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An aerial photograph showing a wide highway cutting through a suburban town. The town has numerous houses, trees, and some commercial buildings. In the background, there are rolling hills under a cloudy sky.

# **New England Highway Tenterfield Heavy Vehicle Bypass**

Preferred route report

**MARCH 2015**

# Executive summary

Roads and Maritime Services (Roads and Maritime) has identified a preferred route for a future heavy vehicle bypass of Tenterfield in northern New South Wales.

Tenterfield is in the New England region of the state and is situated on the New England Highway, about 660 kilometres north of Sydney (18 kilometres south of the Queensland border). The New England Highway is a major interstate freight route and is part of the National Land Transport Network.

The existing New England Highway is the main street (Rouse Street) of Tenterfield and experiences common traffic and safety problems associated with central business district traffic – the mixing of local, regional and long distance traffic, including large heavy vehicles.

A range of preliminary route options for the heavy vehicle bypass were developed and displayed for community feedback in August 2013. Roads and Maritime undertook further investigations and considered community feedback on the preliminary options, prior to displaying four short listed corridor options for comment in May 2014. A range of community forums and information sessions were held during the development of the preliminary route options and the display of the shortlisted corridor options. There were a number of key issues raised consistently by the community throughout the development of the project. These issues included:

- Concern about the potential loss of business caused by the bypass
- Impact on heritage areas, such as the railway museum
- Ensuring connectivity to the western side of the bypass, such as access to the cemetery
- Concern about property values and noise.

The shortlisted corridor options were subject to a range of technical investigations during 2014 which informed the assessment and selection of a preferred route.

These investigations included:

- Geotechnical assessment based on localised mapping and analysis of existing railway cuttings
- Updated traffic surveys and data collection
- Preliminary ecology and biodiversity
- Aboriginal heritage
- Non Aboriginal heritage
- Preliminary noise modelling and analysis
- Preliminary visual impact assessment
- Preliminary socio economic impact assessment
- Indicative land acquisition requirements.

A value management workshop on the four shortlisted corridor options was held in Tenterfield in August 2014. The objective of the workshop was to assist in assessing the

four shortlisted corridors and to recommend a preferred route for consideration in conjunction with the outcome of the technical investigations and community feedback.

The value management workshop included a wide range of stakeholders including local community members, property owners, a representative of the Aboriginal community, business people, Tenterfield Shire Council, National Parks and Wildlife Service, Transport for NSW and the Roads and Maritime project team.

The workshop participants reviewed and evaluated the four shortlisted corridor options against the assessment criteria and compared the outcomes against their relative cost estimates. This led to a recommendation of a preferred corridor.

The workshop unanimously agreed that the orange corridor option should be the preferred option to progress the project planning.

### **The preferred route**

Taking into account the technical investigations, community and stakeholder feedback and the outcome of the value management workshop, the orange corridor has been selected as the preferred route.

The orange corridor was selected based on the following factors:

- The route starts and ends close to the town centre, making it more likely to encourage light vehicles to travel into the centre of Tenterfield
- Has the least environmental impact, in particular avoids the Currys Gap State Conservation Area
- Has no direct impact on heritage areas, such as the Railway Museum
- Provides the best value for money
- Minimises private land acquisition
- Provides a western vista of the town, highlighting the Railway Museum complex and other parts of Tenterfield not currently seen from the existing highway.

Adoption of the orange option as the preferred route will allow a corridor to be reserved for a heavy vehicle bypass in order to give Tenterfield Shire Council and the community certainty in planning for the future. A map of the orange corridor option is provided overleaf.



## Tenterfield heavy vehicle bypass - Preferred route corridor



The preferred route – orange corridor

## Glossary of terms

AHIMS	Aboriginal Heritage Information Management System
Alignment	Design term referring to the spatial position of a proposed road both horizontally and vertically.
OEH	Office of Environment and Heritage
Roads and Maritime	NSW Roads and Maritime Services

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# 1. Introduction

## 1.1 Project overview

Roads and Maritime Services (Roads and Maritime) has investigated corridor options for a future heavy vehicle bypass of the town of Tenterfield in northern New South Wales.

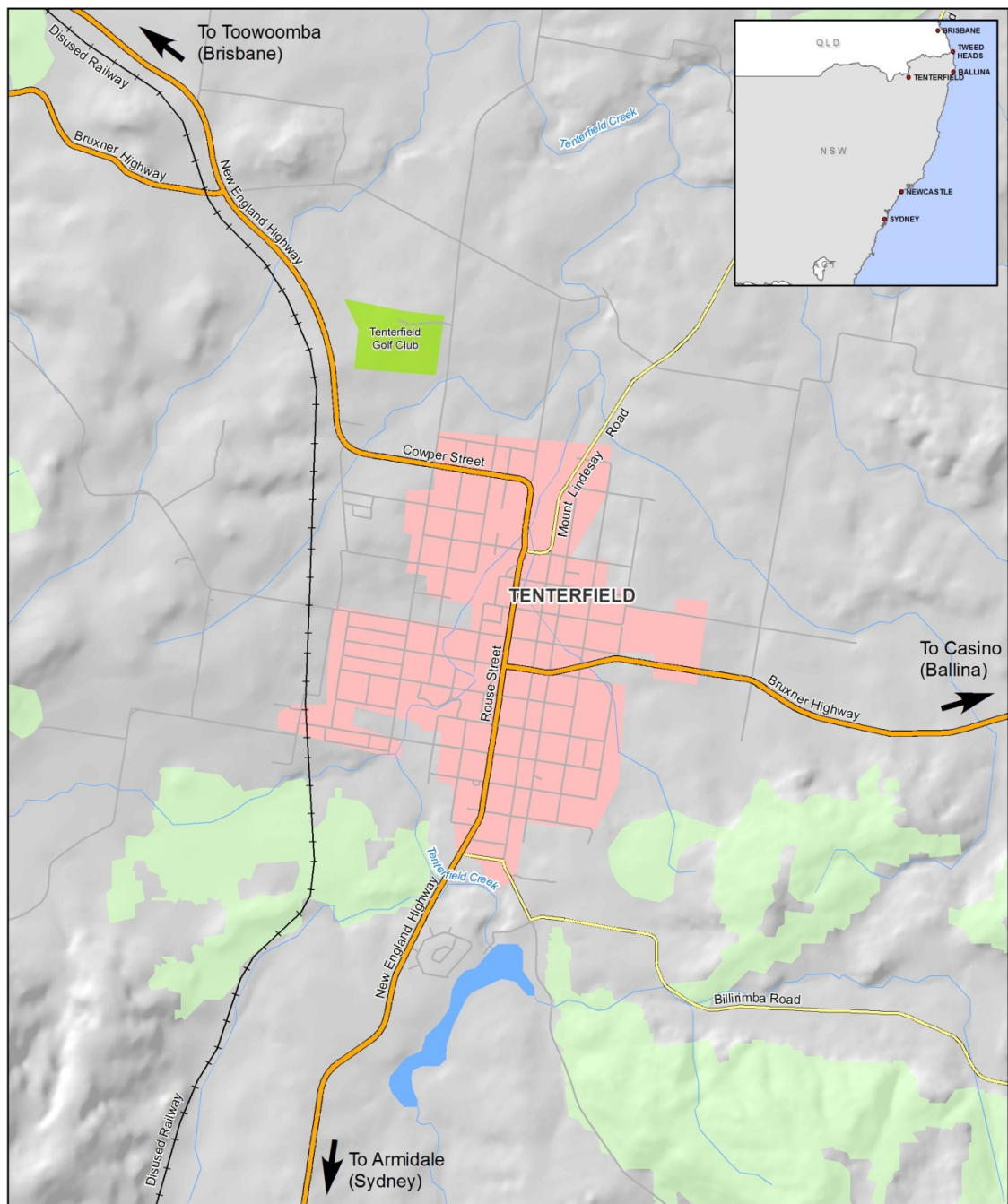
Tenterfield is situated in the New England region of the state at the intersection of the New England and Bruxner Highways, approximately 660 kilometres north of Sydney (18 kilometres south of the Queensland border). The New England Highway is a major interstate freight route and is part of the National Land Transport Network. Tenterfield has a population of 3,966 (2011 census) residents from a total of approximately 6,800 throughout the Shire.

The existing New England Highway is the main street (Rouse Street) of Tenterfield. This street experiences common traffic and safety problems associated with central business district traffic - mixing of local, regional and long distance traffic, including large heavy vehicles. Figure 1.1 overleaf shows the locality of Tenterfield.

Rouse Street is relatively narrow, carrying two traffic lanes (one lane in each direction) with parallel parking on each side. It provides linear access to the town's retail and commercial sector. There are three pedestrian crossings in the Rouse Street commercial area. The general urban speed limit in Tenterfield is 50km/h, with the central business district speed limit 40km/h.

The planning process has included:

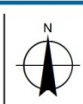
- A review of previous investigations into a bypass of Tenterfield, carried out by Tenterfield Shire Council (the PEECE report)
- The development and community display of a long list of 22 preliminary options
- Review and evaluation of feedback on the preliminary route options
- Further investigations and community display of four shortlisted route corridors
- The selection of a preferred option based on community feedback received throughout the development of the project, a value management workshop and technical investigations undertaken on the options.



#### LEGEND

Local Road	Existing Rail	Built Up Areas	Recreation Areas
Sub Arterial Road	Watercourse	Forest Or Shrub	
Primary Road	Water Body		

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0 0.175 0.35 0.7 1.05 1.4  
Kilometres  
Map Projection: Transverse Mercator  
Horizontal Datum: Geocentric Datum of Australia (GDA)  
Grid: Map Grid of Australia 1994, Zone 56



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Roads and Maritime Services  
Tenterfield Heavy Vehicle Bypass

Job Number 22-16349  
Revision 0  
Date 23 Aug 2012

Locality Sketch

Figure 1

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Data Source: Commonwealth of Australia (Geoscience Australia): 250K Topographic Data Series 3 - 2006. DTDB: LPMA - 2007. Created by: tmorton

Figure 1-1 Locality Sketch

## 1.2 Project need

The existing New England Highway is the main street (Rouse Street) of Tenterfield. This street carries mix of local and through traffic causing urban amenity and road safety issues.

The traffic problems include restrictions for over dimension vehicles travelling through Tenterfield. These vehicles require specific management measures, including the removal of bollards and some street signs, for passage through the main street. There is no feasible alternative route to the existing highway for heavy vehicles passing through Tenterfield.

The New England Highway through Tenterfield also experiences issues associated with the mixing of pedestrians and cyclists with local, regional and long distance traffic, including large heavy vehicles.



Figure 1-2 View of New England Highway (Rouse St) looking south

## 1.3 Strategic transport and planning context

The New England Highway forms part of the National Land Transport Network (NLTN). This network is recognised for its strategic national importance to national and regional economic growth, development and connectivity. The New England Highway also forms part of the inland route of the Sydney-Brisbane Corridor. The New England Highway passing through Tenterfield is recognised as an inland freight and commuter route allowing for the transport of goods to domestic and international markets via Newcastle, Sydney and Brisbane.

This project aligns with a number of strategic Australian and NSW government priorities and plans. The overarching policies and strategic documents relevant to the Tenterfield heavy vehicle bypass are described in detail as part of the Preliminary Route Options Report (Roads and Maritime, 2014).

Key documents directly relevant to this project are listed below:

- *NSW State Plan (NSW 2021)*
- *NSW Long Term Transport Master Plan (LTTMP) 2012*
- *NSW Freight and Ports Strategy 2013*
- *New England North West Regional Transport Plan 2013*
- *NSW Road Safety Strategy 2012*
- *Sydney to Brisbane Corridor Strategy 2007.*

A number of projects are proposed, underway or recently completed to enhance the future performance of the Sydney-Brisbane transport corridor in respect to the above issues. A Tenterfield bypass would contribute to the performance of the corridor by enhancing road safety and increasing capacity.

#### 1.4 Project objectives

The aim of the project is to determine the preferred route for a heavy vehicle bypass of the urban area of Tenterfield. This would allow a corridor to be reserved for a bypass in order to give Tenterfield Shire Council and the community certainty in planning for the future.

The preferred route is required to meet the following Roads and Maritime project objectives:

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

The project objectives have been used to establish the detailed criteria for the assessment of the shortlisted corridor options. This is outlined in more detail in the next sections of this report.

#### 1.5 Report purpose and scope

The purpose of this report is to describe the process used to select the preferred route for a heavy vehicle bypass of Tenterfield.

It provides a summary of community feedback to date and details of further investigations, as well as analysis and assessment of the four shortlisted corridor options. The report also documents the route selection process for the preferred route and the next steps for the project.



## 2. Approach to the project

### 2.1 Study area

In September 2012 Roads and Maritime announced the study area for the project (figure 2.1). Community drop-in sessions were held on Thursday 18 and Friday 19 October 2012 to allow community input to help identify local constraints and issues and to discuss potential routes and assessment criteria.



Figure 2-1 Study area

### 2.2 Development of the preliminary route options

Initial constraints mapping and other technical and environmental studies were carried out within the study area to inform the route selection process. These are described in detail in the *Preliminary Route Options Report* (Roads and Maritime, May 2014). The preliminary route options were displayed for community feedback in February 2013 and September 2013. A total of 22 preliminary route options were initially identified for further consideration. This included nine route options as per the Tenterfield Shire Council *PEECE Report 2009* and a further thirteen route options as per the *Preliminary Route Options Report (May 2014)*. These routes are outlined in figure 2.2 overleaf.

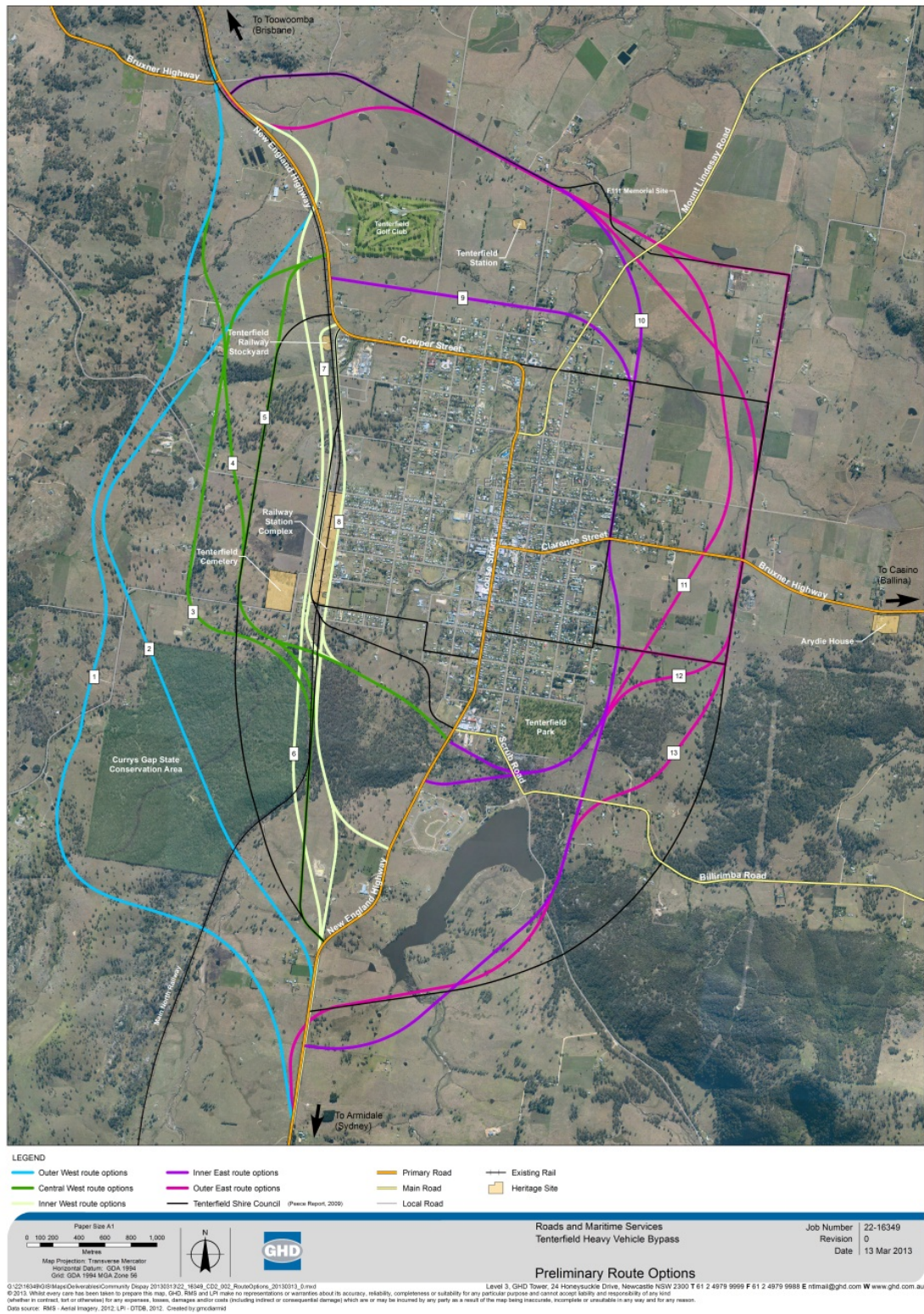


Figure 2-2 Preliminary route options

The key issues raised by the community included:

- The need for a bypass to be implemented to reduce heavy vehicle traffic volumes along the main street of Tenterfield
- Concern that bypass options will impact negatively on residential areas and the local economy
- The need to ensure that the bypass addresses traffic from the New England Highway as well as the Bruxner Highway and Mount Lindesay Road
- The community and Tenterfield Shire Council need to work together to improve the tourist potential of the town to offset any economic impact
- Concern about the economic impact of the proposed heavy vehicle bypass on the community and local businesses
- Current safety concerns along Rouse Street and maximising safety on any future bypass.

An internal technical workshop was held in June 2013 to assess the preliminary route options. The workshop agreed on the assessment criteria and weightings and carried out assessments of each option. As a result of this workshop four options were identified that best met the project objectives and should be considered for further investigation. The internal technical workshop and assessment of each of the shortlisted options is detailed in the *Preliminary Route Options Report* (Roads and Maritime, May 2014).

## 3. Shortlisted route corridor options

### 3.1 Description of shortlisted corridor options

The general characteristics of the shortlisted corridor options are described briefly below. The four route corridors are shown from figure 3.1 to 3.4 on the following pages.

#### 3.1.1 Blue corridor option (figure 3.1)

The blue corridor:

- Starts approximately one kilometre south of Saddlers Road
- Runs east of the railway corridor east of Currys Gap State Conservation Area
- Passes to the west of the Tenterfield cemetery
- Passes across higher terrain west of the town, bearing north and then north-east back toward the railway corridor
- Connects to the existing highway north of Cowper Street
- Is the longest corridor and has a higher assumed design speed, steeper gradients through undulating terrain.

#### 3.1.2 Purple corridor option (figure 3.2)

The purple corridor:

- Is identical to the blue corridor on the southern section
- Proceeds in a northerly direction and crosses to the immediate west of the railway line north of Currys Gap State Conservation area
- Runs parallel to the railway corridor alongside Western Street
- Runs parallel to railway (on western side) north of Sunnyside Loop Road
- Connects to the existing highway north of Cowper Street
- Provides the most direct route, with potential for higher design speeds.

#### 3.1.3 Orange corridor option (figure 3.3)

The orange corridor:

- Starts immediately north of Tenterfield Creek bridge on the southern edge of the town area
- Departs the existing highway on a westerly bearing, proceeding across partially cleared land towards the railway corridor
- Crosses to the west of the railway corridor clear of the Currys Gap State Conservation Area
- Proceeds to the north alongside Western Street, identical to the purple corridor
- Crosses the railway line near the northern end of Western Boundary Street connecting to the existing highway at Cowper Street.



#### 3.1.4 Yellow corridor option (figure 3.4)

The yellow corridor:

- Is identical to the orange corridor in the southern section
- On approach to the railway line veers north, passing to the east of the railway, adjacent Railway Avenue
- Continues on eastern side of railway line along Railway Avenue to Molesworth Street, potentially intersecting with or requiring closure of a number of local streets
- Is marginally the shortest option.



#### LEGEND

- Blue
- Highway

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Metres  
Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 56



Roads and Maritime Services  
Tenterfield Heavy Vehicle Bypass

Job Number 22-16349  
Revision 0  
Date 18 Sep 2014

Blue Corridor Option

Figure 3-1

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Data source: RMS - Aerial imagery, 2012. LPI - DTDB, 2012. Created by: tmorton, gmcdiamid

Figure 3-1 Blue corridor option





#### LEGEND

- Purple
- Highway

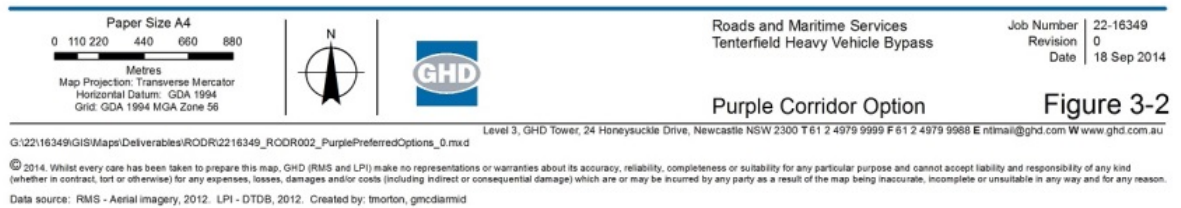


Figure 3-2 Purple corridor option





#### LEGEND

- Orange corridor
- Highway

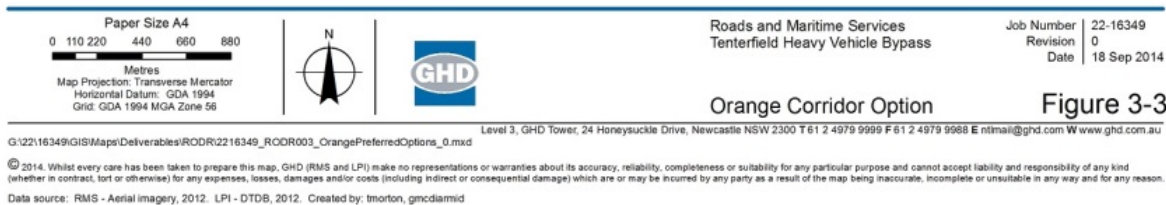


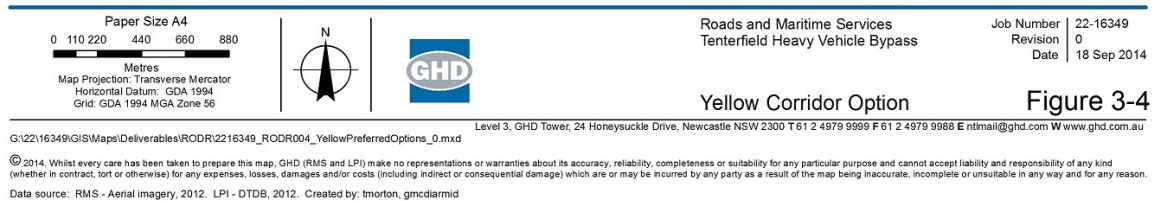
Figure 3-3 Orange corridor option





#### LEGEND

- Yellow
- Highway



**Figure 3-4**      Yellow corridor option

## 4. Route option investigations

### 4.1 Constraints

#### 4.1.1 Constraints identification

The first stage of the development of a potential road alignment within each corridor was to identify constraints that are of community, engineering, social or environmental value.

Specific constraints identified during field investigations included:

- Natural creeks and waterways
- Local road crossings
- Non-operational railway corridor, including cuttings, embankments and rail formation
- Currys Gap State Conservation Area
- Tenterfield cemetery
- Railway station complex and heritage museum
- Property ownership, cadastral boundaries and accesses
- Aboriginal and non-Aboriginal heritage items
- Industrial area on Western Boundary Street
- Tenterfield railway stockyards.

#### 4.1.2 Rail corridor and heritage museum

The most prominent of the constraints identified on the western side of Tenterfield is the railway corridor passing north-south through the study area and the heritage railway museum on the western edge of the town area.

While not operational, the railway line is still significant from a heritage and regulative perspective.

Discussions with rail corridor asset management and property staff from within Transport for NSW have identified that the rail corridor and the rail assets within it have ongoing operational status even though the line is not used.

#### 4.1.3 Constraints mapping and categories

The development of constraints maps enabled a multi criteria analysis (MCA) to be carried out on the route options. MCA is a structured approach used to determine overall preferences among shortlisted route options, where the options accomplish several objectives.

The constraints were also classified into three categories to allow assessment of route options in relation to the project objectives:

- Environment and heritage constraints
- Socio-economic constraints
- Engineering constraints.



A map of the combined constraints west of Tenterfield is provided in figure 4.1.

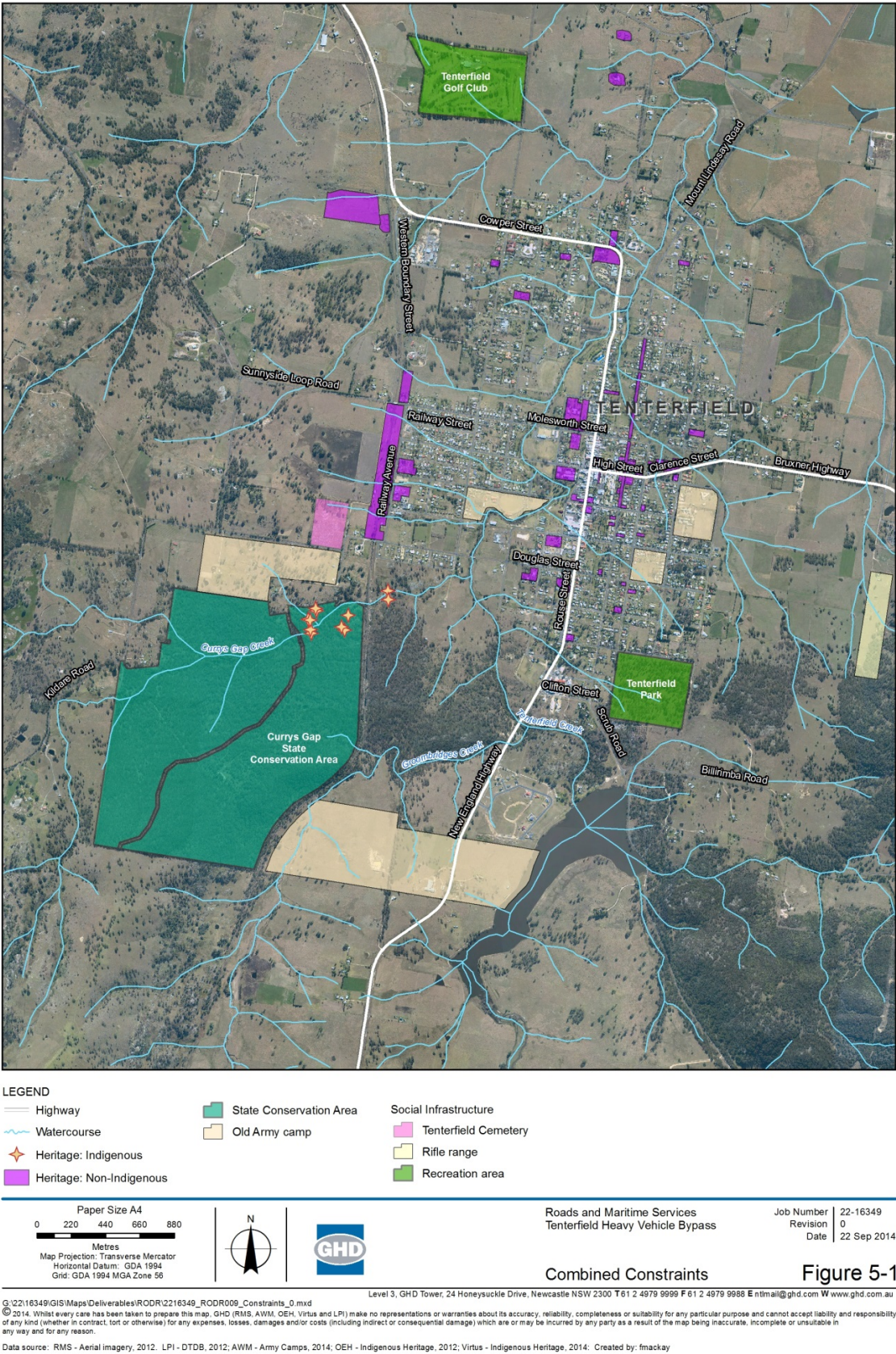


Figure 4-1 Constraints map



## 4.2 Geotechnical investigations

The desktop geotechnical study carried out during the preliminary route options phase provided an overview of what could be expected in relation to granite based rock formations, numerous large rock outcrops and the relatively shallow depth of bedrock.

Rock excavation will be a major undertaking on any future road construction and that construction risk will be proportional to the overall scale of required earthworks and excavation. The expected quantity of earth and rock excavation on each of the routes will be an indicator of construction difficulty associated with ripping and / or blasting of rock, potential rock face stability and long term maintenance of rock cuttings.

In order to understand the potential rock formations in more detail, an investigation of the existing cuttings along the railway corridor has been carried out.

Four rock cuttings in the railway formation were investigated in detail as follows:

- Cut 1 – deep rock cutting on railway line south of Currys Gap Creek
- Cut 2 – shallow rock cutting on railway line near Douglas Street
- Cut 3 – shallow rock cutting on railway line near Molesworth Street
- Cut 4 – deep rock cutting on railway line near Petre Street.

### 4.2.1 Site observations

Based on site observations and existing site records, it is considered that the weathering profile across the study area will be relatively uniform across the southern end of the site (up to Cut 2, or Douglas Street), with slightly weathered bedrock likely to be encountered at relatively shallow depths (<2m).

Towards the northern end of the study area it is considered that there may be some variation in the depth to competent bedrock, with possible “corestone” development to greater than five metres depth. New cuts would therefore generally be within weathered rock, with minimal slope treatment required. However, further geotechnical investigation will be required for the detailed design of any foundations for new structures due to the potential variability in depth to bedrock.

In the existing cuttings and rock outcrops, well developed joint sets were noted and potentially unstable rock block development was observed. This unstable rock block development was most apparent in Cut 1, where the existing cut profiles are generally controlled by persistent sub-vertical and shallow dipping joints that “daylight” within the cut faces. The potential for further large scale rock block development, as a result of modifying the existing cut faces, was also inferred based upon the geological mapping data.

The details of the existing railway embankment over Curry’s Gap Creek are unknown and, based on current guidelines, the construction of this structure and the associated culvert is unlikely to meet current standards.

### 4.2.2 Geotechnical assessment

It is expected that road cuttings along the southern section of the proposed routes (ie south of Douglas Street, and outside of the existing deep rail cutting) would be generally within moderately to slightly weathered rock (as seen in Cut 1). Foundations for any structures in this vicinity would likely only require shallow footings and embankments would likely be founded on moderately to slightly weathered rock. Further geotechnical investigations of this area are therefore considered unlikely to be

needed for concept design development purposes, but will be for completion of detailed design and to allow verification of inferred ground conditions prior to construction.

Based on the observed structure in the existing rail cuttings, it is likely that any route alignment passing through existing railway rock cuts, in particular Cut 1, would require extensive remediation and stabilisation of any existing and new cut faces to meet current Roads and Maritime guidelines.

Considering the observations made during the site inspection, it is expected that the existing embankment will likely need to be completely reconstructed to achieve compliance with current Roads and Maritime design guidelines. Further investigation and assessment of the suitability of the current embankment and culvert will be required to assess whether a more limited scope of work could be undertaken to bring the existing culvert and embankment to an acceptable risk level for the operation of the bypass.

#### 4.2.3 Geotechnical summary

Based upon field observations and engineering judgement, it is considered that the greatest engineering geological risk to the proposed heavy vehicle bypass of Tenterfield would be encountered at the southern end of the route. This is particularly apparent within the sections of the proposed routes that pass through the existing large railway cutting as well as over the existing railway embankment (ie the purple and blue corridors).

Based on these geotechnical and engineering geological factors, it is considered that the orange and yellow corridors would be considered to present lower construction, maintenance, safety and cost risk to the project.

## 4.3 Traffic assessment

### 4.3.1 Traffic modelling and analysis

Traffic survey and data collection activities were carried out for the Tenterfield heavy vehicle bypass investigation in October 2012 and December 2013. The latter surveys were undertaken at 12 locations and these comprised seven day counts with vehicle classification breakdowns. The survey locations are shown in figure 4.2.

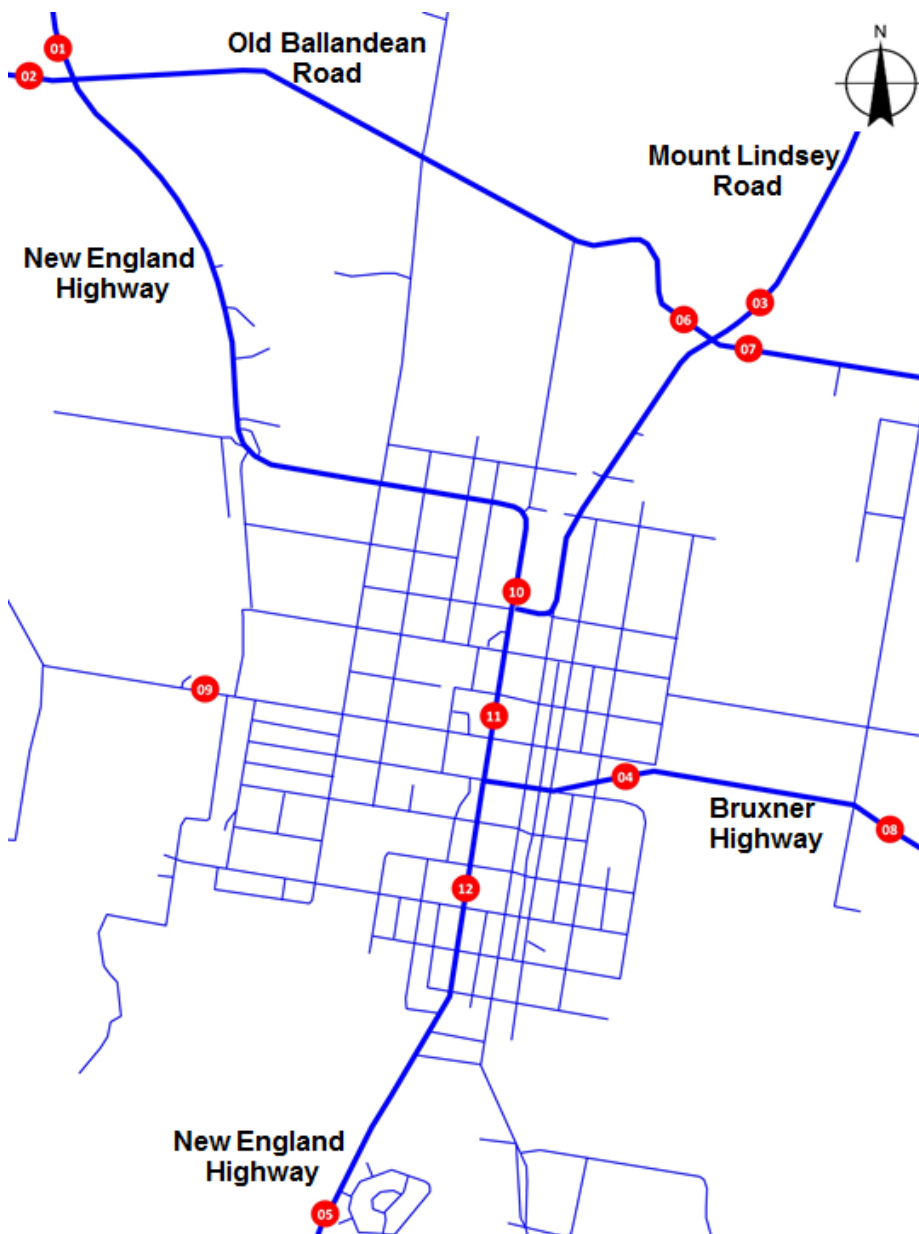
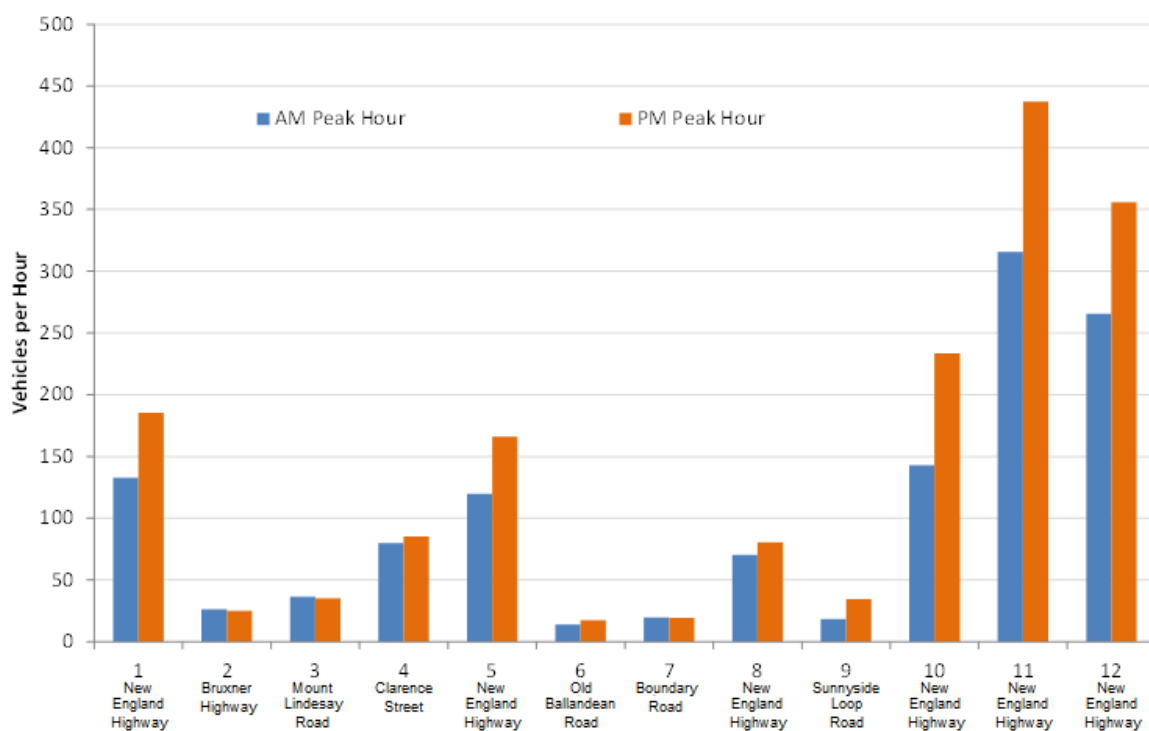


Figure 4-2 Traffic survey locations

The morning and evening peak hour flows at these locations are depicted in figure 4.3. This shows that the highest volumes are on the New England Highway within the Tenterfield town area. On the outskirts of town the existing highway north and south of Tenterfield typically has 120 to 180 vehicles per hour in peak periods.





Notes AM peak hour = 0800-0900

PM peak hour = 1700-1800

Figure 4-3 Peak hour traffic flows (two way)

Expected daily traffic flows for the proposed heavy vehicle bypass have been projected from the most recent surveys and the origin-destination survey carried out in October 2012. In order to estimate future traffic volumes, a theoretical open to traffic date of 2018 was selected for the bypass. The theoretical opening date does not reflect a commitment to construct the bypass by 2018. These future years traffic volume predictions are necessary for use in proposed noise modelling. Projected traffic volumes are provided in table 4.1.

Table 4-1 Forecast daily traffic volumes - proposed bypass

Year	North-bound light	North-bound heavy	South-bound light	South-bound heavy	2-way light	2-way heavy	2-way total
2018 on bypass	419	180	508	213	927	391	1318
2028 on bypass	478	205	579	243	1056	445	1501
2038 on bypass	536	230	649	272	1186	500	1686

Note: All figures are vehicles per day

In relation to functional performance, no attempt has been made to differentiate between the corridor options in relation to the potential variability of traffic demand on the longer versus the shorter bypass options. Although it would be expected that longer, higher speed routes would perform better due to greater travel time savings, the shorter routes provide comparable savings and would be ranked just below in terms of savings from the existing highway path through town.

#### 4.4 Hydrology and flooding

During the engineering investigations for the shortlisted corridors, a catchment analysis was carried out to determine the hydrology and flooding characteristics for each corridor option.

There are four main and several minor creeks within the study area for the shortlisted corridors. Not all corridors cross all of the creeks. The four main (named) creeks within the study area are from south to north as follows:

- Groombridges Creek
- Currys Gap Creek
- Tenterfield Creek
- Ghost Gully Creek.

The first three are major creeks which have large catchments to the south, south-west and south-east of Tenterfield respectively. These creeks all cross the shortlisted corridors in the southern portion of their path to the west of Tenterfield. All crossings are south of Douglas Street in the area east of Currys Gap State Conservation Area.

The fourth creek, Ghost Gully Creek, is a tributary of Tenterfield Creek, joining the major watercourse north of Tenterfield. It has a much smaller catchment, which is split into tributaries immediately west of Tenterfield. All four corridors pass over at least three of these minor tributaries between Douglas Street and the existing highway at Cowper Street.

A summary of the catchment and peak discharge calculations for each corridor is provided in table 4.2. This also provides an estimate of the number of culverts and bridges. Catchment areas and peak flows are quoted for the most downstream creek crossing.

Table 4-2 Creek crossings and catchment calculations

Creek	Catchment area (Ha)	Peak discharge 1% AEP (m <sup>3</sup> /s)	Bridge	Culverts
Groombridges Creek	1,736	98	✓	
Currys Gap Creek	1,771	99	✓	
Tenterfield Creek	5,664	237	✓	
Ghost Gully Creek Tributary 1	74	8		✓
Ghost Gully Creek Tributary 2	80	9		✓
Ghost Gully Creek Tributary 3	34	5		✓

The blue corridor is considered the best corridor from a hydrology and flooding perspective. This is due to it being further upstream of the majority of the creeks and therefore having smaller and fewer catchments when compared with the corridor options closer to town.

However, there is little differentiation between the respective corridors from a hydrology and flooding perspective, each requiring two bridges over major creeks, with all other transverse drainage utilising pipe or box culverts.

## 4.5 Ecology and biodiversity

Flora and fauna surveys were completed across the study area between 2012 and 2013, capturing seasonal variation and recording species, communities and habitat. The aim of the survey was to identify environmental issues and constraints, particularly critical issues that could potentially prevent the adoption of any of the proposed route options. The focus of the information relayed in this section relates to the four shortlisted corridors.

### 4.5.1 Existing environment and biodiversity

Generally the areas surveyed were dominated by agricultural activities, cleared land and small patches of highly modified native vegetation. The watercourses were highly modified and key points of biodiversity were associated with the bushland reserves, the reservoir and the bushland to the southeast of the reservoir.

A major feature of the study area is the Currys Gap State Conservation Area to the west of the railway corridor on the southern portion of the blue and purple corridors. This area is home to a number of vulnerable animal species.

Although much of the study area is highly modified, it does contain threatened vegetation communities and a range of identified flora and fauna species is summarised in table 4.3.

Table 4-3 Potential threatened fauna and flora on route corridors

#### Fauna

Scientific name	Common name	Threatened species listing
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater	TSC Act vulnerable
<i>Miniopterus schreibersii oceanensis</i>	Common Bent-wing Bat	TSC Act vulnerable
<i>Ardea ibis</i>	Cattle Egret	EPBC Act migratory/marine
<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	TSC and EPBC Acts vulnerable

#### Flora

Scientific and or common name	Threatened species listing
Blakely's Red Gum – Yellow Box grassy woodland of the New England Tableland Bioregion	TSC Act EEC and EPBC Act TEC
White Box Yellow Box Blakely's Red Gum Woodland (variant)	TSC Act EEC and EPBC Act TEC
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and derived native grasslands (variant)	EPBC Act EEC



#### 4.5.2 Biological constraints assessment

A summary of biological constraints identified during surveys for the shortlisted corridors is provided in table 4.4 below. A conservation significance rating was assigned to each route based upon presence of threatened communities and species, terrestrial habitat values and aquatic habitat values of each of the alignments.

Table 4-4 Route options and biological constraints

Route option	Blue	Purple	Orange	Yellow
Total native vegetation (Ha)	37.83	28.80	12.93	11.27
Total TEC listed under TSC Act (Ha)	10.60	4.45	1.45	0.68
Total TEC listed under the EPBC Act (Ha)	3.14	3.14	0	0
Habitat values	High	High	Moderate	Moderate
Threatened species recorded	<i>Eucalyptus nicholii</i> <i>Melithreptus gularis</i> <i>Miniopterus schreibersii oceanensis</i>	<i>Melithreptus gularis</i> <i>Miniopterus schreibersii oceanensis</i>	<i>Miniopterus schreibersii oceanensis</i>	<i>Miniopterus schreibersii oceanensis</i>
Conservation significance rating	Very high	High	Moderate	Moderate

#### 4.6 Aboriginal heritage

The Aboriginal heritage study included both desktop studies and on site surveys of the four shortlisted corridor options.

The survey included a walkover of the entire project impact area. For the survey the area was divided into landform elements to assist with recording individual survey areas. The survey coverage did not include the existing bitumen road surface or other areas where previous disturbance has removed the likelihood of locating intact archaeological deposit or natural ground surface. Efforts were made to investigate the sites previously recorded near Currys Gap Creek to ensure they were not within the study area.

The survey included inspection of mature trees for evidence of Aboriginal scarring, inspection of stone outcrops for evidence of quarrying and inspection of places specifically requested by the Aboriginal stakeholders within the project impact area.

Known Aboriginal resources present were recorded as well as any cultural information, information about Aboriginal resources, information about the landscape and comments by Aboriginal representatives regarding significance. In addition, any comments made by Aboriginal stakeholders involved in the field survey on site locations or the management or cultural values of the project impact were also noted. New sites and areas of archaeological potential were recorded including all information required to complete an Aboriginal heritage information management system Office of Environmental and Heritage Aboriginal Heritage Information Management System (AHIMS) site card.

The heritage assessment and consultation found that the Currys Gap State Conservation Area is of Aboriginal cultural significance and corridor options that affected this area would have a major impact on Aboriginal heritage and cultural values.

### Site finds

Two sites were recorded as part of the survey and are listed in table 4.5.

Table 4-5 Aboriginal heritage investigation findings

Preliminary find	Location	Landform	Route Option(s)
Grinding grooves	Currys Gap Creek	Creek	Orange and yellow
Isolated artefact	Currys Gap Creek	Slope	Orange

The two sites were assessed for significance. The assessment of the grinding grooves (site 1) found that the site is located close to a natural spring and the isolated artefact recorded (site 2) suggesting that these are likely to be cultural grinding grooves. They provide some information about habitation and use of the landscape not provided by other sources (such as artefact scatters). The site is assessed as having moderate scientific significance. No specific aesthetic or historic values were noted for the site.

The assessment of site 2 found that site is an isolated artefact located in a disturbed context on top of an outcropping boulder. It contributes knowledge about the area because no other artefacts have been recorded nearby making it unique within the study area. The scientific significance of the object is assessed as low. No specific aesthetic or historic values were noted for the site.

Some areas of potential sensitivity were identified through predictive modelling in the southern parts of the blue and purple corridors.

### 4.7 Non-Aboriginal heritage

The non-Aboriginal heritage study was carried out and includes the results of both desktop studies and on site surveys. The survey included a walkover of the proposed corridor options.

Areas with known historical heritage items were targeted and inspected during the survey. Consultation with the Tenterfield and District Historical Society was also carried out through face to face meetings during the fieldwork program in Tenterfield. Areas of additional sensitivity or potential for historical heritage items identified by the Tenterfield and District Historical Society within the shortlisted corridors were inspected and investigated.

Historical aerial photographs and original heritage listing sheets and records were taken in the field by the archaeologist to assist with the relocation of these items and the assessment of their curtilages.

A number of previously known and newly identified heritage items were found across the study area in and around the shortlisted corridors. Typical heritage items and features were found in a number of categories as follows:

- Railway camps and related rail infrastructure and structures, including the Railway Museum complex

- Urban heritage items associated with buildings and other infrastructure on the western side of Tenterfield
- Remains of old farms or homesteads
- Pastoral evidence (sheds, shearing sheds, sheep dips, cattle yards and runs)
- Bottle dumps and refuse pits.

In addition to these typical items there has been specific research completed into a substantial military presence in Tenterfield during World War II. Army camps of various sizes were established on a number of large properties during the war years and these have been identified from military archives. Two of these camp areas have been identified on the blue and purple corridors.

The potential significance of each item has been noted and assessed within the following categories.

- State significant
- Potentially State significant
- Locally significant - management or preservation requirements
- Locally significant – notation and recording requirements.

#### 4.8 Noise and vibration assessment

A preliminary noise modelling report was completed to assess the potential impact of the shortlisted corridors on the various noise receivers (houses, properties and commercial premises) in the vicinity of the corridors.

There are three key different areas which may be sensitive to road traffic noise from the possible bypass. These are summarised as:

- Eastern side of the railway corridor
- Western fringe of Tenterfield urban area
- Rural and residential homes in less dense concentrations.

The noise modelling calculates day time and night time traffic noise in the following timeframes:

- Day time road traffic noise – 6.00 am to 9.00 pm
- Night time road traffic noise – 9.00 pm to 6.00 am.

A number of factors contribute to road traffic noise and impacts at nearby residences:

- Proximity of residences and type of construction
- Gradient of the road and whether it is in cut or fill
- Traffic density and travel speed on bypass, particularly heavy vehicles
- Road surface type – seal, concrete or asphalt.

The preliminary noise modelling indicates that the road traffic noise criteria will be exceeded at some receiving locations and that that noise mitigation may be required to manage those impacts.



Table 4-6 Exceedances by corridor option

Criteria	Blue	Purple	Orange	Yellow
Day time exceedances	12	25	20	44
Night time exceedances	19	31	33	61

The table shows that the corridor with the least noise impact on the town is the blue corridor. This is due to it being located further from residences when compared to the other corridors. The orange and purple corridors have a similar number of exceedances due to their similar proximity to residents on populated sections of the potential bypass. The yellow corridor is the worst as it utilises existing road infrastructure that is next to residential areas.

More detailed noise modelling would be carried out on the preferred route should the project proceed to an environmental assessment. The environmental assessment would examine the potential impact in detail and identify mitigation measures which would assist in managing any adverse impacts.

#### 4.9 Visual impact assessment

A visual impact assessment was conducted for each of the shortlisted corridors. This included an assessment of existing landscape character zones (LCZ) and the potential impact that the earthwork requirements and finished appearance of the bypass proposal would have on the existing landscape.

The landscape character zones that crossed by any of the shortlisted corridors are identified below and are shown in figure 4.4 overleaf.

- LCZ 1 – Western rural lands
- LCZ 2 – Tenterfield urban lands
- LCZ 3 – Tenterfield Creek and open space
- LCZ 4 – Tenterfield railway precinct and cemetery
- LCZ 5 – Currys Gap State Conservation Area and adjoining lands
- LCZ 6 - Southern rural lands.

In addition to assessing the impact on these zones the visual impact assessment would also consider the impact on visual receivers (houses, properties and businesses) from the proposed bypass and make recommendations for mitigation measures where appropriate.

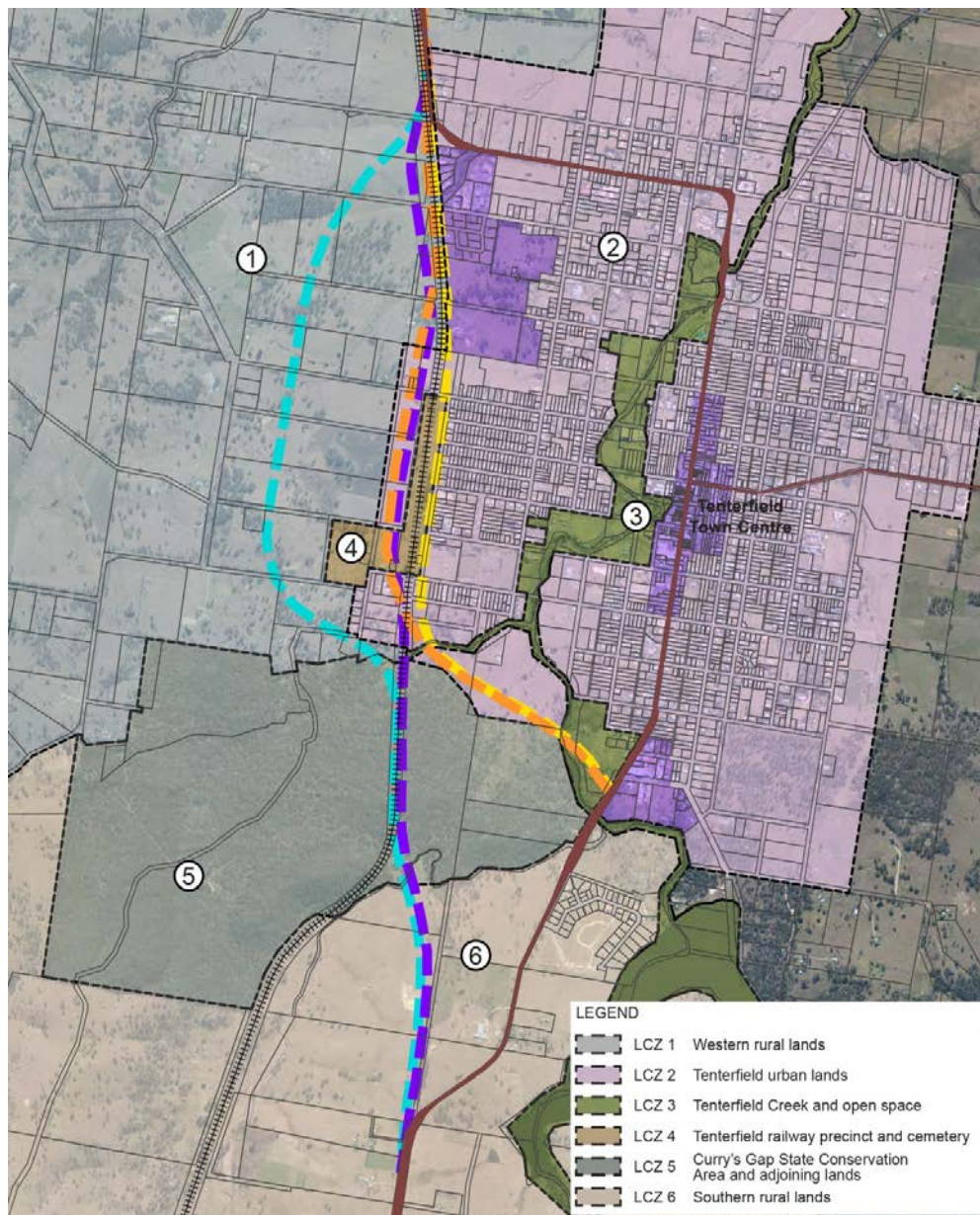


Figure 4-4 Identified landscape character zones

It was established that each of the corridors would have a different perspective from a driver's viewpoint. Any future road would be designed to be sympathetic to the surrounding landscape character and would have suitable vegetation and landscaping incorporated.

The major differentiator from a visual impact perspective would be views to the road from key stationary viewpoints within Tenterfield. The blue corridor would be most remote from town, well west of the railway corridor and although it would most likely feature some large earth cuttings it is considered to be the most favourable in terms of being able to be shielded from the town.

The yellow corridor would have most impact from stationary viewpoints, being on the western fringe of town and along the entire frontage of the railway museum complex. The remaining two corridors, purple and orange, are also located to the west of the railway corridor and would be generally placed low in the natural terrain, allowing them to also be shielded from the town area.

#### 4.10 Socio-economic impact

The project team met with various business and community groups from within the Tenterfield community which could offer insights into the current socio-economic situation of the town. This was additional to the general stakeholder consultation described in section 5.5 of this report.

The project team also sought opinions on the proposed heavy vehicle bypass and the impact that it could potentially have on Tenterfield and any mitigation measures that could be put in place to negate these potential impacts.

Meetings were held with representatives from:

- Tenterfield Shire Council
- Tenterfield and District Business Association (TADBA)
- Tenterfield Tourist Information Centre.

A summary of the information relayed and the outcomes of these meetings are provided as follows.

##### 4.10.1 Tenterfield Shire Council

#### Potential socio-economic impacts

- Some of the corridors cross the council cycleway on the southern outskirts of town
- Local business will be negatively affected by a drop in through traffic. The bypass is also creating uncertainty amongst the business community.

#### Suggested considerations

- Strategies including signage, opportunities and marketing are essential to maintaining visitor numbers to Tenterfield. There is a need to make Tenterfield a destination in itself
- No competing business should be allowed on the new bypass
- Increased beautification measures in the main street to make it more pedestrian friendly
- Potential to develop commercial activity in the town.

##### 4.10.2 Tenterfield and District Business Association

#### Potential socio-economic impact

- Many trucks currently use Sunnyside Loop Road to access the Bruxner Highway
- Railway line is a safety hazard for pedestrians.

#### Suggested considerations

- The western options put forward provide opportunities for Tenterfield, although strategies such as signage, education of businesses, competitive pricing and promotion of the town should be considered
- Potential to develop commercial activity in the town.



#### 4.10.3 Tenterfield Tourist Information Centre

##### Potential socio-economic impacts

- Concern was raised over the potential negative impacts on the town as it is not yet an established tourism destination.

##### Suggested considerations

- Tenterfield Shire Council and Tenterfield and District Business Association need to design an appropriate destination strategy for Tenterfield. This can focus on encouraging people to turn off into the town, al fresco dining opportunities and increasing the town's 'brand awareness'.

#### 4.11 Design standards and road geometry

The general standard for concept design of the Tenterfield heavy vehicle bypass is based on the New England Highway design guidelines to ensure that a consistent design form and quality of road asset is delivered along the entire New England Highway.

##### 4.11.1 Design standards

A summary of the design parameters that would be adopted for the heavy vehicle bypass and the new sections of local access road are provided in table 4.7 below.

Table 4-7 Adopted design parameters

Design parameter	100 Km/h	80 Km/h	60 Km/h
Stopping sight distance	210 m	105 m	65 m
Minimum radius of horizontal curves	630 m	280 m	120 m
Desirable radius of horizontal curves	1200 m	450 m	200 m
Desirable maximum gradient	5%	5%	5%
Minimum K values for crest curves (stopping sight distance)	66	24	10
Minimum K value for sag curves (headlight sight distance)	35	20	10

##### 4.11.2 Typical cross-section

The cross-section parameters adopted for a single carriageway, two lanes / two way heavy vehicle bypass of Tenterfield are provided in table 4.8. These details show typical lane, shoulder and verge widths for the road and solutions for interfacing with the natural terrain either side of the new road formation.

Table 4-8 Typical cross-section details

Design Parameter	Adopted for heavy vehicle bypass
Traffic lanes	3.5 m
Shoulder	2.5 m
Verge	
shallow cut / fill	1.0 m
deep fill with guard fence / barrier	2.0 m
deep cut – earth	1.0 m

Design Parameter	Adopted for heavy vehicle bypass
deep cut – rock	4.0 m
Cut batters in earth (H:V)	2 : 1
Cut batters in rock (H:V)	0.5 : 1
Fill batters less than 2 m (H:V)	4 : 1
Fill batters higher than 2 m (H:V)	2 : 1

#### 4.12 Travel attributes of shortlisted corridors

The functional (travel) characteristics of the shortlisted corridor options – distance saving, likely travel speed and calculated time savings are presented below in table 4.9.

Table 4-9 Key travel attributes for the shortlisted corridor options

Option	Blue	Purple	Orange	Yellow
Length of existing highway between end points (km)	7.27	7.27	5.03	5.03
Total length of new bypass (km)	6.16	5.78	4.34	4.28
Distance saving (km)	1.1	1.4	0.7	0.7
Design at 100 km/h but steeper grades limit heavy vehicles	90			
Average of 90 km/h (south) and 70 km/h (north)		80		
Limit due to proximity to town, could be increased to 80 km/h			70	
Limit due to proximity to town, possibly limited only 60 km/h				70
Calculated travel time saving (mins)	3.0	2.9	1.8	1.9

The longer corridor options, blue and purple, provide greater savings because of the expected higher assumed travel speed. The shorter, orange and yellow, corridor options also provide savings but over a lesser length.

Of the shorter options it is possible that the orange corridor could support a higher travel speed, up to 80 km/h, since it is mostly west of the railway line, away from residential areas. This would lead to increased travel time savings.

The yellow corridor may be limited to 60 km/h for noise and safety reasons. This would result in less travel time saving.

#### 4.13 Bridges

Each of the four corridor options would require bridges over two of the following creeks:

- Groombridges Creek
- Tenterfield Creek
- Currys Gap Creek.

Local overbridges would also likely be required at:

- Douglas Street / Kildare Road

- Molesworth Street / Sunnyside Loop Road.

A summary of the bridges required for each of the options is presented in table 4.10 below.

Table 4-10 Proposed bridge structures

Option	Blue	Purple	Orange	Yellow
Groombridges Creek	Yes	Yes	No	No
Tenterfield Creek	No	No	Yes	Yes
Currys Gap Creek	Yes	Yes	Yes	Yes
Kildare Road Overbridge	Yes	No	No	No
Douglas Street Overbridge	No	Yes	Yes	Yes
Sunnyside Loop Road Overbridge	Yes	Yes	Yes	No
Molesworth Street Overbridge	No	No	No	Yes

#### 4.14 Earthworks

Detailed road design would seek to balance earthwork to provide enough cut material to construct the required embankments without the need to import fill material from off site.

Any uncertainty or risk around this approach needs to factor in the quantity of hard rock likely to be encountered in the road cuttings, presence or otherwise of unsuitable material or poor ground conditions.

Preliminary earthwork calculations have been carried out on an indicative vertical alignment within each of the shortlisted corridor options. These show that the blue corridor would require a large volume of earth and rock to be moved along the corridor, up to five times that required for the yellow corridor and three and a half times that of the orange corridor.

A summary of the preliminary earthworks figures and the estimated rock volumes on each corridor is provided in table 4.11.

Table 4-11 Preliminary earthwork and rock volumes

Preliminary earthworks volumes	Blue	Purple	Orange	Yellow
Earthworks – cut (m3)	490,000	260,000	140,000	110,000
Earthworks – fill (m3)	320,000	190,000	111,000	90,000
Estimated rock volume (m3)	160,000	96,000	32,000	24,000

#### 4.15 Road surface

The road surface type for a heavy vehicle bypass would be determined as part of a future detailed design. The road surface type and thickness would be designed for the projected traffic volumes, particularly heavy vehicles, which have a greater impact on road surface life than light vehicles.

#### 4.16 Noise mitigation

Noise mitigation would be considered in further detail as part of a future environmental assessment. At this point preliminary noise modelling indicates that Roads and Maritime noise criteria would be exceeded at a range of properties, under both day time and night time conditions, on all of the shortlisted corridors.

If required, noise mitigation may include low noise road surface, noise barriers, at residence treatments or a combination of these.

#### 4.17 Utilities

Public utilities and community infrastructure services would be impacted by construction of the heavy vehicle bypass. In areas where utilities and services are directly affected they would need to be relocated or adjusted either in advance or in conjunction with road construction.

Detailed consultation with various utility authorities to identify services impacted, relocation requirements and likely future installations and access arrangements will need to take place. Final detail of revised locations, design and construction timing of relocated services would be carried out during detailed design in consultation with the relevant utility authority.

Of the shortlisted corridors the major impact from utilities would be on the yellow corridor close to the western edge of the town area. Water and sewer mains, overhead power and telecommunications are prominent in the street layout east of the railway line. West of the railway line the public utilities are less and impact is expected to be minimal.

#### 4.18 Property

The four shortlisted corridors have a variety of potential property impacts. Each would require acquisition of a range of property types as follows:

- Crown land
- Tenterfield Shire Council
- Railway corridor
- Small rural allotments
- Larger rural allotments
- Residential properties.



A comparative assessment of the potential impact of each of the shortlisted corridors is provided in table 4.12. This is only an indicative figure as there are many properties that may not be needed once detailed design concepts have been produced.

Table 4-12 Potential property impact –indicative

Potential property impact	Blue	Purple	Orange	Yellow
Number of property owners impacted	23	24	20	23
Number of properties with minor impact (lots)	16	17	14	19
Number of properties with major impact (lots)	20	20	18	11
Number of house demolitions	0	4	4	6 - 8

## 5. Selection of the preferred route

### 5.1 Overview of process to date

The process of selecting the preferred route for the Tenterfield heavy vehicle bypass involved a number of stages in the development and assessment of the shortlisted corridors described in this report. The key stages have been:

- Review of background data and information to establish project constraints and opportunities
- Development of a range of preliminary route options for a potential heavy vehicle bypass
- Shortlisting four route corridors for further investigation and community feedback
- Further technical investigations on the shortlisted route corridors
- Value management process to assess the shortlisted route corridors and recommend a preferred route.

### 5.2 Selection process

The selection of the preferred route from the shortlisted corridors takes into account the following:

- Technical investigations and preliminary design
- Community consultation
- Value management workshop.

### 5.3 Summary of technical and environmental investigations

A summary comparison of the impact of the four shortlisted corridors across the range of engineering, social and environmental investigations and assessments is provided in table 5.1 below.

Table 5-1 Comparison of corridor options

Geotechnical investigations – preliminary risk assessment

Route option attributes	Blue	Purple	Orange	Yellow
The greatest engineering geological risk to project would be encountered at the southern end of the Blue and Purple corridors. This is due to these corridors passing through the existing railway cutting and existing embankment	High	High	Low	Low
The Orange and Yellow routes would be considered to present lower construction, maintenance, safety and cost risk to the project.				

#### Detailed traffic assessment / functional performance

Route option attributes	Blue	Purple	Orange	Yellow
<p>The longer Blue and Purple corridor options provide higher travel speeds and travel time savings (estimated at 3 minutes) from distance savings of between 1.1 km and 1.4 km.</p> <p>The shorter Orange and Yellow corridor options would provide comparable travel time savings (estimated at 2 minutes) due to lower travel speeds over a lesser distance saving of 0.7 km.</p>	Very good	Very good	Good	Good

#### Ecology and biodiversity - conservation significance rating

Route option attributes	Blue	Purple	Orange	Yellow
<p>The Orange and Yellow options perform best against this criteria:</p> <ul style="list-style-type: none"> <li>• Lower area of clearing of higher value habitat and / or threatened species,</li> <li>• Avoidance of the remnant Box Gum Woodland in the road reserve to the south which also contains hollow-bearing trees,</li> <li>• Maintenance of more connectivity between Currys Gap Conservation Area and the Crown land and agricultural land to the south and east</li> <li>• Reduction in the requirement to clear more mature vegetation in more diverse communities.</li> </ul>	Very High	High	Moderate	Moderate

#### Aboriginal heritage - Potential impact assessment

Route option attributes	Blue	Purple	Orange	Yellow
<p>The heritage assessment and consultation found that the Currys Gap State Conservation area is of Aboriginal cultural significance and corridor options that affected this area would have a major impact on Aboriginal heritage and cultural values.</p> <p>Two specific sites were identified as having potential Aboriginal heritage. The assessment found that:</p> <ul style="list-style-type: none"> <li>• Site 1 – Grinding grooves identified in Currys Gap Creek would be affected by the Orange and Yellow corridors. The grinding grooves provide some information on habitation and landscape use. The site was assessed as having moderate scientific significance</li> <li>• Site 2 – An isolated artefact was found immediately north of Currys Gap Creek. This may be affected by the Orange and Yellow corridors. While the artefact contributes to knowledge of the area, it is unlikely to be able to answer research questions on its own and is therefore assigned a low scientific significance.</li> </ul>	High	High	Moderate	Moderate

#### Non-Aboriginal heritage - Potential impact assessment

Route option attributes	Blue	Purple	Orange	Yellow
<ul style="list-style-type: none"> <li>• The Yellow corridor is performs poorest against this criteria due to the need to encroach on the historic railway precinct and museum.</li> <li>• The Blue, Purple and Orange corridors all have a similar level of impact on Non-Aboriginal Heritage Items.</li> </ul>	Moderate	Moderate	Moderate	High



## Hydrology and flooding - Hydrology and Flooding assessment

Route option attributes	Blue	Purple	Orange	Yellow
The corridor options that are further west perform better for hydrology and flooding as they are higher up the catchments. This means that the peak flows are smaller and thus easier to manage road and drainage design.	Good	Average	Average	Poor

## Noise and vibration assessment Noise and vibration impact

Route option attributes	Blue	Purple	Orange	Yellow
<ul style="list-style-type: none"> <li>The Blue corridor option has the least noise and vibration impact. This is due to it being located further from residences when compared to the other corridors.</li> <li>Orange and Purple have a similar noise impacts due to their similar proximity to residents on populated sections of the potential bypass.</li> <li>The Yellow option performs poorest against this criteria as it utilises existing road infrastructure that has adjacent residential areas.</li> </ul>	Low	Medium	Medium	High

## Visual impact assessment - visual impact from key viewpoints

Route option attributes	Blue	Purple	Orange	Yellow
<ul style="list-style-type: none"> <li>The Blue corridor would be least visible from the town, having the lowest visual impacts</li> <li>The Yellow corridor would have greatest visual impacts from stationary viewpoints, as it is on the western fringe of town and along the entire frontage of the railway museum.</li> <li>The Purple and Orange are also located to the west of the railway corridor and would be generally placed low in the natural terrain, allowing them to also be shielded from the town area.</li> </ul>	Low	Moderate	Moderate	High

## Socio-economic impacts

Route option attributes	Blue	Purple	Orange	Yellow
In general the corridors that started closer to the town (Orange and Yellow) were considered to perform better than those that started further away from the town (Blue and Purple). This was due to the thought that the closer that drivers get the main street, the more likely that they could see the town and stop in.	High	High	Medium	Medium

## 5.4 Consultation

A comprehensive stakeholder consultation process has been implemented since the project started. Local stakeholders have important information on issues and constraints in the study area with the potential to affect the location of route options and ultimately the performance of the preferred route.

Activities carried out to date:

- September / October 2012 – Display of the study area, project objectives and the timeframe for determining the preferred route option for community comment
- February / March 2013 – Display of 22 preliminary route options for community comment
- August 2013 – Further community update confirming all 22 route options to be assessed in the shortlisting process
- May / June 2014 – Display of the four shortlisted corridors for community comment.

Further information about the community consultation carried out on the preliminary route options can be found in the *Preliminary Route Options Report (Roads and Maritime, May 2014)*.

### 5.4.1 Shortlisted corridor consultation

The shortlisted corridor options were displayed for community feedback between 20 May and 18 June 2014. A total of 102 feedback forms were received.

The key issues were:

- Concern about the potential loss of business from light vehicles no longer travelling through the centre
- Impact on heritage areas, such as the railway museum
- Ensuring connectivity to the western side of the bypass, such as access to the cemetery
- Concern about property values and noise.

Table 5-2 Summary of benefits and challenges identified by the community on shortlisted corridors

Option	Benefits / opportunities	Challenges / issues identified by the community
<b>Blue</b>	<ul style="list-style-type: none"> <li>Least impact on heritage items and the cemetery</li> <li>Least disruptive to the community in terms of connectivity, property and noise</li> <li>Least number of houses and business that need to be acquired</li> <li>Saves the most time.</li> </ul>	<ul style="list-style-type: none"> <li>Travellers may bypass the railway museum and other attractions</li> <li>Concern about impact on wildlife and the Currys Gap State Conservation Area</li> </ul>
<b>Purple</b>	<ul style="list-style-type: none"> <li>Runs alongside the existing railway corridor</li> <li>Safety improvements at the corner of Schiffmens Hill to the south as the route will provide a straight alignment from the existing highway onto the bypass.</li> </ul>	<ul style="list-style-type: none"> <li>Potential impact on heritage railway museum and cemetery.</li> <li>Concern about impact on wildlife and the Currys Gap State Conservation Area</li> <li>Travellers may bypass the railway museum and other attractions.</li> </ul>
<b>Orange</b>	<ul style="list-style-type: none"> <li>Potential for the heritage railway station to have greater visibility to passing traffic</li> <li>Potential to encourage light vehicles to continue through town on Rouse Street to help mitigate any economic impact on the town</li> <li>Less local disturbance on existing streets when compared with the yellow option</li> <li>This option would use mostly unoccupied land.</li> </ul>	<ul style="list-style-type: none"> <li>Potential impact on heritage railway museum</li> <li>Concern about the environmental degradation in the vicinity of the cemetery</li> </ul>
<b>Yellow</b>	<ul style="list-style-type: none"> <li>This option appears to be the lowest cost at this stage of project development.</li> </ul>	<ul style="list-style-type: none"> <li>Potential impact on the heritage railway museum and cemetery access</li> <li>Concern about speeding vehicles and pedestrian safety</li> <li>This option is too close to town</li> <li>This option will have a major impact on residential houses on Railway Avenue.</li> </ul>



A full breakdown of the feedback received can be found in the *Shortlisted Corridor Consultation Report* at Appendix A.

#### 5.4.1 Tenterfield Shire Council

Tenterfield Shire Council (Council) provided a detailed submission to Roads and Maritime in response to the display of the *Preliminary Route Options Report* (May 2014). This submission advised that Council unanimously resolved at its meeting on 25 June 2014 that the Orange option is its preferred route as follows:

1. *That the Director of Engineering Services' Report "Tenterfield Heavy Vehicle Bypass – Final Route Options" be received and noted; and further that;*
2. *Council's submission request that the project name, and all signage associated with the project be changed to **Tenterfield Heavy Vehicle Detour**.*
3. *Council's submission advises the **Orange route** best facilitates the desired outcome; that the through route leads to Tenterfield and **bypassing Tenterfield requires a conscious detour**.*

Council also put forward some conditions for its support of the Orange option as follows:

- *The intersection at the southern end of the route should be configured as a T-intersection with the current New England Highway alignment. Configuring the intersection in this way would:*
  - *require traffic to take a 90 degree turn to bypass*
  - *make north bound traffic more likely to continue into Tenterfield as the default driver behaviour.*
- *At the northern end of the route the intersection for vehicles travelling south should be a roundabout. This roundabout should be configured so that the default driver behaviour is a gentle left turn to the current alignment. The detour for heavy vehicles should require to navigate at least 225 degrees around the roundabout.*

Roads and Maritime acknowledges the issues raised in Council's submission and will consider these in the future development of the project.

## 5.5 Value management workshop

A value management workshop on the four shortlisted corridor options was held in Tenterfield in August 2014. The objective of the workshop was to assist in assessing the four shortlisted corridors and to recommend a preferred route in conjunction with the outcome of the technical investigations and community feedback.

Ten community and local representatives attended the workshop, including two elected representatives from the recent community briefing, two representatives from Council and members of the Local Aboriginal Land Council, business chamber, the historical society and National Parks and Wildlife.

The workshop was independently facilitated and followed a structured process to ensure that key issues were identified and that the outcomes met the project objectives. A separate report has been prepared following the workshop and this section provides an overview of that report.

The workshop unanimously recommended the orange corridor as the preferred route, as it, on balance, meets the project objectives as a heavy vehicle bypass, it is fit for purpose and provides value for money. The workshop also recommended to refine the northern end of the orange corridor and move the corridor slightly to the west, similar to the purple option.

The relative strategic cost for each option has been considered as part of the value management workshop. It is estimated that the cost of the Orange and Yellow options are relatively close. The cost of the Purple option is approximately 35% more than the Orange/Yellow option, with the Blue Option being some 80% more.

The yellow option was assessed as the worst performing option against the project criteria. The blue and purple options were excluded due to cost and the impact on the Currys Gap State Conservation Area.

The full *Value Management Workshop report* is available on the Roads and Maritime website.

## 6. Description of preferred route

### 6.1 Preferred route

The orange corridor is the preferred route for the Tenterfield heavy vehicle bypass. On balance, the preferred option performs best against the range of social, environmental and functional assessment criteria. It also provides the best value for money.

A heavy vehicle bypass along the orange corridor provides an opportunity to enhance the proximity of the town of Tenterfield as a potential rest and stopping point for light vehicles. The proximity of the southern intersection to the town would alert drivers to the town centre.

The orange corridor provides a western vista of the town along a significant portion of its length, highlighting the railway museum complex and the parts of Tenterfield not seen from the existing highway.

As shown in figure 6.1 overleaf, the key features of the orange corridor are:

- The route would leave the existing highway on a westerly bearing, starting immediately north of Tenterfield Creek bridge on the southern edge of the town area
- It would pass over Tenterfield Creek on a two lane bridge
- Proceeds across partially cleared land on approach to Currys Gap Creek
- Would pass over Currys Gap Creek on a two lane bridge
- Crosses to the west of the railway line, north of Currys Gap Creek, on a minor fill embankment to retain any rail infrastructure intact
- Bridges would be built at Douglas Street and Sunnyside Loop Road to maintain connectivity to the western side of Tenterfield
- Recrosses the railway line near the northern end of Western Boundary Street, connecting to the existing highway at the western end of Cowper Street
- The northern crossing point of the railway line would also be aligned vertically to avoid removal of any rail infrastructure and in particular to be clear of some substantial timber bridge (trestles) foundations over the northern tributaries of Ghost Gully Creek
- The layout of the intersections at the northern and southern access to the bypass would be decided in future planning.



## Tenterfield heavy vehicle bypass - Preferred route corridor

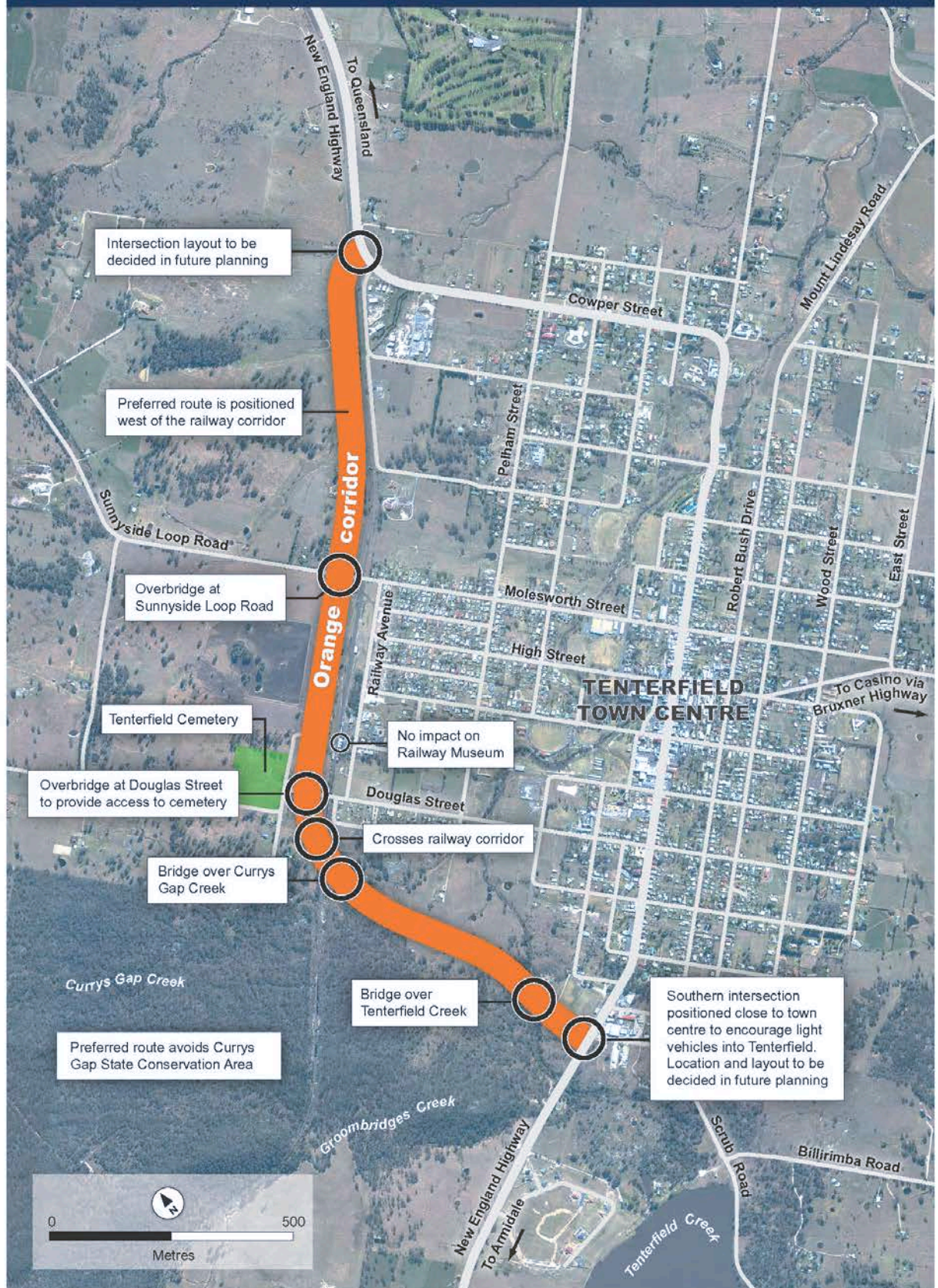


Figure 6-1 Preferred route

## 6.2 Potential impacts

There would be a range of potential impacts from any future bypass construction in the orange corridor. These would be fully assessed in an environmental impact assessment when the project proceeds to detailed planning.

A preliminary assessment of the potential impacts of the orange corridor indicates:

- Up to 20 properties would need to be completely or partially acquired by Roads and Maritime if the project proceeds to construction
- Up to four houses would need to be demolished to build the bypass
- Two local roads, Douglas Street and Sunnyside Loop Road, would be bridged over the heavy vehicle bypass to provide safe passage for local traffic to access the Tenterfield cemetery and the town landfill / waste processing facility
- The existing railway corridor would be crossed in two locations. The bypass would be designed to cross the railway formation at or slightly higher than existing formation levels
- There would be some impact from increased road traffic noise in the western parts of Tenterfield
- Building the bypass would create a new visual impact on the western side of Tenterfield
- Building would take place in close proximity to some residential houses.



## 7. Next Steps

Further refinement of the corridor will take place in consultation with Tenterfield Shire Council and affected landowners. Roads and Maritime Services will then approach Council to incorporate the new road boundaries in their Local Environmental Plan to provide planning certainty for Council and the community.

At this time no funding has been provided for further planning or construction of the heavy vehicle bypass at Tenterfield.

