Government under the strategy will also continue to work cooperatively with the Australian Government and Australian Rail Track Corporation (ARTC) to increase rail freight capacity and competitiveness, with specific initiatives by NSW to increase the share of port container freight carried by rail. The ARTC's two main investment strategies are:

> A north–south investment strategy worth $1.1 billion to achieve a step–change in rail's competitiveness in the interstate intermodal market.
> Investment of over $200 million in major rail renewals in NSW.

Far North Coast Regional Strategy 2006-31

The *Far North Coast Regional Strategy* aims to guide sustainable growth across the region. The strategy sets out a range of policies and plans. Of particular relevance are the following:

> Ballina will develop as the third major regional centre.
> Land use and transport planning must be integrated to minimise the need to travel, and to encourage energy and resource efficiency.
> The regional transport network must be protected, and passenger interchanges provided in major centres.
> The Pacific Highway will continue to be the primary inter/intra-region road corridor and its efficiency and safety protected. Upgrading of the Pacific Highway will be continued.
> The Casino to Murwillumbah rail corridor will be protected and an extension of the Gold Coast rail system into NSW will be investigated.

North Coast Regional Environmental Plan

The *North Coast Regional Environmental Plan* establishes a regional framework for the development of the NSW North Coast Region.

Part 5 of the environmental plan identifies the strategic importance of improving regional infrastructure along the NSW North Coast. It sets out objectives which recognise the need to safeguard the role and efficiency of the major arterial road system and the need to facilitate maintenance and improvement of transport across the region.

2.2.2 Growth pressures

National transport growth

The AusLink White Paper identifies trade as an important driver of economic growth, and that trade requires efficient transport infrastructure.

Road transport is identified as the dominant mode for moving freight over relatively short distances and where alternatives are not readily available. Total freight is forecast to almost double in the next 20 years.

Cars are identified as the dominant transport mode for domestic passenger travel, accounting for over 80 percent of total kilometres travelled. The AusLink White Paper identifies that private motor vehicle travel will continue to be of critical importance for access to services in regional areas, especially growth nodes such as the NSW coastal belt and south-east Queensland.

Sydney-Brisbane corridor

The Pacific Highway plays a vital role in linking coastal regions between Sydney and Brisbane, providing access to markets and sources of goods and services.

The Sydney-Brisbane corridor includes some of the fastest growing areas of Australia. Forecasts to 2020 in the AusLink White Paper indicate that centres along the Sydney-Brisbane corridor will have continuing strong growth in freight and passenger traffic, fuelled by economic growth and population expansion.

The *State Infrastructure Strategy* projects that the north coast of NSW (stretching from the Hunter Valley to the Queensland border) will increase in population by around 58,200 people, or 11 percent, between 2006 and 2016.

Far North Coast region of NSW

The Far North Coast region of NSW stretches from Evans Head through to the Queensland border. The Department of Planning has identified urban growth areas, including major regional centres, within this region (**Figure 2.2**).

The *NSW State Infrastructure Strategy* predicts that the population in the region will increase by almost 26,000 people, an increase of over 11 percent, by 2016.

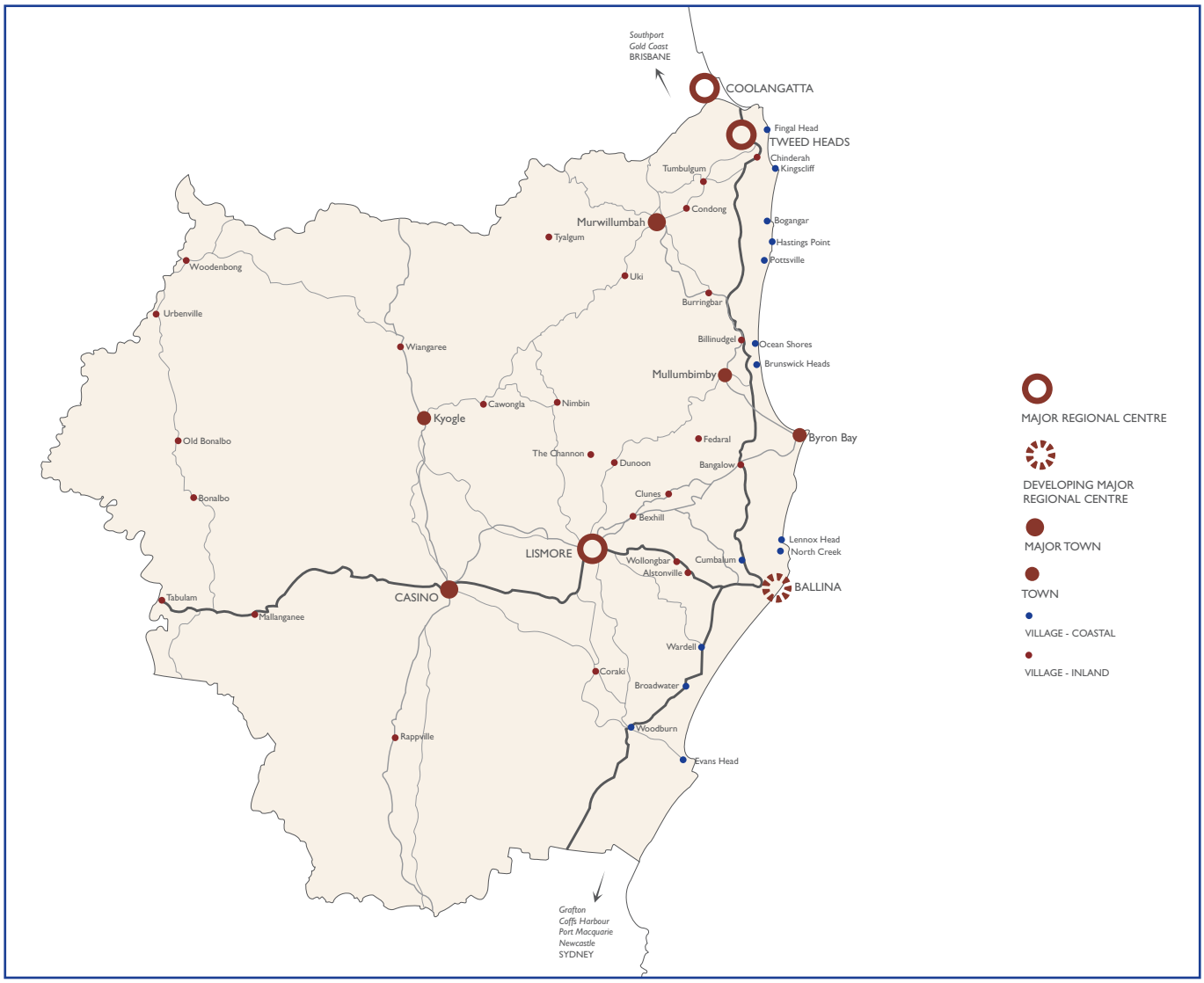
The *Far North Coast Regional Strategy* estimates a regional population of 289,000 by 2031, representing an additional 60,400 people (a 26 percent increase) for the period 2006–2031.

The *Far North Coast Regional Strategy* identifies that the coastal areas of the region have continued to grow at a moderate rate since the 1980s, while growth in the hinterland areas has been low or static. The largest population increases have been in the coastal local government areas of Tweed, Byron and Ballina.

Improved transport routes may result in an increased number of people moving to the Far North Coast for a new lifestyle, more affordable housing and business or employment opportunities. Conversely, population growth tends to put pressure on existing transport networks and increases the demand for road improvements.

Population growth and a growing number of tourists visiting the region have resulted in a change from an economy dominated by agriculture to one now dominated by service sector industries (84 percent), and manufacturing and construction (12 percent).

Figure 2.2 - Hierarchy of urban areas on the NSW Far North Coast (DoP, 2006)



Ballina local government area

The *Ballina Urban Land Release Strategy* (Ballina SC 2000) identifies that the annual population growth rate in the shire between 1991 and 1996 was about 3 percent, dropping since the high growth rate of almost 7 percent annually, between 1976 and 1981. A strategy addendum (Ballina SC 2003) identifies that the annual population growth rate was about 2 percent between 1996 and 2001. The strategy considers it reasonable to expect that substantial population growth demands will continue. The 2003 strategy addendum predicts an annual growth rate of approximately 1.7 percent between 2003 and 2021, with the population exceeding 54,000 in 2021. This compares with the population recorded in the 2006 census of 38,461.

Forecast population growth will be focussed around Ballina, Cumbalum, Wollongbar and Lennox Head.

Byron local government area

The population of the Byron Shire according to the 2006 census was 28,766, which is a slight decrease from the 2001 census where the population was recorded at 28,916.

The *Bangalow Settlement Strategy* (Byron SC 2005) identifies that the 2001 population of Bangalow was approximately 1,200. Development of existing land zoned residential is expected to almost double the village's population according to the strategy. This has been partially borne out between 2001 and 2006, with the 2006 census indicating the Bangalow population increasing to 1,758.

2.3 Transport context

The Far North Coast is currently serviced by a transport network comprised of road, rail and air infrastructure and services. The extensive road network includes:

> Two major north–south corridors, the Pacific Highway and Summerland Way.

> An east–west link, the Bruxner Highway.

In a review of alternative corridors (RTA 2006a) it was determined that the Pacific Highway should remain as the primary north-south corridor on the north coast, with the Summerland Way performing a secondary function.

It is estimated that there are 380 million trips made by residents and visitors, and around 20 million tonnes of freight moved within and through the region each year. The road network is especially important with approximately 75 percent of all journeys within the region by car (DoP 2006).

The Pacific Highway is the primary arterial road and the main transport corridor providing access to Ballina, Byron Bay, and Lismore (via Bangalow Road).

2.3.1 Road conditions

With the exception of the Bangalow bypass and the Ewingsdale interchange, the Pacific Highway between Tintenbar and Ewingsdale is single carriageway roadway, generally with one lane in each direction. Overtaking lanes are provided at intermittent locations.

The existing posted speed limit on this section of the highway is 100 km/h with the exception of the following sections:

> Tintenbar Hill to just north of Ross Lane (80 km/h).

> Skinners Creek to the southern end of the Bangalow bypass (80 km/h).

> St Helena Hill (60 km/h).

The speed reduction is part of an ongoing review of NSW roads aimed at improving road safety.

The existing at-grade intersection between the Pacific Highway and Ross Lane.

A significant section of the highway at this location has a geometry that does not meet current RTA standards, and many advisory speed signs are posted along its length.

Figure 2.3, Figure 2.4 and **Figure 2.5** show the grades, vertical curves, and horizontal curves of the existing highway. Results have been colour coded with regard to their compliance to both the RTA's minimum and desirable design criteria for the project.

The combined geometry rating graph, shown on **Figure 2.6** combines the vertical and horizontal information from the other three graphs. It shows that over 50 percent of the existing highway does not comply with at least one minimum design standard.

Other examples of poor geometry are evident on the existing highway. This includes insufficient sight distances, particularly the 28 at-grade intersections and 75 property driveways directly accessing the highway along this section.

Figure 2.3 - Condition of existing highway - grades

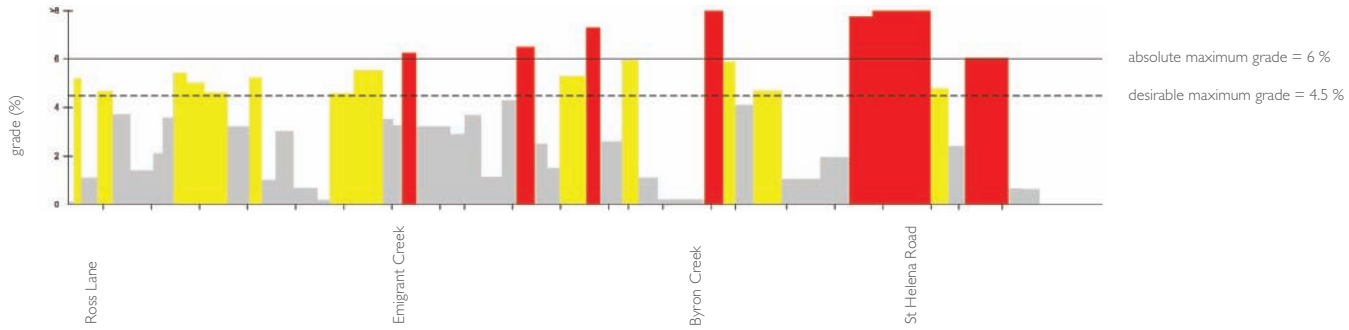


Figure 2.4 - Condition of existing highway - vertical alignment

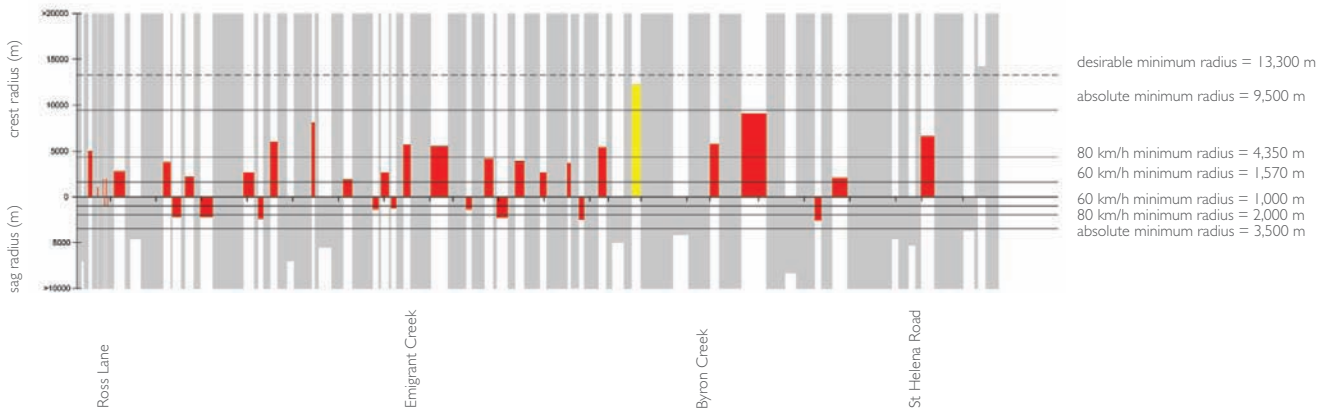


Figure 2.5 - Condition of existing highway - curve radius

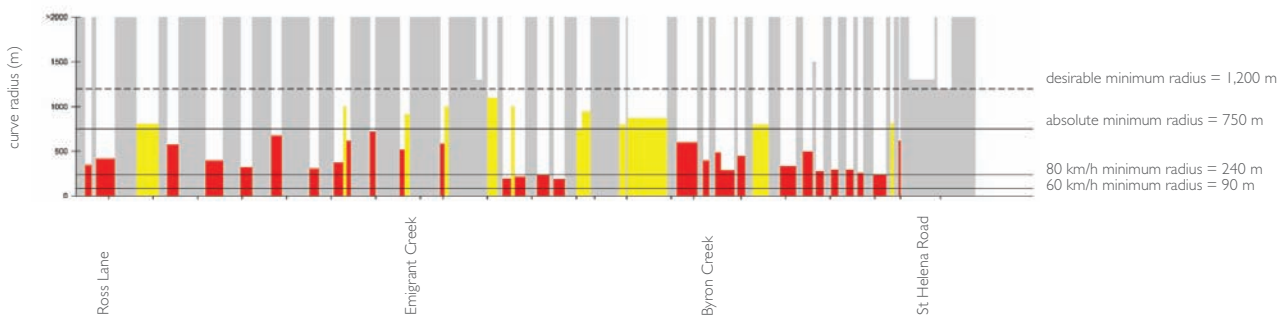
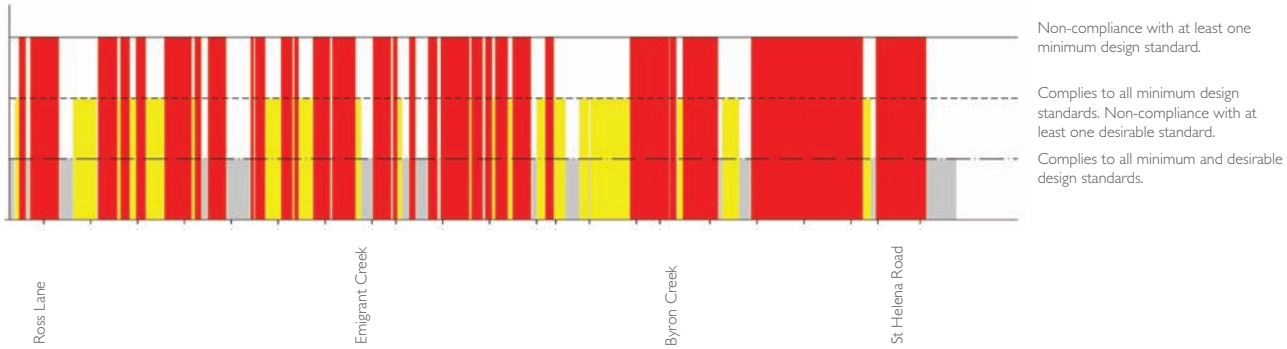


Figure 2.6 - Condition of existing highway - combined geometry



2.3.2 Local road network

The existing highway serves an important function for local traffic. It is adjacent to and provides immediate access to the townships of Tintenbar, Knockrow, Newrybar, Bangalow and Ewingsdale. In conjunction with local roads it also provides access to the communities of Fernleigh, Brooklet, Coopers Shoot, Skinners Shoot, Possum Creek and Coorabell.

Direct access from the existing highway is also provided for the following businesses and facilities:

> Macadamia Castle.
> Various properties undertaking agricultural activities.
> A lookout at the corner of Coolamon Scenic Drive.
> A rest area and toilet facilities south of St Helena Hill.

More detail on the local road network is included in **Chapter 13 - Traffic**.

2.4 Need and anticipated benefits

The contextual evaluation of the existing highway discussed in **Section 2.2** and **2.3** identifies its inadequacies. These can be summarised in terms of two fundamental factors:

> It does not meet safety objectives.
> It is inefficient.

These two primary inadequacies are discussed below, with a detailed assessment discussed in **Chapter 13 - Traffic.**

Highway safety

The need for the upgrade is strongly supported in road safety terms, both at the local and regional level. The accident rate (described in more detail in **Chapter 13 - Traffic**) along the Tintenbar to Ewingsdale section of the highway is 36 per one hundred million vehicle kilometres travelled (MVKT), well above the average of 32.8 accidents per 100 MVKT (RTA, 2004) for rural two-lane roads and further still above the target of 15 accidents per 100 MVKT that has been set by the RTA for the Pacific Highway. For the five-year period 1 May 2002 to 30 April 2007, approximately three percent of reported accidents resulted in a fatality (seven in total) on this section of the Pacific Highway, compared with a state-wide average of 1 percent (RTA accident data, 2003-2007).

This situation is ongoing and difficult to resolve without an improved road. The high accident rate is related to poor road geometry (**Figures 2.3-2.6**) and a large number of at-grade intersections with local roads. The RTA currently minimises the accident rate for the existing highway through its ongoing review of speed restrictions and road conditions.

In regional terms, it is desirable that motorists be provided with a uniform standard for safe roads. Continuity of high quality road conditions directly correlates with lower levels of accidents, especially fatalities. Additionally, the predictability of an improved highway with uniform road conditions would reduce driver fatigue and frustration, which are both factors that contribute to accidents. Safety issues associated with this section of the Pacific Highway are therefore related to adjacent road conditions to the north and south, and fit within the framework of the overall Pacific Highway Upgrade Program.

Highway efficiency

Highway efficiency refers to the ease with which a highway user can travel through a given section of highway. In the case of the Tintenbar to Ewingsdale section, the existing highway is inefficient because:

> Its vertical and horizontal geometry generally require a lower travel speed when compared with a typical dual carriageway configuration.

> It is largely a two-lane single carriageway, which results in traffic speed being influenced by slow moving vehicles.

> There are a large number of at-grade intersections with local roads that result in variable traffic speed from vehicles entering and exiting the highway.

Traffic volumes are predicted to increase for the foreseeable future. Therefore, the magnitude of the above problems could similarly be expected to increase as the existing highway approaches capacity.

The inefficiencies of the existing highway affect different types of vehicle users in different ways. Direct implications of highway inefficiency include:

> Increased time and cost involved in transporting freight.

> Increased commuting and general travel time for local residents.

> Increased travel time, and reduction in amenity of travel experience for locally based tourists.

> Increased travel time and reduction in amenity of travel experience for tourists and other private vehicle users passing through this section of the highway en route to destinations to the north and south.

Indirect implications of the above potentially include:

> Negative effects on local and regional economic growth through the inefficiencies in freight transport.

> Negative effects on local and regional tourism industry because of inefficiencies and frustrations in using the highway network.

> Negative effect on the implementation of regional urban planning strategies, which have been developed (in part) on the basis of there being an efficient road transport network.

> High motor vehicle fuel consumption and emissions.

Benefits

The benefits of the proposed upgrade relate to addressing the needs discussed above. Specifically:

> Accident rates are anticipated to reduce to the RTA target of 15 accidents per 100 MVKT, including reductions in fatalities and injuries. This figure is based on accident rates typically achieved on roads built to a similar standard.

> Typical travel time savings for this section of the highway would be at least 2.5 minutes for trucks and 2 minutes for cars when compared with travel on the existing highway. The time saving would be expected to be greater in peak holiday times and would increase through time as traffic volumes increase, as the performance of the existing highway reduces markedly when experiencing higher traffic volumes.

The above would flow on to a range of more specific benefits, including:

- Reduction in the economic and social impacts of traffic accidents.
- Improved efficiency of access within the local area for residents and tourists, through a higher standard of highway and the removal of traffic from the existing Pacific Highway.
- Support for economic development of the area through improved access for tourists and lower freight costs.
- Support for economic development of New South Wales and south-east Queensland through improved access for tourists and lower freight costs.

2.5 Relationship between the strategic outcomes of the Pacific Highway Upgrade Program and the Tintenbar to Ewingsdale upgrade

The Pacific Highway Upgrade Program has defined objectives which have been developed with an understanding of the planning strategies and growth forecasts. The proposed Tintenbar to Ewingsdale upgrade has sought to further build upon these objectives such that they are location and community specific whilst still achieving the overall Pacific Highway Upgrade Program objectives and strategic outcomes. This is represented in the improvements that would result for the local community in ease of access throughout the local area, as well as specific environmental management measures relating to factors such as visual impact, noise and water quality. **Section 2.6** tabulates the project objectives in relation to the Pacific Highway Upgrade Program objectives. **Chapter 21 – Strategic and project justification**, further illustrates the relationship between the overall Pacific Highway Upgrade Program and the proposed upgrade, through consideration of impacts of the project and how these will be managed to achieve acceptable environmental outcomes across the program in accordance with principles of ecologically sustainable development.

2.6 Objectives of the project

Project specific objectives were developed in the context of the Pacific Highway Upgrade Program with the input of the community liaison group established for the project. These are described in **Table 2.1.**

Table 2.1 - Project objectives

Pacific Highway Upgrade Program objectives	Project objectives

Significantly reduce road accidents and injuries	> Develop a project that meets the following design criteria:
	  > Four-lane divided carriage between Ross Lane and Ewingsdale joining the northern end of the proposed Ballina Bypass and the existing dual carriageway roadway at Ewingsdale with potential to expand to six lanes if required with minimal disruption.
	  > Grade separation of local roads and the proposed highway Limited access conditions, i.e. no private access points along the proposed highway upgrade.
	  > Concept design for a 110 km/h design speed for the vertical alignment and 110 km/h design speed for the horizontal alignment.
	  > Concept design that incorporates pedal cyclists' requirements.
	> Develop a project with a target crash rate of a maximum of 15 crashes per 100 million vehicle kilometres travelled over the project length.
	> Develop a project that retains or replaces existing rest areas within the study area and is consistent with RTA policies on rest areas.
	> Where possible, improve safety of travel on the existing Pacific Highway (through the study area) until the proposed upgrade is operational.

Reduce travel times	> Develop a project that reduces travel time for Pacific Highway traffic. > Develop intersections and interchanges designed to at least a Level of Service C, 20 years after opening for the 100th Highest Hourly Volume. > Develop a project that provides adequate flood immunity on at least one carriageway, target 1:100 year flood event. > Develop a project that minimises disruption and delay during construction.
Reduce freight transport costs	> Develop a project that reduces overall freight transport costs. > Develop a project that meets freight transport vehicle requirements.

Table 2.1 (cont)

Pacific Highway Upgrade Program objectives	Project objectives
Develop a route that involves the community and considers their interests	> Meet the objectives of the community involvement plan and the community liaison group. > Seek the experience, expertise, and input of the community to better inform each stage of the upgrade process. > Adopt a policy of transparency in the development and assessment of route options. > Investigate feasible routes in the initial stages of the study.
Develop a route that involves the community and considers their interests (cont)	> Minimise uncertainty in affected communities by undertaking the route selection process as efficiently as possible. > Mitigate the impact of noise levels associated with the project (including engine braking noise), and meet the Environment Protection Authority Target Noise Levels where it is reasonable and feasible to do so and implement the adopted recommendations from the Northern Pacific Highway Noise Taskforce. > Develop a project that takes account of air quality concerns at locations of sensitive receptors. > Develop a project that minimises impacts on the scenic value of the area. > Develop a project that is enjoyable for users, but minimises impacts on nearby residents. > Develop a project that minimises the physical impacts of the route, including community severance and access patterns. > Develop a project that minimises the impact on property.
Provide a route that supports economic development	> Develop a project that minimises the impacts on businesses dependent on Pacific Highway traffic. > Develop a project that minimises the impacts on prime agricultural lands. > Develop a project that improves accessibility for local industries, utilities and emergency services.
Manage the upgrading of the route in accordance with ESD principles	> Develop a project that addresses environmental safeguards and measures necessary to mitigate environmental impacts. > Develop a project that minimises the impacts on sensitive ecological constraints. > Assess route options with consideration of environmental, social and economic evaluation criteria. > Apply RTA and Department of Environment and Conservation (DEC) Guidelines for managing environmental issues (biodiversity, water quality, Acid Sulfate Soils). > Assess and address cumulative environmental impacts.
Provide the best value for money	> Maximise the use of the existing road reserve and other road assets for duplicated sections of the project where possible > Minimise the Whole of Life Costs of the project.

2.7 Alternatives considered

The following section provides a summary of the alternatives considered during the route development and selection phases from the initial long list of options through to the final preferred route.

2.7.1 Route selection

Route options for the Pacific Highway upgrade were developed through an iterative process involving a range of environmental, engineering, urban design, community, safety and cost considerations structured around the route options stages shown in **Figure 2.7.**

Figure 2.7 - Route selection process

The preferred route for the proposed upgrade was announced by the Minister for Roads in September 2006, thereby completing the route selection phase of the project.

Documentation supporting the selection of the preferred route, including the *Tintenbar to Ewingsdale – Upgrading the Pacific Highway: Preferred Route Report* (RTA 2006a) and a series of working papers was released and publicly exhibited during September 2006. The preferred route report was also placed on the RTA project website immediately following the announcement of the preferred route. All of these documents can be downloaded from the proposed upgrade website **www.rta.nsw.gov.au/pacific** (click on Tintenbar to Ewingsdale).

2.7.2 Route options development

Route options were developed through an iterative process, commencing with the mapping and documenting of environmental and design constraints in the study area. Preliminary assessments considered a wide range of potential issues, including transport and safety, topography, geology and soils, hydrology, aquatic and terrestrial ecology, air quality and climate, land use, planning, cultural heritage, visual amenity and noise. The methodology generally included a review of:

> Maps and aerial photographs.
> Previous investigations in the study area.
> Technical databases and relevant technical and academic papers.
> Byron Shire and Ballina Shire councils local environmental plans (LEPs).
> Site walkover surveys and field investigations.
> Community and agency consultation.
> Technical modelling.

Using interactive computer modelling and constraints mapping, it was possible to investigate a large number of possible route options. Routes were progressively adjusted to avoid as many constraints as possible while still achieving the design criteria and maintaining project objectives and functionality. The resulting long list of route options was made up of sections which through multiple combinations produced over 200 route options.

The process adopted to evaluate and rank the long list of route options included two steps:

> Assessment of the performance of each section against initial evaluation criteria performance measures with the project team's pairwise weightings used as the base case.

> Application of pairwise weightings from the community liaison group and government agencies to test sensitivity of performance of each option to the evaluation criteria performance measures.

A separate assessment was carried out for two northern tunnel approach options to determine which option(s) should be shortlisted. Assessment of the tunnel approaches did not identify any major differences between the two options.

The shortlisted options were termed Option A, Option B, Option C and Option D, and are shown in **Figure 2.8.** There were also two minor variations in tunnel approaches at St Helena ridge, which were referred to as T1 and T2 and fall within the area labelled as tunnel section on **Figure 2.8.** The main characteristics of the options are as follows:

> Option A incorporated an upgrade generally following the existing highway corridor.

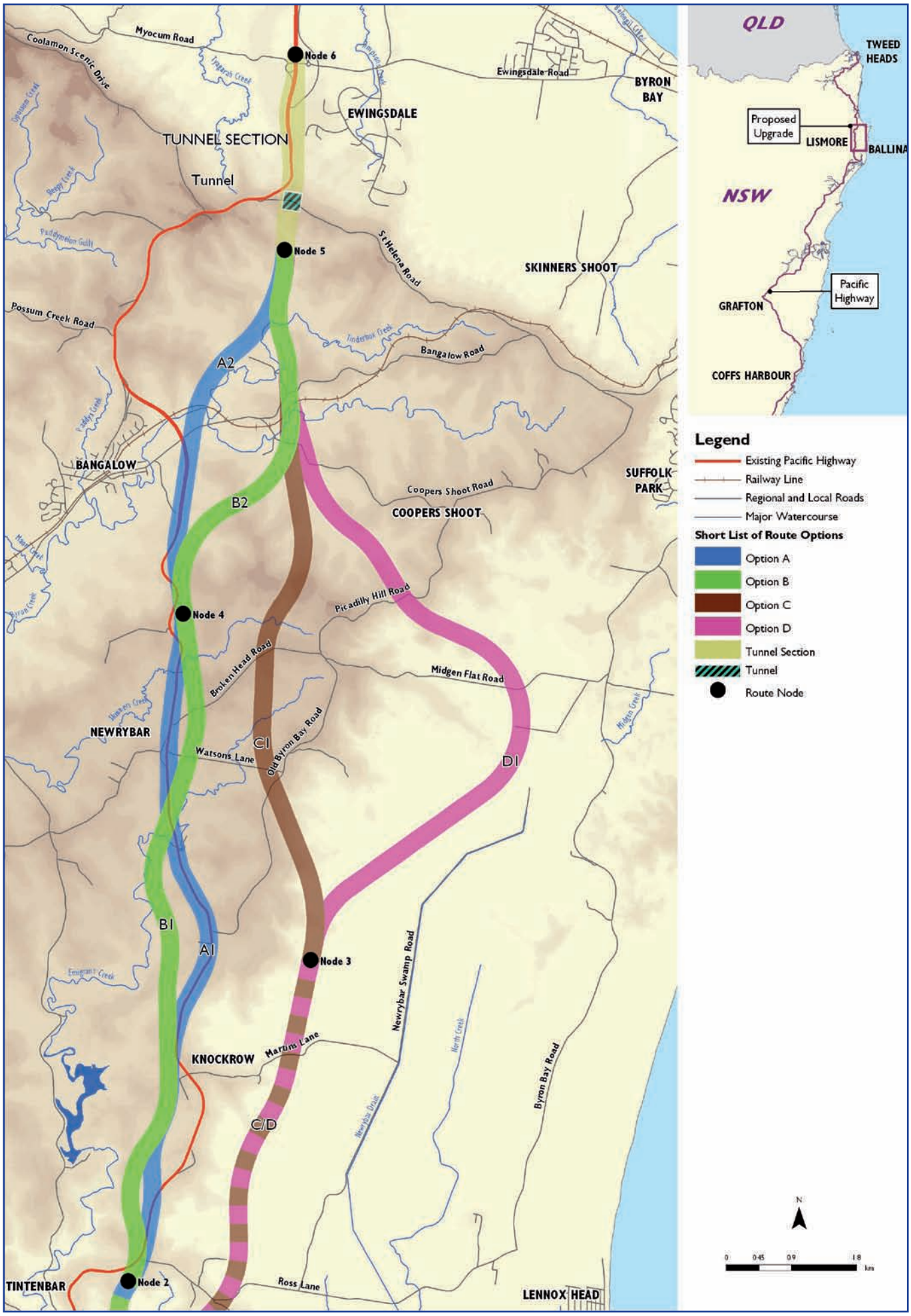
> Option B was a plateau option in an entirely new corridor.

> Options C and D were partly located on the eastern coastal plain.

Options A and B were divided into segments referred to as A1, A2, B1 and B2. A1 and B1 were located south of a point near Lawlers Lane (north of Newrybar), while A2 and B2 were north of this point.

Further details relating to the development and selection of the shortlisted route options can be found in the *Tintenbar to Ewingsdale Upgrading the Pacific Highway - Route Options Development Report* (RTA 2005) and the *Tintenbar to Ewingsdale Upgrading the Pacific Highway - Preferred Route Report* (RTA 2006a). These reports are available on the project website **www.rta.nsw.gov.au/pacific** (click on Tintenbar to Ewingsdale).

Figure 2.8 - Shortlist of route options



2.7.3 Selection of the preferred route

The selection of the preferred route was based on the outcome of three independent assessment streams that were developed to identify the environmental costs and benefits, as well as economic cost and value for money. The three streams were:

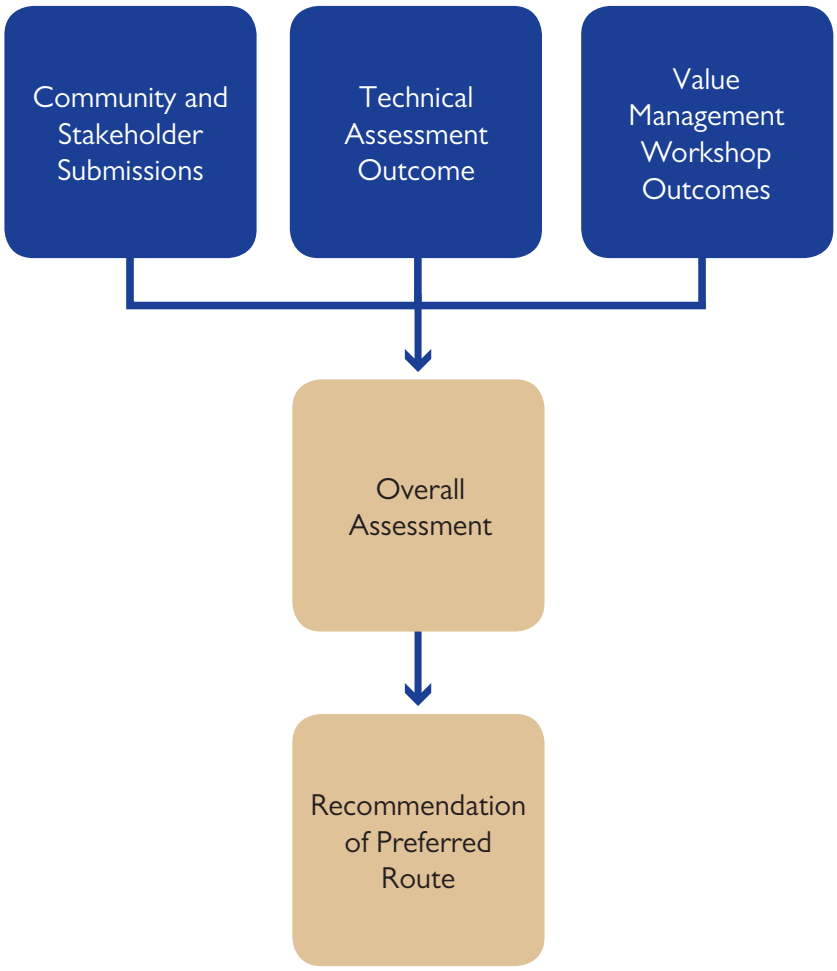
> Community and agency submissions on the route options display, which are documented in the Tintenbar to Ewingsdale: Upgrading the Pacific Highway – Route Options Submissions Report (RTA 2006b).

> The outcomes of the value management workshop for the shortlisted route options documented in the Tintenbar to Ewingsdale: Upgrading the Pacific Highway – Value Management Workshop Report (RTA 2006c).

> A technical assessment that included refinement of the shortlisted route options as well as updated engineering, environmental and economic investigations. The technical assessment (and a summary of the outcomes of the previous two streams) is described in the Tintenbar to Ewingsdale: Upgrading the Pacific Highway – Preferred Route Report (RTA 2006a).

An overall assessment of the shortlisted route options was carried out by comparing the outcomes of the three streams. The process is outlined in **Figure 2.9**

Figure 2.9 - Process for recommending the preferred route



The overall assessment of the short list of route options considered the results of the three streams. This assessment is described below.

Option A, B, C and D assessment

Option C was the worst performing option in the value management workshop and it performed poorly in the technical assessment; additionally community and agency submissions generally preferred Options A and B over Option C. Option C performed worse than all other options in terms of potential impacts on the natural and cultural environment.

Option D performed poorly in the technical assessment, and community and agency submissions generally preferred Options A and B over Option D. The value management workshop results regarding Option D were uncertain. The reasons for the poor performance of Option D were mainly its performance in terms of safety and functionality compared to the other options as well as potential impacts on the natural and cultural environment.

Costs for Options C and D were significantly higher than costs for Options A and B. The combination of poorer performance and higher costs resulted in low value for money.

Options C and D's clearly inferior results compared to Options A and B suggested that they should not be considered further. A more detailed evaluation was then made of Options A and B which included subdividing each into two sections (A1, A2, B1 and B2). These are shown in **Figure 2.8**.

A1 and B1 assessment

The technical assessment identified that combinations of subsections for A1 and B1 perform better than A1 and B1 as stand alone sections. Further assessment of Sections A1 and B1 was therefore carried out on a subsection basis with subsections referred to as A1a, b and c, and B1a,b and c. Subsections A1-a and B1-a were between the southern extremity of the sections and Martins Lane at Knockrow. Subsections A1-b and B1-b were between Martins Lane and a point near the existing crossing of Emigrant Creek. Subsections A1-c and B1-c were between Emigrant Creek and a point approximately 500 m south of the existing Bangalow bypass.

A1-a versus B1-a assessment

Subsections A1-a and B1-a were not directly compared in the community and agency submissions or at the value management workshop, but potential impact on Emigrant Creek Dam was an area of concern raised in both streams.

In terms of the technical assessment, A1-a performed similarly to B1-a. A1-a has lower natural and cultural environment impacts, primarily because it is further from Killen Falls and Emigrant Creek Dam. In addition, it more closely matched the Ballina bypass EIS design and allowed full use of land already acquired by the RTA for the Ballina bypass. A1-a was also about $5 million less expensive than B1-a. On the basis of similar performance at a lower cost, A1-a provided greater value for money than B1-a.

Compared to B1-a, A1-a performed similarly in the technical assessment, better addressed issues raised in the other two streams, and provided greater value for money. A1-a was the preferred section.

A1-b versus B1-b assessment

Subsections A1-b and B1-b were not directly compared in the community and agency submissions or at the value management workshop, but potential impacts on high value agriculture and Emigrant Creek were areas of concern raised in both streams.

In terms of the technical assessment, Section B1-b performed better than A1-b, particularly in terms of safety and had a similar cost. On the basis of better performance at a similar cost, B1-b provided greater value for money.

A1-c versus B1-c assessment

Subsections A1-c and B1-c were not directly compared in the community and agency submissions or at the value management workshop, but potential impacts on Newrybar and the Newrybar Public School were areas of concern raised in both streams.

In terms of the technical assessment, B1-c performed much better than A1-c. B1-c was estimated to cost about $10 million less than A1-c. B1-c therefore provided greater value for money.

B1-c performed better in the technical assessment and better addressed key issues raised in the other two streams. B1-c was the preferred section.

A2 versus B2 assessment

A key outcome of the value management workshop was the recommendation that Section B2 should not be considered further.

Results of the technical assessment indicated that A2 and B2 were very similar, thus the only significant difference was the cost. A2 was significantly less expensive than B2, mainly due to higher structure costs in B2. Additionally, A2 utilised almost half of the existing Bangalow bypass. On the basis of similar performance at a much lower cost, A2 provided greater value for money.

On the basis of value for money considerations A2 was the preferred section.

T1 versus T2 assessment

While the performance of T1 and T2 were considered similar in the value management workshop, T2 was generally preferred in the community and agency submissions. In the technical assessment of T1 and T2, T2 was preferred based on a small performance advantage.

T2 was more expensive than T1; however T2 provided benefits which off-set the additional capital costs. These benefits included:

> Lower grades providing ongoing benefits over the project life in travel time savings, accident reduction, fuel savings and reduced greenhouse gas emissions.

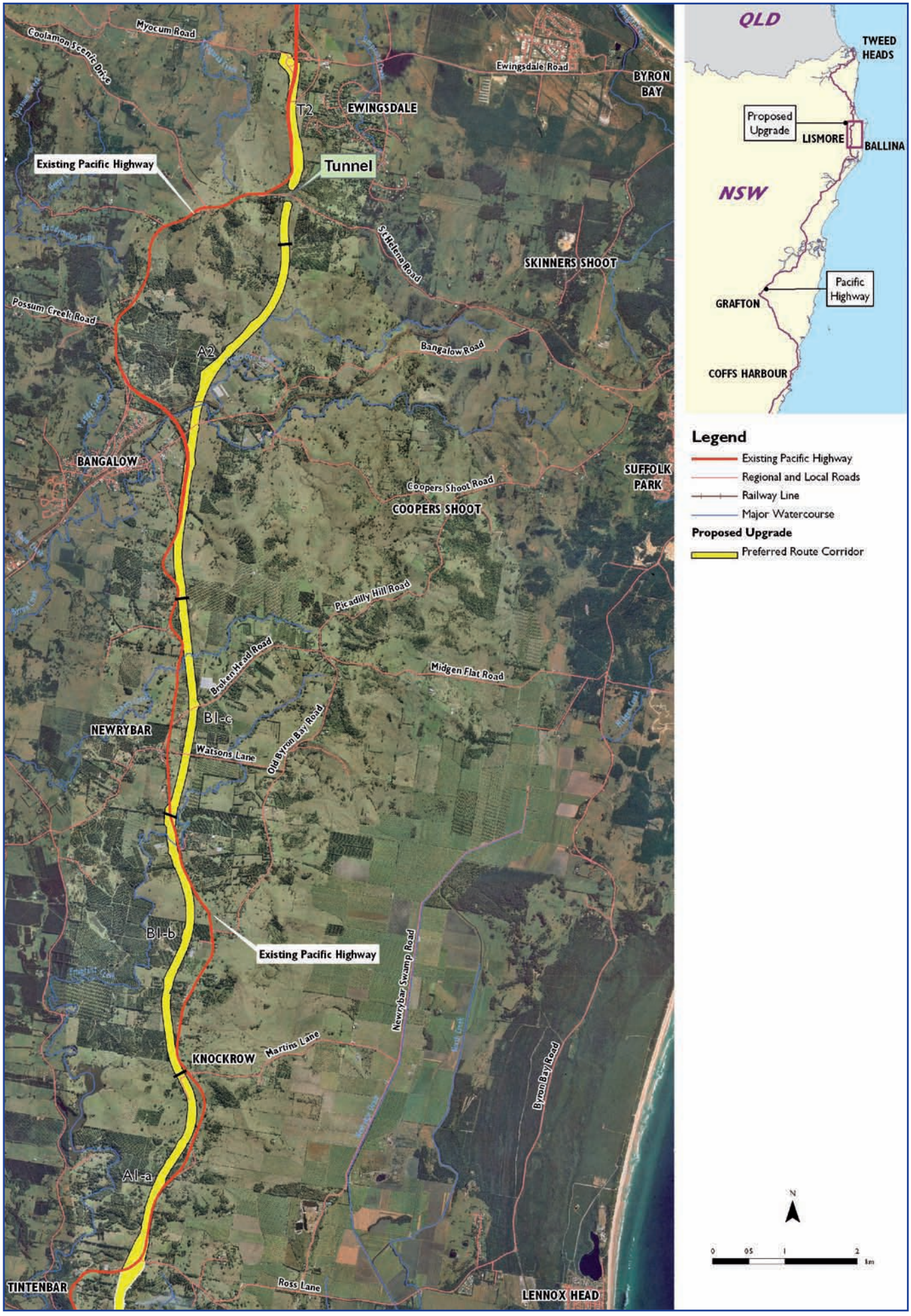
> Less complex construction and traffic management, thus easier and safer to build.

Considering the results of the three streams and the above benefits, the additional cost of T2 was considered justified in terms of value for money considerations. T2 was the preferred section.

Following the development, assessment and refinement of the route options, the option made up of: **A/B, A1-a, B1-b, B1-c and A2 and T2** was considered the best route in terms of meeting project objectives and the principles of ecologically sustainable development.

The preferred route was announced by the Minister for Roads and placed on exhibition for community comment in September 2006 **(Figure 2.10)**. **Chapter 4** provides details of the display.

Figure 2.10 - Preferred route as shown at public display in September 2006



2.8 Why the preferred route was chosen

As described above, the preferred route was determined through a selection process which sought to meet the objectives of the project, the Pacific Highway Upgrade Program and the *Environmental Planning and Assessment Act 1979*, particularly in relation to ecologically sustainable development. This process involved the consideration of alternatives with the resultant preferred route selected because it:

> Provides the best overall balance between functional, ecological, heritage, social, and economic considerations and provides for staging opportunities.
> Best meets the objectives of both the Pacific Highway Upgrade Program and the Tintenbar to Ewingsdale project.
> Achieves high safety standards.
> Provides for grade separation of the upgraded Pacific Highway and the local road system.
> Provides a good outcome in terms of transport efficiency.
> Provides reasonable physical separation from existing and proposed major residential areas such that acceptable visual and traffic noise outcomes could be achieved with sensitive urban design.
> Considers the outcomes of the value management workshop and community submissions.
> Allows for potential water quality risk reductions to Emigrant Creek Dam.
> Provides good road user benefits for a reasonable construction cost.
> Retains 'Macadamia Castle', a local landmark.
> Retains the existing highway as a local/tourist road.
> Has a lower impact on the escarpment and visual amenity compared to coastal options.
> Utilises the highest amount of existing and planned highway reserves.
> Avoids known Aboriginal heritage sites.
> Minimises length through State significant agricultural land.
> Has a lower impact on endangered ecological communities compared to coastal options.
> Has a lower risk associated with soft soils, flooding and land slips compared to coastal options.
> Has the minimum impact on wildlife corridors compared to other options.
> The T2 tunnel has reduced travel time, lower greenhouse gas emissions, and less road user costs than the T1 tunnel.
> Impacts on agricultural properties could be reduced, where possible, through discussions with individual land owners and refinement of the design.

Since the preferred route announcement, the concept design has been developed and is presented in **Part B** as the proposal upon which the environmental assessment has been undertaken.

For a detailed description of the selection process for the preferred route, refer to the *Preferred Route Report* (RTA 2006a). This is available on the project web site **www.rta.nsw.gov.au/pacific** (click on Tintenbar to Ewingsdale).