

# 07. Tunnel Interiors

The tunnel interiors have been meticulously crafted through a co-design process involving Aboriginal artist and Knowledge Holders. This collaborative effort ensures a distinctive travel experience within WHT, significantly contributing to its visual identity.



Figure 104: Artist's impression Sydney Harbour tunnel event - driver's perspective

# 7.0 Tunnel interiors

***Deliver a tunnel that makes a positive contribution to the journey experience through intuitive wayfinding and a varied and stimulating driver environment.***

Mainline tunnel and tunnel ramps principle, EIS Appendix V

## 7.1 Overview

### 7.1.1 Scope

The treatment of the elements along the corridor is not static, but speaks to journey as users traverse Country, passing beneath the Harbour to cross between Cammeraygal and Wangal Country. While a cohesive approach to tunnel cladding unifies the project, lighting, colouring and patterning allow for legibility of the journey. Outside of the tunnel, the designed elements, from the portals to the various support structures, align with this integrated approach. From Rozelle in the south, to Cammeray in the north, the locations along the corridor are expressed, embracing the existing context and adding a new layer of interpretation related to the development of WHT.

Tunnel cladding panels and events will be coordinated with tunnel cross passages, emergency egress and related wayfinding signage, and other in-tunnel treatments.

### 7.1.2 Site context

The physical scope of works is entirely subterranean. However, the design carefully considers the vegetation, fauna, textures, and colors of the diverse landscapes through which the tunnel passes. Some of this includes the lush green in Cammeray, River edge of Rozelle and Rozelle, oysters and middens in Waverton, and camp grounds in Birchgrove.

### 7.1.3 Tunnel interior design principles

- Create a connection to Country through respectful integration of inputs developed and endorsed by Traditional Knowledge Holders
- Provide for wayfinding through references to surface features, allowing for intuitive navigation of the tunnel by road users
- Allow for continuity of the driving experience with other tunnels in the Sydney region to limit distractions





'Long tunnels require an emphasis on driver experience due to the potential for a repetitive and monotonous driving environment, disconnection from the above ground environment and difficulty wayfinding, including successfully navigating tunnel entry, exit and merge points.'

Western Harbour Tunnel And Warringah Freeway Upgrade UDLCVIA (EIS Appendix V)

Figure 105: Artist's impression of Wangal Country tunnel event - driver's perspective

## 7.2 Tunnel lining design

The single most visible component for users of WHT will be the lining of the tunnels, which are bright white Compressed Fibre Cement (CFC) panels. The lining strategy has been developed based upon the precedent established by recent tunnel projects in the region, leveraging proven techniques and technologies while embedding context-specific expressions of Country to promote a consistent driving experience that reduces visual clutter. Input was sought from the ACA sustainability team to determine if there were suitable alternatives to provide for better sustainability outcomes.

### 7.2.1 Alignment-wide consistency

The tunnels will be lined with a consistent panel system that provides a uniform, seamless visual experience along the entire alignment. The design will create a final condition that is cohesive, with no discernible difference to tunnel users between the various parts of the tunnel (TBM vs road header) and integration of signage, services and other equipment mounted within the tunnels.

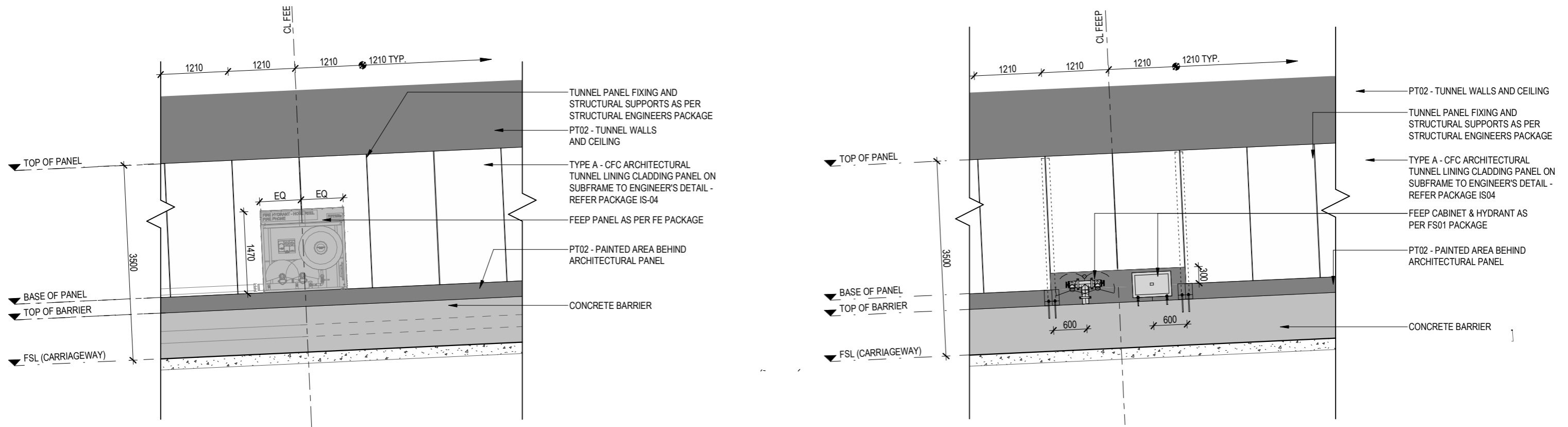
The panels are designed to align with the technical criteria established in the SWTC. Key characteristics include:

- The panels will be mounted perpendicular to the roadway vertical alignment, with joints between the panels minimised
- Panels will be mounted above the concrete crash barriers, with a minimum of 280mm between the bottom of the panel and the top of the traffic barrier
- All items in the space between the barrier and panel will be painted black to ensure subframe support structures are not visible
- The top of the panels will be no lower than 3500mm above the road surface, with the unlined wall above painted black.

### 7.2.2 Fire Emergency Equipment Points (FEEPs)

FEEPs are required along the tunnels. Their design has evolved to reduce the height and therefore the visibility of this element to motorway users. The FEEP panels have been resized, reduced in height to an approximately 300mm high indentation at the bottom of the tunnel lining panels, and running across the width of two tunnel lining panels. The design includes a small, exposed hydrant, painted black to make it recessive. Key features of the design are:

- The current FEEP is smaller than the previous design and is located much lower,
- The new design acts as an extension to the 280mm high continuous horizontal gap running between the concrete barrier and tunnel lining, with the aim of integrating and concealing the FEEP
- There is no enclosure, resulting in better access to services, and also in easier installation and maintenance of the new FEEP.



## 7.3 Tunnel 'events'

The standard tunnel panel approach will be modified in specific locations, as shown in [Figure 107](#) with representative patterns, graphics and typography to demarcate 'events' along the journey. All tunnel events are subject to First Nations consultation and are designed by an Aboriginal artist Dennis Golding, through the Connection to Country process outlined in [Section 3.5](#). The event design will be a print or paint applied to the tunnel lining surface along with enhancement of the statutory lighting.

Three types of events have been established, providing drivers with interest along their trip and a sense of location to ease wayfinding in advance of decision points. The scope for enhanced lining treatment varies between the three different event types, broadly characterised as:

### Tier 1 events: Acknowledging Country

- Greatest degree of modification
- Special pattern/colour on a standard sized panel module, co-designed with Aboriginal artist
- Extends for approx. 220m (10 seconds at 80km/hr)
- Enhanced lighting

### Tier 2 events: Suburb wayfinding events, provided before key decision points

- Moderate degree of modification
- Special pattern/colour on standard panel module, co-designed with Aboriginal artist
- Extends for approx. 110m (5 seconds at 80km/hr)
- Enhanced lighting

### Tier 3 events: Suburb context events, provided beneath each suburb for general orientation

- Minor degree of modification
- Special pattern/colour on standard panel module, co-designed with Aboriginal artist
- Extends for approx. 66m (3 seconds at 80km/hr)
- Enhanced lighting

Overarchingly, the deployment of enhanced lighting and scale of the text and graphics will allow the events to be easily understood by motorists travelling at speed. Modifications, as described below, will be simple in design as to not distract drivers while being memorable, attractive and immediately identifiable within the context of the tunnel experience and the relative location of tunnel users.

The deployment of graphics and lighting at events has considered the location of breakdown bays, emergency access points and other required tunnel wayfinding and signage to ensure cohesion and legibility of tunnel elements.

- Warringah Freeway
- Rozelle interchange
- WHT TBM tunnel
- WHT road header tunnel

### Tunnel events

- Tier 1
- Tier 2
- Tier 3



Figure 107: Tunnel event locations

### 7.3.1 Tier 1 events

Three locations along the underground alignment (for a total of six installation locations between the two tunnels) celebrate key moments in relation to Country, addressing the ambition of the project to address the Indigenous landscape of the region. The three locations are:

- Sydney Harbour
- At the southern portion of the tunnels, in Wangal Country
- At the northern portion of the tunnels, in Cammeraygal Country

Each Tier 1 event, co-designed by an Aboriginal artist, is 220m in length (10 seconds at 80km/h), with treatment on both sides of each tunnel, as shown in the concept sketches and in [Figure 111 to Figure 113](#).

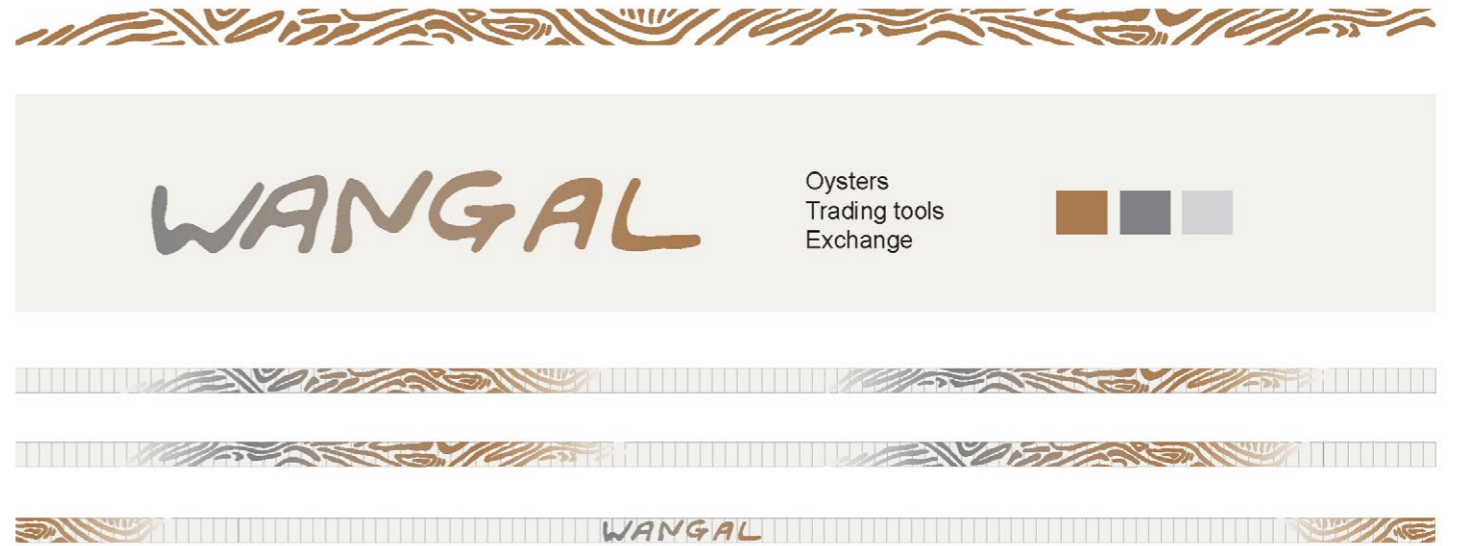


Figure 108: Tunnel artwork concept - Wangal Country



Figure 109: Tunnel artwork concept - Sydney Harbour



Figure 110: Tunnel artwork concept - Cammeraygal Country



Figure 111: Artist's impression of tunnel event- Wangal Country



Figure 112: Artist's impression of tunnel event- Sydney Harbour



Figure 113: Artist's impression of tunnel event- Cammeraygal Country



### 7.3.2 Tier 2 events

Three locations along the underground alignment (for a total of seven installation locations between the two tunnels due to the split of the exit at City West Link) will provide tunnel users context and wayfinding at key decision points (entries and exits). The three locations are:

- Cammeray
- North Sydney
- Rozelle

Each Tier 2 event will be 110m in length (5 seconds at 80km/h), with treatment on the left side of each tunnel in the direction of travel, as shown in the following concept sketches (Figure 114- Figure 116).



Figure 114: Tunnel artwork concept- Rozelle



Figure 115: Tunnel artwork concept- North Sydney

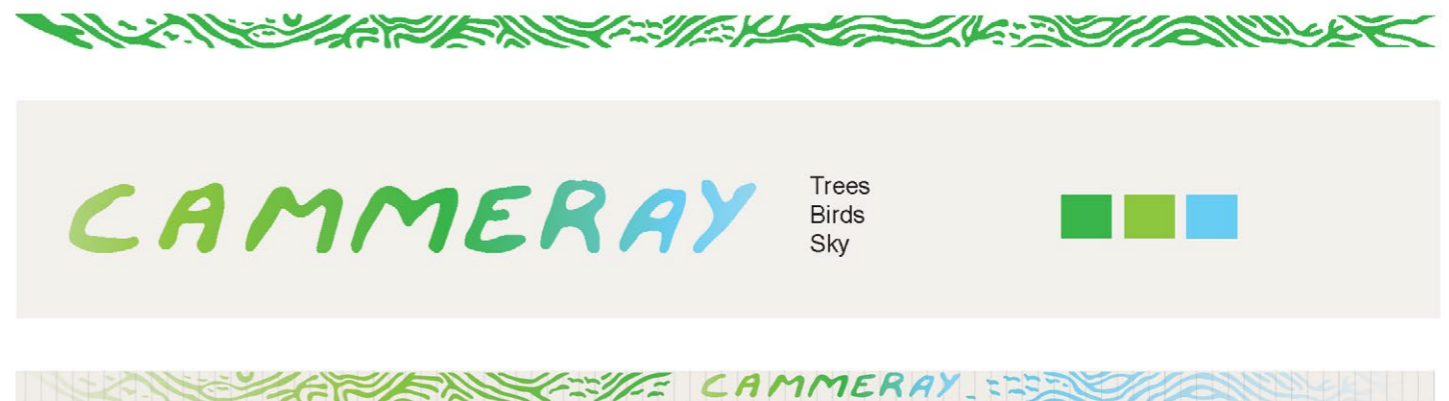


Figure 116: Tunnel artwork concept- Cammeray

### 7.3.3 Tier 3 events

Three locations along the underground alignment (for a total of six installation locations between the two tunnels) will provide tunnel users context on their journey. The three locations are:

- Waverton
- Birchgrove
- Balmain

Each Tier 3 event, will be 66m in length (3 seconds at 80km/h), with treatment on the left side of each tunnel in the direction of travel, as shown in the following concept sketches ([Figure 117 - Figure 119](#)).

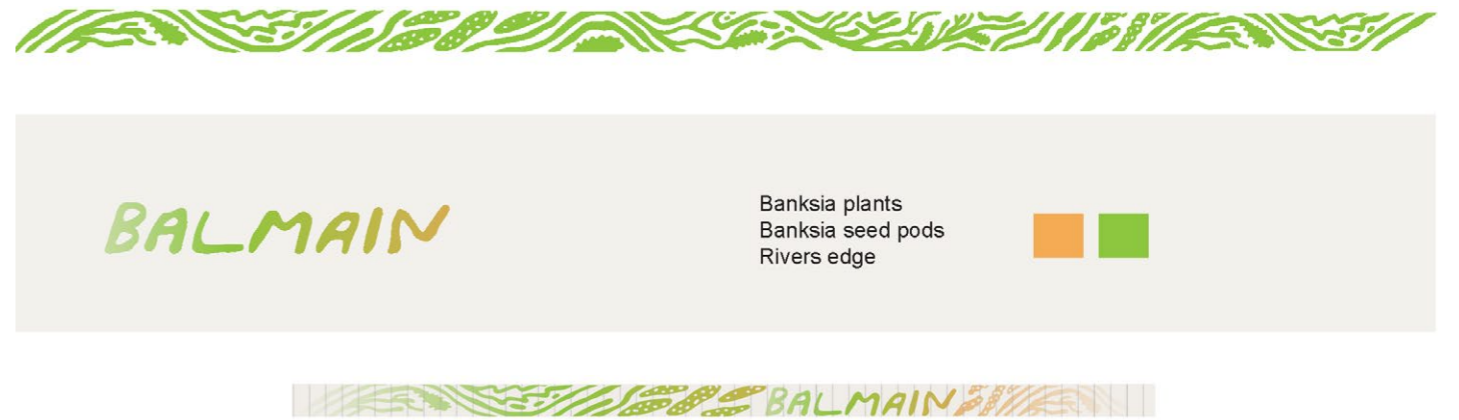


Figure 117: Tunnel artwork concept- Balmain

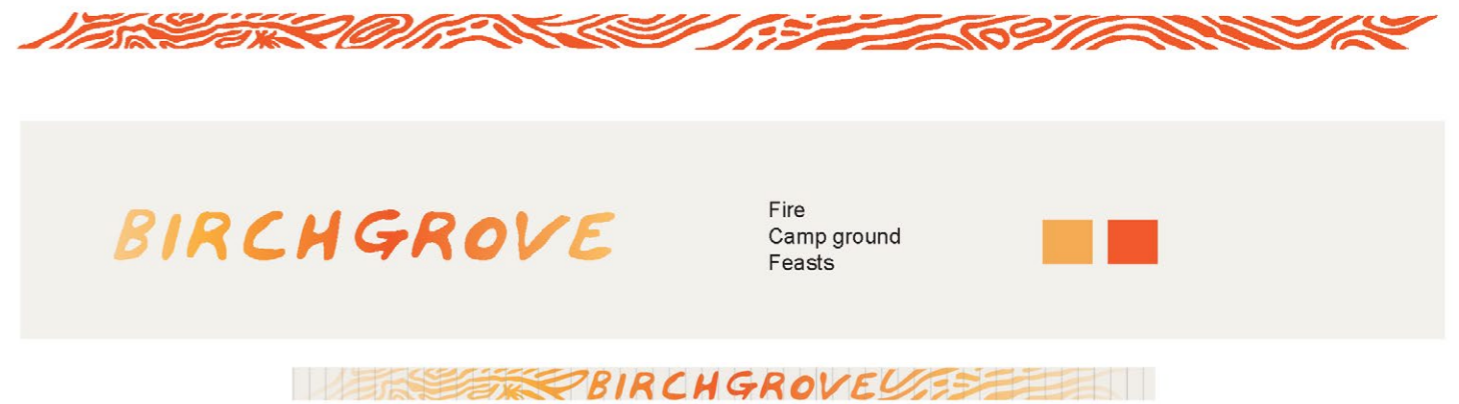


Figure 118: Tunnel artwork concept- Birchgrove

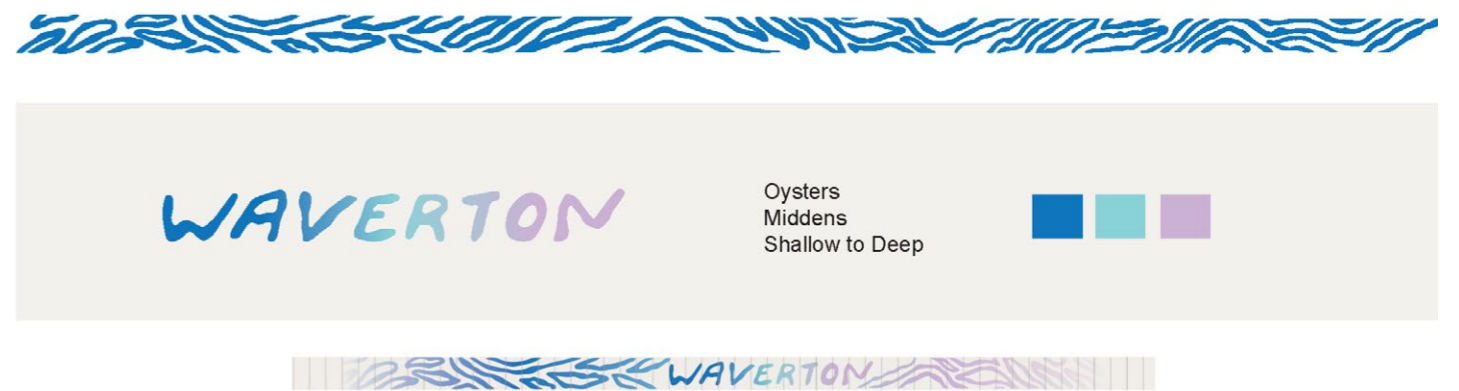


Figure 119: Tunnel artwork concept- Waverton

## 7.4 Tunnel interiors design response to project principles

PROJECT PRINCIPLE	KEY DESIGN MOVE
<b>Objective 1 - Designing with Country</b>	
Design built elements to acknowledge and celebrate the deep history and unique culture of the place, and the enduring connection of Aboriginal people to the land	– All tunnel events underwent First Nations consultation and are crafted by Aboriginal artist Dennis Golding through the Connection to Country process. The design honours the area’s distinctive culture and landscape.
Communicate to motorway users that they are entering and travelling through the land of the Cammeraygal and Wangal people	– Tier 1 tunnel events distinguish the Cammeraygal and Wangal countries by incorporating specific patterns, colors, and typography on panels
Care for Country through reciprocal relationships between landscape, flora and fauna and people	– The tunnel events depict the flora and fauna of the respective locations through abstracted artworks
<b>Objective 2 - Identity and user experience</b>	
Adopt a cohesive and simple design language for the motorway elements including tunnel panels, walls, screens, building façades and portals to create consistency and avoid visual clutter.	– The tunnels will be lined with a consistent panel system that provides a uniform, seamless visual experience along the entire alignment. Despite variations in length, colors, and patterns, the tunnel events also share a consistent design language.
Ensure awareness of the geographic location while travelling by referencing the specific natural and cultural characteristics of the places the corridor is passing through.	– The design of the tunnel events reference to the characters of the places the tunnel passing through
Story telling - develop design themes around the historic and geographic significance of the place and articulate it through integration of arts and design elements to create interest and provide a distinctive travel experience for the users.	– The artworks featured at the tunnel events narrate the stories of the Country, employing symbols, patterns, and colors. The design themes for these events are developed through the Connection with Country process.
Enhance the overall experience by using high-quality, durable and functional materials throughout the corridor.	– The materials selected for the project, both for the structures and landscape,
Create an intuitive journey with the careful design and positioning of the urban design elements, street furniture and signage.	– The tunnel events provides the context of the journey, indicates key decision points and (entry and exit) and celebrate key moments in journey in relation to Country
<b>Objective 3 - Integrated design</b>	
Ensure a smooth transition to and from the adjacent road corridors including WestConnex and Warringah Freeway, considering their general visual appearance and material palettes.	– The tunnel interiors have been designed as part of the wider network including Westconnex and Warringah Freeway in terms of the overall design and lining treatment.
Take inspiration from and draw reference to the natural and built features of the surrounding area including the landform, geology, flora and fauna.	– The tunnel events depict the geological patterns, flora and fauna of the place through abstracted artworks
Ensure the surface structures at Cammeray are sensitive to the adjacent uses and have a strong visual and spatial relationship with the existing features.	– This principle does not relate to the tunnel interior
Integrate the landscape design seamlessly with the existing vegetation.	– This principle does not relate to the tunnel interior

PROJECT PRINCIPLE	KEY DESIGN MOVE
<b>Objective 4 - Connectivity and legibility</b>	
Enhance the legibility within the tunnel through the sequence of tunnel events that refer to the geographic locations	– The tunnel events create a legible travel experience on three levels: they respond to the underlying Indigenous themes and narratives of the area; they identify suburbs being passed under; and overall they identify to motorway users that they are on a journey across the harbour.
Ensure clear wayfinding through the corridor with the clever use of design elements, viewpoints and signage	– The tunnel events provide the context of the journey, indicate key decision points and (entry and exit) and celebrate key moments in journey in relation to Country
Provide active transport facilities where feasible and tie them in with existing and future networks and improve links from Cammeray Park	– This principle does not relate to the tunnel interiors
Ensure visual consistency with the cohesive design language and material palette along the corridor.	– The tunnels will be lined with a consistent panel system that provides a uniform, seamless visual experience along the entire alignment
<b>Objective 5 – Urban renewal and liveability</b>	
Develop open spaces as high-quality urban places accessible for the entire community	– This principle does not relate to the tunnel interiors
Utilise public art opportunities and landscape design to enhance the appearance and experience of the place	– The tunnel events are used as canvases for public art to enhance the travel experience through the tunnel
Ensure the surface structures, including the ventilation buildings and portals, are designed to contribute to the existing character of the surrounding environment and have high visual quality	– This principle does not relate to the tunnel interiors. However, it is important to note that the tunnel will contribute positively to the overall travel experience in terms of visual quality
Improve street connectivity and provide safe and shaded shared paths tying in with existing routes active transport routes and the broader green network	– This principle does not relate to the tunnel interior
Incorporate Crime Prevention Through Environmental Design (CPTED) principles, particularly passive surveillance and clear, legible connections in the public domain, to increase safety and the perception of safety for people.	– This principle does not relate to the tunnel interiors. However, CPTED principles of clear and legible paths of travel are broadly relevant to the location and design of the tunnel events, which enhance the journey, help locate the traveller, and mitigate inattention and/or drowsiness which can arise in an undifferentiated underground environment

PROJECT PRINCIPLE	KEY DESIGN MOVE
<b>Objective 6 – Living Environments (note: these principles relate to landscape and planting above-ground)</b>	
Where possible, protect existing vegetation and increase tree cover	– This objective does not relate to the tunnel interior
Promote opportunities for habitat creation	– This objective does not relate to the tunnel interior
Incorporate Water Sensitive Urban Design (WSUD) principles to reduce reliance on reticulated water supply, for example through re-use of stormwater and plant selection of drought-resistant species	– This objective does not relate to the tunnel interior
Incorporate appropriate built form and site planning to ensure minimum building footprint.	– This principle does not relate to the tunnel interiors
Replace and restore the affected landscape.	– This objective does not relate to the tunnel interiors. Interestingly however the use of artistic motifs and themes, abstracted by the artist for the tunnel events, is an acknowledgement of the importance of landscape and of being on Country
<b>Objective 7 – Sustainability</b>	
Maximise planting opportunities adjacent to the corridor and within service compounds	– This principle does not relate to the tunnel interiors
Use robust, durable materials that contain recycled content and that are recyclable at the end of life	– Tunnel lining materials selection was to meet the technical requirements of the project and also to be consistent with precedent and adjacent projects. There is no recycled content, but the aluminium is recyclable
Consider whole-of-life and circular economy in the selection of materials	– The tunnel lining is bright white Compressed Fibre Cement (CFC) panels, consistent with precedent and adjacent projects. The lining is robust and durable.
Provide active transport links across the corridor	– While this principle does not relate to the tunnel interiors, the tunnel project has provided the opportunity for improved cross-corridor connection for pedestrians and cyclists by way of the Ernest Street Bridge
Implement strategies and measures aimed at reducing the impact of the urban heat island effect	– This principle does not relate to the tunnel interiors