

Appendix J

Landscape character and visual impact assessment
report

New England Highway Upgrade - Belford to Golden Highway

Landscape Character, Visual Impact Assessment + Urban Design Study

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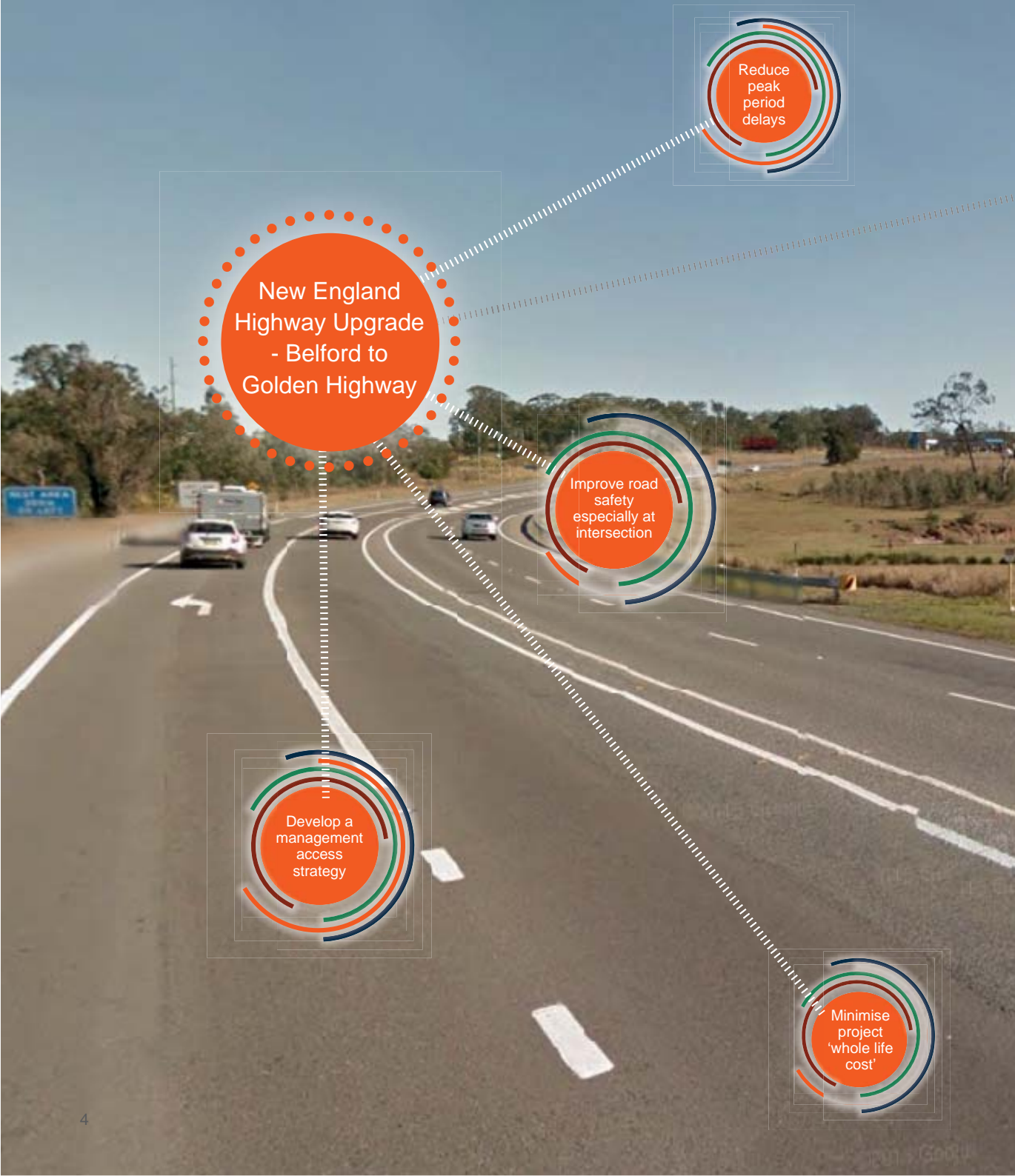
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New England Highway Upgrade - Belford to Golden Highway

Reduce peak period delays

Minimise impact on environment

Improve road safety especially at intersection

Develop a management access strategy

Minimise project 'whole life cost'

1. Introduction

1.1 Project overview

Roads and Maritime Services (Roads and Maritime) proposes to upgrade the New England Highway between Belford and the Golden Highway. The road upgrade would improve traffic flow, travel times and safety for motorists along a busy section of the New England Highway. The proposal would provide a divided road with two travel lanes in each direction between Belford and the Golden Highway and a flyover for vehicles turning right from the Golden Highway towards Maitland and Newcastle.

The proposal is located within the Singleton Local Government Area (LGA) and the Hunter region of the Roads and Maritime network. The existing Belford and Golden Highway intersection is a key link in the regional infrastructure of the Hunter Region, connecting the Golden Highway corridor with the New England Highway corridor. Both corridors are locally and regionally important, with the New England Highway forming the inland route from Sydney to Brisbane and the Golden Highway accessing and servicing industries including agriculture and mining, and commuter needs.

At peak times there is currently queuing and congestion, particularly on the Golden Highway approach to the intersection. The capacity of the New England Highway in its current configuration is also approaching its maximum upper operation capacity. In addition, the Lower and Upper Hunter have been identified as target growth areas within the development planning of the region.

The proposal presents an opportunity to:

- Increase capacity and connectivity of the New England Highway and Golden Highway for the efficient and reliable movement of freight
- Improve safety at the New England Highway and Golden Highway intersection by reducing the risk of crashes, particularly for motorists turning right from the Golden Highway
- Increase capacity at the New England Highway and Golden Highway intersection to cater for the predicted increase in traffic movements as a result of future growth in the Hunter
- Allow for access to existing and future adjoining land uses.

1.2 The Proposal

The proposal includes:

- Widening the New England Highway for around 3.2km to provide a divided road with two travel lanes in each direction between Belford and Golden Highway
- Replacing the existing right turn movement from the Golden Highway to the New England Highway with a right turn flyover
- Associated road furniture and infrastructure, including CCTV, lighting and directional signage
- Removal of the Whittingham rest stop area adjacent to the New England Highway and Golden Highway intersection

1.3 Project wide objectives

The objectives of the proposal are:

- Reduce peak period delays at the New England Highway / Golden Highway intersection especially for traffic turning right from the Golden Highway
- Improve road safety along the New England Highway between Belford and the Golden Highway, especially at the intersection with the Golden Highway
- Maintain average peak hour travel times on the New England Highway for a period of 20 years
- Identify all existing and future accesses, develop an access management strategy through the area and minimise direct access to the New England Highway corridor
- Ensure all design works comply with the relevant Work Health & Safety (WHS) legislation and the Code of Practice for Safe design of Structures
- Minimise impact to the community and the environment
- Minimise the project 'whole of life cost'.

1.4 Purpose of Landscape Character, Visual Impact Assessment and Urban Design Study

Arup has been engaged by Roads and Maritime to prepare a Landscape Character, Visual Impact Assessment and Urban Design Study. The purpose of the report is to develop and present an integrated engineering and urban design outcome that:

- Fits sensitively into the built, natural and community environments through which it passes. Is well designed and contributes to the character and function of the area
- Contributes to the accessibility and connectivity of people within the region and communities
- Contributes to the overall quality of the public domain for the community and all road users
- To carry out a succinct landscape character and visual impact assessment, the results of which are iteratively fed into the concept development process and REF.

1.5 Methodology

1.5.1 Approach

The study follows an iterative process where issues, constraints and mitigation related to the landscape character and visual assessment are integrated into the engineering and urban design concept.

The study comprises the following components:

1. Urban Design Strategy | The development of urban design objectives that underpin an overall vision for the corridor and align with the Roads and Maritime guidance and the New England Highway Urban Design Framework. Each objective is supported by clear principles to articulate how the objective has been achieved through the urban concept design.
2. Contextual Analysis | An analysis of the regional and local context is undertaken with a focus on landscape and urban characteristics (e.g vegetation cover, land-use and topography), visual amenity and overall landscape character.
3. Landscape Character Assessment | An analysis of the existing character from Belford to the Golden Highway, capturing the baseline conditions to assess the anticipated effects as a result of the proposed works.

4. Visual Impact Assessment | An analysis of the existing visual amenity from Belford to the Golden Highway and selection of representative viewpoints to comprehensively illustrate and assess the anticipated effect as a result of the proposed works.
5. Urban Concept Design | Delivery of an overarching illustrative urban design concept that responds to the urban design strategy and seeks to mitigate adverse impacts associated with the project.
6. Mitigation | Identification of mitigation measures to reduce adverse impacts.

The methodology used in this urban design study is based on the Roads and Maritime “Environmental Impact Assessment Practice Note *EIA - N04 (2013) Guidelines for Landscape Character and Visual Impact Assessment.*”

1.5.2 Landscape Character Zones

A Landscape Character Zone (LCZ) is an area of landscape with similar properties or strongly defined spatial qualities, distinct from areas immediately adjacent. (Roads and Maritime Service, EIA-N04, p.4). LCZs are mapped and described in Section 3.

Two primary factors are used to determine impacts within LCZs:

- Sensitivity of the character zone
- Magnitude of the proposal in that zone

The Roads and Maritime Environmental Impact Assessment Guidance Note (2013) defines sensitivity as: “*The sensitivity of a LCZ or view and its capacity to absorb change. Combined with magnitude, sensitivity provides a measure of impact.*” (Roads and Maritime Service, EIA-N04, p.6). It further states: “*Sensitivity refers to how sensitive the character of the setting is to the proposed change. For example a pristine natural environment will be more sensitive to change than an industrial area.*” (Roads and Maritime Service, EIA-N04, p.9).

The term magnitude is defined as: “*a measurement of the scale, form and character of a development proposal when compared to*

the existing condition." (Roads and Maritime Service, EIA-N04, p.9). The location of the proposal in relation to the LCZ also influences magnitude. For example, a proposal which passes through the middle of a character zone would have greater magnitude than one which skirts the edge of a zone.

The LCZ Impact is determined using the matrix shown in Table 1. Rankings for sensitivity and magnitude are combined to generate the impact in the body of the table.

It is important to note that LCZ Impact Assessment has to do with the way and extent to which a proposal alters the perceived nature or sense of place of a zone.

1.5.3 Visual Impact Assessment

To assess the likely visual impact of the proposal, the following tasks were undertaken:

- A desktop analysis to ascertain the visual catchment of the proposal within the area, and potential receptors of the visual impact determined through topographic analysis and available maps. This provides the basis for the establishment of the Visual Envelope Map (VEM), view corridors and selected viewpoints.
- An on-site field inspection to confirm the visual catchment, gain an understanding of the proposal within the context of the study area and to identify and confirm viewpoints and the sensitivity of potential visual receptors.
- Assessment of the sensitivity of each viewpoint based on the sensitivity ranking of the view and the transient or permanent natures of the receptor.
- Assessment of the magnitude of change as a result of the proposed development.
- In a process similar to that used for LCZ Impact Assessment, the visual impact is assessed by combining the viewpoint sensitivity and the magnitude of the proposal in the matrix in Table 1.

		Magnitude			
		High	Moderate	Low	Negligible
Sensitivity	High	High Impact	High Moderate Impact	Moderate Impact	Negligible Impact
	Moderate	High Moderate impact	Moderate Impact	Moderate - Low Impact	Negligible Impact
	Low	Moderate Impact	Moderate - Low Impact	Low Impact	Negligible Impact
	Negligible	Negligible Impact	Negligible Impact	Negligible Impact	Negligible Impact

Table: 1. Landscape Character and Visual Impact Grading Matrix, Roads and Maritime Services (2013)

2. Urban Design Strategy

2.1 Urban Design Corridor Vision

This chapter outlines the urban design vision for the upgrade with a series of urban design objectives and principles to guide the design development process.

A separate strategy for the whole length of the New England Highway has been prepared by RMS, titled the New England Highway Urban Design Framework (October 2016), which has informed the development of the Belford to Golden Highway Urban Design Strategy to ensure a coherent and contextual design response.

2.2 Objectives and Principles

Objective 1: Fit with the landform

Respond to changes in landform as the New England Highway traverses the plains and plateaus.

- Form a road in response to topography and landform.
- Minimise the physical footprint, including during the construction phase
- Provide soft, feathered transitions at the top, bottom and ends of earthworks
- Grade out landform to match existing adjacent slopes but no steeper than 1(V) in 2(H), unless rock. In flatter areas, minimise embankments and mounding
- Avoid the use of shotcrete

Objective 2: Design an experience in movement

Create a self-explaining road environment that recognises and reflects the interaction with the topography of the Great Dividing Range and the character and change of openness and enclosure of the road alignment.

- Enhance and frame views from the road. Provide lower height species where views are available
- Retain and enhance the progressive sequence of visual events such as the character of the Spotted Gum Forest, flood plain and wooded edge landscape.

Objective 3: Respond to natural vegetation patterns

Ensure the road design reflects the change in landscape character from enclosed forest to more open, scattered trees with pasture grasses and waterway crossings.

- Integrate natural patterns and waterways into the road design
- Minimise the impact on native vegetation
- Avoid the introduction of native weeds
- Retain views out from the road
- Provide distinctive trees at key points such as the proposed flyover.

Objective 4: Achieve integrated and minimal maintenance design

- Use robust durable materials fit for purpose and place
- Provide a self-reliant and minimal maintenance natural landscape
- Avoid opportunities for vandalism
- Create a simple, coordinated and neat composition of road elements along a corridor
- Ensure signage does not block important views and avoid putting in highly scenic areas
- Locate fencing to minimise visual impact. Utilise dark coloured mesh where fencing can not be screened by vegetation.
- Consider the design quality of major road components and individual built elements

3. Contextual Analysis

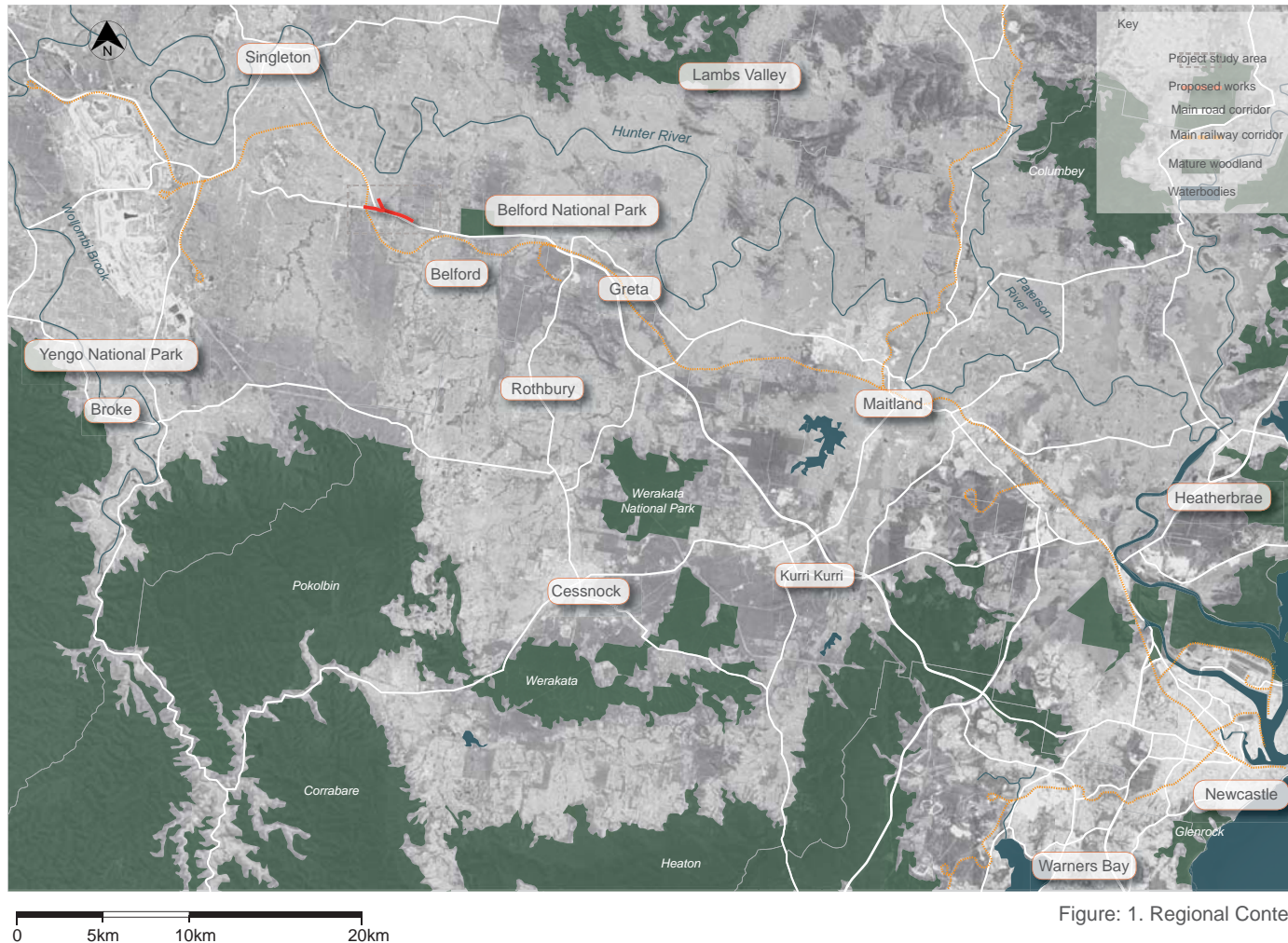


Figure 1. Regional Context

3.1 Regional context

The New England Highway Upgrade from Belford to Golden Highway is situated within the Singleton LGA.

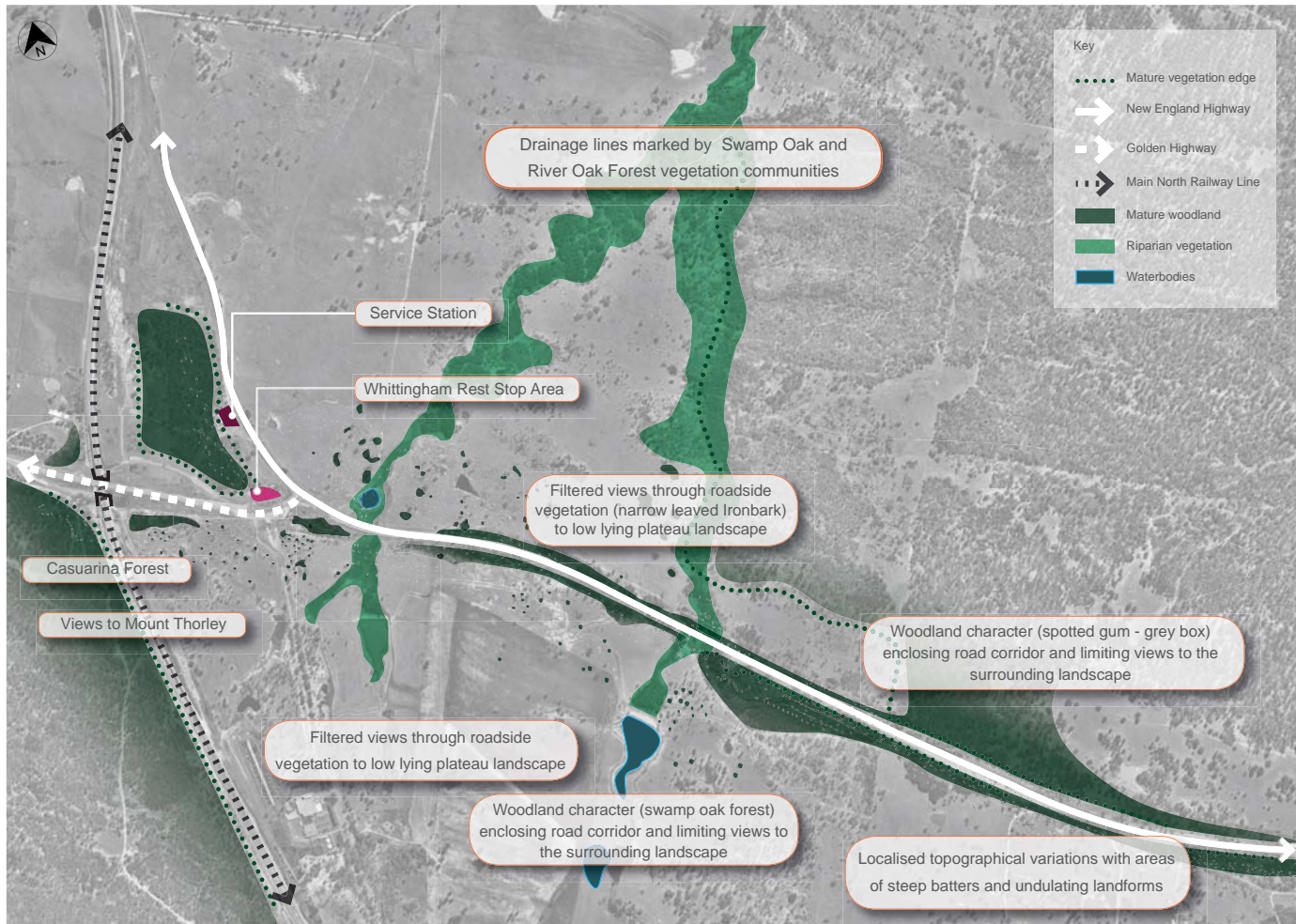
Singleton LGA is located 200km northwest of Sydney and 80km inland from Newcastle. It includes the township of Singleton, as well as a number of villages including Broke, Milbrodale, Bulga, Jerrys Plains, Putty and rural areas such as Whittingham, Mount Olive, Belford, Kirkton, Camberwell and Elderslie.

Singleton is located in the heart of the Hunter Valley with Yengo National Park to the west, Belford National Park to the southeast and Lams Valley to the east.

The LGA covers a wide variety of landforms ranging from mountains of the Great Dividing Range to the alluvial plains of the Hunter River, which contains many fertile valleys. Before European occupation these areas were likely to have provided hunting grounds for the Aboriginal Australians inhabiting the region. Sir Thomas Mitchell described the valley in 1831 as being park-like, with light forest and grassy glades.¹

The proposal area is characterised by stretches of highway through agricultural and equine grazing lands to the west and areas of dense vegetation to the east, with the undulating road alignment providing open views to rolling plains and forested hills in the distance.

¹<http://www.singleton.nsw.gov.au/Index.aspx?NID=1637>



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Figure 2. Local Context

3.2 Local context

Figure 2 illustrates the landscape and visual characteristics along the road corridor. These characteristics have been summarised below.

Landscape Characteristics

- The topography is predominantly flat to the west of the New England Highway, becoming gently undulating further to the east
- Two drainage lines extend from north to south of the New England Highway, marked by Swamp Oak and River Oak Forest vegetation communities with waterbodies and farm dams located to the north and south of the alignment.
- Open agricultural landscape to the west of the New England Highway with scattered trees
- Central Hunter Ironbark Grey Box Forest encloses the road corridor to the east with intermittent breaks in vegetation providing short distance views out from the road corridor
- Stands of mature vegetation stretch along the existing New England Highway earthworks, filtering views out to the surrounding agricultural landscape
- Views of Mount Thorley can be seen when driving along the Golden Highway, westbound after crossing the rail bridge.

Visual amenity

- The visual amenity of the road corridor varies from east to west. The west of the corridor at the Golden Highway and New England Highway intersection offers views out from the road corridor across a low lying agricultural landscape with scattered trees. Recent planting at the intersection and a gentle undulation in topography reduces distant views to the west.
- To the east, Ironbark Grey Box Forest encloses the road corridor, limiting views out across the landscape.

3.3 Constraints and opportunities

The proposed works, including the widening of the New England Highway, removal of the Whittingham rest stop area and introduction of the flyover structure have been analysed through desktop analysis and site investigations.

A range of potential constraints and opportunities have been summarised below and illustrated in Figure 3 to inform the iterative design development process.

- ① New road alignment and bridge would result in an elevated structure within a relatively flat low lying landscape. Opportunity to reduce or vary earthwork gradients to assist with integration of the flyover structure.
- ② Open views north to the plateau would be obstructed due to the new road alignment. Opportunity to propose landscape vegetation on the north and south of the bridge to strengthen links with the existing woodland edge and integrate the proposed bridge structure and approach roads.
- ③ The western natural drainage line opens into a small water body. Opportunity to improve flora within existing water body through an appropriate species mix.
- ④ There is an opportunity to provide a landscape treatment between the new alignment and existing road and extend the woodland character experienced to the east.
- ⑤ The Whittingham rest stop area will be removed as a result of the realignment of the New England Highway.
- ⑥ Maintain existing forest character along the New England Highway and sensitively integrate the proposed earthworks.
- ⑦ The proposed works will include further rock cutting along the alignment to the east. Consider a sensitive landscape and engineering approach to minimise the extent of rock cutting and provide vegetation to soften the overall appearance.
- ⑧ Retain verge planting along eastern end of the New England Highway on the cutting side to assist with screening views from adjacent properties. Extend vegetation where possible

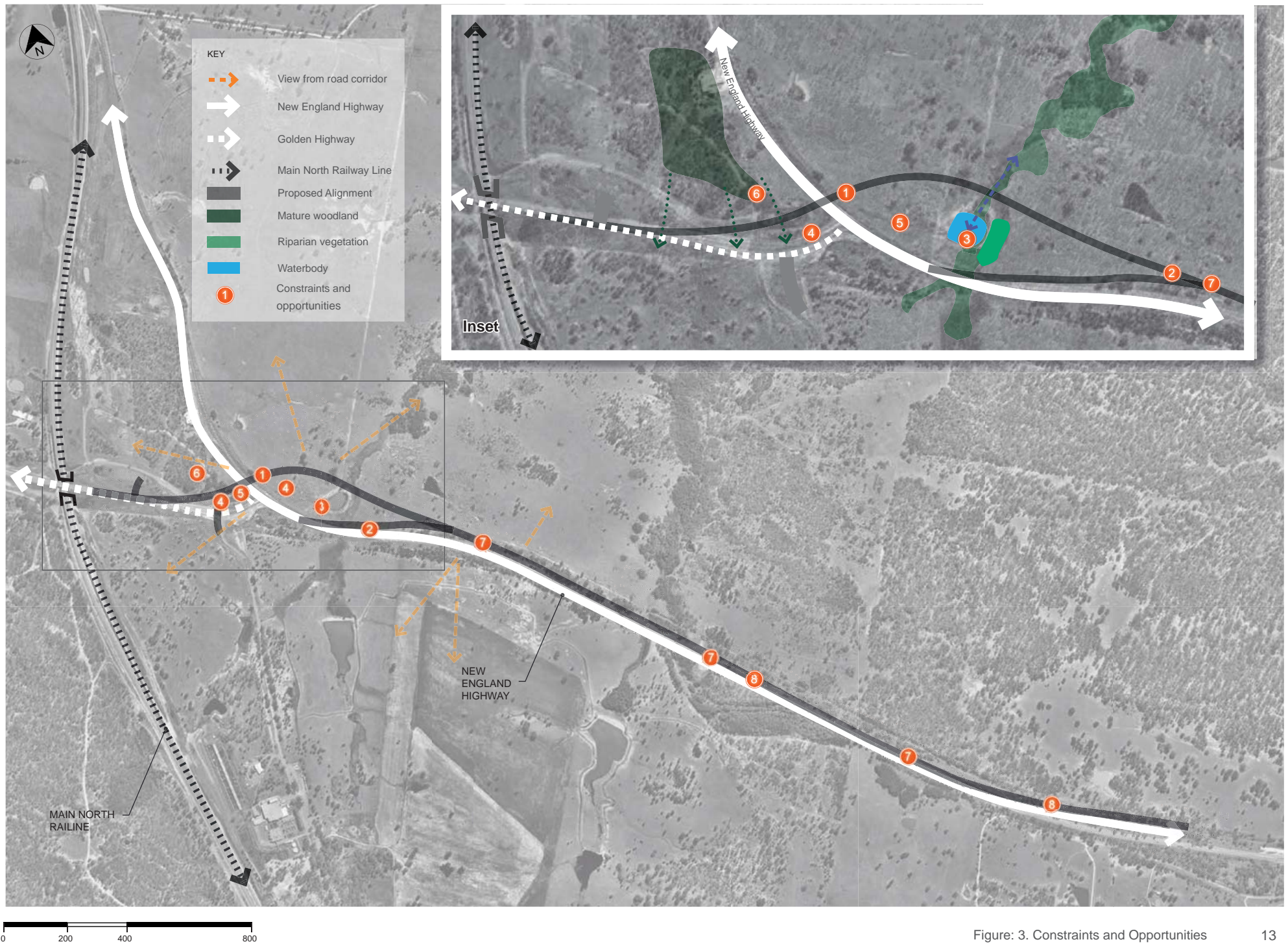


Figure: 3. Constraints and Opportunities

4. Landscape Character Assessment

4.1 Landscape Character Zones

LCZs separate the landscape into distinct, broadly homogeneous units with defining characteristics. In this way each character area should be distinct from an adjoining area which will be defined by a different set of parameters.

A summary of the character areas for the proposal area and contributing characteristics has been provided and are illustrated in Figure 4.



LCZ 1 | Wooded edge

- Locally undulating hill defines the edges of the corridor at the intersection of the Golden Highway and the New England Highway
- The gentle rise in topography encloses the northern edge of the rest area and stretches west towards the Main North Railway Line and north to the existing United Petroleum Service Station
- Site location of the United Petroleum Service Station
- Existing Whittingham rest stop area including basic picnic facilities.



LCZ 2 | Floodplain

- Central to the New England Highway corridor are two distinct creek lines extending from the Hunter River to the north. At the base of these creeks are small water bodies with ecological value (refer to Ecology chapter for further information)
- There are several farm dams that are located on the existing creek lines
- Existing access route that run along the northern edge of the New England Highway
- Areas of surveyed hollow tree locations suitable for Speckled Warbler bird
- Survey data has recorded multiple possible habitat trees in this location surrounding the creek ponds.



LCZ 3 | Spotted Gum Forest

- The character of the road is enclosed with Spotted Gum vegetation on either side of the New England Highway
- Central Hunter Ironbark, Spotted Gum - Grey Box vegetation in moderate to good condition
- Areas of surveyed hollow tree locations potential for habitats for Speckled Warbler, Grey-Crowned Babbler and Squirrel Gliders.



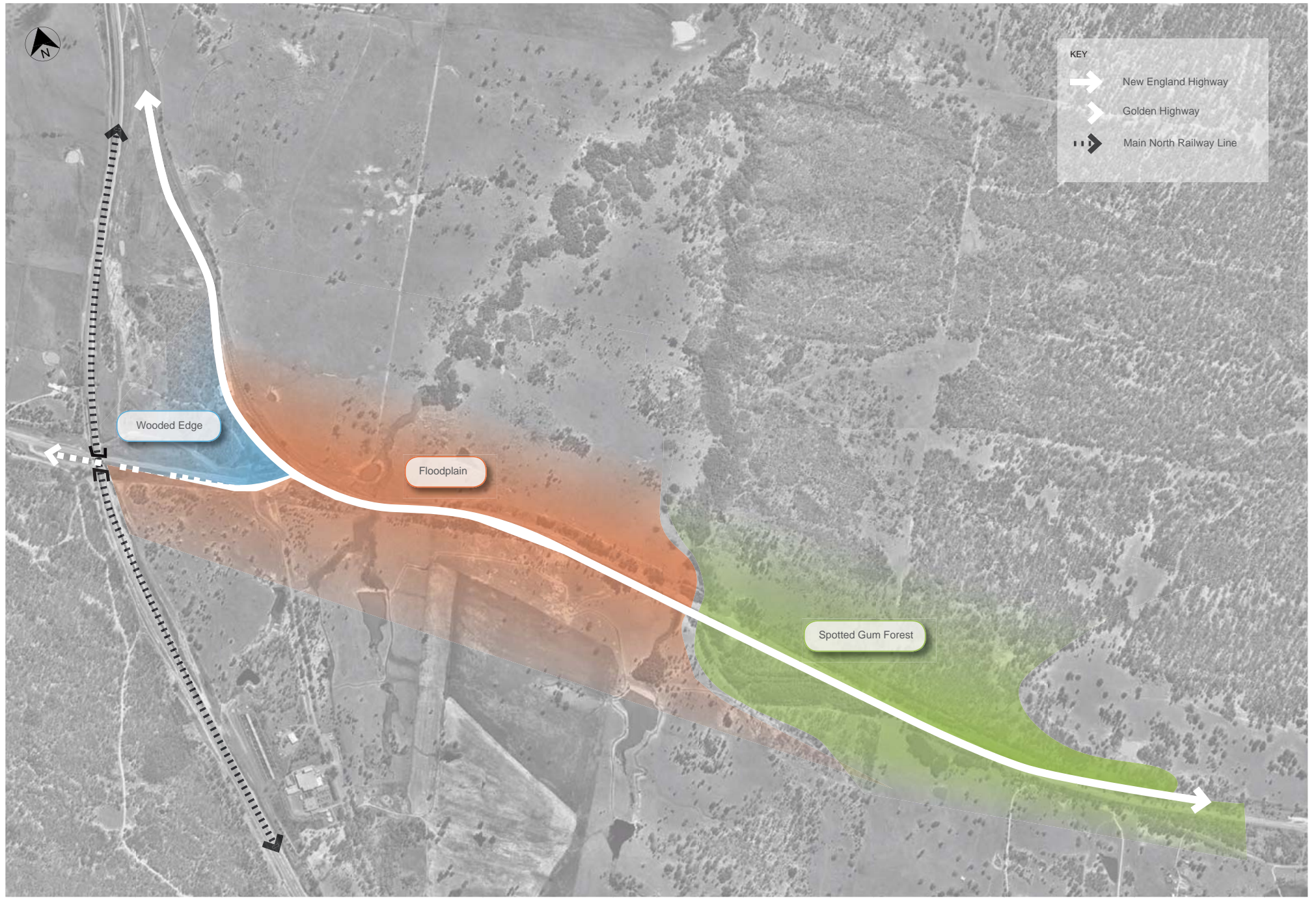


Figure: 4. Landscape Character Zones

4.2 Landscape Character Assessment



3.2.1 LCZ 1 | Wooded Edge

This LCZ comprises of Spotted Gum Forest on a locally undulating hill. This is situated between the existing United Petroleum Service Station to the south, near the intersection of the Golden Highway and the New England Highway and the Whittingham rest stop area which includes facilities such as toilets, signage, historical interpretation and parking.

Description of proposed works

The extent of the proposed works associated with the New England Highway Upgrade - Belford to Golden Highway within the LCZ include:

- New flyover and approach roads, resulting in the removal of the Whittingham rest stop area
- Associated road furniture such as directional signage, lighting and CCTV cameras on the corner of the Golden Highway and New England Highway
- Loss of moderate-high quality Central Hunter Ironbark Spotted Gum Grey Box Forest

Sensitivity : Low

- Undulating topography with mature blanket of vegetation.

Magnitude of change : Moderate

- The proposed upgrade works would result in additional road infrastructure in the form of additional road lanes, earthworks and a flyover. The flyover would be an elevated structure, incongruous with the existing topography and landform.
- Incremental increase in extent of road furniture, including CCTV, lighting and signage.
- Removal of Whittingham rest stop area

Landscape Character Impact : Low-Moderate

Low sensitivity and moderate magnitude of change resulting in a low to moderate landscape impact.



3.2.2 LCZ 2 | Floodplain

This LCZ is located in a floodplain with a series of creek lines and dammed ponds. The area is predominately cleared riparian vegetation. Within the floodplain there are isolated Aboriginal heritage sites that are of potential significance.

Description of proposed works

The extent of the proposed works associated with the New England Highway Upgrade - Belford to Golden Highway within the LCZ include:

- A new road alignment running to the east of the existing New England Highway, A new flyover around the northern side of the existing dams and running parallel with the existing New England Highway
- The proposed alignment will run along open grassland with sporadic tree coverage
- New raised medians have also been proposed on the New England Highway at intersection with the Golden Highway
- The new alignment and associated works will run very close to an area of surveyed hollow tree locations that could have the potential for habitat
- Modification (including only reline-marking at this stage) of the existing single four lane carriageway to a dedicated two lane westbound carriageway.

- Associated road furniture such as directional signage, lighting, CCTV camera's on the corner of the Golden Highway and New England Highway

Sensitivity : Moderate

- Aside from the existing New England Highway there is little modification to the surrounding landscape with low lying agricultural fields to the north and south east. The heritage and ecological value influence the sensitivity of this LCZ.

Magnitude of change : Moderate

- The works would result in localised vegetation removal along the northern edge of the New England Highway Upgrade from Belford to Golden Highway and an incremental enlargement of the road infrastructure in this character zone.
- Introduction of a flyover structure on embankment that contrasts with the low lying floodplain landscape
- Incremental increase in extent of road furniture, including CCTV, lighting and signage.

Landscape Character Impact : Moderate

The moderate sensitivity and moderate magnitude of change results in a moderate landscape impact.



3.2.3 LCZ 3 | Spotted Gum Forest

This LCZ provides a forest edge of Spotted Gum trees along this section of the New England Highway. Parts of the alignment go through areas of rock cutting that are evident as the existing alignment traverses the gently undulating terrain.

Description of proposed works

The extent of proposed works associated with the New England Highway upgrade from Belford to the Golden Highway within the LCZ include:

- Removal of mature Central Hunter Ironbark Spotted Gum Grey Box Forest along the northern section of the alignment for this character area
- Loss of potential hollow trees for habitat
- Modification (including only re-linemarking at this stage) of the existing single three lane carriageway to a dedicated two lane westbound carriageway
- Directional signage and a variable message sign (VMS).

Sensitivity : Moderate

This LCZ comprises of Spotted Gum trees in good condition with occasional hollow trees suitable for habitat of the Speckled Warbler, Grey-Crowned Babbler and Squirrel Gliders.

Magnitude of change : Low

The works would result in localised vegetation removal with localised impacts on the forest edge that lines the existing New England Highway.

Landscape Character Impact : Low - Moderate

Moderate sensitivity and low magnitude of change result in a low - moderate landscape impact.

4.3 Summary of Landscape Impacts

Table 1 'Landscape Impacts' captures the anticipated impact on each of the LCZ.

Table 1. Landscape Impacts

LCZ No.	Description	Sensitivity	Magnitude	Impact
1	Wooded Edge	Low	Moderate	Low - Moderate
2	Floodplain	Moderate	Moderate	Moderate
3	Spotted Gum Forest	Moderate	Low	Low - Moderate

5. Visual Impact Assessment

5.1 Visual Envelope

The visual envelope map (Figure 5) illustrates the visual catchment of the proposed New England Highway upgrade from Belford to Golden Highway Project. It generally describes the area surrounding the proposal from which directional views towards it are anticipated to be achieved.

Viewpoints from which potential visual impacts are to be assessed were determined on site and from further desktop analysis. View points include:

- ① Viewpoint 1 - United Petroleum Service Station
- ② Viewpoint 2 - EC Throsby Pty Limited
- ③ Viewpoint 3 - Road users of the existing Golden Highway
- ④ Viewpoint 4 - Residential Property 3193 New England Highway, Branxton
- ⑤ Viewpoint 5 - Road users of the existing New England Highway

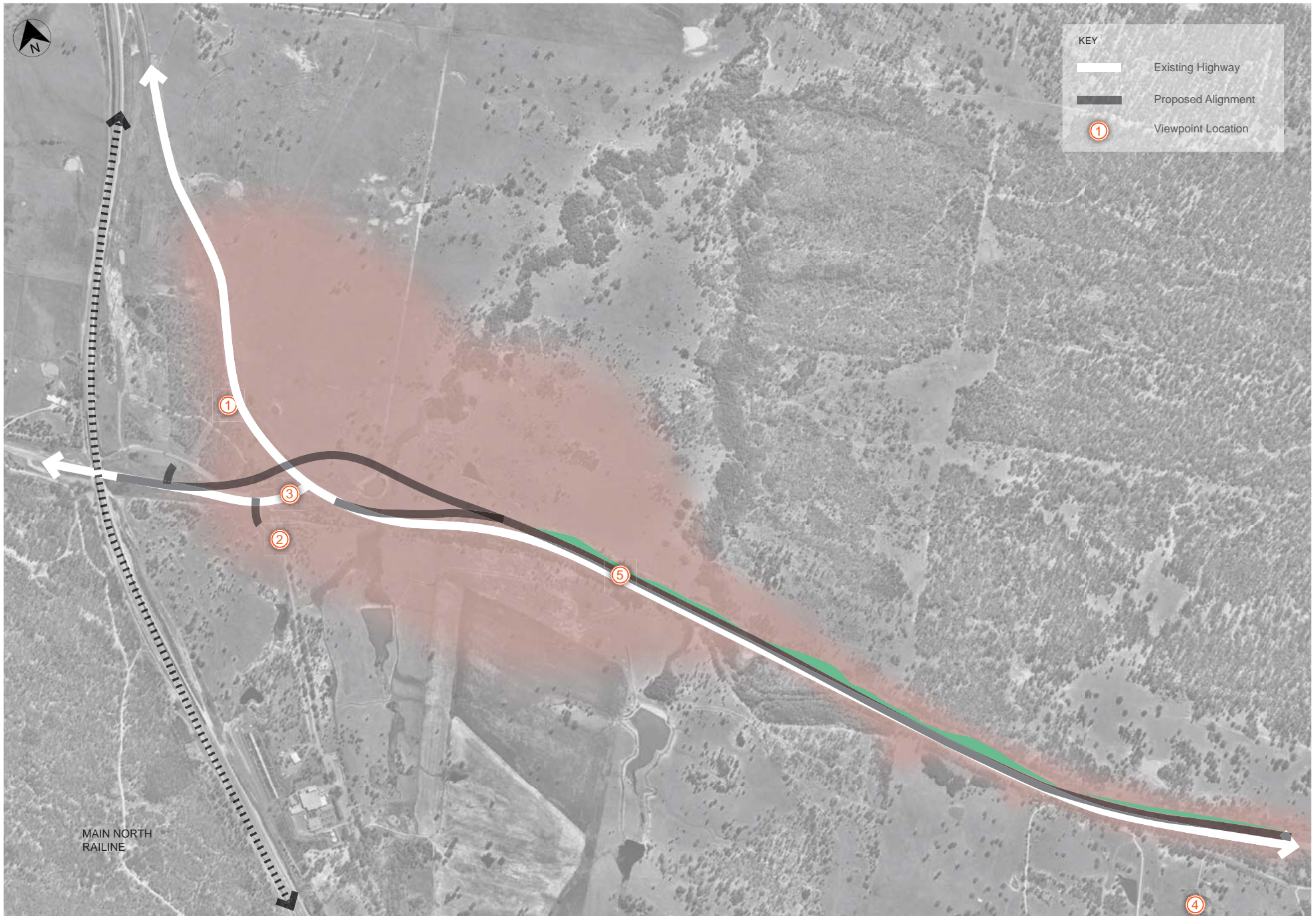


Figure: 5. Visual Envelope

5.2 Visual Assessment

5.2.1 Viewpoint 1 | United Petroleum service station

Description of anticipated visible elements

- New road alignment from the Golden Highway with new flyover and earthworks, approximately 13-15m in height
- Views of associated road furniture and infrastructure, including CCTV, lighting and directional signage

Impacts

The view has low sensitivity due to the passing nature of the view from road users. The visual magnitude of change will be high due to the physical footprint of the scheme introduced by the elevated flyover, lighting columns, localised vegetation removal, vehicle protection gantry and bridge structure. Additional lighting structures will appear around the intersection and the addition of a 25m high CCTV camera will add vertical elements visible during the day and during night time hours.

The overall visual impact will be moderate adverse.



Visual sensitivity	Low
Magnitude of change	High
Visual impact	Moderate

5.2.2 Viewpoint 2 | EC Throsby Pty Limited

Description of anticipated visible elements

- New alignment and access road to Abattoir Access Road
- Elevated earthworks and new flyover structure over the New England Highway
- Whittingham rest stop area removed on the south side of the Golden Highway.

Impacts

Due to the private gated access, this assessment is based on views obtained from the entrance to the property access road.

The view has a low sensitivity due to the industrial nature of the business and its location in the landscape. Views towards the elevated flyover would be filtered by intervening vegetation and result in a moderate magnitude of change and a low-moderate adverse visual impact.



Visual sensitivity	Low
Magnitude of change	Moderate
Visual impact	Low - Moderate

5.2.3 Viewpoint 3 | Road users of the existing Golden Highway

Description of anticipated visible elements

- Loss of rest stop facilities due to the extent of earthworks and introduction of the proposed bridge structure
- Introduction of flyover and associated works
- Views of associated road furniture and infrastructure, including CCTV, lighting and directional signage

Impacts

The view has a low visual sensitivity due to the passing nature of the view from road users. The visual magnitude of change will be high due to physical footprint of the proposed scheme and introduction of road furniture, the elevated flyover, localised vegetation removal, lighting columns, vehicle protection gantry, bridge structure, and loss of expansive views on the approach to the intersection of the Golden Highway and the New England Highway.

The overall visual impact will be moderate adverse.



Existing Viewpoint Assessment

Visual sensitivity	Low
Magnitude of change	High
Visual impact	Moderate

5.2.4 Viewpoint 4 | Residential Property 3193 New England Highway, Branxton

Description of anticipated visible elements

- The proposal is located on the eastern side of the New England Highway and will include localised vegetation removal to the east.
- Views of associated road furniture and infrastructure, including CCTV, lighting and directional signage

Impacts

Due to the private gated access, this assessment is based on a desktop analysis and assumptions made from views from adjacent roads. The property has a moderate sensitivity due to the residential use and visual interest in the surrounding landscape. Along this part of the existing New England Highway, the alignment runs through rock cutting with mature intervening vegetation filtering views of the road corridor. It is anticipated that the property experiences filtered views towards the road corridor to the west where the existing road passes on slight embankment.

The localised vegetation removal to the east and introduction of lighting columns and signage are anticipated to result in a low magnitude of change, resulting in a low-moderate visual impact.



Visual sensitivity	Moderate
Magnitude of change	Low
Visual impact	Low-Moderate

5.2.3 Viewpoint 5 | Road users of the existing New England Highway

Description of anticipated visible elements

- New road alignment from the Golden Highway with new flyover works and earthworks, approximately 13-15m in height
- Views of associated road furniture and infrastructure, including CCTV, lighting and directional signage

Impacts

The view has a low sensitivity due to the presence of the existing highway and infrastructure within the context of the view. Road users will experience views towards an elevated bridge structure with approaching roads to the east and west. Lighting, signage and the CCTV pole will be evident in the view.

The introduction of the bridge and associated infrastructure would impinge on the distant views to the north and contrast with the low lying landform, resulting in a high magnitude of change and a moderate visual impact.



Visual sensitivity	Low
Magnitude of change	High
Visual impact	Moderate

5.3 Summary of Visual Impact

The majority of visual impacts are low to moderate, reflecting the existing land use and limited number of high sensitivity visual receptors. The table below summarises the preceding viewpoints assessment.

Table 2. Overall visual impact for each viewpoint

View point number	Sensitivity	Magnitude	Impact
1	Low	High	Moderate
2	Low	Moderate	Low - Moderate
3	Low	High	Moderate
4	Moderate	Low	Low - Moderate
5	Low	High	Moderate

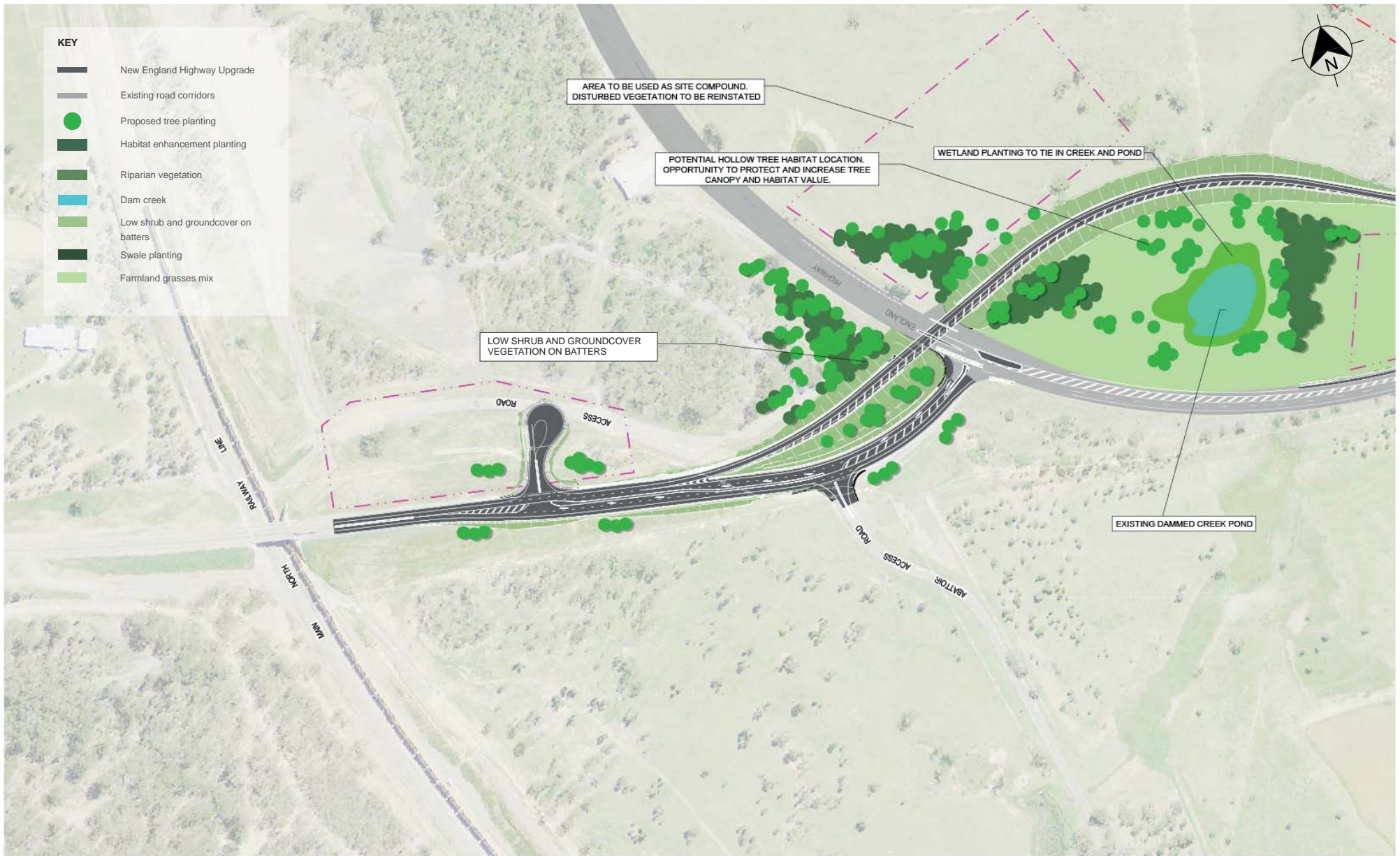
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6. Urban Design Concept

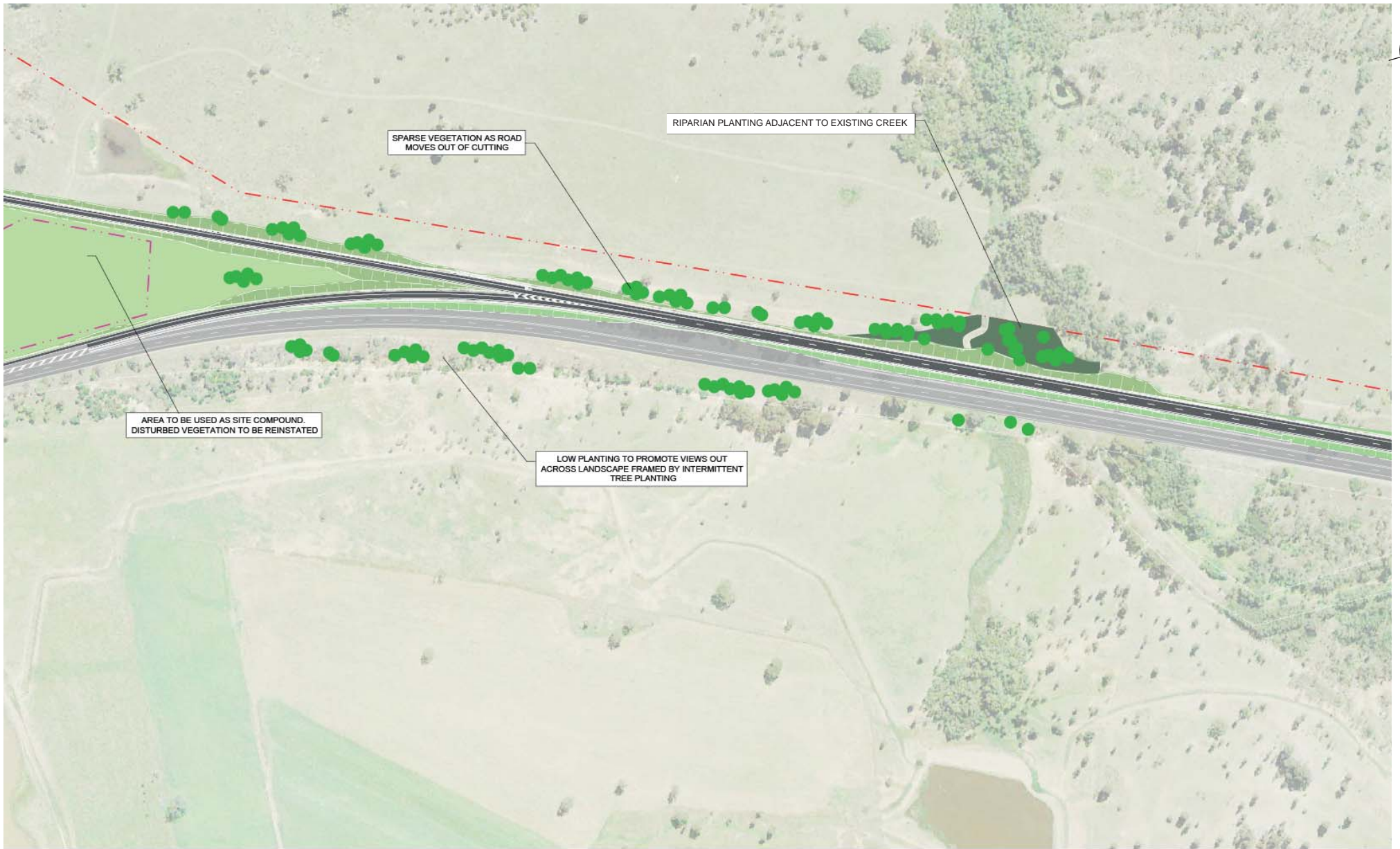
6.1 Concept Design Overview

The concept design applies the urban and landscape design principles developed in Section 2 'Urban Design Strategy' and provides a concept that can be further discussed and developed with the project team as the design progress through to detailed design.

The urban design concept comprises of four plans (see Figure 6) that illustrate the response to the upgrade with Section 6.2 providing an indication of the anticipated species selection and Section 6.3 providing a response to the urban design treatments.



30 Figure: 6. Design Concept

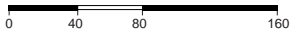


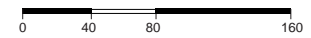
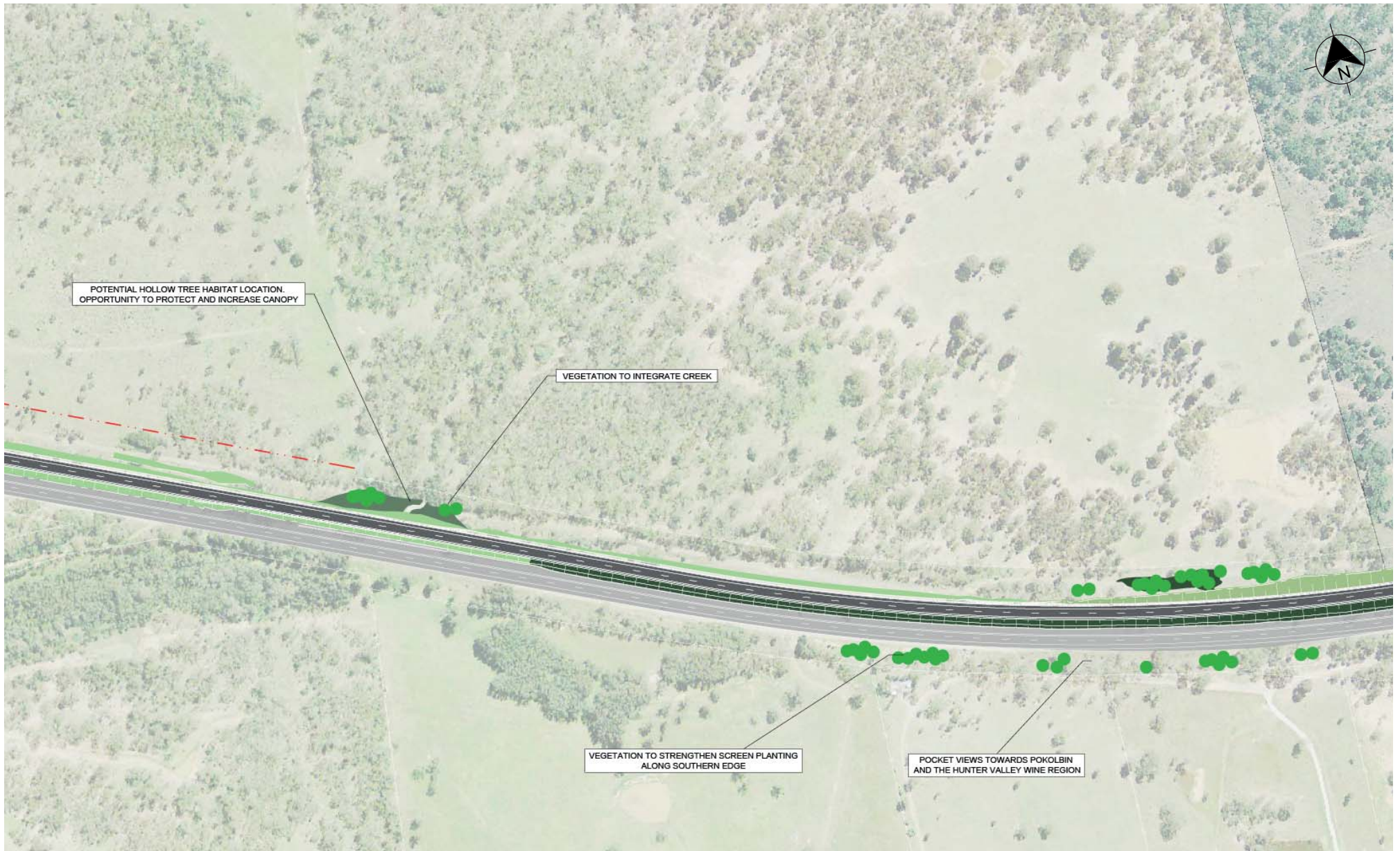
SPARSE VEGETATION AS ROAD MOVES OUT OF CUTTING

RIPARIAN PLANTING ADJACENT TO EXISTING CREEK

AREA TO BE USED AS SITE COMPOUND. DISTURBED VEGETATION TO BE REINSTATED








LOW PLANTING TO PROMOTE VIEWS OUT ACROSS LANDSCAPE FRAMED BY INTERMITTENT TREE PLANTING



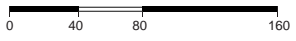


32 Figure: 6. Design Concept



- KEY**
-  New England Highway Upgrade
 -  Existing road corridors
 -  Proposed tree planting
 -  Habitat creation planting
 -  Riparian vegetation
 -  Dam creek
 -  Low shrub and groundcover on batters
 -  Swale planting
 -  Farmland grasses mix

SWALE PLANTING TO DRAINAGE AREAS



6.2 Indicative planting palette



Trees

Eucalyptus moluccana
Eucalyptus fibrosa
Eucalyptus tereticornis
Eucalyptus crebra
Eucalyptus eugenioides
Corymbia maculata

6.3 Consideration of Bridge Design

The Belford to Golden Highway bridge design has been developed as part of an iterative design process and in response to a number of maintenance, cost and constructability considerations. These considerations are outlined below;

- Spill through abutments have been proposed to avoid impacting the gas main and provide adequate access for gas main maintenance.
- Provision for improved drainage arrangement adjacent to the New England Highway, with increased space for construction and maintenance.
- The bridge structure allows for a reduction in imported fill material, reducing the number of construction vehicle movements in and out of the construction site.
- A spill-through abutment is proposed in light of the above constraints, reducing construction and maintenance operations for these elements.
- The space between the pier and spill through abutment provides a break in the visual obstruction, allowing for sight lines for eastbound traffic on the New England Highway.

6.4 Concept Bridge Design

6.4.1 Abutments

The Belford to Golden Highway bridge proposes spill-through abutments in response to the gas mains and future maintenance requirements. The rock proposed for the spill-through abutments will complement the local landscape, and subject to durability testing, the local underlying geology to assist with relating the proposed structure to the existing context.

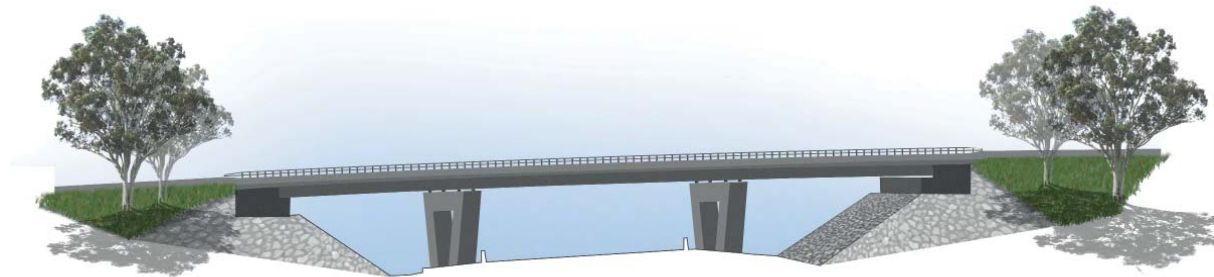
6.4.2 Parapets

The parapet walls will be continuous, single plane unadorned surface, with a generous overlap at abutments. The colour palette of the parapet walls will work to respond to the rock colour of the spill through abutments.

6.4.3 Piers and superstructure

Piers have been positioned to allow views between the abutments and the piers and ensure sightlines requirements are achieved.

The bridge design considerations outlined in 6.3 limit opportunities for the Belford to Golden Highway to relate to the existing bridge structures in the area, specifically the unique colour banding of the retaining walls associated with the Hunter Expressway bridge.



New England Highway preferred flyover design structure

Reference documents:

Bridge Aesthetics - Design Guidelines to Improve the Appearance of Bridges in NSW, RMS, July 2012.

7. Mitigation Recommendations

The urban design concept responds to the overall project objectives and is underpinned by a set of urban design objectives and more specific principles. The concept design on the preceding pages illustrates the application of these principles to the proposal. It adopts the mitigation measures detailed in Table 3: Recommended Mitigation Measures, integrating them into a coherent urban and landscape composition for the corridor.

Table 3: Recommended Mitigation Measures

Location	Visible elements and potential impacts	Mitigation
Viewpoint 1 United Petroleum Service Station, A15	<ul style="list-style-type: none"> • New road alignment from the Golden Highway with new flyover and earthworks, approximately 13-15m in height • Views of associated road furniture and infrastructure, including CCTV, lighting and directional signage • Potential localised impacts to areas of vegetation clearance. 	<ul style="list-style-type: none"> • Provide tree planting, taking into account requirements for clear zones, to filter views to and from the road corridor. • Planting to earthworks surrounding bridge to soften impact on the horizon. • Abutments to be sympathetic to existing environment and new flyover structure • Wetland planting to residual land around creek dams and along existing creek lines to increase vegetation cover and habitat opportunity. • Extent of rock cutting to be minimised with landscape revegetation to soften the overall appearance of any rock cutting slopes.
Viewpoint 2 EC Throsby Pty Limited	<ul style="list-style-type: none"> • New alignment and access road to Abattoir Access Road • Elevated earthworks and new flyover structure over the New England Highway • Whittingham rest stop area removed on the south side of the Golden Highway. • Associated earthworks and loss of localised vegetation 	<ul style="list-style-type: none"> • Wetland planting to residual land around creek dams and along existing creek lines to increase vegetation cover and habitat opportunity. • Opportunity to provide a soft landscape gateway feature that will assist with redefining the arrival and departure from New England Highway to Golden Highway. Opportunity to be explored during detailed design.

Location	Visible elements and potential impacts	Mitigation
<p>Viewpoint 3</p> <p>Road users of the existing Golden Highway</p>	<ul style="list-style-type: none"> • Loss of rest stop facilities due to the extent of earthworks and introduction of the proposed bridge structure • Introduction of flyover and associated works • Views of associated road furniture and infrastructure, including CCTV, lighting and directional signage • Incremental enlargement of the scale and dominance of road corridor within the view. 	<ul style="list-style-type: none"> • Provide replacement tree planting to re-establish the mature landscape boundary. • Maximise elevated position in the landscape and views across landscape when passing over the flyover
<p>Viewpoint 4</p> <p>Residential Property 3193 New England Highway, Branxton</p>	<ul style="list-style-type: none"> • The proposal is located on the eastern side of the New England Highway and will include localised vegetation removal to the east. • Views of associated road furniture and infrastructure, including CCTV, lighting and directional signage 	<ul style="list-style-type: none"> • Screen planting to be provided to reduce views towards lighting columns in night time views.
<p>Viewpoint 5</p> <p>Road Users of the New England Highway</p>	<ul style="list-style-type: none"> • New road alignment from Golden Highway with new flyover associated works and earthworks, averaging 13-15m in height • Views of associated road furniture and infrastructure, including CCTV, lighting and directional signage • Views out across the landscape horizon are likely to be interrupted for users heading south. 	<ul style="list-style-type: none"> • Further develop urban design of the bridge design and framing views using the structure during detailed design. • Planting to earthworks to integrate approach roads.

New England Highway upgrade - Belford to Golden Highway
Landscape Character, Visual Impact Assessment + Urban Design Study