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Pacific Highway Upgrade
Iluka Road to Woodburn

Concept Design Report

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Glossary

AADT	Annual average daily traffic volumes
ABS	Australian Bureau of Statistics
ADT	Average daily traffic volumes
AEP	Annual exceedance probability
AHD	Australian height datum
ANZECC	Australian and New Zealand Environment Conservation Council
At-grade	At the same level; eg an intersection where two or more streams of traffic are required to cross paths when turning
B-double	A combination road vehicle consisting of a prime mover towing two semi-trailers
BCR	Benefit cost ratio
BH	Bore hole
CIS	Community information session
Class A	Divided road with at least two lanes in each direction and shoulders and some direct accesses
Class M	Divided road with at least two lanes in each direction and shoulders with no direct accesses and with flyover type interchanges
CLG	Community liaison group
CMP	Conservation Management Plan
Concept design	Initial alignment for consultation with community and other stakeholders. Concept design has been developed for the upgrade of the Pacific Highway between Iluka Road to Woodburn
CRAFTI	Comprehensive Regional Assessment Aerial Photograph Interpretation vegetation maps
dB(A)	Decibel. Unit used for 'A-weighted' sound pressure levels. A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear
DEC	Department of Environment and Conservation (comprising National Parks and Wildlife Service and Environment Protection Authority)
DNR	Department of Natural Resources
DoP	Department of Planning
Double lane divided road	Dual carriageway
DPI	Department of Primary Industries (NSW Fisheries, NSW Agriculture, NSW Forests)
DHV	Design hour volume
EEC	Endangered ecological community
EIA	Environmental impact assessment
EIS	Environmental impact statement
Endangered	Species listed as 'endangered' under the Threatened Species Conservation Act 1995
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC	*Environmental Protection and Biodiversity Conservation Act 1999*
ESD	Ecologically sustainable development
Flyover	An overpass to enable separation of main road traffic and minor crossing traffic
FMZ	Forest Management Zones
Grade-separated	Refers to roads constructed at different levels such as flyovers, interchanges and overpasses
hr	Hour
Interchange	Any junction enabling movements between the main road and a minor road
km/h	Kilometres per hour
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan

Glossary (cont.)

LGA	Local government area
LOS	Level of Service
MLEP	Maclean Local Environmental Plan 2001
Model Provisions	*Environmental Planning and Assessment Model Provisions 1980*
Mvkt	Million vehicle kilometres travelled
NPWS	National Parks and Wildlife Service
NRMA	National Roads and Motoring Association
NSW	New South Wales
PADS	Potential archaeological deposits
pc/h	Passenger cars per hour
PFM	Planning focus meeting
pH	Value taken to represent acidity or alkalinity of an aqueous solution
PHUP	Pacific Highway Upgrade Program
PVB	Present value of benefits
PVC	Present value of costs
REP	Regional Environmental Plan
RL	Reduced level
RRLEP	*Richmond River Local Environmental Plan 1992*
RTA	Roads and Traffic Authority
Seagull	T-intersection on a divided road with deceleration and acceleration lanes in the median
SEPP 4	*State Environmental Planning Policy No. 4 – Development Without Consent and Miscellaneous and Complying Development*
SEPP 14	*State Environmental Planning Policy No. 14 – Coastal Wetlands*
Service road	Through route adjacent to Class M providing a link to access roads and local communities
Shoulder	The area beside a main road where a driver can stop in an emergency
Threatened	Species listed as 'threatened' under the *Threatened Species Conservation Act 1995*
T-intersection	Where one road meets another without crossing it, forming the shape of a letter 'T'
TSC Act	*Threatened Species Conservation Act 1995*
TSS	Total suspended solids
U-turn bay	Facility to enable one to turn and travel in the opposite direction
VOC	Vehicle operating costs
vpd	*Vehicles per day*
Vulnerable	Species listed as 'vulnerable' under the *Threatened Species Conservation Act 1995*

Executive Summary

Between Iluka Road and Woodburn, the Roads and Traffic Authority (RTA) proposes to upgrade the Pacific Highway, generally by following its existing route. This report describes the proposed concept design.

With the $2.2 billion Pacific Highway Upgrade Program in place since 1996, a total 233 km of the highway are now double-lane divided road. A further 302 km of new highway are under construction, have been approved for construction or have had a preferred upgrade route identified (refer to Figure A).

As of the end of March 2006, this leaves only 162 kilometres where a preferred route is still to be identified.

Route options for five projects were displayed in October – November 2005:

- F3 Freeway to Raymond Terrace.
- Oxley Highway to Kempsey.
- Woolgoolga to Wells Crossing.
- Wells Crossing to Iluka Road.
- Tintenbar to Ewingsdale.

This final group of five projects is now proceeding to the route selection phase. These five projects, along with the sections from Macksville to Urunga and Woodburn to Ballina, will provide preferred routes for a total 230 km of the highway. This will provide planning certainty for local communities and pave the way for a construction program to complete the upgrade of the Pacific Highway.

Another three projects:

- Iluka Road to Woodburn;
- Failford Road to Tritton Road; and
- Herons Creek to Stills Road;

involve upgrading the highway along the existing alignment. Concept plans are currently being prepared, and the upgrading of the highway to dual carriageway in these locations is being discussed with adjacent communities.

The Iluka Road to Woodburn upgrade is proceeding to concept design display in March 2006.

Beyond 2006

The Roads and Traffic Authority (RTA) is planning in the long term to provide a high standard road, described as a motorway or 'Class M'. A key feature of a motorway involves the separation of local and through or long distance traffic, refer to Figure B. This means that alongside the motorway, which is designed for a speed of 110 km/h, there will be a lower speed alternative local road. Local traffic can get onto the motorway at regular grade-separated interchanges.

Iluka Road to Woodburn

The Iluka Road to Woodburn Project comprises approximately 35 km of the existing Pacific Highway, from the Iluka Road turnoff to the junction of the Pacific Highway and Tuckombil Road at Trustums Hill, approximately 2 km south of Woodburn. The aim of the project is to upgrade the highway to a high-standard dual carriageway facility. The plans discussed in this report would be built in two separate

stages, firstly to a 'Class A' or arterial standard, and in the longer term, to a 'Class M' or Motorway standard (the two are described below).

The study area predominantly follows the existing Pacific Highway alignment and is confined to a band approximately 1.5 km wide.

Road design and upgrade strategies

Design standards for the PHUP require a four lane divided highway, capable for future upgrade to a motorway-standard road. The design will allow for future growth in Pacific Highway traffic, based on projections of traffic volumes for 20 years from the date of opening (taken as being 2016).

The proposed upgrade strategy being considered for Iluka Road to Woodburn is initially for a 'Class A' highway with two lanes in each direction, limited access and at-grade intersections. The speed limit would be signposted at 100 km/h but may be increased to 110 km/h.

Grade-separated or flyover-type interchanges would be located at both the Iluka Road intersection and at Woodburn. The interchanges are being planned as part of the adjoining Pacific Highway upgrade projects for Wells Crossing to Iluka Road and Woodburn to Ballina, which form part of project planning south and north of the Iluka Road to Woodburn highway upgrade, respectively.

The RTA is also planning for a possible future upgrade to a 'Class M' or motorway standard road, with two lanes in each direction, but with the capability of being upgraded to three lanes in each direction when warranted. A Class M road would have 110 km/h posted speed, controlled access, and grade-separated or flyover-type interchange access. Under a future Class M arrangement local traffic would be diverted to a parallel service road, having two lanes and with a posted speed limit of less than 100 km/h.

At the present time, there is no timeframe proposed for implementing a Class M strategy for the proposal. However, planning is important at this stage of the project so that it can be achieved with minimal disruption to highway operation, without having to reconstruct large sections of new highway, without major environmental impact and without further disruption or uncertainty for private landowners. Potential property and land use issues for the Class M strategy are considered in this report.

Development of the proposed concept design

The route development process has involved the following steps:

- Review of existing data.
- Site visits – road and aerial inspections of the study area.
- Preliminary ecological, heritage, traffic, geotechnical and other investigations including field studies.
- Community involvement activities to identify community interests, issues and concerns.
- A risk assessment workshop.
- Identification of a possible highway upgrade route.
- Development and refinement of the proposed route concept design.
- Preparation of the Concept Design Report.
- Commencement of detailed survey of the proposed concept design route.
- The concept design display provides the community with an opportunity to comment on the proposed concept design.
- Community groups and individuals have been kept informed of the project to date through:
- Community information session (CIS) held in Woodburn at the commencement of the study in December 2004.
- CIS held in New Italy to provide a project update and identify opportunities and constraints in March 2005.

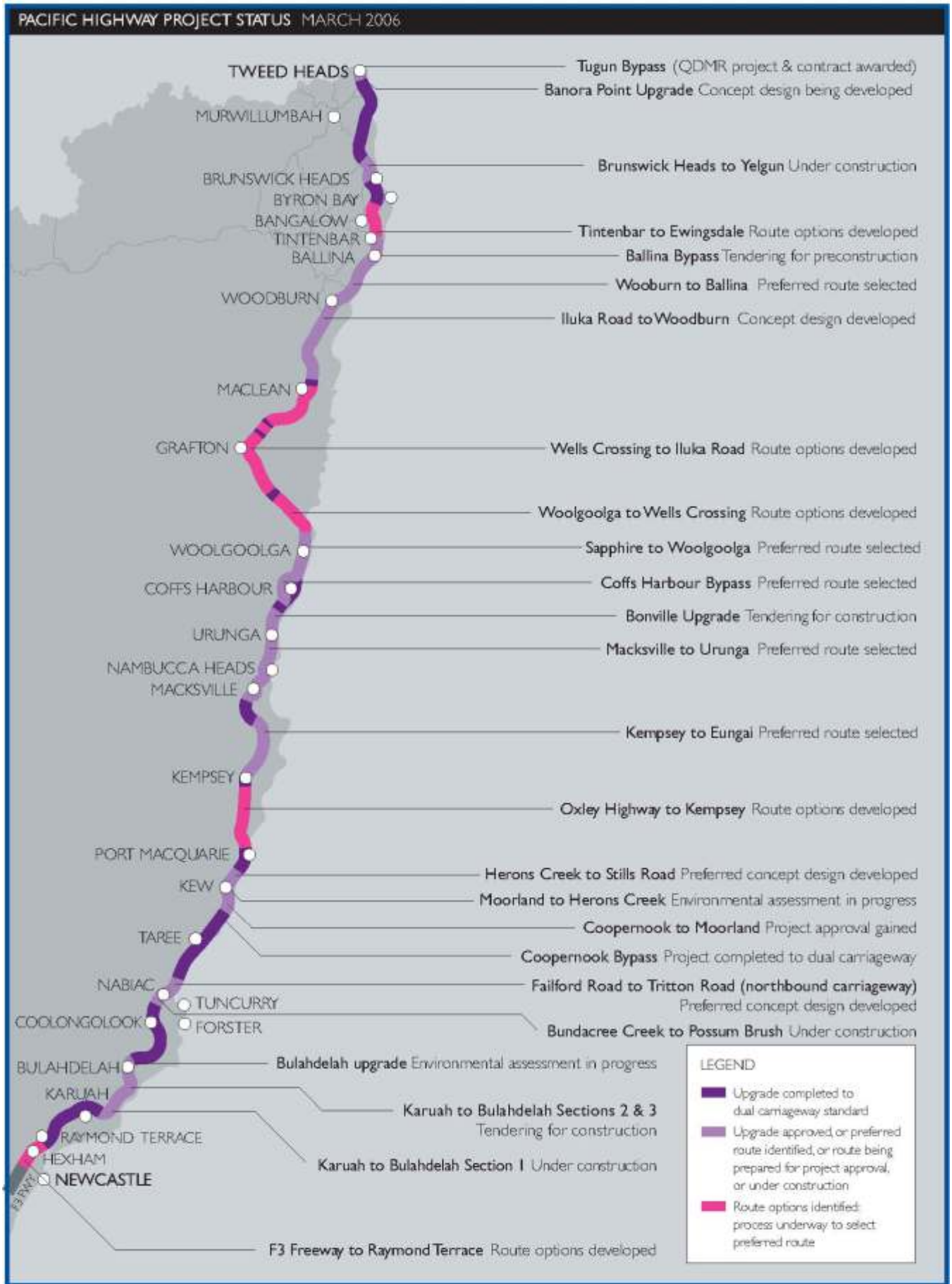

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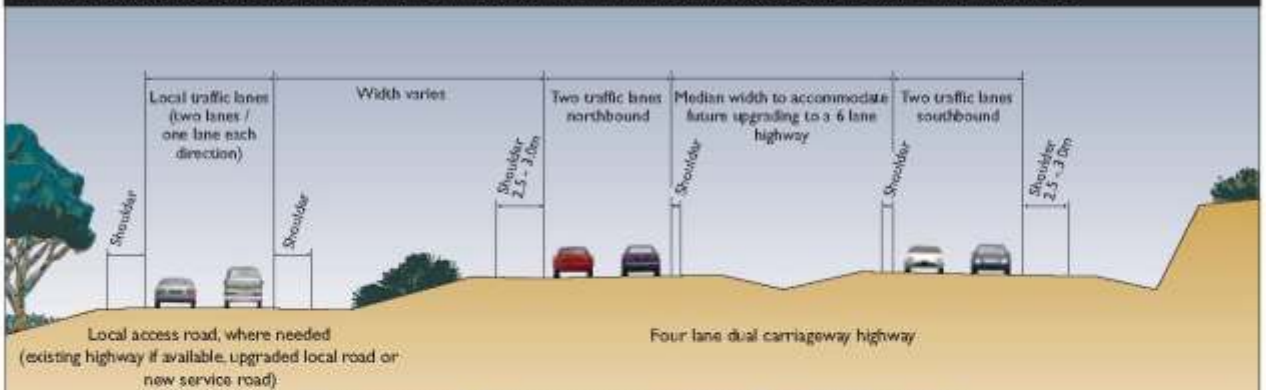
FIGURE A
PACIFIC HIGHWAY UPGRADE PROGRAM
AS AT MARCH 2006

TYPICAL CROSS SECTION SHOWING AN UPGRADE, DUAL CARRIAGEWAY HIGHWAY

This cross section shows a typical arrangement of the Pacific Highway.
The final arrangement may vary as conditions change, for example, local topography.

A new carriageway is to be constructed along side the existing highway for much of this project. Which side of the existing highway the new carriageway will be built on may vary from location to location depending on environmental, engineering or other constraints.

TYPICAL CROSS SECTION SHOWING THE NEW MOTORWAY WITH A LOCAL ACCESS ROAD RUNNING PARALLEL



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- Distribution of community updates in November 2004, February 2005, October 2005 and December 2005.
- Public notice advertising and media coverage (print and electronic) informing the community of key aspects of the project and opportunities for involvement.
- Submissions and comments via letters, a free call community information line and e-mail.
- A project website to host project information, project updates and records of CIS meetings.
- A planning focus meeting (PFM) with representatives of State government agencies, Clarence Valley Council and Richmond Valley Council.
- Meetings/briefings with local councils and State government agencies.
- Meetings and site visits with individual residents and property owners.

At the first CIS meeting, nominations were invited from the community for the formation of a community liaison group (CLG). However, the study area's population is small and dispersed and it was considered that all interested community members could be directly engaged with through the continuation of the CISs. As such a CLG was not formed for this project.

Area characteristics

The study area is shown in Figure C.

Traffic and transport issues

The proposed upgrade of the Pacific Highway between Iluka Road and Woodburn is needed to improve road safety and to reduce travel times. Upgrading the Pacific Highway will reduce travel times, bringing benefits for all road users including local and long distance travellers, and freight transport operators.

Future travel demand in the corridor is unlikely to be served by rail transport. It is therefore important that the road system be upgraded to ensure that there is capacity to safely meet future demand.

The existing Pacific Highway through the study area is primarily a two-lane road with occasional overtaking lanes. The existing alignment in some sections does not meet current design standards for the upgrading of the highway, in terms of curves and gradients. However, much of the route has a good alignment and has been designed with curves and gradients that are suitable for upgrading by duplicating the existing carriageway, either on the east or the west side of the existing highway.

The current crash rate on the Pacific Highway between Iluka Road and Woodburn is approximately 30 crashes per 100 million vehicle kilometres travelled (Mvkt). The crash rate is predicted to decrease to 28 crashes per 100Mvkt once a wire rope median scheme (currently being installed) has been fully implemented. The proposed highway upgrade will reduce this crash rate further, and is predicted to achieve a crash rate of 23 crashes per 100Mvkt.

Within the study area, the highway currently passes through semi-rural residential areas, cane farms and the New Italy historical settlement. Characteristics of the existing highway are:

- A high proportion of long distance traffic, especially heavy vehicles, which have been increasing substantially over the past five years (approximately 90% of existing traffic between Iluka Road and Woodburn is through traffic).
- Predominantly single carriageway with limited overtaking opportunities and potential for head-on collisions.
- Vehicles cannot travel at a consistent speed.
- A number of residences along the highway in close proximity to the road edge.
- Vehicles can enter or exit the highway at numerous access points, including local roads and private properties, which increases the potential for conflicts with high speed through traffic.

There is a need to provide a higher and consistent standard of road to better serve existing and future road users. The upgrading of this section of the highway forms an essential part of the overall upgrade of the highway between Hexham and the Queensland border.

Concept design

The existing highway route is mostly of a good standard. Therefore, a route concept based on duplication of the existing highway with short sections of new highway where the existing alignment is sub-standard has been used, rather than multiple route options. The largest section of proposed new highway is a 3 km deviation adjacent to the Devils Pulpit State Forest. The RTA has already acquired a corridor of land to the east of the existing highway for this purpose. There would be additional minor land acquisition in certain areas, where the corridor is either too narrow to accommodate the second carriageway, or where realignment for curve straightening is required.

The route concept was developed through a process that involved an assessment of transportation issues, and the opportunities and constraints to new road development within the study area. Key environmental and land use constraints include:

- Rural residential communities.
- Agricultural land, in particular the sugar cane farms at the southern end of the study area.
- Areas of environmental sensitivity including State Forests, nature reserves and the Bundjalung National Park.
- The New Italy village and Museum Complex, which is of local historical, social and cultural significance.
- Locally and regionally significant flora and fauna, some of which have been identified as threatened or endangered.
- Flood prone land along the highway route.

Another important issue is the need to link the project with other Pacific Highway Upgrade projects to the south (Iluka Road to Wells Crossing) and north (Woodburn to Ballina). The Iluka Road to Woodburn project would tie into the Wells Crossing to Iluka Road project at Iluka Road and would tie into the preferred option being considered for the Woodburn to Ballina project, in the vicinity of the junction of the Pacific Highway and Tuckombil Road at Trustums Hill, approximately 2 km south of Woodburn.

In developing the proposed concept design, the project team sought to avoid significant constraints while identifying a feasible highway upgrade option that could be developed to meet the project objectives. The PHUP has a set of broad objectives for the whole of the highway from Hexham to the Queensland border. From the PHUP objectives, the RTA derived a set of more specific objectives to guide the development of the Iluka Road to Woodburn project. The PHUP objectives and the Iluka Road to Woodburn project objectives are listed in Table A.

The project team has also developed a set of assessment criteria to measure the performance of the proposed concept design against the PHUP and project objectives. The assessment criteria, and the evaluation of the proposed concept design against the objectives, are also set out in Table A.

The proposed concept design was then assessed against the PHUP and project objectives, to determine whether it remained feasible. The proposed concept design is illustrated in Figure D-1 to D-5.

Assessment of the proposed concept design

The proposed concept design was assessed against a wide range of social, biophysical, economic, traffic and transport factors. The proposed concept design and assessment criteria will be further refined after the public display period. Results of investigations undertaken to date, in developing the proposed concept design, are summarised in the Table A below.

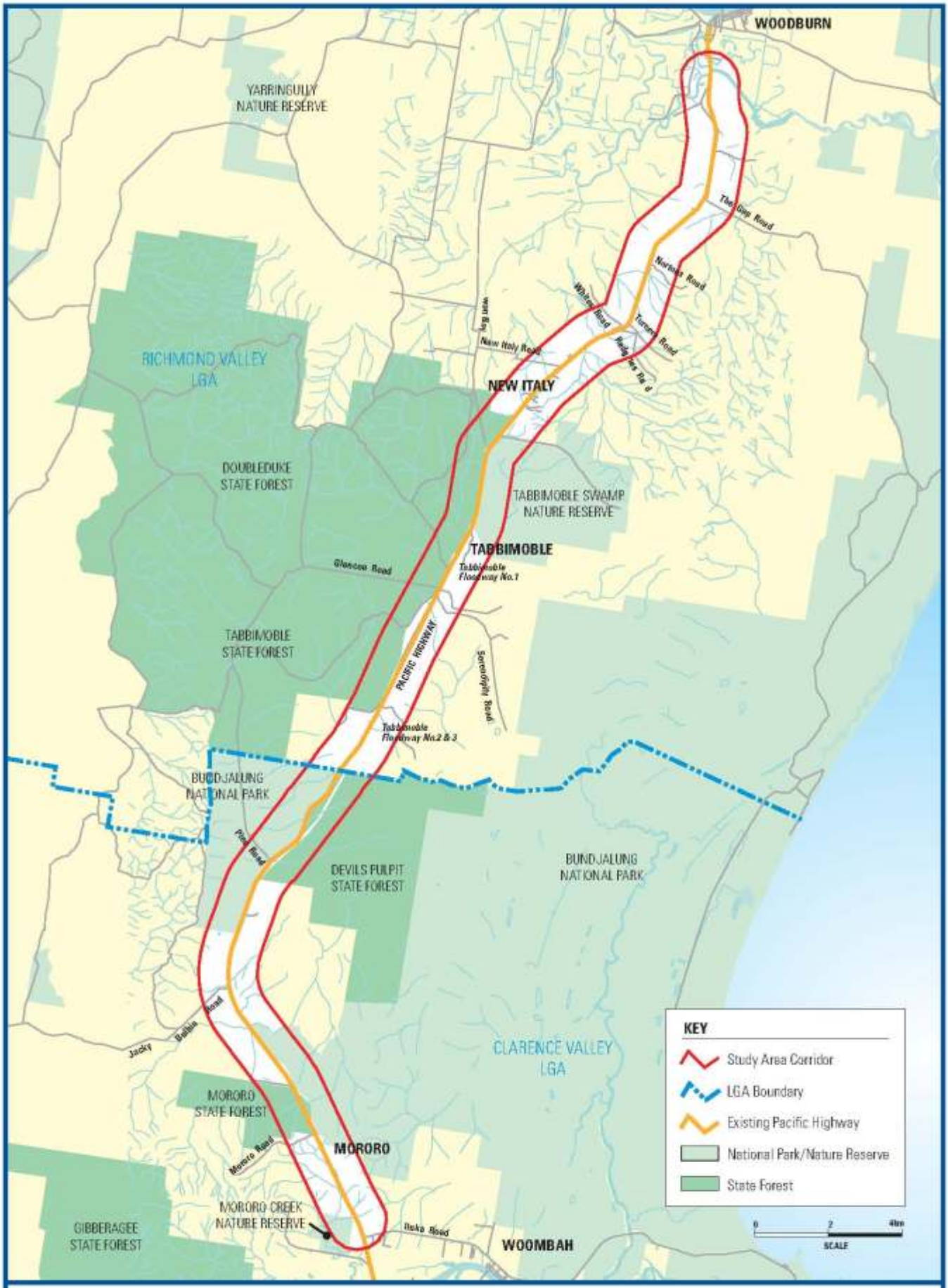

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FIGURE C
STUDY AREA

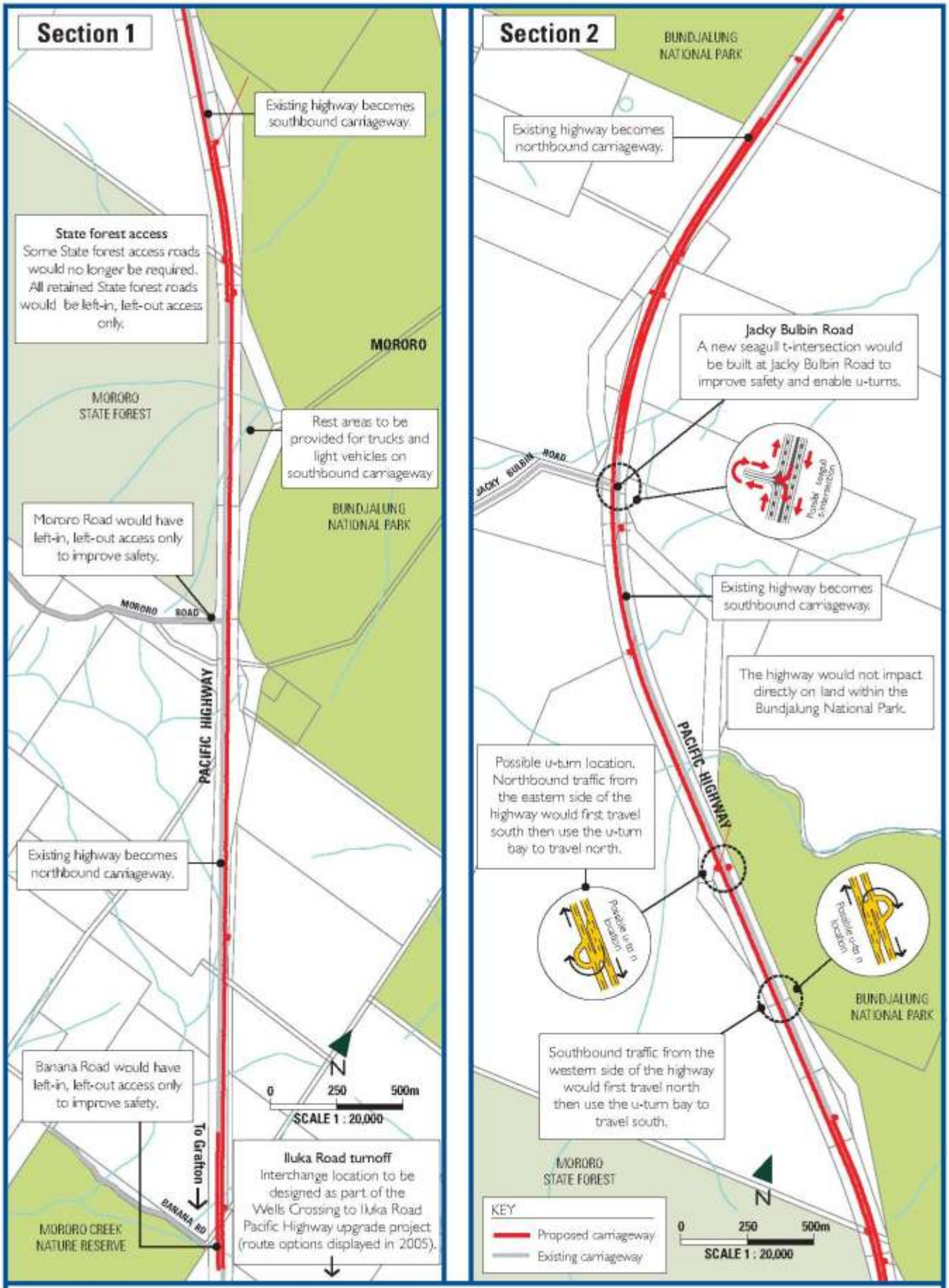

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FIGURE D2
PROPOSED CONCEPT DESIGN

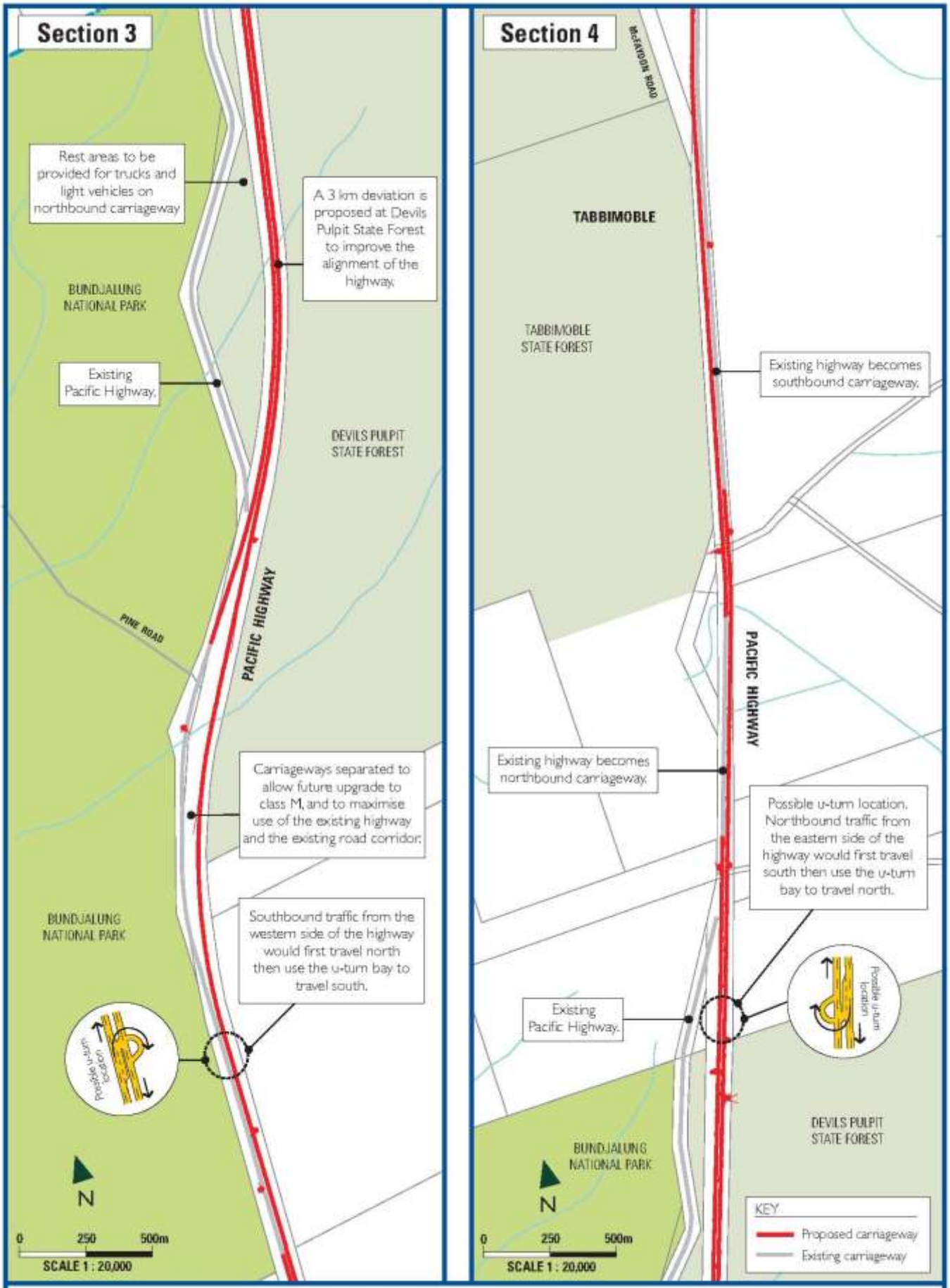

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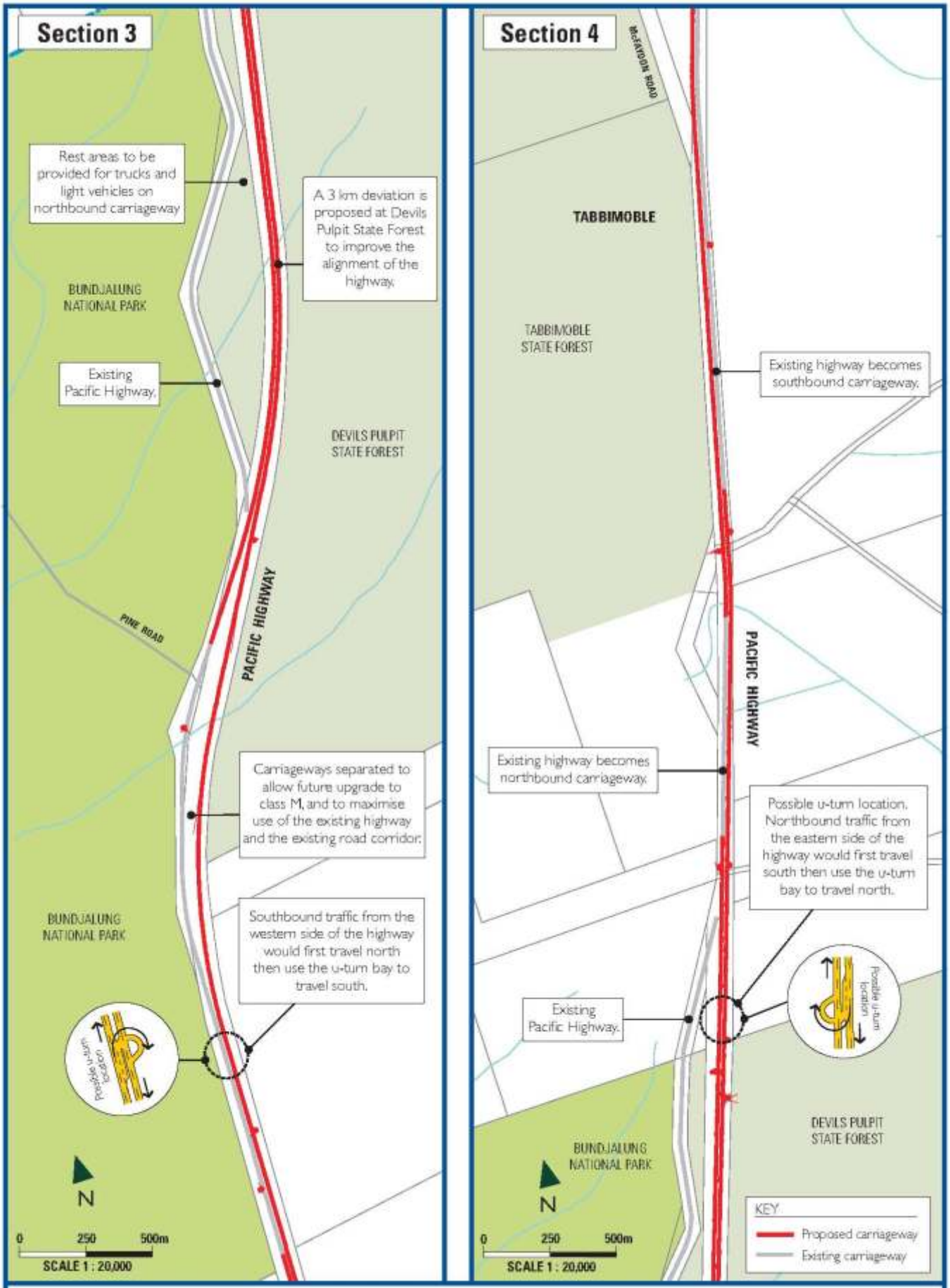
FIGURE D3
PROPOSED CONCEPT DESIGN



ILUKA ROAD TO WOODBURN
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FIGURE D3
PROPOSED CONCEPT DESIGN

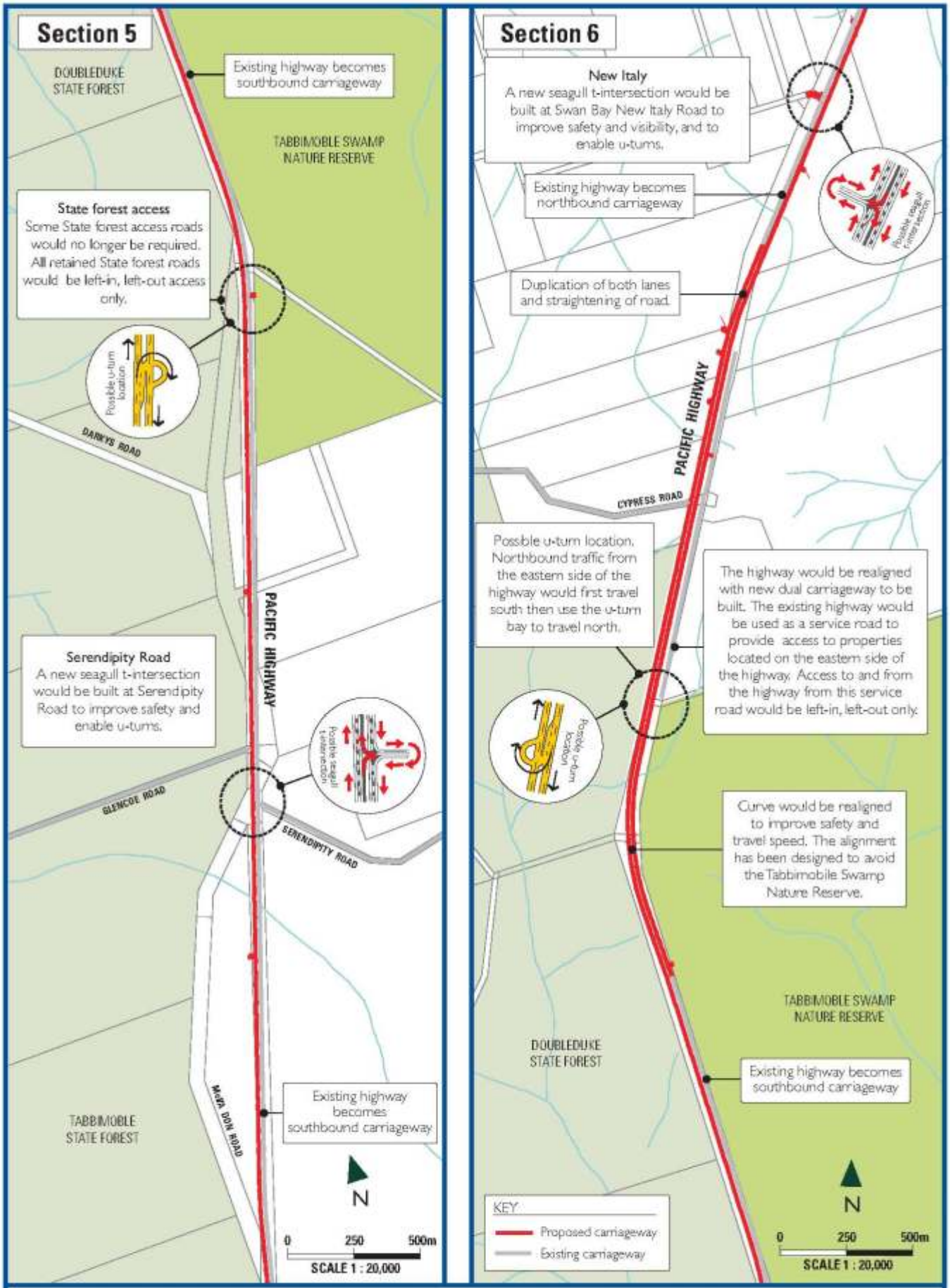

FIGURE D4
PROPOSED CONCEPT DESIGN

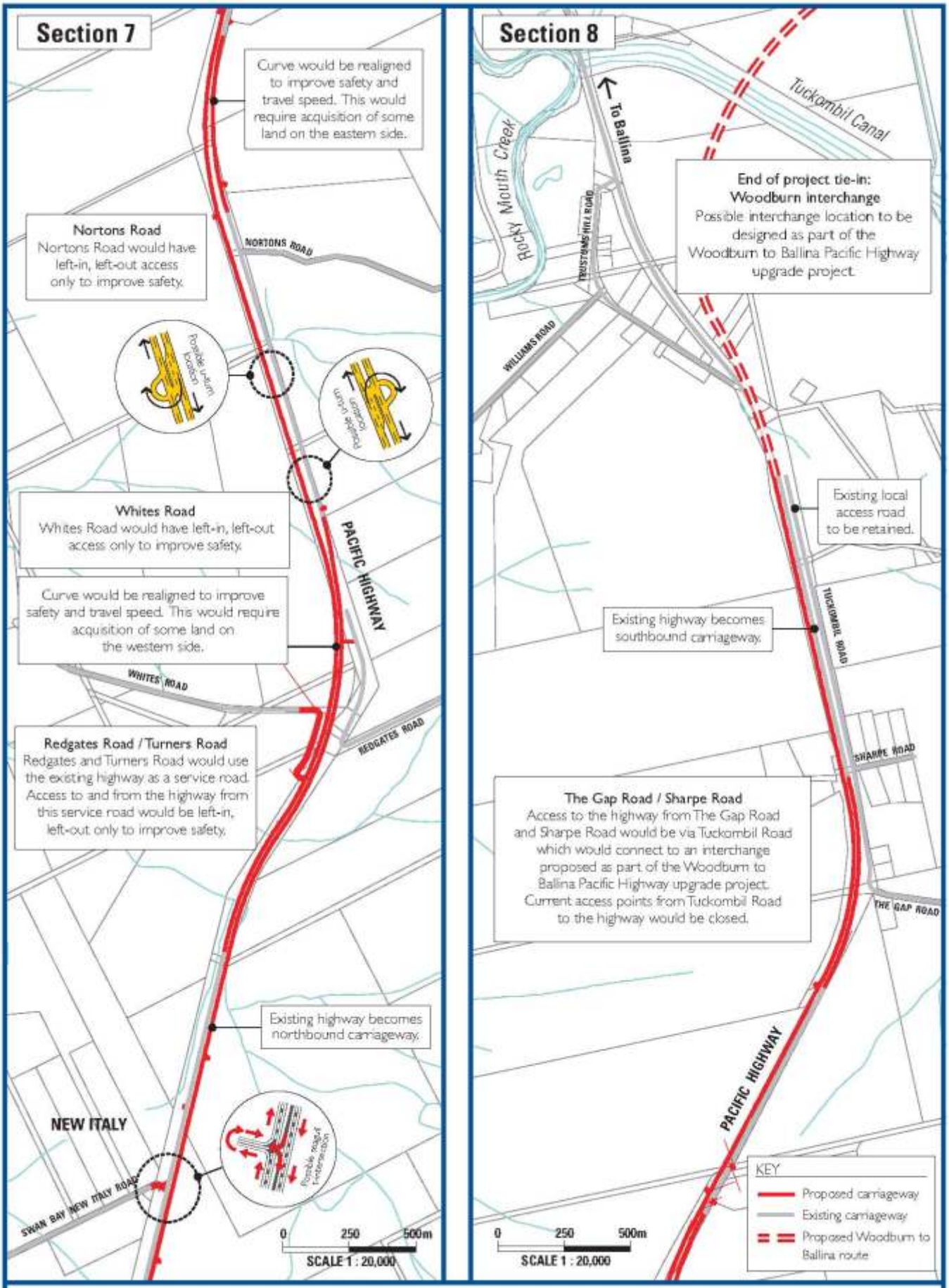

FIGURE D5
PROPOSED CONCEPT DESIGN

Table A Evaluation of the proposed concept design against the objectives and assessment criteria

PHUP objectives	Assessment criteria – *achieved in proposed concept design (Y/N)*	Y/N
Significantly reduce road crashes and serious injuries	Improvement in road safety	
	▪ Comply with design and engineering safety standards.	Y
	▪ Retain existing rest areas.	N/A*
	▪ Optimise number of direct access points onto highway.	Y
	▪ Optimise number of at-grade intersections.	Y
	▪ Provide emergency stopping bays.	Y
	Design to bypass sections of road with poor existing horizontal alignment	
	▪ Replace existing sections of sub-standard highway with new road that meets current RTA design standards.	Y
	Design to make allowance for future upgrade to Class M	
	▪ Identify locations for potential future interchanges, service roads, etc.	Y
	Identify property acquisition requirements for Class M corridor, including service roads	
	▪ Total Class M corridor requirements identified.	Y
	Provision of rest areas and truck parking bays at intervals as required by RTA design guidelines	
	▪ Retain or relocate existing rest areas and truck parking bays – in accordance RTA design guidelines.	Y
Reduce travel times and delay	Minimise length of upgraded highway and travel times	
	▪ Minimise route option length.	Y
	▪ Minimise travel time.	Y
	▪ Minimise vehicle operating costs.	Y
	Improve the reliability of travel times on the highway	
	▪ Achieve appropriate Level of Service.	Y
	▪ Ensure capacity to accommodate seasonal traffic variations.	Y
	Ensure upgrade is flood-proof for the 1:100 year flood	
	▪ Design for 1:100 year flood (subject to hydrology and hydraulics report).	Y
	Minimise disruption to traffic during construction	
	▪ Optimise length of highway under construction at one time.	Y
	▪ Maximise off-line construction where possible within corridor.	Y
	▪ Minimise cross-over points for new second carriageway.	Y
	▪ Utilise available RTA-owned 'controlled access road' land adjacent Devils Pulpit State Forest.	Y
	▪ Design to current RTA design standards within available RTA corridor/land assets.	Y
	Deliver travel benefits as soon as possible	
	▪ Ability to stage project works.	Y
	Optimise highway alignment and geometry	
	▪ Enable trucks and B-doubles to travel safely at maximum legal speed limit.	Y
Develop route that involves the community and considers their interest	Achieve community acceptance of the selected route	
	▪ Maintain community support for preferred option.	Y
	▪ Minimise severance across highway corridor.	Y
	▪ Minimise impacts on areas of cultural or archaeological significance.	Y
	▪ Minimise impact to native flora and fauna.	Y
	▪ Minimise businesses affected by potential acquisition.	Y
	▪ Minimise length of highway in visually sensitive (or medium-high visual quality) areas.	Y
	▪ Minimise number of properties that will experience noise that could require mitigation.	Y

* *Existing rest areas will be replaced with new high-standard rest areas catering for all road users, with one rest area for each direction of travel*

Cont.

PHUP objectives	Assessment criteria – a*chieved in proposed concept design (Y/N)*	Y/N
	Improve/maintain existing traffic and access	
	▪ Improve local traffic circulation, safety, separation from highway traffic.	Y
	▪ Improve vehicle, cyclist and pedestrian facilities.	Y
	▪ Maintain/improve availability of safe access across the highway corridor for all residents.	Y
	▪ Direct access points and intersections onto the highway will be formalised to Class A standard.	Y
	▪ Traffic surveys and forecasts for future performance at key intersections indicate that the performance of intersections would be good with the proposed upgrade.	Y
	Minimise property impacts	
	▪ Retain private property access on and off the highway.	Y
	▪ Minimise property acquisition and displacement impacts.	Y
	▪ Minimise number of sensitive land uses that may be subject to construction dust and other air quality impacts.	Y
	▪ Minimise impacts of altered flood flows.	Y
A route that supports economic development	Maintain access to and from the highway for businesses and producers	
	▪ Minimise distance from local producers to nearest highway access or interchange.	Y
	▪ Optimise highway to meet RTA flood requirements.	Y
	▪ Maintain access to Bundjalung National Park.	Y
	Provide access to New Italy for north and south-bound traffic on highway	
	▪ Minimise direct property impacts.	Y
	▪ Retain Driver Reviver facility.	Y
	Minimise impacts on high quality agricultural land and existing agricultural enterprises and resources	
	▪ Minimise number of properties with greater than 10% of land acquired by the preferred option.	Y
	▪ Minimise number of agricultural enterprises that will experience reduction in primary production.	Y
	▪ Minimise length of route encroaching on State Forests.	Y
Manage the upgrading in accordance with ecologically sustainable development principles	Conserve biological diversity and ecological integrity	
	▪ Minimise impact on threatened species and habitats.	Y
	▪ Minimise impact on endangered ecological communities (EEC).	Y
	▪ Mitigate against risk identified for loss of, or disturbance to flora and fauna, including threatened species during construction and operation.	Y
	Eliminate the threat of serious or irreversible environmental damage	
	▪ Minimise the area of high and moderate conservation value land affected.	Y
	▪ Develop a comprehensive Environmental Management Plan (for the construction phase).	Y
	▪ Minimise use of energy and non-renewable resources.	Y
	▪ Maintain or improve water movement across the highway corridor.	Y
	▪ Minimise disturbance of potential acid sulphate soils.	Y
	▪ Minimise potential for elevated total suspended solids levels in watercourses from construction.	Y
	▪ Minimise the risk of water quality impacts in small creeks draining to sensitive SEPP 14 wetlands.	
	Eliminate encroachment or direct impact on National Parks and wildlife estate	Y
	▪ National Parks and wildlife estate lands preserved with no encroachment.	
	Improve air quality and reduce greenhouse emissions	
	▪ Minimise travel distance, travel time and delays.	Y
	▪ Ensure atmospheric carbon monoxide concentrations would be well below Department of Environment and Conservation criteria.	Y

Cont.

PHUP objectives	Assessment criteria – a*chieved in proposed concept design (Y/N)*	Y/N
Provide best value for money	Design to make allowance for future upgrade to Class M	
	▪ Locations identified for potential future interchanges, service roads.	Y
	▪ Total Class M corridor requirements identified.	Y
	Minimise impacts on existing utility infrastructure	
	▪ Minimise cost of public utility adjustments.	Y
	▪ Maximise use of existing road infrastructure.	Y
	Maximise economic benefits to offset costs	
	▪ Minimise construction cost.	Y
	▪ Minimise operation cost.	Y
	▪ Deliver earlier economic benefits.	Y
	▪ Maximise benefit/cost ratio for the preferred option.	Y
	▪ Optimise benefit/cost ratio of construction staging options.	Y
	▪ Maximise compatibility of the preferred option with broader long term land use and development strategies.	Y

Source: Connell Wagner, 2006.

Next steps

The project is being developed in a way that is both ecologically sustainable and achieves the best overall outcome for the whole community. The RTA recognises the importance of achieving a balance between social, ecological, engineering and cost factors while continuing to provide for future transport needs. Most importantly, dual carriageway roads and fewer highway connections will result in a safer road environment.

Community response to the proposal is an important part of the route development process. The concept design will be on display for approximately four weeks. Community feedback will be integrated into the refinement of the proposed concept design and the approval of a preferred route.

Community consultation will continue. Updates in the local media, newsletters, meetings with individuals and groups, and the project website will continue to keep the community informed and assist community input.

Following the concept design display, the key stages in the process leading to the opening of the completed road include:

- *Publication of Community Update* – The preferred route will be confirmed following consultation with the community and input.
- *Refined Concept Design* – The proposed concept design will be refined taking into consideration all relevant constraints and design guidelines. This stage of the project provides the opportunity to refine the design to optimise the alignment and to minimise environmental and other impacts.
- *Environmental Impact Assessment (EIA)* – An EIA will be undertaken to identify environmental constraints and potential impacts associated with the project. During the EIA appropriate mitigation and ameliorative measures will be developed to minimise the environmental impacts of the construction and operation phases of the project.
- *Value Engineering Workshop* – A value engineering workshop involving members of the study team will be conducted to provide a critical evaluation of the preferred route concept design. The value engineering study will incorporate a risk management workshop, the aim of which is to optimise the project design and provide a risk assessment of the preferred route.
- *Determination and Approval* – Following the EIA and depending upon the statutory planning approval process to be adopted (which is subject to further consideration), the project will either be determined by the RTA or the Department of Planning, and approved by the Minister for Planning.
- *Construction* – If project approval is obtained, construction may commence.