

# 19 Landscape, visual and urban design

**The Proposal incorporates a range of built and natural (landscape) features to integrate the Proposal within the context of the study area, while still providing visual connections to the surrounding environment. This chapter provides an overview of the existing environment along the Proposal's alignment as well as detailing the impacts that the Proposal would have on that environment.**

## 19.1 Existing visual environment

### 19.1.1 Landform

Within the study area, there are three broad landform classes (refer Figure 19.1):

- Coastal flats – low and gently undulating coastal strip, 1:60-1:20 gradients.
- Coastal footslopes – undulating spur and valley landform 1:20-1:10 slopes.
- Upper ranges and valleys – steep and rugged topography, 1:10 and steeper.

These landform types contribute to the visual and scenic character of the landscape and determine the visual catchments of the study area.

### 19.1.2 Vegetation

Vegetation characteristics contribute to the visual and scenic character of a landscape. Vegetation often forms the secondary or local viewshed (an area that can be seen from a fixed vantage point) and can provide a visual buffer from the road to adjacent areas.

There are four broad vegetation classes within the study area (refer Figure 19.2):

- Coastal wetland.
- Open woodland / cleared land (pasture).
- Cultivated land (crops).
- Forest.

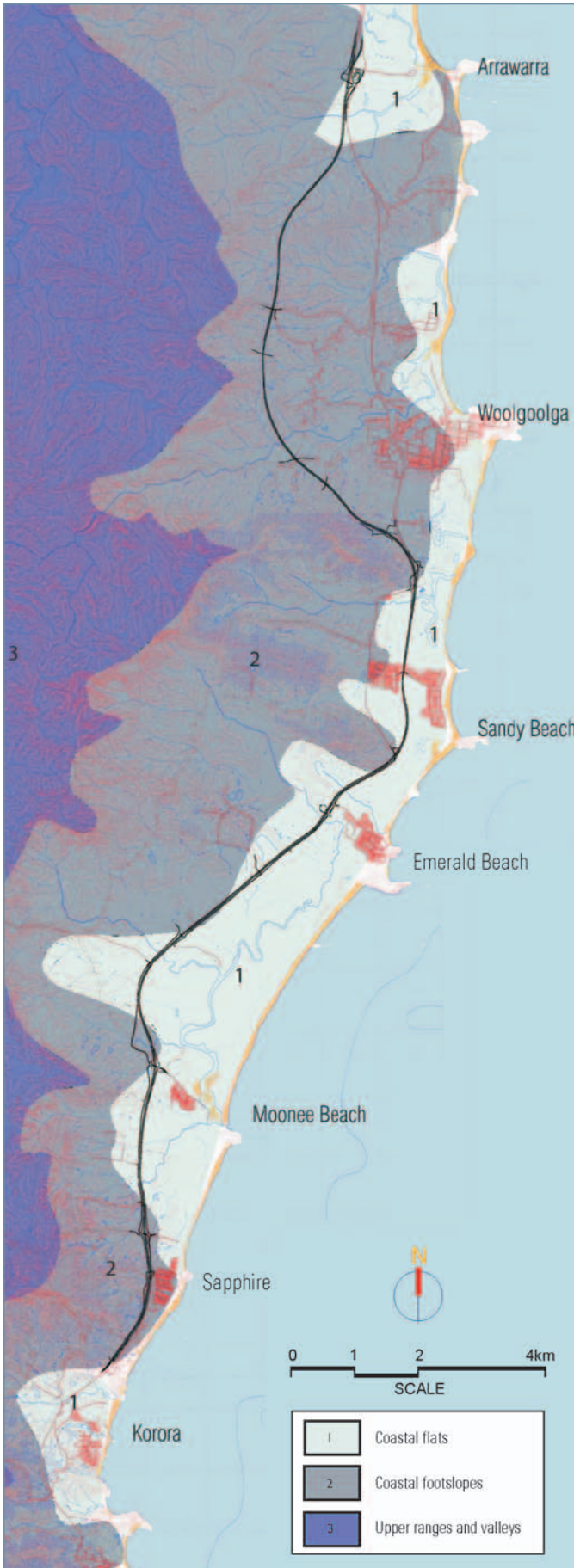


FIGURE 19.1 EXISTING LANDFORM

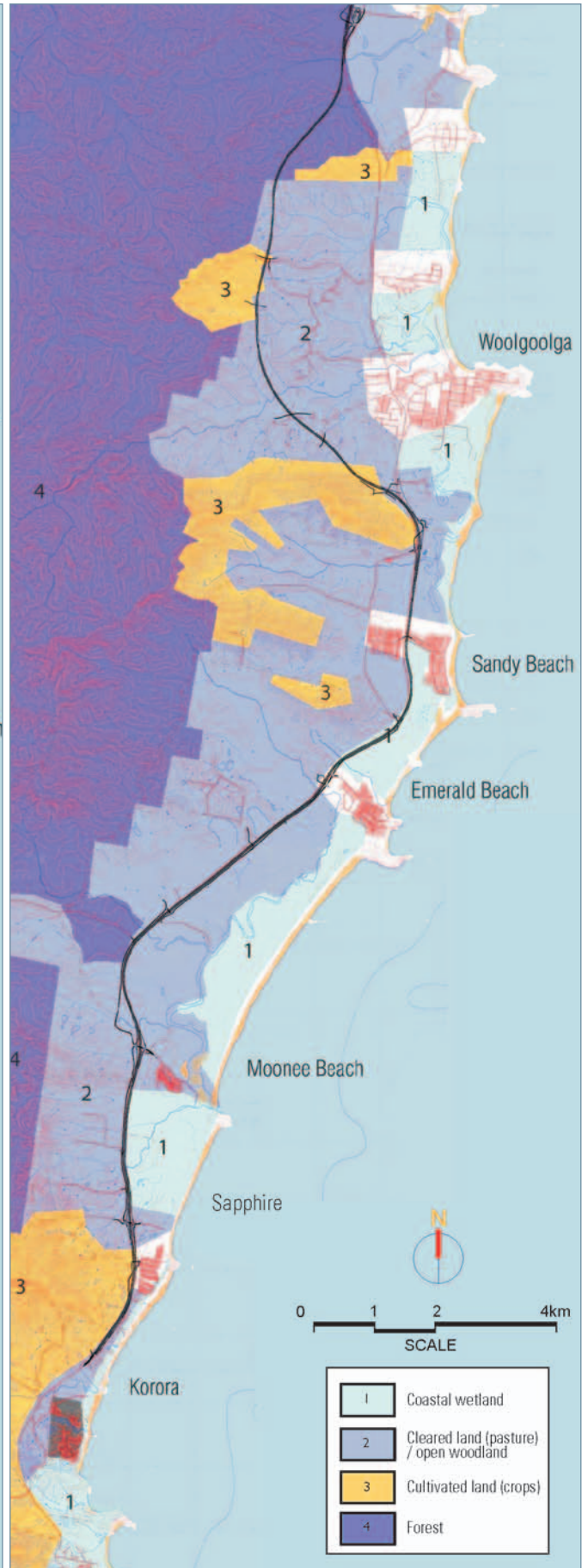


FIGURE 19.2 EXISTING VEGETATION

### 19.1.3 Land use

Land use characteristics contribute to the visual character of a landscape and are important in the analysis of the potential visual impacts of the Proposal. Land use types are often closely associated with landform types described in Section 19.1.1. For the purpose of identifying the existing visual environment, the following four broad categories of land use were identified within the study area (refer Figure 19.3):

- Natural (including forested lands).
- Urban area (including residential / industrial / commercial).
- Rural area (including farmland).
- Recreation and environmental / open space.

### 19.1.4 Scenic quality

Scenic quality is a measure of visual variety and interest from the road user's perspective. The amount and type of landscape character units available within any visual catchment determine scenic quality of an area.

Landscape character units are defined from a combination of landform type, vegetation type and land use. The value of a landscape unit is largely a function of how representative its scenic quality is in a regional context.

Six landscape character units have been identified in the study area (refer Figure 19.4):

- Upper ranges and valleys (forest).
- Foothills woodland / forest.
- Foothills rural / agricultural.
- Coastal wetland / woodland.
- Coastal rural (pasture / cleared) / rural residential.
- Urban area (residential / industrial / commercial).

### 19.1.5 Existing road user experience

#### Upgrade section

Starting at Sapphire near the Nautilus Resort, views of the Pacific Ocean are present to the east of the highway. This is one of the few opportunities to gain glimpses of the Pacific Ocean from the highway, and is a distinctive point in the journey. At four lanes wide, the existing highway corridor is open and expansive. The corridor (heading north) is initially characterised by resort style accommodation / facilities followed by the residential areas of Sapphire. There are many large rural residential lots and rural properties to the west of the existing highway.

Heading south from Sapphire the experience is dominated by views of the high forested range behind Coffs Harbour. At this point the existing highway is four lanes plus turning lanes, offering an open character.

The highway narrows to two lanes just north of Campbell Close, becoming more enclosed, set into embankments, with trees and low lying shrubs along the road edge. This vegetation is characterised by introduced species including Norfolk Island and Hoop Pines and other introduced pine species. The characteristics of this vegetation are unique to this section of the study area. The vegetation along the highway embankments generally provides an effective visual screen to residential areas, but in some places residential properties and streets are visible from the highway.

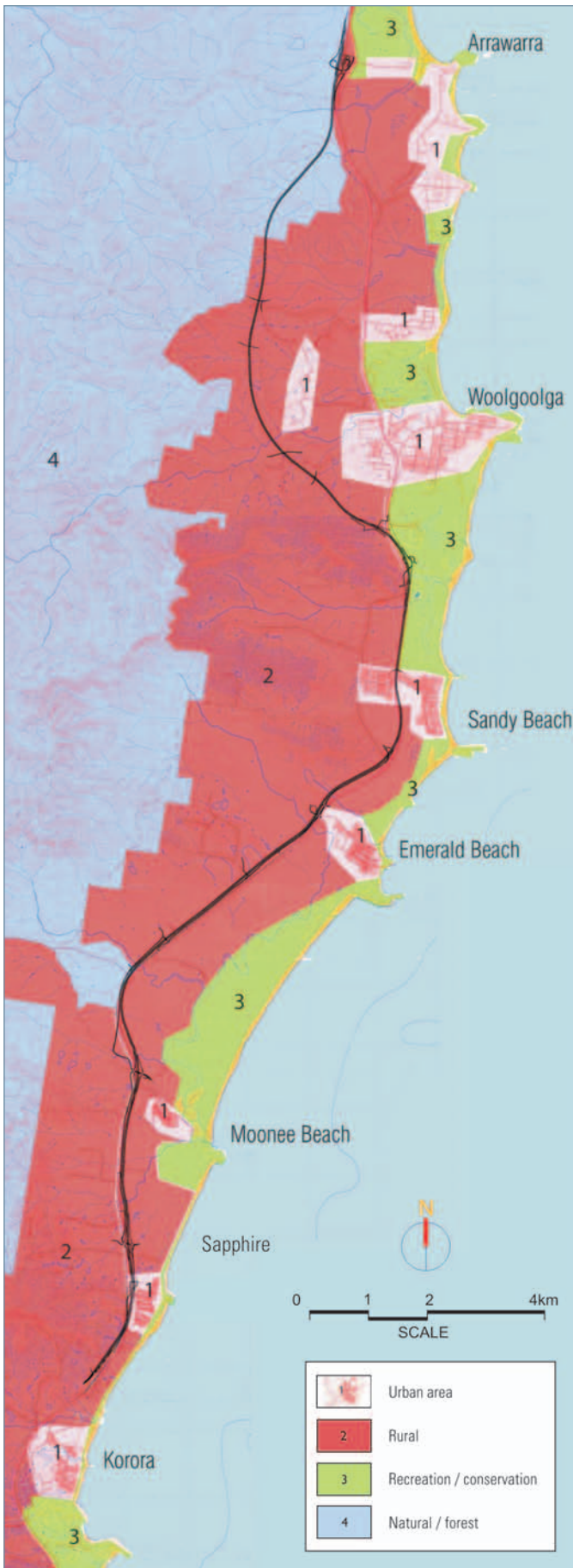


FIGURE 19.3 EXISTING LANDUSE

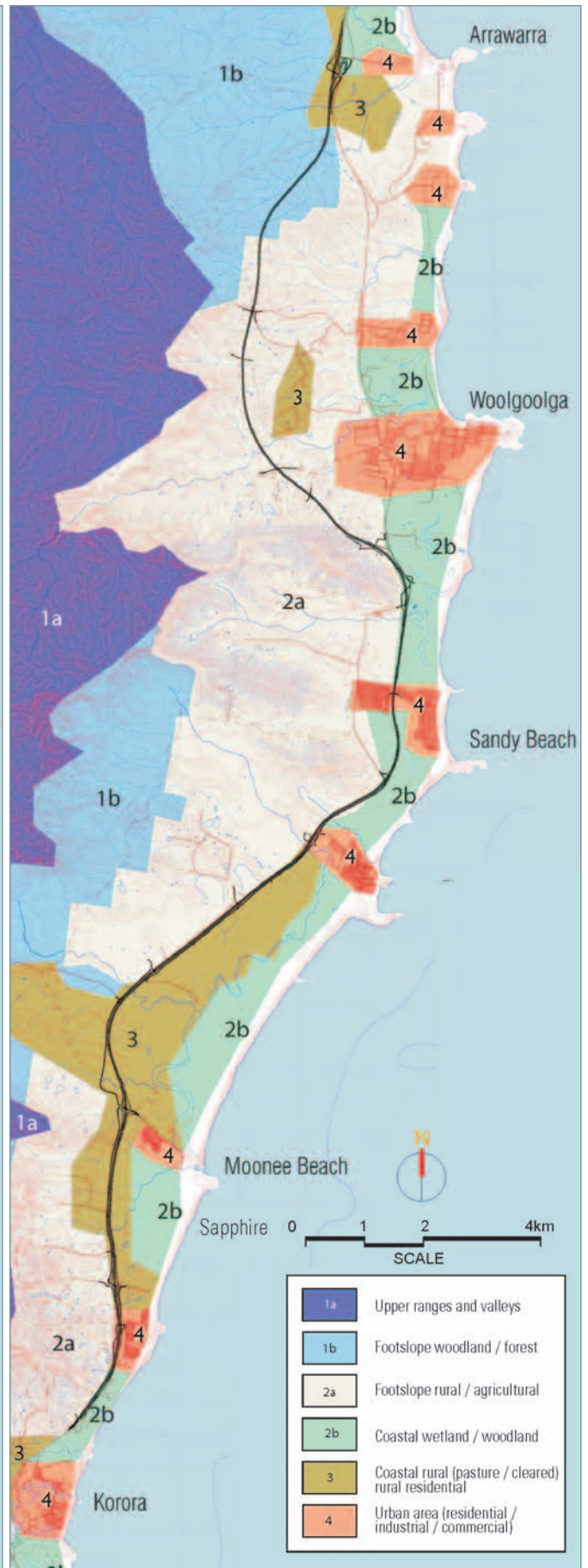


FIGURE 19.4 SCENIC QUALITY

At the junctions of the existing highway with Gaudrons Road and Split Solitary Road, the view south incorporates open views of foothills and forested ridges. Vegetation along the highway to Moonee comprises of tall, scattered woodland trees and open fields, providing variety in the experience of the journey along the highway.

Heading further north from Split Solitary Road, the existing highway becomes enclosed with coastal woodland on each side. At most times of the day the road is shaded by the tree canopy. Views remain constrained by this vegetation and some embankments. Occasional glimpses are afforded to rural and agricultural land through the trees.

The woodland vegetation opens up to the east of the highway intersection with Moonee Beach Road, which is undergoing change as it transforms into a commercial area. However, a general feeling of enclosure is provided by the roadside woodland canopy.

North of Moonee, the character of the road changes, with coastal wetland and pasture becoming the dominant landscape types north of Bucca Road. The vegetation is characterised by Casuarina and Melaleuca species scattered across low, level to gently undulating coastal floodplains and watercourses. Scattered patches of coastal woodland also occur along this section.

The development of Heritage Park as a rural residential area between Killara Avenue and Smiths Road has created a rural suburb character, consisting of large dwellings and large lots in a coastal woodland setting.

On the approach to Emerald Beach from the south, cuttings form on each side of the highway as it passes over the hill towards the Fiddaman Road intersection. Vegetation is scattered along the road side and relatively sparse, leading to a large thick clump of woodland on the western side of the intersection of the highway. Travelling north from Fiddaman Road, there are a number of homes in Emerald Heights that are elevated and could view the highway, with views extending across to Emerald Beach.

Heading north from Sandy Beach to Graham Drive North, the landscape character along the highway changes from a combination of woodland and clearing to low lying coastal forest

### **Bypass section**

At the commencement of the bypass section at south Woolgoolga (near Hearn's Lake Road), the Proposal would traverse scenic footslope woodland and agricultural landscapes to the south and west of Woolgoolga. Rural land use includes banana plantations and blueberry farms, which provide a distinct contrast to the steep slopes and other pockets of footslope woodland.

The bypass would move further into agricultural land consisting mainly of banana plantations, with the landform changing from rolling footslopes to steeper mid-slopes. There is a variety of landscape types along the footslopes from rural to agricultural and remnant woodland. Many vantage points open up throughout this area, particularly on the tops of ridges, providing expansive views across Woolgoolga.

Heading north past Bark Hut Road, the Proposal would move away from the footslopes behind Woolgoolga providing relief from the undulations in the landscape and traversing flatter land. The coastal woodland environment and relatively enclosed road corridor through the state forest lands would provide a more consistent landscape character along this section. North of the state forest, the existing environment in the vicinity of the Arrawarra interchange is characterised by coastal woodland which provides an enclosed character to the existing highway.

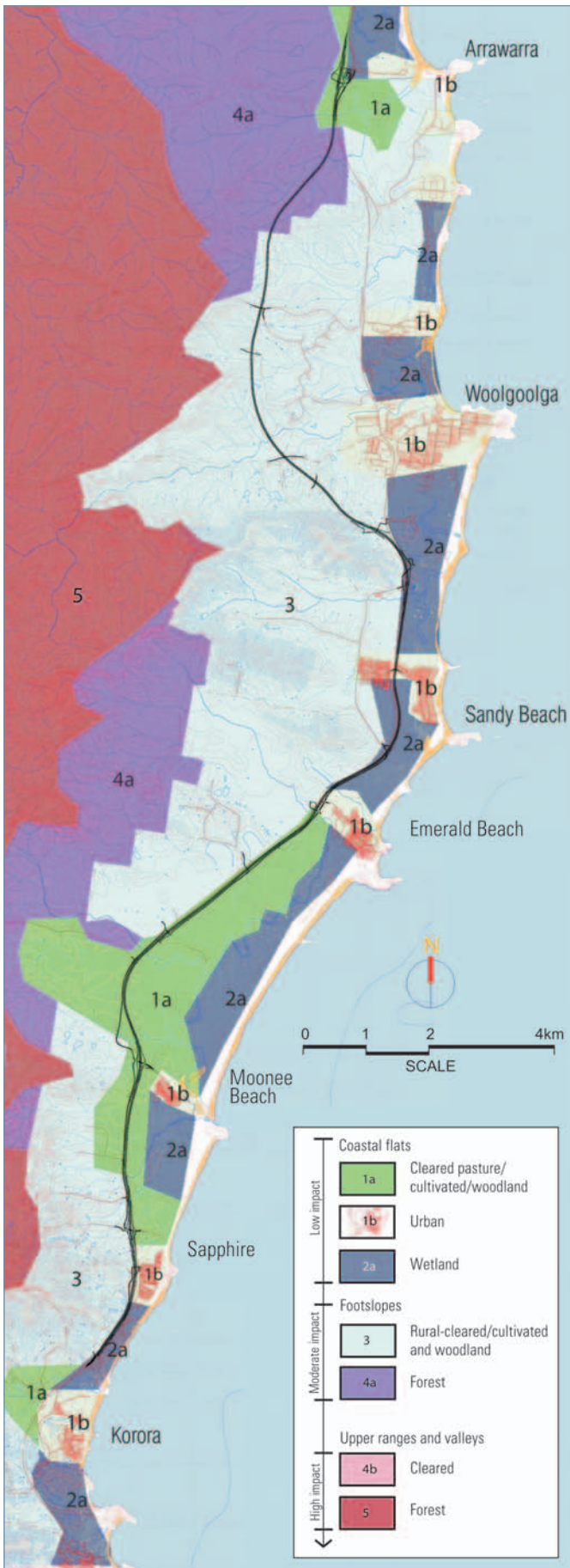


FIGURE 19.5 SCENIC IMPACT

## 19.2 Urban design and landscape objectives and principles

### 19.2.1 Landscape and urban design objectives and principles

The *Pacific Highway Urban Design Framework* (NSW Roads and Traffic Authority (RTA) 2005) sets an urban design and landscape vision for the Pacific Highway as follows:

*The upgrade should be 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.*

This is broken down into the following key objectives:

- Provide a flowing road alignment that is responsive to and integrated with the landscape.
- Provide a well vegetated, natural road reserve.
- Provide an enjoyable, interesting highway.
- Value the communities and towns along the road.
- Provide consistency-with-variety in road elements.
- Provide a simplified and unobtrusive road design.

In addition to consideration of the overall Pacific Highway urban design objectives, the following objectives were developed specifically for the Proposal:

- Design the upgraded highway to integrate with immediate context.
- Design for safe, yet convenient, connections to local roads and access to adjacent properties.
- Ensure and enhance visual connections to ward significant landscape features.
- Integrate the new highway landforms and landscape with adjoining lands where appropriate.
- Provide a positive contribution to the landscape.
- Ensure a safe driving environment.
- Create a quality driving experience that reflects the significance of this motoring route.
- Provide cost effective solutions.

The following descriptors have been used to describe the existing visual environment within the study area:

- Landform – the landform types within the study area (coastal flats, coastal footslopes and upper ranges and valleys) contribute to the visual and scenic character of the landscape and determine the visual catchments of the study area.
- Scenic quality – is a measure of visual variety and interest. The amount and type of landscape character units available within any visual catchment determine scenic quality.
- Landscape character units- are defined from a combination of landform type, vegetation type and land use.

These qualities determine the landscape and urban design approach taken for the Proposal, and in the landscape plan and urban design features proposed as part of the Proposal. Landscape principles are identified on both a macro and detailed scale, with principles also being outlined generally for built form and more specifically for bridge design:

#### Macro scale

- The existing highway already provides a good driving experience, passing through a diverse cross section of scenic bushland, coastal forest and rural areas, including the steeper footslopes and undulating landscape incorporating a range of vegetation communities. In this context, the

landscape design for the Proposal needs to be strongly built on the existing key visual attributes of the area. The aim is to ensure the integrity of the landscape journey along the existing highway is maintained.

- Strengthen and enhance the existing landscape patterns experienced along the route.
- Variations in plant species would be used to complement various vegetation communities and habitat requirements.
- Where possible, minimise the extent of clearing and earthworks of the Proposal to conserve existing vegetation communities and fauna habitat.
- Integrate measures to conserve natural drainage crossings and provide fauna movement corridors where required.
- Use a consistent approach to engineering and architectural components to provide a unified design solution (eg. medians, bridges, rails, etc.) to enhance visual unity and clarity.

#### **Detailed scale**

- Use appropriate vegetation treatments to reinforce key landscape patterns, vegetation communities and habitat types.
- Generally base plant species selection on those growing locally within the identified vegetation communities, consistent with safety (eg. headlights, frangibility) and functional (eg. erosion control, species availability) requirements.
- Utilise native species and foraging food habitat species at proposed fauna movement corridors (eg. underpasses). Detailed information on location and design of fauna crossings is presented in Chapter 7 of this report.

#### **Principles for built form**

Principles for urban design elements of the Proposal include:

- Improve provision for pedestrians, cyclists, public transport and local vehicle access with an integrated design.
- Improve the visual quality of the corridor.
- Reinforce the high visual quality of this section of the Pacific Highway derived from its built and natural elements in line with the RTA's *Pacific Highway Urban Design Guidelines*.
- Use of robust and long lasting materials that minimise maintenance.
- Enhance road safety by providing safe and legible urban elements.

#### **Principles for bridge design**

The key principles established for the architectural design of the bridges are:

- Unobtrusive appearance – the bridges will be designed to be as visually unobtrusive as possible allowing the landscape and environmental attributes of the area to be fully appreciated. Bridges will have smooth, clean lines with neat connections between bridge elements (eg. bridge barriers with road and safety barriers).
- Coordinated design of bridges – the design, form, materials and finishes of the bridges will be coordinated to ensure visual consistency between structures along the highway.
- Transparency – the bridge superstructure should have as little visual obtrusiveness as possible to optimise views through the bridge to the landscape beyond. This will include minimising the depth of structure and careful design detailing of the bridge abutments.

## 19.3 Impacts on the existing built, natural and community context

The Proposal would have varying visual impacts on the existing environment, depending on the landscape character of the area. As the bypass section of the Proposal is traversing through rural/



agricultural land that is away from the existing highway, the visual impacts would be greater than through the upgrade section, which only sees the amplification of the existing highway mostly within the existing road reserve. Other factors that will determine whether the Proposal will be visually intrusive to the observer include vegetation cover and slope.

The potential level of visual impacts of the Proposal is shown in Figure 19.5, where the Proposal may cause major visual contrast with the visual landscape, the visual impact is high, where a Proposal may cause minor visual contrast, the visual impact is low.

### 19.3.1 Upgrade section

As the upgrade section would involve duplication of the existing highway, the visual impacts would be relatively minor because of the strong presence of the existing highway formation and associated roadside furniture. More specific impacts for each area along the route are described below. The strategy design elements to manage these impacts are described in Section 19.4, while the urban design and landscape strategy is outlined in Section 7.5.10.

#### Sapphire

Two retaining walls would be required, one near Campbell Close (at a height of approximately eight metres) and one near Hunter Close (at a height of approximately 10 metres) adjacent to the northbound carriageway. These walls would be visible from the eastern side of the highway.

A three tier cutting west of the highway at approximate chainage 7.900 km (at a depth of approximately 27 metres) would be prominent in the road corridor and would be visible from residential areas in Sapphire until revegetation of batters is established.

It should be noted that the depth and heights of cuttings / fills are only indicative and are subject to change during further refinement of the design during the detailed design phase of the project.

At Headlands Road, the highway cuttings and an overbridge would be prominent in the road corridor and from some residential areas in Sapphire until revegetation of batters is established. Sight screens and noise walls along this section of the highway would be visible immediately after construction until screen vegetation is established (refer Figure 7.5a).

#### Sapphire interchange

The interchange at Gaudrons Road / Split Solitary Road is a large formation with an overpass, access ramps and associated embankments. However, the elevated interchange roundabouts and bridge would be prominent along this section of the highway as viewed from both the road user and neighbouring buildings until vegetation is established. There would only be a minor view impact of the Proposal from residences near Split Solitary Road and Gaudrons Road until proposed landscaping is established (refer Figure 7.5b). However, the Proposal at this location has been placed in cut, below the level of the existing highway to minimise the visual impacts.

#### Sapphire to Moonee

With vegetation quite close to the carriageway along the corridor between the Sapphire interchange and Moonee Beach Road, the proposed widening to the west would result in apparent visual impacts. While the relatively flat, woodland landscape and additional vegetation planted, has some capacity to absorb these impacts, the increased width of the highway would contrast the current sense of enclosure experienced along this section of highway.

#### Moonee interchange

The Moonee interchange is a large formation consisting of an overpass, access ramps and associated embankments. Because it is located in a relatively flat area, it would be prominent along this section of the highway as viewed from both the road user and the nearest properties

such as Moonee Beach Road and the retail / commercial precinct. Existing vegetation would be retained where possible, (subject to road safety requirements) between the carriageways and ramps and between the highway and local access road. Until proposed new vegetation areas becomes established to reduce the visual impact of the interchange, the interchange will remain a locally prominent feature along this section of the highway (refer Figure 7.5c).

### **Moonee to Emerald**

The mainly low lying landscape along this section of the highway would generally absorb the proposed works, as cut and fill batters are minimal. Views across the mostly flat landscape and gentle hills would be retained for the benefit of the existing road user.

The local access road at Killara Avenue would link into the local access road on the eastern side of the highway near Tiki Road with an overpass (refer Figure 7.5d). The overpass would be highly visible along this flat section of the highway and would be visible from some residential areas within Heritage Park. Further north, the overbridge at Smiths Road would be visible but less obtrusive in that it spans a low highway cutting. It would also be visible from residential areas in Heritage Park and Avocado Heights but the visual impact associated with these overbridges would be mitigated in time as proposed landscaping becomes established.

### **Emerald Beach**

Visual impacts at Emerald Beach include the northbound exit loop, highway overbridge and roundabouts required to connect the bridge and Fiddaman Road (refer Figure 7.5f). While some existing vegetation would be retained, these structures would be prominent in this section and would be visible from some elevated residential areas in Emerald Heights as well as from some residences in Emerald Beach.

### **Emerald to south Woolgoolga (including Sandy Beach)**

Heading north to Graham Drive South the terrain remains relatively flat and to an extent the landscape can absorb the increased road infrastructure of the combined highway and local access road. At Graham Drive South the local access road crosses the highway on a curved overbridge. This requires cuttings on the western side of the highway which in combination would be highly visible until proposed planting becomes established and softens the visual impacts (refer Figure 7.5g).

At Sandy Beach, the existing highway cutting would be widened on the western side to accommodate the Proposal. Noise walls are proposed on each side of the highway north and south of these cuttings. These walls and cuttings would be highly visible until screen planting can be established to mitigate the impact. The existing overbridge connecting Sandy Beach would be rebuilt; however this is not expected to create a substantial additional visual impact over the existing situation. North of Sandy Beach, the flat coastal landscape has the ability to generally absorb the impacts of the widened corridor.

## **19.3.2 South Woolgoolga to Arrawarra**

As the bypass section traverses predominantly rural / agricultural landscape where no highway or major road formation currently exists, the visual impacts for this section would be greater than the upgrade section. The bypass section would pass through numerous local spurs and ridges resulting in large cut and fill earthworks. The visual impacts for each area along this section of the route are described below. The strategy design elements to manage of these impacts are described in Section 19.4, while the urban design and landscape strategy is outlined in Section 7.5.10 of this report.

The bypass section of the Proposal has been designed to tuck the alignment behind the lower foothills to the west of Woolgoolga to minimise the highway's visibility further afield (see Figure

7.4f). For example, there would only be fleeting glimpses of the Proposal from the Woolgoolga lighthouse, due to the nature of the design, topography and the natural vegetation along the proposed alignment.

### **South Woolgoolga / Hearn's Lake**

The south Woolgoolga interchange includes access ramps, roundabouts, local access road connections and a highway overbridge to south Woolgoolga. These features would be prominent compared to the existing highway formation and there would also be substantial existing woodland vegetation removed in the area. Existing vegetation would be retained where possible between the local access road, ramps and the highway and the visual impact would be softened over time as proposed landscape planning in the interchange area becomes established. The overbridge and other parts of the interchange would be very visible along the highway and from adjacent residential / tourist areas until the screen planting is established (refer Figure 7.5h).

### **West Woolgoolga**

As the bypass leaves the existing highway corridor its alignment heads north west into the footslopes and hills of south and west Woolgoolga. With the hilly and undulating character of this landscape, the major visual impacts of the Proposal relate to the extensive cut and fill batters. Between Unwins Road and Greys Road (refer Figure 7.5i), the most prominent elements include a two tier cut batter at chainage 23.400 km (at a depth of approximately 13 metres), a two tier fill batter at chainage 23.500 km (at a height of approximately 12 metres), and a three tier cut batter at chainage 23.700 km (approximately 30 metres deep). These major cuttings and fill batters would be highly visible to some adjacent and nearby rural properties and from more distant elevated viewing positions around Woolgoolga.

Along this part of the route, overbridges are proposed at Greys Road and Woolgoolga Creek Road and they also require large cut and fill batters (to a depth of approximately 18 metres at Greys Road and an eight metre high fill at Woolgoolga Creek Road) to achieve the necessary clearance over the highway. The Greys Road bridge would be visible from some adjacent and nearby properties and from more distant elevated viewing positions, while the clearing of vegetation and earthworks for the Woolgoolga Creek bridge would be more locally visible. These visual impacts would be mitigated over time as proposed vegetation planting becomes established.

North of Woolgoolga Creek, the main visual impacts are again associated with the exposed batters of deep cuttings (two cuttings in this vicinity are approximately 12 metres deep) that occur between Woolgoolga Creek Road and Newmans Road, between approximate chainage 25.500 km and 26.600 km. Until revegetation becomes established, these cuttings would have prominent local impacts.

Towards Bark Hut Road, a two tier cut batter (at a depth of approximately 15 metres) and a two tier fill batter (at a height of approximately 16 metres) would be required between chainage 27.000 km and 27.500 km and would be visible from Palmers Road and from the proposed Bark Hut Road overbridge. The overbridge would also be a locally prominent built feature spanning a deep cutting. North of Bark Hut Road the bypass may be visible from one or two elevated properties to the west (refer Figure 7.5k). Further north the road enters the state forest lands and becomes enclosed in woodland landscape. While there would be substantial visual changes with the required vegetation clearing and cut and fill embankments, this landscape has better capacity to absorb the bypass formation and its visual impact would be less substantial. The effects would be managed by minimising removal of vegetation and additional roadside planting.

It should be noted that the depth and heights of cuttings / fills are only indicative and are subject to change during further refinement of the design during the detailed design phase of the project.

## Arrawarra

The proposed Arrawarra interchange is focussed on a low ridge and a widened cutting and clearing of woodland vegetation would be required to accommodate the combination of access ramps, roundabouts and highway overbridge. Existing vegetation would be retained where possible between the local access road, ramps and highway, however the scale of the interchange would mean it is visually prominent at this northern part of the route (refer Figure 7.5m).

A large rest area is proposed immediately to the east of the interchange. The rest area is located within an isolated pocket of state forest and while existing vegetation would be retained where possible on the site, there would be some clearing of the native vegetation. Being situated on flat land, the rest area would mean it is visible from the proposed southbound carriageway, but it should remain screened from the view of northbound carriageways due to the southbound off load and on load ramps. Over time, the proposed screen and amenity planting would help mitigate the scale and visual impact of the rest area, particularly from nearby local roads. Vegetated noise mounding would be provided along the sides of the rest area that would also assist in mitigating visual impacts from the surrounding areas.

## 19.4 Urban design and landscape elements

The strategy that has been proposed would effectively integrate the Proposal into the surrounding landscape so as to achieve the principles outlined in Section 19.2 and positively address the identified visual impacts. The Proposal has integrated urban design and engineering objectives to produce sensitive design outcomes (refer Chapter 7 of this report). The general element treatments which is utilised in the urban design and landscape strategy are outlined below.

The urban design and landscape strategy has also been developed in tandem with other environmental mitigation measures (eg. flora / fauna, noise control and safety measures) presented in other chapters. The management and design measures would comply with the RTA *Pacific Highway Urban Design Framework*.

### 19.4.1 Built form elements

Emphasis has been placed on simple, low key unadorned elements which are described below.

#### Bridges

The Proposal includes 17 transverse bridge or bridge sized structures and 13 longitudinal structures over creeks. The following urban design elements would be applied to each of these structures:

- The bridge decking would be consistent and when possible, clear of any apparent miscellaneous services, pipes, ducts or protrusions. Where stormwater drainage is required, drainage pipes would be located unobtrusively.
- Bridge super structures and substructures would be finished in a "class 2" concrete grey colour to minimise their obtrusiveness on the landscape.
- Traffic barrier rails would be a standard RTA metal twin rail and post traffic barrier mounted on a concrete upstand.
- Safety 'throw' screens on overpass bridges in accordance with RTA standards.
- Bridge abutments would generally be spill through in style and would be protected in the 'rain shadow' section under the bridge deck. Adjoining abutment areas would be revegetated with native tree, shrub and groundcover species. Abutments are generally shown with a grade of 2:1 vertical to horizontal but would be refined locally to suit the location of each bridge.

- Pedestrian railings on bridges where pedestrian and cycle access across the highway is provided. Pedestrians would be separated from traffic on the bridge via standard RTA barriers.

### *General approach to noise walls and headlight screens*

Noise walls would be provided at locations identified in Table 7.6. Two wall types, urban walls and rural walls are proposed.

The urban wall would consist of panels and designed in a strong linear form, with consideration to its scale, proportion and form relative to the adjacent roadscape and urban areas. They would be plain and simple structures. Where noise walls are highly visible from the road or adjacent areas, wall pattern or texture would be considered to help create interest and reduce the scale of these elements.

The rural walls would consist of panels with all visible surfaces of panels and posts painted in a dark coloured finish such as 'charcoal grey'. Screen planting would be utilised to blend the barrier with the adjacent landscape and soften its visual impact.

### *Headlight screens*

Headlight screens, which are discussed in Section 7.5.5, would be provided along sections of the route where headlight glare needs to be screened between the highway and adjacent local access roads. Where a constructed physical barrier is not required, fast growing frangible shrubs may perform a similar function. Headlight screens would conform with RTA requirements relating to the durability of the elements and depending on their location along the alignment, would be of a consistent form and type to either the urban noise wall or rural noise wall. Where practical, low screen planting would be utilised to blend the barrier with the roadscape and surrounding landscape character.

### *Retaining walls*

Facing panels would cover some retaining structures and would be plain and simple. However where retaining walls are highly visible, consideration would be given to pattern or texturing of the structure to help create interest and reduce the scale of these elements, however, this is secondary to the overall form, proportion and colour of the wall.

### *Road furniture*

As noted in Section 7.5.5, various types of road furniture would be required along the Proposal including signs, vehicular barriers, fencing and lighting. They would be designed to be apparent to the motorist but not obvious "features" in the landscape. The following would apply in the detailed design of the road furniture:

- Signs would be limited to those required for information and driving requirements only. Where functional requirements permit, the signs would be located in the least visually sensitive sites (ie. below skyline / against a treed background, etc.). RTA standard poles without embellishment would be used throughout.
- Vehicle barriers would comprise standard RTA wire rope, guardfence, concrete barrier and bridge safety rails. These would be made from aluminium and / or galvanised steel and concrete as appropriate to each element in its location.
- Safety barriers on bridges would have the lowest permitted parapets topped by bridge safety rails to maximise potential views.
- Fencing would mainly comprise standard post, wire and dropper stock proof fencing along the road reserve. Where fauna movements are to be controlled, floppy top fauna fencing would be provided. Where fauna fencing is close to the carriageway, it would be painted black to reduce visual impact in accordance with RTA guidelines.
- Lighting would be located at major access and interchange areas.

## 19.4.2 Landscape Elements

The design of all elements of the proposal to ensure they deliver a visually coordinated landscape that is in sympathy with the existing environment is a key objective in the landscape design of the Proposal:

- Grading – the way the constructed landform meets the natural landform will be important in minimising the visual impact of the road. The tops and toes of soil batters will be rounded out to blend with the adjacent landform. The tops and toes of embankments in rock cuttings will be over excavated and backfilled with soil to facilitate screen planting and revegetation close to the edge where possible. Batters will be designed to ensure vegetation can be established to allow its regeneration and mitigate the impacts of cut and fill.
- Marker Planting – in keeping with context based philosophy used in the landscape and urban design, the design of the southern area at Sapphire will draw upon the special elements of the locations within which marker planting will be sited. The design will have an emphasis on the use of local plant material and or cultural plant material such as Norfolk Island Pines, which already provide distinctive marker planting in this location.

It is considered that a proliferation of markers and architectural features along the Pacific Highway would detract from the overall driving experience as well as detract from the landscape setting, so this will be avoided.

- Planting design will be based on the existing spatial sequence and characteristics along the route. Enclosure will be reinforced when passing through woodland/forest areas while long distance views will be retained where available across adjoining open pasturelands or agricultural lands. Plant species and mixes conform to the existing landscape zones through which the upgrade passes and reinforces local vegetation patterns and bushland characteristics. Planting will be designed to maintain and enhance existing landscape character along the route. Planting throughout the upgrade will occur as either:
  - Massed plantings in prepared and mulched planting areas.
  - Individual plantings in hydromulched areas.
  - Individual plantings in existing undisturbed areas.

All plant material will be installed as tubestock size plants. All planting will be installed in accordance with RTA *QA Specification DCM R179 – Landscape Planting*.

- Seeding – the concept design drawings identify all areas to be hydromulched and also include a schedule of the seed mixes to be used where direct seeding via hydromulch is proposed. Native tree, shrub and groundcover mixes will include non-invasive grass cover crop mixes in accordance with RTA *QA Specification DCM R178 – Vegetation*.
- Water quality control structures indicated in the final design plans are as documented in the engineering design. Water quality control structures will be shaped to be informal and natural in appearance.
- Fauna underpasses – features of the designs of fauna underpasses may include the following elements, depending on the size and location of the underpasses.
  - Rocks / logs / tree branches may be placed strategically to provide cover for small animals, while ensuring a clear view through the culvert is maintained.
  - Fauna refuge poles may be provided around selected underpasses.
  - Fauna proof fences will be located between the toe of the batter and the road reserve boundary to a minimum distance of 200 metres from the entries to the underpasses.
  - Native grasses, trees and shrubs will be planted and the area will be mulched with hardwood mulch.
  - Tree planting will favour the species likely to use the underpass.

For longitudinal bridges, the tree and shrub vegetation will be continued to the edge of the bridge to afford protection to the animals that may use the riparian habitats. The ground layer will be covered with a variety of materials (consistent with the local habitat) to provide cover for animals going under the bridges. This could include rocks, logs, and mulches as appropriate to the location.

### **19.4.3 Draft Statement of Commitments**

In the draft Statement of Commitments at Appendix A, the RTA has committed to the following urban design and landscape measures:

- (i) Urban design treatments will reflect the urban design and landscape objectives and principles identified in Chapter 19 of the environmental assessment.
- (ii) The schedule of species to be used in the landscaping treatments will include native and locally indigenous plants selected in consultation with a qualified landscape officer.
- (iii) Disturbed areas will be progressively revegetated with consideration to related controls such as erosion and sedimentation controls and drainage and future road user safety requirements.
- (iv) Landscape and rehabilitation works will be subject to monitoring and any remedial measures where required for a minimum of two years.