

1 Introduction

1.1 Background

Roads and Maritime Services (RMS) engaged Cardno in September 2012 to carry out an options and route assessment study and preliminary environmental assessment for upgrading approximately three kilometres of the New England Highway (HW9) at Bolivia Hill between Glen Innes and Tenterfield.

The New England Highway passes through the Bolivia Range about 55 kilometres north of Glen Innes in NSW. The Bolivia Range runs east west and connects with the Great Dividing Range to the east and Deepwater River passes around the range to the west. Bolivia Hill (1225 metres) and Little Bolivia (1100 metres) are hills within the Range. Both the New England Highway (1025 metres) and the Main Northern Railway line (disused) pass through gaps in the range just to the west of Bolivia Hill.

The existing highway at Bolivia Hill has a deficient horizontal alignment (curves with 75 kilometres per hour advisory speeds), steep grades (up to nine per cent) and an adverse crash history with respect to fatalities and injuries. It has narrow or no road shoulders with a rock face to the east and steep drop to the west. Traffic volumes at Bolivia Hill are relatively low with little or no growth over recent years.

The study includes development of route options and identification of a preferred option. A concept design and environment assessment will be carried out for the preferred option. Results of each of the main stages of the study will be put on public display.

Community engagement is a key aspect of this project. The broader community will have the opportunity to make a demonstrable input to the process and to ensure that the requirements and aspirations of the community will be adequately and appropriately addressed. This is particularly relevant to:

- Any potential impacts on rural areas within the study area
- Social and economic impacts
- Accessibility of the road network for local and through traffic
- Potential impacts on water quality
- Potential impact on flooding
- Potential impacts on land uses
- Threatened flora and fauna species
- Aboriginal and non-Aboriginal heritage
- Visual impact
- Noise.

The project is currently in the preferred option development and display phase.

This document has been prepared to explain the preferred option development process. It describes the investigative work and analysis that has led to the identification of the recommended preferred option. It describes the recommended preferred option and summarises the next steps.

1.2 Project objectives

The aim of the project is to determine a preferred New England Highway corridor route at Bolivia Hill. Objectives for this project have been determined as follows:

- Improve road safety
- Improve road transport productivity, efficiency and reliability of travel
- Minimise the impact on the natural, cultural and built environment
- Provide value for money.

The preferred option development and selection process is one that seeks to identify the route that best meets these objectives. This process is set out in more detail in **Chapters 7 to 10**.

1.3 The study area

The study area identified for the proposed upgrade covers an area that starts at the top of Bolivia Hill (known as Chainage 56.4 kilometres) and descends to the valley floor to the north, ending at Pyes Creek bridge (known as Chainage 59.4 kilometres). The area is approximately three kilometres long and approximately 0.75 kilometres wide on either side of the existing highway. **Figure 1-1** shows the study area.

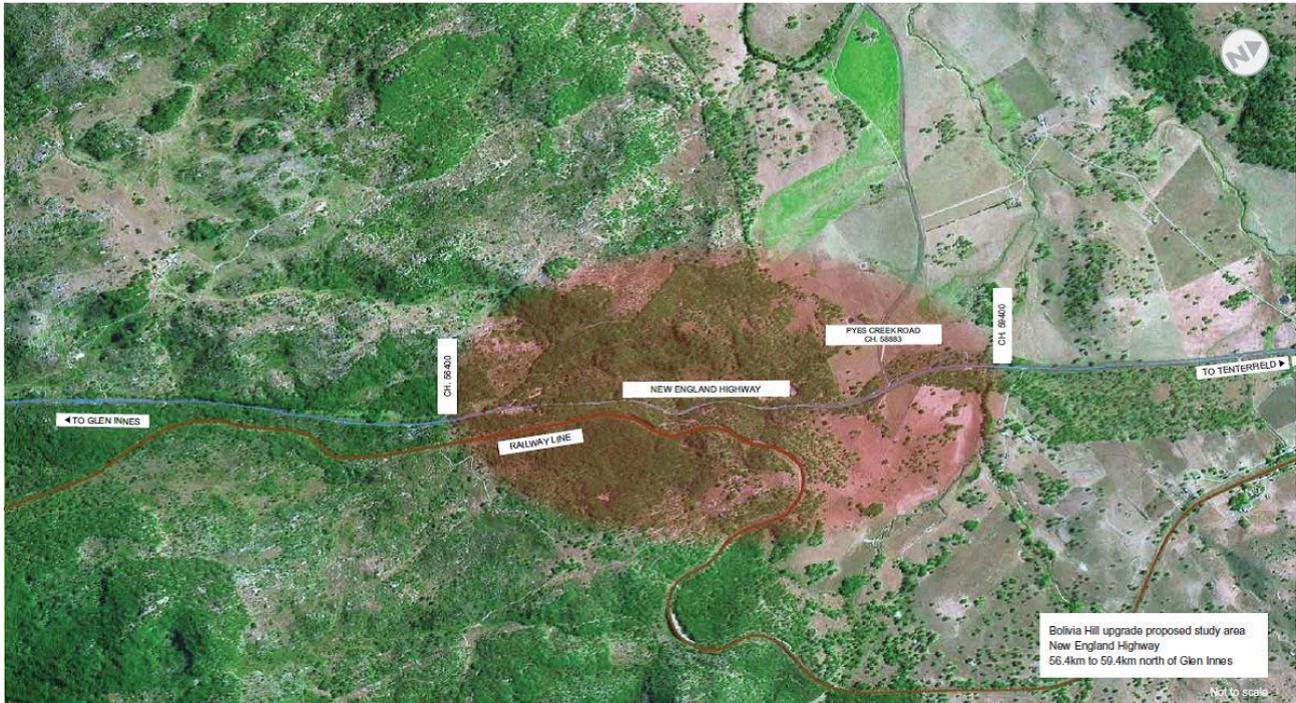


Figure 1-1 **The study area (shaded red)**

Significant constraints that influence the location and design of the route options include:

- The existing highway corridor
- Sub-standard road geometry of the existing highway
- Very steep terrain
- The Main Northern Railway (disused)
- Agricultural industry
- Aboriginal and non-Aboriginal cultural heritage at various locations across the study area
- Areas identified as Threatened Ecological Communities and the presence of threatened species.

1.4 The existing highway

The section of the New England Highway that passes through the Bolivia Range is approximately nine kilometres long but the length of road locally known as "Bolivia Hill" is the section of the highway that descends 100 metres (980 metres to 880 metres AHD) over two kilometres on the northern granite escarpment of the range. This alignment has steep cross falls and narrow road corridors with hard rock cutting to the east of the alignment and steep rockfill embankments to the west. In the 1950s, a 35 metre deep rockfill embankment was constructed in the steep gully halfway down the northern escarpment. The steep downslope batter and gorge have carved out a granite ridgeline that is locally known as the central ridge. Some wetland areas and rock pools are located in the drainage lines.

Figures 1-2 to 1-4 show views of the existing highway within the study area.



Figure 1-2 Looking north on the New England Highway at the southern end of the study area



Figure 1-3 Looking north on the New England Highway from about the centre of the study area



Figure 1-4 Looking south on the New England Highway from just south of Pyes Creek Road

1.5 Project development process

Figure 1-5 shows a summary of the route options development and selection process. **Chapters 7 to 10** include descriptions of the route options development and recommended preferred route option selection phases.

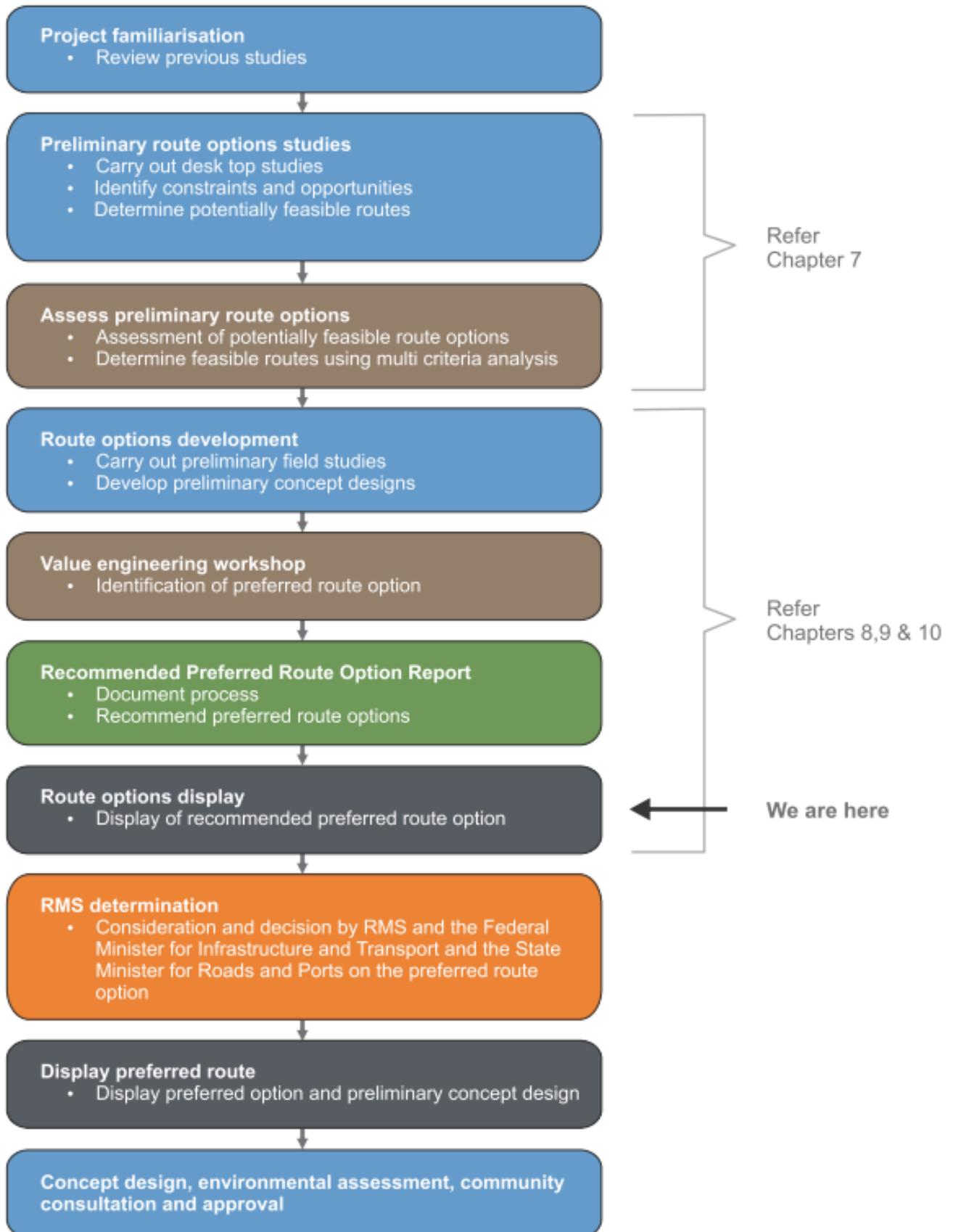


Figure 1-5 Project development process

1.6 Specialist studies

A number of key environmental, engineering and economic issues influence the location and design of the preferred option. Preliminary investigations are complete and include reviews of studies from previous investigations into the upgrade as well as field surveys specifically undertaken for the purposes of the assessment of options.

The current investigations comprise a review of existing background data, fieldwork and analysis to provide a more detailed understanding of the physical, social and economic aspects of the study area. Specialist studies conducted during the route options development phase include:

- Geotechnical (desktop)
- Topography, geology and soils
- Traffic, transport and road safety
- Public utilities and services
- Social-economic
- Flora and fauna (terrestrial and aquatic)
- Cultural heritage (Aboriginal and non-Aboriginal)
- Flooding and drainage
- Land use and planning
- Climate
- Visual amenity.

Further specialist studies were completed following the initial route options development stage to input into evaluation of route options and the selection of a preferred option:

- Flora and fauna (terrestrial and aquatic)
- Cultural heritage (Aboriginal and non-Aboriginal).

1.7 RMS environmental commitment

Through its Environmental Policy 2009¹, RMS is committed to undertaking activities in an environmentally responsible manner and to manage any risks that may lead to an impact on the environment. To this end, environmental management is considered an essential element of effective road and traffic related infrastructure planning, construction, maintenance and operation.

1.8 Ecologically sustainable development

Ecologically Sustainable Development (ESD) is development that aims to meet the needs of Australians today, while conserving our ecosystems for the benefit of future generations. Consideration of this is an important part of the project development process. This section provides an overview of the principles of ESD and provides a discussion on how they have been integrated into the options assessment process.

1.8.1 NSW Ecologically Sustainable Development Requirements

In NSW, Section 5(a)(vii) of the *Environmental Planning and Assessment Act 1979* (EP&A) Act states that ESD is a primary objective of the planning process under the Act. In accordance with the EP&A Act, Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* sets out the principles of ESD as follows:

- **The precautionary principle** – if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent

¹ The RMS Environmental Policy 2009 is available to download from the RMS website www.rta.nsw.gov.au

environmental degradation. In the application of the precautionary principle, decisions should be guided by:

- Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment
- An assessment of the risk-weighted consequences of various options.
- **Inter-generational equity** – the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations
- **Conservation of biological diversity and ecological integrity** – that conservation of biological diversity and ecological integrity should be a fundamental consideration
- **Improved valuation pricing and incentive mechanisms** – environmental factors should be included in the valuation of assets and services, such as:
 - Polluter pays, ie those who generate pollution and waste should bear the cost of containment, avoidance or abatement
 - The users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste
 - Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

1.8.2 Commonwealth Ecologically Sustainable Development Requirements

The *National Strategy for Ecologically Sustainable Development* (ESDSC, 1992) sets out the broad strategic and policy framework for governments to cooperatively make decisions and take actions to pursue ESD in Australia. The Strategy defines ESD as “*using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased*”.

1.8.3 Application of the Principles

The following outlines how each of the principles of ESD have been addressed within the route options assessment for the Bolivia Hill upgrade project.

The Precautionary Principle

The project has involved a number of desktop and field investigations to identify the biophysical, social and cultural environment of the study area (see **Chapter 5**). Explicit consideration was made of key constraints and opportunities identified in the route options assessment, with the information collated on the existing environment informing assessment criteria adopted in the scoring of the various route options. Where the impacts associated with a particular option were not known, a conservative approach was adopted.

The precautionary principle will also be applied during the environmental impact assessment phase, with the recommendations incorporated into the design and construction methodology where reasonable and feasible.

Inter-generational equity

The consideration of the potential environmental, social, cultural and economic impacts of the route options considered has sought to optimise the long-term benefits associated with the proposal. One of the core objectives of the project is to improve road safety, and the achievement of this objective will provide a long term benefit to the community.

The future environmental impact assessment of the project will ensure that the potential for long-term negative impacts is minimised. The risk of any long-term impacts occurring would be managed via the development of a series of environmental management and mitigation measures.

Ongoing community consultation will assist in identifying the community's concerns. This will enable the community to continue to provide feedback and raise issues for consideration by the RMS as the project proceeds.

Conservation of biological diversity and ecological integrity

Field surveys of terrestrial and aquatic biodiversity have been undertaken, targeting conservation significant species and communities known, or with potential to, occur in the study area. This has led to the development of a considerable amount of information, and has enabled the preparation of maps overlaying the route options on sensitive communities and species records. This information was considered in the route options assessment and selection of the recommended preferred option, with an effort being made to minimise the impacts on biodiversity, particularly for conservation significant species habitat or communities.

The information collated will also be used to inform the development of the preferred option through the detailed concept design process.

Improved valuation pricing and incentive mechanisms

As discussed above, consideration of the potential environmental impacts of the project was incorporated into the options assessment. In addition, the route options assessment has involved an economic evaluation of the various options, including consideration of the project cost and the development of a cost:benefit ratio. This has been used in comparing the route options and selection of the preferred option.

1.9 Report objective

The objective of this report is to describe the recommended preferred option that has emerged from the route options selection process.

More specifically, the report:

- Presents the justification for the project and its strategic context
- Outlines community engagement to date and key issues arising
- Confirms the constraints and opportunities which influence the development of feasible route options including social, environmental and engineering issues
- Confirms the design parameters applicable to this project
- Explains the route options development process and specifically the filtering of potential route options to a proposed shortlist of feasible options
- Presents the comparison between the feasible options, addressing engineering, environmental, social and economic issues
- Presents the recommended preferred option
- Outlines the next steps.

1.10 Report structure

This report has twelve chapters:

- Chapter 1** introduces the project.
- Chapter 2** outlines the strategic context of the project.
- Chapter 3** addresses the community and stakeholder involvement in the preliminary route options development process.
- Chapter 4** considers the strategic and statutory planning approvals process pertinent to the project.
- Chapter 5** describes the existing environment in biophysical, social and cultural terms.
- Chapter 6** outlines the design criteria and physical constraints that influence the development of the route options.

- Chapter 7** addresses the preliminary route options development and assessment process.
- Chapter 8** presents the shortlist of feasible options and their specific impacts on the existing environment.
- Chapter 9** outlines the development of the preferred option.
- Chapter 10** presents the recommended preferred option and its specific impacts on the existing environment.
- Chapter 11** documents the next steps of the project.
- Chapter 12** lists documents referenced during this stage of the project.

1.11 Assumptions and suitability of assessment

This report has been prepared based on desktop studies (ie review and analysis of existing published information such as reports, mapping, government policy and planning documents), targeted field investigations and assessment of the route options including constructability and strategic estimates of cost.

Assumptions and limitations specifically related to the various specialist studies carried out for this report are identified in the relevant sections of this report.

The project team has exercised all reasonable skill and care in preparing this report and has taken reasonable steps to ensure that the information contained in this report is accurate and up to date.

The information contained in this report is for conducting a comparative assessment of the preliminary route options and identifying a preferred route option. The alignments presented in this report are preliminary only and may be further refined during the concept design phase based on further investigations and feedback from the community and other stakeholders.