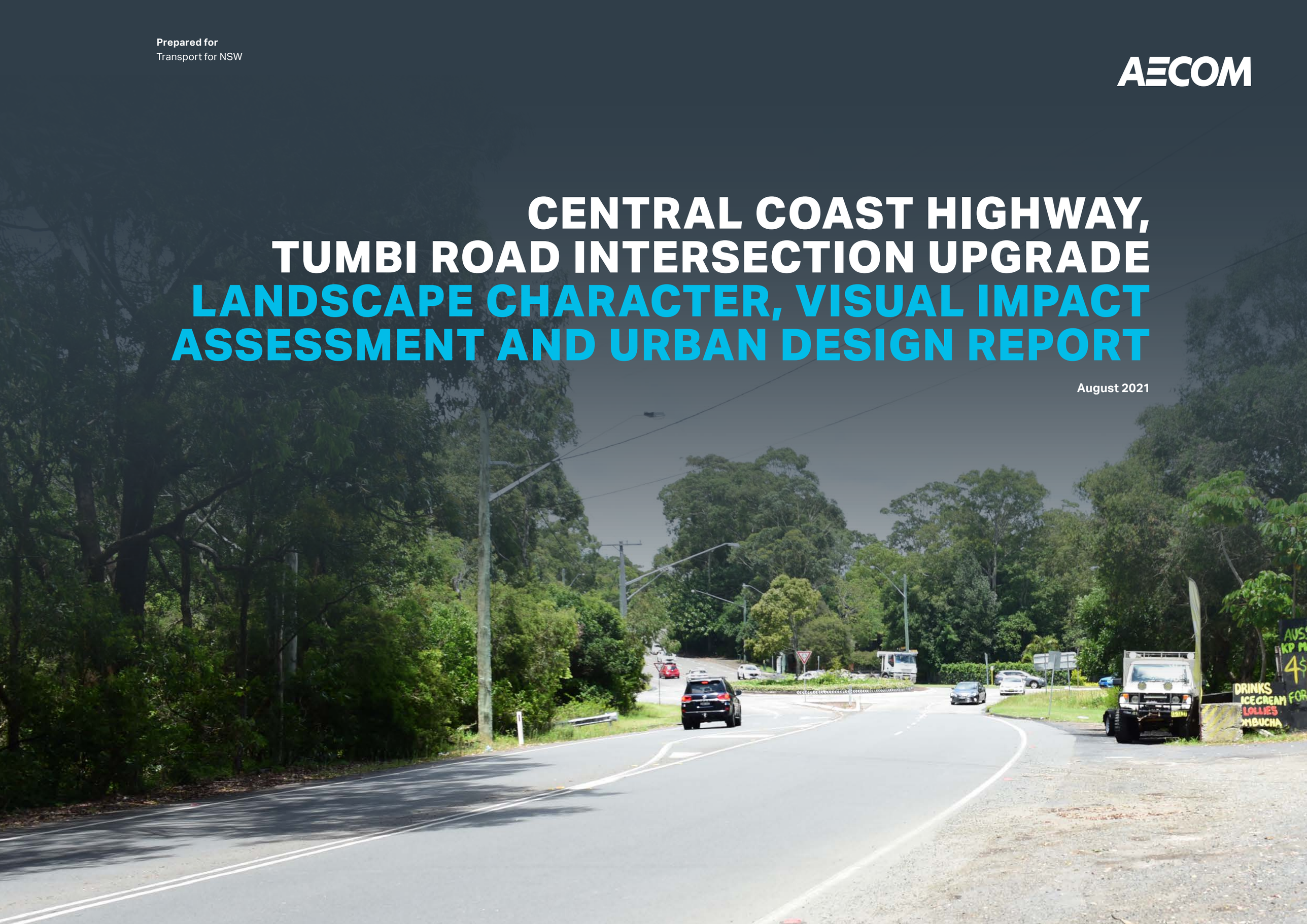
**Prepared for**
Transport for NSW

AECOM

# CENTRAL COAST HIGHWAY, TUMBI ROAD INTERSECTION UPGRADE
# LANDSCAPE CHARACTER, VISUAL IMPACT ASSESSMENT AND URBAN DESIGN REPORT

August 2021



## Quality information

| Document name | Ref | Prepared for | Prepared by | Date | Reviewed by |
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| Landscape Character, Visual Impact Assessment and Urban Design Report | 60641070_LCVIA & Urban Design Report | Transport for NSW | Gabi Parke and Giulia Vignaroli | 05/08/21 | Stephen Callaghan |

## Revision history

| Issue | Issue date | Details | Name | Position |
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| A | 10/03/21 | 50% Issue - DRAFT LCVIA and UD report for Review | Frank Ciancio | Associate Director - Urbanism + Planning |
| B | 23/03/21 | 50% Issue - amendments to methodology responding to TfNSW comments | Frank Ciancio | Associate Director - Urbanism + Planning |
| C | 29/04/21 | 50% Issue - amendments to report responding to REF team comments | Frank Ciancio | Associate Director - Urbanism + Planning |
| D | 03/06/21 | 80% Issue | Frank Ciancio | Associate Director - Urbanism + Planning |
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| F | 30/07/21 | 100% Issue - Draft Report for Review | Frank Ciancio | Associate Director - Urbanism + Planning |
| G | 05/08/21 | 100% Issue - Draft Report for REF issue | Frank Ciancio | Associate Director - Urbanism + Planning |

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# EXECUTIVE SUMMARY

AECOM Australia Pty Ltd (AECOM) has been engaged by Transport for NSW (TfNSW) to prepare a Landscape Character, Visual Impact Assessment and Urban Design Report. This document would inform the Review of Environmental Factors (REF) and Concept Design being prepared for The Central Coast Highway, Tumbi Road Intersection Upgrade at Wamberal. The proposal would be about 650 metres in length of road upgrade and comprise signalisation of the intersection, dual carriageway with widened central median, left-turn slip lanes entering and exiting Tumbi Road, and provision for on-road cycle lanes and shared user paths to both sides along the Central Coast Highway. The intersection upgrade would provide safer traffic movements and alleviate congestion at Tumbi Road, while establishing the typical cross-section arrangement for the future upgrade of the Central Coast Highway.

A summary of the report findings is shown over.

**Effects on landscape character**

The overall ratings for landscape character impact range between Moderate and Negligible, with most ratings resulting in a Moderate to Low change.

The highest rating was for change to landscape character within LCZ 5: Transport Corridor, within which a majority of the proposal is located. The overall landscape character of this LCZ would be affected by the replacement of the vegetated roundabout with a more open signalised intersection. The removal of roadside vegetation and the widening of the road corridor would increase the visual prominence of the road.

**Effects on views and visual amenity**

The overall ratings for the impact of the proposal on views range between Moderate and Low, with most viewpoints returning a Moderate to Low rating.

The highest impact of the proposal on views was recorded at Viewpoint 1: Central Coast Highway North, where the view south along the road corridor was opened out due to widening of the road corridor and the removal of roadside vegetation, particularly along the eastern edge of the road adjacent to the Wamberal Lagoon Nature Reserve.

The views within the road corridor seen by road users were the most effected by the proposal, with few visual receptors outside the road corridor seeing changes due to the proposal from within private properties.

Overall, the Proposal has a good urban and landscape design response, both of which assist in reducing and minimising impacts on landscape character and views. Urban and landscape design measures include the following:

- Landscape and urban design elements are consistent with the existing character and elements to ensure the Proposal is fully integrated with the surrounding environment and reduces the visual impact of the road and associated structures
- Indigenous plant species have been selected for use except for nominated points of interest where culturally appropriate species would be implemented
- Planting has been used to provide or highlight significant entry statements or to screen undesirable views
- Safety and sustainability have been considered with urban design and landscape outcomes
- Water sensitive urban design measures have been implemented where the works occur near areas of water accumulation, or where there are designed drainage basins and swales along the Proposal
- Urban design elements are integrated to provide a simple and consistent design language along the road corridor and as part of the greater Central Coast Highway
- Visual clutter has been minimised with the reduction and elimination of built structures where possible. Where these components are unable to be eliminated, they have been coordinated to provide an integrated urban design outcome.

These measures have aimed to avoid or minimise potential impacts to landscape character and views.

| LANDSCAPE CHARACTER ZONE | SENSITIVITY | MAGNITUDE | LANDSCAPE CHARACTER IMPACT |
|---|---|---|---|
| **LCZ 1: Recreational and Bushland Open Space** | MODERATE | LOW | MODERATE TO LOW |
| **LCZ 2: Rural Residential** | MODERATE | LOW | MODERATE TO LOW |
| **LCZ 3: Low Density Residential** | MODERATE | LOW | MODERATE TO LOW |
| **LCZ 4: Education** | MODERATE | NEGLIGIBLE | NEGLIGIBLE |
| **LCZ 5: Transport Corridor** | MODERATE | MODERATE | MODERATE |

| VIEWPOINT | SENSITIVITY | MAGNITUDE | VISUAL IMPACT RATING | BENEFICIAL | NEUTRAL | ADVERSE |
|---|---|---|---|---|---|---|
| **Viewpoint 1: Central Coast Highway North** | LOW | HIGH | MODERATE | | | X |
| **Viewpoint 2: Tumbi Road Intersection** | LOW | MODERATE | MODERATE TO LOW | | X | |
| **Viewpoint 3: Central Coast Highway South** | LOW | MODERATE | MODERATE TO LOW | | X | |
| **Viewpoint 4: Dalpura Road Intersection** | MODERATE | LOW | MODERATE TO LOW | | | X |
| **Viewpoint 5: Aldinga Drive Intersection** | LOW | LOW | LOW | | X | |

Placeholder Image Caption ( Source: AECOM)

# 1 INTRODUCTION

## 1.1 Proposal overview

Transport for NSW (TfNSW) propose to undertake the concept design, environmental assessment, detailed design and construction of the Central Coast Highway and Tumbi Road Intersection Upgrade project. This would involve the replacement of the existing roundabout with a new Traffic Control System, along with localised road widening throughout the intersection (the proposal). The proposal would also include utility relocations and drainage, lighting and active transport upgrades. Construction of the proposal would require private property acquisition.

The proposal is part of a broader commitment to improve travel on the Central Coast Highway between Tumbi Road, Wamberal and Bateau Bay Road, Bateau Bay which will see the highway widened to two lanes in both directions for 3.8 kilometres. Within this broader proposed upgrade, TfNSW has prioritised the upgrade of the Central Coast Highway and Tumbi Road intersection (this Proposal) in order improve journey times, safety and accessibility for local residents and other road users.

The Central Coast Highway is classified as a State Road and is a designated freight route, with a posted speed of 60 km/h through the intersection, changing to 70 km/hr north of Tumbi Road. Tumbi Road is a local road under Central Coast Council jurisdiction with a posted speed limit of 60 km/h. There is a school zone within the proposal footprint on Tumbi Road, with an enforced speed limit of 40 km/h between Mondays and Fridays during school pick up and drop off times.

The Central Coast Highway between Wamberal and Bateau Bay is used by around 26,500 motorists every day and subject to traffic congestion during peak periods. This general section of the highway is typically undivided with a single lane in each direction and has limited pedestrian and cyclist facilities. The broader proposal to upgrade the highway between Wamberal and Bateau Bay will increase capacity and improve pedestrian and cyclist facilities to cater for the growing needs of the Central Coast.

The proposal comprises:

- Replacement of the existing roundabout at the intersection of Central Coast Highway and Tumbi Road with a signalised intersection
- Widening to the west of the existing Central Coast Highway to allow for two lanes in each direction
- The provision of dedicated turning lanes throughout the Central Coast Highway and Tumbi Road intersection
- Construction of improved shared path connections, including the re-establishment (and enhancement) of all affected footpaths as well as the construction of new shared paths on both sides of Central Coast Highway north of the intersection.

The key benefits of the proposal would include:

- Reduced traffic delays and congestion at key intersections
- Improved travel times for all road users
- An expansion of safer cycling and pedestrian facilities, particularly near the intersection
- Enhanced economic growth and productivity of the surrounding region, particularly during busy holiday periods.

## 1.2 Proposal objectives

The proposal specific objectives of the proposal, as defined in the *Strategic Design Report for HW30 Central Coast Highway - Tumbi Road, Wamberal to Bateau Bay Road, Bateau Bay* (TfNSW, 2019), are:

- To contribute to a sustainable transport system and improve the operational efficiency for all customers of the road network in the Central Coast Council area;
- To improve traffic flow and optimise the effective use of road space;
- To improve road safety for all customers;
- To improve consistency of travel times for all road users, particularly during peak hours; and
- To provide for the need of all customer groups, particularly at locations with a high place function.

While the above proposal objectives were developed for the broader upgrade of the Central Coast Highway, they are particularly relevant to this proposal as the first of many upgrades as part of the greater project. They also inform the urban design objectives and principles in guiding the design and built outcomes for the proposal. These range from tangible objectives such as providing a safe road corridor, to the more inclusive objectives of accommodating for all user groups by enhancing pedestrian and cyclist amenity through improved place, environmental and legibility outcomes.

The urban design objectives and principles are outlined in *Chapter 3* of this document. These have been based on *Landscape and Urban Design Report for MR336 - The Entrance Road, Ocean View Drive to Tumbi Road* (Andrews Neil, 2005).

## 1.3 Proposal description

The proposal comprises improvements to the intersection of Central Coast Highway and Tumbi Road at Wamberal, NSW. The description of the proposal is based on a concept design for the preferred option and is subject to future refinement during the detailed design phase. The proposal includes:

- Replacement of the existing roundabout with traffic lights
- Associated ancillary road improvements such as localised road widening
- The upgrade of the Central Coast Highway from single to dual lanes in each direction within the vicinity of the intersection
- A raised central median and sealed shoulders north and south of the intersection.

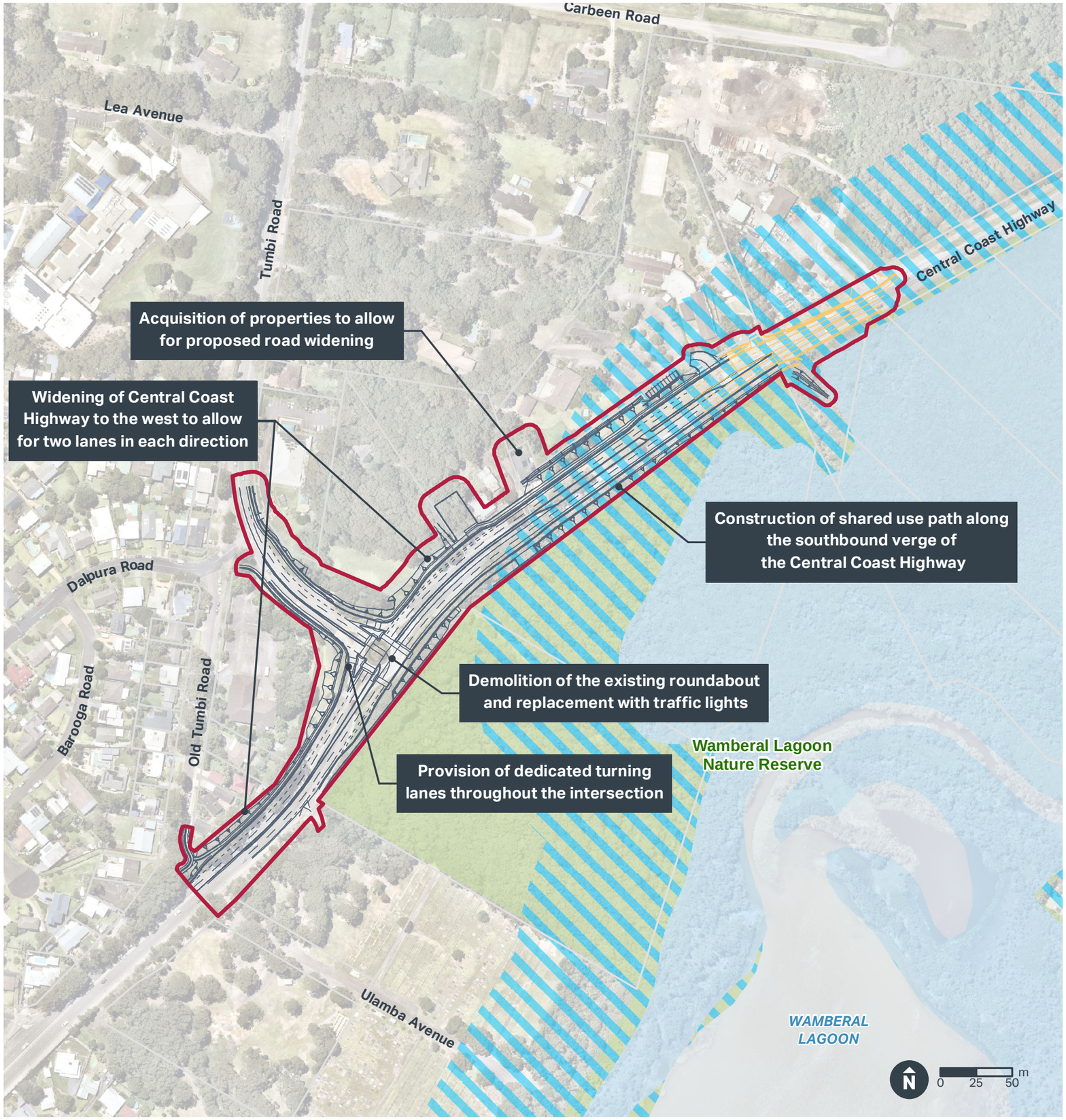
The proposal would also include associated drainage upgrades, utility relocations and new and upgraded shared path connections. Adjustments to public and private property boundaries, fences, parking and property accesses would also be undertaken as necessary to support the above elements of the proposal.

The southern limit of works is approximately 200 m south of the Tumbi Road intersection, adjacent to the Old Tumbi road cul-de-sac. The northern limit of works is approximately 400 m north of the Tumbi Road intersection. The western limit of works would be in proximity to the Tumbi Road/Dalpura Road intersection. The upgraded (widened) section of the Central Coast Highway would tie back in to the existing lane configuration near the southern and northern limit of works.

This proposal would be the first stage of a larger ultimate proposal to upgrade the Central Coast Highway from single to dual lanes in each direction up to Bateau Bay Road, Bateau Bay. However, this proposal has a need that is stand-alone from the larger ultimate proposal as one of the objectives is to alleviate substantial congestion and road and pedestrian safety issues at the existing intersection of the Central Coast Highway with Tumbi Road.

Key features of the proposal would include (refer *Figure 1*):

- Site preparation works, including establishment of ancillary facilities, vegetation clearing, site fencing, temporary drainage measures, and implementation of environmental management measures
- Relocation of the following bus stops to a common location on the western side of the Central Coast Highway, just the north of the intersection:
  - Bus stop 2260187 - Tumbi Road at Central Coast Highway
  - Bus stop 2260174 - Central Coast Highway opposite Ulamba Avenue.
- Minor relocation of bus stop 2260137 (Central Coast Highway at Ulamba Avenue) approximately 30 metres north
- All existing bus services would remain in operation during construction of the Proposal
- Localised demolition of existing footpaths to accommodate works. Alternative access would be provided for pedestrians throughout construction
- Temporary relocation of active traffic lanes, including the placement of temporary pavement, to maintain traffic flow during construction and local access
- Demolition of the existing roundabout and sections of pavement over each arm of the intersection
- Widening of the Central Coast Highway to the north of the intersection to dual lanes in both directions, with a transition back to single lanes prior to the northern limit of works
- Widening of Tumbi Road as it approaches the intersection. This would include dual left turn lanes and a single right turn lane for traffic approaching the intersection. Tumbi Road would remain single lane for traffic leaving the intersection (heading north)
- Installation of new traffic lights at the intersection of the Central Coast Highway and Tumbi Road, including the following road changes:
  - Construction of a slip lane for left turn onto Tumbi Road from the northbound lanes of the Central Coast Highway
  - Construction of a dedicated right turn lane onto Tumbi Road from the southbound lanes of the Central Coast Highway
  - Construction of a slip lane for left turn onto the northbound lanes of the Central Coast Highway from Tumbi Road
  - Construction of dedicated dual right turn lanes onto the southbound lanes of the Central Coast highway from Tumbi Road.
- Construction of concrete and vegetated medians on Tumbi Road and the Central Coast Highway to separate opposing lanes of traffic
- Earthworks, including excavation and the construction of retaining walls and batters to accommodate the widened road (see section 3.3.5 for further detail of excavations)
- Construction of retaining walls and batters on both sides of the Central Coast Highway
- Changes to the existing culvert under the Central Coast Highway immediately north of the Tumbi Road intersection. This would include:
  - Extension of eastern side the culvert to accommodate the widened road
  - Addition of a new pipe under the road to increase capacity of the culvert
  - Construction of new inlet and outlet structures at both ends of the culvert
  - Construction of an energy dissipation device at the eastern end of the culvert to reduce the velocity of water entering the Wamberal Lagoon Nature Reserve.
- Provision of a new pedestrian footpath adjacent to the northbound lanes of the Central Coast Highway between Old Tumbi Road and Tumbi Road, including a pedestrian connection to the Old Tumbi Road cul-de-sac
- Provision of a new pedestrian footpath along the northern side of Tumbi Road from a point 20 metres north of the intersection with Dalpura Road towards the intersection with the Central Coast Highway intersection, and continuing north adjacent to the northbound lanes of Central Coast Highway to the Pacific Garden Hotel
- Provision of suitable temporary and permanent entry arrangements for private properties fronting the Central Coast Highway and Tumbi Road within the limit of works
- Provision of a u-turn facility adjacent to the Pacific Garden Hotel for southbound traffic to turn back northbound, including a new kerbside lane on the northbound side of the road to facilitate entry to the hotel
- Permanent and temporary acquisition of private property, both full and partial, to accommodate the widened road and associated construction activities
- Subject to landowner agreement, property adjustments to the Wamberal Grocer and Fruit Market, including removal of the existing parking area provision of a new replacement parking and loading facility immediately south of the existing shop
- Drainage upgrade works within the road corridor and adjacent private property
- Provision of formalised drainage along the Central Coast Highway at the north eastern limit of works, discharging into an existing waterway
- Provision of a new permanent maintenance vehicle access ramp on the eastern side of the Central Coast Highway, north of the intersection
- Street lighting upgrades within and approaching the upgraded intersection
- Provision of new pavements and upgrade of existing pavements throughout the Proposal area
- New and adjusted signage and line marking




**Legend**

- Proposal area
- Coastal wetlands
- Coastal wetlands proximity area
- Nature reserve
- Proposed permanent works
- Temporary works

- Construction of new and upgraded active transport connections, including the re-establishment of any footpaths or shared paths removed to facilitate construction
- Construction of a new permanent bus stop adjacent to the northbound lanes of the Central Coast Highway, just north of the intersection. This new bus stop would consolidate bus stops 2260187 and 2260174 with all services being transferred to the new permanent bus stop
- Landscaping, including the planting of trees, shrubs and grass within the Proposal area and the regeneration of bushland adjacent to the Wamberal Lagoon Nature Reserve boundary. Drainage channels would be planted with suitable mix of species aimed at improving water quality
- Relocation and adjustment of existing utilities including water, sewerage, electricity, gas and telecommunications as required to accommodate the Proposal. This includes adjustments to existing utility connections into private property where these are affected by the Proposal, and may include short adjustments outside the limit of works to allow for connection back to existing utility alignments
- Demobilisation of construction activities, including removal of ancillary facilities, remaining construction materials and stockpiles and temporary environmental management measures. All temporary sites occupied during construction would be rehabilitated upon completion to at least their condition prior to the start of works.

**Figure 1:** Project concept design (Source: AECOM)

### 1.3.1 Construction

Construction of the proposal would include:

- Site preparation works, including establishment of ancillary facilities, vegetation clearing, site fencing, temporary drainage measures, and implementation of environmental management measures
- Temporary relocation of bus stops within the limit of works
- Demolition of existing footpaths where road widening is proposed. Alternative access would be provided for pedestrians throughout construction
- Demolition of the existing roundabout and adjacent pavement over each arm of the intersection Localised road widening (to dual carriageway) for the approaches and departures to the intersection, with transition back to single carriageway prior to the northern southern limit of works
- Installation of new traffic lights at Tumbi Road with metering in the short-term
- Construction of a concrete medians
- Construction of a high angle entry left turn onto Tumbi Road from Central Coast highway northbound
- Construction of a double right turn from Tumbi Road to the northbound carriageway of Central Coast Highway
- Localised earthworks, including excavation and the construction of batter to accommodate the widened road
- Construction of a retaining wall adjacent to the southbound carriageway at the Tumbi Road intersection
- Construction of a retaining wall adjacent to the northbound carriageway approaching the Apollo Inn
- Extension of the existing drainage line under Central Coast Highway immediately north of the Tumbi Road intersection
- Provision of a new pedestrian footpath adjacent to the northbound carriageway of Central Coast Highway between Old Tumbi Road and Tumbi Road, including a connection to the Old Tumbi Road cul-de-sac
- Provision of a new pedestrian footpath along the northern side of Tumbi Road as it approaches the Central Coast Highway intersection, continuing north adjacent to the northbound carriageway of Central Coast Highway to the new Apollo Inn driveway
- Provision of suitable entry arrangements for private properties fronting Central Coast highway north of the Tumbi Road intersection
- Associated drainage upgrade works and utilities adjustments
- Street lighting upgrades within and approaching the upgraded intersection
- New and adjusted signage and line marking
- Construction of improved shared path connections, including the re-establishment of footpaths removed to facilitate construction of the new intersection and road widening
- Demobilisation of construction activities, including removal of site compounds and temporary environmental management measures. All temporary sites occupied during construction would be rehabilitated upon completion.

Temporary ancillary facilities would be required to accommodate a site office, amenities, laydown and storage area for materials (refer *Figure 2*, *Figure 3*, *Figure 4* and *Figure 5*).

## 1.4 Purpose of report

The purpose of this Landscape Character, Visual Impact Assessment and Urban Design Report is to ensure landscape character and visual impact are considered during the road design as an integrated engineering and urban design outcome. Successful outcomes would see that the proposal, in accordance with *Beyond the Pavement - Urban design policy procedures and design principles* (TfNSW, 2020) and with the *Landscape and Urban Design Report, MR336 - The Entrance Road, Ocean View to Tumbi Road* (Andrews Neil, 2005):

- fits sensitively into the built and natural environments through which it passes and contributes positively to the character and function of the area;
- contributes to the safety, accessibility and connectivity of people within the region and communities;
- mitigates to the best of its ability any negative landscape or visual impacts that may be imposed on the community and the natural environment; and
- considers the outcomes of the landscape character and visual impact assessment so they are iteratively fed into the concept design development process.

This report aims to develop a series of urban design principals and objectives and assess the impact of the proposal on landscape character and views. Remaining impacts on landscape character and views due to the proposal not addressed during the concept design process in response to initial report findings are addressed with mitigation measures.

### 1.4.1 Proposal footprint and study area

The proposal footprint shows the extent of changes due to the operational proposal (refer *Figure 2*). The study area is the extent of the landscape surrounding the proposal footprint assessed for landscape character and visual impact within the report. It extends beyond the proposal footprint 300 m to the north and south and 500 m to the east and west, as shown in *Figure 2*.

The visual impact of three ancillary facilities are discussed within Section *6.2* (Visual Impact During Construction), although these lie outside the study area. It is assumed that ancillary facilities result in temporary changes as the sites would be restored to their original condition, therefore, no assessment of change to landscape character is completed for these sites and the study area is defined by the constructed proposal and its immediate surrounds, rather than extending to include all ancillary facilities. The ancillary facility locations are shown in *Figure 2* and in more detail in *Figure 3, Figure 4* and *Figure 5*.


**LEGEND**

PROPOSAL

PROPOSAL FOOTPRINT

STUDY AREA

# ANCILLARY FACILITY LOCATION

**Figure 2:** Keyplan showing the proposal, the proposal footprint and study area (Source: AECOM)


**Figure 3:** Approximate boundary of Ancillary facility 1 (Source: AECOM)


**Figure 4:** Approximate boundary of Ancillary facility 2 (2 possible sites) (Source: AECOM)


**Figure 5:** Approximate boundary of Ancillary facility 3 (Source: AECOM)

# 1.5 Methodology

This study has been an iterative process where issues relating to landscape character and visual impact are incorporated into the urban design recommendations and then integrated into the final design.

The report has been undertaken in accordance with the TfNSW *Environmental Impacts Assessment Practice Note – Guideline for Landscape Character and Visual Impact Assessment EIA-N04 (2020)*, with more detailed guidance taken from *Guidelines for Landscape and Visual Impact Assessment, Third Edition (2013)*, developed by the Landscape Institute and Institute for Environmental Management, UK (GLVIA3). GLVIA3 is widely recognised as comprising an example of 'best practice' in this field.

In accordance with these guidelines, key steps in the development of the Urban Design, Landscape Character and Visual Impact Assessment include:

1. **Contextual analysis** - An analysis of the regional and local context through which the road passes. It considers the findings of the *Landscape and Urban Design Report, MR336 - The Entrance Road, Ocean View to Tumbi Road* (Andrews Neil, 2005) which locates the study area adjacent to the Wamberal Nature Reserve Estuarine Paperbark Swamp Forest to the east and Tumbi Spotted Gum and Ironbark Forest to the west. Refer *Section 1.5.1*.

2. **Urban design vision, objectives and strategy** - The development of urban design principles that align with the overall vision based on *Landscape and Urban Design Report, MR336 - The Entrance Road, Ocean View to Tumbi Road*. The principles would be delivered through a set of clear and achievable objectives that would guide the urban concept design.

3. **Urban design concept** – The preparation of an illustrative urban design concept that reflects the urban design strategy, developed in collaboration with the proposal team.

4. **Landscape character impact assessment** - An evaluation of the existing landscape character within the proposal footprint to inform the early stages of the urban design process, and to assess the anticipated landscape impacts as a result of the final design outcome. Refer *Section 1.5.2.1*.

5. **Visual Impact Assessment** - An evaluation of the existing views and visual amenity within the study area to identify and assess possible impacts placed on the community by the proposed works. Refer *Section 1.5.2.2*.

6. **Mitigation** – Design outcomes and mitigation measures to avoid, reduce or mitigate adverse impacts that the proposal may impose within the study area, developed in collaboration with the proposal team. Refer *Section 1.5.3*.

## 1.5.1 Contextual analysis

The existing environment section includes a broad description of the landscape within which the proposal is located. This is then used for identification of elements and features relevant to assessment of the proposal, including site setting, topography, land use, landscape and heritage values. It is developed using the following steps.

### 1.5.1.1 Desktop analysis

Existing data was gathered and reviewed, including:

- available information on sensitive visual receptors, Proposal design, and photos of similar examples of key infrastructure elements proposed
- GIS mapping, including visual envelope mapping, zoning / land use, topography and heritage information
- Google Earth and Google Street View.

Using this data, a preliminary assessment of the landscape and visual resource was undertaken and used to inform a subsequent site inspection. A description of the existing environment was further detailed, including topography and hydrology, land use, review of heritage aspects and landscape character zones (refer Section 1.3.3).

### 1.5.1.2 Site inspection

A site inspection was undertaken to:

- confirm initial reporting on landscape and visual resources and existing environment
- identify views from sensitive visual receptors within publicly accessible locations
- assess landscape character
- undertake site photography to record key views and landscape character.

### 1.5.1.3 Landscape Character Zones

A landscape character assessment was undertaken, beginning with the identification of Landscape Character Zones (LCZs). These identify what makes a place distinctive, without necessarily assigning a value to it. It considers the way different components of the environment - both natural (the influences of geology, soils, climate and flora), and cultural (the historical and current impact of land use, settlement, enclosure and other human interventions) - interact together and are perceived to form a distinct pattern, which gives its particular sense of place.

## 1.5.2 Impact assessment

### 1.5.2.1 Landscape character assessment

Assessment of impacts on landscape character considers the effect of change on the landscape as a resource in its own right. Impacts on landscape character are assessed at operation only as it is assumed that construction activity would result in temporary changes and the landscape would be restored to its original condition.

The consideration of potential impacts on landscape character is determined based on the existing landscape's sensitivity to change and the magnitude of change that is likely to occur.

The sensitivity and magnitude of landscape impacts address the following specific criteria:

- sensitivity of landscape to proposed change, based on:
  - susceptibility to change - this means the ability of the landscape receptor (whether it be the overall character or quality/condition of a particular LCZ, or an individual element and/or feature, or a particular aesthetic and perceptual aspect) to accommodate the proposal without undue consequences for the maintenance of the existing situation, and/or the achievement of landscape planning policies and strategies
  - value of landscape
- magnitude of landscape impact, based on:
  - size or scale of change
  - geographical extent of impacts
  - duration and reversibility of impacts.

Sensitivity and magnitude have been assessed and graded as being High, Moderate, Low or Negligible. A matrix was then used to combine the ratings for sensitivity and magnitude (refer *Table 1*) to determine an overall 'Significance of Landscape Effects' rating. Overall impact ratings of High and High to Moderate are considered to be significant.

**Table 1:** Overall significance of landscape character impacts

| SENSITIVITY | MAGNITUDE OF IMPACT | | | | |
|---|---|---|---|---|---|
| | | **High** | **Moderate** | **Low** | **Negligible** |
| | **High** | High | High - Moderate | Moderate | Negligible |
| | **Moderate** | High - Moderate | Moderate | Moderate - Low | Negligible |
| | **Low** | Moderate | Moderate - Low | Low | Negligible |
| | **Negligible** | Negligible | Negligible | Negligible | Negligible |

### 1.5.2.2 Visual Impact Assessment

**Zone of Theoretical Visibility**

The likely visibility of the proposal, once operational, from surrounding areas was broadly mapped to define a Zone of Theoretical Visibility (ZTV). This provides an indication of which parts of the proposal are likely to be viewed from surrounding areas. The mapping typically shows 'worst case', i.e. some receptors may only see a small portion of the proposal, while other receptors may view a more substantial part of the proposal. This mapping only accounts for landform, not built form or vegetation.

**Representative visual receptors and viewpoints**

Potential visual receptors were identified within the ZTV. These were used to identify a series of viewpoints from which to assess the visual impacts due to the proposal. Factors such as proximity to the proposal, number of visual receptors at each location, and the type of visual receptors were taken into account to select the viewpoints. Viewpoints primarily assess the changes from publicly accessible locations, although some viewpoints were used to approximate the changes seen from private locations such as residences or community facilities.

**Assessment of visual impact at operation**

The assessment of visual effects addresses the impact of the proposal on the views available to visual receptors. It assesses how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views as a result of the change or loss of existing elements and/or the introduction of new elements within the view.

The evaluation of potential impacts on views were based on the sensitivity to change of the visual receptors at each of the viewpoints, and the magnitude of change arising from the proposal that was likely to occur.

The sensitivity of each viewpoint is mainly a function of:

- the occupation or activity of the people experiencing the view at particular locations
- the extent to which their attention or interest may therefore be focused on the views and the visual amenity they experience at particular locations, for example:
  - people who are engaged in outdoor recreation where their attention or interest is likely to be focused on views and the visual amenity they experience are likely to be more sensitive to a proposed change in that view, rather than
  - people at their place of work whose attention may be focused on their work, not on their surroundings, and where the setting is not important to the quality of working life
- value attached to the view experienced, for example:
  - value in relation to heritage assets or through planning designations
  - indicators of value attached to views, e.g. through appearing on tourist maps, or provision of facilities for their enjoyment (such as parking places, sign boards and interpretative material).

The magnitude of change to views and visual amenity depends on:

- size or scale of change in the view with regard to the:
  - loss or addition of features in the view and changes in its composition
  - degree of contrast or integration of any new features with the existing landscape in terms of form, scale and mass, line, height, colour and texture
  - nature of the view of the proposal in terms of amount of time it would be experienced, and whether the views would be full, partial or glimpses
- geographical extent of the visual impact with different viewpoints including the:
  - angle of view in relation to the main activity of the receptor
  - distance of the viewpoint from the proposal
  - extent of area over which the changes would be visible
- duration and reversibility of visual impacts, for example:
  - duration in terms of short term (0-5 years), medium term (6-15 years) or long term (16-30+ years)
  - reversibility with regard to the prospects and practicality of a proposed change being reversed in a generation, e.g. housing can be considered permanent, but wind energy developments for example are often argued to be reversible since they have a limited life, and could eventually be removed and the land reinstated (GLCVIA3, 2013).

The extent of sensitivity and magnitude were each assessed and graded as being High, Moderate, Low or Negligible. A matrix was then used to combine the ratings for sensitivity and magnitude (refer *Table 2*) to determine an overall 'Significance of Visual Effects'. Overall impact ratings of High and High to Moderate were considered to be significant.

A qualitative assessment rating further assigns a rating to the change in the views seen by receptors. This qualitative assessment is a professional judgement as to whether the visual impacts are deemed beneficial, neutral or adverse from each viewpoint. This judgement is based on whether the changes would affect the quality of the visual experience of visual receptors, given the nature of the existing views. Importantly, the qualitative assessment rating is secondary to the overall impact rating, thereby a low change in views from a viewpoint with an adverse rating, for example, still remains a minor change but with a slightly adverse outcome.

**Table 2:** Overall significance of visual impact

| | | MAGNITUDE OF IMPACT | | | |
|---|---|---|---|---|---|
| | | **High** | **Moderate** | **Low** | **Negligible** |
| SENSITIVITY | **High** | High | High - Moderate | Moderate | Negligible |
| | **Moderate** | High - Moderate | Moderate | Moderate - Low | Negligible |
| | **Low** | Moderate | Moderate - Low | Low | Negligible |
| | **Negligible** | Negligible | Negligible | Negligible | Negligible |

**Assessment of visual impact during construction**

A high level commentary on changes seen during construction was provided as these changes are temporary and, more often than not, reversible. Visual receptors were considered in terms of the views they are likely to obtain from locations within proximity of the proposal, including consideration of any key vantage points, e.g. lookouts where there is particular interest in the view. This assessment was presented as a general discussion rather than a detailed assessment from individual viewpoints.

**Photomontages**

Photographs of the view from each viewpoint were used to assist in providing a baseline from which to assess changes arising from the proposal.

An artist's impression was produced to illustrate the proposed changes from key viewpoints, selected during the desktop assessment as viewpoints from which the largest visual impact would potentially be seen. These were prepared by overlaying a 3D model of the proposal over an existing photograph, removing any structures to be replaced using graphic software.

## 1.5.3 Mitigation and management measures

During the concept design phase, outcomes of contextual analysis, urban design development and landscape character / visual impact assessment were fed back to the wider Proposal team at the 20% and 80% stages. This prompted mitigating measures to be adopted within the concept design process to avoid or reduce potential impacts of the proposal on landscape character, views and visual amenity. These implimented changes were documented within section *8.1*.

At the completion of the concept design a set of mitigation measures were developed aimed at reducing or avoiding remaining adverse impacts of the proposal on identified sensitive receptors. Mitigation measures typically comprise a range of techniques including, but not limited to, appropriate lighting design, staging or construction method, material and colour selection, and landscape planting. These mitigation measures were documented in section *8.2*. Any further identified opportunities either outside the proposal footprint or not related directly to the proposal were documented in section *8.3*.

Muswellbrook coal mine (Source: Google)

# 2 CONTEXTUAL ANALYSIS

## 2.1 Regional context

The proposal is located at the intersection between Tumbi Road and the Central Coast Highway, Wamberal. Wamberal is a suburb within the Central Coast Council LGA. Nearest larger townships to the proposal are located at the Entrance (approximately 8.5km north east), Erina (6.2km south west) and Gosford (10.3km west) (refer *Figure 6*).

The landscape within this region is split into distinct zones: denser urban development is situated along the coastal edge to the east, surrounding Tuggerah Lake to the north and Brisbane Waters to the south. The landscape between these densly developed areas contains residential acerages positioned between ridges of bushland.

Major north / south connecting roads include the M1 Motorway, the Pacific Highway and the Central Coast Highway.

The Central Coast Highway is the primary coastal road corridor linking Gosford, Erina and The Entrance. The Highway also provides the only connection between Gosford and the key tourist areas of Terrigal and Wamberal. The road passes through a range of environments including a riparian zone at East Gosford, commercial zone at Erina, wooded ridgelines through Erina Heights and Wamberal and coastal heath at the northern most end towards The Entrance.

The character of the area surrounding the proposal is predominantly low density and rural residential housing softened by the presence of existing native bushland surrounding the immediate site. Wamberal Lagoon Nature Reserve lies to the east of the proposal, providing a dense edge of bushland to the eastern side of the Central Coast Highway which adds to the wooded character of the local area.

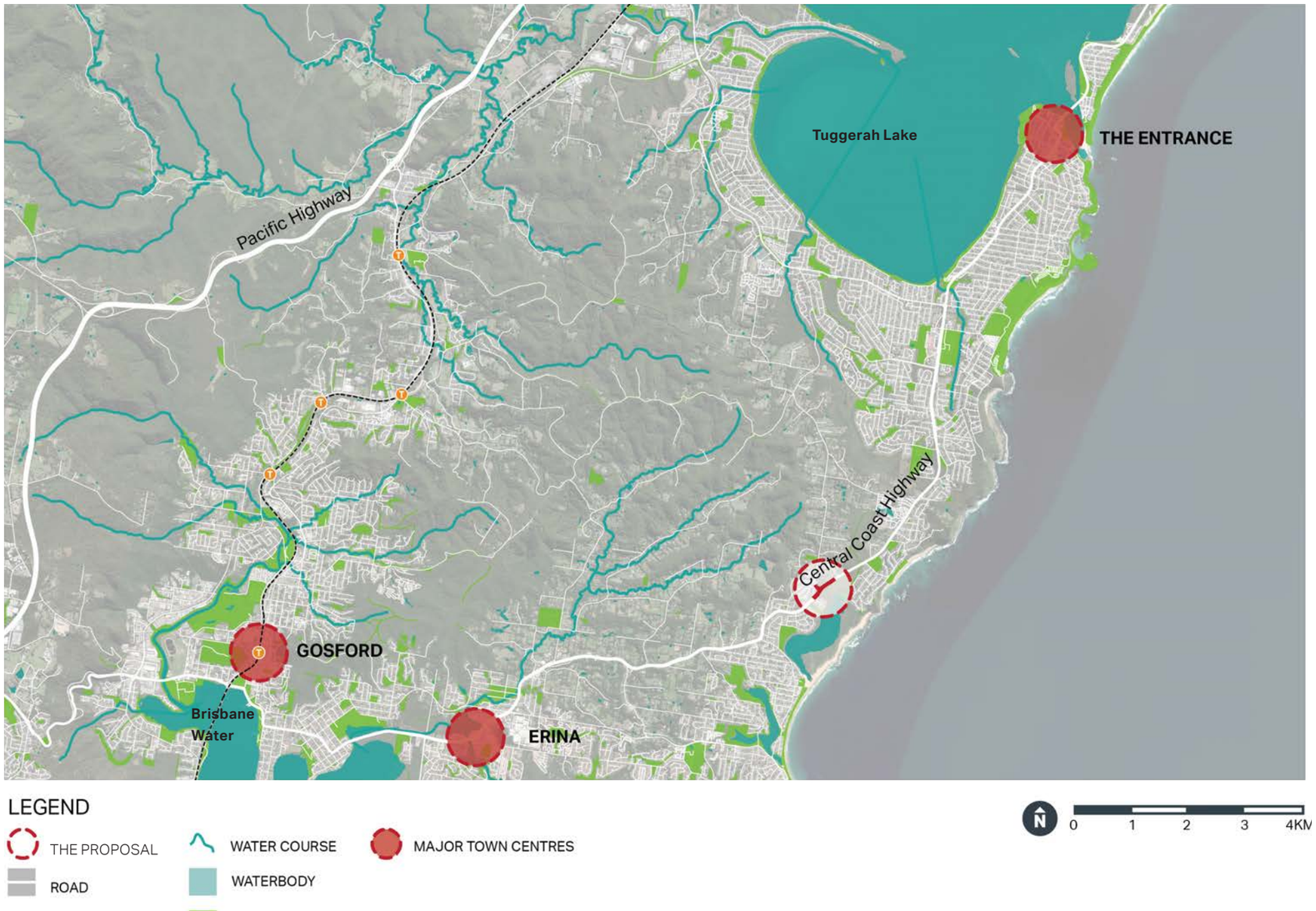



**Figure 6:** Central Coast Reional Context Map (Source: Google Earth, modified by AECOM)

# 2.2 Local context

## 2.2.1 Landscape setting

The landscape within the study area is strongly characterised by distinct blocks of homogeneous land uses, including blocks of bushland, low density and rural residential housing, with boundaries and transport corridors fringed with tall native vegetation (refer *Figure 7*). The tall, dense bushland edges and tall trees characterise the area (refer *Figure 8 and Figure 9*). The landscape ranges from steep hillsides and ridgelines to gently undulating, leading down to the lower estuarine conditions nearing the coast to the southeast.

The landscape immediately surrounding the proposal consists of low density and rural residential housing (refer *Figure 10*) to the west and dense bushland within Wamberal Lagoon Nature Reserve to the east (refer *Figure 8*). While the overall character of the local landscape is defined by the tall native trees and dense bands of bushland that fringe the more open landscape zones, the underlying cultural landscape planting that defines residential communities can be seen within these residential areas. Dense bushland areas are often punctuated by open space, as seen in Wamberal Cemetery (refer *Figure 11*).

Community facilities are Interspersed amongst the residential development and bushland areas, often positioned on or near main roads, including Wamberal Public School on Tumbi Road (refer *Figure 12*), Kingdom Hall of Jehovah's Witnesses (refer *Figure 13*) and a fruit shop, restaurant and hotel on Central Coast Highway. Similar to the residential housing and road corridors, these developments are nestled within the surrounding bushland.


**Figure 7:** Landscape setting (Source: AECOM)

**Figure 8:** Central Coast Highway looking southwest towards the intersection with Tumbi Road, showing roadside bushland vegetation within Wamberal Lagoon Nature Reserve to the east (Source: AECOM)

**Figure 9:** View north along Tumbi Road (Source: AECOM)

**Figure 10:** Residential housing on Tumbi Road (Source: AECOM)

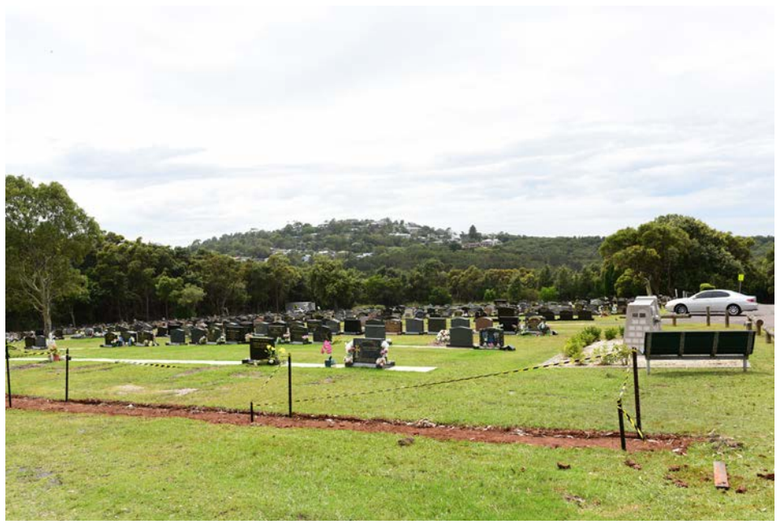


**Figure 11:** Wamberal Cemetery nestled within surrounding bushland (Source: AECOM)

**Figure 12:** Wamberal Public School entry on Tumbi Road (Source: AECOM)


**Figure 13:** Kingdom Hall of Jehovah's Witnesses backs onto the intersection of the Central Coast Highway and Tubmi Road (Source: AECOM)

## 2.2.2 Geology

*Figure 14* shows the local geology within the landscape setting of the proposal.

The regional geology is characterised by Quaternary Alluvium (comprising gravel and sand), overlying Terrigal Formation of the Gosford Subgroup of the Narrabeen Group, comprising interbedded laminate, shale and fine to course grained quartz to quartz-lithic sandstone and minor red claystone. The proposal is located near the boundary of the Terrigal Formation and Alluvial Sand and Gravel.

The proposal lies on the boundary of two soil groups:

- Woodburys ridge (overlying Terrigal Formation near the proposal), which is formed of highly erodible soils on gently undulating rises and low hills on Patonga Claystone
- Wyong unit (overlying the Alluvial Sand and Gravel near the proposal), consisting of poorly drained alluvial sediments which are potentially acid sulfate soils.

There is a risk of acid sulfate soils being encountered where excavation is required in land directly south of the proposal but north of Wamberal Lagoon, however, ground levels across the proposal are generally above 4 m AHD and there is no known occurrences of acid sulfate soils at and above this AHD. This land also returned a moderate salinity hazard.


**Figure 14:** Topographical Map, 1:5,000 at A3 (Source: AECOM)

## 2.2.3 Topography and drainage

The topography of the study area transitions from Wamberal Ridge (at a height of approximately 100 m AHD), seen in *Figure 15* to the top left of the map, eastwards down to the coastal lowlands and Warberal Lagoon. A series of gentle, low ridgeline foothills project southeast into Wamberal Lagoon Nature Reserve.

The Central Coast Highway remains relatively flat, curving around and over a series of low landforms. Tumbi Road heads west and then north from the intersection with the Central Coast Highway through gently undulating rural areas.

The study area drains from Wamberal Ridge east and south to the coast via Wamberal Lagoon. The Central Coast Highway passes over a number of minor watercourses which traverse beneath the road in culvert structures.

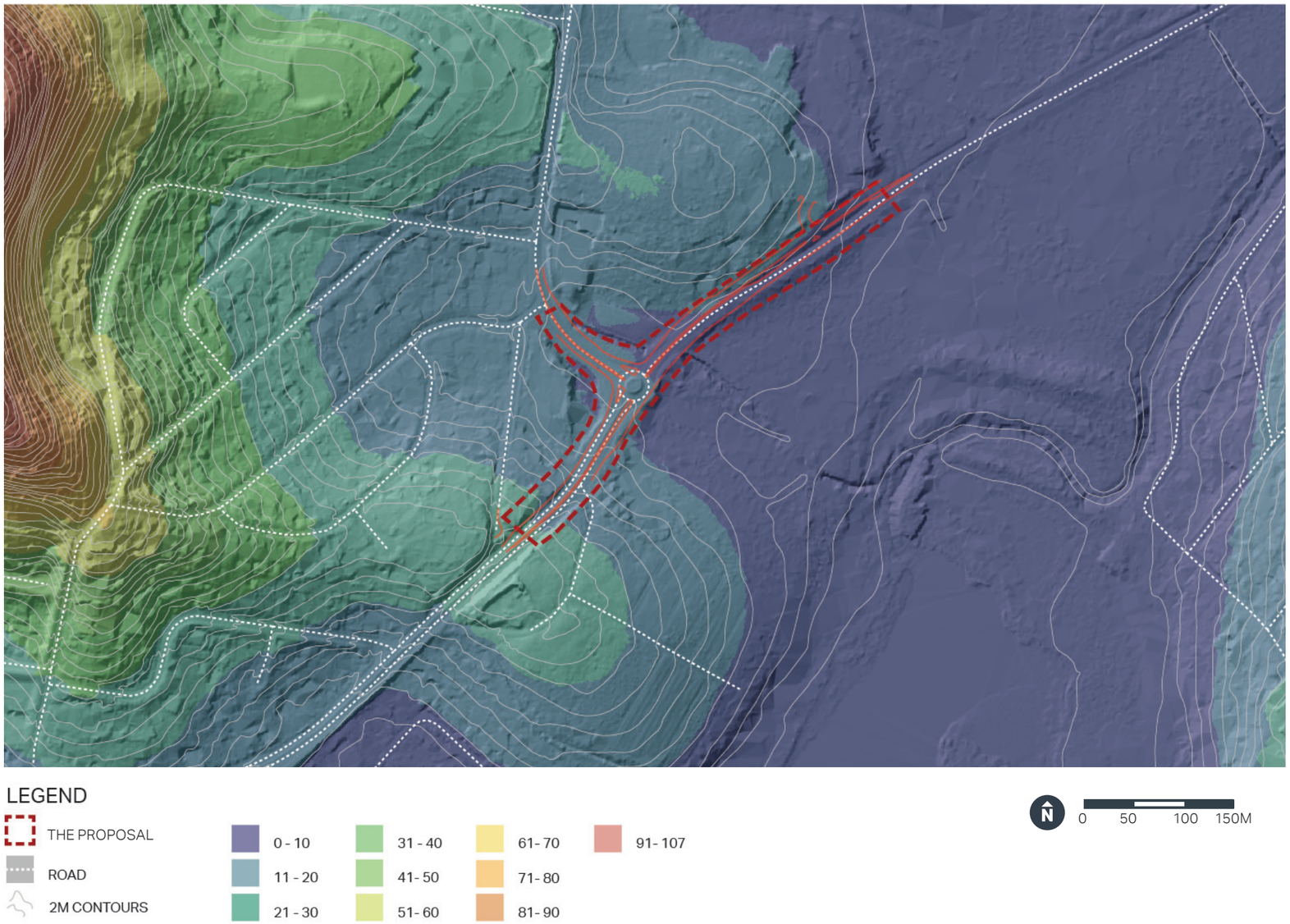



**Figure 15:** Drainage Map, 1:5,000 at A3 (Source: AECOM)

## 2.2.4 Land use zoning

The land uses within the locality comprise:

- A large portion of National Parks and Nature Reserve areas (E1) lies to the east of the Central Coast Highway. The vegetation communities associated with this land use provides the predominant natural character along the road corridor;
- Public Recreation areas (RE1) are generally confined to main drainage lines and adjacent to the road corridor. While not classified as a public recreational area, the heritage-listed Wamberal Cemetery lies adjacent to the road and provides open views beyond;
- Extensive portions of Low Density Residential (R2) to the west of the intersection of Tumbi Road and the Central Coast Highway, then on both sides of the Highway southwest of the Wamberal Cemetery;
- Land located north of the proposal and extending into the native bushland areas along Tumbi Road is listed as a 'deferred matter' in the LEP, but contains large lot rural residential properties;
- Educational Establishment (SP2) of the Wamberal Public School to the northwest of the proposal on Tumbi Road.

Key infrastructure elements (SP2) comprise the Central Coast Highway and Tumbi Road intersection.

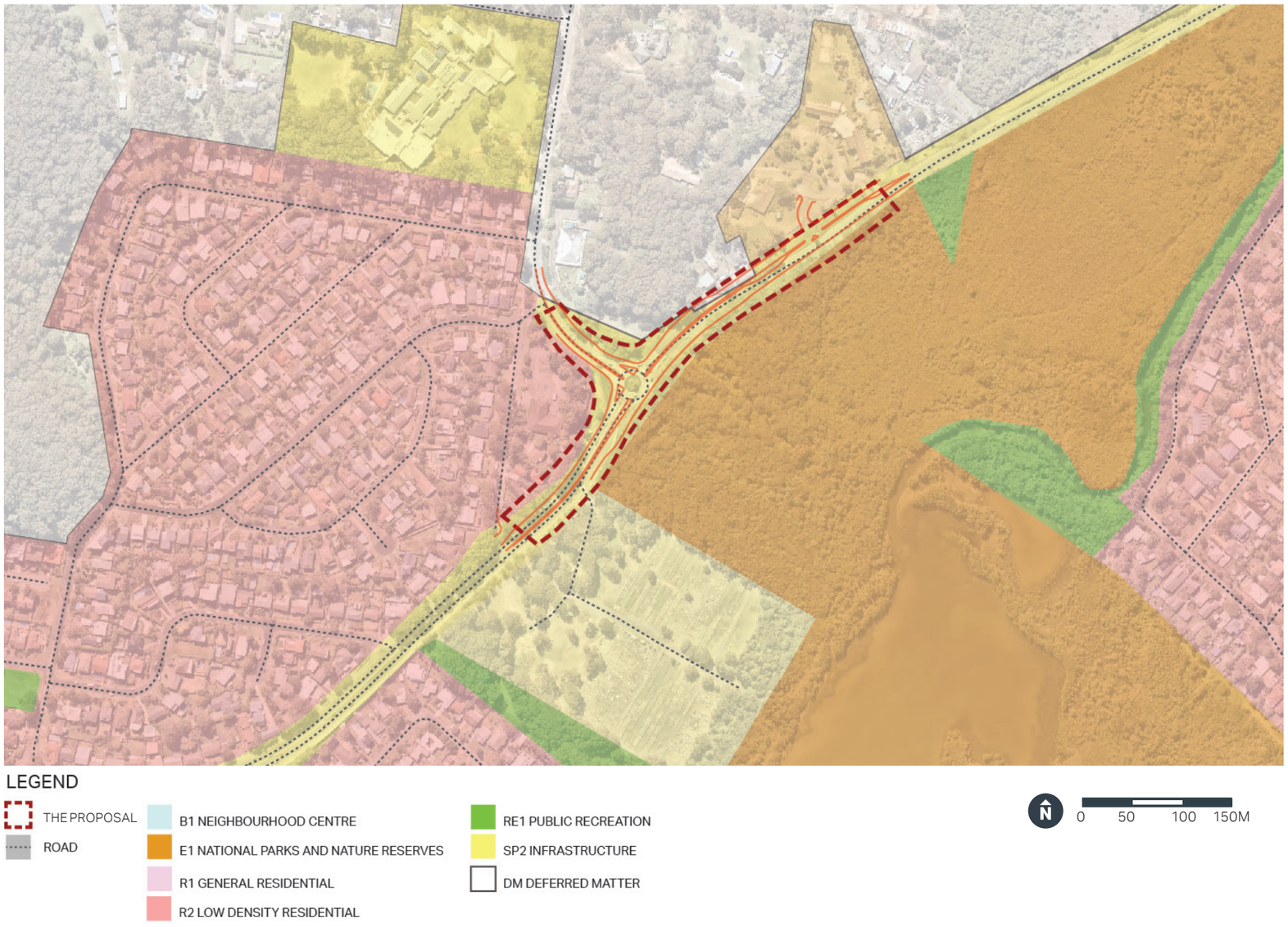



**Figure 16:** Land zoning within the study area Map, 1:5,000 at A3 (Source: AECOM)

## 2.2.5 Vegetation

Vegetation within the study area is varied due to the different soils, topography and drainage within the landscape. Ridgelines and slopes on higher land contain areas of Spotted Gum Shrubby Open Forest and Blackbutt Tall Open Forest. Lower, coastal and drainage landscapes contain Paperbark Forest, Saltmarsh and Swamp Oak Forest. These communities are associated with Wamberal Lagoon. A patch of Littoral Rainforest lies to the east of Wamberal Lagoon.

Areas disturbed by development typically contain non-native vegetation, including residential suburbs and Wamberal Cemetery. However, these developed areas retain the overall 'bushy' character of the locality with the retention of patches of remnant native trees, particularly at lot boundaries and along road corridors.


**Figure 17:** Vegetation communities within the study area Map, 1:5,000 at A3 (Source: AECOM)

## 2.2.6 Aboriginal and European heritage

The preliminary assessment results for proposed Central Coast Highway Upgrade from Tumbi Road (TfNSW, 2020) found that the proposal would be unlikely to harm known Aboriginal objects or places. An Aboriginal Heritage Information Management System (AHIMS) search indicated two registered Aboriginal objects or places, however, these were outside the study area. Further, there was an absence of sandstone ruck outcrops likely to contain Aboriginal art and the cultural heritage potential of the study area appears to be reduced due to past disturbance, previous road works and urban infrastructure.

The heritage listed Wamberal Cemetery is located on the eastern side of the study area (refer *Figure 18*). The cemetery cannot be seen directly from The Central Coast Highway. This section of road corridor and Crown Land is characterised by 2H:1V road batters on each side, both regenerated with native species.


**Figure 18:** Aboriginal and European Heritage Map, 1:5,000 at A3 (Source: AECOM)

## 2.3 Landscape Character Zones

Five Landscape Character Zones (LCZ) have been identified within the study area (refer *Figure 19*):

- LCZ 1: Recreational and Bushland Open Space
- LCZ 2: Rural Residential
- LCZ 3: Low Density Residential
- LCZ 4: Education
- LCZ 5: Transport Corridor

Refer following sub chapters for detailed description of LCZs.


**Figure 19:** Landscape Character Zones Map, 1:5,000 at A3 (Source: AECOM)

## 2.3.1 LCZ 1: Recreational and Bushland Open Space

This LCZ comprises areas used for public and private recreational purposes and native bushland. Within the study area this includes Wamberal Lagoon Nature Reserve, Wamberal Cemetery and the reservoir site, which contains Wamberal Ridge Walk. Large blocks of this LCZ are prominent within the study area, with the native bushland containing indigenous vegetation communities which transition from taller forests to coastal heath, swamp paperbark and estuarine complex.

Native bushland areas are typically densely vegetated with fully structured vegetation: trees, shrubs and a dense ground layer of groundcovers and grasses (refer *Figure 20*). These bushland areas typically contain walking tracks and occasional clearings for informal recreation. Larger areas of open turf surrounded by bands of dense bushland vegetation provide opportunities for recreation or other human uses, such as the lawns within the cemetery (refer *Figure 21* and *Figure 22*) or near the reservoir.

Where this LCZ meets other LCZs (e.g. at road corridors) the tall, dense vegetation provides an edge which screens views into the LCZ (refer *Figure 23*), unless the viewing location is at a higher point, in which case views over the landscape and to the horizon are seen (refer *Figure 21*).

| Component | Description |
|---|---|
| Land Use | RE1 Public Recreation (parks public reserves and the lawn cemetery), E1 National Parks and Nature Reserves (native bushland and nature reserves). |
| Topography and drainage | Associated with ridgelines and drainage corridors traversing towards the coast line. Topography is typically undulating with flatter open spaces associated with lawn areas. Steeper ridgelines and creeks typically heavily vegetated with native bushland. |
| Vegetation | Predominantly native bushland communities with significant mid-storey and canopy cover, and managed / mown turf with taller peripheral bands of vegetation. |
| Built Form | Limited to drainage infrastructure and minor structures such as retaining walls, with occasional built form such as toilet blocks or reservoirs |
| Spatial Form | Predominantly enclosed bushland interspersed with open areas such as water features (Wamberal Lagoon, dams) or lawn areas (Wamberal Cemetery or areas for recreation). |

**Figure 20:** Dense bushland within the study area (Source: AECOM).

**Figure 21:** View south from within Wabmeral Cemetary to Wamberal Lagoon (Source: AECOM).

**Figure 22:** Lawn clearings surrounded by dense bands of bushland (Source: AECOM).

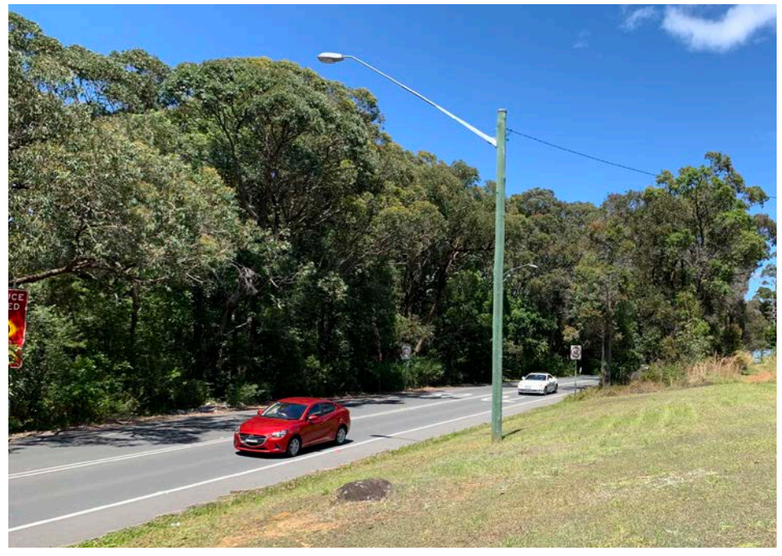


**Figure 23:** Central Coast Highway with an edge of dense bushland (Source: AECOM).

## 2.3.2 LCZ 2: Rural Residential

This LCZ is positioned north of the intersection of Tumbi Road and Central Coast Highway within the gently undulating foothills of the adjacent ranges. It predominantly comprises large lot rural residential developments and patches of bushland vegetation, as seen in *Figure 24*.

The topography of this LCZ is gently undulating, with steeper areas associated with ridgelines and drainage corridors. Small acreage lots are predominantly cleared of vegetation, with individual trees and patches of remnant vegetation scattered throughout the paddocks. The boundaries between properties and along roads often remain heavily vegetated, including large native forest trees. This heavily influences the character of the landscape, enclosing lots within the wooded setting. The rural setting is highlighted by the use of rural style post, rail and wire fencing along front boundaries (refer *Figure 25*). Streets have a rural profile with open drains and wide grass verges (refer *Figure 26*).

Lots typically contain patches or individual mature paddock trees and have mature gardens surrounding the houses. Gardens are often characterised by landscaped gardens containing exotic trees, shrubs and groundcovers. Houses are typically single storey brick construction, with detached outbuildings such as sheds and garages positioned nearby. Building setback from the street varies, with some homes positioned near public roadways and others accessed via longer driveways. Building placement is often influenced by the lot size and shape, as well as slope.

Some commercial properties are scattered within this LCZ (e.g. a nursery, fruit shop, motel and child care centre), but typically conform to a rural residential architectural and landscape style (refer *Figure 27*).

There are no heritage items or recreational values attached to this LCZ.

| Component | Description |
|---|---|
| Land Use | R5 - Large Lot Residential |
| Topography and drainage | Gently undulating with some steeper areas associated near ridges and watercourses |
| Vegetation | Mix of remnant native trees, gardens planted with an exotic palette of species, and open, manicured lawns. |
| Built Form | Detached dwellings and large sheds. |
| Spatial Form | Mostly enclosed due to vegetation and topography with some elevated areas having a sense of openness with views to distant forested coastal lands. |

**Figure 24:** Aerial photo showing typical lot size and placement, with roads and boundaries heavily treed (Source: Google Earth Pro)

**Figure 25:** Fencing surrounding lots is often rural style post, rail and wire (Source: AECOM)

**Figure 26:** Rural residential housing is set within small acreage, with landscaped ground planted with exotic vegetation (Source: Google Street View)

**Figure 27:** A commercial enterprise (child care centre) on Tumbi Road within the LCZ (Source: AECOM)

## 2.3.3 LCZ 3: Low Density Residential

This LCZ comprises a majority of the residential housing to the west and southwest of the proposal. Predominant features of the LCZ include small housing lots on wide streets typically arranged to run with the contours of the gently undulating topography (refer *Figure 28*). Streets typically are not planted with formal avenues of street trees, with the well vegetated character instead being influenced by patches and individual remnant native trees within and around the housing lots, and the bushland backdrop to the area (refer *Figure 29* and *Figure 30* and *Figure 31*).

Residential homes have been constructed with a range of architectural styles and finishes, from brick to weatherboard and from mid-century to modern. Homes typically feature mature, landscaped front gardens with a mix of exotic and native trees, shrubs and groundcovers. Lots typically contain ample parking, which reduces the number of cars parked on the streets. Streets are wide enough to include parallel parking on both sides.

Topography of the zone varies from flat to gently undulating. Views within the LCZ are typically contained within road corridors, with the exception of views from higher locations, which sometimes experience district views southeast towards the coast. Views to the LCZ from surrounding areas are available, with the mature trees within the LCZ breaking up the area of roofs visible from any one place.

There are no heritage items in this LCZ, however, it does contain community religious facilities.

| Component | Description |
|---|---|
| Land Use | R2 Low Density Residential |
| Topography and drainage | Gently to steeply undulating |
| Vegetation | Native remnant vegetation at boundaries (including roads), with exotic landscaped gardens surrounding the houses. Some wider drainage corridors are more heavily vegetated. |
| Built Form | Single and some double storey housing, typically brick and weatherboard construction. |
| Spatial Form | Streets laid out to follow contours of the landscape. View corridors along streets and to the wooded ridgelines. |

**Figure 28:** Pattern of streets and housing lots within the LCZ (Source: Google Earth Pro)

**Figure 29:** View west along Dalpura Road to Wamberal Ridge (Source: AECOM)

**Figure 30:** Typical brick residence with backdrop of native trees (Source: AECOM)

**Figure 31:** Typical streetscape, with Wamberal Ridge in the background (Source: AECOM)

## 2.3.4 LCZ 4: Education

This LCZ comprises a small portion of land within the study area: Wamberal Public School on Tumbi Road. The site is bounded by LCZ 2: Low Density Residential to the south and LCZ 2: Rural Residential to the north and east.

While the school is nestled amongst residential properties, the bands of tall native trees and vegetation at the boundaries conform this LCZ to the greater wooded character of the area (refer *Figure 34*). The fringing native vegetation and tall trees reduce the visual scale and bulk of the campus architecture, which is larger than that of surrounding development.

| Component | Description |
|---|---|
| Land use | SP2 Educational Establishment |
| Topography and drainage | Gently undulating. |
| Vegetation | Predominantly native bushland with turfed, cleared play areas, reflective of the existing vegetation communities. |
| Built Form | Typical two-storey institutional built form. |
| Spatial Form | Built form of the school is broken up by the informal landscape character setting of the surrounding native bushland and canopy vegetation. |

**Figure 32:** Aerial image of Wamberal Public School (Source: Google Earth Pro)

**Figure 33:** The entry to Wamberal Public School on Tumbi Road (Source: AECOM)

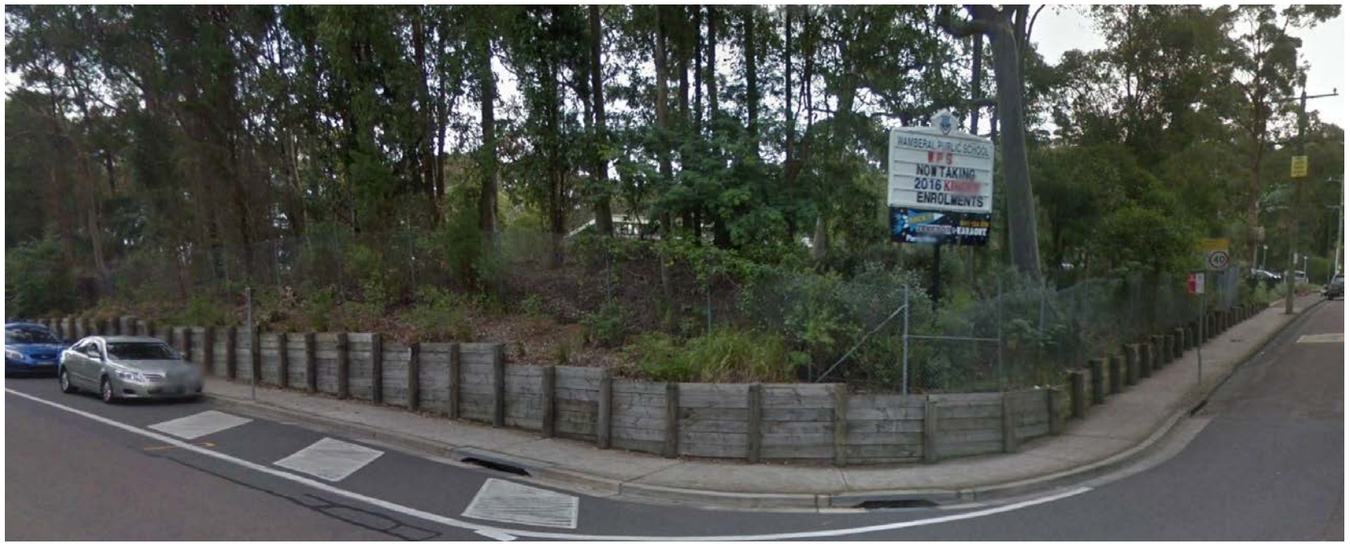



**Figure 34:** The intersection of Tumbi Road and Lea Avenue looking west towards the school (Source: Google Street View)

## 2.3.5 LCZ 5: Transport Corridor

This LCZ comprises the Central Coast Highway and Tumbi Road within the study area. These two corridors share characteristics, both being wide, linear elements within the greater landscape. The road corridors within this LCZ are fringed with bushland vegetation (refer *Figure 35*), with development typically set back from the road corridor by wide, turfed verges (refer *Figure 36*) or service roads (refer *Figure 37* and *Figure 38*).

This LCZ is used as transport corridors for vehicles, and while predominantly used by local traffic, would also service tourists and provide a somewhat scenic route along the coast.

| Component | Description |
|---|---|
| Land Use | SP2 Infrastructure |
| Topography and drainage | Flat to undulating |
| Vegetation | Limited to turf and native bushland |
| Built Form | Road signage, powerlines and general road furniture. |
| Spatial Form | Road corridor typically enclosed by fringing vegetation and occasional development |

**Figure 35:** Central Coast Highway looking northeast from the entry to Wamberal Cemetery (Source: AECOM)

**Figure 36:** Wide turf verge separating the Kingdom Hall of Jehovah's Wittnesses from the intersection (Source: AECOM)


**Figure 37:** Service road with residential housing on the Central Coast Highway, with bushland fringing the road corridor to the east (Source: AECOM)


**Figure 38:** Service road with residential housing on the Central Coast Highway (Source: AECOM)

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# 3 URBAN DESIGN OBJECTIVES AND PRINCIPLES

## 3.1 Introduction

The *Landscape and Urban Design Report for MR336 - The Entrance Road, Ocean View Drive to Tumbi Road* (Andrews Neil, 2005), hereafter 'The Andrews Neil Report', outlines the overarching urban design approach for the future upgrade to the Central Coast Highway. The Andrews Neil Report also defines the guiding design objectives and principles to be adopted along the Central Coast Highway. Together with *Beyond the Pavement - Urban design policy procedures and design principles* (TfNSW, 2020), hereafter 'Beyond the Pavement'. These two documents provide direction on the development for the landscape and urban design to achieve an integrated built outcome for this Proposal.

The design objectives and principles relating to this Proposal are further described in the following pages. The Proposal objectives have been taken from the Andrews Neil Report and adapted to suit the project and reflect the character of the site. The design principles have been developed from Beyond the Pavement to guide the design process and to ensure a coordinated design response.

Section 4 describes in further detail the landscape proposal and urban design components of this Proposal.

# 3.2 Urban design objectives and principles

The following urban design objectives are closely aligned to those outlined in the Andrews Neil Report but have been tailored specifically to this Proposal. Each of these objectives is supported by a set of design principles to guide the urban design and provide a benchmark for the built outcomes. The application of these objectives and principles would ensure a 'whole of corridor' design outcome is achieved that is integrated with the surrounding landscape character.

## 3.2.1 Objective 1: Improve safety

Provide an environment where vehicular, pedestrian and cyclist movements along the study area are safe.

**Principles:**

- Ensure the landscape and urban design proposal maintains the relevant sight distance and clear zone requirements along the corridor, while providing shade and menity for pedestrians and cyclists.

## 3.2.2 Objective 2: Enhance the user experience

Provide an enhanced driver, cyclist and pedestrian experience compared with the existing condition, is enhanced in relation to identity, legibility and visual amenity.

**Principles:**

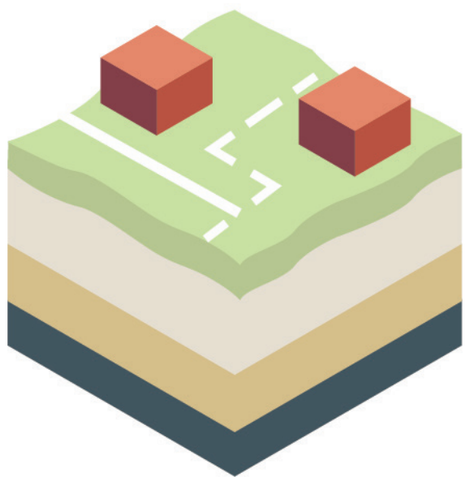
- Consider both transport and community needs in the planning and design of the road corridor by focusing on safety, operational efficiency and amenity;
- Celebrate the sense of place by protecting and enhancing historic items and features within the landscape that are characteristic to the region;
- Improve the visual quality of the proposal by integrating urban design and landscape treatments to enhance or minimise visual impacts;
- Consider future development adjoining the proposal to ensure the road corridor design responds to future requirements, including access and views.

## 3.2.3 Objective 3: Reinforce the surrounding landscape character

Select landscape and urban design elements that emphasise the existing landscape character and context of the site.

**Principles:**

- Reference the various vegetation communities associated with the Wamberal Nature Reserve, Wamberal Lagoon and surrounding ridgelines;
- Minimise disturbance, and maintain the existing landscape experience, to the Wamberal Cemetery entrance;
- Provide appropriate visual stimuli within the road corridor to enliven the road journey experience.



## 3.2.4 Objective 4: Respond to landscape patterns

Reflect the surrounding low-lying landform, landscape patterns and drainage corridors in the proposed landscape and urban design treatments that:

**Principles:**

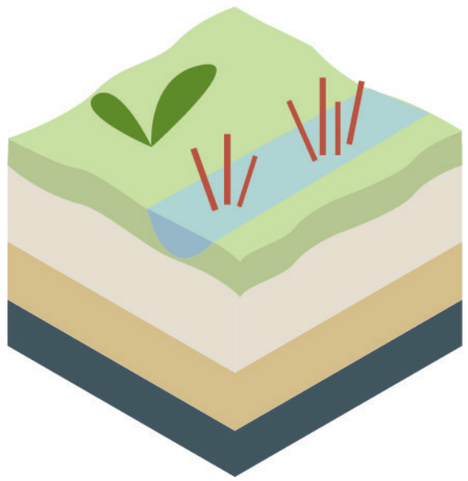
- Integrate adjacent vegetation communities and patterns in the landscape and design a complementary roadside landscape;
- Maintain and enhance natural systems connections, drainage and habitat corridors;
- Minimise the removal of native vegetation and consider road design options that minimise reduce impacts to the existing vegetation.

## 3.2.5 Objective 5: Design for minimal lifecycle costs

Develop a materials and finishes palette that considers amenity, cost and long term maintenance.

**Principles:**

- Propose robust materials that are readily available and can be replaced safely and easily;
- Design for a low maintenance, long-living and self-sustaining landscape;
- Investigate design strategies and incorporate materials that deters vandalism; and
- Consider, and implement where possible, ecologically sustainable development (ESD) and water sensitive urban design (WSUD) principles throughout the design.



## 3.2.6 Objective 6: Coordinate a simple and consistent design language.

Provide an integrated landscape and urban design approach for the proposal that continues existing road corridor elements.

**Principles:**

- Integrate road elements physically and visually with the existing landscape character and surrounding context along the corridor;
- Ensure components such as retaining walls, signage,street lighting, traffic barriers and handrails are designed as coordinated composition, rather than individual elements, to minimise roadside clutter and so they do not present as visually distracting features in the landscape;
- Locate fencing, walls and barriers, and incorporate landscape measures to minimise visual impact.

Wamberal Cemetery looking east over Wamberal Lagoon

# 4 URBAN DESIGN CONCEPT

## 4.1 Introduction

The Central Coast Highway is the main arterial road that connects the M1 Pacific Motorway with the major town centres of Gosford, Erina and The Entrance. It is also a scenic route that is used to access the many beachside suburbs and ridgeline townships of the Central Coast. Given the Highway's function as both an arterial road and scenic route, several pinchpoints have been identified causing significant traffic congestion and delays during peak periods. One of the locations is the intersection with Tumbi Road, at Wamberal and is proposed to be upgraded from a roundabout to a signalised intersection.

The Proposal would be about 650m in length of road upgrade and comprise signalisation of the intersection, dual carriageway with widened central median, left-turn slip lanes entering and exiting Tumbi Road, and provision for on-road cycle lanes and shared user paths to both sides along the Central Coast Highway. These elements would be brought together in the urban design to create an integrated 'whole-of-corridor' response.

The intersection upgrade would provide safer traffic movements and alleviate congestion at Tumbi Road, while establishing the typical cross-section arrangement for the future upgrade of the Central Coast Highway. The urban design approach for this Proposal is based on the design objectives and principles established in *Section 3* of this report. The objectives and principles are closely aligned to the Andrews Neil Report which outlines the broader urban design strategy for the Central Coast Highway between Ocean View Drive and Tumbi Road. The findings from the contextual analysis have also been applied to inform the landscape and urban design concept.

To ensure a fully coordinated, 'whole-of-corridor' and context-related road design, the urban design team has work closely with the project team to further develop the design for the alignment, retaining walls, cut batters, fill embankments, traffic barriers, fences and handrails. The overarching landscape and character of the Central Coast Highway has also been referenced in the proposed works to provide consistency, continuity and a cohesive design response.

## 4.2 Design concept

The urban design and landscape concept (refer *Figure 39* to *Figure 55*) has been developed in accordance with The Andrews Neil Report, Beyond the Pavement and Transport for NSW's various design guidelines.

A summary of the landscape contextual elements critical to the urban design outcome include:

- the recreational and bushland open space to the east comprising indigenous vegetation communities which transition from taller open forests to coastal heath, swamp paperbark and estuarine complex. As part of the Wamberal Lagoon Nature Reserve, the ecological value and visual amenity of this vegetation would be preserved;
- rural residential the the north of the proposal, generally associated with the steeper ridgelines and drainage corridors with paddock trees and patches of remnant vegetation;
- low density residential to the west and south-west comprising small housing lots which feature a mix of native and exotic cultural gardens;
- the grass-lined and vegetated drainage basins and swales immediately adjacent the proposal consisting of individual or small clusters of tree planting to define the low points and culvert locations

The overall urban design response would be to integrate the project works within the surrounding landscape character, improve connectivity and amenity for pedestrians and cyclists,  while providing a safe environment for road users.

Urban design objectives have been developed to guide from design through to construction. These objectives are outlined below, and described further in *Section 3* of this report:

- Objective 1: Improve safety
- Objective 2: Enhance the user experience
- Objective 3: Reinforce the surrounding landscape character
- Objective 4: Respond to landscape patterns
- Objective 5: Design for minimal lifecycle costs
- Objective 6: Coordinate a simple and consistent design language.

### 4.2.1 Landscape concept

The proposed landscape concept responds to the existing surrounding landscape context, including LCZs. Plant species have been selected from the adjacent indigenous vegetation communities and interfacing land-use zones to reinforce the prominent landscape character, while maintaining the functional requirements of the road corridor. The vegetated basins and swales adjacent the proposal provide an opportunity to transition from a closed-forest environment to a suburban landscape setting by opening up the intersection with low native grass planting and individual tree planting reflective of the residential native landscape character to the west. This transition also facilitates improved safety at the intersection with appropriate ground treatments and the selection of clear-trunked tree species to maintain sight distances.

The proposed landscape treatments seek to maintain and reinforce the character and vegetation communities of the existing environment adjacent the road corridor, rather than impose a stylised vegetation treatment. The landscape concept and its components are described in further detail in this section (*Section 4.3*) of the design report.

### 4.2.2 Urban design considerations

The transition of the surrounding topography from ridgelines to drainage swales and eastwards to the coastal lowlands and Wamberal Lagoon requires several retaining structures to be considered as part of the proposal. These structures include:

- The Lagoon retaining walls to the east of the proposal, interfacing with the Wamberal Nature Reserve
- The retaining wall associated with the Wamberal Grocer & Fruit Market (TBC)
- A feature-clad retaining wall along the Pacific Garden and Apollo Resort hotel / motel (TBC)
- Drainage culvert inlet / outlet walls.

To provide a safe and functional environment for all road users and maintenance workers, various barriers, fences and handrails are required. To minimise visual clutter these components have been designed-out where possible by reducing the heights of retaining structures. Where these components are unable to be eliminated, they have been coordinated to provide an integrated urban design outcome. The above urban design components are described in further detail in this section (*Section 4.6*) of the design report.

# 4.3 Landscape design response

The landscape design is an integral part of the proposal and is essential to maintain and enhance the character of the surrounding environment. Implemented appropriately, the proposed landscape design would enable the existing character to be re-established along the road corridor, enhance connectivity - including ecological, pedestrian and cyclist - and provide a safe road user experience.

The landscape design response aims to:

- Develop a landscape design consistent with the existing character and elements to ensure it is fully integrated with the surrounding environment and reduces the visual impact of the road and associated structures
- Generally utilise indigenous species across the project, except for nominated points of interest where culturally appropriate species would be implemented
- Use planting to provide or highlight significant entry statements or to screen undesirable views
- Utilise planting height, density and frangibility appropriately, dependent on distance from the road edge, topography, and adjoining land use
- Create a landscape that is self-reliant and can be managed and maintained safely and economically
- Implement water sensitive urban design measures where the works occur near areas of water accumulation, or where there are designed drainage basins and swales along the project.

## 4.3.1 Landscape treatment

The landscape treatments proposed for this concept design are based on an assessment of the existing landscape character and the construction requirements of the proposal. The landscape treatments aim to integrate the road with the surrounding land form, land uses and vegetation communities through the sympathetic application of earthworks and planting. Where earthworks are not feasible, retaining walls would be utilised to protect and enhance existing adjacent vegetation and to reduce embankment slopes, increasing the opportunity for planting to establish along the road corridor.

The proposed landscape concept design generally reflects the distinctive qualities of the landscape zones and existing vegetation communities. The local environment through which the road corridor passes would contribute significantly to the aesthetic qualities of the road. The dominant vegetation communities that interface with the project site include Spotted Gum Shrubby Open Forest and Blackbutt Tall Open Forest. The vegetation communities extend from the ridgelines west of the Central Coast Highway through to east, providing a distinctive vegetative screen where the road interfaces with the Wamberal Lagoon Nature Reserve. The landscape concept design utilises plant species from these vegetation communities as the basis for the overall planting response the proposal.

To achieve a successful landscape outcome, the starting point was to ensure the earthworks across the proposal were appropriately graded and prepared for plant installation. The general approach was to provide cut batters and fill embankments of 4H:1V where possible. Where this gradient could not be achieved, low-height retaining walls are be proposed, or alternate methods of earthworks preparation and planting methodologies applied, to ensure gradients do not exceed 3H:1V.

The following planting mixes / typologies are proposed:

- Native bush regeneration to the interface with Wamberal Lagoon Nature Reserve (species TBC in consultation with bush regeneration specialist)
- Native screening shrubs and grasses
- Native grasses and ground covers
- Road edge groundcover planting
- Resort ornamental planting
- Ephemeral / drainage planting
- Turf.

As described above the dominant vegetation communities across the project include Spotted Gum Shrubby Open Forest and Blackbutt Tall Open Forest. Disturbed areas interfacing the Wamberal Lagoon Nature would be planted with species from these communities and be undertaken in consultation with a bush regeneration specialist.

Plant species from these vegetation communities have also been used in the 'Screen shrubs and native grasses' planting mix to reinforce the surrounding landscape character. This planting mix is used to stabilise the steeper embankments and to reinforce the landscape character along the western side of the Central Coast Highway.

The proposed 'Native grasses and ground covers' planting mix also comprise of species from endemic vegetation communities. This planting mix is generally applied along the top and bottom of proposed retaining walls where maintenance access is required. The width of these maintenance zones are approximately 2m and selected plant species would be robust enough to withstand 'foot' traffic, provide coverage all year round and maintain a consistent height of 500-800mm.

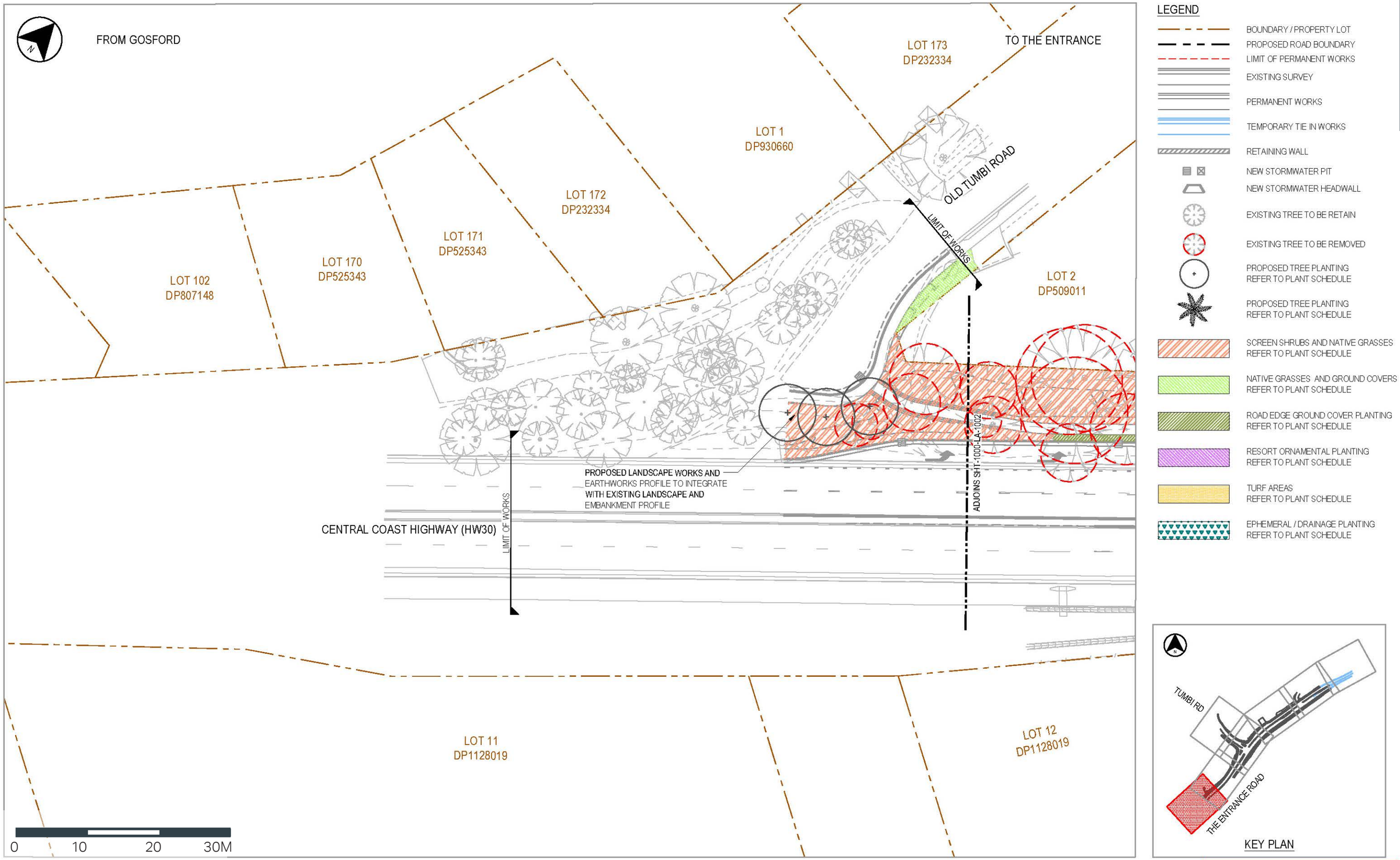
The proposed 'Road edge planting' mix consists of robust low ground covers that require minimal ongoing maintenance and impose no sight distance impediments to road users. This planting mix is also a good alternative to the existing roadside turf, not only due to its minimal maintenance requirements, but because it provides a visually consistent transition with the interfacing landscape character.

The proposal will also impact the established landscape associated with the Pacific Garden Hotel frontage. This existing landscape consists of palms, ornamental shrubs and ground cover planting. The planting functions as a feature entry and will be substantially disturbed to accommodate the proposal. Considerable earthworks and retaining structures have been proposed, which has guided landscape response to ensure these elements are integrated. The proposed design seeks to reinstate disturbed planting and ensure the earthworks and retaining structures are suitably integrated landscape consistent with the 'resort' style character and provide an appropriate entry from the Central Coast Highway.

The existing open drainage basins and swales have been adjusted to accommodate the road design and additional stormwater provisions. These areas would be planted with an ephemeral species mix and native grasses to improve water quality and reduce ongoing maintenance requirements. Melaleuca tree planting would provide supplementary canopy coverage to the swales and basins, while reinforcing the existing landscape charcter.

Culvert inlets and outlets would also be treated with a native 'Ephemeral / drainage planting' mix to funnel major water concentration at these locations as part of the water quality treatment prior to discharging downstream into Wamberal Lagoon.

**Drafting note: Landscape and urban design still under development**




URBAN DESIGN CONCEPT

**Figure 39:** Landscape concept plan - Sheet 01

**Drafting note: Landscape and urban design still under development**

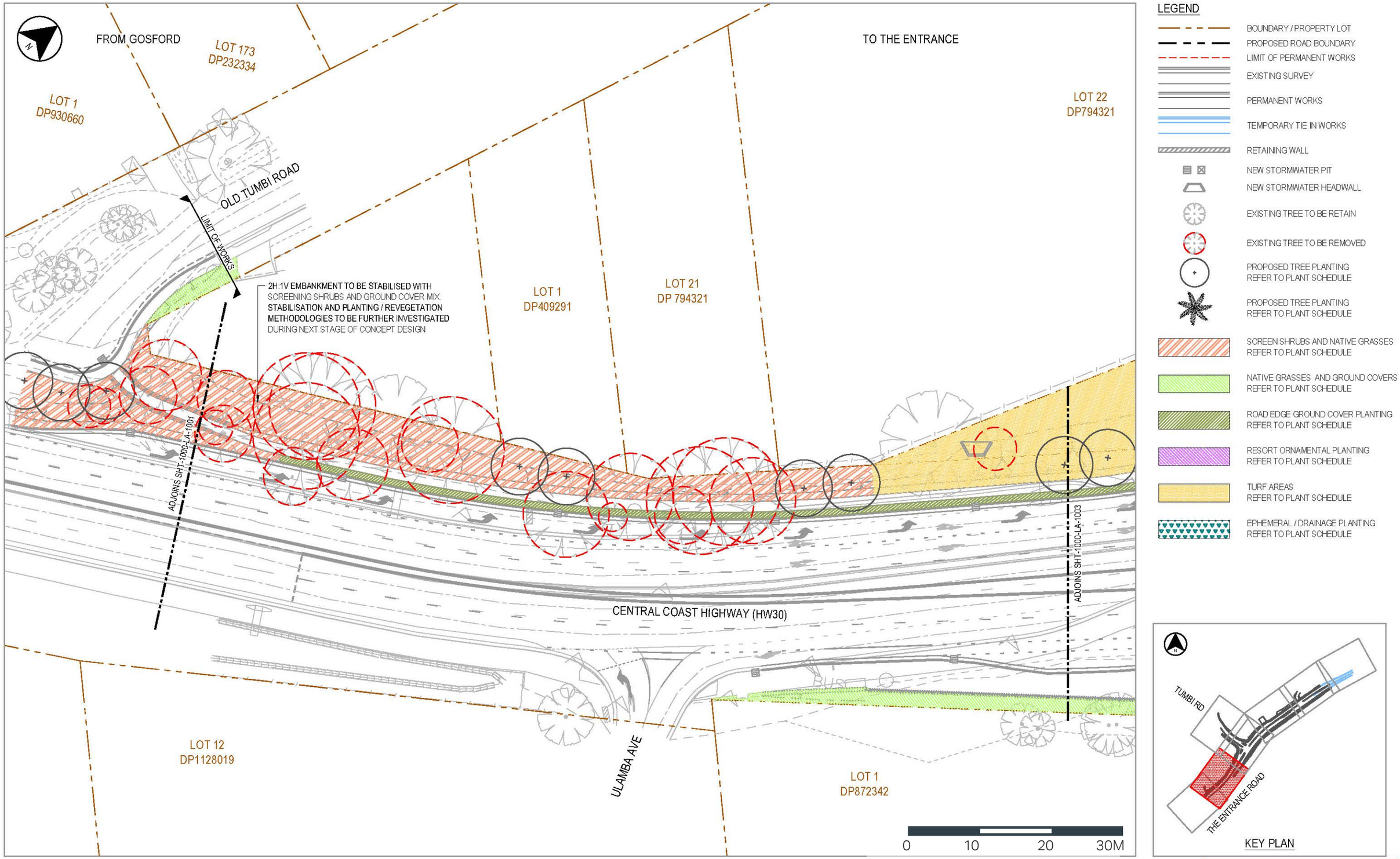



**Figure 40:** Landscape concept plan - Sheet 02

**Drafting note: Landscape and urban design still under development**



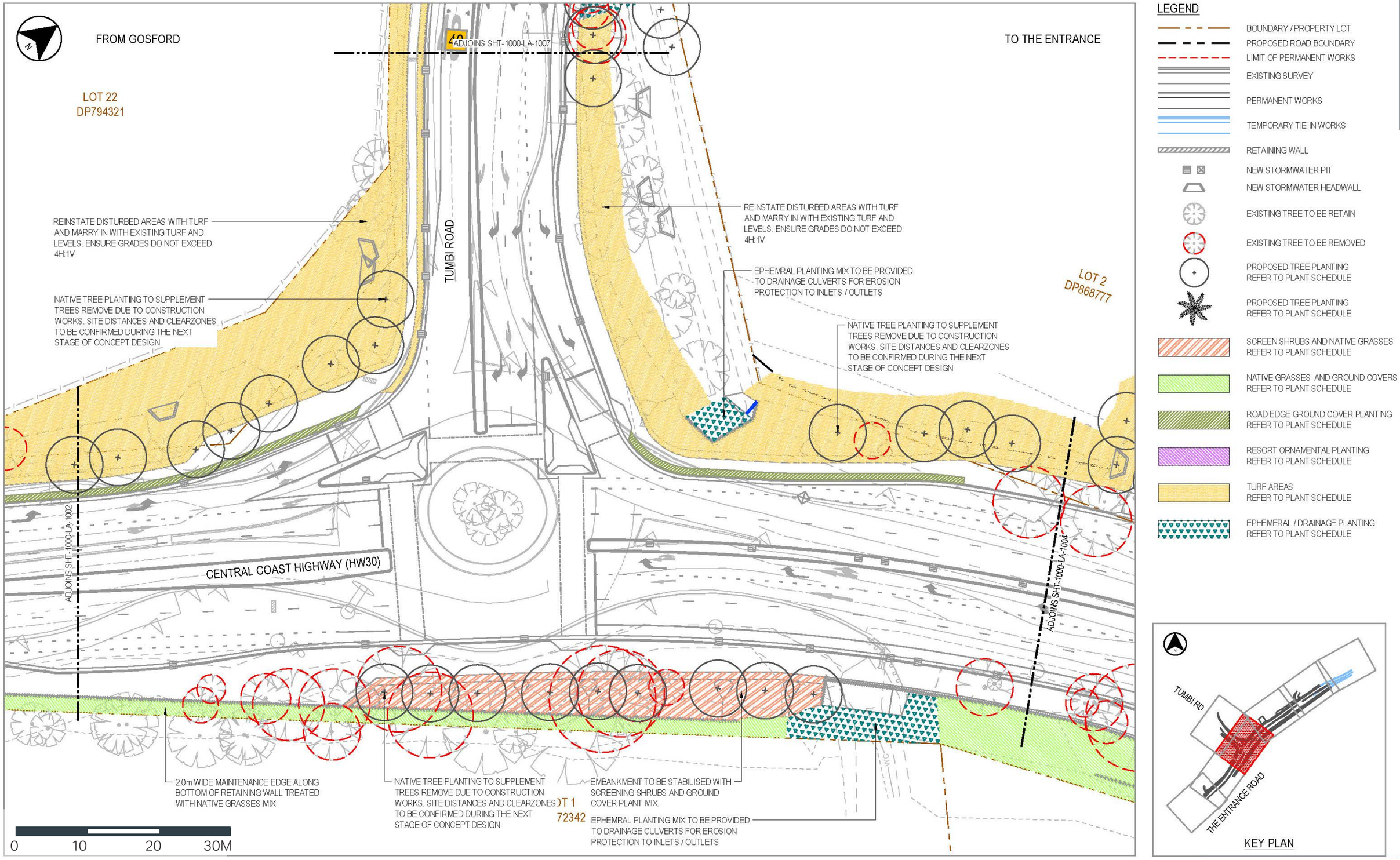



**Figure 41:** Landscape concept plan - Sheet 03

**Drafting note: Landscape and urban design still under development**

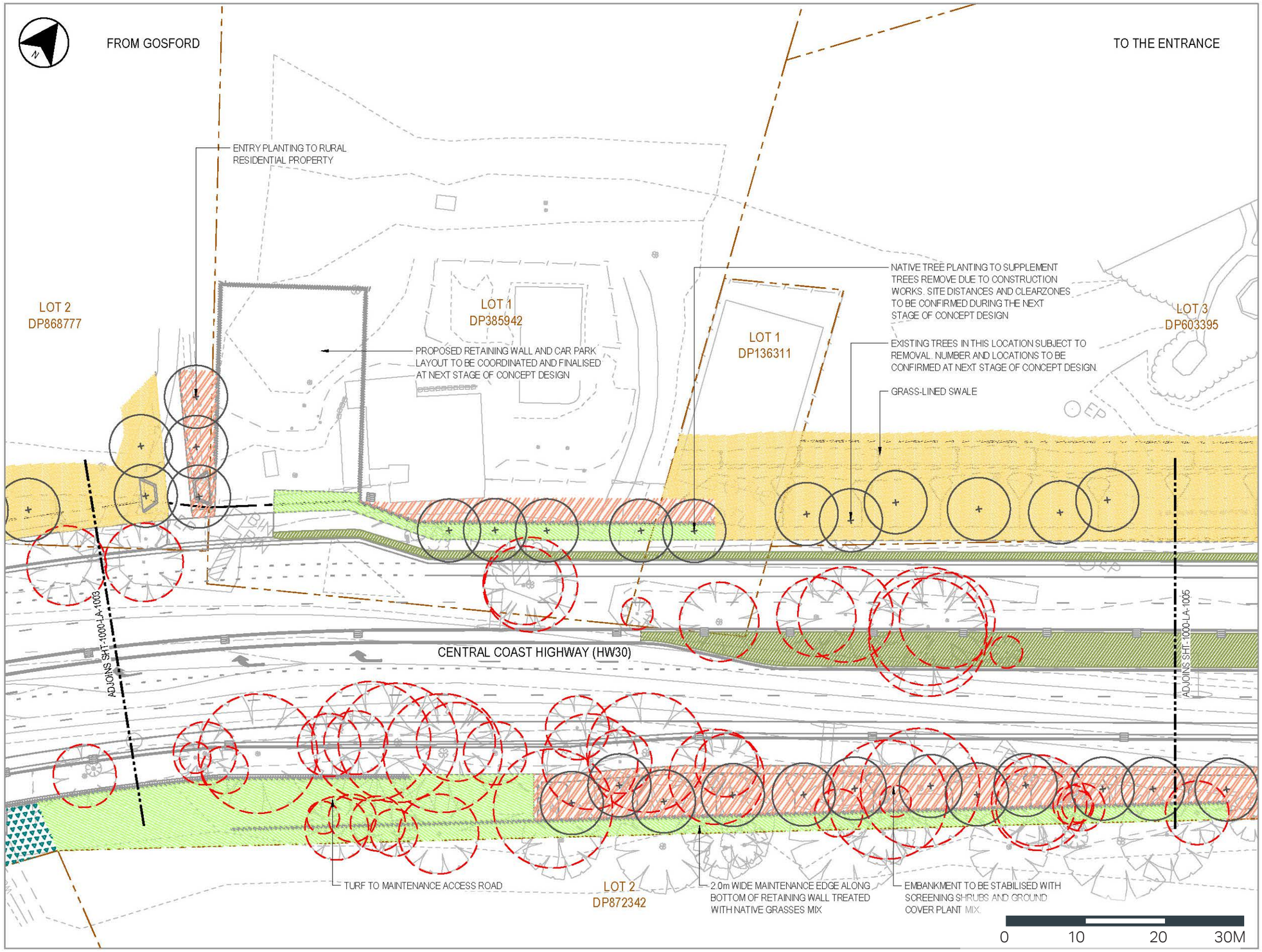
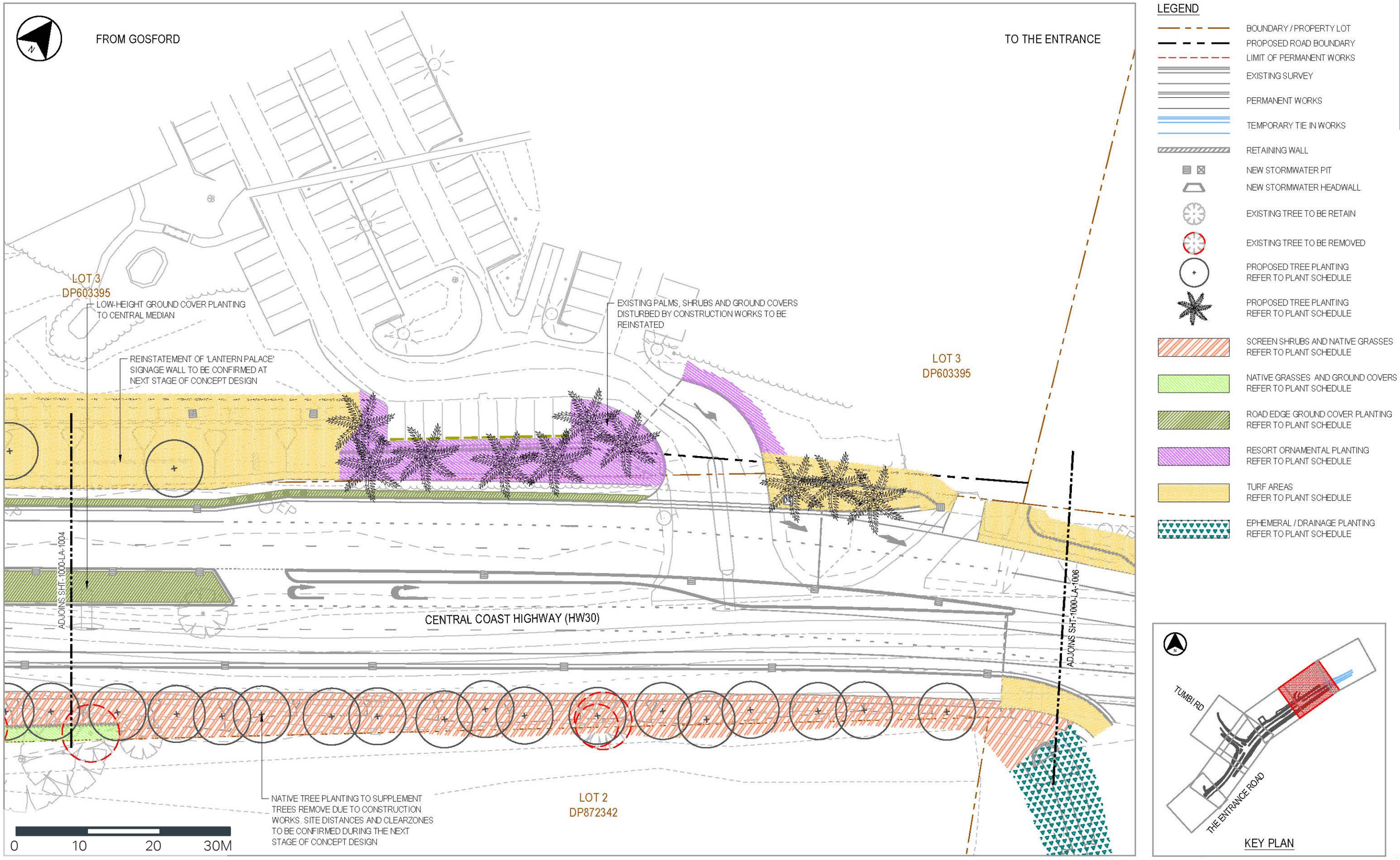



**Figure 42:** Landscape concept plan - Sheet 04

**Drafting note: Landscape and urban design still under development**




URBAN DESIGN CONCEPT

**Figure 43:** Landscape concept plan - Sheet 05

**Drafting note: Landscape and urban design still under development**

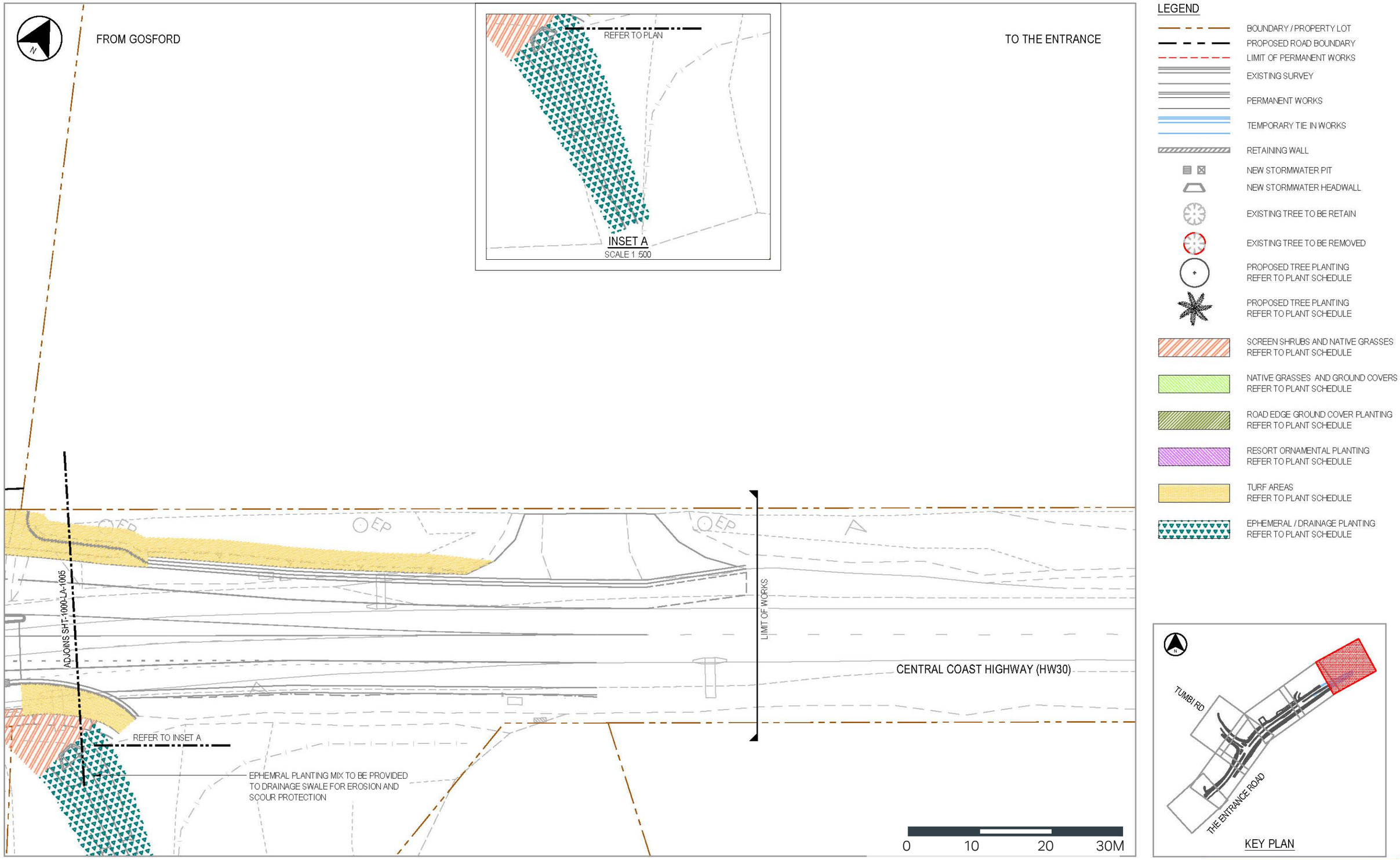
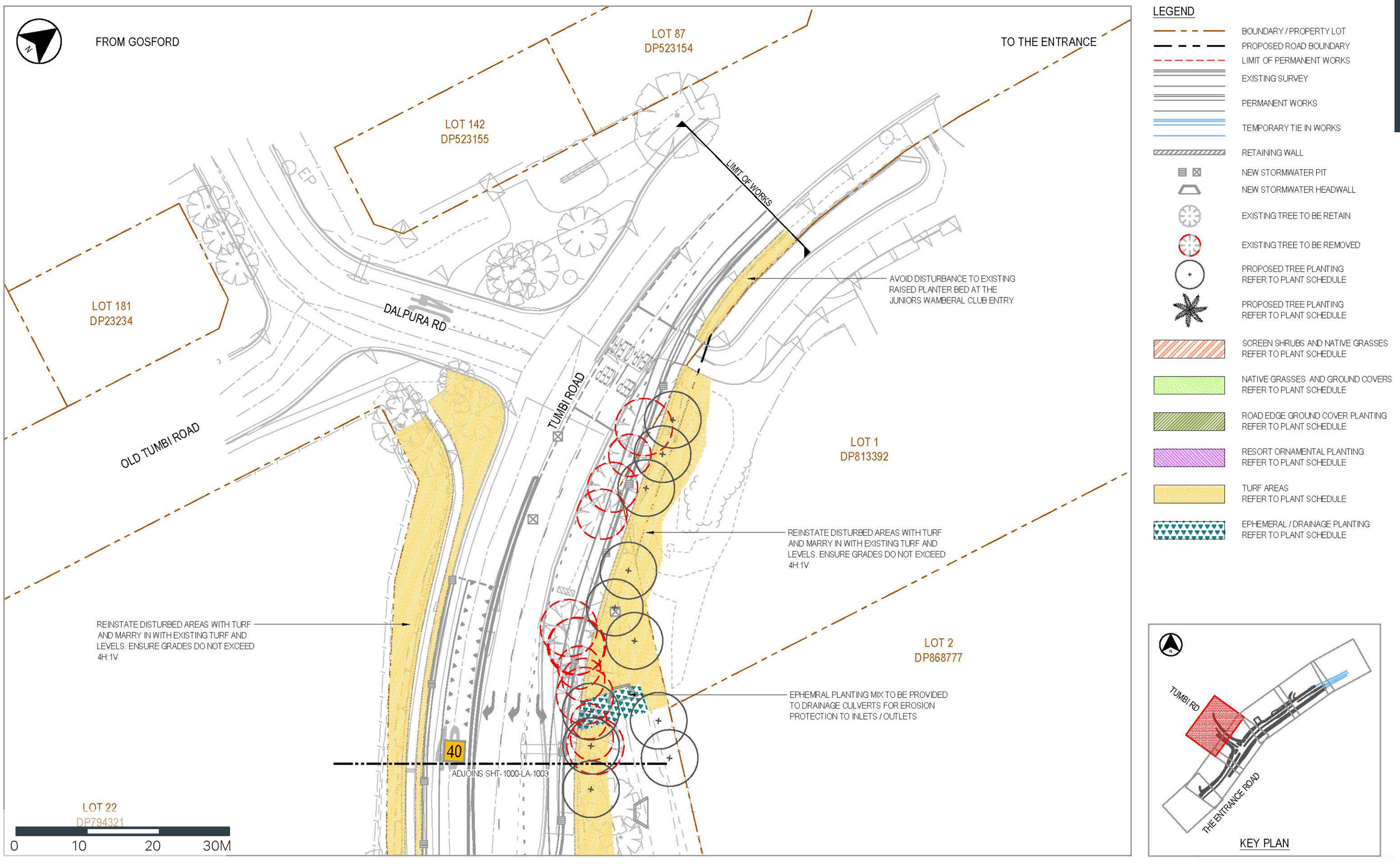



**Figure 44:** Landscape concept plan - Sheet 06

**Drafting note: Landscape and urban design still under development**




URBAN DESIGN CONCEPT

**Figure 45:** Landscape concept plan - Sheet 07

**Drafting note: Landscape and urban design still under development**

# 4.4 Landscape cross sections


**Key Plan (NTS)**

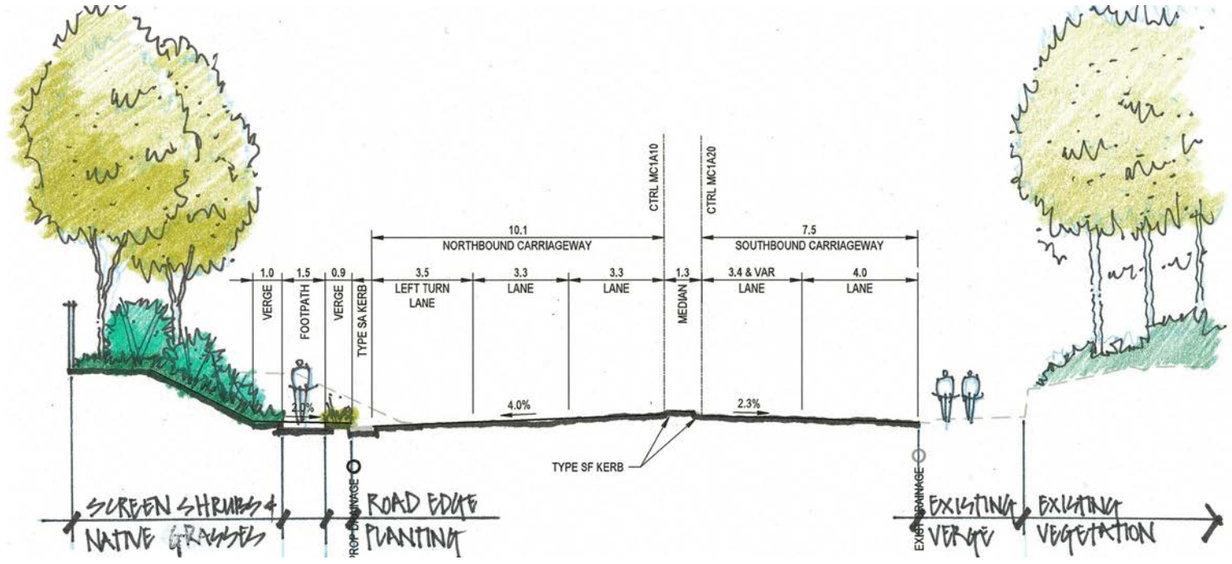



**Figure 47:** Cross section - CH 12710 (MC1A10)


**Key Plan (NTS)**

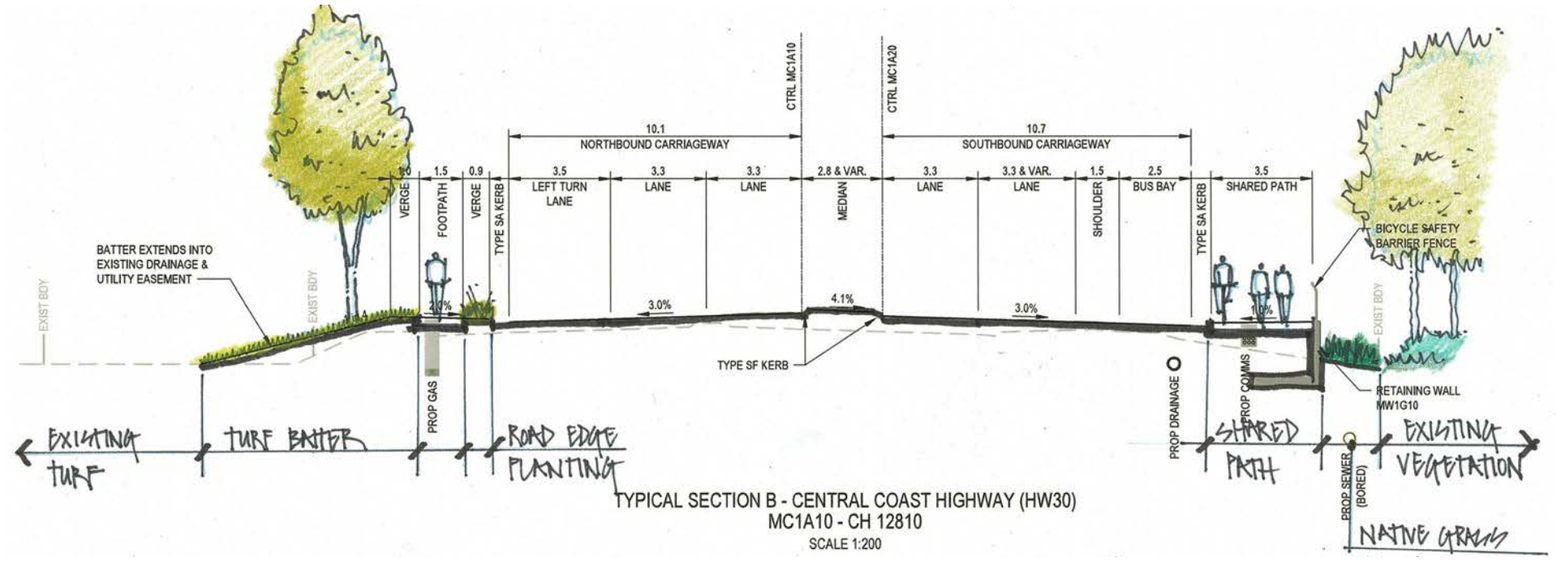



**Figure 46:** Cross section - CH 12810 (MC1A10)

**Drafting note: Landscape and urban design still under development**


**Key Plan (NTS)**

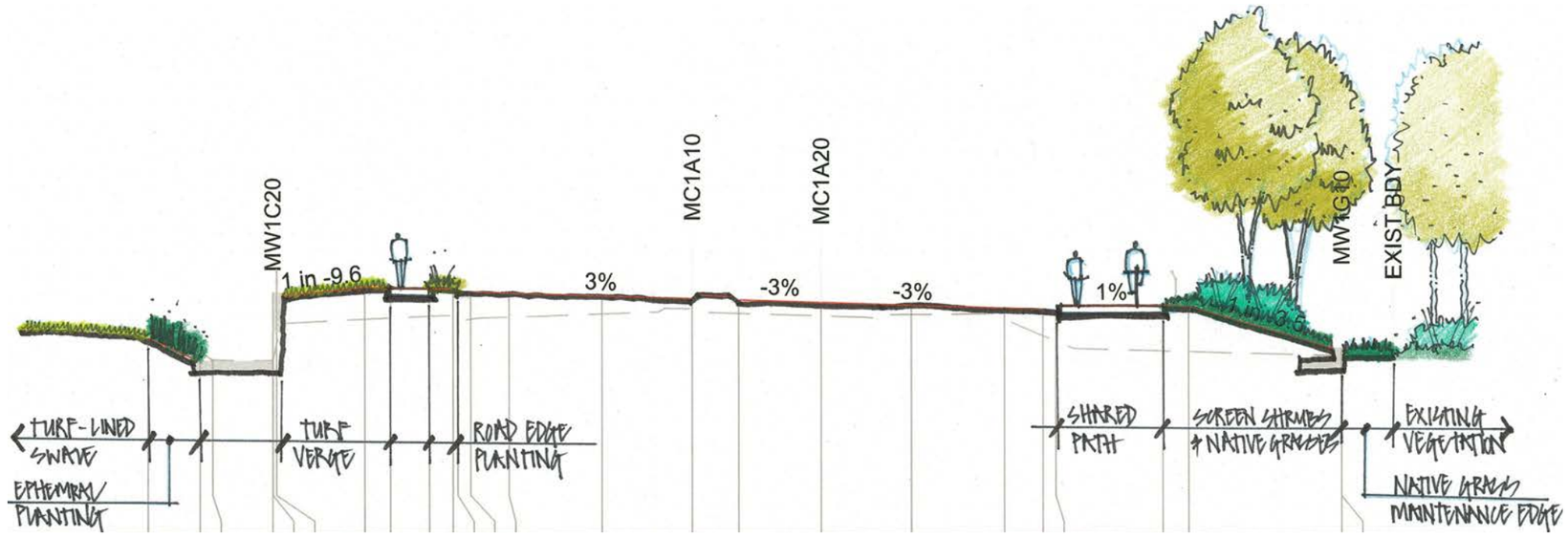



**Figure 49:** Cross section - CH 12910 (MC1A10)


**Key Plan (NTS)**

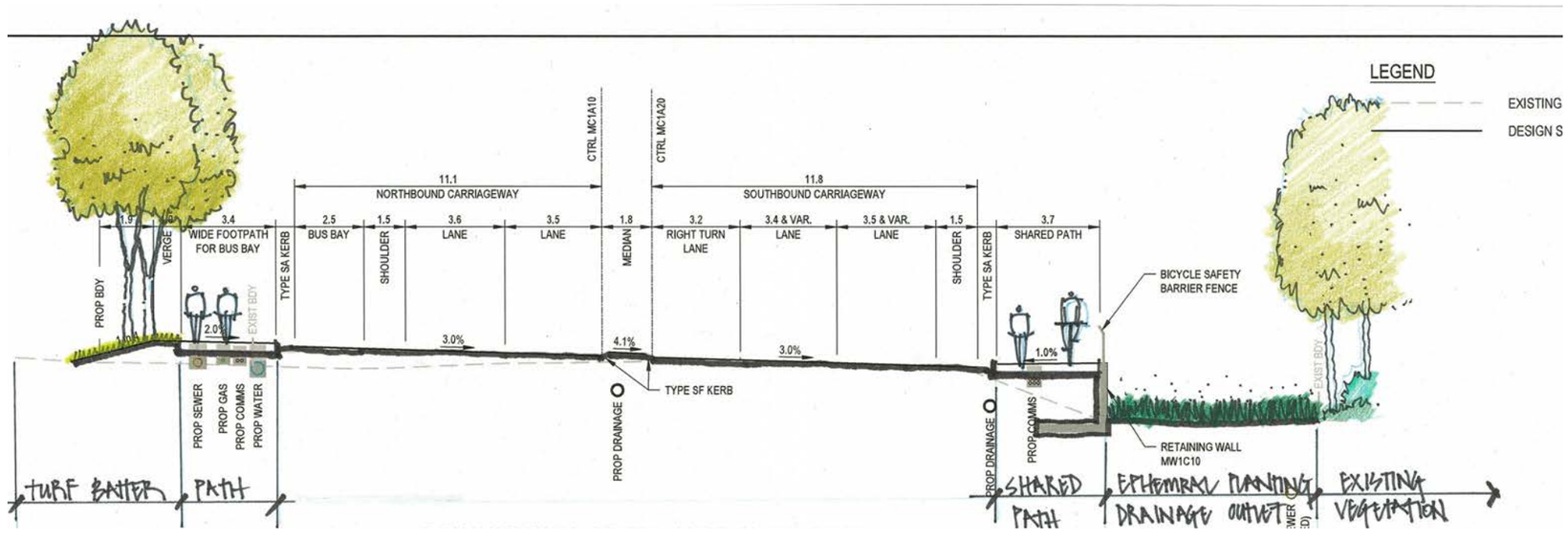



**Figure 48:** Cross section - CH 12945 (MC1A10)

**Drafting note: Landscape and urban design still under development**


**Key Plan (NTS)**

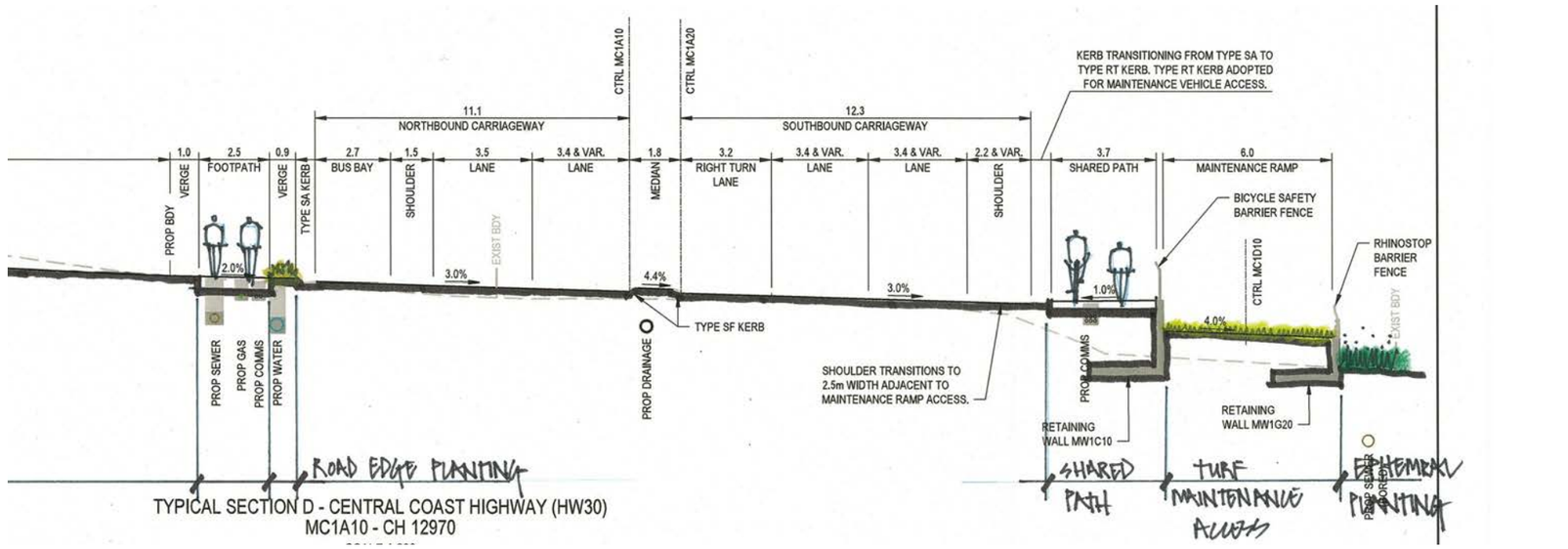



**Figure 51:** Cross section - CH 12710 (MC1A10)


**Key Plan (NTS)**

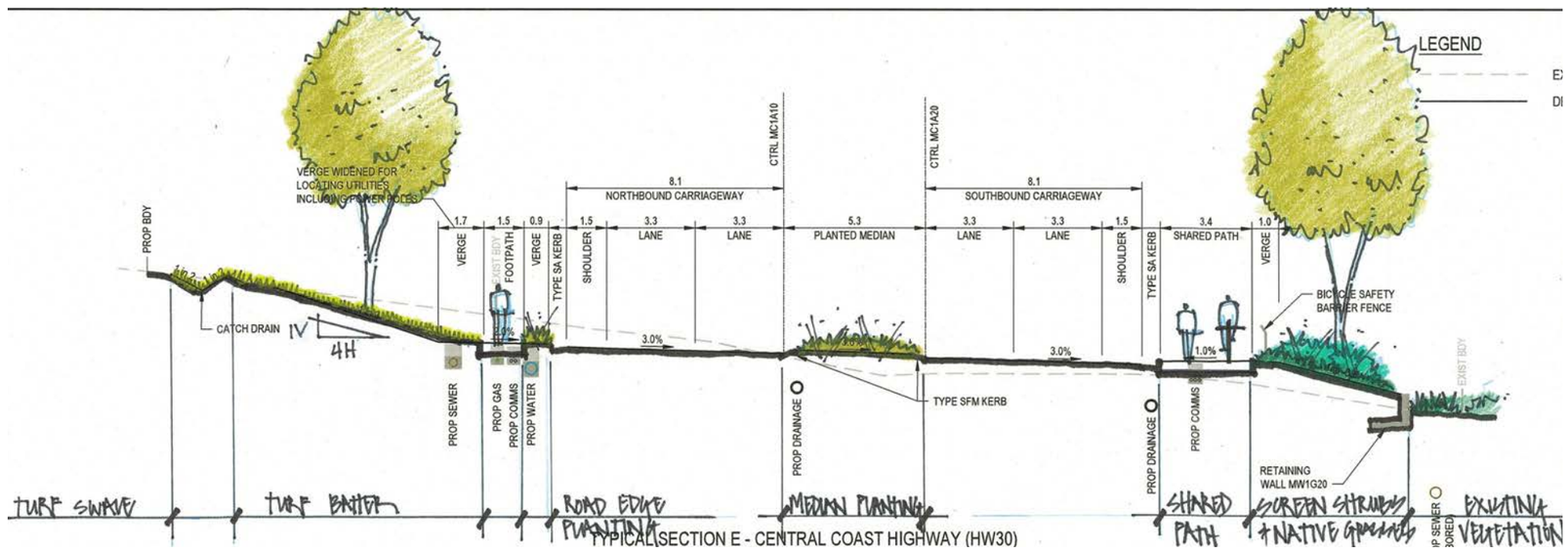



**Figure 50:** Cross section - CH 12810 (MC1A10)

**Drafting note: Landscape and urban design still under development**


**Key Plan (NTS)**

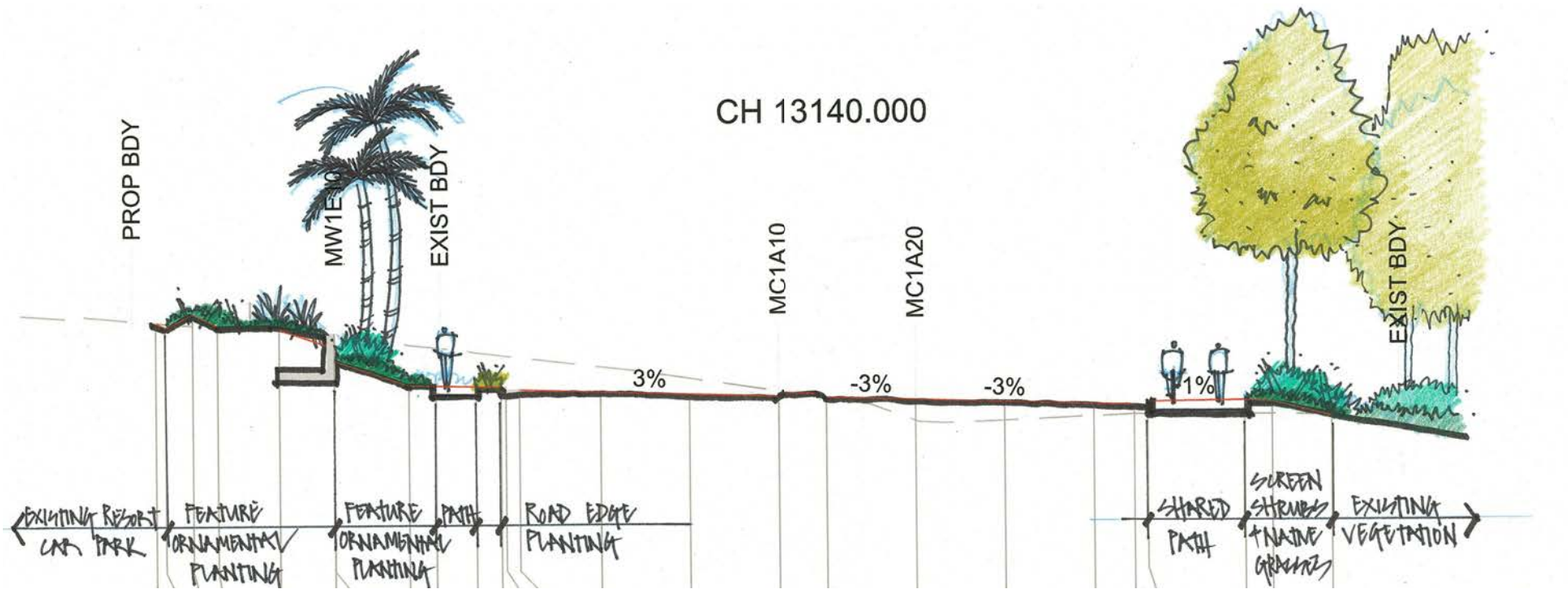



**Figure 53:** Cross section - CH 13120 (MC1A10)


**Key Plan (NTS)**

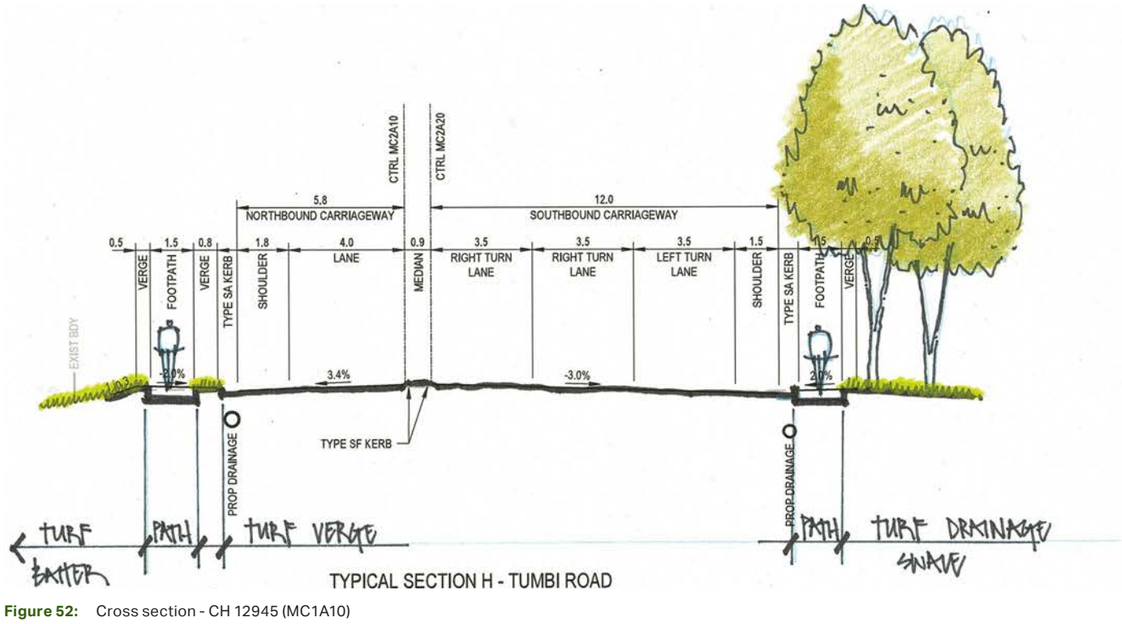



**Figure 52:** Cross section - CH 12945 (MC1A10)

## 4.5 Indicative species list

Indicative plant species to be used in landscaping the project are listed below. These have been selected due to their appropriateness for use within the region: either being locally native, or in the case of exotic species, reference cultural plantings within the reasidential areas adjacent the road corridor.

| Species | Common name | Type | | | | | |
|---|---|---|---|---|---|---|---|
| | | Native Screening Shrubs and Grasses | Native Grasses and Groundcovers | Road Edge Groundcover Planting | Resort / Ornamental Planting | Ephemeral / Drainage Planting | Trees |
| **Trees** | | | | | | | |
| *Banksia integrifolia* | Coast Banksia | | | | | | ● |
| *Callistemon salignus* | Sweet Willow Bottlebrush | | | | | ● | |
| *Corymbia maculata* | Spotted Gum | | | | | | ● |
| *Cupaniopsis anacardioides* | Tuckeroo | | | | ● | | ● |
| *Eucalyptus microcorys* | Tallowwood | | | | | | ● |
| *Livistona australis* | Cabbage Tree Palm | | | | ● | | |
| *Melaleuca quinquenervia* | Broad-leaved Paperbark | | | | | ● | |
| *Podocarpus elatus* | Plum Pine | | | | | | ● |
| *Syncarpia glomulifera* | Turpentine | | | | | | ● |
| *Syzygium luehmannii* | Riberry | | | | | | ● |
| **Shrubs** | | | | | | | |
| *Acmena smithii* | Lilly Pilly | ● | | | | | |
| *Acmena 'Sublime'* | Sublime Lilly Pilly | | | | ● | | |
| *Allocasuarina torulosa* | Forest Oak | ● | | | | | |
| *Breynia oblongifolia* | Coffee Bush | ● | | | | | |
| *Callistemon 'Better John'* | Bottle Brush | | | ● | ● | | |
| *Melaleuca nodosa* | Prickly-leaved Paperbark | | | | | ● | |
| *Ozothamnus diosmifolius* | White Dogwood | ● | | | | | |
| *Pittosporum revolutum* | Yellow Pittosporum | ● | | | | | |
| *Westringia 'Aussie Box'* | Native Rosemary | | | | ● | | |

| Species | Common name | Type | | | | | |
|---|---|---|---|---|---|---|---|
| | | Native Screening Shrubs and Grasses | Native Grasses and Groundcovers | Road Edge Groundcover Planting | Resort / Ornamental Planting | Ephemeral / Drainage Planting | Trees |
| **Ground covers, forbs, grasses** | | | | | | | |
| *Baloskion tetraphyllus* | Tassell Rush | | | | | ● | |
| *Baumea rubigiosa* | Soft Twig-rush | | | | | ● | |
| *Carex appressa* | Tall Sedge | | | | | ● | |
| *Chrysocephalum apiculatum* | Yellow Buttons | | | ● | ● | | |
| *Cissus hypoglauca* | Giant Water Vine | | | | | ● | |
| *Dianella caerulea* | Blue Flax Lily | ● | ● | ● | ● | | |
| *Gahnia clarkei* | Tall Saw-sedge | | | | | ● | |
| *Hibbertia scandens* | Climbing Snake Vine | | ● | | | | |
| *Imperata cylindrica var. major* | Blady Grass | ● | ● | | | | |
| *Lomandra longifolia* | Spiny-headed Mat-rush | | | | | ● | |
| *Microlaena stipoides* | Weeping Grass | ● | | | | ● | |
| *Schoenus brevifolius* | Zig-zag Bog-rush | | | | | ● | |
| *Themeda australis* | Kangaroo Grass | ● | ● | | | | |
| *Grevillea 'Mt Tamboritha'* | Groundcover Grevillea | | | ● | ● | | |

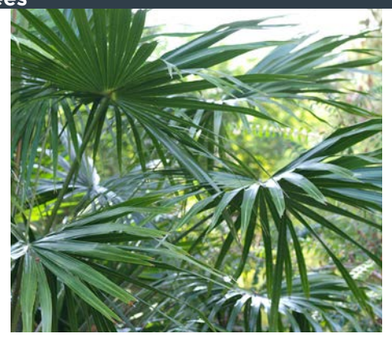
Note - Proposed bush regeneration species to be further developed in consultation with a bush regeneration specialist using species from the adjacent vegetation communities.

## Trees

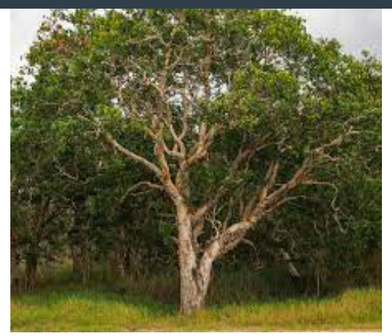
*Banksia integrifolia* **(Coast Banksia)**

*Cupaniopsis anacardioides* **(Tuckeroo)**

*Eucalyptus microcorys* **(Tallowwood)**



*Livistona australis* **(Cabbage Tree Palm)**



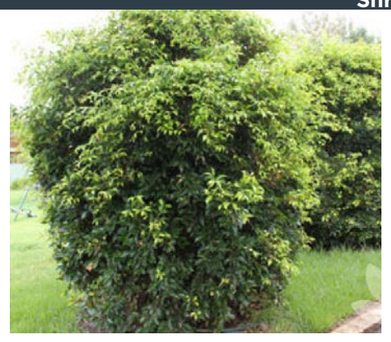
*Melaleuca quinquenervia* **(Broad-leaved Paperbark)**

*Podocarpus elatus* **(Plum Pine)**

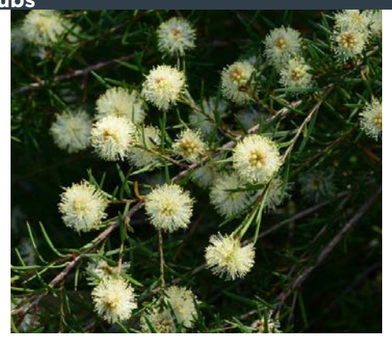
## Shrubs

*Breynia oblongifolia* **(Coffee Bush)**

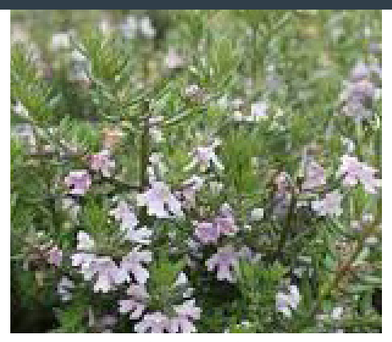
*Ozothamnus diosmifolius* **(Rice Flower)**



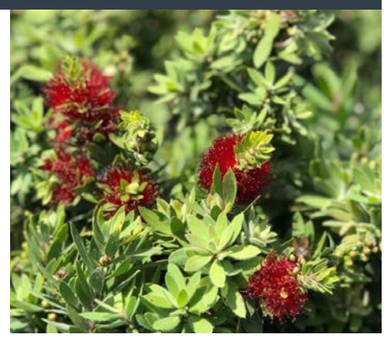
*Acmena 'Sublime'* **(Sublime Lilly Pilly)**



*Melaleuca nodosa* **(Prickly-leaved Paperbark)**



*Westringia 'Aussie Box'* **(Native Rosemary)**



*Callistemon 'Better John'* **(Bottle Brush)**

## Ground covers, forbs and grasses

*Imperata cylindrica* **(Blady Grass)**

*Cissus hypoglauca* **(Giant Water Vine)**

*Themeda australis* **(Kangaroo Grass)**

*Dianella caerulea* **(Blue Flax-lily)**

*Hibbertia scandens* **(Climbing Snake Vine)**

*Grevillea 'Mt Tamboritha'* **(Groundcover Grevillea)**

**Drafting note: Landscape and urban design still under development**

# 4.6 Urban design approach

In delivering a coordinated and integrated design it is necessary of various elements of the design team to work collaboratively on a whole-of-corridor outcome. This allows for a shared vision to be carried through from design through to procurement, implementation, operation and maintenance.

For this proposal, collaboration between the urban design team and the project design team has developed a coordinated and integrated design approach for the urban design components consistent with The Andrews Neil Report and Beyond the Pavement.

The integrated urban design outcome presented here delivers:

- A safe road environment
- A design that minimises the impacts on the natural land form as much as possible
- Consistent elements that follow a common design approach, adapted to each context
- A simple, unified 'whole-of-corridor' design of the road corridor and its components that considers maintenance and associated whole-of-life costs.

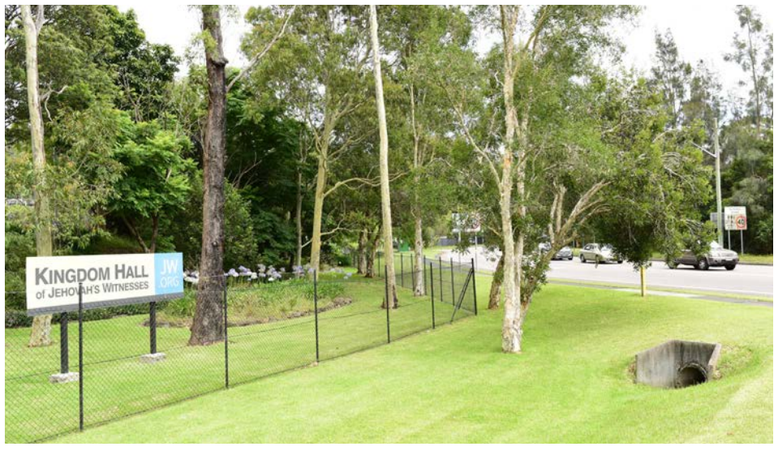
## 4.6.1 Urban design components

The urban design response follows on from the urban design objectives and principles developed and aims to identify a specific direction for the project.

The following urban design components have been coordinated as part of this Proposal:

- Retaining walls
- Safety barriers, fences and handrails.

These urban design components are further desribed on the following pages.


**Drafting note: Landscape and urban design still under development**

## 4.7 Retaining walls

Retaining wall structures are required to accommodate the Proposal and to limit encroachment of the project into interfacing properties and vegetation communities, particularly to the east. Design collaboration on retaining wall types and locations occurred early in the concept design process to identify and mitigate adverse physical and visual impacts.

The general approach guiding the retaining wall design included:

- Minimise their use along the project
- Where retaining walls cannot be avoided, minimise their visibility by providing landscape screening in front, especially from publicly accessible locations
- Achieve a consistent appearance for all retaining walls across the project, where required
- Selection of exposed finishes, materiality and embellishment should be consistent and integrated with the surrounding context
- Finished surface design should discourage graffiti / vandalism and consider methods for removal / rectification.

The predominant construction for the retaining walls across the project is in-situ concrete walls. The prescribed finishes to the retaining walls is dependent on their location along the road corridor, however visually prominent retaining walls would have a 'higher' level of embellishment than those less visible.

The proposed retaining walls types and finishes have been identified below with their locations shown on *Figure 54*:

- Type 1 Proposed retaining walls: In-situ concrete walls - would consist of minimal surface embellishment limited to smooth concrete face and inscribed vertical joints at consistent intervals. These walls are proposed for locations that are not visible from public areas
- Type 2 Proposed retaining walls (TBC): In-situ concrete walls - this wall would consist of a medium level of embellishment to exposed faces and is proposed along the frontage to the Wamberal Grocer and Fruit Market. The requirement for a retaining wall at this location is to be confirmed
- Type 3 Feature clad retaining walls: In-situ concrete walls - this wall is located along the frontage to the Pacific Garden Hotel and would have an feature clad finish to exposed surfaces to lift its appearance from the Central Coast Highway
- Type 4 Drainage culvert walls - would consist of a similar level of finish as Type 1 retaining walls, as they will generally interface with each another.

The design development for each of these retaining wall types will be further investigated and resolved in the next stage of concept design.

**Drafting note: Likely embelishment of retaining walls facing the public domain still under development, to be added.**


**Figure 54:** Proposed retaining wall types and locations

**Drafting note: Landscape and urban design still under development**

## 4.8 Safety barriers, fences and handrails

A review of roadside safety barriers, fences and handrails was undertaken to design-out, simplify and integrate with retaining wall structures. Coordination was also undertken to rationalise the barriers, fences and handrails to minimise awkward interface details and to provide an unclutterd and legible design outcome.

A total of six types of safety barriers, fences and handrails have been adopted for the proposal:

- Pedetsrian fence / handrail - generally used as pedestrian handrails or as maintenance safety balustrades along the top of retaining walls. This handrail would be simple in its design consisting of a top and mid-height rail with regularly spaced vertical posts
- Shared path fence / handrail - this fence would be used along the shared path on the eastern side of the Central Coast Highway and would consist of a top and bottom rail with vertical infill balusters. A separate grabrail would extend from the balustrade
- Handrail on top of culvert - this would be consistent in appearance to the pedestrian fence / handrail, and located on top of drainage culvert walls for safety purposes
- Rhino stop barrier fence - a low-performance vehicle safety barrier located along the vehicle maintenance access track from the Central Coast Highway to the Wamberal Lagoon Nature Reserve
- Maintenance access gate - a simple, low-height maintenance access gate that would not be highly visible from the road corridor. This gate would be located at the entrance to the vehiclular maintenance access road on the southbound carriageway
- Vehicle protection bollards - these bollards would be located at the vehicle U-turn bay adjacent to the Pacific Garden Hotel entrance to prevent vehicles from mounting the kerb and pedestrian footpath. These bollards will be selected to be highly visible along the road environment.

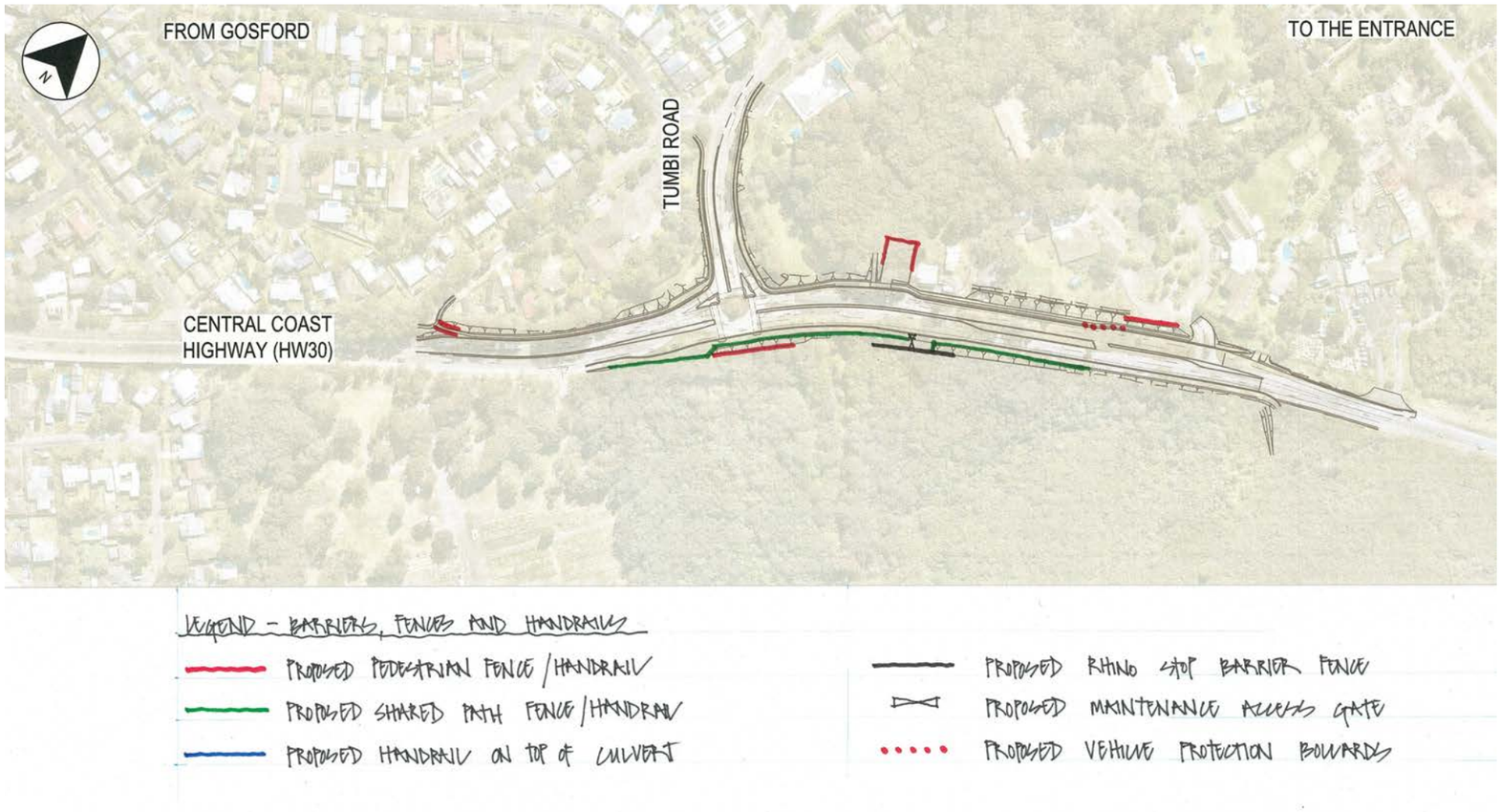



**Figure 55:** Proposed barrier, fence and handrail types and locations

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View west along Dalpura Road (Source: AECOM)

# 5 LANDSCAPE CHARACTER IMPACT ASSESSMENT

## 5.8.1 LCZ 1: Recreational and Bushland Open Space

**Description of works**

This LCZ lies adjacent to the southeastern and eastern boundary of the proposal. Along the Central Coast Highway, the widening of the road would result in the following changes to the edge of the LCZ:

- the removal of vegetation within this LCZ along the road corridor
- the construction of retaining walls and batters to mitigate the difference in levels between the road and the surrounding landscape
- the construction of a concrete footpath and the widening of the road into this LCZ
- the construction of drainage infrastructure
- landscaping.

**Sensitivity: Moderate**

The sensitivity is influenced by:

- the LCZ has a high susceptibility to change. Construction of road infrastructure elements are uncharacteristic within this LCZ and the likely congruency of the proposal with the LCZ is low
- the landscape value of the LCZ is high due to its recreational and environmental values. The LCZ contains nationally valued landscapes (National Parks and Reserves).

**Magnitude: Low**

The magnitude is influenced by:

- the changes comprise the widening of an existing road adjacent to this LCZ, rather than a new piece of infrastructure within this LCZ
- the changes only occur along an edge of the LCZ, which would not substantially affect the character of the overall LCZ
- there would be minimal loss or addition of features within the LCZ, although there would be some clearing of vegetation along the roadside and a slight encroachment of road infrastructure east into the LCZ
- the duration of the change would be long term, although with the maturation of the landscaping along the length of the road, the changes would decrease in visibility over time.

**Landscape character assessment: Moderate to Low**

The rating is primarily influenced by:

- the LCZ has high recreational and environmental landscape values
- however, the proportion of the overall LCZ affected by the proposal is very low
- there would be a small amount of vegetation cleared and the expansion of road infrastructure within the LCZ, but only at an edge which is shared by the LCZ and an existing road corridor.

**Figure 56:** Keyplan showing extent of LCZ in green (Source: AECOM)

**Table 3:** Landscape character assessment - LCZ 1: Recreational and Bushland Open Space

| Landscape Character Impact Assessment | |
|---|---|
| Sensitivity | Moderate |
| Magnitude of Change | Low |
| Impact | Moderate to Low |

## 5.8.2 LCZ 2: Rural Residential

**Description of works**

This LCZ lies adjacent to the northern corner of the intersection of Tumbi Road and the Central Coast Highway. Changes would be limited to the very edge of the LCZ and would include:

- the removal of vegetation fringing the road corridor
- the construction of retaining walls and batters
- the construction of a concrete footpath
- the relocation of a driveway to a property
- the removal or alteration to the landscape for a small number of residential and commercial buildings
- landscaping.

**Figure 57:** Keyplan showing extent of LCZ in dark blue (Source: AECOM)

**Sensitivity: Moderate**

The sensitivity is influenced by:

- the LCZ is a rural residential setting, common within the overall landscape
- the likely congruency of the proposal with the LCZ is moderate, with main roads being common within the character of the overall LCZ.

**Magnitude: Low**

The magnitude of landscape impact is influenced by:

- the changes result in a localised widening of the road corridor adjacent to the LCZ
- there would be a small number of built structures removed from the edge of the LCZ which may result in a localised change in character, but would not substantially affect the overall character of the LCZ as the changes are positioned within a visually enclosed area
- the duration of the change would be long term, although with the maturation of the landscape along the length of the road, the changes would decrease in visibility over time.

**Landscape character assessment: Moderate to Low**

The rating is primarily influenced by:

- the LCZ has a moderate level of landscape value
- the proposal would result in a localised change but no overall change in character.

**Table 4:** Landscape character assessment - LCZ 2: Rural Residential

| Landscape Character Impact Assessment | |
|---|---|
| Sensitivity | Moderate |
| Magnitude of Change | Low |
| Impact | Moderate to Low |

## 5.8.3 LCZ 3: Low Density Residential

**Description of works**

This LCZ lies adjcent to the proposal at the western edge of the intersection of Tumbi Road and the Central Coast Highway. Changes would be limited to the edge of the LCZ where it meets the proposal footprint and would include:

- the removal of vegetation within this LCZ along the road corridor
- the construction of batters to mitigate the difference in levels between the road and the surrounding landscape
- the construction of a concrete footpath
- the construction / alteration of drainage infrastructure
- landscaping.

**Figure 58:** Keyplan showing extent of LCZ in light blue (Source: AECOM)

**Sensitivity: Moderate**

The sensitivity is influenced by:

- the residential setting, which is common within the area, and the LCZ contains elements of cultural importance (e.g. places of worship and community facilities)
- the likely congruency of the proposal is moderate considering roads are a characteristic element within the LCZ.

**Magnitude: Low**

Similar to that within LCZ 2, the magnitude of landscape impact is influenced by:

- the proposal resulting in change to a road corridor outside this LCZ, maintaining a similar size and scale
- the change occurs only on the boundary as a result of the road widening within the road corridor
- the change occurs next to a small proportion of the overall LCZ
- the duration of the change would be long term, although the visual prominence of the change would reduce over time with the maturation of the landscaping.

**Landscape character assessment: Moderate to Low**

The rating is primarily influenced by:

- the moderate level of landscape value of the LCZ
- the small percentage of overall LCZ that would be affected by the changes
- at this location the changes are somewhat limited to the road corridor, with little to no encroachment into this LCZ.

**Table 5:** Landscape character assessment - LCZ 3: Low Density Residential

| Landscape Character Impact Assessment | |
|---|---|
| Sensitivity | Moderate |
| Magnitude of Change | Low |
| Impact | Moderate to Low |

## 5.8.4 LCZ 4: Education

**Description of works**

None of the proposal would occur within or adjacent to this LCZ.

**Sensitivity: Moderate**

The sensitivity is influenced by:

- the high landscape value due to cultural and community values associated with the landuse. The typically small areas associated with this LCZ result in changes more likely to affect overall landscape character
- however, the distance of the proposal from the LCZ coupled with the visual isolation of the LCZ within the greater landscape due to topography and vegetation reduce the sensitivity of the LCZ to the proposal.

**Magnitude: Negligible**

The magnitude of change to the LCZ is negligible given its separation from the proposal.

There would be no loss, change or addition of any feature within the LCZ.

**Landscape character assessment: Negligible**

**Table 6:** Landscape character assessment - LCZ 4: Education

| Landscape Character Impact Assessment | |
|---|---|
| Sensitivity | Moderate |
| Magnitude of Change | Negligible |
| Impact | Negligible |

**Figure 59:** Keyplan showing extent of LCZ in pink (Source: AECOM)

## 5.8.5 LCZ 5: Transport Corridor

**Description of works**

Changes within this LCZ include:

- removal of vegetation
- construction of batters and retaining walls
- reconfiguring and construction of drainage infrastructure
- realignment of the intersection at Tumbi Road, including removal of the roundabout and installation of a signalised intersection
- reconfiguration of lanes, construction of a new concrete median, introduction of turning lanes
- widening of the road corridor nearing the intersection
- landscaping.

**Sensitivity: Moderate**

- The landscape value of the LCZ is low. The LCZ is utilitarian in design in that the function of the landscape as paramount to its design
- However, the road corridor has scenic qualities associated with the landscape through which the corridor passes, particularly where the road passes natural areas such as Wamberal Lagoon Nature Reserve.
- The likely congruency of the proposal with the LCZ is high, with the proposal resulting in the reconfiguration of an existing intersection.

**Figure 60:** Keyplan showing extent of LCZ in yellow (Source: AECOM)

**Magnitude: Moderate**

The magnitude of landscape impact is influenced by:

- the proposal would result in a localised increase in the scale of the road corridor and intersection
- there would be both loss of features within the LCZ (the roundabout at Tumbi Road) and the addition of elements (a signalised intersection) within the LCZ
- the proposal would affect only a small portion of the overall LCZ, but within the study area this makes up a sizable proportion of the LCZ. Within the context of the LCZ outside of the study area (i.e. the greater stretch of the Central Coast Highway) the changes would be very localised
- the duration of the impact would be long term with no chance of reversibility. However, the changes would visually reduce over time with the maturation of landscaping.

**Landscape character assessment: Moderate**

The rating is primarily influenced by:

- the value of the landscape is low due to the function-driven design, however, the road passes through scenic areas, particularly adjacent to the bushland associated with Wamberal Lagoon Nature Reserve
- the changes result in a similar (albeit widened) road outcome with a change to the configuration of an intersection.

**Table 7:** Landscape character assessment - LCZ 5: Transport Corridor

| Landscape Character Impact Assessment | |
|---|---|
| Sensitivity | Moderate |
| Magnitude of Change | Moderate |
| Impact | Moderate |


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# 6 VISUAL IMPACT ASSESSMENT

## 6.1 Visual impact at operation

### 6.1.1 Zone of Theoretical Visibility

Zone of Theoretical Visibility (ZTV) mapping has been undertaken for the proposal. This provides an indication of which parts of the proposal are likely to be visible from the surrounding landscape. The mapping process uses landform data only (topographic mapping) without any landcover, i.e. no trees or buildings are 'seen' by the program. Additionally, some receivers might only see parts of the proposal such as the top of traffic lights, while other receivers would view more substantial parts of the proposal.

Considering only the topography of the surrounding landscape, the proposal would theoretically be seen from the landscape to the east and west of the intersection of Tumbi Road and the Central Coast Highway (refer *Figure 61*). However, the built form and tall, dense vegetation surrounding the proposal limits views to the intersection.

During the site visit it was confirmed that the dense vegetation within Wamberal Lagoon Nature Reserve screens views to the intersection from the east and southeast. Dense vegetation on the northern corner of the intersection and along the roadside screens views to the intersection from the north and north west. A band of vegetation both in the road verge and within private properties to the west of the intersection screens views from the residential suburb to the west.

The proposal footprint therefore has a very small visual footprint within the surrounding landscape.

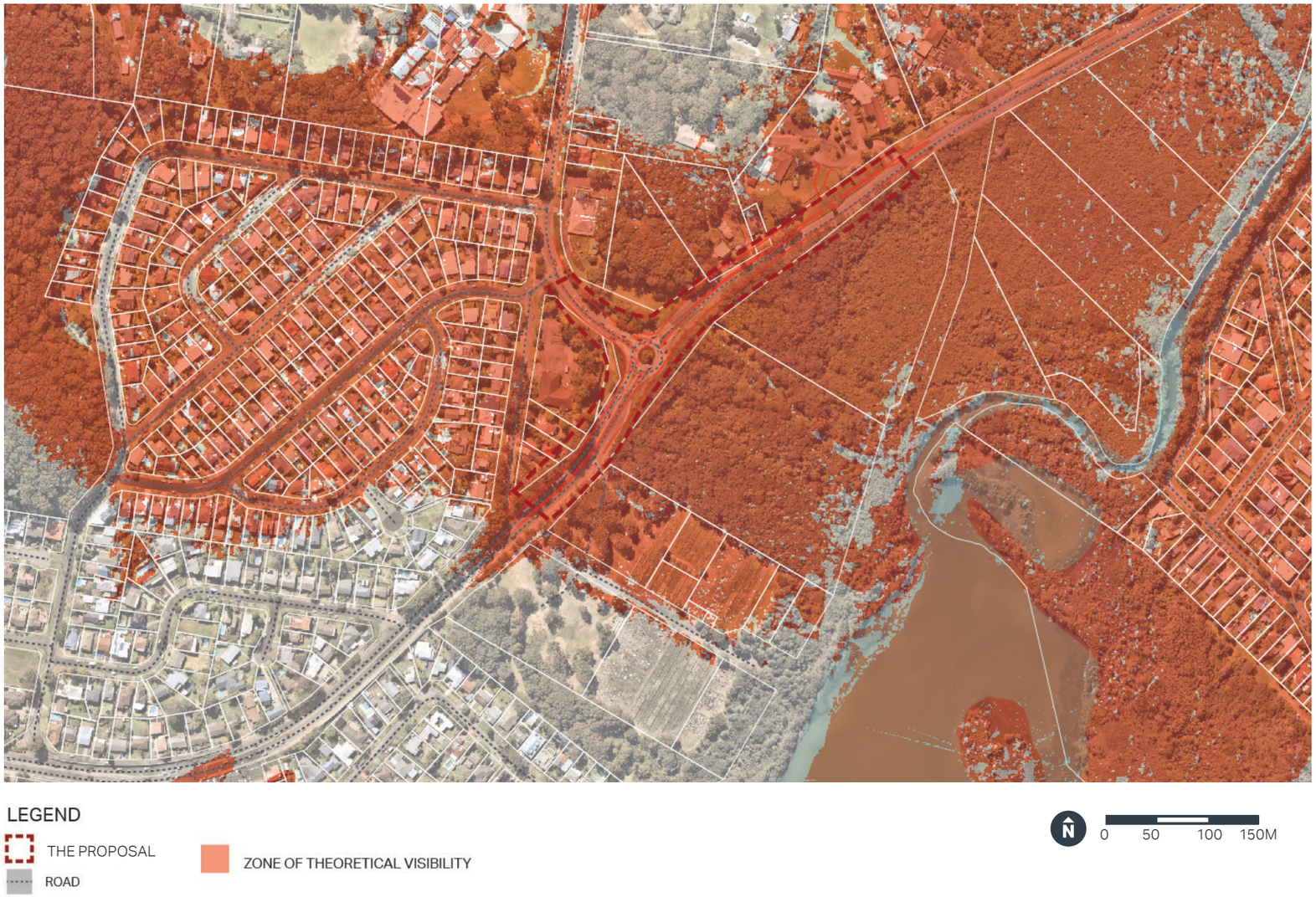


**Figure 61:** Zone of Theoretical Visibility Map, 1:5,000 at A3 (Source: AECOM)

## 6.1.2 Visual receptors

Two visual receptor types have been defined, each of which are considered to typically share defined sensitivity to change in the character of the current views:

- Private Domain – views from residences and places of work or worship.
- Public Domain – views from parks, sports fields, roads, footpaths and cycleways, walking tracks and other public facilities.

### 6.1.2.1 Representative viewpoints

Five representative viewpoints have been chosen to assess potential impacts on existing views seen by the above visual receptors (refer *Figure 62*). These viewpoints are all positioned within the road corridor and typically at intersections to represent the clearest view to the changes as possible, but discuss potential changes seen by surrounding receptors at each location.

The rationale for choice of viewpoint locations comprises:

- **Viewpoint 1: Central Coast Highway North**
  Representative view for road users on the Central Coast Highway at this location
- **Viewpoint 2: Tumbi Road Intersection**
  Representative view for road users and visitors to the Kingdom Hall of Jehovah's Wittnesses at this intersection
- **Viewpoint 3: Central Coast Highway South**
  Representative view for road users and visiors to the Wamberal Cemetary
- **Viewpoint 4: Dalpura Road Intersection**
  Representative view for road users and nearby residents
- **Viewpoint 5: Aldinga Drive Intersection**
  Representative view for road users, nearby residents and visitors to a preschool at this location on Tumbi Road.


**Figure 62:** Representative viewpoint locations, 1:5,000 at A3 (Source: AECOM)

## 6.1.3 Assessment of viewpoints

### 6.1.3.1 Viewpoint 1: Central Coast Highway North

This viewpoint is positioned approximately 120 m north of the Tumbi Road Intersection on the Central Coast Highway and is representative of the view seen by road users as they travel southwest (refer *Figure 63*).

**Description of current view**

The existing view is shown in *Figure 64*.

The view from this viewpoint to the southwest comprises the Central Coast Highway road corridor, with the intersection with Tumbi Road seen in the middleground of the view. The road is fringed by tall, dense bushland associated with Wamberal Lagoon Nature Reserve on the eastern verge of the highway framing the view along the road.


**Figure 63:** Keyplan showing viewpoint 1 (Source: AECOM)

At the intersection with Tumbi Road, a large, planted roundabout lies within the road corridor, with the intersection fringed with turf verges and exotic vegetation. The background of the view comprises the vanishing point where the Central Coast Highway disappears from view as it curves and is screened by the tall fringing native vegetation on either side of the road.

**Anticipated change to the view**

Changes to the view are illustrated in *Figure 65* and *Figure 66* and include:

- removal of vegetation, particularly from the eastern side of the Highway
- widening of the road corridor
- realignment of the intersection at Tumbi Road, including removal of the roundabout and installation of a signalised intersection
- reconfiguration of lanes, construction of a new concrete median, introduction of turning lanes
- construction of batters and retaining walls
- reconfiguring and construction of drainage infrastructure
- new signage, safety infrastructure and road furniture
- landscaping.

**Sensitivity: High**

The sensitivity of receptors at this viewpoint is influenced by the following factors:

- the view is seen from a highway by a high number of motorists who would be expected to primarily be focussing on the road and traffic
- many of the motorists would be driving to and from, or as part of work-related activities, and as such not having a primary focus on the amenity of the landscape
- motorists would primarily fall within the workers or local residents category, with a smaller number comprising tourists or holiday makers
- the view is a relatively fleeting one as motorists move towards, and past, the intersection
- the quality of the existing view is moderately picturesque, particularly with the bushland associated with the Wamberal Lagoon Nature Reserve to the east.

**Magnitude: High**

The magnitude of change at this viewpoint is influenced by:

- the scale of the road corridor within the view would increase due to the proposal, with the road widening leading up to the intersection with Tumbi Road
- the view south along the road corridor would be visually 'opened up' due to the widening of the road, the addition of elements within the verge (e.g. footpath and planting / turf) and the removal of dense vegetation from either side of the road
- additional features would be seen within the view, including a new signalised intersection to replace the existing roundabout, additional pedestrian footpaths, and new landscaping
- an increased amount of visual clutter would be seen within the road corridor, comprising traffic lights, street signage and street lighting
- there would be an increased amount of lighting at night within the road corridor, including the lighting at the intersection and traffic lights. Light spill beyond the road corridor may increase due to the removal of roadside vegetation
- elements would be lost from within the view, including the existing landscaped intersection and vegetation from beside the road corridor
- while elements would be added or removed from within the view, the overall effect would result in a replacement of existing road infrastructure with similar, albeit slightly larger scaled, elements
- the changes would be seen from close proximity, but for short periods of time as the receptor moved towards and past the Tumbi Road intersection
- the changes would be seen over a large proportion of the view from this location
- the duration of the changes would be long term and with no chance of reversibility, however, would become less visually prominent over time as the proposed landscaping matured, particularly any planting to the east along the road edge adjacent to the Wamberal Lagoon Nature Reserve.

**Figure 64:** Existing view from viewpoint (Source: AECOM)


**Figure 65:** Proposed changes to view from viewpoint (Source: AECOM)

‘Adverse’, ‘Neutral’ or ‘Beneficial’

**Visual Impact Assessment: Moderate (Adverse)**

The rating is primarily influenced by:

- the sensitivity of receptors is low, comprising motorists who would travel past the site as part of a greater journey
- the proposal would result in features being added and lost from within the view, but the overall view comprising an existing major road corridor would remain similar, albeit slightly wider and more ‘urban’, and with some loss of taller native roadside vegetation and the addition of shorter ornamental landscaping.

The change in the view is considered to be adverse. The road would be widened, resulting in the loss of tall roadside vegetation which is characteristic of the area. The widened road would be more visually prominent within the view.

**Table 8:** Visual impact assessment - Viewpoint 1: Central Coast Highway

| Visual Impact Assessment | | Beneficial | Neutral | Adverse |
|---|---|---|---|---|
| Sensitivity | Low | | | |
| Magnitude of Change | High | | | x |
| Impact | Moderate | | | |


**Figure 66:** Proposed changes to view from viewpoint (Source: AECOM)

### 6.1.3.2 Viewpoint 2: Tumbi Road intersection

This viewpoint is positioned on the western corner of the intersection of Tumbi Road and the Central Coast Highway (refer *Figure 68*). It is a representative view for pedestrians and visitors to the Kingdom Hall of Jehovah's Witnesses to the west of this intersection. The Kingdom Hall of Jehovah's Witnesses is positioned approximately 50 m southwest of the intersection and behind a landscaped earth berm, as shown in *Figure 67*.

**Description of current view**

The existing view from this viewpoint is shown in *Figure 69*. The view to the northeast from the intersection of Tumbi Road and the Central Coast Highway comprises the flat expanse of the turf verge with footpath and road pavement in the foreground. The existing roundabout is seen in the middleground of the view, with the tall native vegetation fringing the intersection to the east (Wamberal Lagoon Nature Reserve) and northwest framing the road and screening views to the background.


**Figure 68:** Keyplan showing viewpoint 2 (Source: AECOM)

The Central Coast Highway disappears from view to the north between bands of thick vegetation.

**Anticipated change to the view**

The change in view is illustrated in *Figure 70*. The most visually prominent changes are the raising of the intersection in the foreground of the view, with the roundabout replaced with a T-intersection. Other changes to the view include:

- removal of vegetation, particularly from the eastern edge of the Highway and at the northwestern intersection verge
- widening of the road corridor on both Tumbi Road and the Central Coast Highway
- new signalised intersection
- reconfiguration of lanes, construction of a new concrete median, introduction of turning lanes
- construction of batters and retaining walls
- reconfiguring and construction of drainage infrastructure
- new signage, safety infrastructure and road furniture
- landscaping.


**Figure 67:** View west from the Central Coast Highway to the Kingdom Hall of Jehovah's Witnesses: AECOM)

**Sensitivity: Low**

The sensitivity of receptors at this viewpoint is influenced by:

- receptors may include visitors to the Kingdom Hall of Jehovah's Witnesses positioned on the western corner of this intersection, 50 m west of the road. However, it is unlikely that many of the changes would be seen from within the property of the Kingdom Hall of Jehovah's Witnesses due to significant amounts of vegetative screening at the boundary of this property (refer *Figure 67*)
- visitors to the Kingdom Hall of Jehovah's Witnesses could be expected to have their attention focussed on their activities within the place of worship and grounds during their visit, rather than on the landscape outside the property to the east
- pedestrians would see this view as they walked past this location. Many of these would be locals travelling to or from public transport from residential areas and may not have primary focus on the amenity of the landscape
- the quality of the existing view is moderately picturesque, particularly with the bushland associated with the Wamberal Lagoon Nature Reserve to the east, however, the intersection is visually dominant within the view.

**Magnitude: Moderate**

The magnitude of change at this viewpoint is influenced by:

- while the scale of the road corridor would slightly increase due to the proposal, the area of road pavement would visually decrease due to the raising of the levels of the intersection and the angle of viewing
- the intersection would be positioned at a higher level than existing, which would screen some of the lower vegetation on opposite sides of the road
- additional features would be seen within the view, including a new signalised intersection to replace the existing roundabout, additional pedestrian footpaths, and new landscaping
- elements would be lost from within the view, including the existing landscaped roundabout and vegetation from beside the road corridor, however, new landscaping would be an additional element seen within the road verges
- there would be an increase in visual clutter within the view due to the traffic lights, street signs and street lighting
- there would be an increase in lighting within the road corridor, however, with the addition of trees planted within the median any additional light spill may be contained by the canopies over time as the trees mature

**Figure 69:** Existing view from viewpoint (Source: AECOM)


**Figure 70:** Proposed changes to view from viewpoint (Source: AECOM)

- the overall effect would result in a replacement of existing road infrastructure with similar, albeit slightly larger scaled, elements
- the changes would be seen from close proximity, but for short periods of time as the receptor moved towards and past the Tumbi Road intersection
- the changes would be seen over a large proportion of the view from this location
- the duration of the changes would be long term and with no chance of reversibility, however, would become less visually prominent over time as the proposed landscape matured, particularly any planting to the east along the road edge adjacent to the Wamberal Lagoon Nature Reserve.

**Visual Impact Assessment: Moderate to Low (Adverse)**

The rating is primarily influenced by:

- the low sensitivity of the receptors
- the there would be little change in overall character or composition of the view.

The change in the view is considered to be neutral. While the reconfigured intersection, widened roads leading into the intersection and increase in visual clutter within the road corridor would be positioned within the view, the raised level of the road pavement and addition of landscaping within the foreground would reduce the seen area of the road pavement. The removal of taller roadside vegetation to the northeast would be positioned in the background of the view and therefore more difficult to see from this location.

**Table 9:** Visual impact assessment - Viewpoint 2: Tumbi Road Intersection

| Visual Impact Assessment | | Beneficial | Neutral | Adverse |
|---|---|---|---|---|
| Sensitivity | Low | | | |
| Magnitude of Change | Moderate | | x | |
| Impact | Moderate to Low | | | |

### 6.1.3.3 Viewpoint 3: Central Coast Highway south

This viewpoint is positioned on the footpath of the Central Coast Highway approximately 130 m south of the intersection with Tumbi Road at the entry to the Wamberal Cemetery. It is representative of the view seen by road users (pedestrian and motorist) on the Central Coast Highway heading north, and by visitors entering and exiting the cemetery.

**Description of current view**

The view from this viewpoint to the north is framed by existing tall native vegetation on either side of the Central Coast Highway (refer *Figure 72*).

The entry road to the Wamberal Cemetery is seen in the foreground, with the dense fringing vegetation of Wamberal Lagoon Nature Reserve seen to the east, to the right of frame. The highway extends north, with the intersection with Tumbi Road seen in the middleground. The landscaped roundabout is seen at the intersection, against a backdrop of tall native trees which lie on the northwest corner of the intersection.

Tumbi Road is seen extending to the west (centre of frame) from the intersection, with both road corridors disappearing between the fringing roadside vegetation to the north and west.

**Anticipated change to the view**

The change in the view seen from this viewpoint is illustrated in *Figure 73*. The most visually prominent change would be the widening of the road corridor to the north, and the reconfiguration of the lanes and intersection arrangement. Other changes to the view include:

- removal of vegetation, particularly from the eastern edge of the Highway and at the northwestern intersection verge, lengthening views to the north
- widening of the road corridor \new signalised intersection
- reconfiguration of lanes, construction of a new concrete median, introduction of turning lanes
- construction of batters and retaining walls
- new pedestrian footpaths on either side of the road
- new signage, safety infrastructure and road furniture
- landscaping.

**Sensitivity: Low**

The sensitivity of receptors at this viewpoint is influenced by:

- the view is seen from the road by a high number of motorists who would be expected to primarily be focussing on the road and traffic
- many of the motorists would be driving to and from, or as part of work-related activities, and as such not having a primary focus on the amenity of the landscape
- motorists would primarily fall within the workers or local residents category, with a smaller number comprising tourists or holiday makers
- the view is a relatively fleeting one as motorists move towards, and past, the intersection
- other receptors may include visitors to the Wamberal Cemetery, who would see this view as they were entering or leaving the grounds. These receptors would, at this point, fall within the 'motorist' category as they would not see the changes when inside the cemetery.


**Figure 71:** Keyplan showing viewpoint 3 (Source: AECOM)


**Figure 72:** Existing view from viewpoint (Source: AECOM)


**Figure 73:** Proposed changes to view from viewpoint (Source: AECOM)

**Magnitude: Moderate**

The magnitude of change at this viewpoint is influenced by:

- the scale of the road corridor within the view would increase due to the proposal, with the road widening to the east resulting in removal of roadside vegetation and the construction of retaining walls below the level of the road pavement
- the reconfiguration of the intersection and road leading to the intersection would result in additional elements seen within the view, and some lost from within the view, including the existing landscaped intersection and vegetation from beside the road corridor. The overall effect would result in a replacement of existing road infrastructure with similar elements
- The removal of vegetation on the western side of the road would be replaced with a landscaped verge, replacing the taller, denser 'bush' with a lower, ornamental planting palette
- there would be an increase in visual clutter within the view due to the traffic lights, street signs and street lighting, however, the removal of overhead power lines would also reduce some of the visual clutter within the view
- there would be an increase in lighting within the road corridor
- the changes would be seen from close proximity, but for short periods of time as the receptor left the cemetery and turned onto the Central Coast Highway
- the changes would be seen over a moderate proportion of the view from this location
- the duration of the changes would be long term and with no chance of reversibility, however, would become less visually prominent over time as the proposed landscape matured, particularly any planting to the east along the road edge adjacent to the Wamberal Lagoon Nature Reserve.

**Visual Impact Assessment: Moderate to Low (Neutral)**

The rating is primarily influenced by:

- the low sensitivity of the receptors
- an increase in the scale of the road within the view, but a replacement and rearrangement of road infrastructure, such as signage, safety fencing and road furniture
- the changes would reduce in visual prominence over time as the landscape matured.

The change in the view is considered to be neutral. The changes to the road and intersection would be seen from a slightly further distance and from a more oblique viewing angle than Viewpoint 1. Some loss of roadside vegegetation would be seen, but the changes would be less visually prominent.

**Table 10:** Visual impact assessment - Viewpoint 3: Central Coast Highway South

| Visual Impact Assessment | | Beneficial | Neutral | Adverse |
|---|---|---|---|---|
| Sensitivity | Low | | | |
| Magnitude of Change | Moderate | | x | |
| Impact | Moderate to Low | | | |


**Figure 74:** Keyplan showing viewpoint 4 (Source: AECOM)

### 6.1.3.4 Viewpoint 4: Dalpura Road intersection

This viewpoint is positioned on the corner of Dalpura Road and Tumbi Road, looking east towards the Central Coast Highway. It is representative of the view seen by motorists on Tumbi Road heading east and nearby residents.

**Description of current view**

The view from this location comprises the Tumbi Road corridor looking east (refer *Figure 75*). The foreground of the view includes the grassed verge and footpath and the three lane road, with the opposite verge heavily vegetated with native trees and shrubs. A childcare centre can be partially seen in the middleground to the left of frame, and the intersection between Tumbi Road and the Central Coast Highway is seen in the background to the right of frame, against a backdrop of tall, dark bushland vegetation within Wamberal Lagoon Nature Reserve.

**Anticipated change to the view**

The anticipated view is shown in *Figure 76*. In the fore and middleground, minor changes to Tumbi Road include resurfacing of the road, a new concrete median, new concrete footpaths and new road signage and furniture. In the background of the view, changes include:

- removal of vegetation, particularly from the eastern side of the Highway
- widening of the road corridor
- realignment of the intersection at Tumbi Road, including removal of the roundabout and installation of a signalised intersection
- reconfiguration of lanes, construction of a new concrete median, introduction of turning lanes
- reconfiguring and construction of drainage infrastructure
- new signage, safety infrastructure and road furniture
- landscaping.

**Sensitivity: Moderate**

The sensitivity of receptors at this viewpoint is influenced by:

- a majority of the receptors at this location are motorists, who would be expected to primarily be focussing on the road and traffic
- many of the motorists would be driving to and from, or as part of work-related activities, and as such not having a primary focus on the amenity of the landscape. A smaller number may comprise tourists or holiday makers

**Figure 75:** Existing view from viewpoint (Source: AECOM)

**Drafting notes: 28/5/21 (to be amended)**

- *Provide clean line to right hand footpath edge.*
- *Replace metal light poles with timber light poles to match existing.*
- *The trees in the background 'behind' the intersection would be lower as the row of trees on the roadside would be removed.*

**Figure 76:** Proposed changes to view from viewpoint (Source: AECOM)

- residents in houses on Tumbi Road and at the intersection would be more sensitive to changes to the view seen from their properties, particularly any seen from living areas of their homes. Few residents would see the view to the Tumbi Road corridor from this location due to house placement and window orientation.
- parts of the proposal would be seen from relatively close proximity from some residences, however, it is unlikely they would see the larger changes at the Central Coast Intersection as clearly as they would minor changes on Tumbi Road
- the quality of the existing view is moderate considering the tall native vegetation fringing the road corridor
- the duration of viewing would potentially occur for moderate periods of time for residents (but from a greater distance) with views from their homes, and short periods of time for motorists.

**Magnitude: Low**

The magnitude of change at this viewpoint is influenced by:

- while the road corridor on the Central Coast Highway would increase in size at the intersection with Tumbi Road, the scale of the Tumbi Road at the Dalpura Road intersection would not change
- there would be some minor elements removed from the view and others added (primarily signage and road furniture), but the overall effect would be the replacement of road infrastructure within the existing road corridor
- there would be an increase in visual clutter within the view due to the traffic lights, street signs and street lighting
- there would be a minor increase in lighting within the road corridor, particularly at the intersection
- the changes occur within a moderate portion of the view to the east
- the duration of the changes would be long term and with no chance of reversibility, however, would become less visually prominent over time as the proposed landscape matured.

**Visual Impact Assessment: Moderate to Low (Neutral)**

The rating is primarily influenced by:

- the visual receptors include a low number of residents, who are typically more sensitive to changes than motorists
- the changes are minor at this viewpoint, with more visually prominent changes seen from a distance of over 100 m.

The change in the view is considered to be neutral. The widening of the road and changes to the intersection would not significantly change the composition of the road within the view, and the loss of roadside vegetation would be seen but not visually prominent.

**Table 11:** Visual impact assessment - Viewpoint 4: Dalpura Road Intersection

| Visual Impact Assessment | | Beneficial | Neutral | Adverse |
|---|---|---|---|---|
| Sensitivity | Moderate | | | |
| Magnitude of Change | Low | | | x |
| Impact | Moderate to Low | | | |


**Figure 77:** Keyplan showing viewpoint 5 (Source: AECOM)

### 6.1.3.5 Viewpoint 5: Aldinga Drive intersection

This viewpoint is positioned 180 m northwest of the Central Coast Highway on Tumbi Road. It is representative of the view seen by road users, nearby residents and visitors to a preschool on Tumbi Road.

**Description of current view**

The view comprises Tumbi Road pavement and verges in the foreground, with the childcare centre on the eastern side of the road seen in the middleground, as shown in *Figure 78*. The tall native vegetation fringing property boundaries and the road corridor is seen as a backdrop to the view, fringing the road and screening views to the horizon.

**Anticipated change to the view**

Changes within the view would be limited to some minor removal of vegetation (seen in the background), resurfacing of the road, a new concrete median and concrete footpath to the south (right of frame). Minor changes to road signage may also be seen.

As most of the changes occur on the ground, they would be difficult to see from this location. Changes to the intersection of the Central Coast Highway and Tumbi Road would be screened from view.

**Sensitivity: Low**

The sensitivity of receptors at this viewpoint is influenced by:

- a majority of the receptors at this location are motorists, who would be expected to primarily be focussing on the road and traffic
- residents and visitors to a daycare centre would be more sensitive to changes to the view seen from these properties, but most of the changes due to the proposal are screened from view
- the duration of viewing would potentially occur for moderate periods of time for residents (but from a greater distance) with views from their homes, and low for motorists.

**Magnitude: Low**

The magnitude of change at this viewpoint is influenced by:

- the scale and size of the changes are similar to that within the existing view
- there would be no significant loss or addition of elements within the view, some minor changes (e.g. road signage) would be visually recessive and a replacement of road infrastructure within a road corridor
- the changes would occur within a small proportion of the view

- the duration of the changes would be long term and with no chance of reversibility, however, would become less visually prominent over time as the proposed landscape matured.

**Visual Impact Assessment: Low (Neutral)**

The rating is primarily influenced by the minimal amount of change seen within the overall view, coupled with a lowered sensitivity of receptor due to this. The quality of the view would not be altered by the proposal.

**Table 12:** Visual impact assessment - Viewpoint 5: Aldinga Drive Intersection

| Visual Impact Assessment | | Beneficial | Neutral | Adverse |
|---|---|---|---|---|
| Sensitivity | Low | | | |
| Magnitude of Change | Low | | x | |
| Impact | Low | | | |


**Figure 78:** Existing view from viewpoint (Source: AECOM)

## 6.2 Visual impact during construction

During construction, visible construction elements would be expected to typically include demolition of existing structures (including the existing roundabout), removal of vegetation, construction of retaining walls and drainage infrastructure, construction of new pedestrian infrastructure, resheeting of the road corridor, landscaping, etc. Three site options have been identified for ancillary facility location to accommodate a site office, amenities, and laydown area for materials. It is expected that only one or two of the following site locations would be used for the ancillary facility (refer *Figure 79*):

- Ancillary facility 1 would be located at the Foresters Beach Garden Centre at 893 The Entrance Road, Wamberal (refer *Figure 80*)
- Ancillary facility 2 would be located at a development site located at Lot 51 DP 1028301, The Entrance Road, Foresters Beach (refer *Figure 81*)
- Ancillary facility 3 would be located at 35 Bellevue Road, Bateau Bay (refer *Figure 82*).

Ancillary facility 1 would be located within the existing nursery to the north of the proposal. This site is reasonably visually shielded from the road by existing vegetation and fencing. As a working nursery and soils / landscape products supplier it has a high visitation rate from trucks and utility vehicles delivering and collecting material. Visual receptors would comprise passers-by on the Central Coast Highway (The Entrance Road), most of whom would be vehicles. As such there are no highly sensitive visual receptors who would see the construction activity, and the site would be seen for short periods of time as the drivers passed the site.

Ancillary facility 2 is partially screened from the road, set back behind vegetation and a small number of houses. There are a small number of potentially sensitive visual receptors that would see the construction activity from their houses, however, the compound would unlikely to be seen beyond the back fences of these properties (and therefore from living areas within these residences) due to fencelines and vegetation along the rear boundaries of these properties. Passers-by on The Entrance Road would see construction vehicles enter and leave the entry points to the site and would have some brief views to within the ancillary facility.

Ancillary facility 3 would be located on Bellevue Road, off The Entrance Road at Bateau Bay. The proposed compound site lies opposite the Foresters Beach Retirement Village,  and next to a small commercial complex on the quiet road. The ancillary facility would be visually contained, with a majority of the site positioned behind the commercial compound and predominantly screened from the road by the commercial development and a band of vegetation to the east.

A low number of visual receptors would see the compound as trucks and equipment moved through the entrance gate and on Bellevue Road, and to a lesser extent from the rear of the commercial properties on Bellevue Road. There is already a high level of construction activity in the local area surrounding this ancillary facility due to the ongoing development of villas within the Foresters Beach Retirement Village, therefore the movement of trucks on the road would increase rather than be a new element along this stretch of road.

Overall, there would be a high number of passers-by on the roads seeing construction activity and increased traffic movement due to construction vehicles. Visual receptors of the construction activity at the Tumbi Road, Central Coast Highway intersection would predominantly be passers-by on these road corridors who would get detailed views to the activity, but these views would be fleeting and make up only a small proportion of their overall journey.

A small number of more sensitive visual receptors would see construction activity at the intersection, including from a number of residences in the vicinity of the intersection. It is unlikely that any of these would see this construction activity from within their homes, and more likely they would see it as they entered or left their properties.

Overall, views to the ancillary facility and construction activity due to the proposal are considered to be relatively minor. They would be consistent with similar temporary construction work sites and activities, and transitory over a period of about 18 months until completion of the proposal.


**LEGEND**

PROPOSAL

PROPOSAL FOOTPRINT

STUDY AREA

# ANCILLARY FACILITY LOCATION

**Figure 79:** Keyplan showing the proposal, the proposal footprint and study area (Source: AECOM)


**Figure 80:** Approximate boundary of Ancillary facility 1 (Source: AECOM)


**Figure 81:** Approximate boundary of Ancillary facility 2 (2 possible sites) (Source: AECOM)


**Figure 82:** Approximate boundary of Ancillary facility 3 (Source: AECOM)

# 7 SUMMARY OF OUTCOMES

## 7.1 Summary of impact on landscape character

As shown in *Table 13*, the overall ratings for landscape character impact ranges between Moderate and Negligible, with most ratings resulting in a Moderate to Low change.

The highest rating was for change to landscape character within LCZ 5: Transport Corridor, within which a majority of the proposal is located. The overall landscape character of this LCZ would be affected by the replacement of the vegetated roundabout with a more open signalised intersection. The removal of roadside vegetation and the widening of the road corridor would increase the visual prominence of the road.

**Table 13:** Summary of landscape character impacts

| LANDSCAPE CHARACTER ZONE | SENSITIVITY | MAGNITUDE | LANDSCAPE CHARACTER IMPACT |
|---|---|---|---|
| **LCZ 1: Recreational and Bushland Open Space** | MODERATE | LOW | MODERATE TO LOW |
| **LCZ 2: Rural Residential** | MODERATE | LOW | MODERATE TO LOW |
| **LCZ 3: Low Density Residential** | MODERATE | LOW | MODERATE TO LOW |
| **LCZ 4: Education** | MODERATE | NEGLIGIBLE | NEGLIGIBLE |
| **LCZ 5: Transport Corridor** | MODERATE | MODERATE | MODERATE |

## 7.2 Summary of impact on views and visual amenity

As shown in *Table 14*, the overall ratings for the impact of the proposal on views ranges between Moderate and Low, with most viewpoints returning a Moderate to Low rating.

The highest impact of the proposal on views was recorded at Viewpoint 1: Central Coast Highway North, where the view south along the road corridor was opened out due to widening of the road corridor and the removal of roadside vegetation, particularly along the eastern edge of the road adjacent to the Wamberal Lagoon Nature Reserve.

The views within the road corridor seen by road users were the most affected by the proposal, with views for receptors outside the road corridor generally remaining screened by vegetation, fencing or other existing elements.

**Table 14:** Summary of visual impacts

| VIEWPOINT | SENSITIVITY | MAGNITUDE | VISUAL IMPACT RATING | BENEFICIAL | NEUTRAL | ADVERSE |
|---|---|---|---|---|---|---|
| **Viewpoint 1: Central Coast Highway North** | LOW | HIGH | MODERATE | | | X |
| **Viewpoint 2: Tumbi Road Intersection** | LOW | MODERATE | MODERATE TO LOW | | X | |
| **Viewpoint 3: Central Coast Highway South** | LOW | MODERATE | MODERATE TO LOW | | X | |
| **Viewpoint 4: Dalpura Road Intersection** | MODERATE | LOW | MODERATE TO LOW | | | X |
| **Viewpoint 5: Aldinga Drive Intersection** | LOW | LOW | LOW | | X | |

MITIGATION OF IMPACT

# 8 MITIGATION OF IMPACT

## 8.1 Impacts avoided/minimised and improved outcomes

a) Roadside planting of larger trees will over time reduce the visual prominence of the road corridor widening as the landscape establishes

b) Retaining walls have been utilised to reduce and minimise the encroachment of works on adjacent landscapes. Earthworks have been utilised to provide batter slopes which can sustain healthy plant growth to minimise visual impact over time

c) Retaining walls facing the public domain would be embellished to either reduce the visual prominence of these or to increase visual amenity when viewed from surrounding landscape. To be further developed during detailed design

d) Reducing and rationalising built elements and road infrastructure to minimise visual clutter within the road corridor

e) Drainage structures have been enhanced with ephemeral plantings to improve water quality and minimise erosion at culverts. Indigenous plant species have been selected from surrounding vegetation communities to reinforce the local character of the surrounding area

f) The intersection serves as a gateway to more urban and rural residential areas to the west, therefore, planting at the intersection has been implemented to reflect this suburban character. Predominantly native plant species have been used which reflect the cultural plantings of these areas.

## 8.2 Strategy to mitigate adverse impacts

a) Tree planting along the eastern edge of the road corridor adjacent to Wamberal Lagoon Nature Reserve would, in time, visually enclose the road corridor and reduce the visual prominence of the road within the landscape.

b) Tree planting at the western corners of the intersection would also visually enclose the intersection and reduce the prominence of the street lights and other taller elements within the views to the intersection. These taller tree plantings would also, over time, help screen views from suburban landscapes to the west.

c) Retain and protect existing trees wherever practical to minimise impacts upon views and the landscape character. Establish TPZs around trees to be retained

d) Provide cut-off or directed lighting within and outside of the construction site and ancillary facilities, with lighting location and direction considered to ensure glare and light spill is minimised

## 8.3 Opportunities

a) Improve the road frontage outside the Pacific Garden Hotel with the detailed design of the retaining wall and landscaping to provide a feature entry statement to the property.

b) Consider measures to deter or limit graffiti on proposed road-facing retaining walls through the use of textures or embellishments.

CONCLUSION

# 9 CONCLUSION

An urban and landscape concept design has been prepared that responds to the local context and seeks to reduce impacts on landscape character and views. Specific measures proposed include:

- Landscape and urban design elements were consistent with the existing character and elements to ensure the Proposal is fully integrated with the surrounding environment and reduces the visual impact of the road and associated structures
- Indigenous plant species were selected for use except for nominated points of interest where culturally appropriate species would be implemented
- Ornamental plant species were slected to provide or highlight significant entry statements or to screen undesirable views
- Safety and sustainability were considered with urban design and landscape outcomes
- Water sensitive urban design measures were implemented where the works occur near areas of water accumulation, or where designed drainage basins and swales occur along the Proposal
- Urban design elements were integrated to provide a simple and consistent design language along the road corridor and as part of the greater Central Coast Highway
- Visual clutter was minimised with the reduction and elimination of built structures where possible. Where these components were unable to be eliminated, they were coordinated to provide an integrated urban design outcome.

The key findings of the report relate to one Landscape Character Zone and one visual receptor location that were assessed as being subject to moderate impacts arising from the project.

The proposal would result in relatively few impacts on landscape character, with ratings for individual LCZs ranging between Negligible to Moderate. Overall the impact of the proposal on landscape character is considered to be Moderate to Low.

Key issues affecting impact on landscape character are:

- The proposal lies primarily within one LCZ (LCZ 5: Transport Corridor) and the changes visually comprise the upgrade of an intersection within an existing road corridor
- There would be a general increase in visual prominence of road infrastructure within the landscape, however this would be reduced over time as the proposed landscape matures
- The long term nature of the changes with no chance of reversal.

With regard to visual impact, the proposal is somewhat visually shielded from the surrounding landscape by tall, dense vegetation to the east (within Wamberal Lagoon Nature Reserve), along the road side, and surrounding private properties. The key impact on views would occur from viewpoints within the road corridor, as follows:

- The largest visual receptor group comprises road users within the road corridor, who would see the view for short periods of time and as one of many within their greater journey
- There are fewer more sensitive receptors (e.g. residents in surrounding houses) and these would be unlikely to see the changes from within their homes
- The Proposal would result in the upgrade of an existing intersection, with some localised road widening leading up to the intersection.

Impacts to landscape character and views are mitigated primarily with the use of planting for targeted screening or reduction of visual prominence of embankments and batters within the broader landscape.

# 10 APPENDIX

## References

*Beyond the Pavement - Urban design policy procedures and design principles* (TfNSW, 2020)

*Geotechnical Factual Report: Tumbi Road Intersection Upgrade* (AECOM, 20 May 2021)

*Guideline for Landscape Character and Visual Impact Assessment EIA-N04* (TfNSW, 2020)

*Guidelines for Landscape and Visual Impact Assessment, Third Edition* (Landscape Institute and Institute for Environmental Management, UK,2013)

*Landscape and Urban Design Report for MR336 - The Entrance Road, Ocean View Drive to Tumbi Road* (Andrews Neil, 2005)

*Strategic Design Report for HW30 Central Coast Highway - Tumbi Road, Wamberal to Bateau Bay Road, Bateau Bay* (TfNSW, 2019)

## Figures

# Tables

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