Roads and Traffic Authority of NSW

Oxley Highway to Kempsey
Upgrading the Pacific Highway

Environmental Assessment

MAIN VOLUME

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17. Visual amenity and urban design

This chapter focuses specifically on identifying the likely visual impacts of the Proposal, and the management measures to reduce these impacts.

The Director-General's environmental assessment requirements identify visual amenity and design to be a key issue. **Table 17-1** indicates where the aspects of the Director-General's environmental assessment requirements that relate to visual amenity and urban design are addressed, either in this chapter or in other chapters (in *italics*).

Table 17-1 Visual amenity and urban design

Environmental assessment requirements	Where addressed
Visual Amenity and Design – including but not limited to	
• Design (including noise barriers, retaining walls and landscaping) consistent with overall design of the PHUP and the existing (and desired) character of affected localities.	**Section 17.4**
• Consideration of the *Noise Wall Design Guideline* (RTA 2006b).	**Section 17.4.2**
• Visual significance of the crossings at the Hastings and Wilson Rivers (including district views across floodplain).	**Sections 17.2** and **17.3**

17.1 Landscape and policy context for the Proposal

17.1.1 Assessment approach

A qualitative assessment of visual impact was undertaken for the Proposal in 2007, and following design refinements was updated in 2010. The visual impact of the Proposal has been primarily evaluated on the basis of a combination of two main factors, visual modification and visual sensitivity (EDAW 2007).

Visual modification refers to the change to the landscape that would occur as a result of the Proposal from a given viewpoint. This includes what has changed, and how it has changed. Visual modification describes the extent of change and identifies elements which are removed or added, changed in colour and texture, and compatibility of new elements with the existing landscape. Visual modification can result in an improvement or reduction in visual amenity. The level of visual modification has been assessed using three categories – considerable, noticeable and no perceived change.

Visual sensitivity refers to the nature and duration of views. Locations from which a view would potentially be seen for a longer duration, where there are higher numbers of potential viewers and where visual amenity is important to viewers can be regarded as having a higher visual sensitivity. Visual sensitivity is generally assessed based on views of national, state, regional and local sensitivity.

The visual impact significance levels used in this assessment are shown in **Table 17-2**.

Table 17-2 Visual impact significance levels

Significance level	Description
Major adverse	Any reduction in the amenity of a view of national visual sensitivity. Considerable reduction in the amenity of a view of state level visual sensitivity.
High adverse	Noticeable reduction in the amenity of a view of state level sensitivity. Considerable reduction in the amenity of a view of regional visual sensitivity.
Moderate adverse	Noticeable reduction in the amenity of a view of regional level visual sensitivity. Considerable reduction in the amenity of a view of local visual sensitivity.
Minor adverse	Noticeable reduction in the amenity of a view of local level sensitivity. Considerable reduction in the amenity of a view of less than local visual sensitivity.
Negligible	No perceived reduction or improvement in the amenity of a view (although development may be visible).
Minor beneficial	Considerable improvement in the amenity of a low local visual sensitivity. Noticeable improvement in the amenity of a view of local visual sensitivity.
Moderate beneficial	Considerable improvement in the amenity of a view of local visual sensitivity. Noticeable improvement in the amenity of a view of regional visual sensitivity.
High beneficial	Considerable improvement in the amenity of a view of regional visual sensitivity. Noticeable improvement in the amenity of a view of state level visual sensitivity.
Major beneficial	Considerable improvement in the amenity of a view of state level visual sensitivity. Any improvement in the amenity of a view of national visual sensitivity.

A series of representative viewpoints were selected on the basis of potential views to the Proposal and to illustrate the visual impact analysis.

The assessment of a visual impact is a subjective process depending on a number of factors that may include:

- The relationship of the viewer to the view (ie whether the person is a permanent resident, traveller or worker).
- Exposure to the view (ie whether it is a brief glimpse or an outlook from a house).
- The distance from a particular vantage point or the number of views available from that vantage point.
- The perception of the viewer.

17.1.2 Landscape policy context

Several planning and strategy documents are relevant to the assessment of the area's existing landscape character and values, and they express aspirations for the area's desired landscape character. These strategy documents identify areas of high landscape value in some locations of the Proposal and set out objectives to improve and protect landscape values. The aims and objectives of these planning and strategy documents are consistent with the objectives of the *Pacific Highway Urban Design Framework* (RTA 2005c) summarised in **Section 17.1.3**. **Chapter 10 Land use and property** provides further information on the likely future land use changes in the region.

Mid North Coast Regional Strategy

Aims of the *Mid North Coast Regional Strategy* (Department of Planning 2009a) relevant to the Proposal include:

- Limiting development in areas constrained by coastal processes, flooding, wetlands, important farmland and landscapes of high scenic and conservation value.
- Protecting the cultural and Aboriginal heritage values and visual character of coastal towns and villages surrounding rural landscapes.

Settlement Planning Guidelines: Mid and Far North Coast Regional Strategies

Aims of the *Settlement Planning Guidelines: Mid and Far North Coast Regional Strategies* (Department of Planning 2007) relevant to the Proposal include*:*

- Future development should recognise, protect and be compatible with any unique topographic, natural or built cultural features essential to the visual setting, character, identity, or heritage significance of the area that it is to be located in.
- Future development should reflect high quality design that is compatible with the local and regional attributes, which make up the region's character, such as climate, landscape, history, topography and existing built environment.
- Future development should be designed to ensure there is public access to an adequate supply of appropriately located public open space and recreation areas, to provide for a range of recreational uses and visual amenity.

Area 13 Structure Plan

The *Hastings Urban Growth Strategy 2001* (Hastings Council 2001a) identifies Area 13 Thrumster as an urban investigation area for future urban and industrial development. The *Area 13 Structure Plan* (Diecke Richards 2006), covering an area located to the east of the Proposal at the junction of the current Pacific Highway and the Oxley Highway, sets out the desired characteristics for development at this particular location. The Proposal would not impact the area covered by this plan, although the development could substantially alter the landscape character of the southern part of the Proposal area. In addition distant views of the Proposal may be available from within Area 13 Thrumster.

17.1.3 Pacific Highway Upgrade Program Urban Design Framework

The RTA's vision for the overall design of the Pacific Highway Upgrade Program was originally established in the *Pacific Highway Urban Design Framework* (RTA 2005c). The vision of the Pacific Highway Upgrade Program is:

> *"A sweeping green highway providing panoramic views to the Great Dividing Range and the forests, farmlands and coastline of the Pacific Ocean; sensitively designed to fit into the landscape, and be unobtrusive; and characterised by simple and refined road infrastructure.'*

The vision is consistent with the development and landscape aims of the strategy and guidelines for the Mid North Coast.

The *Pacific Highway Urban Design Framework* (RTA 2005c) references several RTA urban design guidelines, including *Beyond the Pavement, RTA Urban and Regional Design Practice Notes* (RTA 2009c) and contains six design objectives. These objectives also aim to achieve a minimal maintenance and cost-effective outcome. The landscape and urban design principles used during the development of the Proposal are consistent with consideration to these objectives, which are:

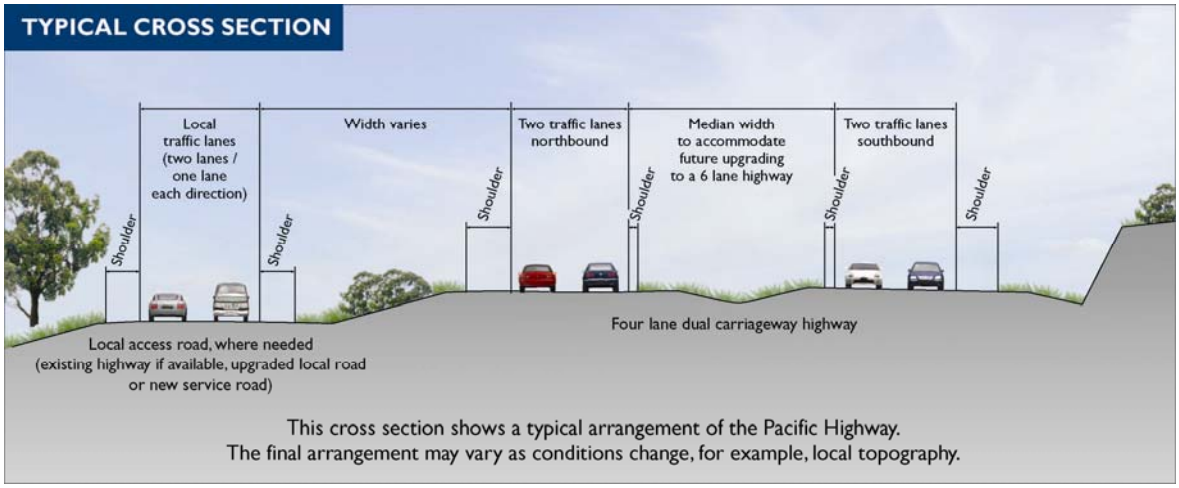
- Objective 1: Provide a flowing road alignment that is responsive to and integrated with the landscape.
- Objective 2: Provide a well-vegetated, natural road reserve.
- Objective 3: Provide an enjoyable and interesting highway with varied views and vistas of the landscape and pleasant, restful places to stop.
- Objective 4: Value the communities and towns along the road.
- Objective 5: Provide consistency-with-variety in road elements.
- Objective 6: Provide a simplified and unobtrusive road design.

Objective 1: An alignment that is responsive to the landscape

The vision and objectives of the *Pacific Highway Urban Design Framework* (RTA 2005c) are consistent with the development and landscape aims of the planning and strategy documents for the Mid North Coast discussed in **Section 17.1.2**.

Figure 17-1 provides a typical cross section demonstrating a typical arrangement for the Pacific Highway Upgrade Program.

Figure 17-1 Typical cross section for the Pacific Highway Upgrade Program



Subsequent to the visual amenity and urban design assessment being undertaken for the Proposal, the RTA has released a new policy titled *Beyond the Pavement RTA Urban Design Policy, Procedures and Design Principles* (RTA 2009b). The objectives of the *Pacific Highway Urban Design Framework* (RTA 2005c) are consistent with the principles contained in this new policy.

17.2 Existing landscape character

17.2.1 Overview

The landscape types through which the Proposal would pass may be broadly characterised as open agricultural, scattered forest, enclosed forest and a small area of industrial development as shown in **Figure 17-2**.

The area is predominantly rural with generally low relief (flat to gently undulating) and comprises a mixture of cleared pasture land, plantations or partially cleared areas with scattered trees and natural vegetation of varying quality. Key natural features include large areas of state forest and nature reserves, the Hastings and Wilson rivers, and their associated floodplains, and Cooperabung Hill.

The existing Pacific Highway, North Coast Railway and industrial area centred upon Sancrox Road are the most notable built features within the landscape. The villages of Telegraph Point and Kundabung are located generally to the east of the existing highway. A number of rural residences are scattered along the existing highway.

17.2.2 Section A – 700 metres north of the Oxley Highway to Blackmans Point Road

Section A is flat to gently undulating, reflecting its location in the Hastings River valley. It is dominated by open agricultural lands on the Hastings River floodplain, and vegetated areas generally to the south of the Fernbank Creek (scattered forest) and within Cairncross State Forest and Rawdon Creek Nature Reserve (enclosed forest) to the north of the floodplain (**Figure 17-2**).

Existing highway near Fernbank Creek, looking north

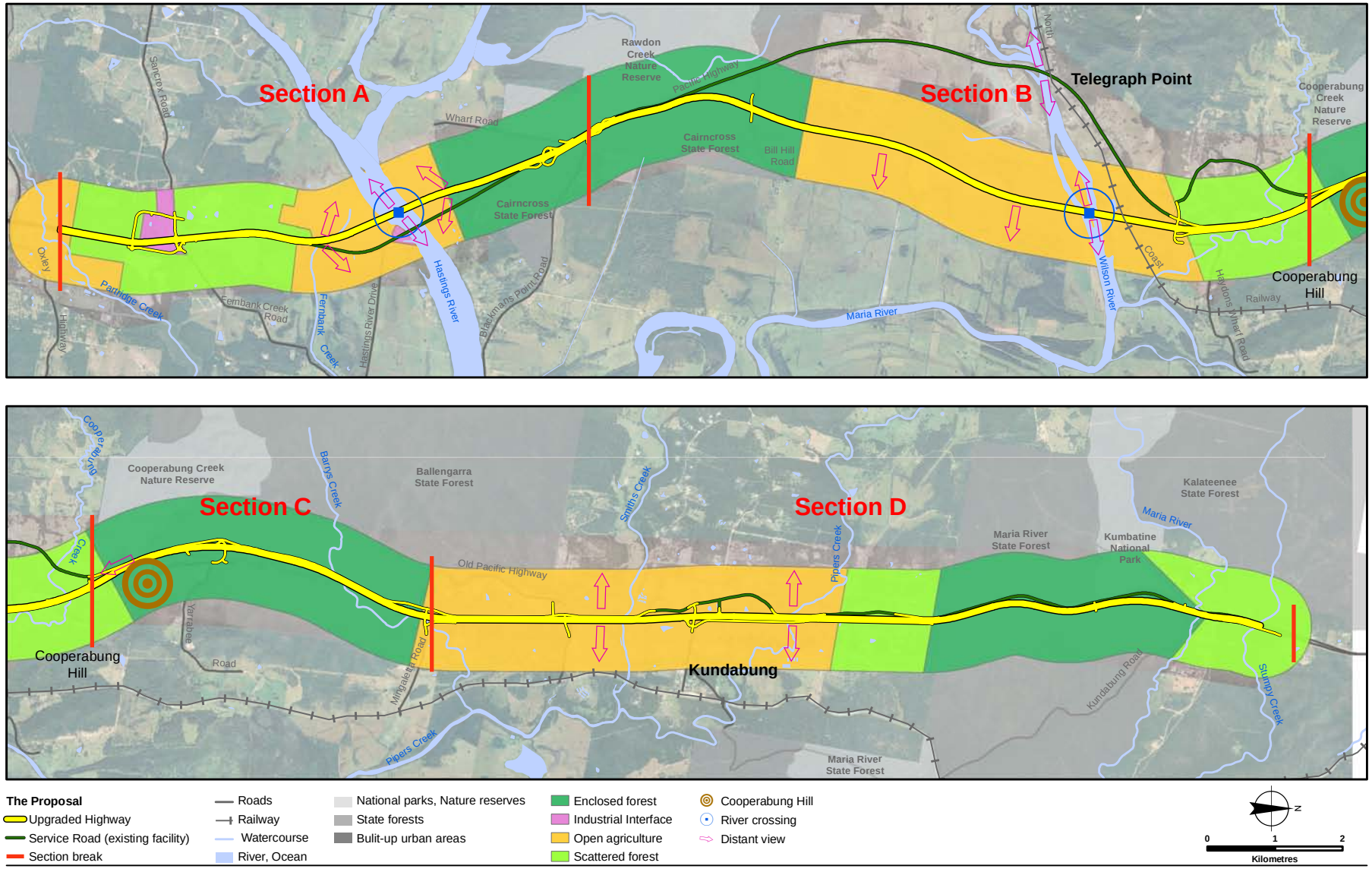
An industrial area comprising a mechanical spare parts business, a quarry, a winery and other industrial activities are the visually dominant structures in the vicinity of Sancrox Road. A mixed residential, commercial and industrial area in Area 13 Thrumster is currently under development in this area and would be expected to significantly change the visual character and landscape of the local area.

The southern bank of the Hastings River in the area of the existing highway is industrial in character and built form with a marine engineering and dredging business. The intersection of the existing highway and Hastings River Drive is a notable feature of the landscape in this section.

At the Hastings River the existing Dennis Bridge (a steel truss structure) is the most dominant feature of the landscape, acting as a visual marker for the northern access point for Port Macquarie. The views from the Dennis Bridge at this location are significant, as they are representative of the Pacific Highway in the context of the coastal plains and riverine environment. They also offer some of the better riverine and coastal floodplain views with long distance mountain backgrounds to be found along the Pacific Highway.

North of the Hastings River floodplain the existing highway enters an enclosed forested landscape created by the heavily vegetated areas within Cairncross State Forest and Rawdon Creek Nature Reserve.

Figure 17-2 Landscape character



Section B – Blackmans Point Road to Cooperabung Drive

The southern part of Section B is dominated by the enclosed forested landscape of Cairncross State Forest, the open agricultural landscape of the Wilson River floodplain and areas of scattered forest to the north of Haydons Wharf Road (**Figure 17-2**).

The heavily vegetated areas within Rawdon Creek Nature Reserve to the west of the existing highway and within Cairncross State Forest provide few opportunities for long distant views beyond the immediate forests flanking the existing highway.

Existing highway near Moorside Drive, looking north

The Wilson River floodplain is dominated by open pastures, with scattered rural residences, and remnant stands of vegetation in low lying areas and along the banks of the Wilson River. The village of Telegraph Point is centred just to the east of the existing highway immediately north of the Wilson River, with collections of residences also located in Moorside Drive and Mooney Street to the south of the river. Distant mountain and agricultural views are available from the existing highway across the floodplain.

The existing highway bridge across the Wilson River is a dominant feature and provides road users with sweeping views of the river systems and the adjoining floodplains, as well as some distant views to the mountains to the west.

North of the Wilson River the topography starts to rise and the landscape is largely comprised of scattered forest with rural residences located throughout. The North Coast Railway follows the northern bank of the Wilson River and is a dominant built feature in this area.

17.2.3 Section C – Cooperabung Drive to Mingaletta Road

Existing highway approaching Cooperabung Hill, looking north

Section C is entirely comprised of an enclosed forest landscape around the steeper topography of Cooperabung Hill (**Figure 17-2**). The heavily vegetated areas within Cooperabung Nature Reserve and Ballengarra State Forest surround the existing highway limiting views in this area to the existing highway cuttings and immediate forests. Barrys Creek is located in the northern part of this section. Expansive views of the Hastings and Wilson river floodplains are available for southbound road users as they reach the crest of Cooperabung Hill. A quarry is located to the east of the existing highway on Yarrabee Road. The few rural residences in this section have enclosed or filtered views reflecting their bush setting.

17.2.4 Section D – Mingaletta Road to Stumpy Creek

Landscape types in Section D are dominated by an open agricultural landscape between Mingaletta Road and Ravenswood Roads, and the enclosed forests within Maria River State Forest (**Figure 17-2**). Scattered forests are located to the south and north of the state forest. Kumbatine National Park adjoins the western edge of the existing highway in the northern part of this section. The heavily vegetated areas surrounding the existing highway within Maria River State Forest limit views in this area.

The general topography in the section is undulating. The existing highway crosses a number of watercourses including Smiths Creek, Pipers Creek, Maria River and Stumpy Creek. The village of Kundabung is primarily located approximately 500 metres to the east of the existing highway, while a number of rural residences are located in Rodeo Drive, Ravenswood Road and scattered throughout the section. Distant views from the existing highway are available at vantage points in the southern part of this section.

Existing highway, Kundabung, looking north

17.3 Landscape and visual amenity impacts

17.3.1 Landscape modifications and visual sensitivity

The Proposal would involve the construction of a number of elements that would be visible from surrounding areas and alter the existing character of the landscape and viewshed. The potential impacts of the Proposal on the landscape in terms of visual modification and visual sensitivity are discussed below. The visual impact as a result of the modifications at a number of representative view points are also discussed in **Section 17.3.2**.

Section A – 700 metres north of the Oxley Highway to Blackmans Point Road

In the southern part of Section A, the Proposal would involve duplication of the existing highway, resulting in a wider cleared corridor through a predominantly scattered forest landscape. In the vicinity of Sancrox Road an overbridge and sections of service roads would be constructed to the east and west of the upgraded highway in proximity to the existing and proposed industrial and commercial areas. In this area views are generally limited by mature road side vegetation. In the vicinity of the winery, retaining walls along with embankments would be required. The Proposal would result in a considerable alteration to the landscape character in this area due to the widening of the existing cleared corridor and additional built infrastructure.

The view in this location is assessed as being of less than local visual sensitivity, as it is generally restricted to views of the existing highway, as seen by users of the highway. The visual impact in this vicinity is determined to be minor adverse and this is illustrated by viewpoints 1 and 2 in **Table 17-3**.

North of Fernbank Creek the upgraded highway would deviate to the west of the existing highway to pass through an open agricultural landscape on the Hastings River floodplain, and cross the Hastings River approximately 300 metres upstream of the existing highway crossing (Dennis Bridge). The views from the Dennis Bridge at this location are significant, offering road users riverine and coastal floodplain views against a long distance mountain backdrop. A visualisation illustrating a view of the proposed crossing of the Hastings River is shown in **Figure 17-3**. It should be noted that the visualisation does not include the proposed landscape treatments discussed in **Section 17.4**.

The Dennis Bridge would be retained for use as part of the local service road network and would continue to form an important part of the viewscape to the east from the upgraded highway. From the Dennis Bridge the upgraded highway would be visible, resulting in a considerable alteration to the landscape that would be viewed in a context of a predominantly natural landscape.

From the Dennis Bridge this would be a view of less than local visual sensitivity, as following construction of the Proposal it would be viewed from a local road accessed by relatively fewer users. The visual impact in this vicinity is determined to be minor adverse and this is illustrated by viewpoint 4 in **Table 17-3**.

The embankment across the floodplain to the north and south of the Hastings River and new twin bridges would be a dominant built feature on the landscape and would be visible at varying distances from a number of rural residences in a relatively wide area. A number of rural residences in Glen Ewan Road would have close views of the embankment and new twin bridges. This would result in a noticeable alteration to the landscape in this localised area.

Dennis Bridge, Hastings River. The Proposal would cross the Hastings River at the bottom of this photo

From the southern bank of the Hastings River this is a view of local visual sensitivity as it is a scenic view across the river with limited public access and vantage points. The visual impact in this vicinity is determined to be minor adverse and this is illustrated by viewpoint 3 in **Table 17-3**.

North of the Hastings River floodplain the upgraded highway would rise out of the Hastings River valley and enter the enclosed forested areas within Cairncross State Forest and, to the west of the Proposal, pass the eastern boundary of Rawdon Creek Nature Reserve. The upgraded highway would then rejoin the existing highway alignment just south of Blackmans Point Road, where a grade separated interchange is proposed within the enclosed forested landscape. The existing cleared corridor in this area would be widened significantly resulting in a considerable alteration to this landscape.

The view in this location is of less than local visual sensitivity as it is generally restricted to a view of the existing highway, as seen by users of the highway. The visual impact in this vicinity is determined to be minor adverse and this is illustrated by viewpoint 5 in **Table 17-3**.

Section B – Blackmans Point Road to Cooperabung Drive

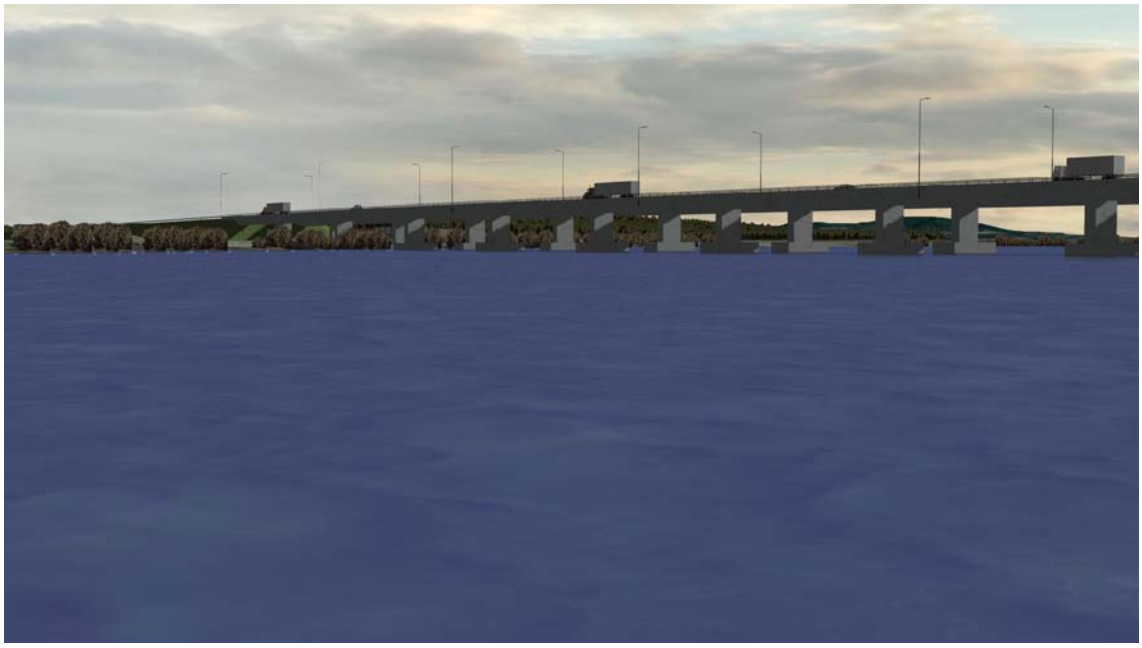
In the southern part of Section B the upgraded highway would continue through the enclosed forest landscape of Cairncross State Forest and to the west, Rawdon Creek Nature Reserve. The Proposal would involve duplication of the existing highway, resulting in a wider cleared corridor. The addition of service roads and an underpass, which connect with the proposed interchange at Blackmans Point Road in Section A, would further increase the cleared corridor. South of Bill Hill Road the upgraded highway would deviate to the east of the existing highway follow a new alignment through Cairncross and begin its bypass of Telegraph Point. A new overbridge would be constructed at Bill Hill Road.

The view in this location is of less than local visual sensitivity as it is generally restricted to a view of the existing highway, as seen by users of the highway. The visual impact in this vicinity is determined to be minor adverse and this is illustrated by viewpoint 5 in **Table 17-3**.

North of Cairncross State Forest, the Proposal would enter an open agricultural landscape on the Wilson River floodplain. Distant views of the surrounding agricultural landscape to the east would be available from the upgraded highway in this area. A rural residential subdivision at Moorside Drive is located to the west of the upgraded highway in a forested area. The intervening vegetation of this bushland setting would screen views from the rural residences. As a result there would be a negligible alteration to the landscape in this location.

Figure 17-3 Visualisations

Hastings River (view south west)



Visualisation does not include proposed landscape treatment

Wilson River floodplain (view north)

Visualisation does not include proposed landscape treatment

Not to scale. All design features are subject to refinement during detailed design.

The view in this location is of less than local visual sensitivity as it is restricted to a small number of rural users with screened views. The visual impact in this vicinity is determined to be negligible and this is illustrated by viewpoint 6 in **Table 17-3**.

The embankment across the floodplain of the Wilson River would be a dominant built feature on the landscape visible at varying distances from a small number of rural residences located to the east of the Proposal over a relatively wide area. The upgraded highway would largely be set against a backdrop of vegetation and would not intervene with the more distant views. This would result in a noticeable alteration to the landscape in this area.

Dalhunty Island, Wilson River. The Proposal would cross the Wilson River at the top right of this photo.

From the east of the upgraded highway, this is a view of local visual sensitivity as it is a scenic view across the floodplain with middle ground forested areas and distant mountain views. The visual impact in this vicinity is determined to be minor adverse due to the low number of distant viewers. A visualisation illustrating a view of the proposed crossing of the Wilson River floodplain is shown in **Figure 17-3**. It should be noted that the visualisation does not include the proposed landscape treatments discussed in **Section 17.4**.

The upgraded highway would bypass to the east of the village of Telegraph Point, crossing the Wilson River at the eastern tip of Dalhunty Island approximately 2 kilometres downstream of the existing highway. Similar to the existing highway bridge, which would be retained as part of the service road network, expansive views would be available from the proposed Wilson River crossing for road users. There are few rural residences that would have close views of the upgraded highway at this location.

From the southern bank of the Wilson River in the vicinity of where the upgraded highway would cross the river, there would be a considerable alteration to the landscape by the introduction of the large built structure against a predominantly natural setting.

This is a view of local visual sensitivity, as although there are few viewers it is a view of high scenic amenity. The visual impact in this vicinity is determined to be moderate adverse and this is illustrated by viewpoint 8 in **Table 17-3**.

From the existing highway bridge and key locations within the village of Telegraph Point the new twin bridges over the Wilson River and North Coast Railway would be visible at a distance for short periods between mature vegetation. This would result in a noticeable alteration to the landscape in this area, which would diminish over time with establishment of landscaping for the Proposal.

This is a view of local visual sensitivity, for both the local community and road users and it has high scenic amenity. Following construction of the Proposal, recreational use in the vicinity of the existing highway bridge and within Telegraph Point could also increase the number of viewers. The visual impact in this vicinity is determined to be minor adverse and this is illustrated by viewpoints 7 and 9 in **Table 17-3**.

At Haydons Wharf Road a half interchange is proposed to provide connectivity between Telegraph Point and the upgraded highway. To the north the upgraded highway would rejoin the existing highway alignment and involve duplication of the existing highway in a scattered forest landscape surrounding Cooperabung Creek. Rural residential development is scattered throughout the area north of the Wilson River.

In the vicinity of Haydons Wharf Road this would result in a considerable alteration to the landscape due to the introduction of new built infrastructure associated with the half interchange and a series of cuts and fills.

This is a view of local visual sensitivity, as although there are few viewers it is a view of high scenic amenity. The visual impact in this vicinity is determined to be minor adverse and this is illustrated by viewpoint 10 in **Table 17-3**.

Section C – Cooperabung Drive to Mingaletta Road

Existing highway cutting in Cooperabung Hill. The Proposal would duplicate the existing highway requiring widening of the cutting.

The Proposal would involve duplication of the existing highway for the entire length of Section C. A series of large cuts and fills would be required as the upgraded highway passes through the steep topography around Cooperabung Hill. A service road would also be constructed to the west of the upgraded highway passing along the benches of the larger cuts resulting in the creation of a wider cleared corridor with a number of rock faces. In the vicinity of Yarrabee Road an underpass and service road arrangement would provide for safe access for heavy vehicles to the nearby quarry. The expansive views of the floodplains of the Hastings and Wilson rivers would still be available for southbound road users on the upgraded highway as they reach the crest of Cooperabung Hill. The Proposal would result in a considerable alteration to the enclosed forest landscape in this section due to the widening of the existing cleared corridor and existing cuttings.

This is a view of local visual sensitivity as it has a high level of scenic amenity created by the combination of enclosed forests, existing rock cuttings and steep topography viewed primarily by road users. The visual impact in Section C is determined to be moderate adverse in the general vicinity of Cooperabung Hill, and minor adverse in the vicinity of Mingaletta Road. This is illustrated by viewpoints 11, 12 and 13 in **Table 17-3**.

Two new rest areas would also be constructed in the northern part of this section and, while initially this would create a substantially wider cleared corridor, landscaping would be designed to create a visually attractive environment for road users.

Section D – Mingaletta Road to Stumpy Creek

The Proposal would involve the duplication of the existing highway in the majority of Section D, with a minor deviation at the northern end within Maria River State Forest. A service road would also be provided to the west of the upgraded highway, comprised of sections of new roads, existing local roads and the existing highway. New overbridges would be constructed at Mingaletta Road, Kundabung Road and Middle Gate Road. Distant views from the upgraded highway would still be available at vantage points in the southern part of this section.

When viewed by road users from Kundabung Road or Smiths Creek Road, the Proposal would introduce a new built feature on the landscape in the form of an overbridge and associated service road network. This would result in a noticeable alteration to the landscape at this location.

When viewed from Kundabung Road this is a view of local visual sensitivity as it has a high level of scenic amenity created by the agricultural nature of the area set against forested hills, which would be viewed by road users along Kundabung Road. The visual impact at this location is considered to be minor adverse and this is illustrated by viewpoint 14 in **Table 17-3**.

When viewed from Smiths Creek Road this is a view of less than local visual sensitivity as it is generally restricted to a view of the upgraded highway by a relatively low number of road users and a few isolated rural residences. The visual impact at this location is considered to be negligible and this is illustrated by viewpoint 15 in **Table 17-3**.

Further to the north at Ravenswood Road the Proposal would continue with the duplication of the existing highway and a service road would be constructed to the west of the upgraded highway using the existing Ravenswood Road. While the Proposal would widen the existing cleared corridor, intervening mature vegetation would screen the upgraded highway from this location, and this would result in no perceived alteration to the landscape.

This is a view of less than local visual sensitivity as there are few viewers and existing mature vegetation would obscure the upgraded highway. The visual impact at this location is considered to be negligible and this is illustrated by viewpoint 16 in **Table 17-3**.

At the existing northern intersection of Ravenswood Road and the existing highway the Proposal would include a duplication of the existing highway and a new service road on the western side. There are a few rural residences in this general area however intervening mature vegetation would largely obscure or filter any views of the upgraded highway. This would result in widening of the existing cleared corridor and would result in a considerable alteration to the scattered forest landscape in this area.

This is a view of less than local visual sensitivity as it is dominated by the existing highway. The visual impact at this location is considered to be minor adverse and this is illustrated by viewpoint 17 in **Table 17-3**.

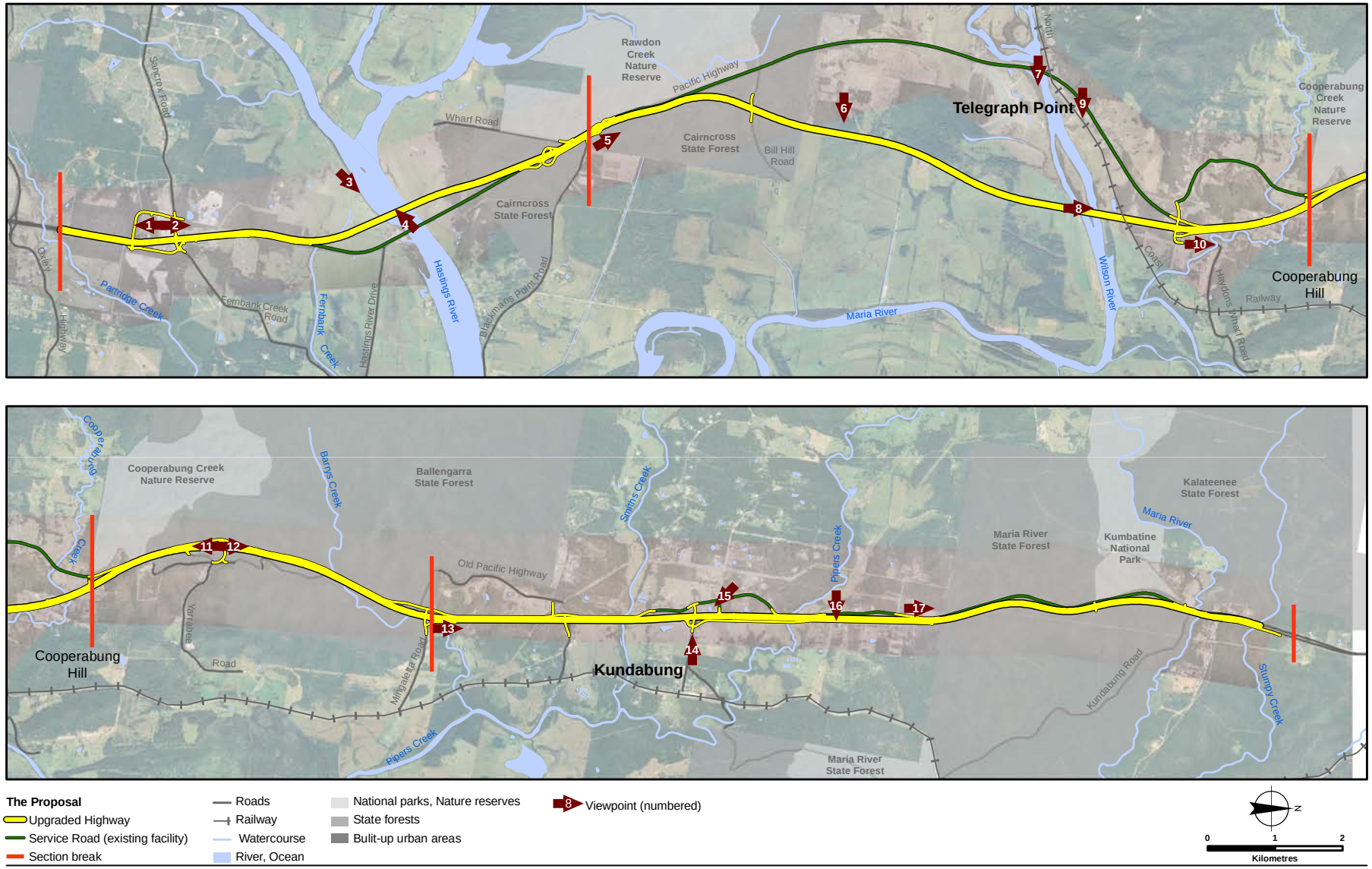
The Proposal would then enter the enclosed forest of the Maria River State Forest, slightly deviating to the east before rejoining the existing highway at the Maria River. This would create a new cleared corridor through the heavily vegetated area resulting in a noticeable alteration in the landscape. Views in this area are restricted to road users on the upgraded highway and the visual impact is considered to be minor adverse.

17.3.2 Visual amenity impacts

A series of viewpoints have been selected to assess the potential views to and from the Proposal. The viewpoints were selected as they are representative of significant views of the Proposal available from the surrounding landscape, or are representative of views of the surrounding landscape from the Proposal. The selected viewpoints along the Proposal are shown in **Figure 17-4** and are:

- Corner of Sancrox Road and existing highway looking south.
- South of Sancrox Road looking north.
- Upstream southern bank of Hastings River looking north east.
- Existing Hastings River bridge (Dennis Bridge) looking west.
- Pacific Highway, Cairncross State Forest near Blackmans Point Road looking north.
- Moorside Drive, Telegraph Point looking east.
- Existing Wilson River bridge looking east.
- Wilson River southern bank looking north west.
- Catholic Church, Telegraph Point looking east.

Figure 17-4 Viewpoints



- Haydons Wharf Road looking north.
- Pacific Highway, Cooperabung Hill looking south.
- Pacific Highway, Cooperabung Hill looking north.
- Corner of Mingaletta Road and existing highway looking north.
- Kundabung Road, Kundabung looking west.
- Smiths Creek Road, Kundabung looking south east.
- Ravenswood Road south, Kundabung looking east.
- Ravenswood Road north, Kundabung looking north.

For each identified viewpoint the visual sensitivity and visual impact are discussed in **Table 17-3**.

Table 17-3 Viewpoints and impacts

Viewpoint, visual sensitivity and visual impact significant level	Existing view
1 Corner of Sancrox Road and existing highway looking south. The view in this location is of less than local visual sensitivity as it is generally restricted to a view of the existing highway, as seen by users of the highway. Visual impact: minor adverse.	
2 South of Sancrox Road looking north. The view in this location is of less than local visual sensitivity as it is generally restricted to a view of the existing highway, as seen by users of the highway. The view of the winery does not substantially increase the sensitivity of this view. Visual impact: minor adverse.	
3 Upstream southern bank of Hastings River looking north east. From the southern bank of the Hastings River this is a view of local visual sensitivity as it is a scenic view across the river with limited public access and vantage points. Visual impact: minor adverse.	

	Viewpoint, visual sensitivity and visual impact significant level	Existing view
4	Existing Hastings River bridge (Dennis Bridge) looking west. From the Dennis Bridge this would be a view of less than local visual sensitivity, as following construction of the Proposal it would be viewed from a local road accessed by relatively fewer users. Visual impact: minor adverse.	
5	Pacific Highway, Cairncross State Forest near Blackmans Point Road looking north. The view in this location is of less than local visual sensitivity as it is generally restricted to a view of the existing highway, as seen by users of the highway. Visual impact: minor adverse.	
6	Moorside Drive, Telegraph Point looking east. The view in this location is of less than local visual sensitivity as it is restricted to a small number of rural users with screened views. Visual impact: negligible.	
7	Existing Wilson River bridge looking east. This is a view of local visual sensitivity, for both the local community and road users and it has high scenic amenity. Following construction of the Proposal recreational use in the vicinity of the existing highway bridge and within Telegraph Point could also increase the number of viewers. Visual impact: minor adverse.	

Viewpoint, visual sensitivity and visual impact significant level	Existing view
8 Wilson River southern bank looking north west. This is a view of local visual sensitivity, as although there are few viewers it is a view of high scenic amenity. Visual impact: moderate adverse.	
9 Catholic Church, Telegraph Point looking east. This is a view of local visual sensitivity, for both the local community and road users and it has high scenic amenity. Following construction of the Proposal recreational use in the vicinity of the existing highway bridge and within Telegraph Point could also increase the number of viewers. Visual impact: minor adverse.	
10 Haydons Wharf Road looking north. This is a view of local visual sensitivity, as although there are few viewers it is a view of high scenic amenity. Visual impact: minor adverse.	
11 Pacific Highway, Cooperabung Hill looking south. This is a view of local visual sensitivity as it has a high level of scenic amenity created by the combination of enclosed forests, existing rock cuttings and steep topography viewed primarily by road users. Visual impact: moderate adverse.	
12 Pacific Highway, Cooperabung Hill looking north This is a view of local visual sensitivity as it has a high level of scenic amenity created by the combination of enclosed forests and steep topography viewed primarily by road users. Visual impact: moderate adverse.	

Viewpoint, visual sensitivity and visual impact significant level	Existing view
13 Corner of Mingaletta Road and existing highway looking north. This is a view of local visual sensitivity as it has a high level of scenic amenity created by the combination of enclosed forests and steep topography viewed primarily by road users. Visual impact: minor adverse.	
14 Kundabung Road, Kundabung looking west. This is a view of local visual sensitivity as it has a high level of scenic amenity created by the agricultural nature of the area set against forested hills, which would be viewed by road users along Kundabung Road. Visual impact: minor adverse.	
15 Smiths Creek Road, Kundabung looking south east When viewed from Smiths Creek Road this is a view of less than local visual sensitivity as it is generally restricted to a view of the upgraded highway by a relatively low number of road users and a few isolated rural residences. Visual impact: negligible.	
16 Ravenswood Road south, Kundabung looking east This is a view of less than local visual sensitivity as there are few viewers and existing mature vegetation would obscure the upgraded highway. Visual impact: negligible.	
17 Ravenswood Road north, Kundabung looking north. This is a view of less than local visual sensitivity as it is dominated by the existing highway. Visual impact: minor adverse.	

Summary of impacts

This assessment has identified that for the majority of the Proposal the visual impact is minor adverse. The overall visual impact is considered to be low to moderate generally as a result of:

- Relatively few viewers being located in proximity to the Proposal including the Hastings River deviation and bypass of Telegraph Point.
- Large sections of the Proposal, including the proposed Blackmans Point Road interchange are visually enclosed within the heavily vegetated areas of Cairncross State Forest, Ballengarra State Forest and Maria River State Forest.

A moderate adverse impact would occur immediately adjacent to where the Proposal crosses the Wilson River (viewpoint 8) and where it passes through the steeper topography of Cooperabung Hill (viewpoints 11 and 12).

At the Wilson River these impacts are associated with a considerable alteration to the landscape by the introduction of the large built structure against a predominantly natural setting. There are very few rural residences that would have close views of the Proposal at this location. Where the Proposal would pass through Cooperabung Hill the views have a high level of scenic amenity created by the combination of enclosed forests, existing rock cuttings and steep topography. The Proposal would widen the existing cleared corridor but would only be viewed primarily by road users.

17.3.3 Construction impacts

Potential visual impacts during the construction phase would be mainly focused around the construction areas adjoining sensitive viewing receptors. These impacts would include views of machinery at work, construction site activities, materials storage, vegetation clearing, embankment and cutting construction, as well as the construction of bridges and other structures.

Various types of large earthmoving and construction equipment that are potentially visually intrusive would be used during construction. Temporary storage compounds and facilities (for both materials and heavy construction vehicles) would be required at various locations within the Proposal.

The activities associated with the construction of the floodplain embankments at the Hastings and Wilson rivers would have temporary impacts on the existing rural character of these areas. Significant amounts of fill material would be imported onto the floodplains by large trucks and other construction equipment would be used to form the embankments. The construction of the concrete bridge structures would also have an impact on the visual amenity of the Hastings and Wilson rivers through the use of large equipment and material stockpiles.

The glare from night time construction activities and the security lighting for construction related facilities such as site offices; batch plants and crushing facilities could have potential visual impacts on neighbouring residential land uses and other sensitive receptors such as road users.

The construction activities associated with the Proposal would be of a temporary nature. As a result, the visual impacts of these activities would be expected to be minimal and only short term in duration.

17.3.4 Staging implications

In preparing this Environmental Assessment, the potential visual and landscape impacts of the possible staging option described in **Section 7.3.2** in comparison to the construction of the entire Proposal to a full motorway standard have been considered as outlined below.

This staging option would have a reduced footprint and less roadside structures such as overbridges relative to a motorway standard upgrade. It is therefore considered that the resultant visual impact and change to the landscape character associated with this staging option would be similar to, or slightly less than that of the ultimate motorway standard upgrade.

The management measures proposed in **Section 17.4** would therefore also be appropriate for this staging option. The detailed urban design and landscape concept plan for the Proposal would be further refined during the detailed design phase if a staging option is adopted.

Should the Proposal be delivered in stages, the staging report described in **Section 7.3.3** would detail the visual and landscape impacts of the staging option. If any additional or altered impacts are identified, the staging report would further assess these impacts and identify appropriate management measures.

17.4 Management of impacts

The Proposal has been developed in accordance with the *Pacific Highway Urban Design Framework* (RTA 2005c), which establishes a vision for the Pacific Highway Upgrade Program and six design objectives. The landscape and urban design principles used during the development of the Proposal are consistent with these objectives and have been considered and incorporated at all phases of development of the Proposal including the route options development, preferred route selection and concept design phases. Further information on the route options development and preferred route selection phases can be found in the *Oxley Highway to Kempsey Route Options Development Report* (RTA 2005f), *Oxley Highway to Kempsey Preferred Route Report* (RTA 2006e) and *Oxley Highway to Kempsey Preferred Route Report – Bill Hill Road Area* (RTA 2007d), which are available at **www.pacifichighwayupgrade.com.au**.

The following sections set out the overall strategy for managing the potential impacts of the Proposal on the landscape and visual amenity of the area. This includes a landscape concept plan for the Proposal and illustrations to demonstrate the intended design outcomes.

To help reduce and manage the potential visual impacts of the Proposal, a detailed urban and landscape design plan would be developed during the detailed design phase.

The main aim of the plan would be to maintain and enhance the existing visual and landscape character of the area where possible. The detailed design would also be undertaken with a view to establishing a visual character for the road that blends in with the surrounding landscape, but at the same time provides an enjoyable road user experience. The treatments that would be utilised in the detailed urban and landscape design plan would be formulated with reference to the *RTA Pacific Highway Urban Design Framework* (RTA 2005c) and *Beyond the Pavement RTA Urban Design Policy, Procedures and Design Principles* (RTA 2009b). The plan would also be developed taking into consideration the other management measures identified in this Environmental Assessment with regard to issues such as flora and fauna, noise control and safety measures.

The following sections set out overall strategy for managing the potential impacts of the Proposal on the landscape and visual amenity of the area. This includes a landscape concept plan for the Proposal and illustrations to demonstrate the intended design outcomes.

17.4.1 Landscape concept plan

A landscape concept plan has been prepared for the Proposal that seeks to maintain and reinforce the character and vegetation communities of the existing environment along the Proposal. In this way the Proposal would blend more naturally with the overall landscape and the degree of visual contrast would be reduced for both the surrounding residents and road users. At the same time, the landscaping is designed to provide road users with a variety of pleasing and interesting experiences as they pass through the different landscape areas.

The landscape concept plan shown in **Figure 17-5a** to **Figure 17-5h** illustrates the proposed treatments across the length of the Proposal. Key locations that demonstrate typical proposed treatments that are representative of the different landscape areas the Proposal passes through are shown in greater detail in **Figure 17-6a** to **Figure 17-6c**.

The landscape concept plan shown in **Figure 17-5a** to **Figure 17-5h** was developed with consideration of various environmental aspects in addition to the landscapes and views of visual sensitivity. These aspects include:

- The land use along the alignment.
- The type and quality of vegetation and ecological communities.
- The habitat corridors intersected by the Proposal.
- Topographical features such as slope, hills and villages.
- The design elements of the Proposal.

17.4.2 Indicative urban design and landscape treatments

Structures

Bridges

Bridges for the Proposal would be designed with reference to the *RTA Bridge Aesthetics, Design Guidelines* (RTA 2003b), *Pacific Highway Urban Design Framework* (RTA 2005c) and the *Beyond the Pavement RTA Urban Design Policy, Procedures and Design Principles* (RTA 2009b). Bridges would be designed to be as unobtrusive as practical, especially adjacent to sensitive landscapes. The intention would be to construct bridges that are simple and elegant to complement the landscape in which they are located, while at the same time fulfilling the requirements of safety and functionality.

Bridge design that complements the landscape and is aesthetically pleasing

While these general design principles would apply to all of the bridges included in the Proposal, particular attention would need to be paid to the bridges over the Hastings and Wilson rivers. Both of these bridges would be important structures from the point of view of their size, visibility and role in the landscape.

Figure 17-5a Landscape concept plan

Note: Locations and features are subject to refinement during detailed design; 2004 Aerial photography.

Figure 17-5b Landscape concept plan

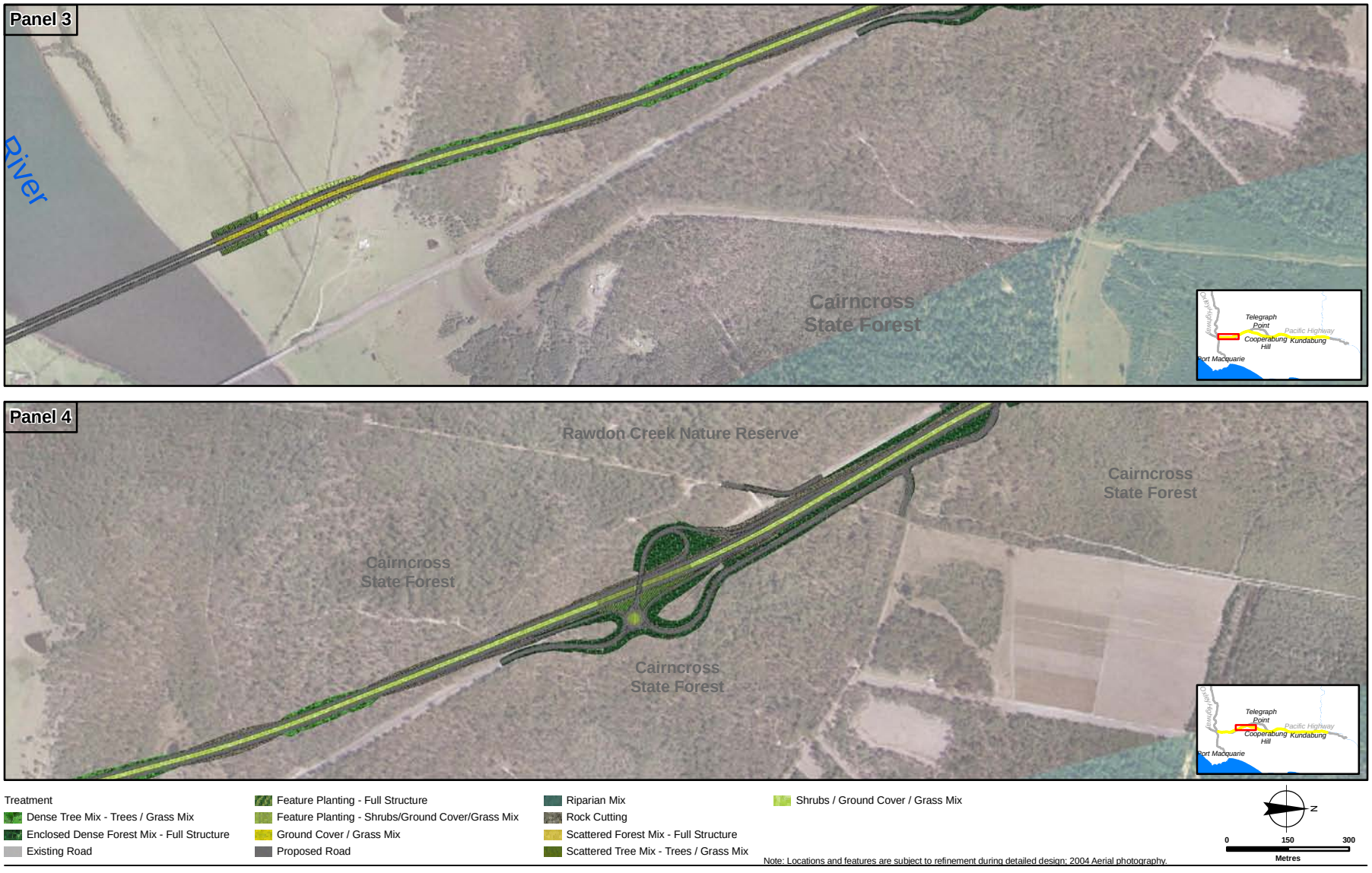


Figure 17-5c Landscape concept plan

Note: Locations and features are subject to refinement during detailed design; 2004 Aerial photography.

Figure 17-5d Landscape concept plan

Figure 17-5e Landscape concept plan

Figure 17-5f Landscape concept plan

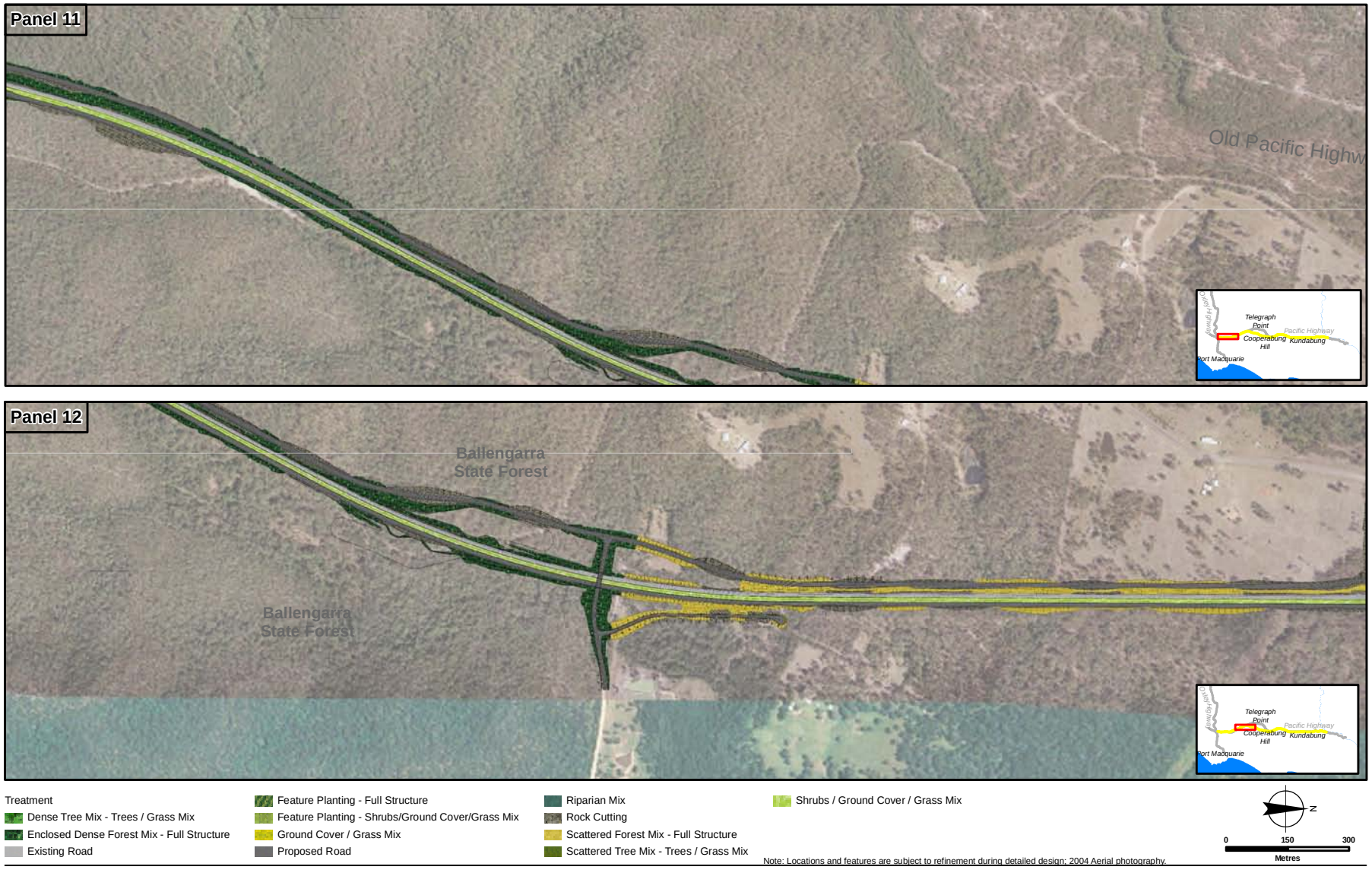


Figure 17-5g Landscape concept plan

Figure 17-5h Landscape concept plan

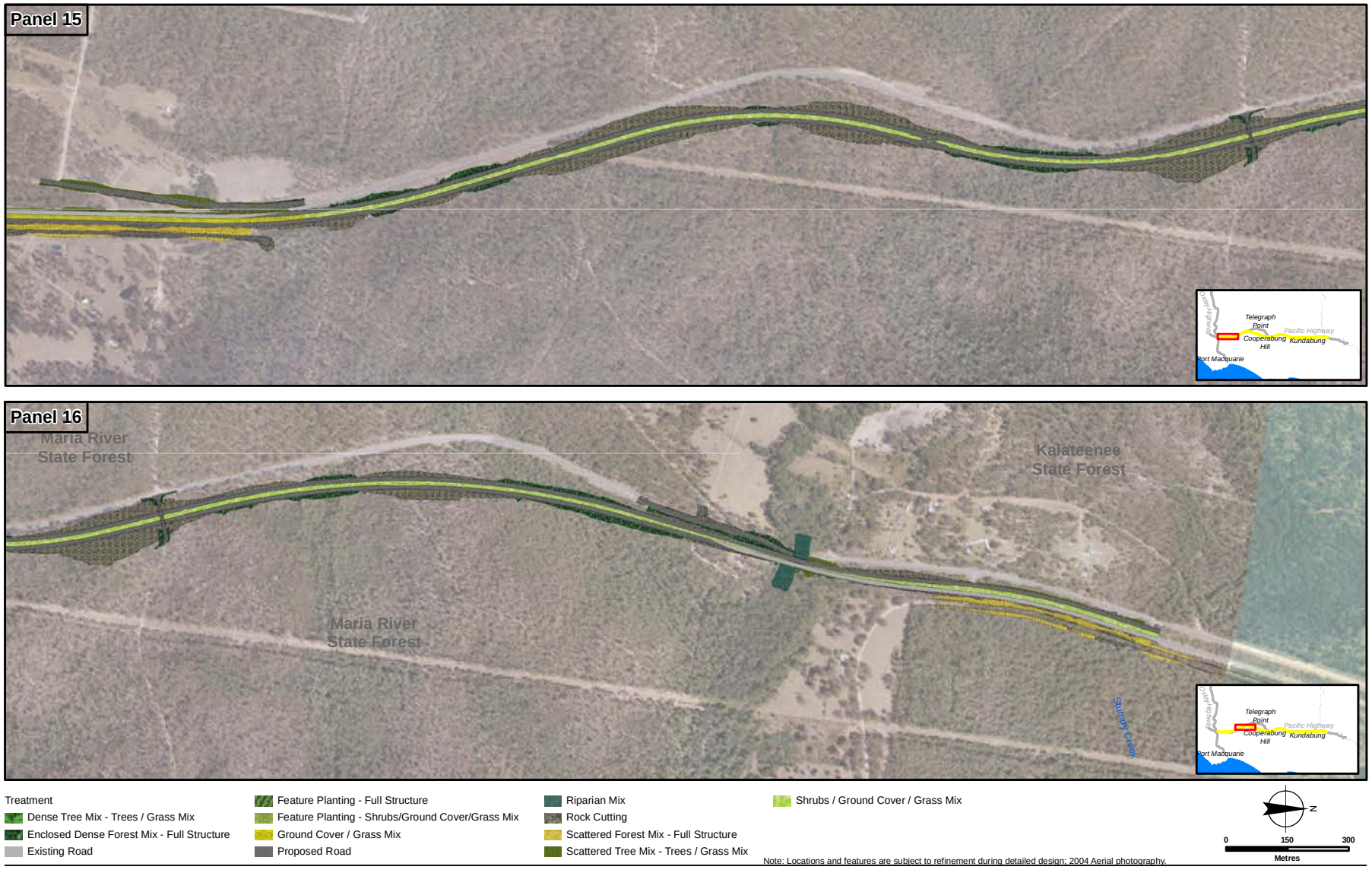
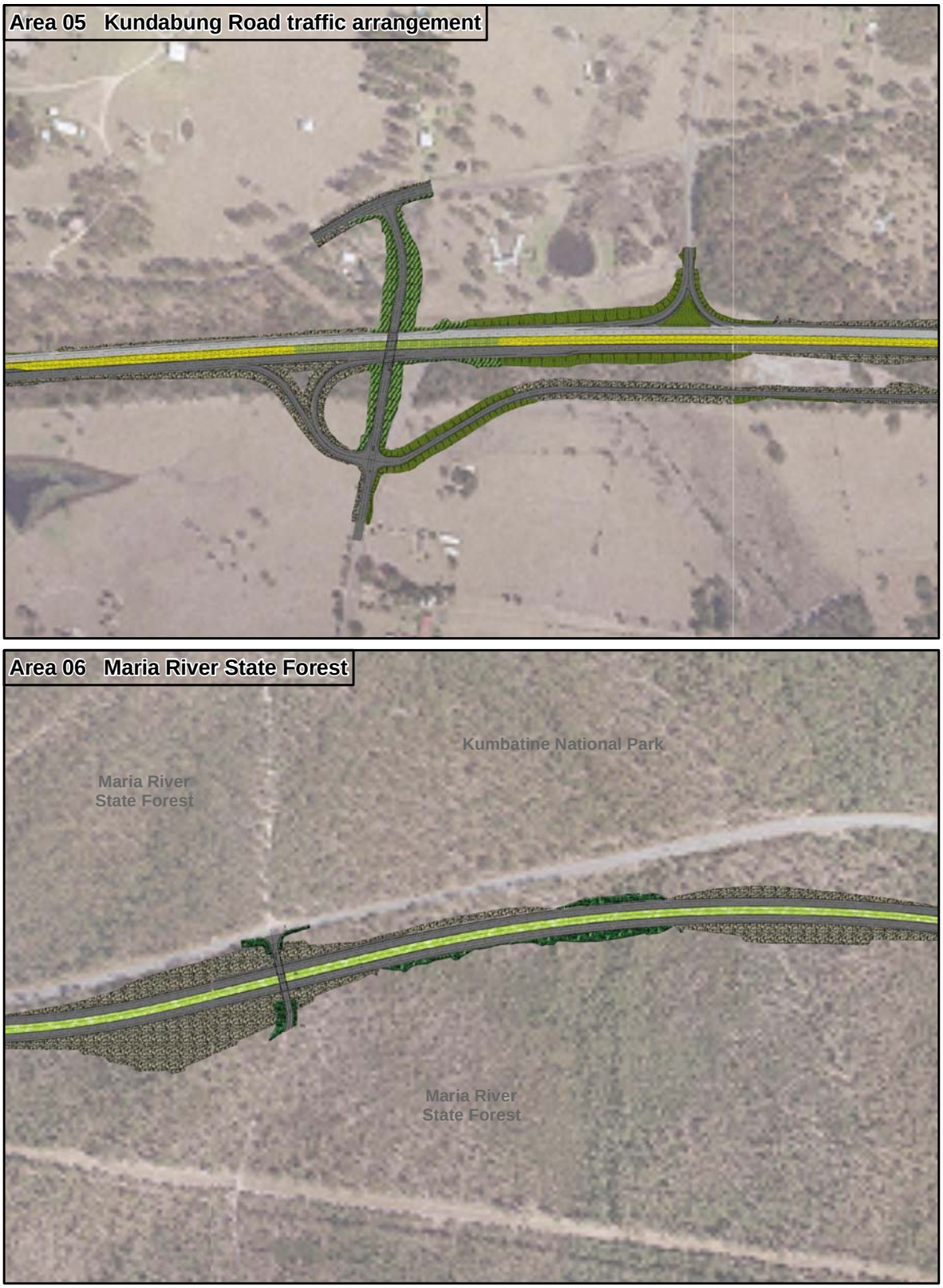


Figure 17-6a Landscape concept plan - detail areas

Figure 17-6b Landscape concept plan - detail areas

Figure 17-6c Landscape concept plan - detail areas



The Hasting River bridge would be a dominant built structure introduced into a significant visual landscape. This large landscape area is visible from a number of different viewpoints (both close and distant), and contains a wide range of visual elements such as industrial, rural residential, riverine, floodplain, wooded hills and a distant mountain backdrop. As such, this bridge would need to be designed to reduce the interference with the existing visual landscape, but concurrently the elements of the bridge would need to be visually attractive because it would still be clearly visible within that landscape. Elements such as the bridge rails and the landscaping on the approaches would also need to be carefully designed to open up and highlight this key north coast landscape vista for the road user.

While the Wilson River bridge is of a similar size, it is located in a different context, with the main visual focus points being the road user and restricted distant viewpoints. The landscape is a distinctly rural floodplain with more vegetation cover than the Hastings River floodplain, particularly around Dalhunty Island and the riverbanks. The key design issue for this bridge would be to blend in with the broader landscape, while still being visually pleasing from local viewpoints such as Hacks Ferry Road. The elements of the bridge would need to be designed to compliment and reflect the more wooded nature of this floodplain, as well as highlighting the available views of the floodplain, river, Dalhunty Island and surrounding hills for the road user.

The length of both of these bridges extends beyond the direct riverbank. This would allow for the retention where possible of much of the existing riverbank and floodplain vegetation in this area. This would also enable the revegetation of disturbed areas in the vicinity of the riverbank, as well as providing a fauna access corridor in the vicinity of the riverbanks. The southern end of the Hastings River bridge would provide a vehicle underpass for Glen Ewan Road, and the Wilson River bridge would provide a vehicle underpass for Hacks Ferry Road. The design and treatment of the southern abutment of these bridges would have to consider the visual aspects of this element of the bridge from the viewpoint of the local road users.

The urban design and landscape treatments of areas adjacent to the bridges would be designed to blend the bridges and abutments with the surrounding landscape as far as possible when viewed from either the highway or adjoining areas. Feature plantings would be used where appropriate adjacent to bridge approaches to assist in visually integrating the structures into the surrounding landscape.

The final design of the bridges for the Proposal would be undertaken utilising the principles outlined above during the detailed design phase.

Rest areas

Rest areas would be required to ensure adequate locations for resting and driver safety. Twin rest areas are proposed in the area south of Mingaletta Road. Design of the rest areas and aesthetic features would be completed during detailed design and in consideration with relevant RTA guidelines.

Attractive and safe rest areas

Roadside furniture

The design and location of all roadside furniture elements such as signs, safety barriers, fencing and lighting would be undertaken with reference to the *Pacific Highway Urban Design Framework* (RTA 2005c) and the *Beyond the Pavement RTA Urban Design Policy, Procedures and Design Principles* (RTA 2009b). The roadside furniture would be designed to minimise the visual impacts on adjoining residents, but still be readily apparent to road users and achieve their functional purpose.

The requirements for the design of these elements of the Proposal would include:

- Intersection and bridge lighting – roadside lighting would be simple, unobtrusive, and consistent along the Proposal. A lighting scheme would be developed in accordance with the *Pacific Highway Design Guidelines* (RTA 2005a) during detailed design. The aim of the design guidelines in this respect is to minimise the use of lighting. The design of the lighting implemented on the Proposal would consider the potential impacts on adjacent landowners. Where technically and economically feasible, the most efficient lighting technology would be used to minimise energy consumption and offsite light spill and glare. Watercourse lighting on the Hastings River and Wilson River bridges would be installed in accordance with NSW Maritime Authority requirements. This lighting would not be visible to motorists.
- Signage – all signage would meet RTA standards and designs. The number of signs would be kept to the minimum that safety, information and driving requirements would allow. Signage would be placed to avoid intrusion into scenic views or the skyline.
- Fencing – general fencing would be standard RTA controlled access boundary fence. Where fauna movements need to be controlled, RTA standard floppy top fauna fencing would be used. Where feasible and reasonable, this fauna fencing would be located behind landscape plantings and well clear of the carriageways.
- Safety barriers – all barriers would fulfil the requirements of safety, functionality and consistency without being dominant or intrusive in the surrounding environment. A combination of concrete barrier, wire rope safety barrier and standard guardrail barriers would be used as appropriate depending on its location. Safety barriers on bridges would have the lowest permitted parapets topped by bridge safety rails to maximise potential views. This would be particularly important in the floodplain areas and on the bridges for the major river crossings of the Hastings and Wilson rivers.

Simple bridge barriers permit panoramic views

Construction facilities

The visual impacts associated with construction activities would generally be expected to be of a temporary, short-term nature. However, the following measures would be included in the landscaping strategy and the construction management procedures to minimise these impacts.

Construction facilities for the Proposal such as compounds, site offices, batch plants and crushing facilities would be located in accordance with the selection criteria for construction facilities set out in **Section 7.6** of this Environmental Assessment. Based on these selection criteria, the potential visual impacts on adjoining residents from the facilities and lighting glare would be kept to a minimum by locating these facilities as far away from residences and other sensitive receivers as possible. If any facilities need to be located near residences or sensitive receivers, the facilities would be designed to minimise the visual impacts as much as possible by using existing vegetation or buildings for screening purposes.

Security lighting for construction facilities such as site offices, batch plants and crushing facilities would be required during the construction phase of the Proposal. Night time construction activities requiring the use of lighting could also be required on occasions.

The impact of glare from any lighting associated with night-time activities and security lighting for construction facilities would be managed by:

- Restricting the use of lighting to essential requirements only.
- The use of the topography, vegetation or buildings to screen lighting from sensitive receptors where possible.
- Designing lighting for constructional facilities to be directional with baffles to minimise unnecessary light spill into adjoining areas.

Cut batter stabilisation

Due to the large number of exposed rock cuttings along the Proposal, it is possible that cut batter stabilisation could be required in some locations. Where possible batter slopes would be stabilised with vegetation however, on steeper slopes this stabilisation could include rock bolting and/or shotcreting. Any cut batter stabilisation would be undertaken in accordance with the RTA *Shotcrete Design Guideline* (RTA 2006d) and the *Pacific Highway Urban Design Framework* (RTA 2005c) and the *Beyond the Pavement RTA Urban Design Policy, Procedures and Design Principles* (RTA 2009b).

Retaining walls would be installed along the Proposal where required. Exact design and location of these walls would be determined during detailed design and landscape character considered in line with the *Pacific Highway Urban Design Framework* (RTA 2005c) and the *Beyond the Pavement RTA Urban Design Policy, Procedures and Design Principles* (RTA 2009b) and other guidelines.

Noise management

As discussed in **Chapter 16 Noise and vibration**, no noise walls or mounds are included as part of the Proposal. It is considered that the noise impacts associated with the Proposal would be best managed by using at-receiver architectural treatments. However, if a need for the provision of a noise wall or mound were identified during the detailed design phase, the design and landscaping of such facilities would be undertaken in accordance with the *Noise Wall Design Guidelines* (RTA 2006b), *Pacific Highway Urban Design Framework* (RTA 2005c) and the *Beyond the Pavement RTA Urban Design Policy, Procedures and Design Principles* (RTA 2009b)

Road reserve vegetation

The design elements for the Proposal include a well-vegetated, natural road reserve, which responds to the adjacent endemic species composition. Native seed collected from the local area would be used for landscaping where feasible. Where planting is necessary in woodland areas or for visual and headlight screening purposes, locally grown trees and shrubs would be used when available. Suitable seeding ratios and plant spacing would be used to help achieve an early result and a balanced range of species in the landscaped areas.

The proposed landscaping would also be integrated into the local vegetation character and communities by continuing bands and groups of existing vegetation. Linear plantings along roadsides would be avoided, along with dense plantings of mid to high-level vegetation in areas where there are open views. This would be important from a visual and flooding perspective in the floodplain areas, particularly in the areas adjoining the crossings of the Hastings and Wilson rivers where there are distant views.

Use of minimal maintenance native species

The landscaping of the road corridor clear of the carriageways would comprise an appropriate mix of canopy trees, shrubs, groundcovers and grasses to match the adjoining vegetation character. The median treatment would also reflect the surrounding vegetation character as much as possible, using small shrub or tree species, with due consideration for road safety and the maintenance of views. Where this type of vegetation in the median is considered to be inappropriate, open native grasses and groundcover would be used. The median and road corridor landscaping would also be designed to compliment the embankment and cutting treatments.

All revegetation of disturbed areas would be carried out in accordance with *RTA guideline R178 Vegetation.*

A typical treatment for an overbridge is shown in **Figure 17-7a**.

Cut batters and fill embankments

Cuttings in earth or highly weathered rock material would be flattened where appropriate to allow for the revegetation and landscaping of the cut faces and berms. A number of cuttings would include exposed rock, particularly in larger cuts where the landform is steep. Examples of this would be in the Cooperabung Hill and Maria River areas.

Where revegetation of the exposed rock cut faces is not possible targeted revegetation, including seeding / plantings would be undertaken where possible.

The embankments would be designed to reflect the local landform where possible, including the flatter embankment slopes in areas such as the Hastings and Wilson river floodplains. Where appropriate, the tops of embankments and the road verges would be rounded to help blend them in with the surrounding landform. Consideration would also be given to varying the slope and width of the batters to better reflect a natural landscape, especially at the transition zone between cuts and fills.

The landscape plan for the proposed embankments would consist of revegetation using species that match the vegetation characteristics of the adjoining areas where suitable and appropriate. The choice of suitable species would also be guided by the views that need to be retained or enhanced, as well as the safety requirements for vegetation within the clear zones adjoining the carriageway.

A typical treatment for a significant embankment is shown in **Figure 17-7a**.

In areas such as the floodplain embankments leading up to the crossings of the Hastings and Wilson rivers, the landscaping would be adjusted to not only match the landscape of the area, but to also maintain the key visual focal points in these areas for both road users and nearby residents. This could generally involve a grass and groundcover mix, with occasional shrubs or feature trees and understorey planting where it is safe and appropriate to include these landscape features.

Major river crossings

Protection and rehabilitation of the seagrass and mangrove habitats at both the Hastings and Wilson rivers, as discussed in **Chapter 15 Flora and fauna**, would be an important aspect of the landscaping strategy. The clearance between the riverbank and the abutment of these bridges could also allow for the consideration of suitable landscaping to encourage and support any fauna movement that may occur in the vicinity of these riverbanks.

The landscaping strategy for these riverbank areas would be developed to match the particular visual landscape requirement of these bridges. Landscaping plans for these areas would also have to consider bridge safety and flood waterway requirements for the Proposal at these locations.

Figure 17-7a Artists impressions

Typical overpass bridge at Sancrox Road

Tie into existing ground level

Typical 1:2/1:3 batter treatment

Plant with native species of adjacent vegetation community.

Tie ground levels and proposed vegetation back into surrounding vegetation.

Tree planting to be tubestock 5L/45L, shrubs and ground covers to be Hydroseed mix and overplanting with tubestock in selected areas

2m verge Hydro-seeding with 'Standard Verge Mix' (RTA).

Carriageway

Median treatment to be Hydroseeding with 'Standard Median Mix' and overplanting with (RTA) shrub tubestock.

Table drain to be planted with swale mix tubestock

Carriageway

2m verge Hydro-seeding with 'Standard Verge Mix' (RTA).

Typical 1:2/1:3 batter treatment

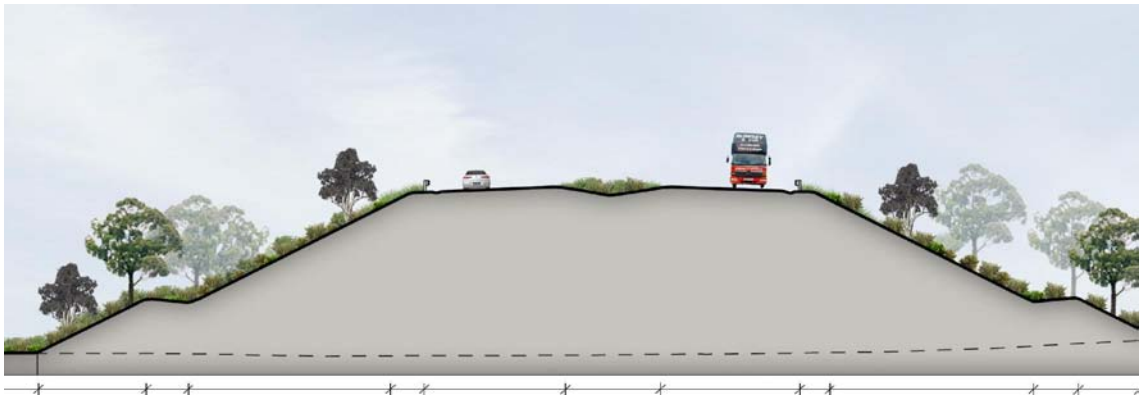
Plant with native species of adjacent vegetation community.

Tie ground levels and proposed vegetation back into surrounding vegetation.

Tree planting to be tubestock 5L/45L, shrubs and ground covers to be Hydroseed mix and overplanting with tubestock in selected areas

Tie into existing ground level

Significant embankment



Tie into existing ground level

Typical 1:2 batter treatment

Typical 1:2 batter treatment

Plant with adjacent vegetation community species.

Tree planting to be forestry tubestock/45L. Shrubs and groundcovers to be Hydroseed mix and overplanting with tubestock in selected areas

2m width 'Standard Verge Seedling Mix' (RTA).

Carriageway

Median treatment to be Hydroseeding with 'Standard Median Mix' (RTA) overplanted with shrubs - adjacent vegetation community species.

Table drain to be planted with swale mix tubestock

Carriageway

2m width 'Standard Verge Seedling Mix' (RTA).

Typical 1:2 batter treatment

Plant with adjacent vegetation community species.

Tree planting to be forestry tubestock/45L. Shrubs and groundcovers to be Hydroseed mix and overplanting with tubestock in selected areas

Typical 1:2 batter treatment

Not to scale. All design features are subject to refinement during detailed design.

Creek rehabilitation

Criteria for the protection and rehabilitation of watercourse crossings along the Proposal would be included in the proposed landscaping strategy. These criteria would include consideration of:

- Requirements for the protection and stabilisation of watercourses.
- Revegetation of disturbed areas to match or enhance the existing vegetation.
- Maintenance of flora and fauna habitat in the vicinity of watercourses.
- Design for fish friendly habitats.
- Continuity in the visual landscape and screening of the Proposal where necessary.

A typical treatment for a creek is shown in **Figure 17-7b**.

Water quality treatment (swales/basins)

The landscaping strategy for water quality control structures would include principles for their location and design to help minimise the disturbance of the existing landscape and vegetation features as much as possible. Those principles would include:

- Locate structures to minimise clearing of existing vegetation where possible.
- Their location and landscaping designed to minimise visibility.
- Design to reflect and compliment the topography and landscape.
- Use of vegetation to screen security fencing for structures.
- Use of cleared vegetation for siltation swales.

Well designed sedimentation basin using local natural rock

- Use of cleared vegetation as mulch to protect and regenerate disturbed areas.
- Early revegetation of cleared areas.
- Regular maintenance of temporary and permanent water quality structures.

A typical treatment for a swale is shown in **Figure 17-7b**.

Nature reserves and state forest areas

In areas adjoining nature reserves and state forests, particular attention would be paid to the species used for landscaping. This would be done to minimise the introduction of new or non-endemic species into areas of high habitat value. Weed control and early revegetation of disturbed sites along the Proposal would also be an important aspect of the landscaping strategy.

Monitoring and maintenance

The urban design and landscape strategy would include provision for the monitoring and maintenance of any landscape and rehabilitation works for a period following the commencement of operation of the Proposal. This period would be determined based on the delivery methodology adopted for the Proposal.

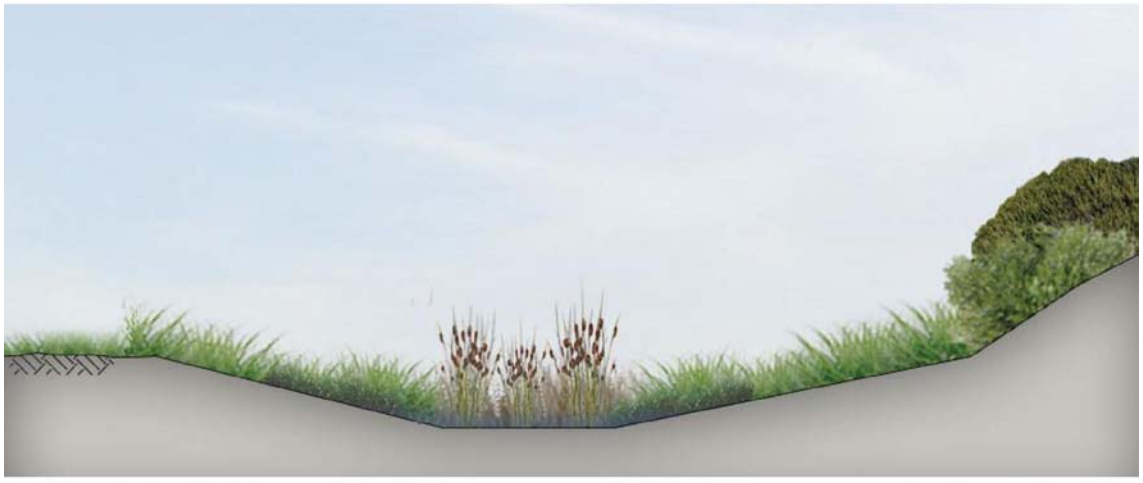
Figure 17-7b Artists impressions

Typical creek treatment adjacent to bridge crossing at Smiths Creek

BRIDGE SPAN – 40m

Tie into existing ground level	Batter finish directly beneath bridge to be 1:1.5 rock work As batter moves away from bridge finish should be (stone) terracing and planting at a maximum grade of 1:3 Larger stone (up to 1500 mmØ) to stabilise toe of batter and create terraces to prevent erosion and allow small pockets of planting Anchor geofabric under boulders to aid stabilisation Plant batters with native species – larger species towards top of batter (including trees). All planting to be tubestock	Creek bench to be rock lined directly below bridge Outside this, bench to be planted with low native sedges/rushes. All planting to be tubestock	Batter finish directly beneath bridge to be 1:1.5 rock work As batter moves away from bridge finish should be (stone) terracing and planting at a maximum grade of 1:3 Larger stone (up to 1500 mmØ) to stabilise toe of batter and create terraces to prevent erosion and allow small pockets of planting Anchor geofabric under boulders to aid stabilisation Plant batters with native species – larger species towards top of batter (including trees). All planting to be tubestock	Tie into existing ground level

Swale treatment



Tie into existing ground level	Banks: to be direct seeded with Swale Mix 1:2 - 1:5 embankment Stabilise embankment with jute mesh as required	Base: native grasses to be planted as tube stock Stabilise base and sides with jute mesh as required Typical depth: 1.0m Typical width: 2.5m	Banks: to be direct seeded with Swale Mix 1:2 - 1:5 embankment Stabilise embankment with jute mesh as required	Road embankment – tree/ shrub and groundcover planting

Not to scale. All design features are subject to refinement during detailed design.

17.4.3 Summary of outcomes

The RTA's vision for the overall design of the Pacific Highway Upgrade Program was originally established in the *Pacific Highway Urban Design Framework* (RTA 2005c). The vision of the Pacific Highway Upgrade Program is:

> *"A sweeping green highway providing panoramic views to the Great Dividing Range and the forests, farmlands and coastline of the Pacific Ocean; sensitively designed to fit into the landscape, and be unobtrusive; and characterised by simple and refined road infrastructure.'*

The Proposal has been developed in accordance with the Pacific Highway Upgrade Program vision and design objectives established in the *Pacific Highway Urban Design Framework* (RTA 2005c). These objectives, which are consistent with the development and landscape aims of the planning and strategy documents for the Mid North Coast discussed in **Section 17.1.2**, also aim to achieve a minimal maintenance and cost-effective outcome. **Table 17-4** summarises how the Proposal's development has responded to the six design objectives.

Table 17-4 Pacific Highway urban design objectives

Design objective	Proposal response
Objective 1: Provide a flowing road alignment that is responsive to and integrated with the landscape.	The Proposal has been developed with reference to a number of environmental, community and operational, including safety, objectives. Within these broader objectives the development of the Proposal has sought to minimise the impact of the upgraded highway on the landscape, and hence the visual impact to local residents. The design of the proposed landscaping and built structures has considered and responded to the natural landscape and other criteria to develop a concept design that is responsive to and integrated with the landscape. These design elements would be further developed during the detailed design phase.
Objective 2: Provide a well-vegetated, natural road reserve.	The design elements for the Proposal include a well-vegetated, natural road reserve, which responds to the adjacent endemic species composition. A landscape concept plan (**Figure 17-5a** to **Figure 17-5h**) has been prepared for the Proposal that seeks to maintain and reinforce the character and vegetation communities of the existing environment and enable the Proposal to blend more naturally with the overall landscape. The proposed landscaping would be integrated into the local vegetation character and communities by continuing bands and groups of existing vegetation. Linear plantings along roadsides would be avoided, along with dense plantings of mid to high-level vegetation in areas where there are open views. The landscaping of the road corridor clear of the carriageways would comprise an appropriate mix of canopy trees, shrubs, groundcovers and grasses to match the adjoining vegetation character. The median treatment would also reflect the surrounding vegetation character as much as possible with due consideration for road safety and the maintenance of views. All revegetation of disturbed areas would be carried out in accordance with *RTA guideline R178 Vegetation.* The landscape concept plan would be further developed during the detailed design phase.

Design objective	Proposal response
Objective 3: Provide an enjoyable and interesting highway with varied views and vistas of the landscape and pleasant, restful places to stop.	The landscape types through which the Proposal would pass may be broadly characterised as open agricultural, scattered forest, enclosed forest and a small area of industrial development. Key natural features include large areas of state forest and nature reserves, the Hastings and Wilson rivers, and their associated floodplains, and Cooperabung Hill. The existing Pacific Highway, North Coast Railway and industrial area centred upon Sancrox Road are the most notable built features within the landscape. The landscape concept plan for the Proposal (**Figure 17-5a** to **Figure 17-5h**) was developed with consideration of various environmental aspects in addition to the landscapes and views of visual sensitivity. For road users key viewpoints at the Hastings and Wilson rivers and Cooperabung Hill would be retained, interspersed with views of the open pastoral and heavily vegetated landscapes. The Proposal would also provide two new rest areas south of Mingaletta Road. Design of the rest areas and aesthetic features would be completed during detailed design and in consideration with relevant RTA guidelines.
Objective 4: Value the communities and towns along the road.	The Proposal passes through a predominantly rural environment with scattered rural residences and large areas of cleared / partially cleared pasture lands and heavily vegetated areas within state forests and nature reserves. The villages of Telegraph Point and Kundabung are located generally to the east of the existing highway. The route options assessment and preferred route selection phases have sought to minimise the impacts on the local community and as a result the Proposal would generally improve community connectivity with the villages by providing a bypass of Telegraph Point and provision of overbridges at key locations in the vicinity of Kundabung. As a result local residents would be provided with improved and safer access to the upgraded highway for access to other regional centres such as Port Macquarie and Kempsey, and safer access within the villages by separation of local and through traffic.
Objective 5: Provide consistency-with-variety in road elements. Objective 6: Provide a simplified and unobtrusive road design.	The Proposal would include a number of bridges, including major crossings of the Hastings and Wilson rivers, minor watercourse crossings and overbridges, cut batters, fill embankments and a variety of roadside furniture elements including signs, safety barriers, fencing and lighting. Bridges for the Proposal would be designed with reference to relevant RTA bridge design guidelines with the aim of being simple and elegant to complement the existing landscape. For the major crossings emphasis would be placed on creating a visually unobtrusive bridge when viewed from surrounding areas, while maximising the available views for road users. Bridge structures would be designed to be similar in form and appearance along the Proposal, and where practical, an occasional distinctive bridge could be included. Treatment of areas adjacent to bridges would be designed to blend the bridges and abutments with the surrounding landscape, with feature plantings used where appropriate. Roadside furniture would also be designed in accordance with relevant RTA guidelines and would be simple and as unobtrusive as possible. For example the emphasis would be on minimising the use of lighting, signage and safety barriers to that necessary for safety and information purposes. Cut batters and fill embankments would be integrated into the surrounding landscape as much as is practical. Where possible, cut batters would be stabilised with vegetation. On steeper slopes this could include rock bolting and/or shotcreting in accordance with relevant RTA guidelines, which provide guidance to avoid, minimise and improve the appearance of shotcrete. Embankments would be designed to reflect the local landform where possible, including rounding of the tops of embankments and road verges. Consideration would also be given to varying the slope and width of the batters to better reflect a natural landscape, especially at the transition zone between cuts and fills.

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