SYDNEY GATEWAY

PLACE, DESIGN AND LANDSCAPE PLAN

Design Package Number: UD-1050
Document Number: SGW13-JHSW-NWW-DU-RPT-105001
Revision No.: H
Issue Date: 12 April 2022

This page has been left blank intentionally

PLACE, DESIGN AND LANDSCAPE PLAN

Welcome to Country by Uncle Steve, Elder and Cultural Knowledge Advisor

“Welcome Welcome Welcome! The Dharawal Wadi Wadi land, the Gadigal land and the Dharug Land I say youse. We lend you this land while we sleep. Come sit rest. Respect this land. Come sit, respect our elders. Come sit, respect each other. Welcome welcome welcome. To dharawal wadi wadi, Gadigal and dharug land was is and always will be Aboriginal land. Thank you. Burra.”

JHSWJV acknowledges the Traditional Custodians of the land, and recognise Elders past and Present. Through authentic engagement with Aboriginal people and the landscapes within which we work, we strive to deepen our understanding of Country and our relationship with its People.

Revision	Date	Description	By	Chk	App
A	19 July 2021	Submission for TfNSW	KR/RN/MV		
B	10 September 2021	FDD Submission	KR/RN/MV		
C	16 September 2021	FDD Submission	KR/RN/MV		
D	24 November 2021	FDD 2 Submission	KR/RN/MV		
E	03 December 2021	FDD 2 Submission to DPIE	KR/RN/MV		
F	16 February 2022	Final PDLP	KR/RN/MV		
G	07 April 2022	Final PDLP Submission to DPIE	KR/RN/MV		
H	12 April 2022	Final PDLP Submission to DPIE	KR/RN/MV		

April 2022

Prepared for: Transport for NSW (TfNSW)

By:

Conybeare Morrison International Pty Ltd, on behalf of
John Holland Seymour Whyte Joint Venture (JHSWJV)

Architecture + Infrastructure + Urban Design
52–58 William Street East Sydney NSW 2011
T: +61 2 8244 8888 | mail@cmplus.com.au | www.cmplus.com.au

This page has been left blank intentionally

Table of contents

List of figures

Terms and abbreviations

ABC
Airport Building Controller

AHD
Australian Height Datum

AS
Australian Standards

ARTC
Australian Rail Track Corporation

ASA
Aviation Safety Advisors

ATL
Active Transport Link

AUDP
Australian Urban Design Protocol

CoA
State Conditions of Approval

CoMA
Commonwealth Conditions of Ministerial Approval

CBD
Central Business District

CPTED
Crime Prevention Through Environmental Design

D&C
Design and Construct

DITRDC
Department of Infrastructure, Transport, Regional Development and Communications

DDA
Disabilities and Discrimination Act

DPIE
Department of Planning, Industry and Environment

EESG
Environment, Energy, Science Group

EIS
Environmental Impact Statement

ESD
Ecologically Sustainable Development

HDG
Hot-dipped galvanised

ISCA
Infrastructure Sustainability Council of Australia

JHSWJV
John Holland Seymour Whyte Joint Venture

MLALC
Metro Local Aboriginal Land Council

LaPACA
La Perouse Aboriginal Community Alliance

LGA
Local Government Area

MIO
Micacious Iron Oxide

MDP
Major Development Plan

M8
M8 Motorway (previously New M5)

NASF
National Airport Safeguarding Framework

NTS
Not To Scale

NSW
New South Wales

OLS
Obstacle Limitation Surface

PDLP
Place, Design & Landscape Plan

The Project
Sydney Gateway

RL
Reduced Level

RMS
Roads and Maritime Services (now Transport for NSW)

SB
Structural bridge

SESL
Sydney Environmental & Soil Laboratory

SiD
Safety in Design

SPI
St Peters Interchange

SWTC
Scope of Works and Technical Criteria

SYD
Sydney Airport Corporation
Also refers to associated bodies CASA, ASA, where applicable

UDRP
Urban Design Review Panel

UMM
Updated Mitigation Measures

WHTBL
Western Harbour Tunnel and Beaches Link

WSUD
Water sensitive urban design

Co-design
A design process that enables a wide range of people from various disciplines to collectively make a creative contribution in the formulation and solution of a problem.

'Gateway' experience
These are points which have a high degree of visibility and a distinct sense of transition. 'Gateways' may include landscaping, public art, 'gateway' structures, special lighting and signs. It also refers to the enhanced user experience that is provided by these 'gateways'.

Place
Refers to an area of the physical environment, which has historical value and provides a sense of identity.

Placemaking
Refers to a collaborative process by which the public domain can be shaped in order to maximize shared value. Placemaking facilitates creative patterns of use, to the physical, cultural, and social identities that define a 'place' and support its ongoing evolution.

Shared path / ATL
These are priority routes for pedestrians and cyclists.

***Note**

The artwork illustrated at the Nigel Love underpass and SB21 underpass is indicative only and is subject to confirmation.

Conditions of Approval compliance matrix

Transport for NSW (TfNSW) have gained approval to deliver a high capacity road connection linking the Sydney motorway network at St Peters interchange with Sydney Airport's domestic and international terminals and the Port Botany Precinct. The Project is located on both State and Commonwealth land. For areas on State land, the Project was declared to be critical State significant infrastructure (CSSI) under the Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act) and was approved by the NSW Minister for Planning and Public Spaces on 27 August 2020.

Commonwealth approval under the Airports Act 1996 (the Airports Act) was granted by the Australian Minister for Infrastructure, Transport and Regional Development on 23 September 2020.

John Holland Seymour White Joint Venture (JHSWJV) have been contracted by TfNSW for the Design and Construction of Sydney Gateway Stage 1 & Stage 3 (the Project).

This PDLP has been prepared to meet the relevant Commonwealth and State Conditions outlined in the:

- Commonwealth Conditions of Ministerial Approval (CoMA)
- State Conditions of Approval (CoA) for the Sydney Gateway Project SSI – 9737
- The updated mitigation measures as outlined in the Response to Submissions Report and the Final Major Development Plan.

Commonwealth Conditions of Ministerial Approval (CoMA)

Clause No.	Clause	Document Reference
1	To address the loss of amenity caused by changes to the active transport network flagged in public submissions to the MDP, the Proponent must ensure that, by the time construction is substantially complete, an active transport link has been constructed to facilitate connectivity between Terminal 1 (international Terminal) and Terminal 2 and Teminal 3 Domestic Terminals). The active transport link will connect the existing shared path near Terminal 1 on Airport Drive, (adjacent to the bridge to Tempe Reserve), to the existing shared path on the corner of Qantas Drive and Seventh Street.	Chapter 5.8.7
6a	All temporary and permanent project lighting complies and is installed in accordance with the relevant requirements in the applicable legislation made under the Civil Aviation Act 1988 and the Aiports Act 1996 and NASF Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airport to minimise the risk of distraction of pilots; and	Chapter 7.11
6b	The potential glare from vehicular headlights distracting pilots is mitigated in accordance with the applicable legislation made under the Civil Aviation Act 1988 and the Airports Act 1996 and the NASF Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports.	Chapter 7.6.2

State Conditions of Approval (CoA)

Clause No.	Clause	Document Reference
Aviation		
E5	The CSSI must be designed so that:	Chapter 1.4
a)	all temporary and permanent project lighting complies and is installed in accordance with the relevant requirements in the applicable legislation made under the Civil Aviation Act 1988 and the Airports Act 1996 and NASF Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports to minimise the risk of distraction of pilots; and	Chapter 1.4
b)	the potential glare from vehicular headlights distracting pilots is mitigated in accordance with the applicable legislation made under the Civil Aviation Act 1988 and the Airports Act 1996 and the NASF Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports;	Chapter 1.4
Lighting and Security		
E65	The CSSI must be constructed and operated with the objective of minimising light spillage to surrounding properties and potential distraction for pilots. All lighting associated with the construction and operation of the CSSI must be consistent with the requirements of AS/ NZS 4282:2019 Control of the obstrusive effects of outdoor lighting, relevant Australian Standards in the series AS/NZS 1158 - Lighting for Roads and Public Spaces and NASF Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports. Additionally, the Proponent must provide mitigation measures to manage residual night lighting impacts to protect properties adjoining or adjacent to the CSSI, in consultation with affected landowners.	Chapter 7.11
Design Outcomes		
E66	The place making, design and landscape outcomes of the CSSI must be informed by and be consistent with the Urban Design and Place Making Concept (Chapter 6 Sydney Gateway Road Project - Technical Working Paper 13 and as amended by Appendix A of the Response to Submissions Report), including but not limited to the objectives and design principles, approaches, recommendations and consultations. Design	Chapter 3.2
Design Independence		
E67	Place making, design and landscape outcomes must be informed by input and review by independent and qualified practitioners in the following fields (practitioners may cover more than one field if suitably qualified):	Chapter 1.7
a)	public art I cultural interpretation public art;	Chapter 1.7
b)	Aboriginal cultural heritage;	Chapter 1.7
c)	European cultural heritage;	Chapter 1.7
d)	open space design and landscape architecture; and	Chapter 1.7
e)	active transport	Chapter 1.7
	These practitioners must be approved by the Planning Secretary at least one (1) month prior to construction and must hold current membership of a relevant professional body, unless otherwise approved by the Planning Secretary. These practitioners must be involved through participation in the Urban Design Review Panel committed to by the Proponent in the documents listed in Condition A1 and the development and review of the Place, Design and Landscape Plan (PDLP) required by Condition E75,	Chapter 1.7
E68	The Proponent's Urban Design Review Panel must be established during detailed design and before construction commencing. The process for the operation of the Panel, including the Panel's Terms of Reference and frequency of meetings, must be agreed to with the panel members representing the Government Architect and Sydney Airport Corporation. The Panel must at a minimum meet at the inception of the project and at critical hold points throughout the project	Chapter 1.7
Open Space		
E69	The CSSI must result in an increase in publicly accessible and useable open space.	Chapter 7.19.2
Place, Design and Landscape Plan		
E75	A Place, Design and Landscape Plan (PDLP) must be prepared to inform the final design of the CSSI and to give effect to the outcomes informed by Condition E66 and design review.	Chapter 3.2
E76	The PDLP must be prepared by a suitably qualified and experienced person in consultation with the Heritage Council of NSW, relevant council(s), EESG, La Perouse Local Aboriginal Land Council (LALC), the Metropolitan LALC, the Registered Aboriginal Parties, the community and affected landowners and businesses. The PDLP must include (but not be limited to):	Chapter 1.2, Chapter 1.7
a)	the design of the CSSI elements including their form, materials and detail, with a focus on high quality bridge design, public space, and integrated art;	Chapter 5, Chapter 6, Chapter 7, Chapter 8
b)	measures to minimise heritage impacts and to enhance heritage interpretation, in particular Alexandra Canal, taking into consideration the *Alexandra Canal Conservation Management Plan* (Government Architect's Office I NSW Department of Commerce, 2004);	Chapter 3.4, Chapter 5.8.7
c)	measures to maximise canopy cover where possible and vegetation growth beneath bridge structures	Chapter 7.17.2

Clause No.	Clause	Document Reference
d)	the design of useable open space, with a focus on land within Tempe	Chapter 7.19.2
e)	the design of the project landform and earthworks	Chapter 5, Chapter 7.18.2, Chapter 7.18.3
f)	a north south green link corridor, linking Cooks River, Tempe Wetlands, Tempe, St Peters and Sydney Park with consideration of the NASF Guideline C: Managing the risk of wildlife strikes in the vicinity of airports in consultation with the Airport Operator;	Chapter 7.17.10
g)	areas of vegetation to be retained and proposed planting and seeding details, including the use of local indigenous and endemic species for revegetation activities, with consideration of the management of urban weeds and the NASF Guideline C: Managing the risk of wildlife strikes in the vicinity of airports in consultation with the Airport Operator	Chapter 7.17.2, Chapter 7.17.3, Chapter 7.17.9, Chapter 7.23
h)	proposed revegetation of the riparian corridor along Alexandra Canal within the project footprint with local indigenous and endemic species	Chapter 7.13.5
i)	visual screening requirements	Chapter 7.16.1
j)	developed visuals, cross sections, illustrated details and plans showing the proposed design outcome; and	Chapter 6, Chapter 7
k)	details of strategies to rehabilitate, regenerate or revegetate disturbed areas with a diversity of appropriate local native species and successfully establish and maintain the resulting new landscape.	Chapter 7.17.2 Chapter 7.17.9, Chapter 7.23
E77	The PDLP must incorporate the following elements in the final design:	
a)	site-specific public art and interpretation including consideration of the use of Aboriginal designs, patterns and motifs;	Chapter 5
b)	a lighting system that complies with the requirements of NASF Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports; and	Chapter 7.11
c)	integration of headlight barriers into throw screens.	Chapter 7.6
E78	The PDLP is to be submitted to the Planning Secretary for approval no later than one (1) month before the construction of permanent works that are the subject of the PDLP.	Chapter 1.7
E79	Construction of permanent built works or landscaping that are the subject of the PDLP must not be commenced until the PDLP has been approved by the Planning Secretary, after considering advice received from the independent practitioners identified in Condition E67.	Chapter 1.7
E80	The PDLP, as approved by the Planning Secretary, must be implemented during construction and operation.	Chapter 1.7

Clause No.	Clause	Document Reference
E81	Notwithstanding Condition E79, designs and delivery of open space and facilities associated with the Tempe lands and subject to Inner West Council master planning may be deferred, subject to the approval of the Planning Secretary.	Chapter 1.7, Chapter 6
Tree Removal, Replacement Plantings and Rehabilitation		
E82	The CSSI must be designed to retain as many existing trees as possible. Replacement trees and plantings must deliver a net increase in trees and tree canopy and aim to enhance the relevant council's position in respect of the Sydney Green Grid.	Chapter 7.17.6
Operational Maintenance of Place and Space		
E83	Replacement trees must:	
d)	be provided no later than six (6) months following the commencement of operation;	Chapter 7.17.6
E84	A Landscape Strategy Report must be submitted to the Planning Secretary which details the type, size, number and location of replacement trees. The report must demonstrate how any replacement plantings are consistent with the requirements of Condition E83. The report must be submitted to the Planning Secretary for information no later than nine months following the commencement of operation.	Chapter 7.17.6
E86	The ongoing maintenance and operation costs of urban design, open space, landscaping and recreational items and works implemented as part of this approval remain the Proponent's responsibility until satisfactory arrangements have been put in place for the transfer of the asset to the relevant authority. Before the transfer of assets, the Proponent must maintain items and works to at least the design standards established in the PDLP required by Condition E75.	Chapter 7.23

Updated mitigation measures (UMM)

The table below demonstrates compliance with the relevant updated mitigation measures (UMM) as identified in the Response to Submissions Report and the Final Major Development Plan.

Clause No.	Issue	Mitigation Measures -Detailed Design	Document Reference
Airport operations			
AS5	Wildlife attraction	The urban design and landscape plan for the project will include consideration of appropriate landscape designs and species lists to minimise opportunities to attract wildlife at levels likely to present a hazard to aviation operations.	Chapter 7.17.4
Landscape character and visual amenity			
LV1	General visual impacts	An urban design and landscape plan will be prepared to provide a consistent approach to project design and landscaping.	This document (SGW13-JHSW-NWW-DU-RPT-105001)
LV2		Further design refinements of structures including bridges and the Terminals 2/3 access viaduct will be undertaken to minimise visual impacts as far as possible.	Chapter 7.1, Chapter 7.2, Chapter 7.3, Chapter 7.4
LV4	Managing the loss of trees	The need to remove trees within the project site will be avoided where practicable. For those trees that cannot be reasonably avoided, a tree management strategy will be developed, including measures to offset the loss of trees and achieve a net increase in tree canopy. The final location of replacement trees will be confirmed in consultation with Inner West Council and Sydney Airport Corporation. The strategy will also include on-site processes and protective measures to ensure trees identified for retention are appropriately protected during construction.	Chapter 7.17.6
LV6	Noise barrier	Noise barriers will be designed to minimise their visual prominence as much as possible.	Chapter 7.7
Non-Aboriginal heritage			
NAH1	Avoiding impacts on heritage	The design will avoid impacts on non-Aboriginal heritage items, significant heritage fabric, locally and State significant archaeological remains and landscapes (including mature trees) as far as reasonably practicable. This includes significant fabric associated with Alexandra Canal and the Sydney (Kingsford Smith) Airport Group.	Chapter 3.4
NAH2	Minimising impacts on heritage	The design will be prepared in accordance with the urban design and landscape plan and Statement of Heritage Impact or the project. The design will minimise the potential for visual impacts on heritage items by incorporating sympathetic fabric, colour and form in the design.	Chapter 3.4

Clause No.	Issue	Mitigation Measures -Detailed Design	Document Reference
NAH3	Design of the bridges over Alexandra Canal	The bridges over Alexandra Canal will be designed to: - Be sympathetic to the heritage sensitivity and industrial landscape of the canal - Minimise physical impacts on the canal - Incorporate a high quality architectural design using suitable material and forms - Integrate with the bridges for the New M5 - Retain the open character of the canal as far as possible - Have regard to the Alexandra Canal Conservation Management Plan. Appropriately qualified and experienced heritage design professionals will be involved in the development of the designs for the bridges over Alexandra Canal. The proposed designs, including the elements of heritage interpretation incorporated into the designs, will be presented to the Heritage Council of NSW and Sydney Water. Feedback from the Heritage Council of NSW and Sydney Water will be considered and adopted in the designs where reasonable and feasible.	Chapter 3.4, Chapter 7
NAH6	Heritage interpretation	Appropriate heritage interpretation will be incorporated into the design in accordance with the NSW Heritage Manual (NSW Heritage Office and Department of Urban Affairs and Planning, 1996), Interpreting Heritage Places and Items: Guidelines (NSW Heritage Office, 2005), and the NSW Heritage Council's Heritage Interpretation Policy. This will focus on recognising the historical significance of the following items: - Alexandra Canal - Sydney (Kingsford Smith) Airport Group - Cooks River Container Terminal - Mascot (Shea's Creek) Underbridge - Botany Rail Line. Elements of heritage interpretation that will be incorporated into the design will be described in the urban design and landscape plan.	Chapter 2.4.6, Chapter 2.4.7, Chapter 3.4, Chapter 5

Clause No.	Issue	Mitigation Measures -Detailed Design	Document Reference
Aboriginal heritage			
AH1	Archaeological investigation areas impacted by the project	Detailed design and construction planning will avoid direct impacts on Investigation Area 1 and Investigation Area 2 where practicable.	Chapter 3.4
AH2		An Aboriginal heritage interpretation strategy will be developed in consultation with registered Aboriginal parties and other relevant stakeholders. The interpretation strategy will have regard to Sydney Airport Master Plan 2039 and the Sydney Airport Heritage Management Plan.	Chapter 3.4
Climate change and greenhouse gas			
CC3	Urban heat island effect	The urban design and landscape plan for the project will include consideration of appropriate landscape designs and species to reduce the impacts of urban heat island effect.	Chapter 7.20.1
GHG2	Greenhouse gas emissions	The final design will incorporate LED lighting in preference to fluorescent fittings or high-pressure sodium lights where fit for purpose, feasible and cost-effective.	Chapter 7.11

Executive summary

Figure i. Aerial view of SB51 looking towards Tempe Lands Mound

Figure ii. View looking towards Botany Bay

Sydney Gateway (the Project) is a high capacity roadway Project that will link Sydney's motorway network with Sydney Airport's domestic and international terminals and beyond. It comprises the following:

– New and upgraded sections of the road connecting to airport terminals
– New bridges over Alexandra Canal and other ancillary infrastructure and road connections.

The Project is located just north of Sydney Airport, predominantly surrounded by industrial and business uses. Tempe Recreation Reserve and Sydney Park are located near to the Project corridor, and the Alexandra Canal and Princes Highway run parallel to the corridor.

Vision

The Project adopts the overall vision as outlined in the *Sydney Gateway Road Project – Environmental Impact Statement / Major Development Plan (EIS / MDP)*, 2020, which states that:

"Sydney Gateway will be a memorable arrival and departure point that befits Sydney's stature as a vibrant global city and major entry point to Australia. It will be an exciting threshold experience that combines the highest quality engineering, landscape, architecture and art. It will celebrate the unique qualities of the place and contribute positively to the local community and environment".

Based on this vision, the Project provides urban and place making opportunities to create a 'gateway' experience for users that leverages the coastal setting of Botany Bay and creates a grand gesture of 'Welcome to Country' at a Motorway scale that capitalises on the infrastructure, mounds and artwork that befits Sydney as a vibrant global city.

The experience

The urban design concept is based upon the user experience through movement and time by individuals using this infrastructure, to provide connection to place and a sense of wayfinding. It can be perceived in three ways:

1. Driver experience – along the roadway, one that is of a fast and direct movement at a regional scale
2. Pedestrian / cyclist experience – meandering through the various precincts through the Active Transport Link (ATL) corridor along the banks of Alexandra Canal, at local scale, perceived as individual elements in a varied landscape
3. Aerial experience – as experienced from the air, on approach or departure, due to proximity to the north-south runway.

Figure iii. View looking north on Airport Drive with Tempe Lands Mound

Figure iv. View of SB61 from ATL

The primary urban design objectives align with those identified in the EIS / MDP (refer to Chapter 3.0), and in addition it also ensures that the Project provides a 'gateway' experience, marking a sense of arrival and departure and providing a sense of place. To guide the design, a big picture thinking has been undertaken to look at opportunities beyond the Project, which could be developed in the future as legacy projects. The bigger picture has been developed around the following key overarching ideas:

- Provide natural connectivity, which will enhance biodiversity and link green corridors along the greater corridor
- Consider the road as a 'gateway' marker, which will help frame significant views that will be created by the elevated bridges and viaduct structures. These elevated connections will also form a visual link to St Peters Interchange (SPI) structures, which will be visible from the bridge and viaduct structures
- Provide individual markers that serve as feature urban design elements. This will create opportunities for artwork to be integrated into the urban design
- Reinforce the connectivity of active transport links, which will create opportunities for interpretation and placemaking.

Project elements

Project elements are grouped into two types:

- Continuous elements - low rise bridges, retaining walls, noise walls, throwscreens, headlight screens, experienced as continuous connecting threads, providing for horizontal continuity and linear identity across the Project
- Punctuation elements - sculpted mounds and feature arch bridges, providing lateral identity, within the visual field of the Project and serving as wayfinding points and visual references within this complex piece of infrastructure.

Project elements have been designed with the following principles:

Consistency

Provide a design that is part of a family of forms and consistent with Sydney's motorway network.

Unobtrusive appearance

Ensure the design elements are visually unobtrusive allowing the landscape and environmental attributes of the area to be fully appreciated.

Integrated art

Provide opportunities for 'Welcome and Connection to Country' through Aboriginal art.

Lighting

Provide opportunities for feature lighting to enhance the Project narrative, making the Project perceptible during the day and night.

Maintenance

Ensure maintenance measures are provided for the design elements.

Figure v. View along Qantas Drive looking south with viaduct

Figure vi. View of type 3 retaining wall along viaduct

Sustainability

The Project will provide sustainability outcomes through the design approach to the lifecycle of the infrastructure: construction, operation and maintenance. Initiatives include:

- Reducing waste of material during construction
- Using digital engineering for construction planning to optimise sequencing
- Using modular, durable materials and detailing across surface works to reduce the level of maintenance, repair or replacement
- Implementing water sensitive urban design (WSUD) initiatives for surface water run off at Alexandra Canal
- Selecting appropriate plant species for the Australian climate, with groundcovers and mulch to suppress weeds and reduce frequency of maintenance.

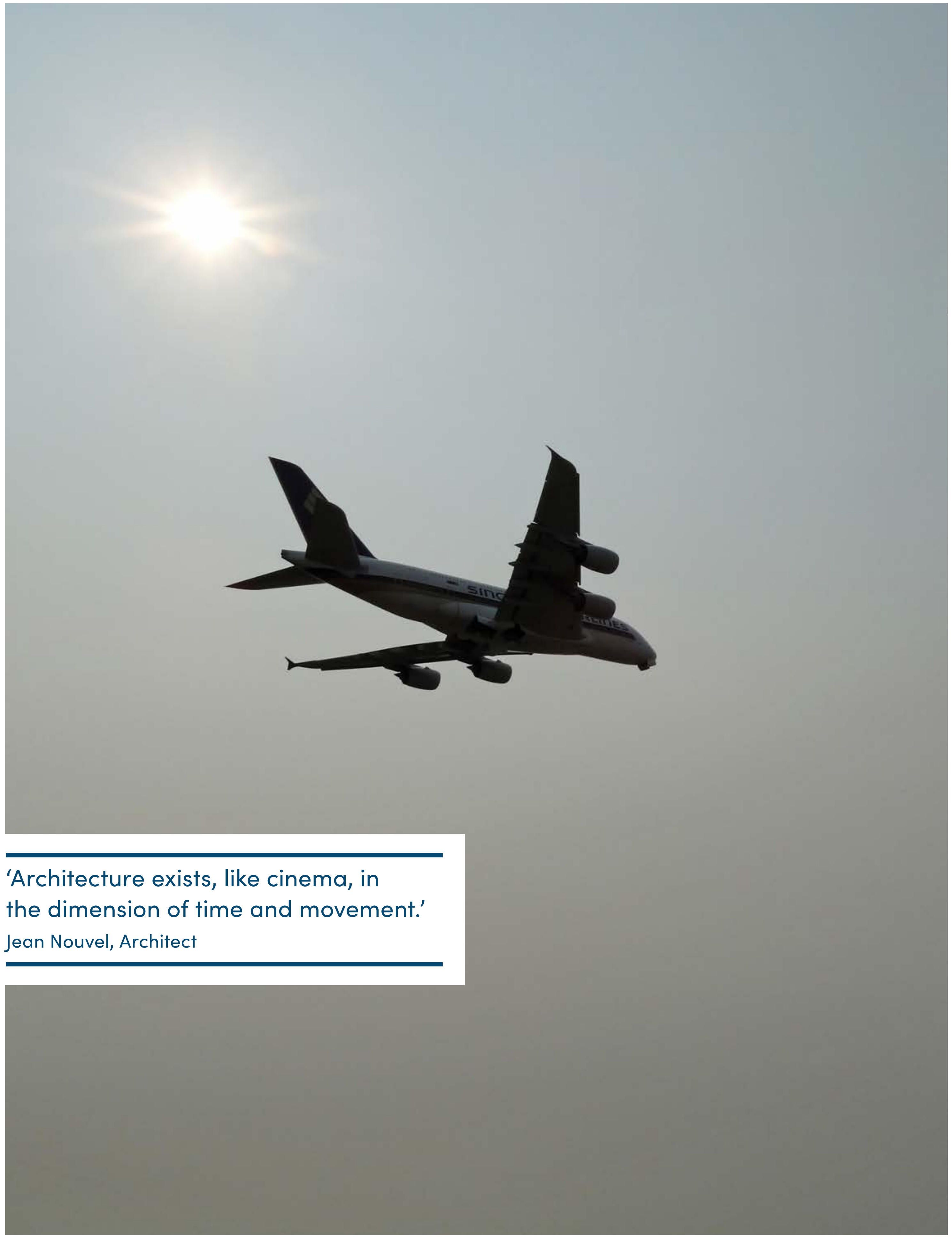
The outcome

The Project creates a work of art that speaks of 'Connection to Country'. The 'gateway' role of this place at the threshold of the international airport and, simply, the experience of movement through space. It will not be experienced as a standalone piece of infrastructure, but as a seamless part of a journey between the airport and the Sydney region. There will be many individual journeys along the Project corridor and these will create many individual experiences. The success of the Project experience will be measured at the individual level.

While there will be no single way to understand this complex place, a strong, simple strategy that leverages the elements of the infrastructure itself will foster legibility and allow individuals to navigate its complexity. In a place of multiple journeys across the visual field wayfinding will need to work from all directions.

The design of the Project will reference the movement that is inherent in this place with the arcing vectors of air and surface movement, the Aboriginal connection to this land and the endemic landscape of this coastal location to deliver enduring value.

Welcome to Country
Welcome to Sydney
Welcome Home



'Architecture exists, like cinema, in the dimension of time and movement.'

Jean Nouvel, Architect

1. Introduction

1.1 Purpose

This Place, Design and Landscape Plan (PDLP) illustrates the Project's urban, landscape and placemaking design. The purpose of this PDLP is to demonstrate compliance with the various Approval documents, including:

- CoMA
- CoA
- The updated mitigation measures as outlined in the Response to Submissions Report and the Final Major Development Plan.

Project components have been developed through an integrated and a co-design approach. This approach encourages a continuous component evolution and refinement throughout the design period.

The components out of necessity, receive further development at detailed design stage, arising from detailed engineering requirements, construction constraints and authority approvals. Further design modifications are also anticipated as an outcome of the community and stakeholder consultation process.

1.2 The team

The integrated urban and landscape design for the Project has been prepared in collaboration with a multidisciplinary team of engineers, contractors, artist representatives, stakeholder consultants, urban designers, landscape designers and 3D visualisers. The team includes:

- John Holland Seymour Whyte Joint Venture (JHSWJV)
- AECOM Arcadis Joint Venture (AAJV) – civil design
- BG&E – bridge structures design
- Conybeare Morrison International Pty Ltd (CM+) in association with Context Landscape Design Pty Ltd – urban and landscape design
- Cultural Capital – Aboriginal art curators.

1.3 Design methodology

This report has been prepared by taking the following key steps:

- Attending site visits
- Reviewing Approval documents
- Identifying opportunities (Project scope and future potential)
- Reaffirming Project urban design objectives and principles based on the EIS / MDP
- Developing designs for bridge structures based on the guiding principles outlined in the EIS / MDP
- Developing design of bridge piers based on the guiding principles outlined in the EIS / MDP
- Attending and contributing to ongoing Safety in Design (SiD) workshops and risk workshops covering whole of life design and user interface as part of the detailed design
- Developing urban design features in consultation with artist representatives.

Software:

- InDesign
- Civil / Map 3D, AutoCad 2020
- 3D Max, Rhino, Sketchup, Lumion, sketches
- Photoshop, Illustrator, PowerPoint.

Figure 1-1. Existing aerial view looking south towards Sydney Airport, April 2018 (TfNSW)

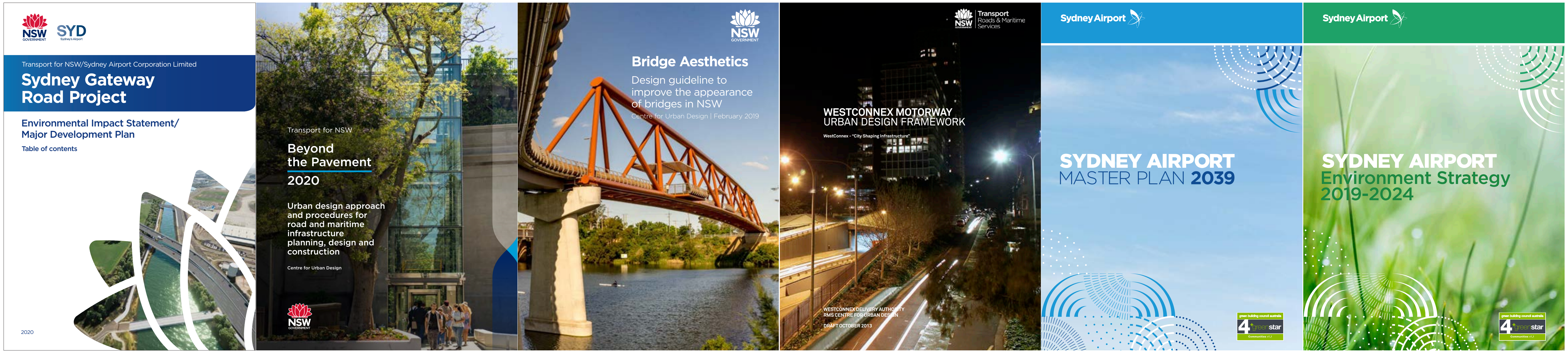
1.4 Key design standards and guideline documents

Project documents

- *Sydney Gateway Road Project – Environmental Impact Statement / Major Development Plan,* Roads and Maritime Services / Sydney Airport Corporation Limited, May 2020
- *Sydney Gateway Road Project Response to Submissions Report,* May 2020.

Guideline documents

- *Soil Landscape of Sydney*, Soil Conservation Services of NSW (1989-2010)
- *NSW Bicycle Guidelines*, Road and Traffic Authority NSW, Version 1.2, July 2005
- *Designing Out Crime Planning Guidelines*, June 2006
- Creating Places for People: An Urban Design Protocol for Australian Cities
- *Inner West Council Biodiversity Provisions*, Inner West Council, 2011
- *WestConnex Motorway Urban Design Framework, WestConnex Delivery Authority – Roads and Maritime Services Centre for Urban Design, September 2013*
- *Sydney's Cycling Future. Cycling for everyday transport,* Transport for NSW, 2013
- *Managing Bird Strike Risk*, Australian Airport Association, 2015
- *Sydney Airport Wildlife Hazard Management Plan*, March 2016
- *NSW Coastal Management Act,* 2016
- *Shotcrete design guideline - design guideline to improve the appearance of shotcrete in NSW*, Roads and Maritime Services, March 2016
- *Noise wall design guideline - design guideline to improve the appearance of noise walls in NSW*, Roads and Maritime Services, March 2016
- *Wildlife Hazard Management at Airports*, Australian Airport Association, 2016
- *Better Placed – an integrated design policy for the built environment in NSW*, GANSW, September 2017
- *Sydney Green Grid, Spatial Framework and Project Opportunities,* Department of Planning and Environment 2017
- *Greener Places – establishing an urban Green Infrastructure policy for NSW*, GANSW, Oct 2017
- *Greater Sydney Region Plan - A Metropolis of Three Cities*, Greater Sydney Commission, March 2018
- *Connecting with Country Framework*, GANSW, November 2020
- *Water Sensitive Urban Design Guideline*, Transport Roads and Maritime Services, May 2017
- *Landscape Design Guideline*, Roads and Maritime Services, December 2018



- *Eastern City District Plan*, Greater Sydney Commission, March 2018
- *Guideline for Landscape Character and Visual Impact Assessment EIA-N04*, Transport Road and Maritime Services Centre for Urban Design, Version 2, 14 December 2018
- *Safer Designed Places*, Roads and Maritimes Services, 2018
- *Future Transport Strategy 2056*, Transport for NSW, 2018
- *Bridge Aesthetics - design guidelines to improve the appearance of bridges in NSW*, Roads and Maritime Services, Centre for Urban Design, February 2019
- *Premier's Priorities Greener Public Spaces Greening Our City*, 2019
- *Sydney Airport Environment Strategy 2019-2024*, Sydney Airport Corporation Limited, April 2019
- *Sydney Airport Master Plan 2039*, Sydney Airport Corporation Limited, April 2019
- *Sydney Airport Wildlife Management Plan*, Sydney Airport, 2020
- *SYD Urban and Landcape Design Guidelines*, July 2020
- *Beyond the Pavement, Urban Design Approach and Procedures for Road and Maritime Infrastructure Planning, Design and Construction,* Transport for NSW, Centre for Urban Design, 2020
- *RMS D&C Specifications R178* (Vegetation)
- *RMS D&C Specifications R179* (Landscape Planting)
- *RMS D&C Specifications R176* (Seed Collection)
- *Civil Aviation Act 1988*
- *Airports Act 1996*
- *NASF Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports*
- *AS/NZS 4282:2019 Control of the obstrusive effects of outdoor lighting*
- *AS/NZS 1158 - Lighting for Roads and Public Spaces.*

Figure 1-2. Key guideline documents

1.5 Document structure

This report identifies the overall design responses and strategies for the Project.

Description of individual chapters are as follows:

1. Introduction

Introduces the Project, design methodologies and guideline documents used to inform the design.

2. Contextual analysis

Provides a brief analysis of the Project context, with particular focus on urban design and landscape related issues.

3. Urban design vision, objectives and principles

Outlines the vision, urban design objectives and principles for the Project.

4. Precedents and benchmarking

Provides relevant Australian and international best practice examples.

5. Design approach

Outlines the overall theme and urban design strategy of the Project.

6. Urban design concept plans

A series of urban design concept plans which illustrate the urban design concept.

7. Design elements

Illustrates the urban design of design elements such as bridges, noise walls, retaining walls, throwscreens and headlight screens.

8. Materials and finishes

Summarises the materials and finishes proposed for the design elements.

9. Conclusion

Reinstates the vision, theme and urban design strategy of the Project.

Figure 1-3. Existing aerial view looking north towards St Peters, April 2018 (TfNSW)

1.6 Project overview

Sydney Gateway is a high capacity roadway Project will link the Sydney Motorway network at St Peters Interchange (WestConnex M8 and WestConnex M4-M5 Link) with Sydney Airport's domestic and international terminals and beyond. It is located about eight kilometres from Sydney CBD and is part of the NSW and Australian Government's initiatives to improve road networks to the Airport and Port Botany, which will provide connections to Sydney's strategic hubs and cater to future growth of this area. It comprises the following:

– New and upgraded sections of the road connecting to airport terminals

– New bridges over Alexandra Canal and other ancillary infrastructure and road connections.

The Project includes the following links:

1. Terminal 1 / Freight and St Peters Interchange link – elevated bridges and embankment structures
2. Terminal 1 and 2 / 3 link – elevated bridge and viaduct structures
3. St Peters Interchange and Terminals 2 / 3 link – elevated bridge and viaduct structure
4. Qantas Drive upgrade – widening of lanes along Qantas Drive
5. Active transport link (ATL) connections – new shared path connections to existing shared path network.

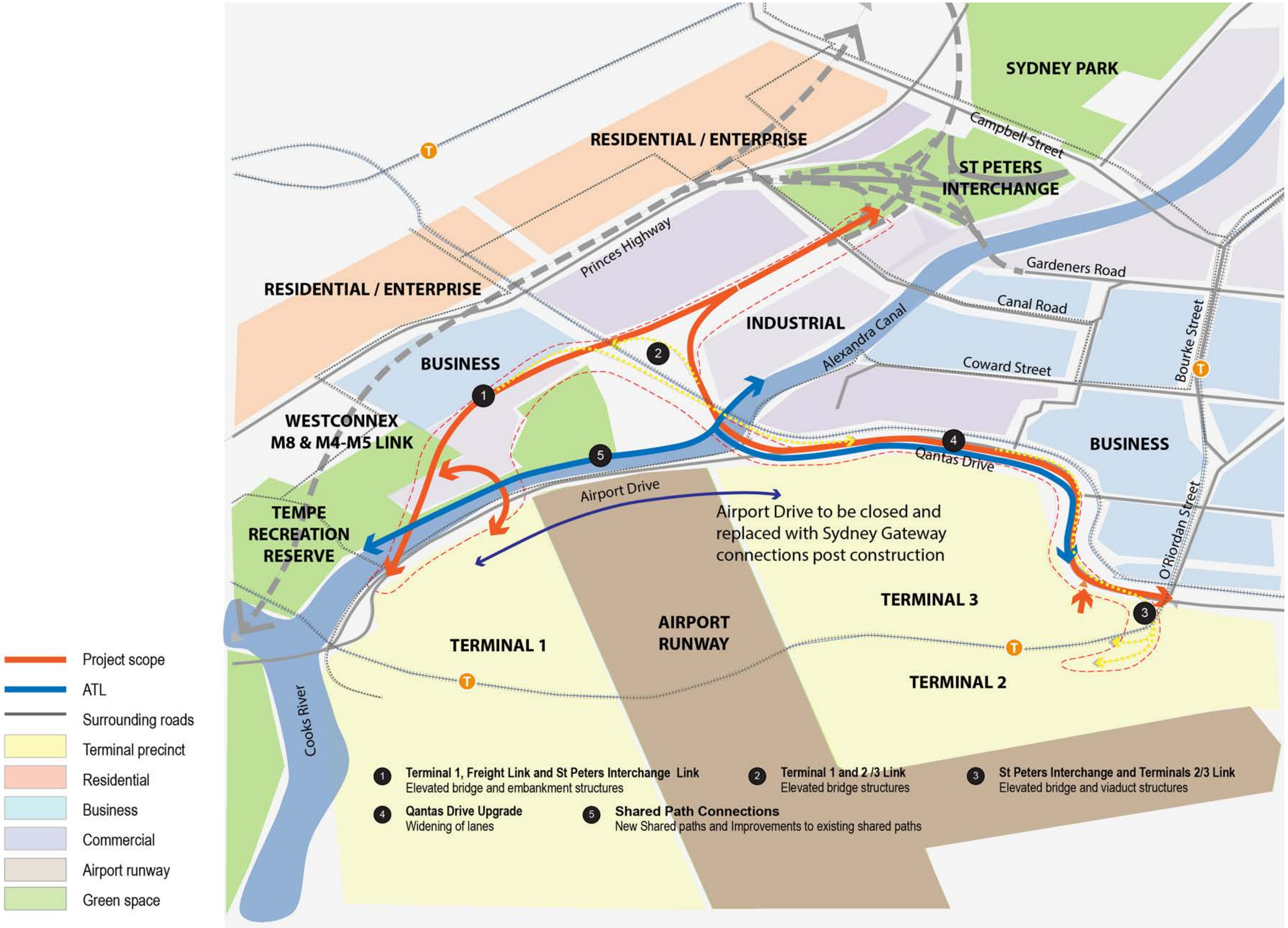


Figure 1-4. Project links

The Project will:

- Strengthen connections to Sydney's Metropolitan Motorway network
- Reduce travel time and improve local road safety
- Improve road transport to and from Sydney Airport and Port Botany
- Reduce traffic congestion through the local road network servicing Sydney Airport and Port Botany
- Improve freight logistics to and from Port Botany, Sydney Airport and Western Sydney
- Provide a safer, more pleasant visitor environment.

The Project encompasses:

- All Project elements broadly to the west of the Lancastrian Bridge.
- Viaduct and connection to the Domestic Terminals T2 / T3.

Infrastructure Sustainability Council of Australia (ISCA)

This PDLP meets the requirements of Urb 1 – Urban design criteria in the ISCA IS Version 1.2 Technical Manual with the inclusion of the following items:

- Site analysis and planning – Macro and Micro – Refer to Chapter 2.0
- Vision and objectives – Refer to Chapters 5.0 & 6.0

The requirements for Urb 2 – Implementation criteria in the ISCA IS Version 1.2 Technical Manual is achieved through the delivery of detailed design and documentation of the design elements illustrated in this PDLP. The detailed design process provides documentation that will be constantly refined and value engineered throughout the Project up until the point the design is 'Issued for Construction' stage. The design will then be implemented in construction.

Figure 1-5. Project diagram

1.7 Approvals and consultation

Approval

As part of the detailed design process, this PDLP has been prepared to satisfy the CoMA, CoA and UMM requirements for urban design and illustrates:

- Update of the concept design
- Compliance with CoMA and CoA documents
- Consultation.

The Department of Planning, Industry and Environment (DPIE) will be the governing authority to approve the urban design.

The draft PDLP was issued for display for community and stakeholder consultation. The PDLP has also been reviewed by an external Urban Design Review Panel (UDRP), that was established to review the Project urban design and advise on the application of the objectives to key design elements in relation to place making, architecture, heritage, urban and landscape design and public art and aesthetic aspects of the Project.

The Director for the Centre for Urban Design at TfNSW has been convening and facilitating the UDRP. The panel comprises the Government Architect, Director Bridges Technical - Services (TfNSW), and an urban design qualified representative from SYD, along with other members pertaining to the various urban design disciplines as noted under Consultation.

The final PDLP was submitted to DPIE for approval with responses to submissions. The construction of permanent built works and landscaping as illustrated in the final PDLP will commence following approval by DPIE.

The PDLP will be implemented during the construction phase of Sydney Gateway as part of the Construction Phase Services. Verification that the PDLP designs have been correctly constructed is provided through a robust Quality Management process and the Construction Phase Services team that regularly attends site during construction to monitor the works and where applicable complete the following activities like signoff off Hold Points, review shop drawings and check test samples e.g. viaduct perforated bridge screens and ATL path concrete path test pours.

Consultation

A UDRP was established to satisfy Condition E67 and E68. The panel was nominated by JHSWJV and approved by the Secretary. The UDRP is made up of suitably qualified, experienced and independent professionals in each of the fields of:

- Public art / cultural interpretation public art
- Aboriginal cultural heritage
- European cultural heritage
- Open space design and landscape architecture
- Active transport
- SYD.

Consultation with the UDRP occurred iteratively through individual sessions with the Panel members for the respective fields and also through group sessions to provide regular updates on the design development. Feedback from the UDRP were provided at the end of each meeting. Four UDRP meetings were held between March and August 2021. Minutes were recorded in each meeting and feedback from the previous meeting was addressed and demonstrated in the subsequent meeting. The majority of UDRP feedback related to the following areas:

- Creating a ‘Gateway experience’ at various scales
- Enhancing the experience of motorists and pedestrians and providing a design that is timeless
- Creating wayfinding points along the route to provide a sense of orientation
- Constructability
- Non-Aboriginal heritage interpretation
- Aboriginal consultation and engagement of artists.

A summary of how the UDRP feedback was addressed has been included at the end of this chapter.

This PDLP will be submitted to DPIE for approval at least one month prior to construction of permanent works. The construction of permanent works and landscaping as illustrated in this PDLP will commence following approval by the Secretary.

A robust and sustainable consultation strategy was established as part of the Project. This will ensure appropriate levels of consultation with key stakeholders and the community to manage expectations and minimise risk as the Project is carried forward.

The strategy outlines the:

- Level of engagement to be carried out

Key stakeholders including but not limited to TfNSW, Heritage Council, SYD, Bicycle NSW and Councils

- Potential issues and mitigation activities
- Consultation and communication activities to ensure effective, relevant and timely input from stakeholders and the community
- Communication protocols and responsibilities within the Project team
- Evaluation activities.

The desired outcomes of the stakeholder engagement and consultation include:

- Stakeholder understanding of the detailed design, urban design and landscape development processes
- Stakeholders submissions are captured and they guide the development of the final PDLP
- Development of a comprehensive final PDLP, which will guide and support major planning and investment decisions
- Early stakeholder participation in the planning of the urban design and landscape planning, which will encourage ongoing interest and commitment to its development and implementation
- Risk mitigation.

Submissions have been received following display and responses have been provided in a separate submissions responses schedule, which address the community and stakeholder comments.

The engagement process also included the development of an art consultation strategy which allowed for local artists to be engaged during the detailed design process.

2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
UDRP Meetings (E68)			●	●		●		●				
Artists Workshops					●	●	●	●	●	●		
UDRP Individual Sessions												
• Art							●					
• SYD / Landscape				●	●	●		●				
• Non-Aboriginal Heritage						●						
Stakeholder Briefings												
• Inner West Council			●			●		●		●		
• Bayside Council				●				●				
• City of Sydney				●				●				
Special Events												
• Livestream Event									●			
• IWC Councillors debrief										●		
ABC/DITRDC/SYD								●				
Heritage Council of NSW									●			
PDLP for Display									●	●		
Finalise PDLP										●	●	
DPIE Approval												●

The design and its integration had been formed in consultation with a number of key organisations and groups independent of the Project, including:

- Aboriginal heritage consultant
- Aboriginal artists
- Local Aboriginal Land Council
- Inner West Council, Bayside Council and City of Sydney
- Heritage Council of NSW
- Sydney Water.

Consultation has occurred with the following stakeholders and independent associations at the time of this report:

- Inner West Council - 02 March 2021
- UDRP Meeting 1 - 10 March 2021
- Engagement with Metro Local Aboriginal Land Council (MLALC) - 19 April 2021
- UDRP Meeting 2 - 21 April 2021
- La Perouse Aboriginal Community Alliance (LaLACA) - 20 May 2021
- UDRP individual session: Non-Aboriginal Heritage - 02 June 2021
- Individual session with SYD: Viaduct and Landscape - 29 June 2021 and 19 August 2021
- UDRP individual session: Art - 01 July 2021
- UDRP Meeting 3 - 21 July 2021
- Inner West Council - 5 August 2021
- Bayside Council - 10 August 2021
- City of Sydney - 13 August 2021
- SYD - 19 August 2021
- ABC / DITRC / SYD - 27 August 2021
- UDRP Meeting 4 - 31 August 2021
- Heritage Council of NSW - 3 September 2021
- Update of the PDLP to LAPA - 20 October 2021
- Presentation to Minister's Office - 30 Sept 2021.

Response to PDLP Consultation

Consultation occurred through a virtual portal between 21 September and 18 October 2021. An online event of the PDLP occurred on the 28 September 2021, which outlined the key features of the PDLP. The PDLP was well received by the community overall. The Project was also featured by the media on 29 September 2021.

A total of 47 submissions were received including:

- Inner West Council
- Bayside Council
- Bicycle NSW
- Community.

The submissions that were directly related to the PDLP have been categorised into the following:

- Landscape
  - Additional planting along the ATL
  - Additional shade trees along the ATL
  - Additional open space along the ATL
  - Success of the mounds and maintenance.
- ATL
  - Additional rest areas along the ATL
  - Additional shade structures along the ATL
  - Improved amenity such as seating for the elderly.
- Noise wall
  - Gap in the noise wall and noise impacts.

Comments from SYD were received through other correspondences and were related to:

- Artwork on the viaduct
- Extents of the viaduct screen
- Parapet-Screen transitions at the viaduct abutment B.

A number of responses made have been incorporated into the design to enhance the project narrative and provide a gateway experience. These responses include; developing a Connection to Country with the engagement of Aboriginal artists on key design elements, including ATL rest areas and interpretation elements as well as the introduction of feature lighting to key elements, and artwork on mounds, walls and screens.

This document, revision F includes the responses that have been incorporated into the design from the public exhibition and consultation.

This document is the current plan and forms the final PDLP.

The following modifications have been made to further enhance the PDLP in light of the feedback received:

- Additional feature native planting along the ATL, which includes cascading mix species, enhancing the visual amenity and maximising the green buffer along the ATL (refer to Chapter 5.8.7, Chapter 7.17.10 and Chapter 7.19.2)
- Additional treatments have been provided in the undercroft area of the Desal pipeline, featuring recycled aggregate, which will help to reduce maintenance issues and further support ISCA credit requirements (refer to Chapter 5.8.7)
- Artwork has been extended to wrap around the undercroft areas of the viaduct abutments. (refer to Chapter 5, Chapter 6, and Chapter 7.5)
- The viaduct screen has been extended along the outer viaduct from abutment to abutment, to provide continuity of the artwork between the ground plane elements (the abutments) and the elevated plane elements (the viaduct screen)
- The rest areas have been further developed to enhance placemaking opportunities to increase the new accessible areas, and provide amenity for the elderly. Opportunities to include additional shade trees and green buffers have also been maximised. The total usable open space in the rest areas on the Project is about 420 square metres.

Incorporation of feedback from the UDRP:

UDRP Feedback	Incorporation of UDRP feedback
Creating a ‘gateway’ experience at various scales	Gateway experience has been provided for the Project at three scales: - **National scale - Aviation scale and speed - The aerial experience:** The feature art mounds at Tempe Lands and Northern Lands provide a large imprint of a visually iconic element that can be seen from the sky. The arches with its feature lighting will also be a visual spectacle as seen from the air. - **Regional Scale - Motorway scale and speed - The driver experience:** The feature arches at SB51 and the viaduct screen with their feature lighting compliment each other and create a grand gesture at the approaches to the Domestic and International terminals. The feature art mounds create a visually iconic elements that create wayfinding points and provide a sense of orientation to the driver experience of the motorway. The feature art walls along the abutments of the viaduct and SB12 provide a continuous thread of linear identity to the motorway. - **Local Scale - Active transport scale and speed - the intimate experience:** The Active Transport Link incorporates feature areas with interpretive elements that reference the Aboriginal and non-Aboriginal heritage, as a demonstration of the evolution of transport in Australia. These feature areas include two rest areas along each side of SB91 and two special areas that incorporate accent materials in the pavement to highlight the canal, railway and aviation history, creating opportunities for placemaking.
Enhancing the experience of motorists and pedestrians and providing a design that is timeless	The user experience of motorists and pedestrians has been enhanced by creating wayfinding and placemaking elements along the motorway and the ATL including: - Feature arches at SB51 - Feature screen along the viaduct - Feature art mounds at Tempe Lands and Northern Lands - Feature art walls at the abutments of the viaduct and SB12 - Feature areas along the ATL that incorporate interpretive elements - Articulation of the noise wall architecture at the Tempe Lands ATL crossing to provide a dynamic aesthetic which incorporates CPTED principles and increases legibility - Feature landscaping on the art mounds at Tempe Lands and Northern Lands, and at the ATL crossing.
Creating wayfinding points along the route to provide a sense of orientation	Wayfinding points are provided at: - The art mounds at Tempe Lands and Northern Lands which serve as vertical visual elements that can be viewed from a long distance in the landscape and strengthen the relationship with the St Peters Mound - The feature areas provided along the ATL including the two special areas and the two rest areas - The artwork on the retaining wall abutments along the viaduct and SB12 serve as linear features along the motorway - The feature screen on the viaduct and the feature arch serve as elements marking the approaches to and from the Domestic and International terminals.
Constructability	Measures have been incorporated to ensure the constructability of the following key elements: - Art mounds - Methodologies have been developed to ensure the stability of the stonework and the landscape on the mounds, which is illustrated in Chapter 7.18.4. - Viaduct screen - A modular system has been developed for the construction of the screen which can be easily installed, maintained or replaced.
Non-Aboriginal heritage interpretation	Non-Aboriginal heritage interpretation has been provided by: - Incorporating interpretive signage and pavement markers provided along the ATL in the feature areas to reference the industrial history of the place - The use of colours and materials such as weathered steel on SB 21 and the shelters to reference the industrial character of historical elements such as the Shea's Creek Bridge truss.
Aboriginal consultation and engagement of artists	Aboriginal consultation and engagement of artists has been undertaken by the commissioning of Aboriginal artists through a curatorial artist selection process who collaborated with local Elders to provide Connection to Country for the Project. The artists worked with the design team to develop visual motifs as an abstraction of the natural objects and cultural practices that were identified to provide Connection to Country. These motifs included various elements such as the mullet, weaving, nawi (canoe), the boomerang, coastal wattle and the fish hooks and flints which have been translated as a supergraphic artwork pattern on the mounds, walls, screens and the ATL as an expression of urban design.

1.7.1 Art consultation methodology

The team's approach for the art consultation strategy is to co-design with local Aboriginal Custodians and their endorsed artists, an interpretation of the Sydney Gateway corridor that illuminates Aboriginal history and contemporary Aboriginal story.

The team's depth of methodology, and 'Connection to Country' and extent of community co-design will ensure the successful delivery on the primary urban design objective of providing a 'gateway' experience for the Project, marking a sense of arrival and departure to create a sense of place.

The following methodology and key tasks have been prepared by Cultural Capital to develop the Aboriginal cultural interpretation strategy.

Phase	Tasks
Artist selection	- Compile initial artist shortlist for direct commission (in consultation with local community)
Art opportunities curation model	- Consultation regarding artists and shortlist
	- Consult with MLALC and LaPACA regarding artist shortlist and methodology
	- Integrate artwork and design opportunities identified
	- Discuss curation approach with UDRP
	- Contact selected artists to ascertain their interest and availability
	- Present shortlist and agree on artist/s to send artist brief and contract
	- Advise UDRP and stakeholders of selected artist
	- Contact selected artist/s and issue artist brief and information package
	- Issue contract to selected artist/s and manage commissioning process
Artist brief and artist contract	- Draft Artist Brief and Information Package and submit for feedback
	- Draft milestone payments and deliverables for Artist Commissioning Agreement and send for feedback
	- Incorporate feedback and finalise Artist Brief and Information package
	- Finalise Artist Commissioning Agreement
Artist deliverables	- Attend site visits and inception meetings with relevant teams
	- Attend collaborative workshops
	- Conduct any research for themes and concepts
	- Liaise with any local community groups, schools for potential design input (optional)
	- Generate concepts and ideas
	- Create designs for integration and submit for implementation
	- Refine concepts and designs
	- Ensure their designs contribute to a cohesive art integrated outcome across the Project
	- Document their creative process and working with any community groups
	- Present their designs and concepts to the UDRP
	- Attendance to final community consultation session as requested (to be confirmed with artist).







2. Contextual analysis

2.1 Regional context

The Project needs to be understood as part of a regional system of movement corridors across Sydney; from Sydney Airport through the metropolitan area and connecting to regional NSW and beyond.

At an even greater scale, the Project is part of a long-term strategy to complete missing links within Sydney's Motorway network, including:

- Outer Sydney Orbital
- Port Botany Link
- Connection to the M6
- Western Harbour Tunnel and Beaches Link (WHTBL)
- M12 Motorway.

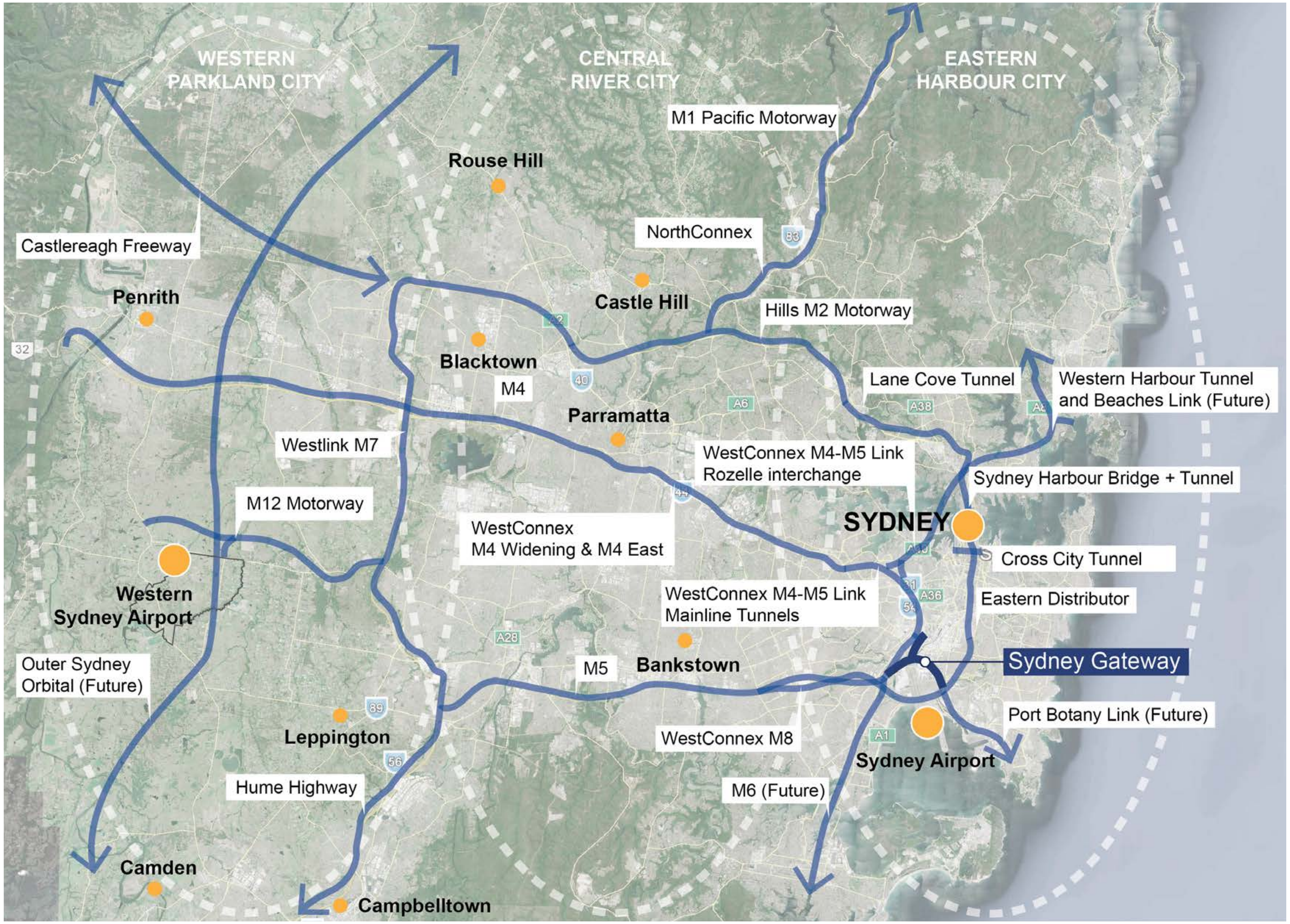


Figure 2-1. Regional context

2.2 Project context

The Project is situated about eight kilometres south of Sydney's CBD, north of Sydney Airport.

The majority of the Project site is owned by the Commonwealth and leased to Sydney Airport. Other land in the Project site is owned by local governments, such as the Inner West Council or other private landowners.

There are two parcels of land located within the Northern Lands, owned by Sydney Airport and used for airport operations, which are not subject to the Airport's Act, as it is not Commonwealth Land.

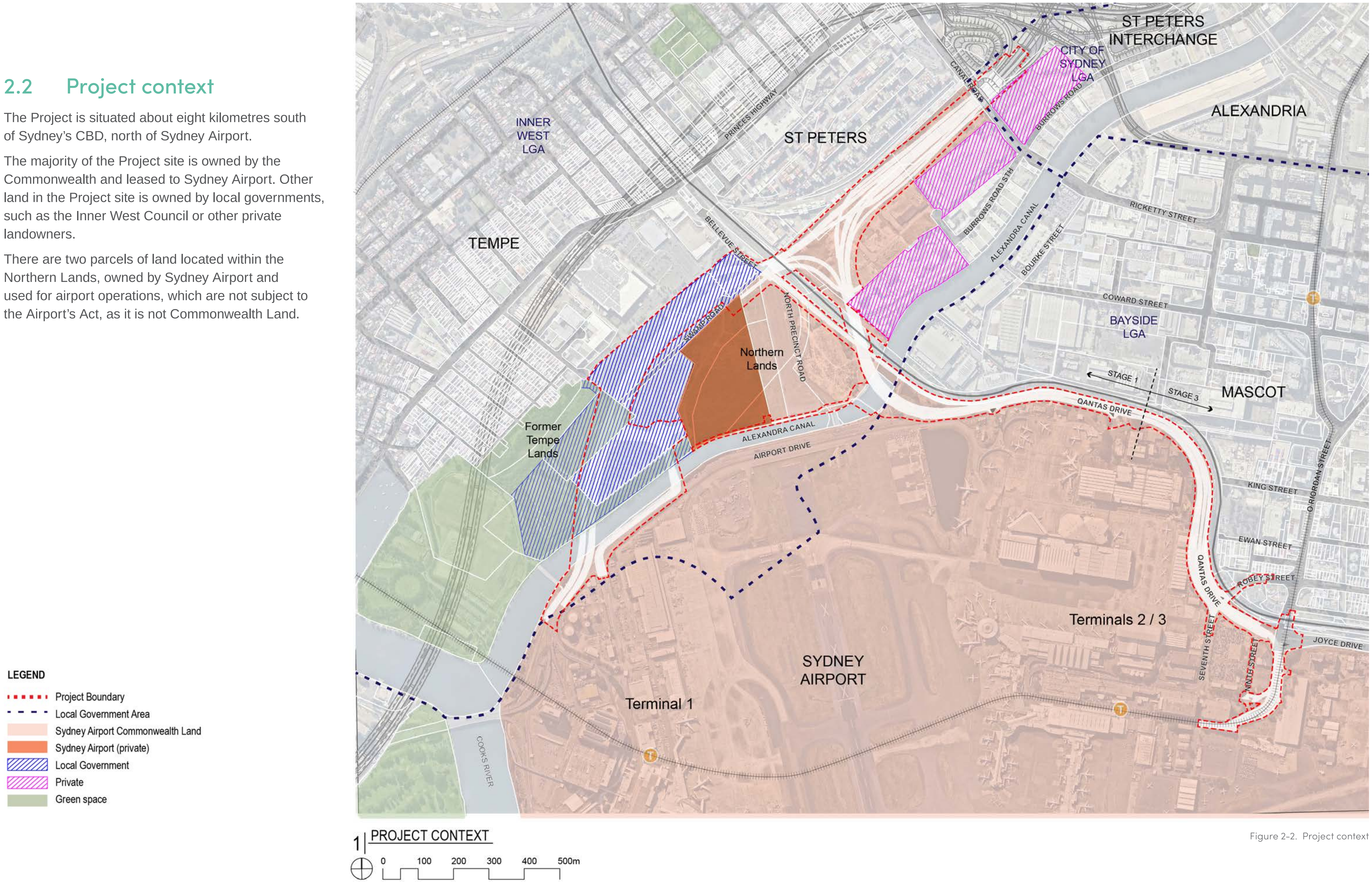


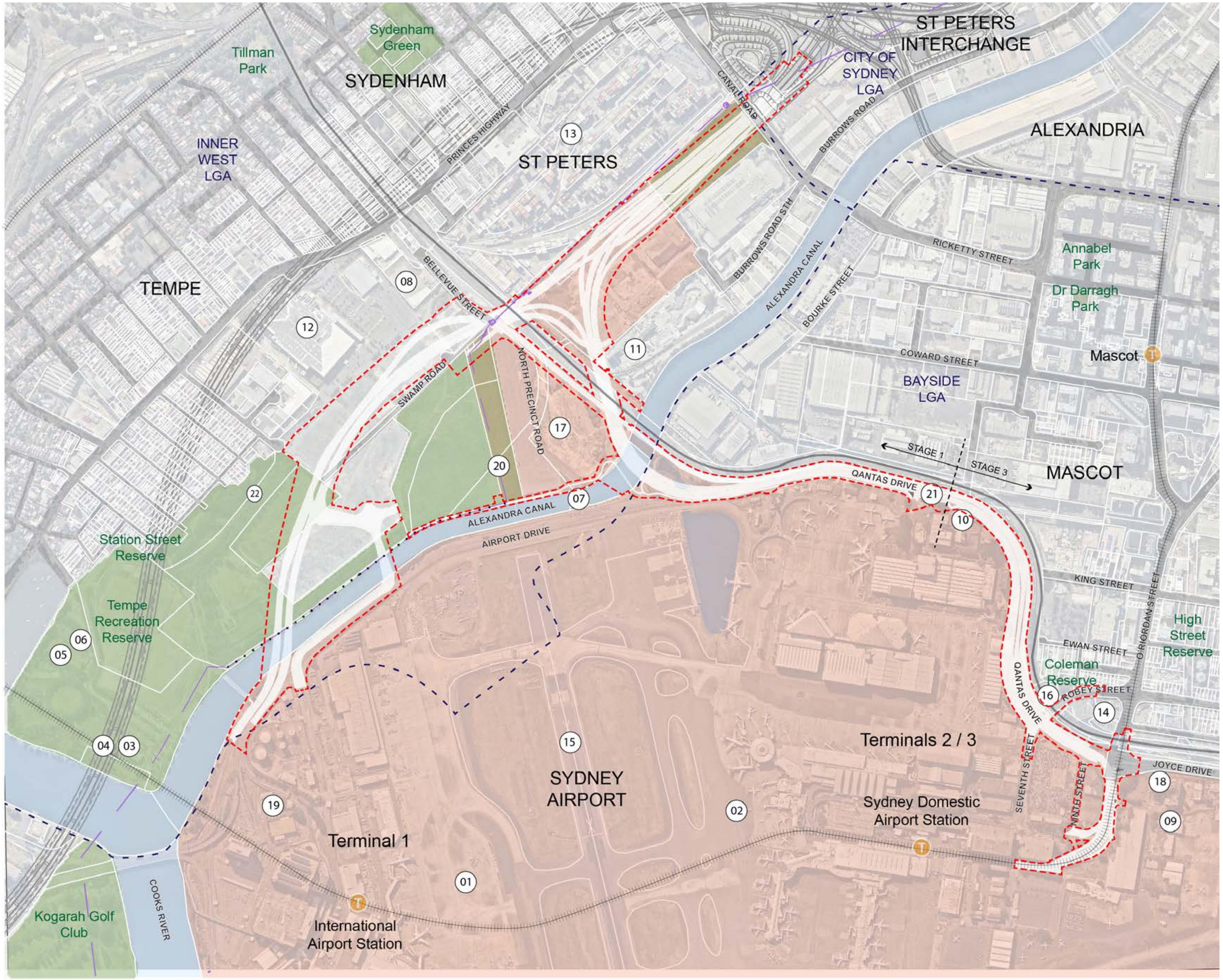
Figure 2-2. Project context

2.3 Local context

Most of the Project falls within the Inner West and Bayside Local Government Areas (LGA), with only a small area north of Canal Road, joining St Peters Interchange located in the City of Sydney locality.

The site is a major transport and infrastructure corridor, with Sydney Airport being the most significant 'gateway', providing freight, trade, business and tourism services.

The northwest area of the site has a significant amount of large open spaces and wetlands. It was the site of a shale quarry in the 1920s, a greyhound racing track in 1940, then a rubbish tip until the 1970s. Today, the Tempe wetlands have become a thriving habitat for native wildlife.



LEGEND

- Project Boundary
- Local Government Area
- Existing Desalination
- Open Space
- Sydney Airport Commonwealth Land

PLACES OF INTEREST

(01) Sydney Kingsford Smith Airport	(12) Ikea
(02) Sydney Domestic Airport	(13) Cooks River Intermodal Terminal
(03) Robyn Webster Sports Centre	(14) Stamford Plaza at Sydney Aiport
(04) Netball Courts	(15) Main Airport Runway
(05) Bowling Greens	(16) Pullman Sydney Airport
(06) Jet Sport Club	(17) Northern Lands
(07) Nigel Love Bridge	(18) Mantra on Sydney Airport
(08) Salvation Army	(19) Freight Terminal
(09) Air Ambulance Services	(20) Desalination Pipeline
(10) Qantas Flight Training Centre	(21) Lancastrian Bridge
(11) Boral Recycling	(22) Wetlands

1 | LOCAL CONTEXT

0 100 200 300 400 500m

Figure 2-3. Local context

2.3.1 Character zones

The place is characterised by many land uses, which contribute to the overall urban experience of the area.

Z1 – Airport terminals

Sydney Airport is Australia's largest transport hub. The high volume of people / traffic using this facility contribute to the significance of this area as an activity generator for economic and cultural values.

Z2 – Open space

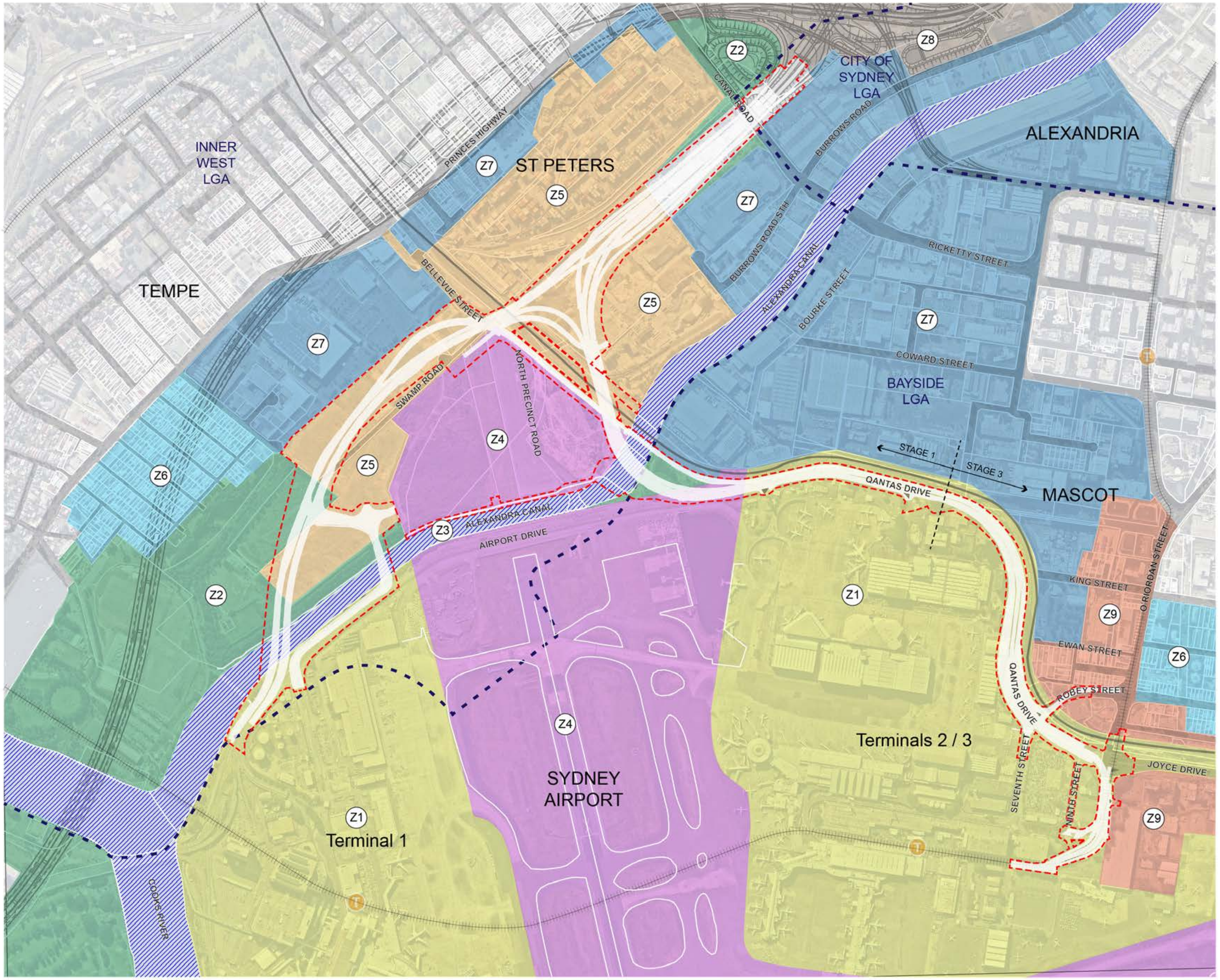
Open spaces in the vicinity of the Project include Tempe Recreation Reserve and St Peters Interchange. The open setting of these areas allows for expansive views towards Alexandra Canal.

Z3 – Alexandra Canal

Alexandra Canal is a significant heritage item with important Aboriginal significance. It is a wide, open body of water, which provides expansive vistas of the surroundings and is a distinct contrast to the dense surrounding built forms. The canal is lined with mature trees and vegetation and creates a green edge to the airport precinct.

LEGEND

- Project Boundary
- Local Government Area
- Botany Rail Line
- Z1 Airport terminals
- Z2 Open space
- Z3 Alexandra Canal
- Z4 Airport runway
- Z5 Industrial
- Z6 Residential
- Z7 Warehouse
- Z8 Motorway
- Z9 Airport support facilities



1 | LANDSCAPE CHARACTER ZONES

0 100 200 300 400 500m

Figure 2-4. Landscape character zones

Z4 – Airport runway

There are three existing runways with associated taxiway entries and exits. The runways are identified as the most aesthetically distinctive part of the airport by the heritage Statement of Significance. They consist of large sections of paved areas for taxiing, take off / landing and car parking, with dramatic open sky views.

Z5 – Industrial

This zone includes the Boral St Peters facility, the former Tyne container storage site and the Botany Rail Line, which all contribute to the overall heavy industrial character and further emphasises the area's busy port activities.

Z6 – Residential

The primary low density residential area near the Project site is in Tempe, which consists of traditional dwellings on small blocks. The area adjoins the former Tempe Lands, with street views and dense vegetation in the Tempe Lands. The other area of traditional single dwelling houses is near the Botany Rail Line, east of O'Riordan Street in Mascot.

Z7 – Warehouses

This zone includes several large retail warehouses, situated along Princes Highway in Tempe, these include IKEA, Salvos Stores, The Good Guys and Decathlon. The large warehousing zone is located in Mascot, along Airport Drive which consists of light industrial, manufacturing and freight related businesses.

Z8 – Motorway

This zone consists of the SPI, located within the Alexandria Landfill site, and is a key connection for the Project, interfacing with existing WestConnex projects.

Z9 – Airport service facilities

This area is characterised by land uses that directly service the Sydney Airport. It is located at the eastern end of the Project site, near O'Riordan Street and Robey Street and includes businesses such as Stamford Plaza at Sydney Airport and the Pullman Sydney Airport, park and fly, logistics and car hire.

Figure 2-5. Z1 -Sydney Airport Terminals

Figure 2-6. Z2 - Open space

Figure 2-7. Z3 - Alexandra Canal

Figure 2-8. Z4 - Airport runway

Figure 2-9. Z5 - Industrial

Figure 2-10. Z6 - Residential

Figure 2-11. Z7 - Warehouses

Figure 2-12. Z8 - Motorway

Figure 2-13. Z9 - Airport service facilities

All photos, CM+

The closest residential areas include:

– Tempe to the northwest

– Mascot to the northeast.

The Northern Lands includes leased and freehold airport land located north of Airport Drive. The area is largely undeveloped, with only staff overflow car parking access from Nigel Love Bridge.

Figure 2-14. Nigel Love Bridge

Figure 2-15. Northern Lands

Figure 2-16. Alexandra Canal near existing land bridge

Figure 2-17. Tempe Recreation Reserve

Figure 2-18. Existing aerial of Sydney Airport main runway

Figure 2-19. IKEA

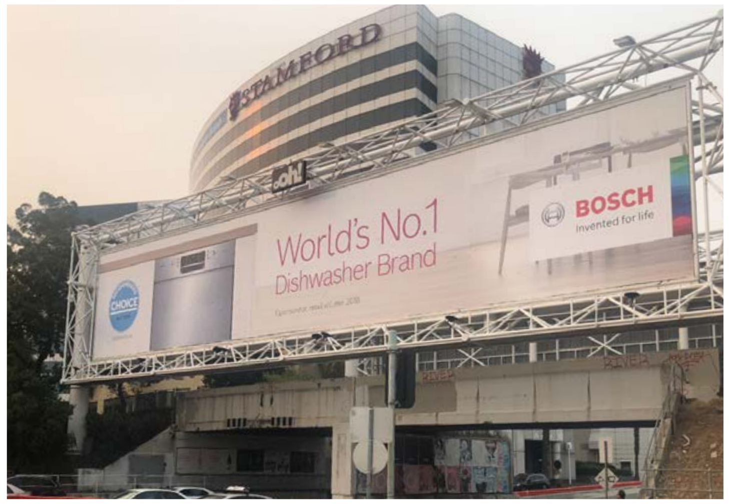


Figure 2-20. Stamford Hotel near O'Riordan Street

Figure 2-21. View of Mantra on Sydney Airport along Joyce Drive

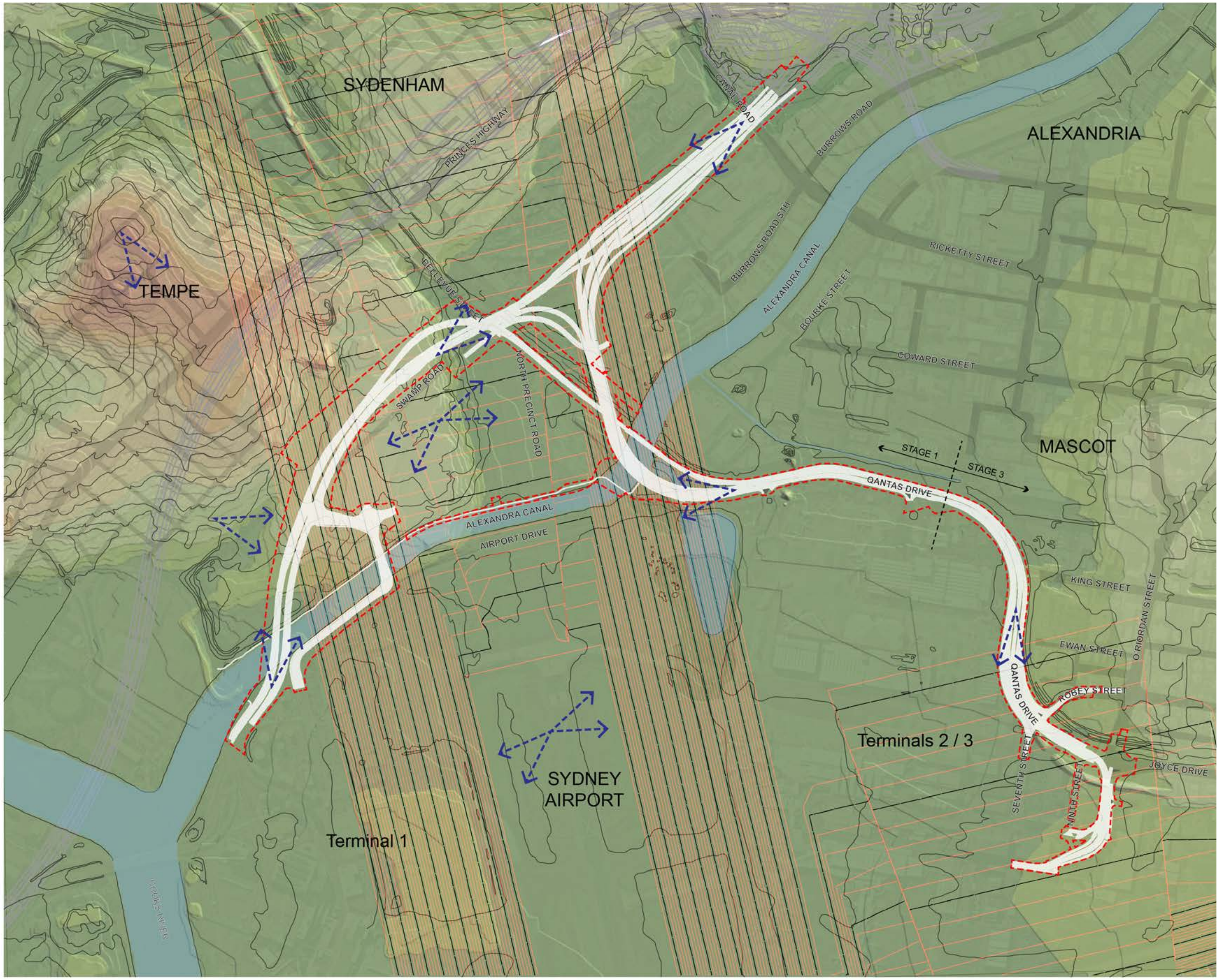
2.4 Physical setting

The following analysis is based on information contained in the EIS / MDP, with GIS mapping overlay.

2.4.1 Topography and views

The overall landform has been modified due to industrial development and transport initiatives and has very few areas of natural ground remaining. As a result, the overall topography is generally flat, with elevations of less than 10 metres Australian height datum (AHD). The Alexandra Canal slowly rises towards the west, reaching higher elevations of about 12 to 15 metres AHD around the former Tempe Lands and Princes Highway.

The Project is constrained by Sydney Airport's Obstacle Limitation Surface (OLS) requirements, which limits the height of any infrastructure and built form elements to prevent any hazards to aircraft operations.



LEGEND

- Project Boundary
- OLS
- -3 to ~ 0.59
- -0.59 ~ 1.81
- 1.81 ~ 4.22
- 4.22 ~ 6.63
- 6.63 ~ 9.04
- 9.04 ~ 11.45
- 11.45 ~ 13.86
- 13.86 ~ 16.27
- 16.27 ~ 18.68
- 18.68 ~ 21.09
- 21.09 ~ 23.5
- 23.5 ~ 25.9
- 25.9 ~ 28.3
- 28.3 ~ 30.7
- 30.7 ~ 33.1
- 33.1 ~ 35.5
- 35.5 ~ 37.9
- 37.9 ~ 40.3
- 40.3 ~ 42.7
- 42.7 ~ 45.1
- 45.1 ~ 47.5
- Views

1 | TOPOGRAPHY

0 100 200 300 400 500m

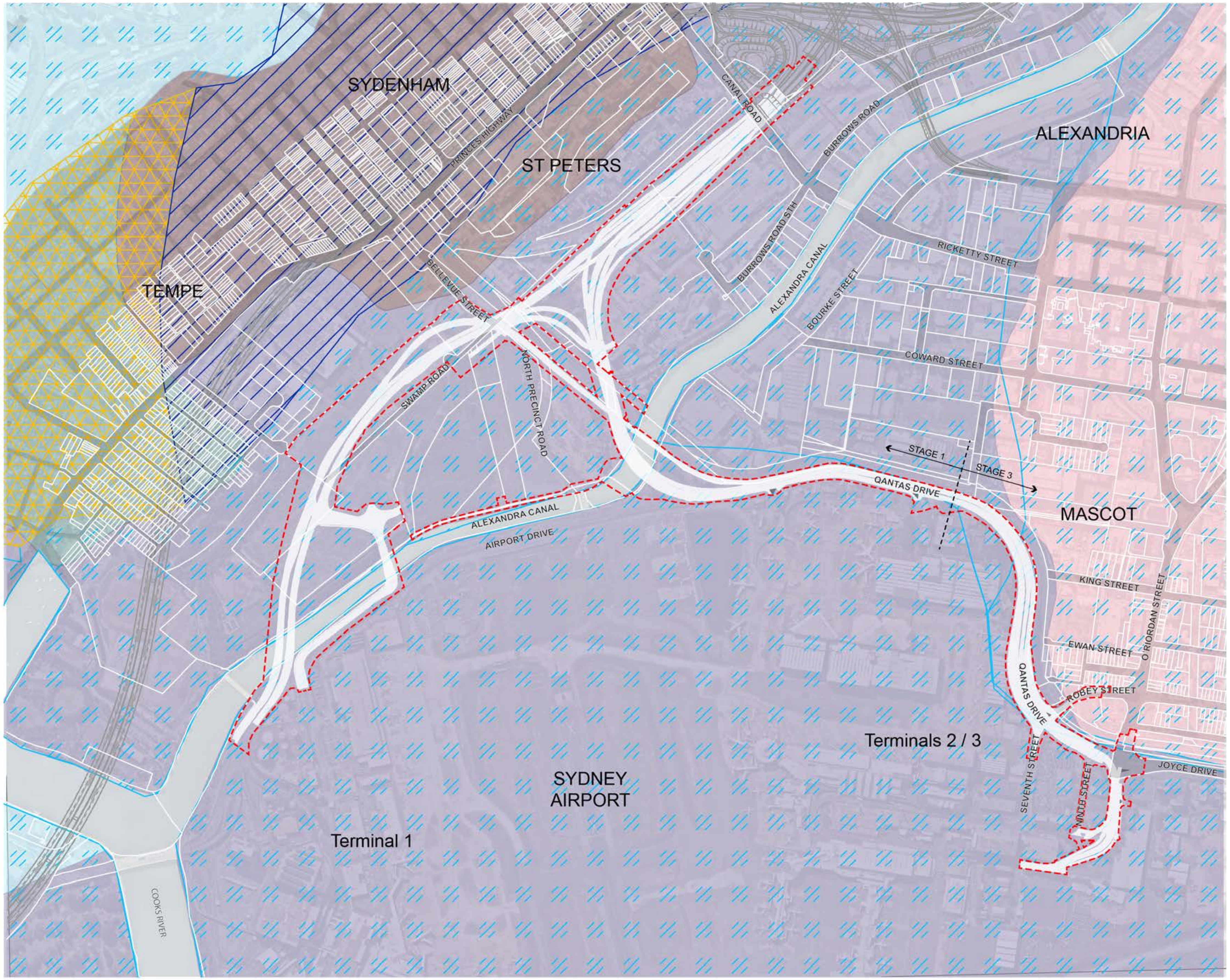
Figure 2-22. Topography and OLS

2.4.2 Soil landscape and geology

The soil landscape is heavily influenced by the underlying topography. The majority of the soil landscape is of disturbed terrain, meaning much of the land has been disturbed extensively by human activity. It extends from Sydney Airport, to the lower regions of the Cooks River and up the Alexandra Canal.

The residual Blacktown soil landscape in parts of Tempe, Sydenham and St Peters consist mainly of low fertility soil.

The geological profile of the area is primarily Sydney Geology, with only small areas of Ashfield Shale in parts of Sydenham and St Peters, and Hawkesbury Sandstone in Tempe.



1 | SOIL AND GEOLOGY

0 100 200 300 400 500m

Figure 2-23. Soil and geology

LEGEND

- Project Boundary
- Aeolian
- Alluvial
- Beach
- Colluvial
- Disturbed Land
- Erosional
- Residual
- Swamp
- Transferral
- Ashfield Shale
- Hawkesbury Sandstone
- Sydney Geology

2.4.3 Pre-European and existing vegetation types

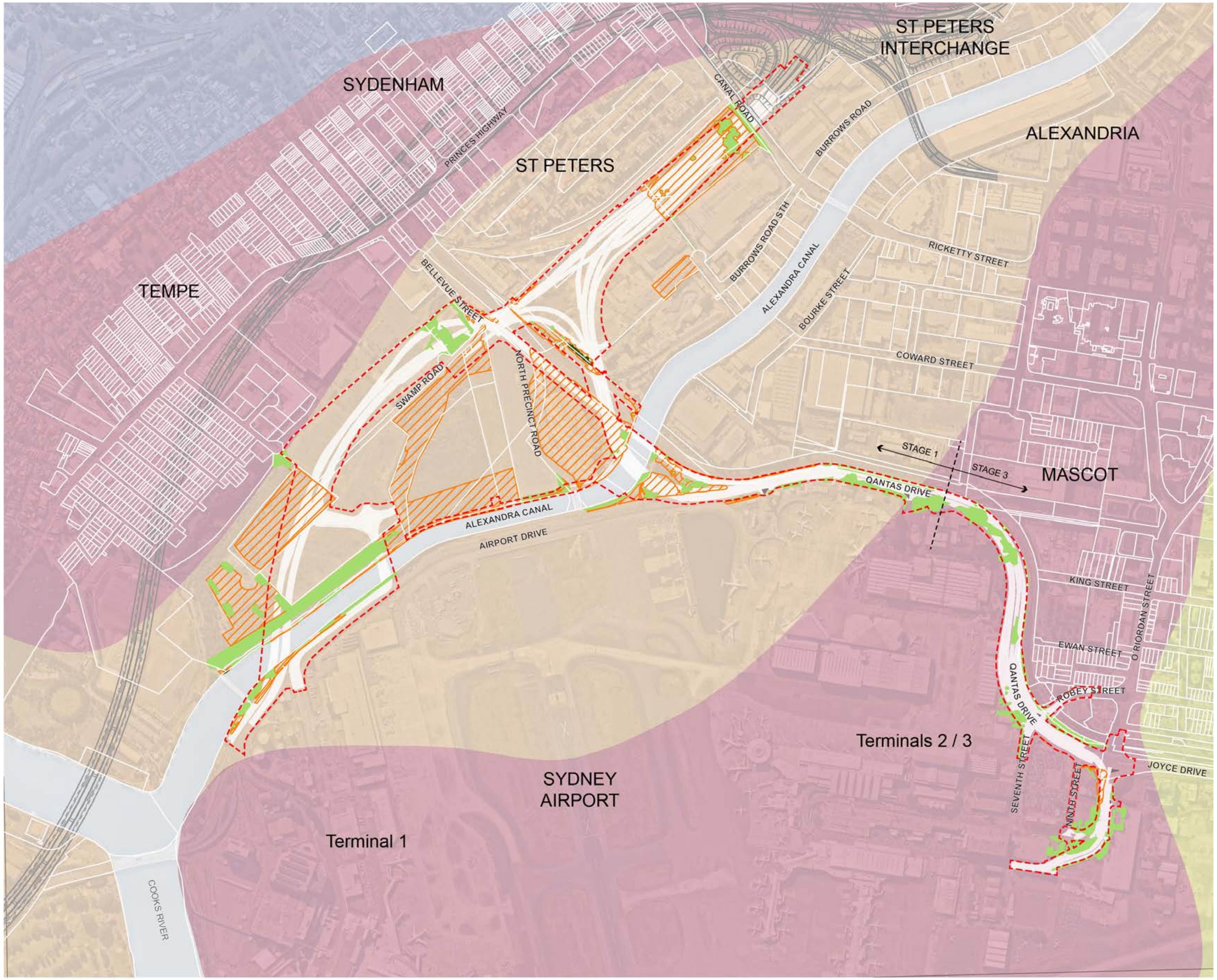
In pre-European times, the areas surrounding the Alexandra Canal consisted of mudflats, extending into salt marshes near Mascot, Tempe and Sydenham. This is closely linked with the Aboriginal history of the area.

Most of the Project area consists of highly disturbed land, which has been subject to historical vegetation clearing. Therefore, there is little to no remnant of the original vegetation cover. However, pockets of native vegetation exist adjacent to the Alexandra Canal near the former Tempe Lands and dotted around the Mascot area near Ninth Street.

These native vegetation communities are:

– Mangrove Forests

– Swamp Oak floodplain swamp forest.



LEGEND

Project Boundary

Pre-European

Mudflats

Mangroves and saltmarsh

Turpentine - ironbark forest

Banksia scrub

Existing

Highly disturbed with no / limited native vegetation

Urban exotic native landscape

1 | PRE-EUROPEAN & EXISTING VEGETATION TYPE

0 100 200 300 400 500m

Figure 2-24. Pre-European and existing vegetation type

2.4.4 Land zoning

The Project site is situated within a range of land zonings as identified in the *Marrickville Local Environmental Plan* (LEP) 2011, the *City of Sydney LEP* (2012) and the *Botany Bay LEP* (2013).

The dominating land use in the area is by far Sydney Airport (SP2). The large section of the Project is located on land used for transport / infrastructure purposes, such as Airport Drive and Qantas Drive.

A range of light industrial and business land uses are located on either side of Alexandra Canal, which include freight and airline support businesses.

Low density residential land uses are located in Tempe, along with a number of open spaces and recreation facilities.

The *Sydney Airport Master Plan 2039,* April 2019 further identifies permissible land uses within the different sectors of the Airport, including:

- Airport terminal and support services
- Airport logistics and support
- Business development.

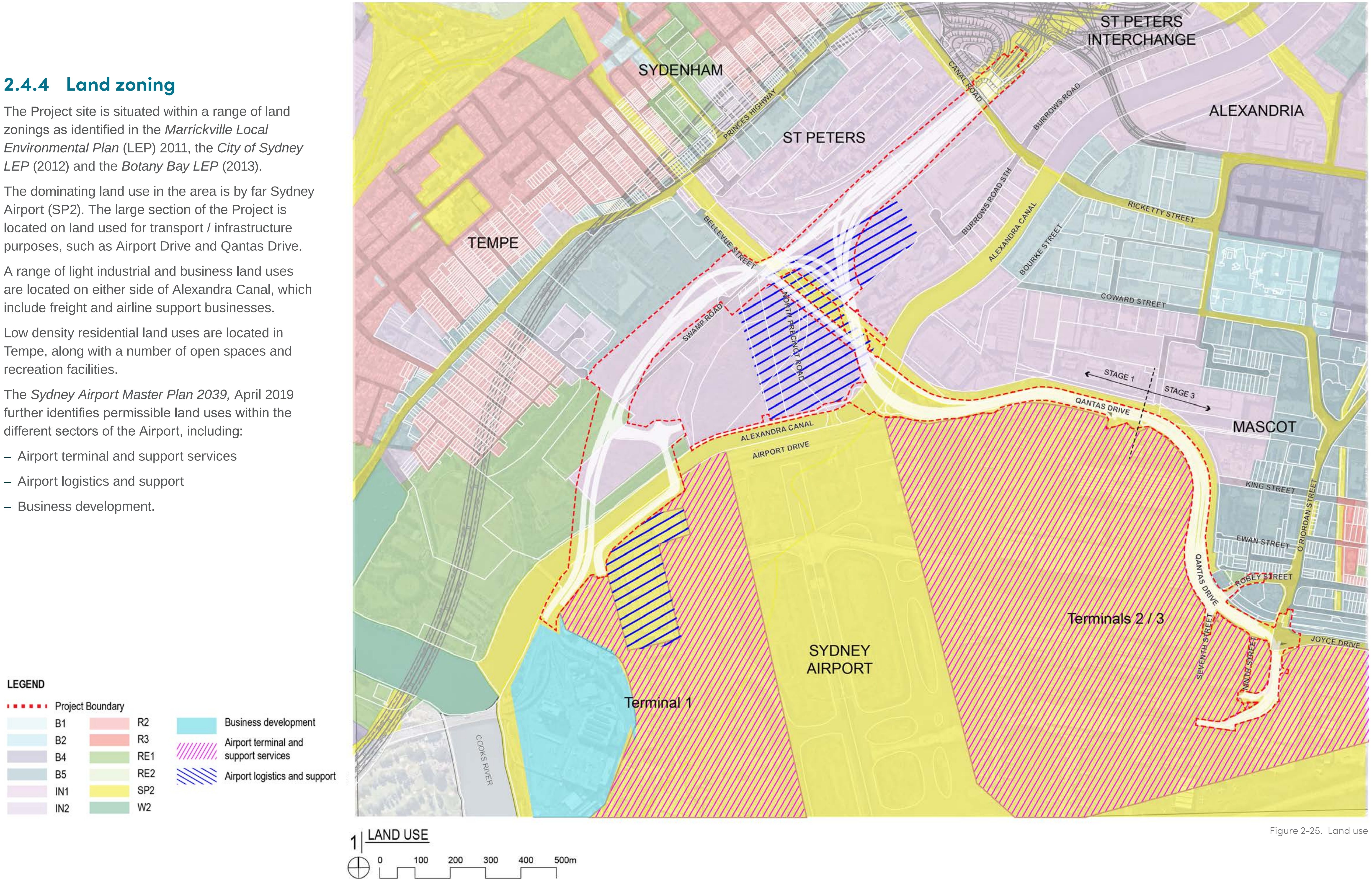


Figure 2-25. Land use

2.4.5 Transport and connectivity

There are a number of significant transport infrastructure elements around the Project site.

Sydney Airport

As the 'gateway' to Australia, the airport is Australia's largest transport hub. It is connected to Sydney's CBD by rail and the M1 Motorway and has a network of light industrial businesses in the surrounding area.

Roads

A number of roads across the site provide access to and from Sydney Airport, Port Botany, and connects to the regional road network. These include Canal Road, Robey Street, O'Riordan Street, Qantas Drive, Airport Drive, Swamp Road and Bellevue Street.

Botany Rail Line

This is a significant freight facility in the vicinity of the Project site. It is a dedicated rail freight line, operated by the Australian Rail Track Corporation (ARTC), transporting containers to and from Port Botany to other intermodal terminals in the region. The recently approved Botany Rail Duplication will duplicate the remaining section of single line track to Port Botany.

Public transport and active transport

The Sydney Trains T8 Airport and South Line, passes through the Project site underground, while a number of bus routes operate in and around the Project site, such as routes 400 and 420. The primary cycle route is the Alexandra Canal cycleway, which extends along Alexandra Canal adjacent to Airport Drive.

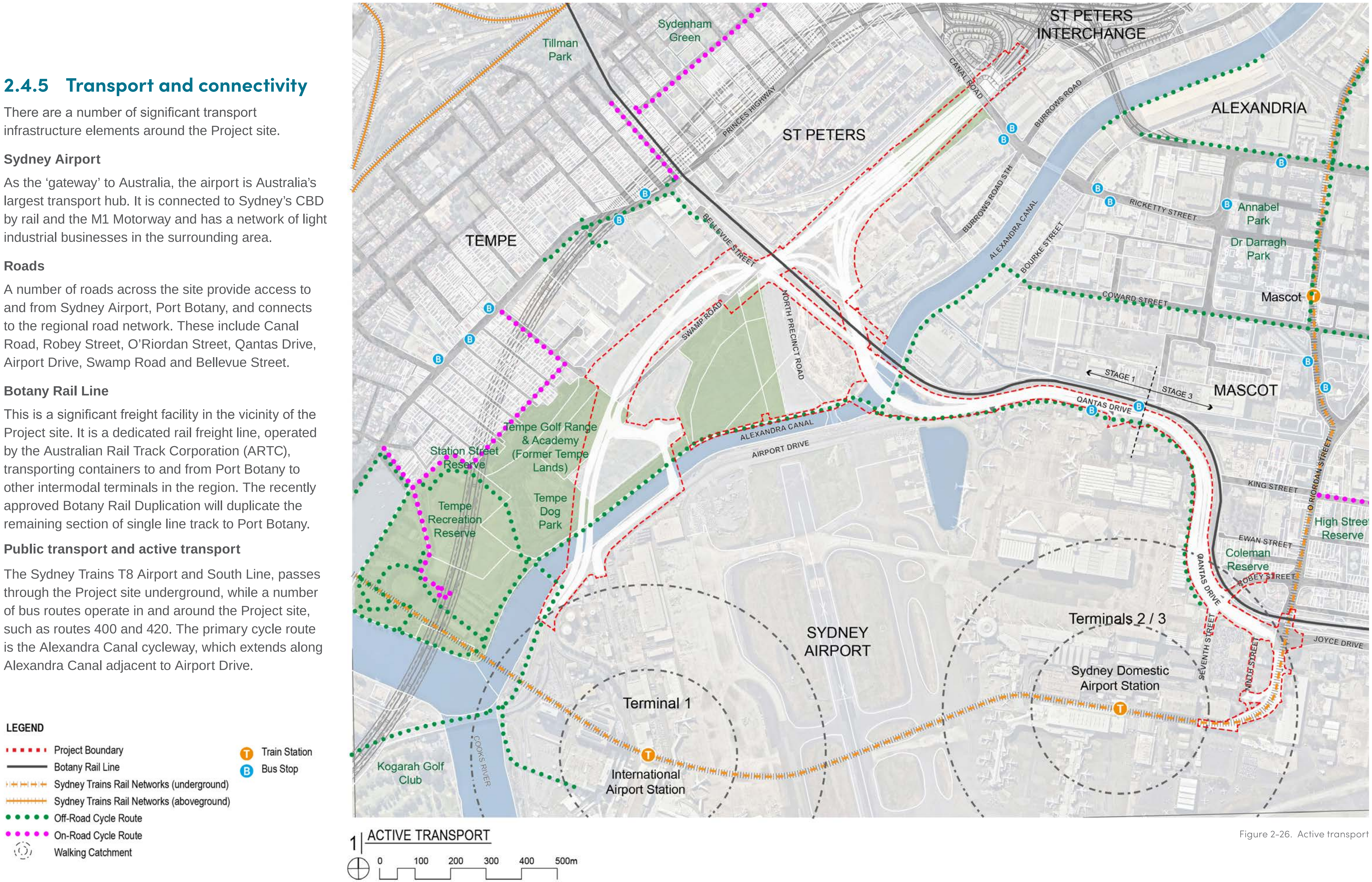


Figure 2-26. Active transport

2.4.6 Non-Aboriginal heritage

In the vicinity of the Project, Sydney Airport is listed in the Botany Bay LEP and Section 170 Registers for its complex cultural landscape, as it has a strong historical, technological and social significance, refer to Section 2.4.10.

Other items of historical significance include:

- O'Riordan Street underbridge, was part of the original infrastructure for the Botany Rail Line
- Robey Street underbridge, has aesthetic significance as a landmark structure over Robey Street and as evidence of early welding techniques used for steel bridge construction
- Shea's Creek underbridge is of local significance as part of the original infrastructure of the Botany Rail Line.

Figure 2-27. O'Riordan Street underbridge

Figure 2-28. Robey Street underbridge

Figure 2-29. Shea's Creek underbridge

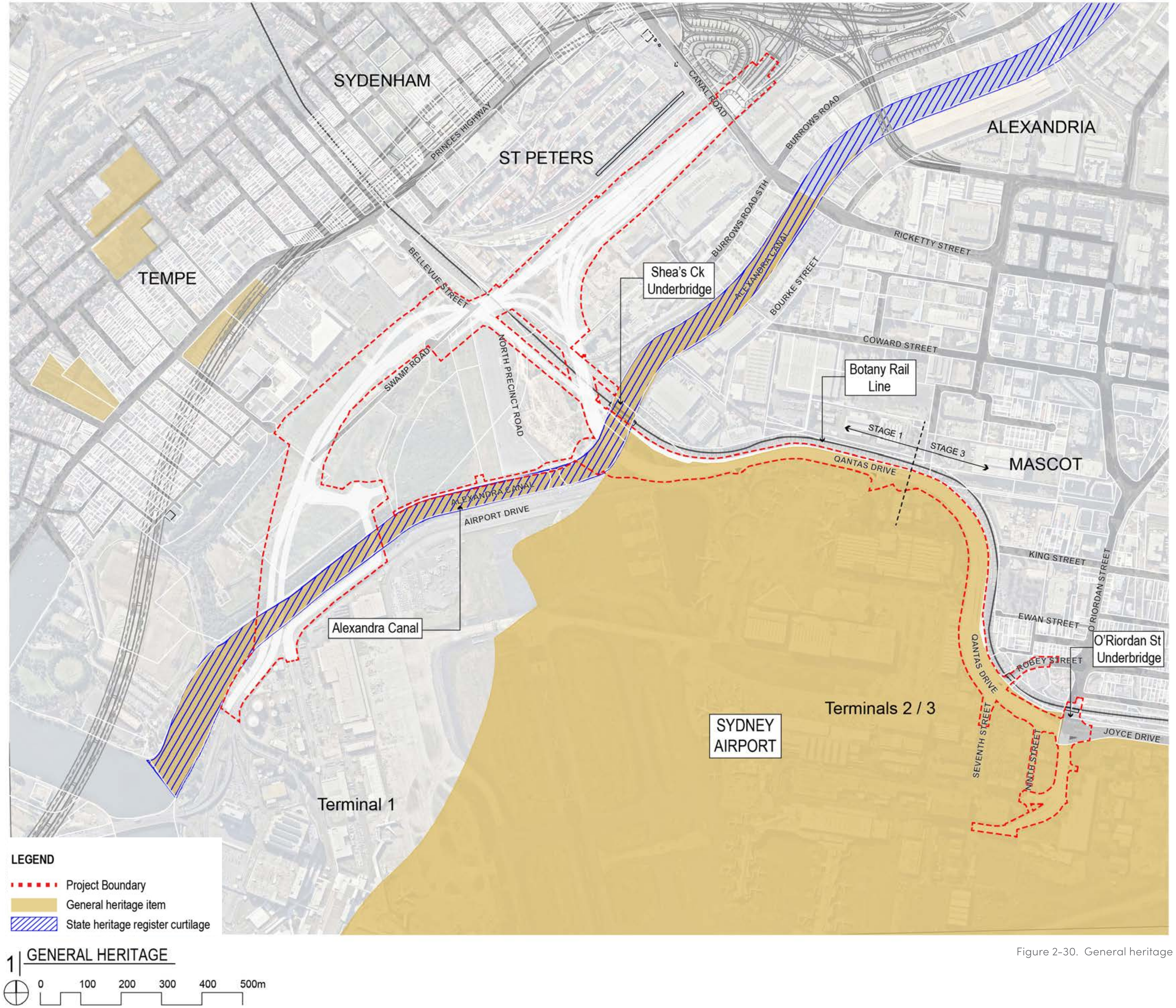


Figure 2-30. General heritage

Botany Rail Line

The Botany Rail Line is also considered to be of local heritage significance and is also a significant piece of infrastructure traversing the Project area.

The statement of significance notes that "*The Botany Rail Line has historic, associative, social, aesthetic, technical and representative significance at a local level due to its relationship with surrounding industrial development (past and present), the Metropolitan Goods Line network and the use of freight transport in NSW*".

The first proposal for a line to Botany can be traced back to 1861, as a means to transport by-products of slaughter houses to tanneries, soap makers and wool scourers located in Botany Bay. Work commenced on the line 1915, then ceased in 1917 before resuming in 1921. The line opened in October 1925 and was extended in 1929 to provide access to the Bunnerong Power Stations.

However, its development has undergone a considerable amount of change over the past century, and one of the most significant impacts was the expansion of Sydney Airport, which by 1960 saw the line substantially rerouted and new bridges such as the Robey Street and O'Riordan Street bridges constructed.

Even today, the Botany Rail Line continues to change, with the proposed Botany Rail Duplication, which will duplicate the remaining section of single line track to Port Botany, allowing freight to be moved more efficiently and effectively.

Figure 2-31. Construction of a cutting and embankment, Botany Rail 1916
Source: State Library of NSW

Figure 2-32. View along existing ATL

Figure 2-33. View of Shea's Creek underbridge

Alexandra Canal

The following historical overview of Alexandra Canal has been summarised in part from the *Alexandra Canal Conservation Management Plan 2004,* and *Sydney Gateway Road Project – Environmental Impact Statement / Preliminary Draft Major Development Plan, Technical Working Paper 9 Statement of Heritage Impact, November 2019.* It is intended as a brief overview to encapsulate the heritage significance of the site.

Alexandra Canal is of high historic, aesthetic and research significance, and being only one of two purpose built canals in the State (the other known example in Victoria). According to the *Alexandra Canal Conservation Management Plan 2004,* the canal is a "3m curtilage along the 3.9 km length of the canal" and a "2m height curtilage above Spring Mean High Tide to protect the watercourse of the canal". It extends from the former course of Shea's Creek in southeastern Sydney to the northwest at the intersection of Cooks River.

In the early days of European settlement, Shea's Creek was a narrow, winding creek, part tidal, part free flowing and fed by streams further inland. By the early 19th Century, the canal became an integral part to the industrial development of the South Sydney / Botany Bay area, influencing the planning of street layouts and the positioning of industrial buildings along the route.

The construction of the canal was to service industry located along Shea's Creek as a result of the Slaughter House Act of 1848, which required all noxious trades to be operated outside of the City, and is also associated with Shea's Creek Wool Sheds and bridges, adding another layer to the industrial urban landscape of the area. The canal was originally lined with fascine dyke sandstone as were sections of the Cooks River, which is a rare example of late 19th century coastal engineering works.

In the 1940s, the canal was rerouted in three phases to accommodate the expansion of the Sydney Airport, including diverting the canal for the construction of the east west runway and again between 1962 and 1972 to allow the north south runway. These major changes took place on the canal as it ceased to be a viable transport corridor from as early as 1950, with the prevalence of road and rail transportation.

The construction the Alexandra Canal has seen it become a major part of the physical environment of the Alexandria and Mascot area. The area has seen significant redevelopment with the light industrial premises now been replaced by warehousing and also a large proportion of office space.

The rail link to the airport has created new urban centres around Green Square and Mascot Stations. The canal provided the back drop as the major element that constantly developed and changed over the years.

Figure 2-34. View of Alexandra Canal from Nigel Love Bridge

Brief timeline	
1887	Dredging began to adapt Shea's Creek to a canal
1890	Completion
1940s	Wharves were demolished due to decline in navigational use of the canal
1947-1970s	Major changes occurred when Sydney Airport was expanded

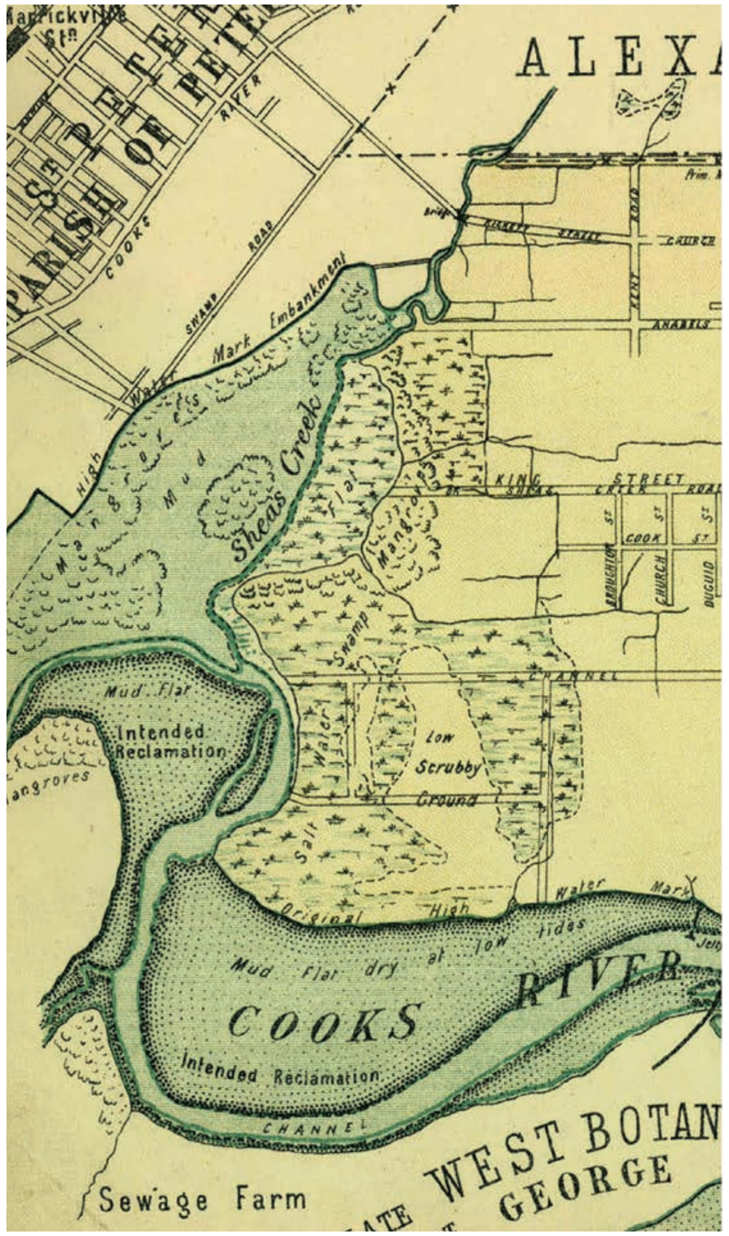


Figure 2-39. Early map of Parish of Alexandria showing Shea's Creek

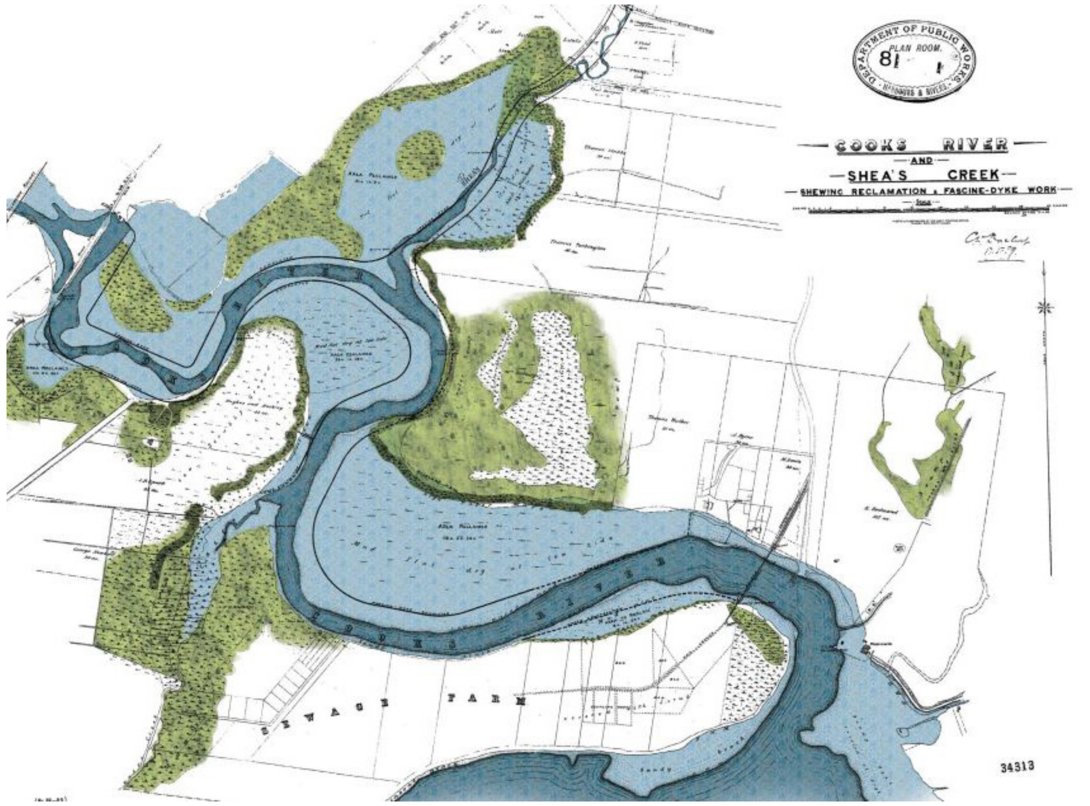


Figure 2-35. Alexandra Canal, before 1880 ©Sydney Water

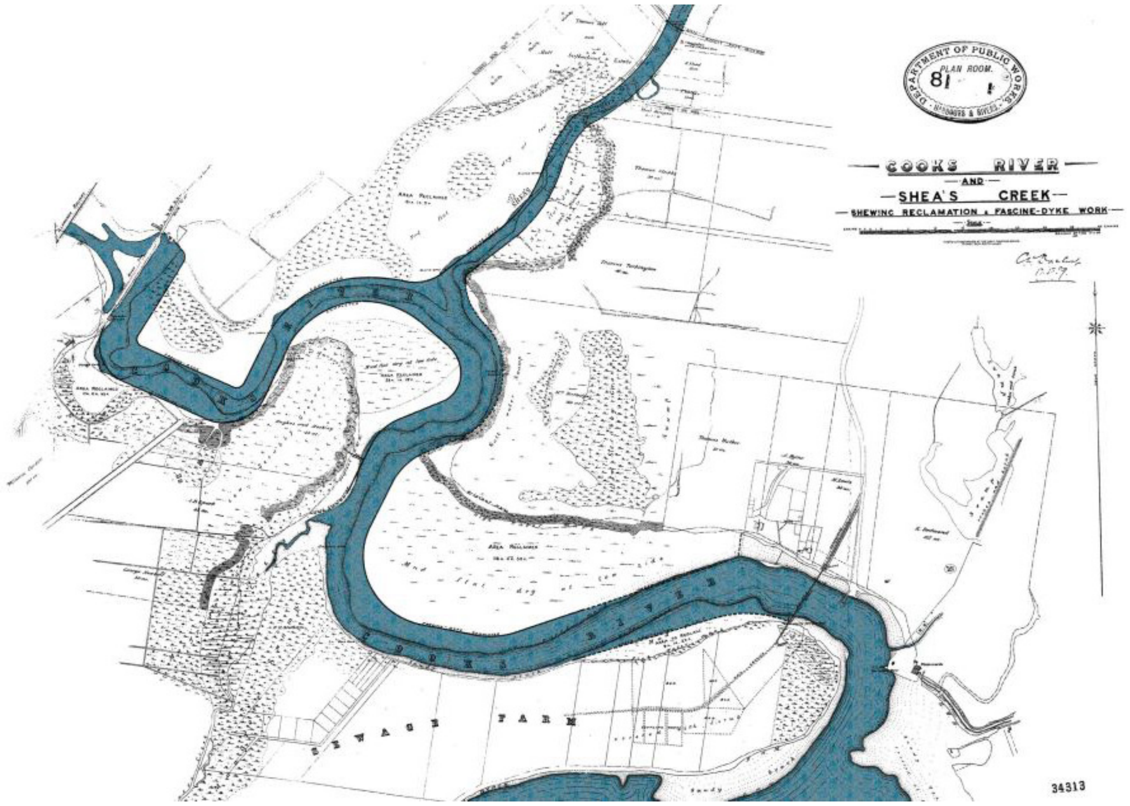


Figure 2-36. Alexandra Canal, late 1880s - 1940s ©Sydney Water

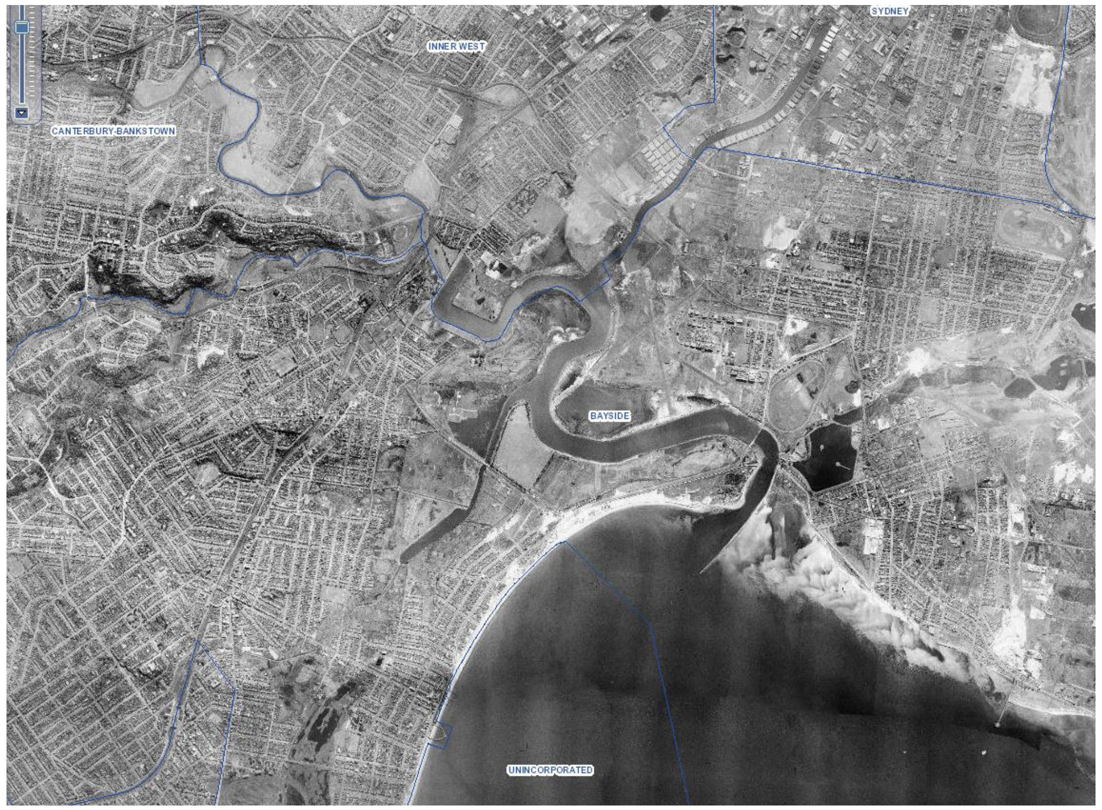


Figure 2-37. Alexandra Canal, 1943 ©Six Maps

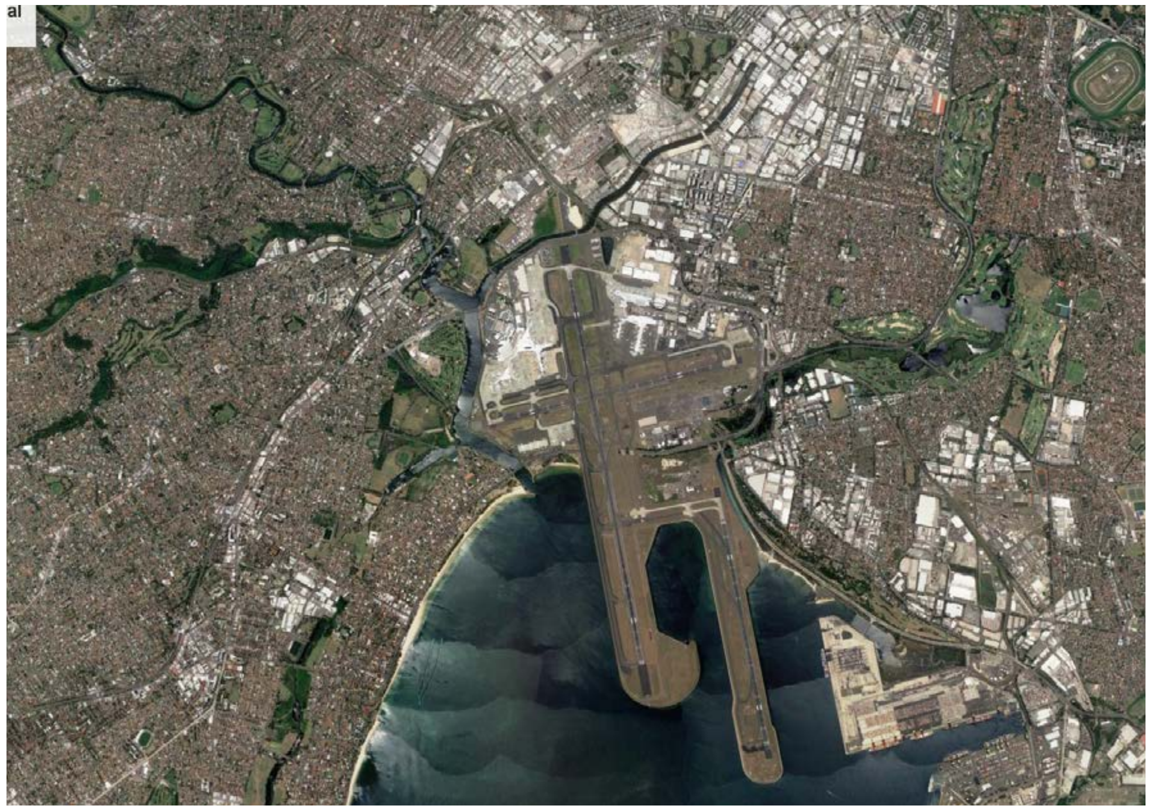


Figure 2-38. Alexandra Canal, 2018 ©Google Earth

2.4.7 Sydney Airport historical context

The historical photos of Sydney Airport illustrate the extent of transformation that the airport and its surrounding context within Botany Bay has undergone from the early built stages in the 1930s to about 1975 when it still had only two runways.

The aerial photo below is an image from more recent times after the third runway was built in the 1980s.

Figure 2-40. Aerial view of La Perouse, Sydney Airport and Botany Bay, 1980s

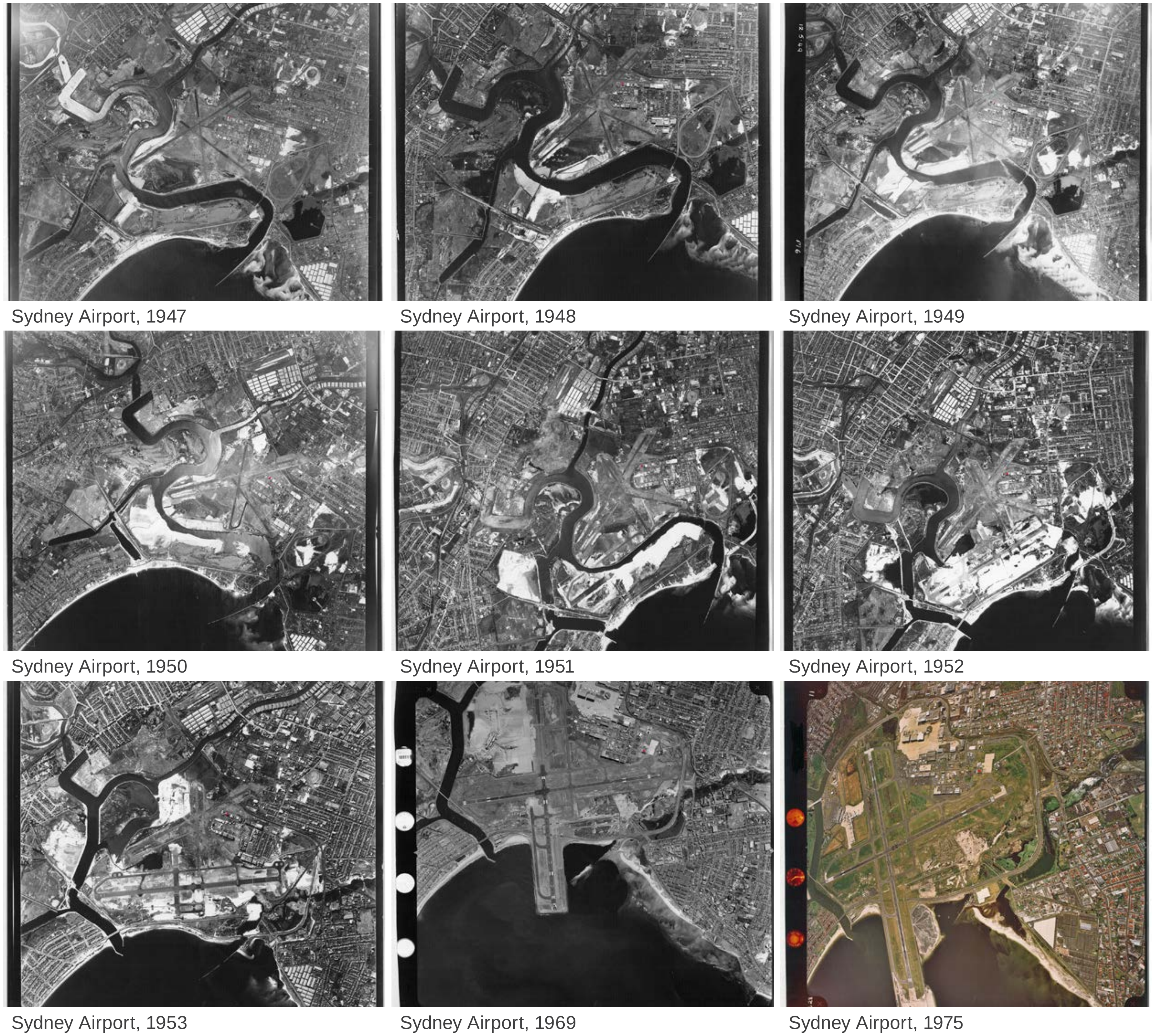


Figure 2-41. Transformation of Sydney Airport

Mascot Aerodrome, 1930s


Sydney Airport, 1958


Sydney Airport, 1969


Sydney Airport, 1969 (b)


Sydney Airport, 1970


Sydney Airport, 2000

2.4.8 Aboriginal heritage values

The Aboriginal heritage values examine the site's ancient geography and its connection to the land.

Key place defining attributes include:

- A water based place with the Gumbramorra Swamp to the northwest and open water towards the southeast
- A ridge line and circulation path ran from northeast to southeast along what was essentially a peninsula
- An abundant place of year-round sustenance and seasonal feasting for Aboriginal people
- Kangaroos were plentiful and grazed across the open land of the peninsula
- At Botany Bay (Gamay/Kamay), sea mullet (bulli) moved from the sea to the Georges and Cooks River fresh water system – where they would swim through the estuaries and tributaries and spawn in the mangroves upriver. When they swam back downstream to the sea, the clean, fat mullet were fished from the beaches by Traditional Land Owners working together with large nets. First Nations people would then feast on fish together on the beach. This is an enduring practice, still undertaken today. The mullet fish was a significant and bountiful food source for many people of south-eastern coast of Australia
- Shea's Creek was once the edge of the land and a salt marsh. During the construction of the Alexandra Canal, stone axes and Dugong bones were uncovered suggesting that this was a place of food production
- A gathering ground for the harvesting of useful plants like the coastal acacia wattle, which was prevalent in the area and used in many ways by local people. For example, wattle leaves can be soaked and worked into a lather for cleaning skin and hair. The blooming of the yellow flower was also a signifier that the mullet (bulli) were plentiful in the bay
- The site is part of the Eora and Dharawal nations and hosts Gadigal, Dharawal and Darug language groups.

These heritage values have been identified through historical research from the reference documents including heritage registers. Input has been provided by the Aboriginal Artists, which has been incorporated in the design.

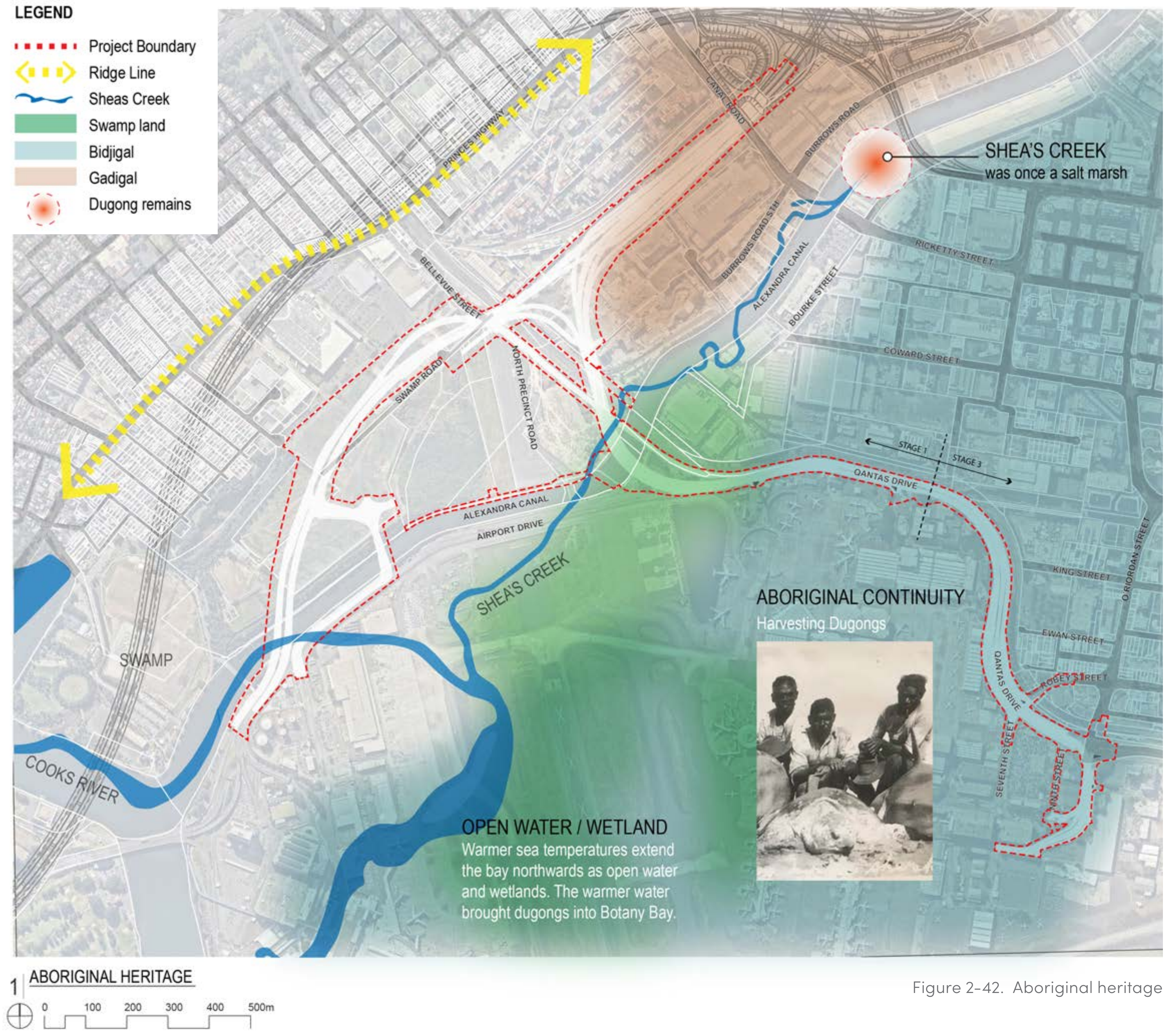


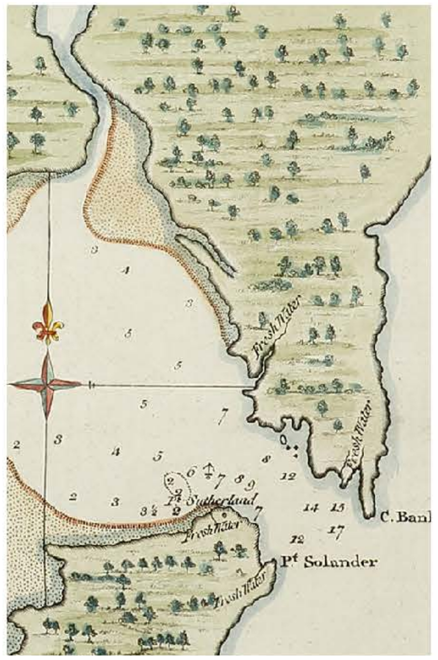
Figure 2-42. Aboriginal heritage

2.4.9 Indigenous landscape

An understanding of the Indigenous landscape, its history and evolution is a major aspect in developing the theme. This study has influenced the landscape design for the Project. Before European settlement, Botany Bay and the Cooks River Valley included a diverse and unique range of vegetation communities. Listed as endangered today, Eastern Suburbs Banksia Scrub and Swamp Oak Floodplain Forest, once covered large tracts of this coastal landscape.

> "Water, sand, rocks and climate shaped the flora and fauna which flourished here: sedges, reeds, cabbage-tree palms and paperbarks in the swamps; and a rich variety of banksia, bottlebrush and grass tree in the scrub."
>
> Karskens, G., Rogowsky, M 2004, Histories of Green Square, UNSW, Sydney

Eastern Suburbs Banksia Scrub



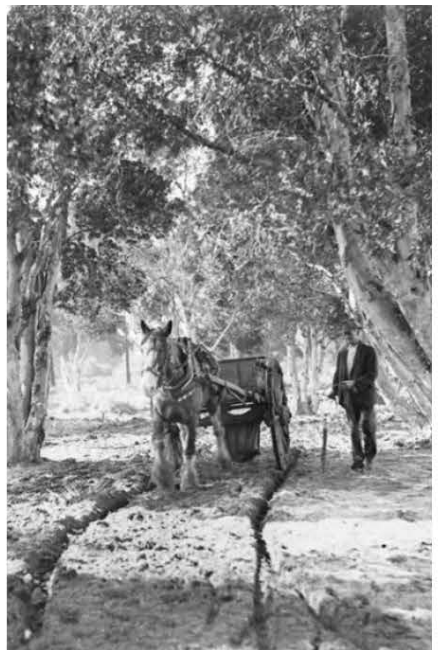
Map of Botany Bay, 1770

Maroubra Speedway, 1930

Figure 2-43. Eastern Suburbs Banksia Scrub

Swamp Oak Floodplain Forest

Map of Cooks River, 1881



Lachlan Swamp, late 19th century

Figure 2-44. Swamp Oak Floodplain Forest

2.4.10 Botany Bay historical context

Botany Bay (Gamay / Kamay) has been inhabited by the Gweagal, Bidjigal, Gameygal (Kameygal) and possibly Gadigal people for more than 5,000 years. Characterised by swampy foreshores and sand dunes it is the area where two rivers, the Georges and Cooks meet.

Botany Bay is significant in Australia's colonial history as the site of Captain James Cook's first landing, and the place where his crew spent their first eight days in Australia. Initially it was known as 'Sting Ray Harbour' after the many stingray (gamay) caught in the area around the shoreline and inlets of the Bay but was later named Botany Bay to reference the rich and diverse botanical life, which was novel to the European settlers.

On the La Perouse headland known as 'the Loop', since the 1800's Aboriginal cultural practitioners have shared their knowledge and artistry, attracting the interest of local and international communities. The sharing of these practices fostered a cultural exchange and established a market for local Aboriginal art which has been an enduring thread of cultural identity and source of income for generations of local families.

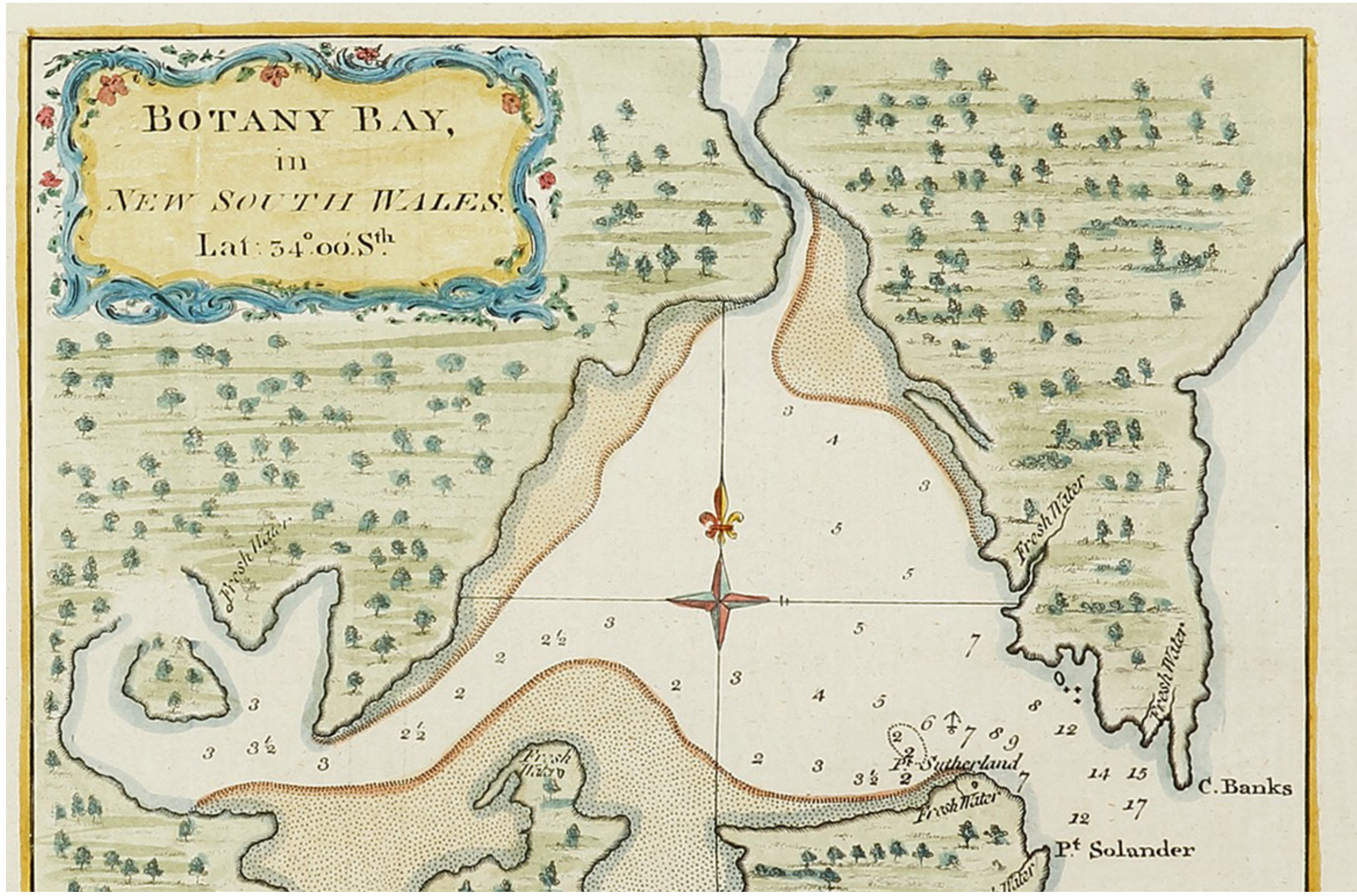


Figure 2-45. Botany Bay, 1770 (Source: antiqueprintmaproom.com)

Figure 2-46. View of the Heads, and part of Botany Bay - from the end of Cooks River, 1822 - 1823 (Source: dictionaryofsydney.org)

2.4.11 Synthesis

The Project site and its context within Botany Bay can be considered to have, three distinct phases of evolution. These, of course, overlap and are essentially snapshots of a dynamically changing place, but they provide useful reference points in building and understanding the site and its context today and can be used to inform the design. This assessment is not intended to replace any detailed archaeological assessment but is intended to understand the dynamics of this place.

The three phases have been defined as:

- Pre-European
- Industrial peak
- Contemporary productivity.

Pre-European

This phase encompasses the time before European contact and looks at ancient geography and the Aboriginal connection to the land. It is important to understand that this relationship underpins a continuing importance of this site and its context to Aboriginals and their connection to this place. Evidence of activity in this area suggests that this place was a place of 'nourishment and gathering'.

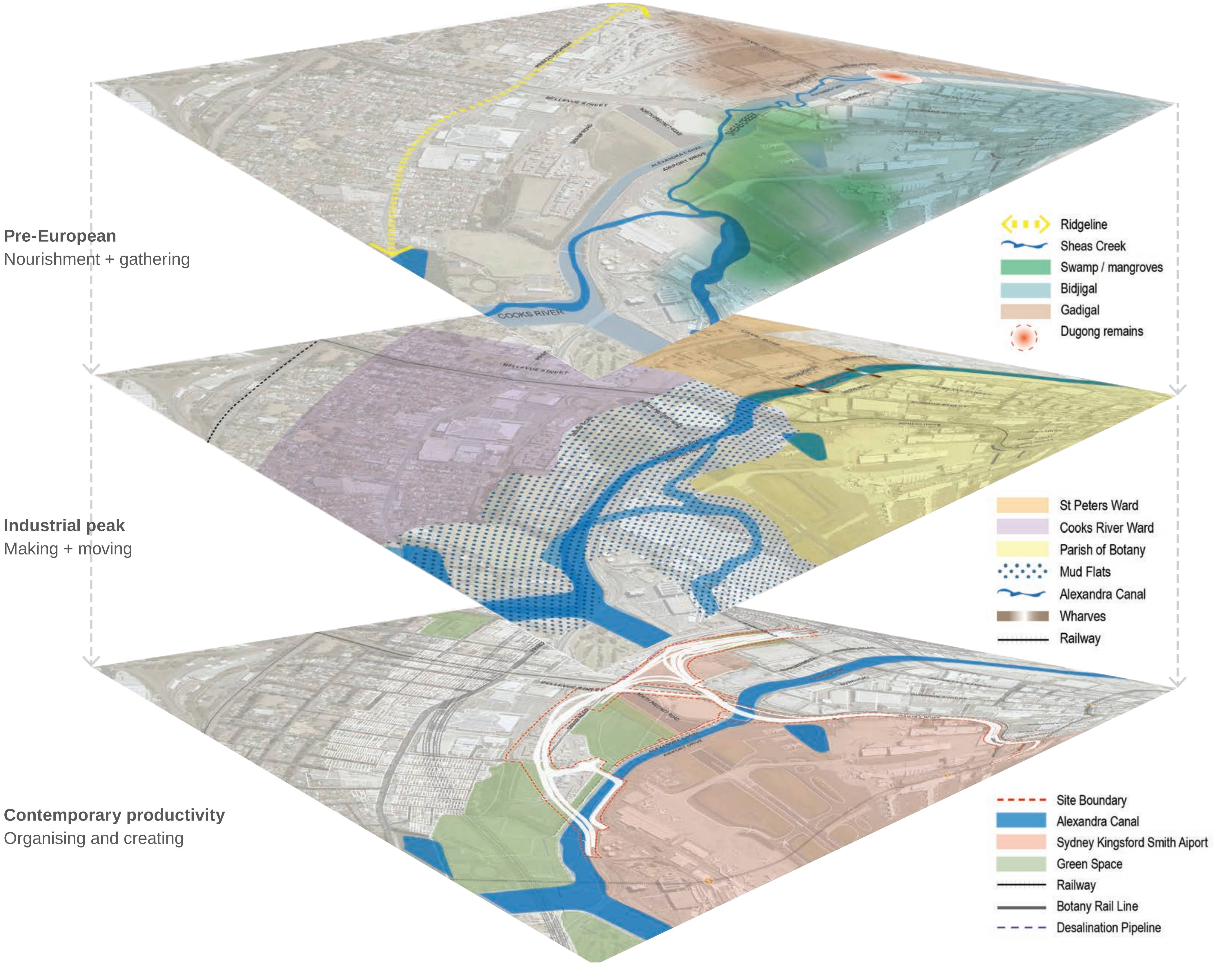


Figure 2-47. Synthesis

Industrial peak

This phase encompasses the time during the decades towards the end of the 19th century when this area was heavily industrialised. This activity gradually built up over the years and then tapered off during the 20th century. Evidence of this time is apparent in this area and suggests this phase was a place of 'making and moving'.

Contemporary productivity

The current phase, which retains its identity as a place of 'organising and creating', but with 21st century methods. With the opening of Sydney Airport and Port Botany, coupled with the decline of in-town heavy industry this area was transformed into a logistics hub. The container stacks on the horizon, freight movements along railways and air access make this location part of a global network of connectivity of movement in time. The receding heavy industries also left space for start-up enterprises, technology businesses, innovative high-tech manufacturing and the street life that comes from this creative mix of activities… a place of 'organising and creating'.

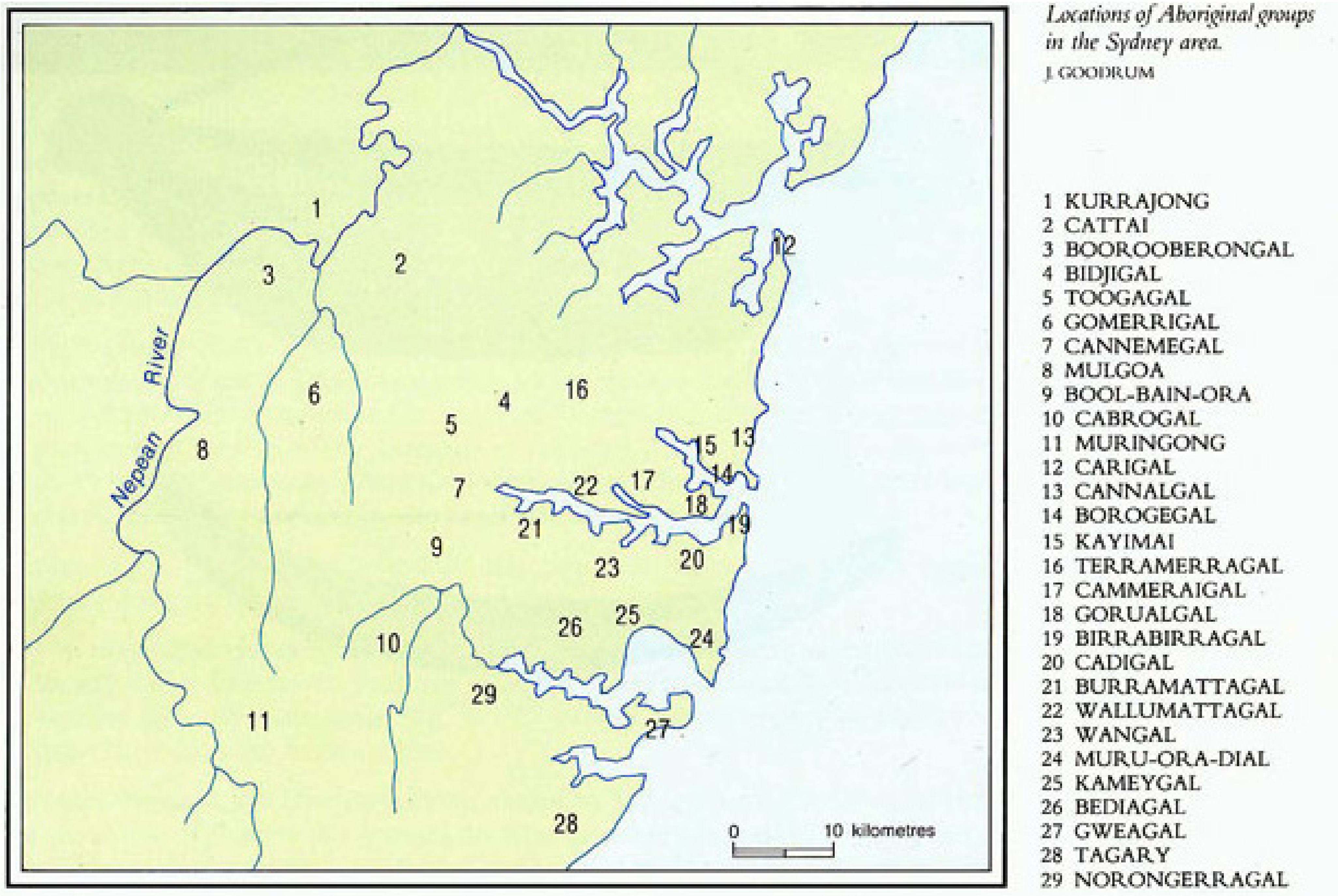
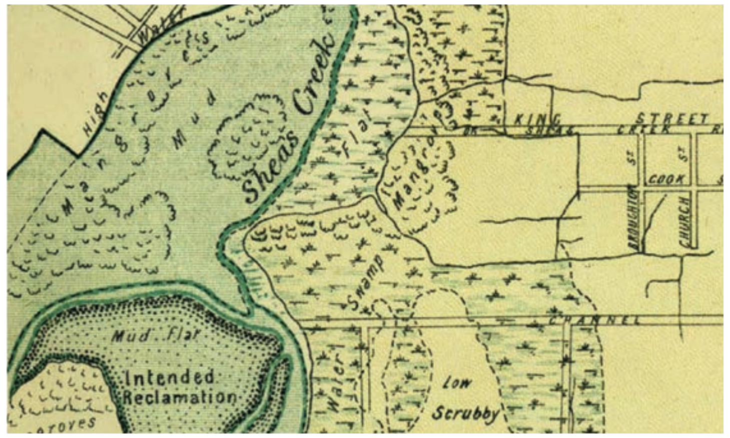
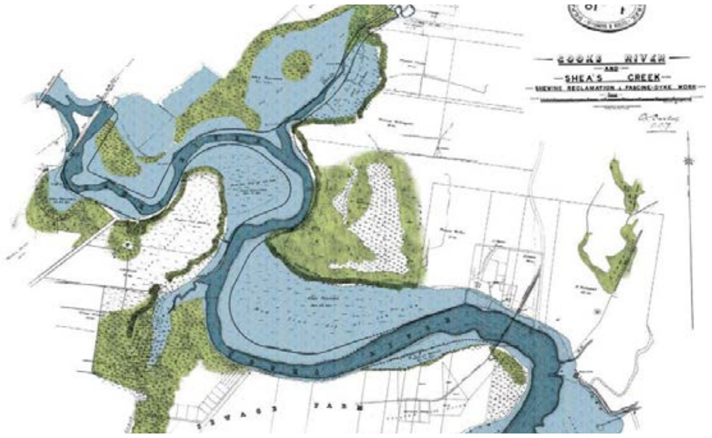


Figure 2-48. Place evolution and locations of Aboriginal groups in the Sydney Area (based on a map by J Goodrum in Mulvaney, D J & White, J Peter 1987, Australians to 1788 Fairfax, Syme & Weldon Associates, Broadway, NSW, Australia)





PRE INDUSTRIAL

MID 19TH CENTURY

LATE 1880 – EARLY 20TH CENTURY

MID 20TH CENTURY

SHEA'S CREEK

- A narrow, winding creek, part tidal, part free flowing and fed by inland streams, draining much of southern Sydney
- Aborigines of the time were known to have frequented this saltwater inlet of the Cooks River and Botany Bay
- Sediment layers contained layers of shell, peat and old tree stumps and bones of a dugong
- The Shea's Creek dugong is still one of the oldest sites around Botany Bay

ALEXANDRA CANAL

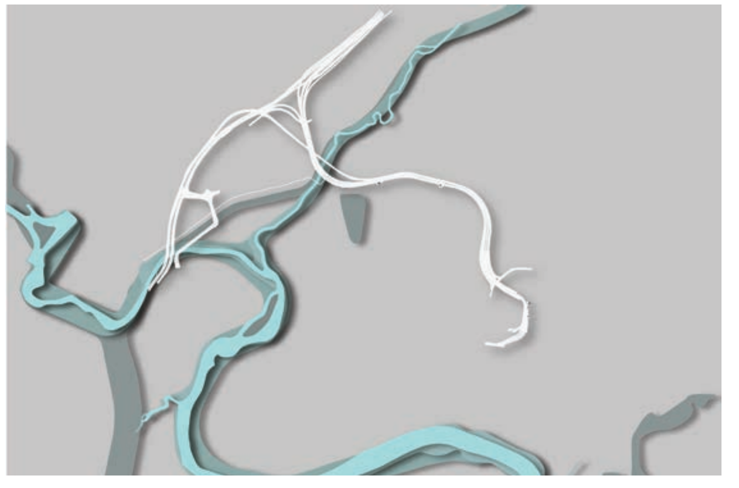
- A heritage listed tributary of the Cooks River, it is an adapted artificial waterway (formerly known as Shea's Creek), and the only purpose built canal in the State with the intention of offering shipping as means of transporting cargo
- A major landmark / component of the industrial landscape of the area, particularly from Ricketty Street Bridge and Airport Drive
- Originally lined with fascine dyke, and intact original sections comprise pitched dry packed ashlar sandstone

BOTANY RAIL LINE

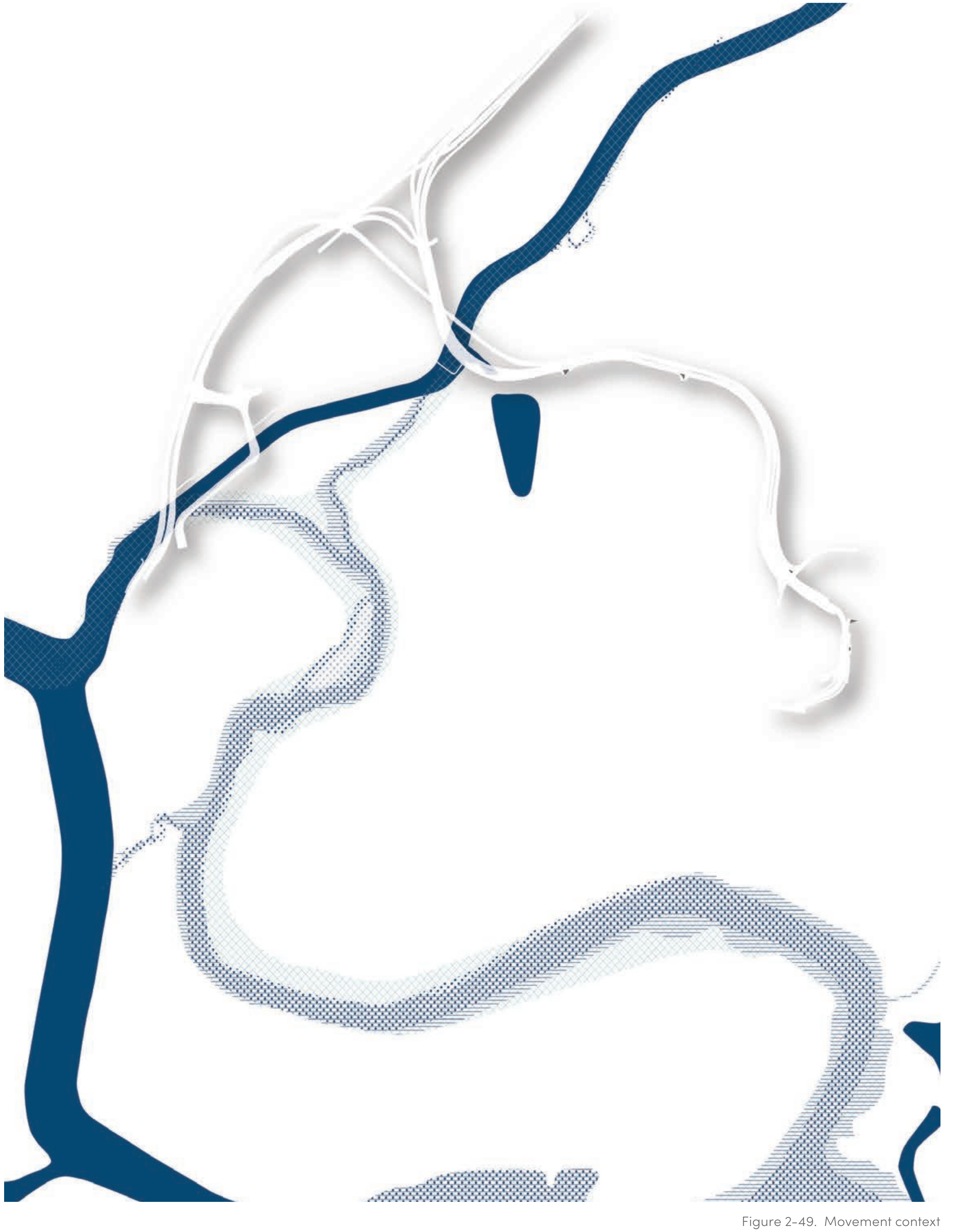
- Originally planned to serve the satellite industries of the abattoir at Homebush Bay, as a means to transport by-products of slaughter houses to tanneries, soap makers and wool scourers located in Botany Bay
- Developments in the Mascot and Botany areas have impacted on many aspects of the rail line, one of which is the expansion of the Sydney Airport by 1960
- The Botany Rail Duplication Project would involve the construction and operation of a new second rail track within the existing rail corridor between Mascot and Botany Bay.

SYDNEY AIRPORT

- Gateway to Sydney and transport hub
- It was a bull paddock until the early 20th century
- The Alexandra Canal forms its northern boundary, the Cooks River its western boundary and Botany Bay its southern boundary
- In 1933, the first gravel runways were constructed, and during the 1940s, part of the Alexandra Canal was realigned in order to create more space for runways



EARLY 21ST CENTURY



SYDNEY DESALINATION PIPELINE

- The Sydney Desalination Plant is a potable drinking water desalination plant that forms part of the water supply system of Greater Metropolitan Sydney
- From Kyeemagh to Erskineville, the pipeline is located within and around a mixture of special uses, including Sydney Airport, open space/ recreation, including the Kogarah Golf Course, Cooks Park and Tempe Reserve, industrial / commercial uses and residential.

INTERPRETATION OPPORTUNITIES

- Landform
- Create landmarks as punctuation points:
  - Aboriginal history
  - Railway history
  - Canal history
  - Aviation history
  - Industrial history.

Figure 2-49. Movement context

2.4.12 Visual impacts summary

The *Sydney Gateway Road Project – Environmental Impact Statement / Major Development Plan* (EIS / MDP), Transport for NSW / Sydney Airport Corporation Limited, 2020 provides a summary of visual impacts, based on the viewpoints established as part of the studies. The summary illustrates the overall visual impact of the Project on the surrounding environment will mostly be in the range of medium to high. The design is based on the EIS / MDP objectives and principles, additional urban and landscape design features such as the development of the ATL corridor heritage strategy, and embellishments to design elements such as the mounds, walls and screens have been incorporated in the design to achieve design excellence and enhance placemaking opportunities.

VIEW	LOCATION	VISUAL IMPACT RATING
01	P2 car park at Sydney Airport - Terminal 1	ML
02	Alexandra Canal cycleway opposite Tempe Recreation Reserve	MH
03	Tempe Recreation Reserve	MH
04	Link Road at the intersection with Airport Drive	MH
05	Rowers on Cooks River restaurant and function centre, Wolli Creek hotels and apartments	M
06	Tempe Lands car park	M
07	Wentworth Street, Tempe residential streets	ML
08	IKEA store	ML
09	Princes Highway bridge over the Botany Rail Line	ML
10	North Precinct Road	M
11	Alexandra Canal cycleway near Shea's Creek underbridge	H
12	Access track along the western side of Alexandra Canal	H
13	Bus stop on the northern side of Canal Road	MH
14	Canal Road bridge over Alexandra Canal	M
15	Burrows Road South	G
16	Alexandra Canal cycleway south of Coward Street	M
17	Qantas and Airport Drive junction	ML
18	Qantas Drive, near the Botany Rail maintenance overbridge	MH
19	Qantas Drive between Robey and Ewan Streets	MH
20	Seventh Street at the intersection with Qantas Drive	MH
21	O'Riordan Street at the intersention with Qantas Drive	MH
22	Joyce Drive near the Sir Reginald Ansett Drive	M
23	Sir Reginald Ansett Drive	MH
24	Seventh Street	MH
25	Qantas Heritage Collection, Level 1, Terminal 3	ML
26	Giovanni Brunetti Bridge	MH

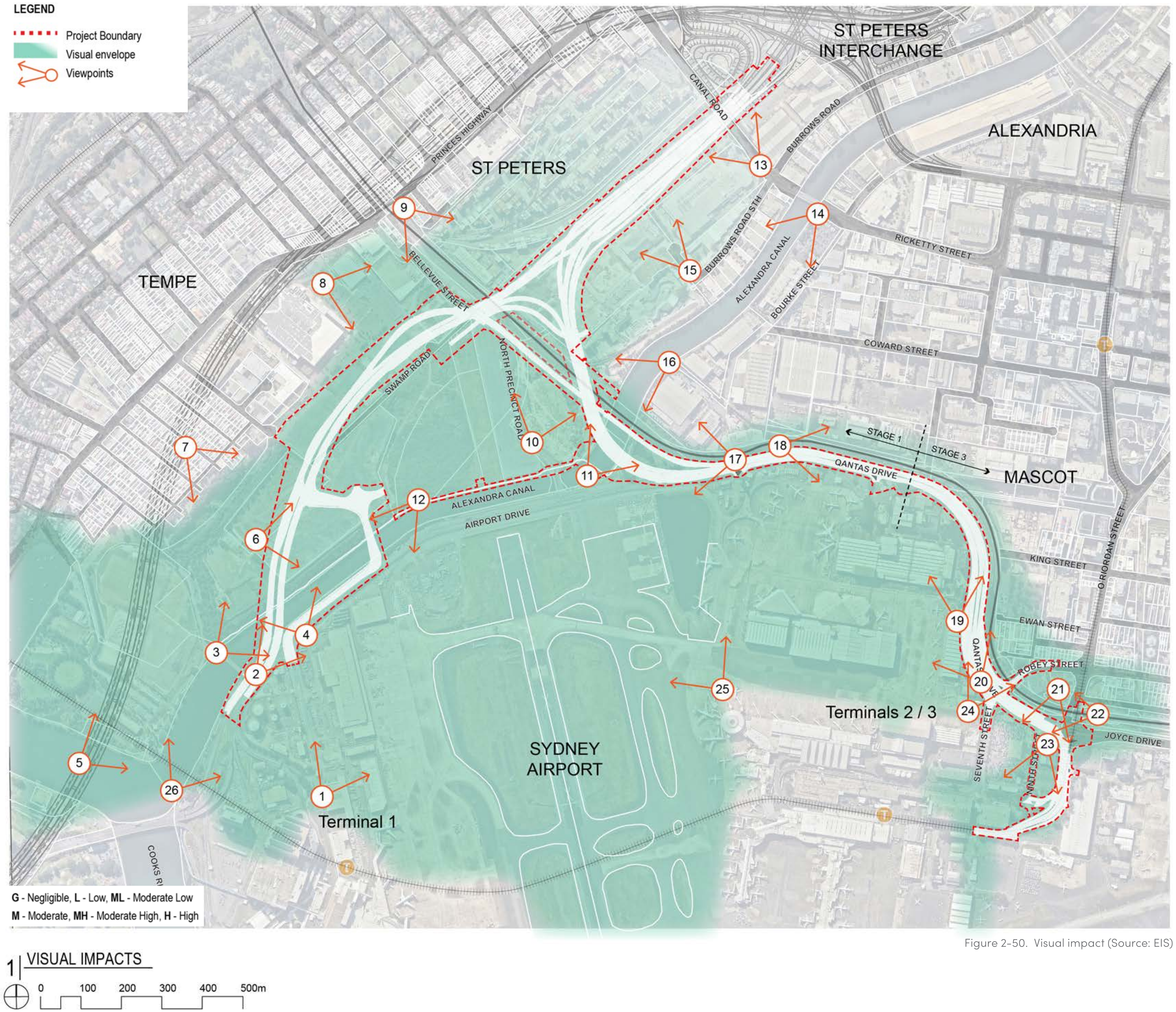


Figure 2-50. Visual impact (Source: EIS)

3. Urban design vision, objectives and principles

3.1 Vision

Sydney Gateway will be a memorable arrival and departure point that befits Sydney's stature as a vibrant global city and major entry point to Australia. It will be an exciting threshold experience that combines the highest quality engineering, landscape, architecture and art. It will celebrate the unique qualities of the place and contribute positively to the local community and environment.

Figure 3-1. Aerial view of La Perouse, Sydney Airport and Botany Bay

3.2 Project urban design objectives and principles

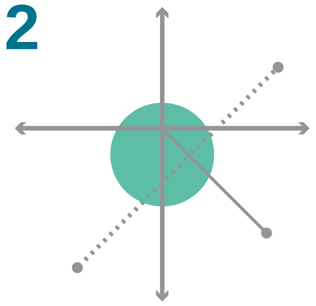
The Urban Design and Placemaking Concept as outlined in Chapter 6 Sydney Gateway Road project - Technical Working Paper 13 of the EIS/MDP presents the urban design and place making strategy and illustrates the urban and landscape design for the Project. It summarises an overarching urban design vision, complemented by an explanation of what the experience of the Sydney Gateway would be. It also outlines the urban design objectives and principles for the Project, which are based on the WestConnex Urban Design Framework.

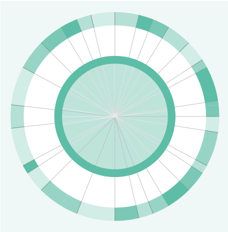
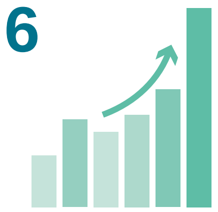
Appendix A of the Response to submissions report May 2020, provides the responses to submissions received and modifications to the EIS/MDP.

These objectives and principles are implemented throughout the detailed design process of the various Project elements to, in turn:

- Improve connectivity to Sydney Airport terminals by providing road connections that will cater for forecast growth in passenger and air freight volumes.
- Support the efficient distribution of freight to and from Port Botany and Sydney Airport to logistic centres in Western Sydney.
- Improve the liveability of Mascot town centre by reducing congestion and traffic movements through the local road network.

The placemaking, design and landscape outcomes of this CSSI is informed by and is consistent with The Urban Design and Placemaking Concept and as amended by Appendix A. A summary of the application of the objectives and principles on the Project is noted under the 'implementation' column.

Objectives	Principles	Implementation
1  **Leading edge environmental responsiveness** Ensure environmental practices respond to the natural systems of the area and promotes sustainability.	**Existing vegetation** – Provide a robust revegetation strategy that features indigenous plant species that are suitable for the Australian climate and reference this coastal location.	– Native planting from the Swamp Oak Floodplain Forest and the Eastern Suburbs Banksia Scrubs communities have been incorporated into the design.
	Protect and enhance waterways – Capitalise on the opportunity to re-imagine the Alexandra Canal and make it a more visible part of life in this area.	– The feature areas along the ATL with the two special areas and two rest areas provide for placemaking of the Alexandra Canal corridor.
	Landscape restoration – Provide a landscape restoration strategy that allows for landscape to be restored in disturbed areas, either as replacement landscape or as residual landscape.	– The revegetation of disturbed areas within the Project boundary will be planted with a mix of plant species from the local and remnant vegetation communities, including Eastern Suburbs Banksia Scrub, Swamp Oak Floodplain Forest and Sydney Coastal Heath. Any areas that are impacted by construction will be reinstated with hydroseeding using endemic and native species.
	Green infrastructure – Integrate natural patterns and ecology into the design, protect watercourses and manage drainage to support the greening of the Project lands – Incorporate leading edge WSUD strategies into the design – Provide measures to reduce the urban heat island effect.	– The revegetation of available landscape areas along the Alexandra Canal will be planted with species primarily derived from the Swamp Oak Floodplain Forest vegetation community and other cultivars that enhance the existing landscape character along these riparian zones and integrate the natural patterns and ecology. – Vegetated drainage channels have been provided to reduce the extent of hard surfaces, reduce runoff velocity, improve water quality and add to the visual amenity of the Project. – Reducing the extent of concrete and introducing a mix of other materials such as stone, decomposed granite etc, which are less absorptive than concrete. Consideration of lighter colours to deal with extreme weather changes. Provision of tree canopy landscape where possible, particularly at the rest areas.
2  **Connectivity and legibility** The Project will improve multi-modal connectivity and legibility between the Project site and surrounds.	**Connectivity** – Improve access to Sydney Airport – Improve active transport links across the precinct as a part of an overall strategy – Ensure that pedestrian and cycle facilities are safe and fully integrated into the design of the Project.	– Provision of a direct roadway connection from St Peters interchange to Sydney Airport Domestic and international Terminals. Streamlining of traffic flows from Qantas Drive, Airport Drive and O'Riordan Street to Sydney Airport. – The dedicated active transport link connects Tempe Recreation Reserve and the neighbourhoods of Tempe and Mascot to the Airport and tie into the existing ATL network. – CPTED principles have been adopted and integrated into the design to ensure the safety and security of the ATL users.
	Amenity – Provide opportunities along the ATL to improve amenity that would help enhance the user experience.	– Feature areas including two rest areas and two special areas have been provided along the ATL to improve amenity and enhance the user experience.
	Accessibility – Integrate the Project with local streets and open spaces such as the Tempe Recreation Reserve, the Alexandra Canal and Mascot active transport routes.	– The active transport link provided along the Alexandra Canal and Qantas Drive helps to integrate the Project with Qantas Drive, Airport Drive, O 'Riordan Street, Alexandra Canal, Tempe Recreation Reserve and the Airport, and tie into the greater network.
	Wayfinding – Leverage significant Project elements to provide intuitive wayfinding across this complex infrastructure.	– Feature visual elements such as landscape mounds, viaduct screens and arched bridges, with integrated art, have been incorporated in the design to provide intuitive wayfinding for the users.

Objectives	Principles	Implementation
3  **Placemaking** To create and support a sense of place drawing on the character of the local area.	**Placemaking** – Create a strong sense of place that derives its narrative from a ‘Connection to Country, and an understanding that the landscape and the infrastructure itself can be a work of art.	– Aboriginal artists were engaged for the Project through a curatorial process to provide Connection to Country. The artists collaborated with local Elders to identify natural objects and cultural practices. These objects were abstracted and further developed with the design team to create visual art motifs which have been incorporated and integrated in the design of the mounds, walls and screens.
	Views – Understand that the experience of this place will have a temporal nature and be formed through movement, understand how wayfinding points relate through motion and shifting visual fields of drivers, cyclists and pedestrians.	– The special visual features such as the landscaped art mounds and the arched bridges serve as wayfinding points and help to frame views to the airport and relate through motion and shifting fields of the users. The viaduct screens have a temporal quality which changes with time and provides a dynamic user experience.
	Existing natural context – Rediscover the natural context of the site that has been lost over time to provide a strong set of visual markers through feature planting and sculpted landforms that reference the site's natural identity.	– Feature planting has been provided on the art mounds, the noise wall and mound and at the ATL noise wall crossing which reference the site's natural context and identity.
4  **Urban renewal and livability** Fit the Project sensitively into the unique natural, built and cultural environment of the airport landscape and its urban surrounds in a way that promotes improved urban amenity.	**Improved streetscapes** – Develop a unified landscape strategy that helps to tie in with the existing communities, whilst allowing for enhanced landscape areas which could be used as visual features, to improve the streetscape environment.	– A unified landscape strategy has been developed for the Project, which responds to the motorway and local road streetscape design, but also enhance the ‘gateway’ experience and reference the surrounding landscape and vegetation communities of Botany Bay and the Cooks River Valley. All landscaped areas are planted with the locally occurring vegetation communities of Eastern Suburb Banksia Scrub. Enhanced landscape planting has been provided at the rest areas, the ATL noise wall crossing and the landscaped mounds to improve the roadway and streetscape environment.
	Improved connectivity – Provide improved public access to recreation assets such as the Alexandra Canal and Tempe Recreation Reserve.	– The ATL is located along Alexandra Canal and provides a direct link to Tempe Recreation Reserve.
	Safety and security – Integrate CPTED strategies into all aspects of the design to ensure that they are safe and comfortable to use at all times. – Provide efficient and conflict free travel routes that are easy to understand and navigate.	– Kinks, corner pockets or any abrupt starts or terminations are avoided. – Tapering of the walls at the Nigel Love Underpass and provision of wide openings to the underpass approaches to open up the visual envelope. – Maintaining end to end visibility at the approaches of the Nigel Love Underpass. – Locating rest areas at strategic locations near the underpasses which provide for passive surveillance. – Incorporating lighting to allow for safe access at night.
5  **Memorable identity and safe, enjoyable experience** Create a memorable sense of arrival and departure that enhances the image of global Sydney.	**Motorway experience** – Provide a memorable driver experience that marks the sense of arrival and departure to the airport and creates a ‘gateway’ experience.	– Feature elements are provided at the approaches to the Airport which mark the sense of arrival and departure and create a ‘gateway’ experience. These include the art mounds, the arched bridges and the viaduct art screen.
	Equitable experience – Provide a design that can be experience by all users from the air, or the ground during the day and night.	– The feature art mounds and the arches will be experienced from the air. The arched bridges, the viaduct art screen, the art walls and the special features along the ATL, along with the mounds provide the day-night experience at the ground level.
	Progression – Create a memorable experience that capitalises on the potential of the infrastructure itself to become a work of art and aid in wayfinding and placemaking. – Develop a place specific identity that is derived from the story of this place, its geography, landscape, a sense of progress in the journey. – Ensure that the ‘gateway’ experience is seamless with WestConnex and can be enjoyed by all each individual journey is valued and equal.	– Various elements of the infrastructure, including mounds, walls, screens and the ATL have been used to create a large piece of environmental art. – Heritage interpretation of the canal, rail and the airport stories and cultural practices are referenced on the walls, screens and mounds to reflect the history and evolution of the place over time, from pre-industrial to post industrial eras within the greater context of the Project site. – The feature landscape mounds reference the St Peters Mound and provide a seamless user experience with WestConnex.
	Views – Enhance opportunities for creating visual landmarks which would create a unique identity for the motorway and serve as wayfinding points and provide a sense of orientation for the journeys traversed.	– The landscaped art mounds and the arched bridges create visual landmarks and serve as wayfinding points.
6  **A new quality benchmark** Achieve a well designed, durable and sustainable environment.	**High quality integrated design** – Ensure that a modular approach is taken to Project elements that feature a family of forms strategy to simplify implementation and maintenance. – Provide a fully integrated outcome that balances urban design, engineering and experience to deliver enduring value.	– A consistent design has been adopted to ensure that the forms and detailed resolution of the built elements are elegant, refined and work together to create a unified user experience.
	Durability – Use materials that are suitable in this marine environment. – Use materials that are robust and will resist vandalism.	– The materials concept features a consistent and robust palette of complementary materials. Their application is based on functionality, durability and the visual prominence of elements within the urban context and incorporate anti-graffiti measures.

The urban design also aligns with the principles of the Australian Urban Design Protocol (AUDP) as outlined in the document Creating Places for People, an Urban Design Protocol for Australian Cities.

The objectives of the AUDP is founded on the integration of five pillars being productivity, sustainability, liveability, leadership and design excellence. Twelve principles underpin the Protocol based on design, leadership and governance. The below table demonstrates the application of the key principles on the Project.

Principle	Expected outcome	Application on the Project
Design principles about place: productivity and sustainability		
Enhancing	Enhances local economy, environment and community	The Project's urban design has been developed as part of an integrated, collaborative and co-design process, which includes contractors, engineers, artists and other consultants to achieve excellence in design.
Connected	Connects physically and socially	
Diverse	Diversity of options and experience	The design respects the community and stakeholder needs, creates opportunities for businesses to prosper, provides for safety opportunities to sustain and enhance the built and natural environment, enhances connectivity and celebrates heritage, environmental and social values that provide a sense of place and identity.
Enduring	Sustainable, enduring and resilient	
Design principles about people: liveability		Key initiatives include:
Comfortable	Comfortable and welcoming	– Providing an Aboriginal voice to the Project, which will provide 'Connection to Country'
Vibrant	Vibrant, with people around	– Developing a robust consultation strategy that allows all stakeholders and the community to participate in the development of the design, including Councils (Inner West, City of Sydney and Bayside), EESG, Heritage Council of NSW, MLAHC and LaPACA
Safe	Feels safe	– Developing a Project narrative that uses the existing and proposed to integrate all Project elements to create a piece of environmental art
Walkable	Enjoyable, easy to walk and bicycle around	– Creating a 'gateway' experience at various scales using the vertical visual elements such as the mounds and arches as navigation points and the linear elements such as the walls and screens to provide linear continuity, together provided to enhance the user experience
Principles about leadership and governance		
Context	Works within the planning, physical and social context	– Providing opportunities for heritage interpretation, particularly along the ATL and on Project elements that are highly visible, such as walls and screens
Engagement	Engages with relevant stakeholders	– Incorporating crime prevention through environmental design (CPTED) principles to reduce the occurrence of crime
Excellence	Excellence, innovation and leadership	– Providing opportunities to reduce the heat island effect by minimising the use of concrete along the ATL and introducing special pavement materials which cause lesser carbon emissions than concrete, whilst increasing opportunities to provide shade at rest areas
Custodianship	Considers custodianship and maintenance over time	– Providing opportunities to include recycled materials in the Project design elements.

Figure 3-2. Craigieburn Bypass ©Peter Hyatt

Figure 3-3. Westlink M7 ©Brett Boardman

Figure 3-4. Glenelg Tram Overpass ©David Russell

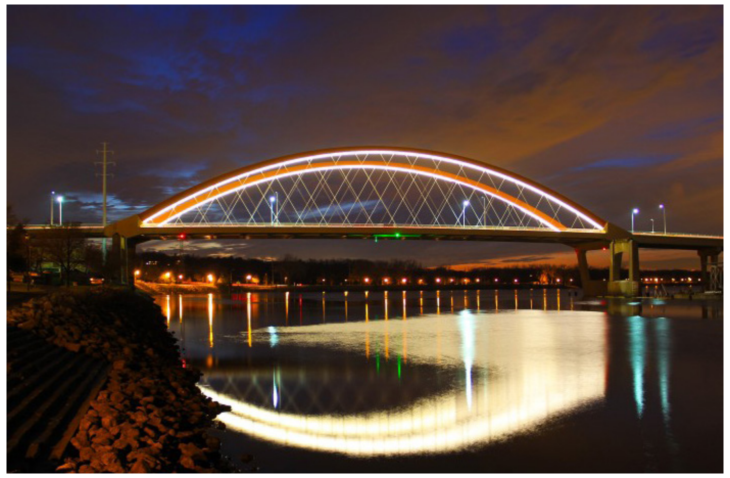


Figure 3-5. Hastings Bridge ©Illumination Arts

3.3 Environmental values

The design is developed within approved site boundaries. The sites for permanent infrastructure minimise the disruption of existing green spaces. As part of the landscaping, greenery is provided in the visual catchment of the Project, where possible.

Specific initiatives include:

- Seamlessly tying in with the public domain improvements currently underway by Inner West Council for the Tempe Recreation Reserve
- Maintaining landscape continuity, where practical and permissible, whilst working with the limitations of National Airport Safeguarding Framework (NASF) guidelines
- Management of existing and newly implemented landscape to ensure high plant survival rates
- Planning for systematic site landscape management and maintenance, including measures to provide for regular watering, pruning, mowing, mulching and top dressing; replacement of dead plants; and removal of weeds.

3.4 Heritage values

Heritage values have been considered in the development of the Project's urban design.

Specific initiatives include:

- Commissioning local Aboriginal artist/s to integrate art as an expression of the urban design, providing an interpretation of Aboriginal heritage, recognising the history and enhancing the legacy of the practices of the Elders to provide Connection to Country
- Providing opportunities for the interpretation of the historical significance of Non-Aboriginal elements such as the Alexandra Canal, the Botany Rail Line and the airport.

An Aboriginal heritage interpretation strategy will be developed by the JHSWJV once the salvage excavation works have been completed. Consultation with registered Aboriginal parties and other relevant stakeholders will then be undertaken as part of the draft strategy. The strategy will have regard to Sydney Airport Master Plan 2039 and the Sydney Airport Heritage Management Plan.

Strategies for salvaging items for reuse may include:

- Identification of elements that are considered of salvage value
- Identification of opportunities for interpretive reuse
- Contacting organisations to ascertain any interest in taking the elements salvaged, should no opportunities for reuse within the Project be available.

Following items are being considered for salvage value:

- Archaeological deposits along the railway corridor
- Remnants of canal walls disturbed during construction.

Non-Aboriginal heritage interpretation will be undertaken in accordance with the NSW Heritage Manual (NSW Heritage Office and Department of Urban Affairs and Planning, 1996), Interpreting Heritage Places and Items: Guidelines (NSW Heritage Office, 2005), and the NSW Heritage Council's Heritage Interpretation Policy.

Feature elements such as interpretive signage plaques, and pavement markers have been provided along the ATL pathways and the rest areas as part of this PDLP to incorporate the interpretation of Aboriginal and non-Aboriginal items of historical significance, including:

- The weaving pattern
- The mullet
- the coastal wattle
- The fish hooks and flints
- The coastal edge
- The nawi (canoe)
- Alexandra Canal
- Sydney (Kingsford Smith) Airport Group
- Cooks River Container Terminal
- Mascot (Shea's Creek) Underbridge
- Botany Rail Line.

The design has been developed in accordance with the Statement of Heritage Impact for the Project by recognising the key items of historical significance that have been listed in the heritage registers and identifying them as opportunities to provide heritage interpretation. Consideration has been given in the design to minimise the potential for visual impacts by incorporating sympathetic fabric, colour and form in the design through a careful section of materials that are conducive to their surrounding context.

The bridges over Alexandra Canal have been designed by appropriate heritage urban design professionals to be sympathetic to the heritage sensitivity and industrial landscape of the canal. They adopt a family of forms using steel trough girders, which help to span across the canal in a single span, minimising physical impacts on the canal and retain its open character. Materials, such as weathered steel has been considered to reflect the industrial character of the area. Textures on retaining walls have been provided which represent the flow patterns of water currents. The Alexandra Canal Conservation Management Plan has been taken into consideration in the design of the bridges over the canal.

The design of the bridges over Alexandra Canal have been developed in consultation with the Heritage Council of NSW and Sydney Water.

3.5 Community safety and security

The incorporation of CPTED principles contribute to the overall safety of the Project. An assessment of CPTED has been undertaken in accordance with the following Conditions and Approvals:

- CoA E70
- UMM (SE2)
- ISCA Credit Hea-2 Crime prevention

An independent report, prepared as part of the Project detailed design, which adopts the following risk assessment methodology to assess crime:

- Identify crime risks or statistics present in the area
- Identify likely consequences of these crimes for the community, and or individual.

The assessment has been based on the following methodology:

- Check relevant compliance documents
- Identify CPTED principles based on ISCA approved guidelines
- Determine applicable CPTED principles
- Develop a risk assessment methodology
- Conduct desktop analysis of crime statistics
- Identify risks, likely consequences and applicable CPTED principles.

Based on the desktop crime statistics and mapping information above, and Section 4.5.3 of the *EIS Technical Working Paper TWP 1 Transport, Traffic and Access*, which outlines that the average pedestrian and cyclist activity carried around Alexandra Canal is 600 cyclists and 100 pedestrians per day with about 90 cyclists and 10 pedestrians during the AM and PM peak hours, resulting in about 700 pedestrians and cyclists per day. Based on these findings, it can be assumed that areas around the Project area are of low pedestrian / cyclist activity and 'medium' fear of crime.

The following measures have been provided to mitigate the risk of crime:

- Passive surveillance measures with the provision of increased pedestrian and cyclist traffic and increased amenity such as rest areas etc, along the ATL
- Lighting at key locations along the ATL
- Optimisation of the alignment to maintain clear sightlines and avoiding blind corners or pockets
- Maximising the openings in the underpasses and on approaches
- Careful selection of patterns, textures, and colours at key locations such as underpasses, walls, and screens to help deter graffiti and vandalism
- Providing opportunities to involve the community to contribute towards the development of the Project, creating a sense of ownership.

3.6 Sustainability

Sustainability is considered in the overall design approach across the lifecycle of the infrastructure, including during construction, operation and maintenance.

Initiatives include:

- Processes in place to reduce wastage of material during construction
- Use of digital engineering and 3D modelling for construction planning to optimise sequencing and enable more efficient building works
- Commitment to achieve 'excellence' in the ISCA certification
- Use of modular, durable materials and detailing across surface works to reduce the level of maintenance, repair or replacement
- Implementation of WSUD initiatives through vegetated drainage channels utilised across the Project, to minimise the extent of hard surfaces, reduce runoff velocity and improve water quality
- Selection of appropriate plant species to withstand extreme Australian summer heat and low rainfall, with groundcovers and mulch to suppress weeds and reduce frequency of maintenance.

Infrastructure Sustainability Council of Australia

This PDLP meets the requirements of Urb 1 – Urban design criteria in the ISCA IS Version 1.2 Technical Manual with the inclusion of the following items:

- Site analysis and planning – refer to Chapter 2.0
- Vision and objectives – refer to Chapters 3.0, 5.0 and 6.0

The requirements for Urb 2 – Implementation criteria in the ISCA IS Version 1.2 Technical Manual is achieved through the delivery of detailed design and documentation of the design elements illustrated in this PDLP. The detailed design process provides documentation that will be constantly refined throughout the Project up until the point the design is 'Issued for Construction' stage. The design will then be implemented in construction.

4. Precedents and benchmarking

This section of the report illustrates a collection of precedents and benchmarking studies of similar projects on the Sydney Motorway network and other examples in Australia and around the world. They also include precedents and benchmarks that show best practice transport integration.

These benchmarks demonstrate:

- Important Project interfaces
- Opportunities to integrate art and infrastructure
- Opportunities for urban and landscape design treatments in relation to landforms, bridge structures, retaining walls, bridge undercroft and road furniture.

A review of the design challenges and how they have been addressed on these projects have been described in the precedents and benchmarks illustrated. This review demonstrates consistency with the exemplar aspects of the outcomes being achieved on the Sydney Motorway network and identifies approaches taken on the Project, which has helped in developing the urban design strategy and concept design.

The design rationale on all these road projects has been to create an interchange that provides a distinct identity to the roadway. The design concepts in these precedents and benchmarks have been provided to create a deliberate 'gateway' statement as a significant placemaking and a story telling device and not to disguise or blend the roadway into its surrounding.

Challenges:

- Lack of understanding of the user experience
- Lack of understanding of location and distance travelled on the journey
- Lack of wayfinding elements to help users navigate their journey.

Management strategies

- Use the Project design elements such as noise walls, retaining walls and landscape to create visual events and provide graphic interest with colour, pattern and visual contrast
- Provide transitional elements to help with change in direction along the journey
- Use the Project design elements to serve as wayfinding landmarks to help in navigation along the journey
- Clearly identify emergency areas with appropriate and legible signage
- Use colour, texture and pattern to strengthen legibility of special features
- Incorporate art as a way of telling the story and providing a sense of place and 'Connection to Country' to the Project.

WestConnex New M5, NSW
Images © Hassell

The design strategy for the SPI is to provide an urban forest created through a formal planting of canopy trees in a deliberate pattern.

SPI is also an important interface with the Project, where a new elevated section of road will extend from SPI, including new bridges over Canal Road.

WestConnex M4-M5 Link Mainline Tunnels, NSW
Images © CM+

The Campbell Road ventilation facility creates a bold statement using the building façade as an expression of art, developed with Aboriginal artists, providing a unique definition to SPI.

It demonstrates how the building became the 3D canvas for art expression.

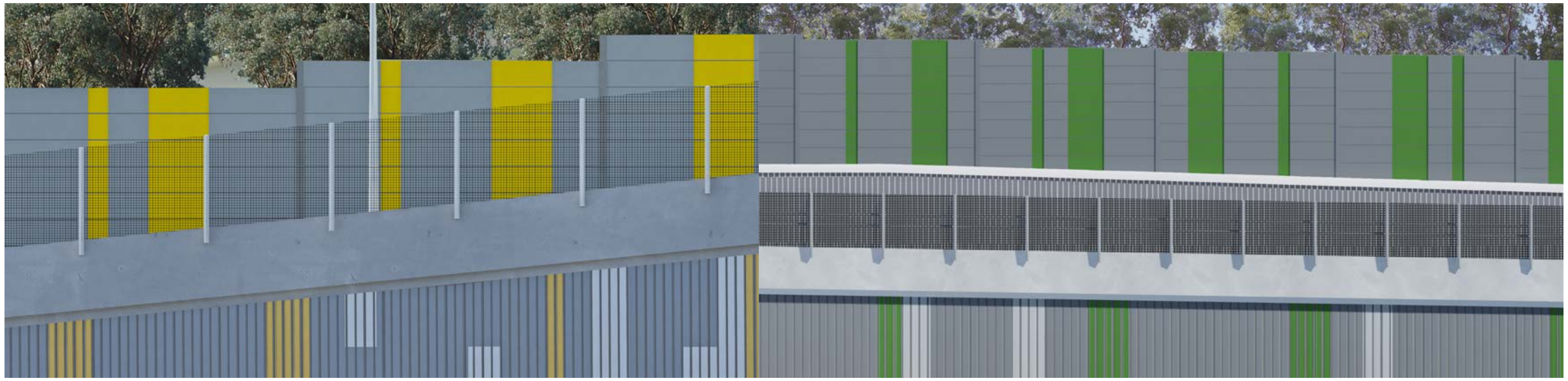
4.1 Sydney Motorway network precedents

WestLink M7, NSW
Images © Brett Boardman

- Roadway elements are designed as a family of elements with texture, pattern and colour to provide linear identity to the 40 kilometre Motorway
- Special elements at major interchanges are created to provide distinct identity and placemaking to the interchange
- Light Horse Interchange: A series of feature vertical elements arranged along the median with a feature light mast as an urban sculpture to symbolise the heroic troops and their horses who served in the Australian Light Horse
- The design of noise walls and bridges incorporate bold gestures along certain sections with accent colours, textures and patterns to provide an urban identity to the roadway.

NorthConnex, NSW
Images © CM+

- Roadway design elements are designed as a continuous series of family of elements with texture, pattern and colour to provide linear identity to the nine kilometre Motorway
- Feature noise walls, portals and buildings providing user experience for people moving from urban to country reflected through warm colours in the urban area to cooler colours in the country area.



4.2 Global precedents and benchmarks

West Dodge Expressway, Omaha, NE, US
Source: *https://www.hawkins1.com/projects/west-dodge-expressway*

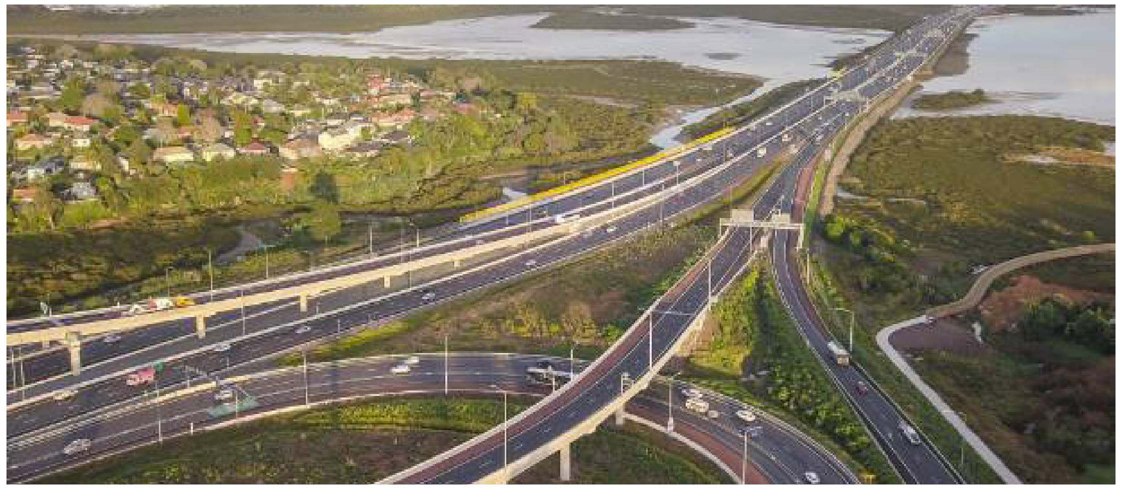
- Roadway elements are designed as a family of elements that complement each other
- Viaduct structure read as a continuous element with a consistent profile
- Viaduct piers and headstock are articulated to provide a pleasant aesthetic.
- Feature lighting incorporated.

South Eastern Arterial, Auckland, NZ
Source: *https://isthmus.co.nz/*

- Roadway elements are designed as a family of elements that complement each other
- Viaduct structure read as a continuous element with a consistent profile
- Feature lighting incorporated
- Innovative use of viaduct undercroft space with the incorporation of art as a feature.

The State Highway 16 Lincoln to Westgate Upgrade, Auckland, NZ
Source: *https://www.tetratech.com/en/projects/the-state-highway-16-causeway-upgrade*

- Roadway elements are designed as a family of elements that complement each other
- Viaduct structure read as a continuous element with a consistent profile.



5. Design approach

5.1 Design initiatives

The following initiatives have been considered to develop the concept design:

Vision

A strong vision will guide the design of the Project. This ensures that a holistic approach informs the development of the Project and a unified outcome can be achieved that will provide enduring value and a 'gateway' experience.

Placemaking

The Project will adopt a placemaking approach to design with an understanding the places are overlaps of movement and activity. Road users, active transport users and community uses all have value. The 'view from the path' is as important as the 'view from the road' for all users.

Connectivity

The Project design needs to provide for good connectivity to active and vehicular transport routes and serve as a 'gateway' to Sydney.

Safety

Safety in Design (SID) is integrated into the design and documentation processes to manage Project risks and hazards.

Context

The design of the Project must respond to its setting in a transitional location between the airport and the region, and a coastal environment that has undergone substantial change.

Legibility

The elements of the Project need to be designed and organised to facilitate intuitive wayfinding that allows ease of navigation through this complex motorway environment.

Sustainability

The Project must embrace sustainability throughout its design, implementation and operating life. This includes an understanding of the role of the Project as part of a larger transport initiative and recognition of the implementation through WSUD, landscape and material selection.

Public benefits

The Project must deliver measurable public benefits. These include a recognition that public benefits can occur at all scales from reduced regional travel times, to returning local streets to local 'ownership', to provision of amenity at the micro-scale through greening of individual places.

The key urban design interfaces in the development of the design are the civil and structural disciplines. The civil design has governed the alignment design due to the limited space along the corridor, and the structural design has governed the design of bridges. The urban design has been coordinated with both the civil and structural designs to optimise the route alignment and the bridge typologies to achieve a balanced urban design and engineering outcome.

5.2 Design process

The team has adopted the following strategies to ensure an inclusive and effective design process occurs:

- Ongoing value engineering to ensure that the Project delivers value for money
- A commitment to ensuring that aesthetics are considered throughout the Project to deliver a piece of infrastructure that can be understood as a work of art in itself
- Collaboration in the design team between engineering, urban design, landscape design and TfNSW to ensure a holistic environmental outcome
- A robust consultation with community so that their voices are heard
- A recognition that an Indigenous voice needs to be part of the Project from the beginning
- Co-design process to integrate art into urban design from day one of the process
- The need to balance urban outcomes with sound business case principles
- Seeking design and maintenance efficiencies through standardisation of elements and a family of forms approach
- Bringing an open approach to understanding heritage and its manifestations in the physical, social and spiritual narrative of this place
- Being mindful of the ongoing body of work being delivered by TfNSW and building on that legacy
- Remaining open to lessons learned from other projects and the current world's best practice benchmarks
- Ensuring that quality remains the essential benchmark and the design process needs to allow for internal challenges and review.

Our design process adopts a comprehensive view of the Project that will balance opportunities and risk to achieve a holistic outcome that is both cost effective and realises the potential of this unique 'gateway' site.

Key design opportunities:

- Creating a new 'gateway' for Sydney
- Unlocking a previously closed precinct along a heritage waterway
- Celebrating the character of the built and natural environment
- Opening up, framing and enhancing existing views through the introduction of the new infrastructure
- Amplifying the Indigenous connection to this place
- Restoring biodiversity
- Fostering the return of local streets to local traffic
- Creating a place of environmental art
- Complementing other significant infrastructure initiatives across Sydney
- Improving local active transport connectivity
- Improving safety
- Promoting a sustainable future through more efficient journey times.

Key design challenges:

The key design challenges are related to the following:

Managing Impacts:

- Impacts on the biodiversity as a result of the corridor being adjacent to Tempe Recreation Reserve
- Impacts on managing Aboriginal and non-Aboriginal heritage and cultural values of the surrounding area
- Managing impacts to the visual character of Alexandra Canal
- Minimising removal of mature trees and vegetation
- Managing environmental impacts such as noise, light spill and vibration
- Managing runoff water and its impacts on the marine ecosystem
- Managing properties as part of the upgrade works
- Managing that the Project landscaping provides a low maintenance outcome to ensure that roadway operations are not compromised.

Achieving outcomes:

- Ensuring that CPTED principles are adequately implemented throughout the design
- Ensuring that a legible outcome is achieved
- Recognising that there will be many individual journeys and short decision times through this place and wayfinding will need to work at many levels and in many directions
- Ensuring a clear understanding of public vs private areas.

The above design challenges have been mitigated through the proposed design strategies and treatments provided as part of the design outcomes.

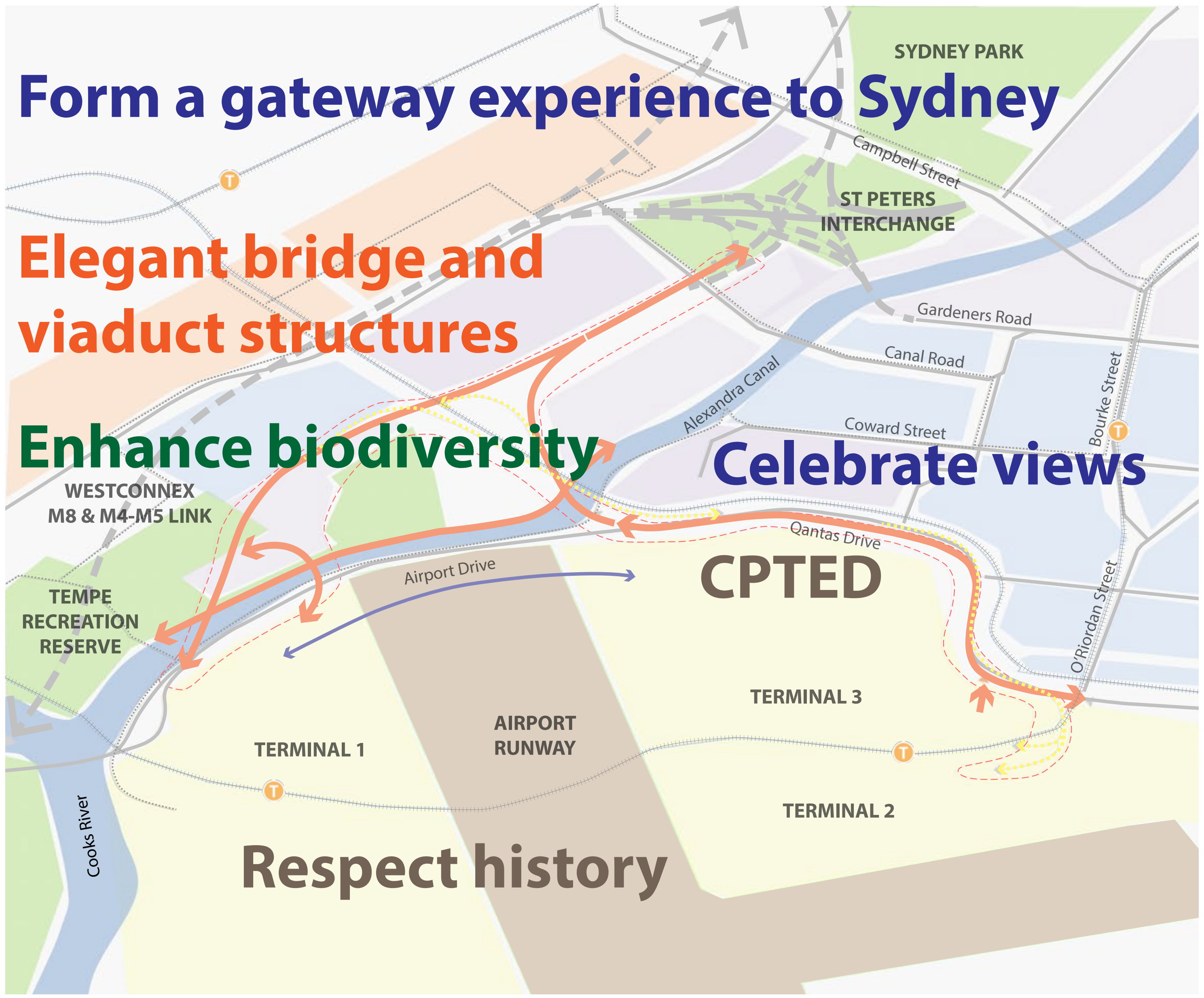


Figure 5-1. Key design opportunities

5.3 Big picture thinking

The primary urban design objective is to ensure that the Project provides a 'gateway' experience, marking a sense of arrival and departure and providing a sense of place. In order to guide the concept design the team thought about the big picture and looked beyond the Project boundaries towards the future.

- Provide natural connectivity, which will enhance biodiversity and connect green links within the corridor
- Consider the road as a 'gateway' marker, which will help frame significant views that will be created by the elevated bridges and viaduct structures. These elevated connections will also form a visual link to St Peters Interchange structures, which will be visible from some bridges
- Use infrastructure elements as platforms to integrate art into the urban design
- Reinforce the connectivity of active transport links, which will create opportunities for interpretation and placemaking.

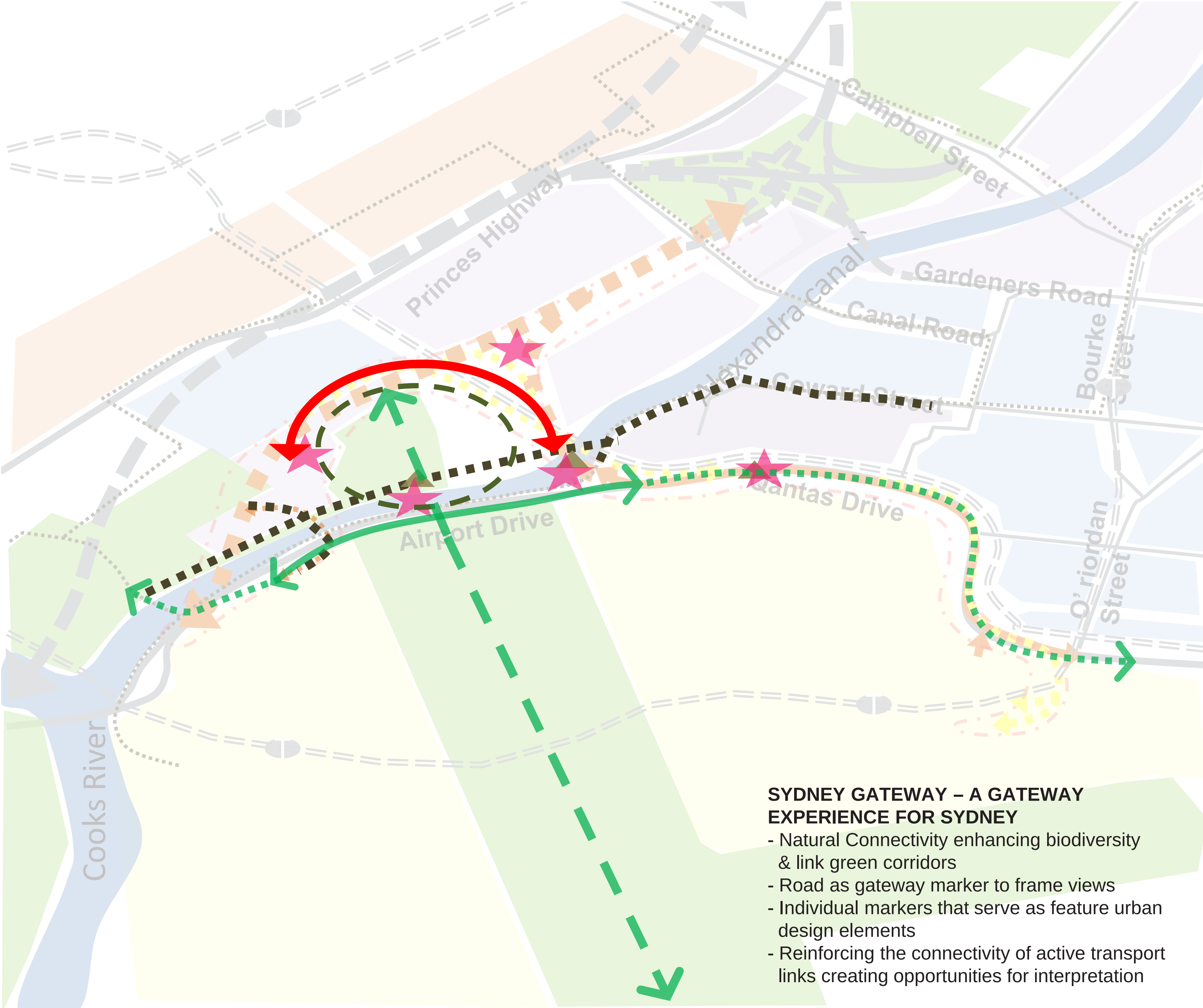


Figure 5-2. The big picture

Figure 5-3. Natural connectivity enhancing biodiversity and link green corridors

Figure 5-4. Road as 'gateway' marker to frame views

Figure 5-5. Individual markers that serve as feature urban design elements

Figure 5-6. Reinforcing the connectivity of active transport links creating opportunities for interpretation

5.4 Visual experiences

The Project consists of a complex network of roads, bridges and paths. These criss cross each other in various configurations, in various directions and at various elevations. Above this network, flights arrive and depart from Sydney Airport at low altitude. Around this network, freight trains move between Port Botany and the rest of NSW. This network of elements sit within a visual field defined by the built form of this part of Sydney. The airport runway and the corridor between Sydney Park and the Cooks River are the most significant part of this visual field.

Within this environment, drivers need to make a number of important decisions to successfully negotiate the journey between the airport, with its own intermodal transfer towards flight, and the City. As an airport 'gateway', these decisions will be made with the added pressure of flight departure or arrival times. An art experience that aids in intuitive wayfinding and enhances the legibility of this space will contribute to making it easier to use, safer and less stressful, in other words, a more enjoyable experience.

The urban design concept is built upon the user experience of movement and time by individuals using this infrastructure. It can be perceived at three scales that work at many vantage points and speeds:

- Aviation – as experienced from the air, on approach or departure, being located adjacent to the north of the north-south runway.
- Motorway – along the roadway, one that is of a fast and direct movement at a regional scale
- Active transport – meandering through the various precincts through the ATL corridor along the banks of Alexandra Canal, at local scale, perceived as individual elements in a varied landscape

The EIS has illustrated four types of movements across the Project. These movements provide a starting point for understanding the holistic experience of Sydney Gateway, as a series of overlapping journeys.

The primary movements generated are:

- International passengers
- Domestic passengers users
- Through traffic users
- ATL.

Drivers will inhabit one experience in time and space, while shared path users will experience another. Each experience will be governed by the extent of visual field, speed of motion, memory of origin point and anticipated arrival point.

The Project is traversed with many decision points and changes in direction in a short time, which suggests the need to envision highly visible elements as punctuation points, providing wayfinding along the linear threads of the Motorway.

1 – International Terminal experience:

This experience marks the arrival and departure to and from the International Terminal with signature elements such as feature arched bridges and the feature art mounds at Tempe Lands, sculpted and landscaped into a piece of environmental art. These elements provide reference and wayfinding points at the threshold of the airport.

2 – Domestic Terminal experience:

This experience provides connections to and from Domestic Terminals and features a viaduct. It is somewhat disconnected from the main visual field of the Project and, due to its narrow corridor and restricted views, will be experienced as a separate event.

3 - Through movement experience:

This provides the pivotal heart of the movement experience where connections to WestConnex, the International and Domestic Terminals come together. It features an art mound and the arch bridges, along with a series of bridges, retaining walls and screens.

4 – ATL experience:

This experience occurs at ground level primarily referencing the feature bridges and artwork walls along the Alexandra Canal. It runs parallel to the desalinisation pipeline, connects the Tempe Recreation Reserve to the east and makes the canal a visible part of the local pedestrian experience. It passes through the Nigel Love Bridge approach in an underpass.

These, taken together, form an overlapping and continuous experience through a visual field of shifting elements and distant and close reference points. It will be possible to see distant reference points even as one approaches close wayfinding points. The elements will shift as one passes each wayfinding point and looks to the next. Therefore it is important to consider the whole field of experience as one experience.

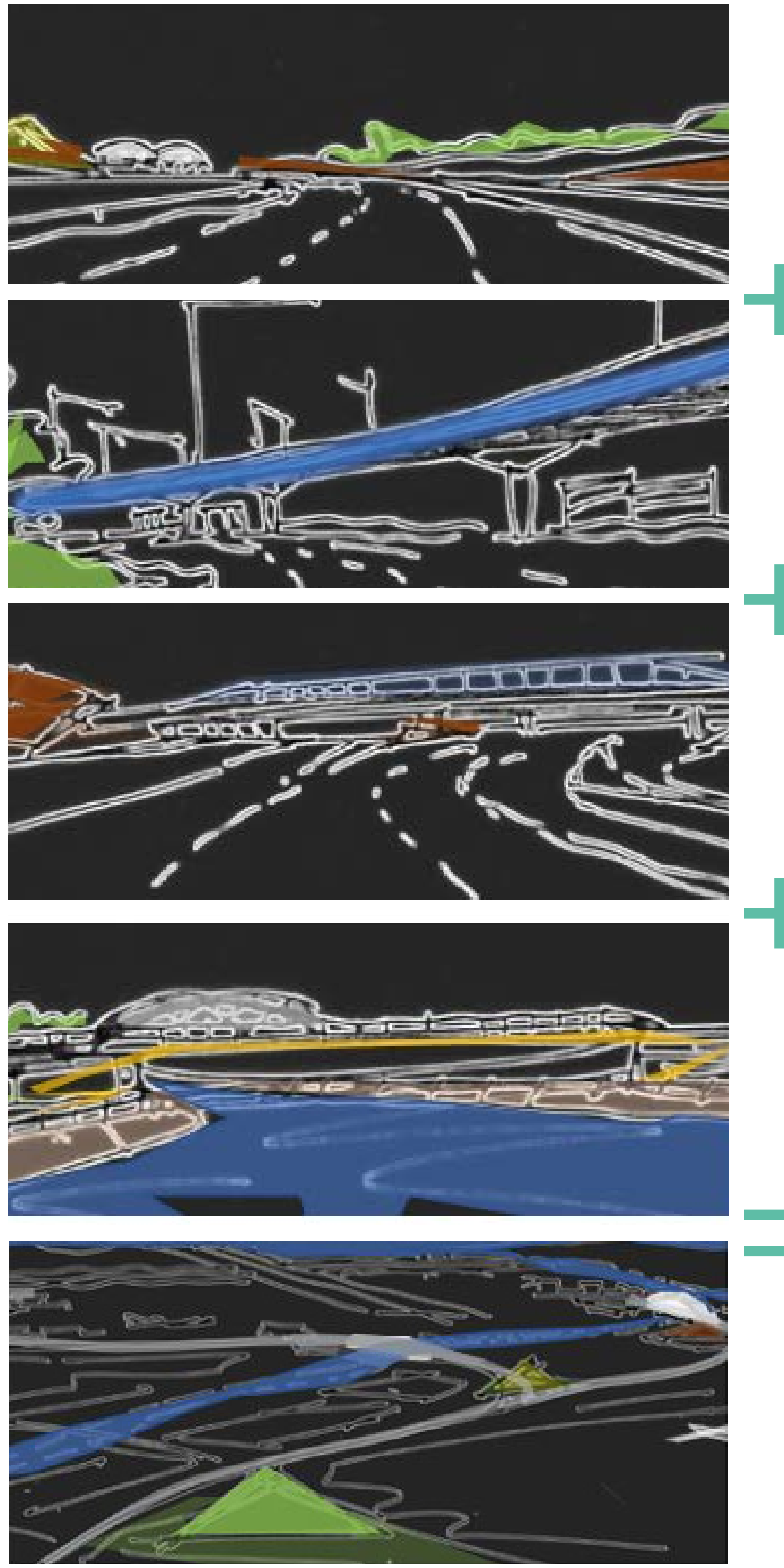
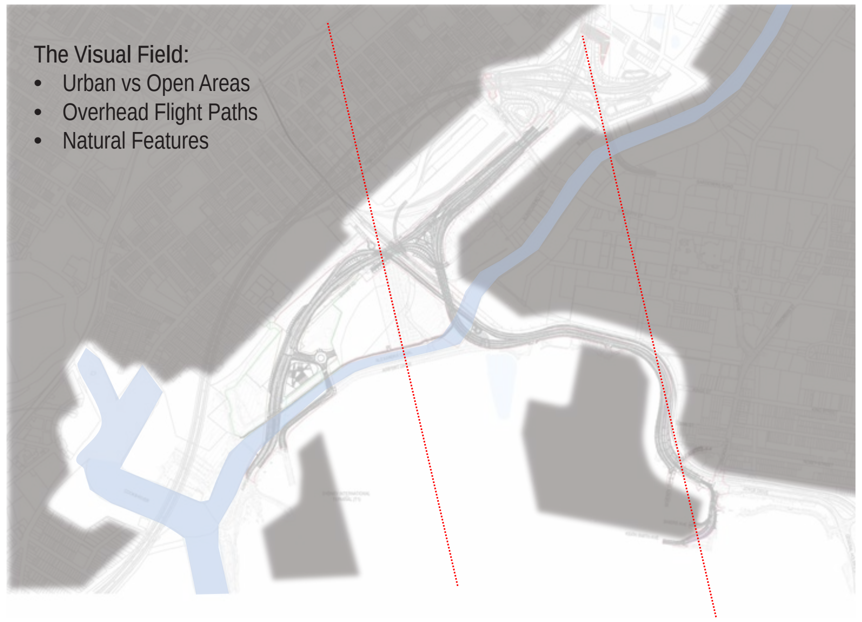
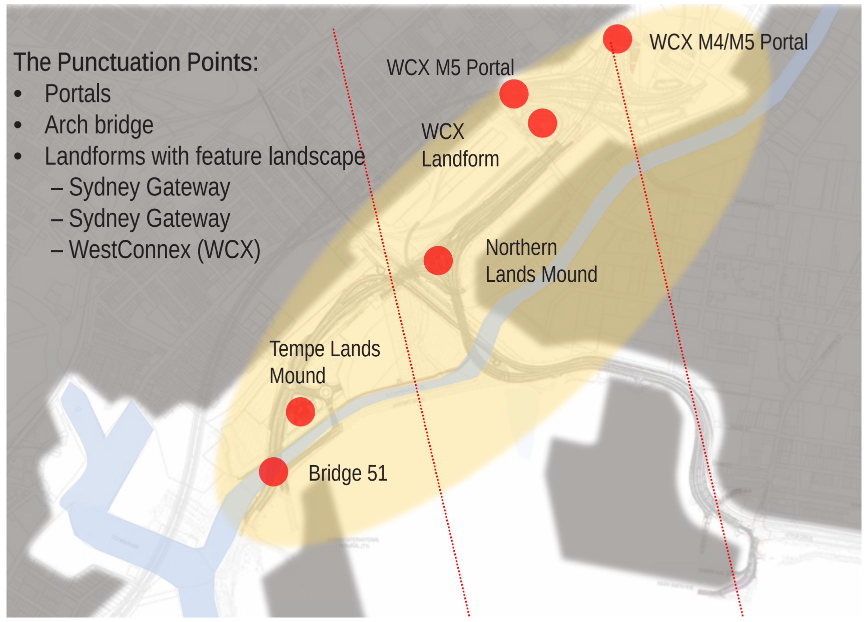
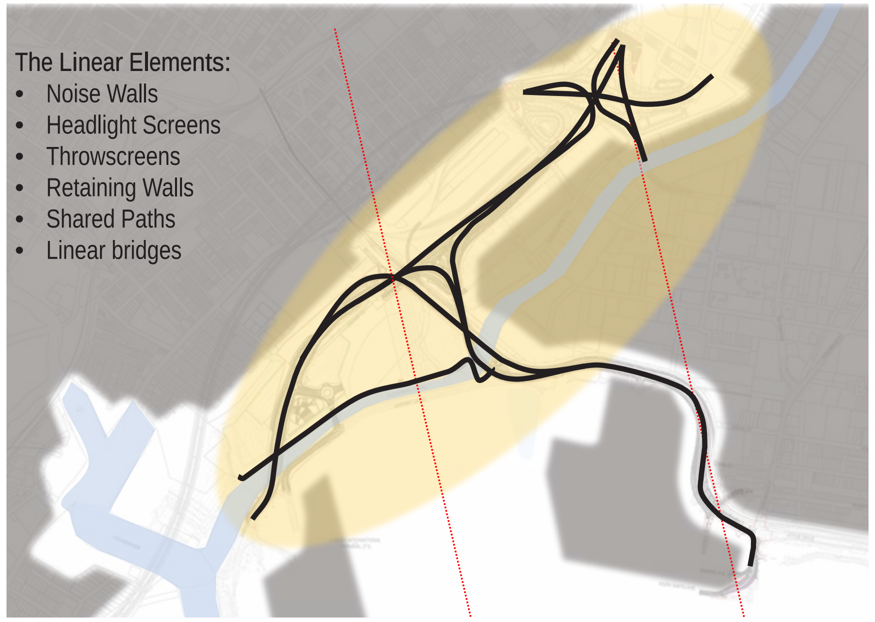
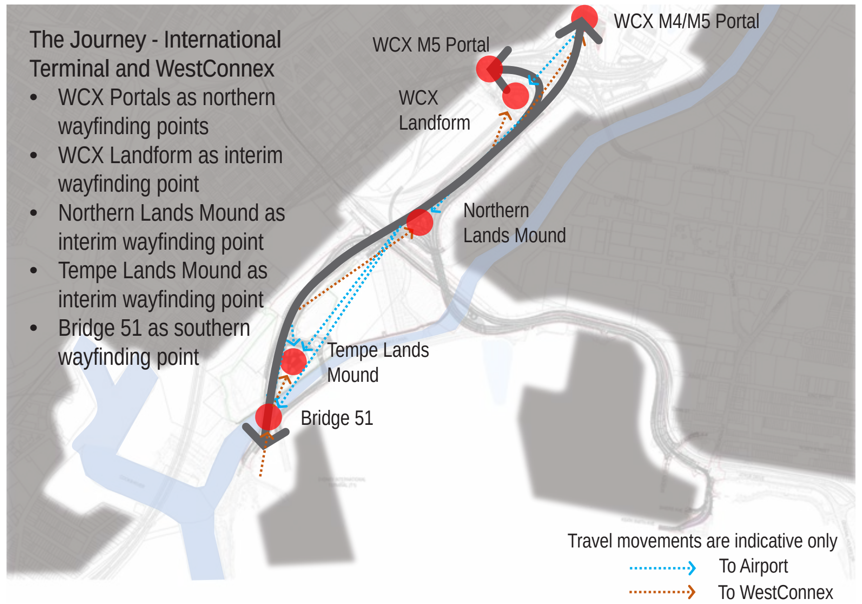


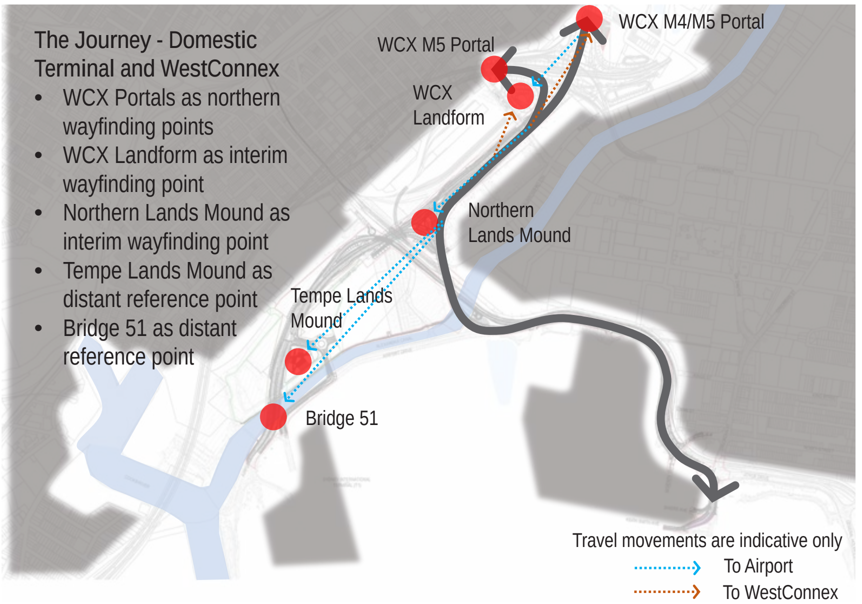
Figure 5-7. Visual experience











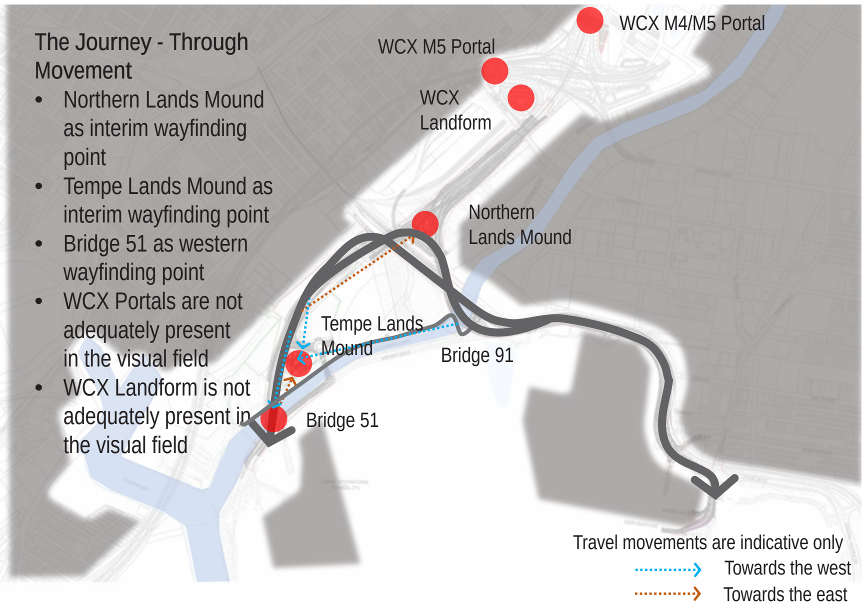


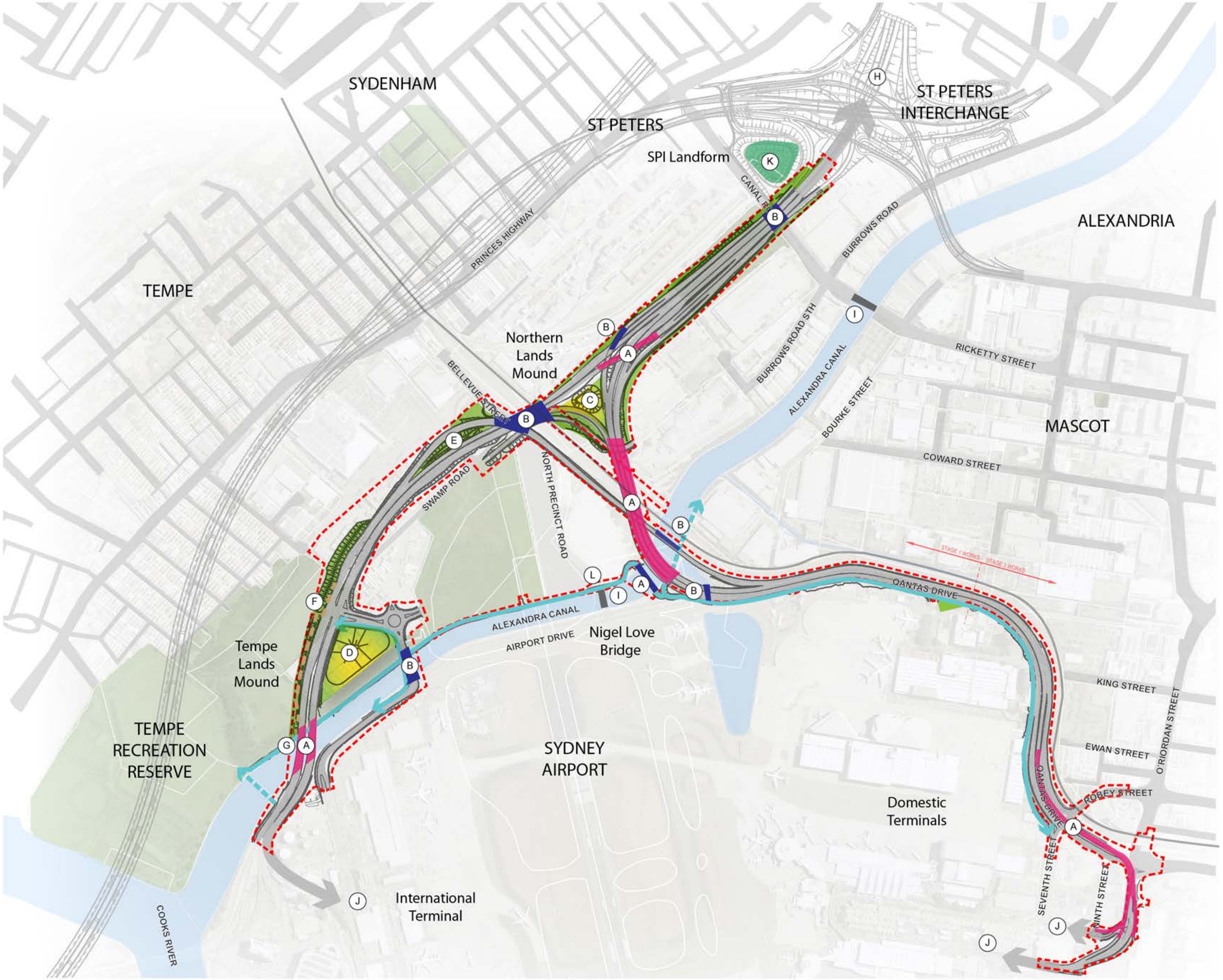
Figure 5-8. Art experiences

5.5 Design strategy

The Project is comprised of a multi-layered series of roads and structures, located within a highly transformed environment. A 'less is more' design approach has been adopted for the urban design and includes the following design strategy.

5.5.1 Design Elements

Key urban design elements identified here define the journeys of the 'gateway' and provide a platform for placemaking opportunities.



1 | URBAN DESIGN FEATURES

0 100 200 300 400 500m

Figure 5-9. Project urban design features

- (A) Major bridges
- (B) Minor bridges
- (C) Northern Lands Mound
- (D) Tempe Lands Mound
- (E) Signature landscape of native banksia scrubs
- (F) Noise wall and mound
- (G) Feature arch bridge
- (H) SPI bridges (by others)
- (I) Existing bridge
- (J) Connection to Domestic Terminals
- (K) SPI Landform (by others)
- (L) Nigel Love Underpass

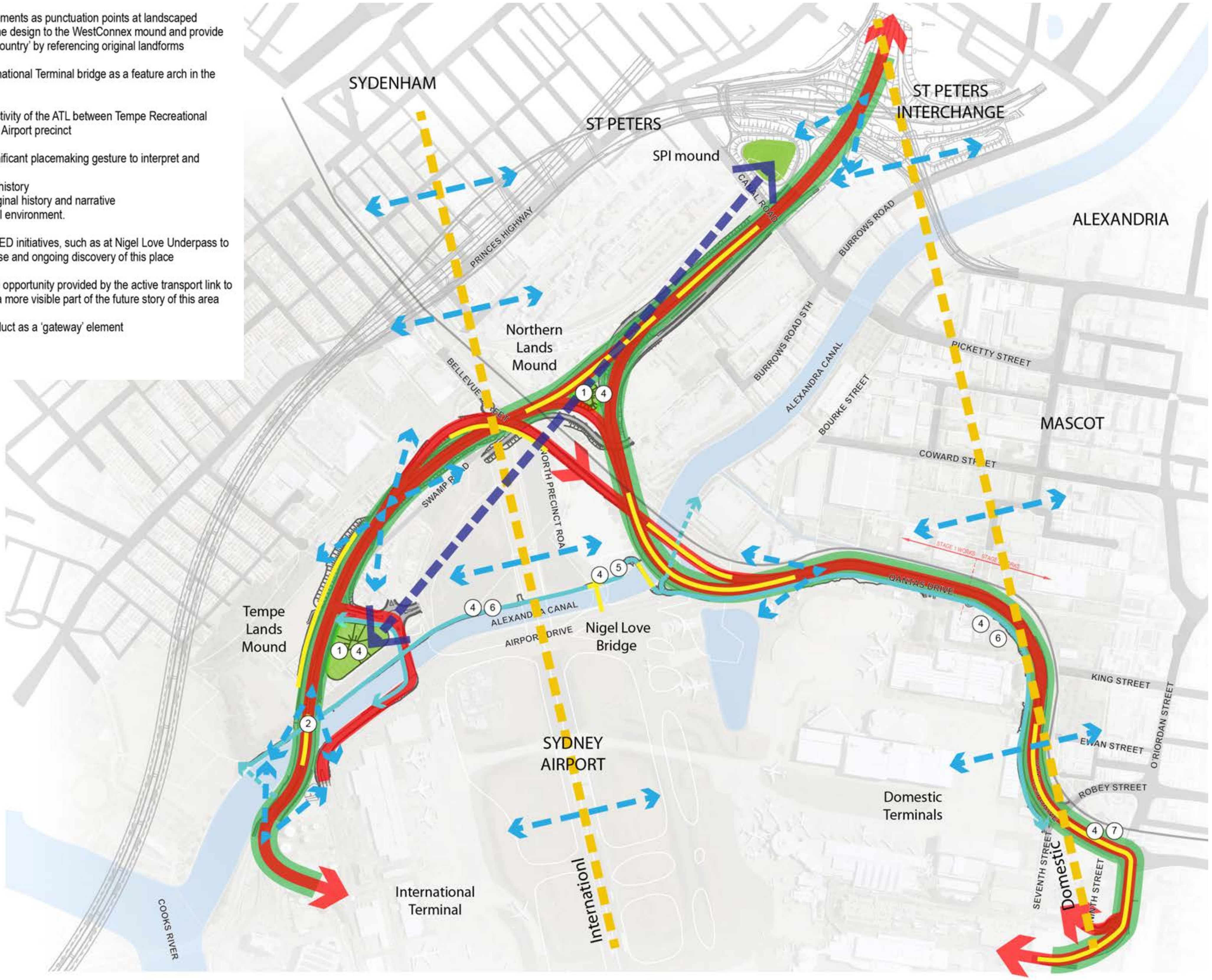
LEGEND

- Project boundary
- Proposed corridor landscape
- Proposed active transport link
- Existing active transport link
- Major bridges
- Minor bridges

5.5.2 Design opportunities

The key design elements provide a series of opportunities to reimagine this place and support a narrative for the journey.

1. Create visual elements as punctuation points at landscaped mounds to link the design to the WestConnex mound and provide 'Connection to Country' by referencing original landforms
2. Design the International Terminal bridge as a feature arch in the landscape
3. Enhance connectivity of the ATL between Tempe Recreational Reserve and the Airport precinct
4. Use art as a significant placemaking gesture to interpret and celebrate:
   - Aboriginal history
   - Non-Aboriginal history and narrative
   - The natural environment.
5. Incorporate CPTED initiatives, such as at Nigel Love Underpass to encourage the use and ongoing discovery of this place
6. Capitalise on the opportunity provided by the active transport link to make the canal a more visible part of the future story of this area
7. Envision the viaduct as a 'gateway' element



LEGEND
- Provide a consistent landscape aesthetic along corridor
- Structures and road elements - bridges, retaining walls,
- Screens and walls
- Proposed Active Transport Link corridor
- Existing Active Transport Link
- Flight path along north-south runway
- Views
- Feature mounds

1 | URBAN DESIGN STRATEGY

0 100 200 300 400 500m

Figure 5-10. Design opportunities

5.6 Infrastructure as art

Use art to 'make sense' of a complex space... the power of art.

Art is a powerful tool for understanding.

The Project creates an environmental work of art that speaks of 'Connection to Country'; the 'gateway' role of this place at the threshold of the international airport and the experience of movement through space.

Public art can take this concept and enlarge it to provide a sense of place, orientation and legibility. In complex urban environments, elements that provide wayfinding, visual cues to the sequence of a journey and meaning about a place all aid in creating an understanding of that particular place. It is important therefore, to consider the power of art at a large scale.

A holistic approach, to embracing space and complexity, is needed to address art at the Motorway scale to be effective and to capitalise on the potential of art to unfold over time as one moves across the visual field. This generates a participatory experience for the viewer and assists in 'making sense' of this complex place.

In addition to these physical characteristics, art can carry a deeper narrative about the meaning of place, aspiration or memory. In the case of large scale environmental art, the physical character of the art overlaid with a narrative about 'place' often generates a rich experience unique to its location.

There will be many individual journeys along the Project corridor and these will create many individual experiences. The success of the Project experience then will be measured at the individual level.

The art strategy for the Project has been developed to complement the artwork provided on other WestConnex projects at the SPI as follows:

- WestConnex New M5 uses art as sculptures in the park
- WestConnex M4-M5 Link Mainline Tunnels uses the Campbell Road ventilation facility architecture as an expression of art
- Sydney Gateway uses the Project infrastructure to be recognised as a piece of environmental art.

Art for the Project is integrated into the urban design and developed as part of the holistic experience as an expression of this infrastructure.

5.6.1 Objectives

Use art to make sense of the environment by:

- Encompassing the totality of the visual field
- Using art to tell the story of 'Connection to Country'
- Highlighting the threshold between Greater Sydney and the airport.

Use art to aid decision making by:

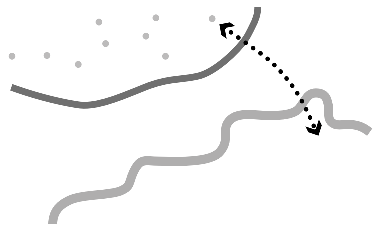
- Using art to improve legibility of the journey
- Working with the major features of the environment to enhance wayfinding and orientation
- Providing an art experience that works in multi-dimensions and directions.

Capitalise on the temporal dimension of movement by:

- Creating an art experience that can be understood over a timeframe of exposure
- Leveraging the sequential nature of the experience.

5.6.2 The narrative

The Place



The edge of land and water

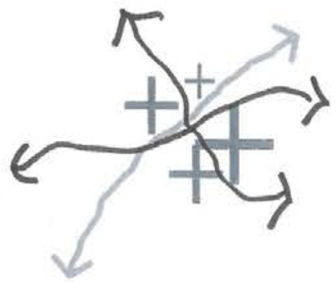
- The narrative emerges from the evolution of this place
- A place of coming together for cultural exchange
- Many journeys begin or end
- Movement across the line
- A place for nourishments

The Idea

A large scale piece of environmental art

- The 'canvas' is a number of elements at differing scales that work together
- A collaborative sum of interventions
- We must seize the scale – over 2km of experience

The 'Experience'



Recognises the many individual paths through elements in the visual field beyond:

- St Peters Mound
- Runway lighting
- Alexandra Canal
- Railway elements

5.6.3 Strategies

Strategies to create the art experience:

- Leverage infrastructure elements as part of the art experience
- Tell the story of 'Connection to Country' across a number of elements to tie the experience together
- Embrace the complexity of the place and the relationship between its punctuation points and connecting threads
- Build on the experience of the SPI with its mound and portals to provide a seamless art experience
- Use feature lighting to reinforce wayfinding and punctuation points.

5.6.4 Elements

The physical elements that make up our experience of the place can be thought of in two ways:

Punctuation Points – Individual elements that can be seen at a distance, sometimes against the sky, that form way finding and reference points

- Mounds
- Bridge arches.

Linear elements – Continuous elements that can be seen by drivers and form continuous experiences

- Viaduct screen
- Retaining walls
- ATL.

The site is located on the edge of land and water and can be experienced from the water, land or air. The Alexandra Canal, meandering through the site, sets up a super graphic line that refers to the junction of land and water. The relationship of the site to adjacent mounds and the linear elements at St Peters interchange is an important part of the spatial experience.

Tying the three elements of water, land and air together into a large piece of environmental art creates a 'gateway' experience for Sydney Gateway.

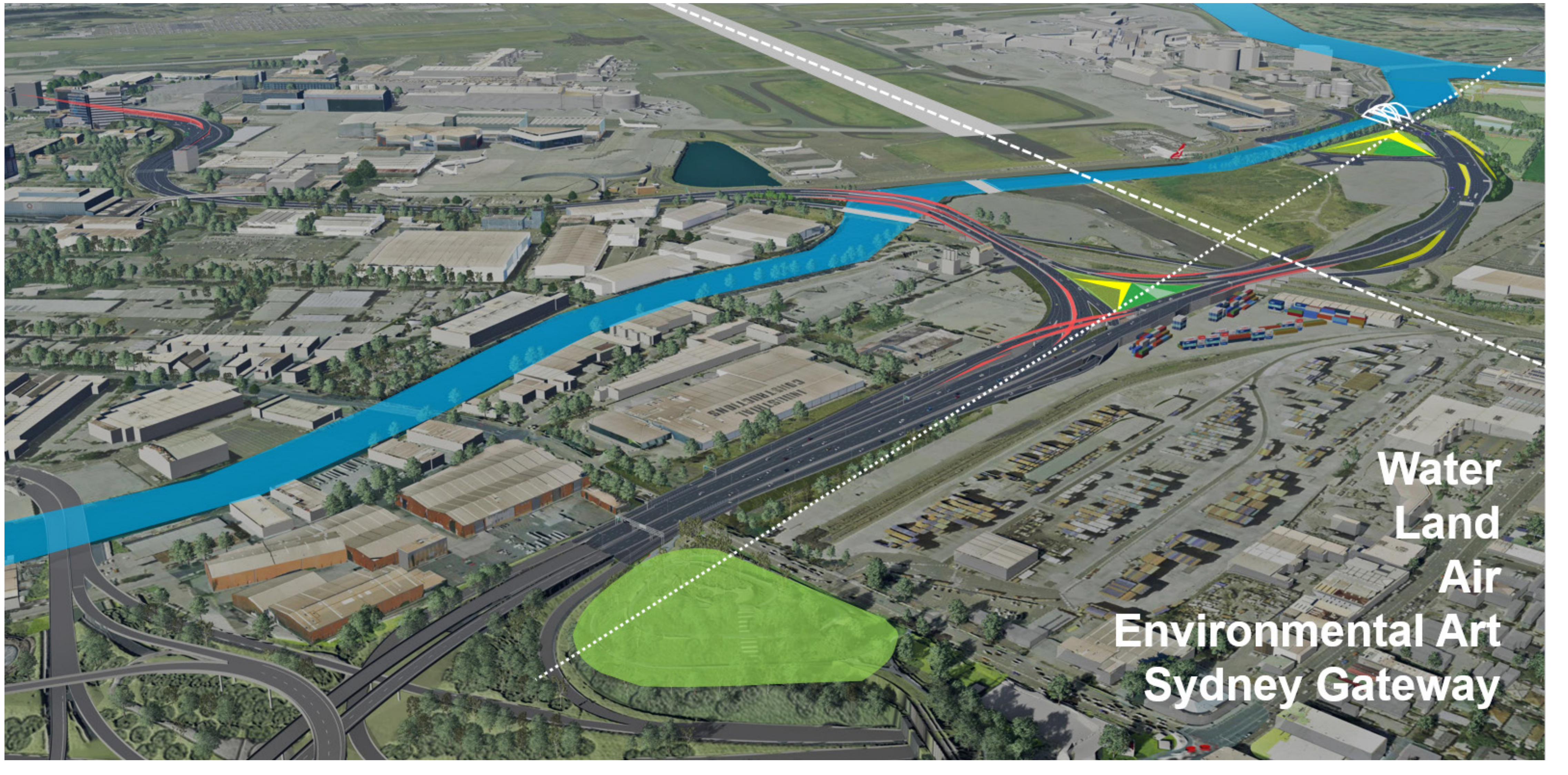
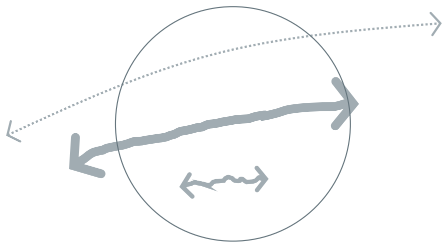


Figure 5-11. The narrative

5.6.5 Realisation



Works at many vantage points and speeds:

- Aviation scale and speed
- Motorway scale and speed
- Active transport scale and speed

The narrative for the Project, transforming a journey into a 'Connection to Country' gateway, is achieved by developing a series of art interventions on the punctuation and linear elements of the Project. These interventions are experienced at overlapping scales and time and have been curated through a co-design process with Aboriginal and non-Aboriginal authors. The public participates in the realisation of this environmental artwork as they move through, around and above it.

The opportunities – 'gateway' experience at various scales

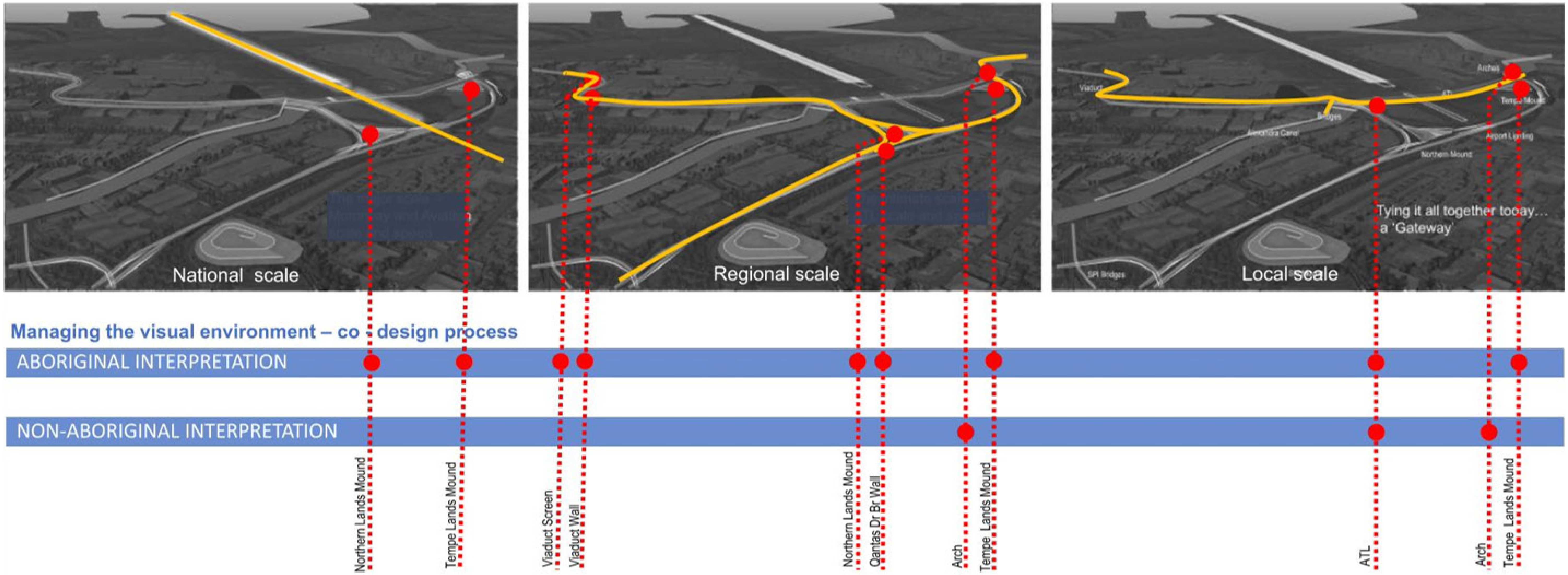


Figure 5-12. The realisation

5.7 The artwork journey

5.7.1 Introduction

Connection to place is fundamental to Aboriginal people. Country supports the way of life of the people who occupy it; their practical needs, cultural practices and religious ceremonies - providing meaning, identity and belonging. And it has done so for tens of thousands of years.

Conversely, beyond its nineteenth and early twentieth century landmarks, Sydney's built environment does not possess the visible legacy of some cities; we do not have ancient cathedrals or medieval buildings that anchor a large percentage of our population in a cultural continuum. We are here as transplanted peoples from many countries without a common heritage.

Yet for millennia there has been a rich and meaningful cultural life here. A sustainable lifestyle not only in harmony with the landscape, but also finding in it significance and a sense of the sacred. By engaging Aboriginal artists and practitioners, aspects of this rich cultural heritage can be revisited and reinterpreted.

Through art and place a common approach between cultures may be found. It is here that there is shared appreciation, a mutual understanding that speaks the same language.

Then peoples from all places may learn to acknowledge and find a greater sense of connection to each other and the landscape that underpins us all. And in so doing, not only find greater meaning and sense of belonging in our own lives but also appreciate a commonality between Aboriginal and non-Aboriginal people, leading to a greater respect for each other.

The Project has drawn upon many experiences and stories that highlight traditional practices of weaving, fishing, gatherings, and cultural knowledge systems that continue through generations of Aboriginal people who care for this Country now and have done so since time immemorial.

5.7.2 Commissioning process

The Project generated a unique opportunity for cultural placemaking at the scale of a Motorway with the integration of culturally appropriate Aboriginal-led public art.

Placemaking consultants Cultural Capital, a firm experienced in undertaking art projects for government and the development industry involving the commissioning of Aboriginal artists, was engaged by JHSWJV to provide curatorial advice and manage the artist selection process. The objective of creating a site narrative 'Connected to Country' called for a considered methodology in the artist selection process. From the start, the focus has been on engaging local Aboriginal artists with strong connections to Gadigal, Bidjigal, Dharawal, and/or Yuin communities.

The artist selection process has been as follows:

1. Cultural Capital curated a shortlist of artists in consultation with Aboriginal curator, writer and academic Tess Allas and local La Perouse Community Leader Ash Walker (Gujaga Foundation, Aboriginal Cultural Heritage Advisor for UDRP). Artists selected for the shortlist had:
   - previous public art project experience with the ability to deliver on time
   - artistic excellence and originality
   - connections to local community or Elders
   - willingness to engage with local Indigenous community members and Elders
   - access to an adequate support network (assistants, collaborators or family members)
   - willingness to collaborate with the urban design teams for design implementation and attend regular face to face workshops
   - availability to work intensively for the timeframe of the Project.
2. The shortlisted artists were contacted to determine their interest and availability for the Project.
3. Cultural Capital presented the artist shortlist for internal review to JHSWJV's nominated panel comprising of Design Managers and Urban Design Review Panel members including; Ash Walker (Aboriginal Cultural Heritage Advisor), Gareth Collins (Co-Chair and Director of Urban Design, TfNSW) and Peter Poulet (Public Art / Cultural Interpretation Advisor).
4. Consultation on final artist selection was sought from Metro Local Aboriginal Land Council and endorsed by La Perouse Aboriginal Community Alliance.

The selection process resulted in the choice of Dennis Golding and Carmen Glynn-Braun (Re-Right Collective) as the lead artist team, collaborating with local Elders Uncle Steve Russell and Aunty Phyllis Stewart as Cultural Advisors.

Curatorial Theme

Art integrated into the urban landscape contributes to a strong and meaningful sense of place that honours and elevates longstanding and continuing 'Connection to Country' and in this case creates a 'gateway' arrival experience.

The theme of Cultural Exchange fosters the integration of Aboriginal cultural practices into the physical infrastructure of the Project. The design elements have been developed by targeted engagement with Elders (Cultural Advisors) undertaken by the selected artists which has included consultation on:

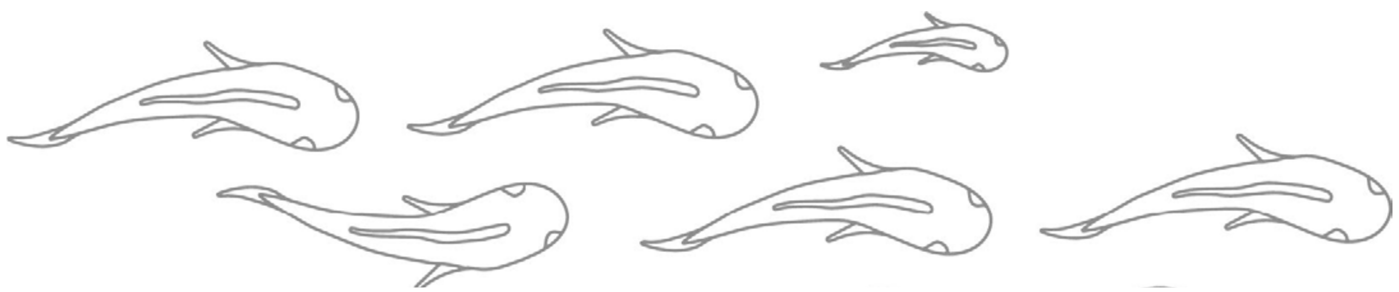
– cultural practices such as weaving, wood-carving and wood-burning

– Indigenous flora

– Bidjigal and Dharawal stories and symbology.

To allow for open cultural exchange, the suggested curatorial theme was non-prescriptive and intended only as a guide for the selected artists. A focus on cultural exchange also aligns with key Project objectives of 'Connection to Country' and collaboration.

This curatorial approach created a connection between Sydney Gateway artwork elements and the M4 - M5 Link Tunnels Ventilation Building artwork in St Peters '*Movement of shells, Movement of time*' by Aunty Esme Timbery and her daughter Marilyn Russell, which highlights and shares the story of local shellwork practices.



5.7.3 Artist biographies

Artist team - Re-Right Collective

Re-Right Collective is an artistic collective between Dennis Golding and Carmen Glynn-Braun. The collective centres on stories of contemporary life with an approach to heal and strengthen the voices of Aboriginal history and experiences. The artists co-founded Re-Right to provide a safe space for emerging Aboriginal practitioners to form ideas and build a support network within the cultural arts.

Re-Right strives to expand their creative practice through collaboration with a key goal to highlight resilience and truthful narratives of history and cultural identity. Both artists have experience in working with the La Perouse community and prominent Elder Aunty Esme Timbery and her daughter Marilyn Russell. Golding and Glynn-Braun are participating in the 2021 Resident artist program at Carriageworks.

Kamilaroi/Gamilaraay artist Dennis Golding critiques the social, political and cultural representations of race and identity. Working in a range of mixed media including painting, video, photography and installation, Golding explores empowering notions of Aboriginal cultural identity by challenging the categorical boundaries from both Aboriginal and non-Aboriginal experiences. Dennis has participated in the Solid Ground project, an initiative of Carriageworks and Blacktown Arts that provides education, training and employment pathways for Aboriginal Australian youth.

Carmen Glynn-Braun, born in Alice Springs now based in Sydney, is an emerging Aboriginal Australian artist stemming from the Southern Arrernte, Kaytetye, and Ammatyerre nations across Central Australia. She takes a trans-disciplinary approach across many mediums including painting, sculpture, and installation. Her work predominantly explores lived experiences of Aboriginal women translated through gentle and experimental approaches to materials and form.

Figure 5-13. Re-Right Collective, in her hands, Esme Timbery Creative Lab, UNSW Kensington Campus

Figure 5-14. Carmen Glynn-Braun

Figure 5-15. Dennis Golding

Cultural advisors (senior artists)

Uncle Steve

Uncle Steve Russell is a Bidjigal drawer, painter and weaver born at La Perouse Mission on the shores of Botany Bay, Sydney. Russell's mother is respected Elder and award winning shellworker Aunty Esme Timbery. His uncle, Joe Timbery, was a champion boomerang thrower who once threw boomerangs as a display for the young Queen Elizabeth during the Royal Tour of 1954.

Russell is an artist member of Boolarng-Nangamai Aboriginal Arts and Culture Studio in Gerrigong, NSW where he undertook his training. He has extended his arts practice from painting and drawing to weaving and in 2002 Wollongong City Art Gallery purchased two of his weavings for their permanent collection. He recently completed a public artwork with Kristine Stewart '*Weaving Pods*' for the Shellharbour Civic Centre. The patterns reflect the movement of Aboriginal people through the coastal landscape, the coastline as habitat and the coming together of communities.

With his wife Phyllis Stewart and her daughter Kristine, they established 'Jungah Weavers', an artist collective based in Gerrigong, all being master weavers.

Aunty Phyllis

Aunty Phyllis Stewart was born in Berry and shares family connections with both the Dharawal and Yuin communities of the south coast of NSW.

Stewart's practice as an artist is extensive. She is considered a master weaver: a testimony to a childhood spent helping adults harvest, weave and value-add from nature, observing and studying animal and plant life – a response to her Home Country playing out directly in her art.

Phyllis Stewart is committed to Dharawal and Yuin country and works with her daughter Kristine to collect and curate the many species of native grasses and plant material and to protect the traditional uses while conserving those resources for current and future use. Aunty Phyllis and Uncle Steve are partners and often collaborate on creative projects.

Figure 5-16. Uncle Steve

Figure 5-17. Uncle Steve Russell and Kristine Stewart, Weaving Pods, Shellharbour Civic Square, 2020

Figure 5-18. Aunty Phyllis Stewart (centre), Yirran Miigaydhu Weavers, 2019, Cement Fondu, photo: Four Minutes to Midnight

Figure 5-19. Phyllis Stewart (with Julie Squires), Rock Weave, Kamay, 2020

Acknowledgement

Hubert 'Laddie' Timbery

Laddie Timbery could often be heard to claim that his family 'were on the shores of Botany Bay when little Jimmy Cook sailed in' – an immediate drawcard for any tourist visiting Laddie's stall at The Loop to purchase a boomerang engraved with a Bidjigal design. A design which has been handed down by Timbery male artisans for generations.

By his side sat his Aunty Esme Timbery behind a table filled with her beautiful shellwork pieces like her mother, aunts and grandmothers before her – a family tradition passed down from mother to daughter for generations. Selling and making the shellwork was woman's work, men's work was to make the boomerangs, didgeridoos and other artefacts.

The Timbery family is also known for their creative and beautiful cultural artefact work. This has been a family tradition for generations and involves the shaping and decorating of wooden objects including boomerangs.

Hubert 'Laddie' Thomas Timbery was born at La Perouse on February 12, 1941 and passed away on July 23, 2019. He had a long association with the craft, the La Perouse community and the La Perouse Museum. He is fondly remembered for his dedication to his family and his contribution to keeping Aboriginal culture relevant and alive in contemporary Australia. He held community activities at the museum with boomerang throwing demonstrations and yarns about his craft and culture.

His career took him throughout Australia and also brought opportunities to travel overseas to Canada and Switzerland, where he brought his knowledge and experience to the wider world. In Australia, he contributed to the design of the Equestrian Centre for the Sydney 2000 Olympics.

Laddie used a technique of 'burning in' to decorate a variety of artefacts and artworks, including his boomerangs. These artefacts were referred to by the artists in the development of their artwork concept and design elements.

Figure 5-20. Hubert 'Laddie' Thomas Timbery selling his artefacts at 'The Loop' - La Perouse. Source: https://laperouseheadland.com

Figure 5-21. Detail of boomerang pattern wooden paddle by Hubert 'Laddie' Timbery

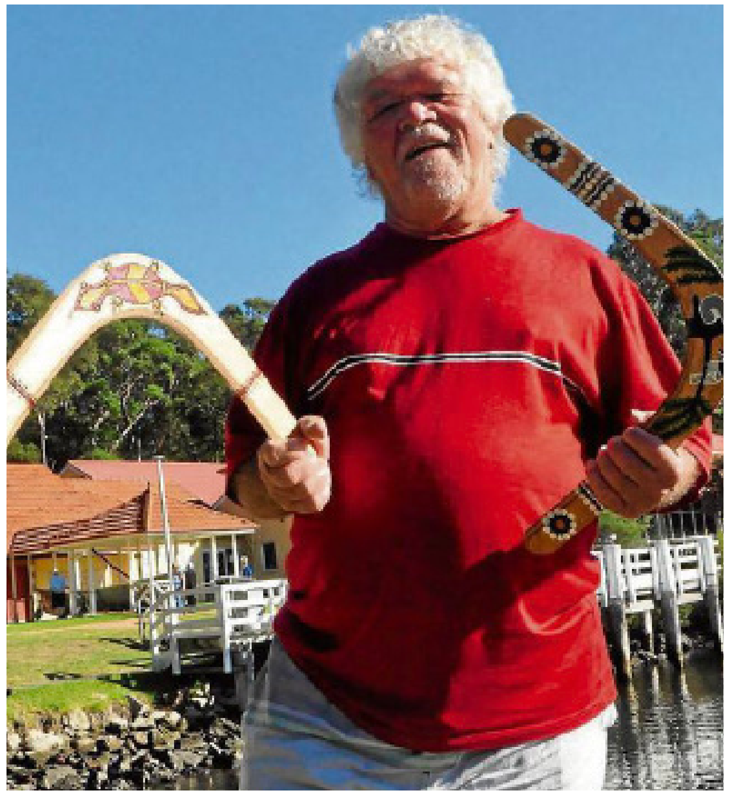


Figure 5-22. Hubert 'Laddie' Thomas Timbery. Source: https://mgnsw.org.au/ articles/uncle-laddie-timbery

Figure 5-23. Hubert 'Laddie' Thomas Timbery. Source: https://laperouseheadland.com

5.8 Art opportunities

1. Mounds

Tempe Lands Mound

Northern Lands Mound

2. Walls

Retaining Walls - Qantas Drive Bridge, Viaduct Bridge

3. Screens

Viaduct Screen

4. ATL

ATL

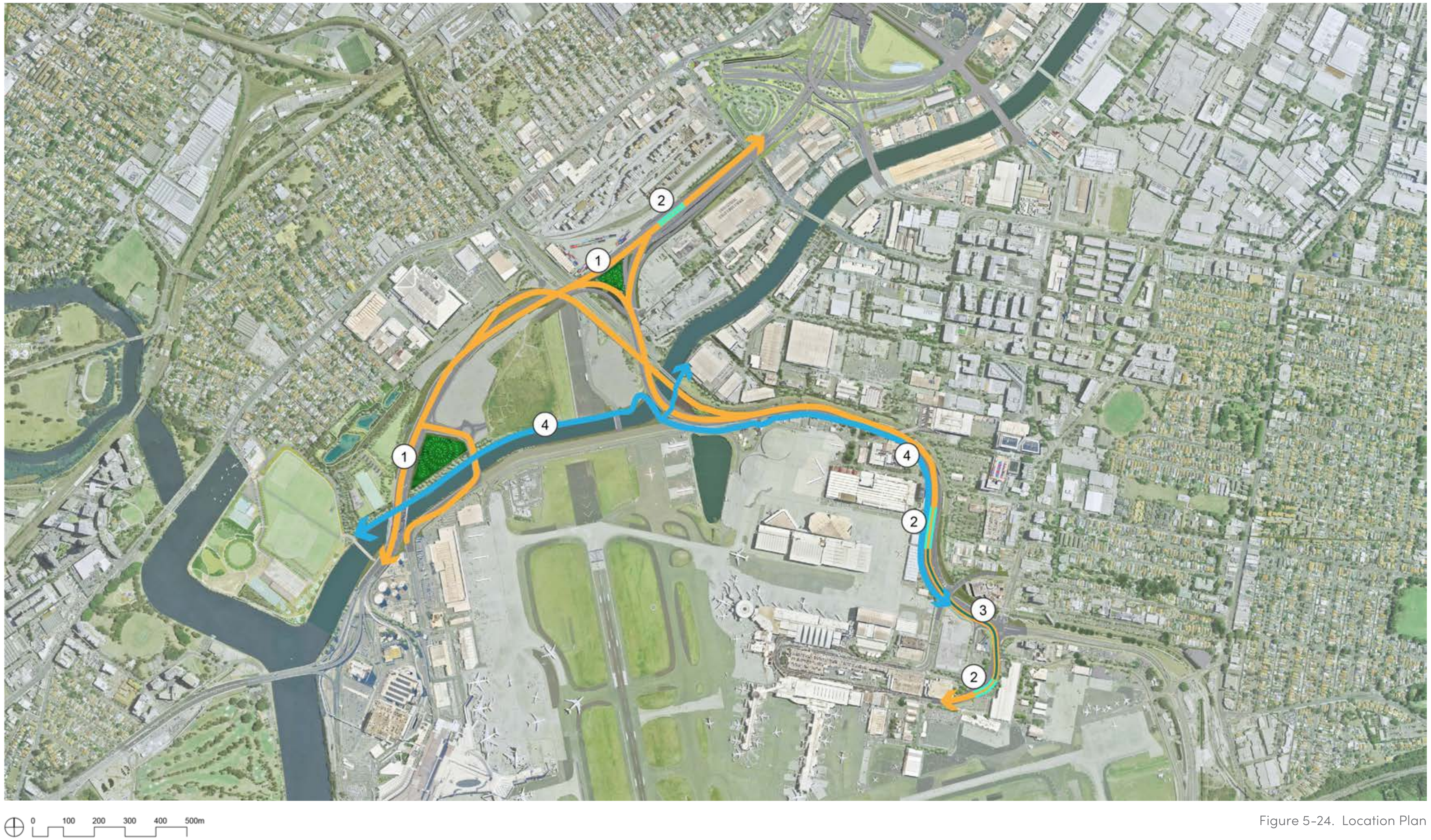
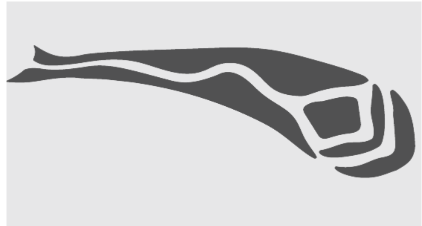
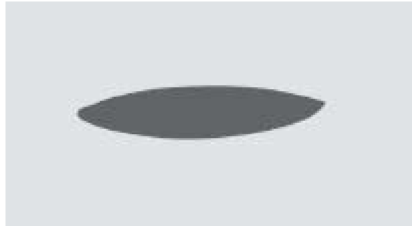


Figure 5-24. Location Plan











It must be acknowledged that Country is not just the land and soil, but extends to the waters, plants, animals, and seasonal climate that all indicate how Country is presented, cared for, and used for life sustainability. These are stories and histories that were translated through the engagements with Uncle Steve Russell and Aunty Phyllis Stewart, who shared their knowledge and connections to Country. The outcome of these engagements helped the artists identify key elements to explore Country through historic practices from natural objects that were found on land such as shells, stones and grasses. Other elements were highlighted through contemporary experiences when local Aboriginal families gathered on the coastlines of Botany Bay to fish for the seasonal mullet that would flow through the Cooks and Georges Rivers.

In connecting all elements together, the artists worked with the design team to develop visual motifs of the mullet fish flowing within the coastline, flints, weaving patterns, coastal wattles, nawis (canoes), and boomerangs. The motifs have been interwoven in a way that each can weave out to focus on certain stories throughout the site and speak to the cultural practices and local knowledge systems of Dharawal, Bidjigal and Yuin peoples.

5.8.1 Concept - narrative and symbols

Project title: Where the sky meets the earth and sea

Contemporary Aboriginal artists Carmen Glynn-Braun and Dennis Golding present their multifaceted artwork for the Sydney Gateway Project. Glynn-Braun and Golding identified key cultural practices that inform historic and contemporary experiences as a way of celebrating culture and shaping the visual identities of Country as people experience these Sydney pathways.

The narrative of the mullet fish and the weaving patterns tie both the artworks and infrastructure elements together.

The significant story of the mullet fish has evolved over time with traditional fishing practices using woven nets and fish hooks carved from stone and shells. Today, the story of the mullet fish and the mullet run still exists and is celebrated every year by the Aboriginal community of La Perouse.

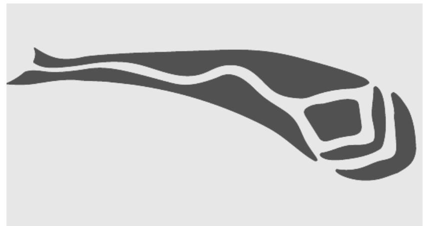
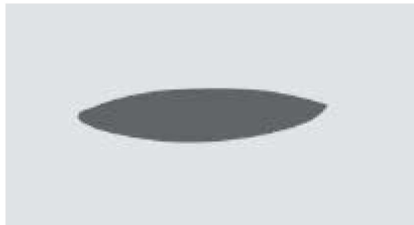
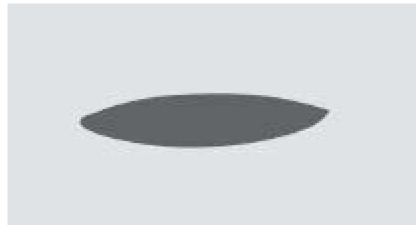
The weaving patterns reflect the works of Uncle Steve Russell and help to continue the legacy of the traditional and cultural practices. The boomerangs are so significant to the La Perouse Aboriginal community of making and producing these on country art and the landscape.

Accompanied with this story of the mullet and the weaving patterns are other core elements such as fish hooks and flints (bara) that are wrapped in the form of a line that represents the coastal line, the coastal wattle which is related to the movement patterns of the mullet when it starts to bloom; and the nawi (canoe) which was considered to be one of the first modes of transport in this place. These elements share greater knowledge of how Country took care of people, and how people cared for Country and cultural knowledge.

5.8.2 Design elements across site

Integrated across the infrastructure are the core design motifs of the weaving pattern, boomerang, water flow, fish hooks and flints, and the navigating pathways to and from Botany Bay where people fished for mullet as the coastal wattle bloomed.

These motifs have been used to create a design language across a number of Project elements to provide a unified outcome across the site.

Design Elements		Mounds	Walls	Screens	ATL
Coastal Edge References the undulating coastal line and understanding Country topographically.					
Blooming coastal acacia wattle A signifier for when the mullet will come through to Botany Bay from the Cooks and Georges River.					
Boomerang Often made from the light and easily worked timber like that of the region's mangrove and flame trees.					
Fish hooks and flints (bara) Cut from shells and stone, these cultural objects were traditionally used to catch fish and other materials. These have been interpreted in a lined pattern to reference wind and waves, linking this cultural knowledge with the landscape and waters.					
Weaving Impressions of technical forms when applying fibres to overlay.					
Mullet (bulli) The patterns on the mullet reference the coastal line, and linkage between two rivers into the bay. The head of the mullet reference shapes of the Sydney boomerang and a cultural motif, often printed on the boomerang.					
Nawi (canoe) The story of the nawi (canoe) as the first form of transportation on this site. Settlers first saw the nawi (canoe) when the fires on each one started to appear out of the darkness over the water, and were thought to be fireflies.					

5.8.3 Unified design approach

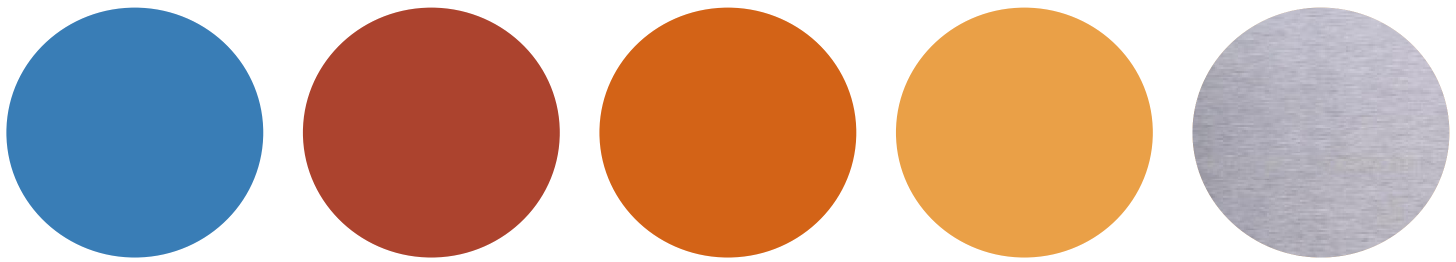
Materials for large scale elements leverage the natural colours of the earth and sky to provide a timeless outcome that responds to daily and seasonal light.

Colour for small scaled elements is used in a focused way along the ATL to provide interest and highlight key transition places.

The marine colour references the narrative of water and the relationship between freshwater and saltwater regions of Dharawal, Dharug, and Gadigal.

The ochre colours provide references to identify Country through pigments underneath the surface and the colours of the fire that were seen upon approach of the nawi (canoe).

Element	Hierarchy	Treatment	Colour
Walls	Recessive	Smooth Concrete	Black
	Prominent	Textured Concrete	Light
	Featured	Art Expression	Light
Screens	Headlight Screens	Smooth	Light
	Throw Screens	Mesh	Neutral
Underpasses	Motorway	Smooth	Ochre
	ATL	Art Expression	Ochre
Noise Walls			
- General	Recessive	Smooth	Black
- Link	Prominent	Smooth	Marine
ATL	Prominent	Art Expression	Marine
Mounds	Prominent	Art Expression	Light / Landscape
Viaduct	Prominent	Art Expression	Light



5.8.4 Mounds

Artwork title: As above so below

There are two mounds on the Project:

- Tempe Lands Mound
- Northern Lands Mound.

These sit prominently in the landscape and provide a setting for two large scale environmental artworks.

The mounds are adorned with large-scale weaving patterns that reference the traditional weaving practices of the Dharawal and Yuin peoples of the South East Coast of NSW who use local fibres such as native grasses, reeds and vines in their cultural practices.

Symbols of meeting places and waterholes are integrated into the spiral-like pattern while nawi (canoe) made on land from tied barks and other fibres, can be seen being prepared for entering or coming out of the water for fishing, transporting and navigating.

The weaving and nawi (canoe) symbols are interwoven with a free form line representing the topography of the south eastern coastline and integrating the juncture between the land and water.

The undulating coastal line introduces another way of understanding Country topographically and connects the two mounds together.

Figure 5-25. Illustrating the cultural practices of traditional weaving within the landscape and seascapes of Country

Figure 5-26. Location Plan

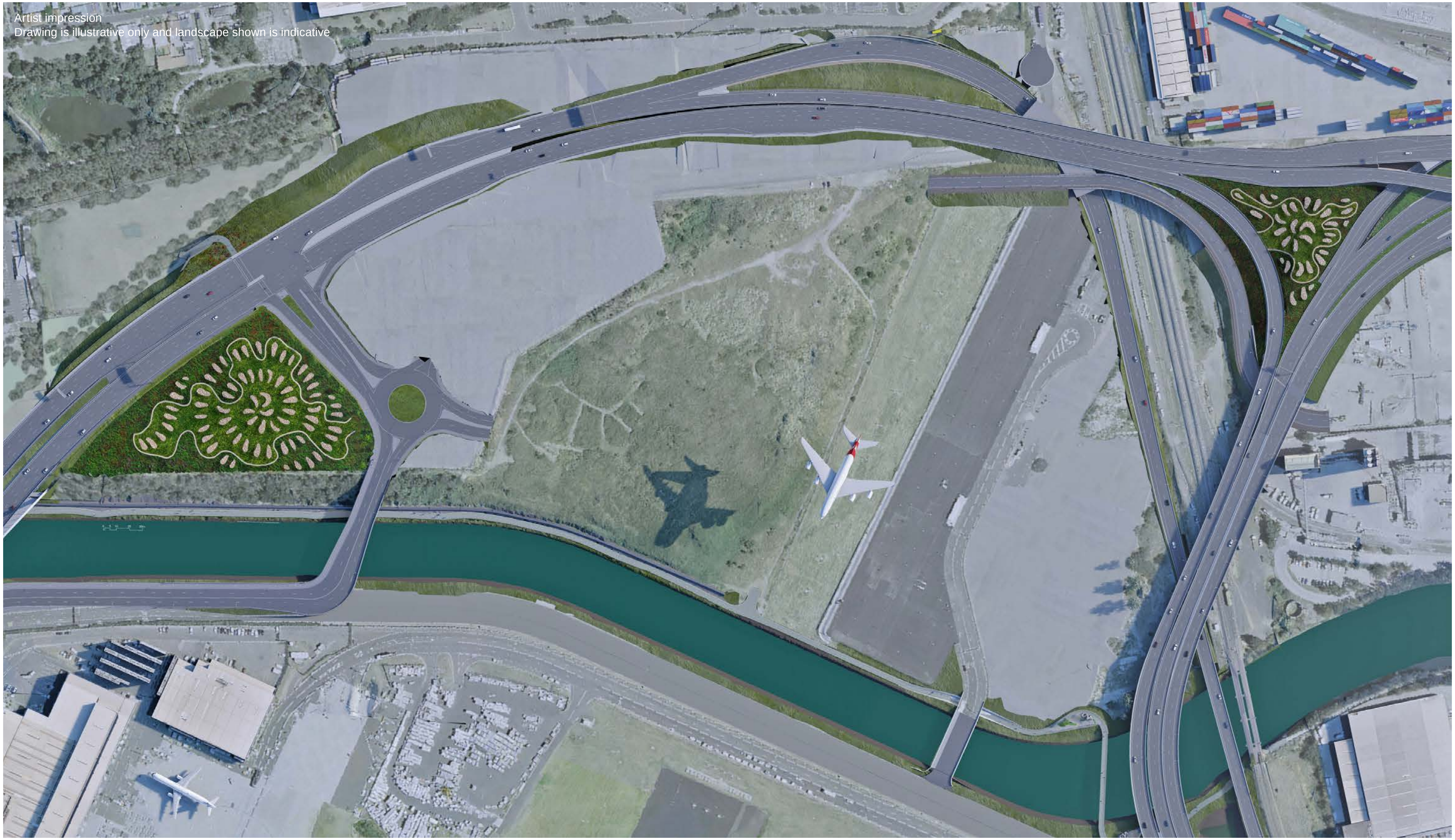


Figure 5-27. Aerial view of Tempe Lands Mound (left) and Northern Lands Mound (right)

Figure 5-28. Aerial view of Tempe Lands Mound

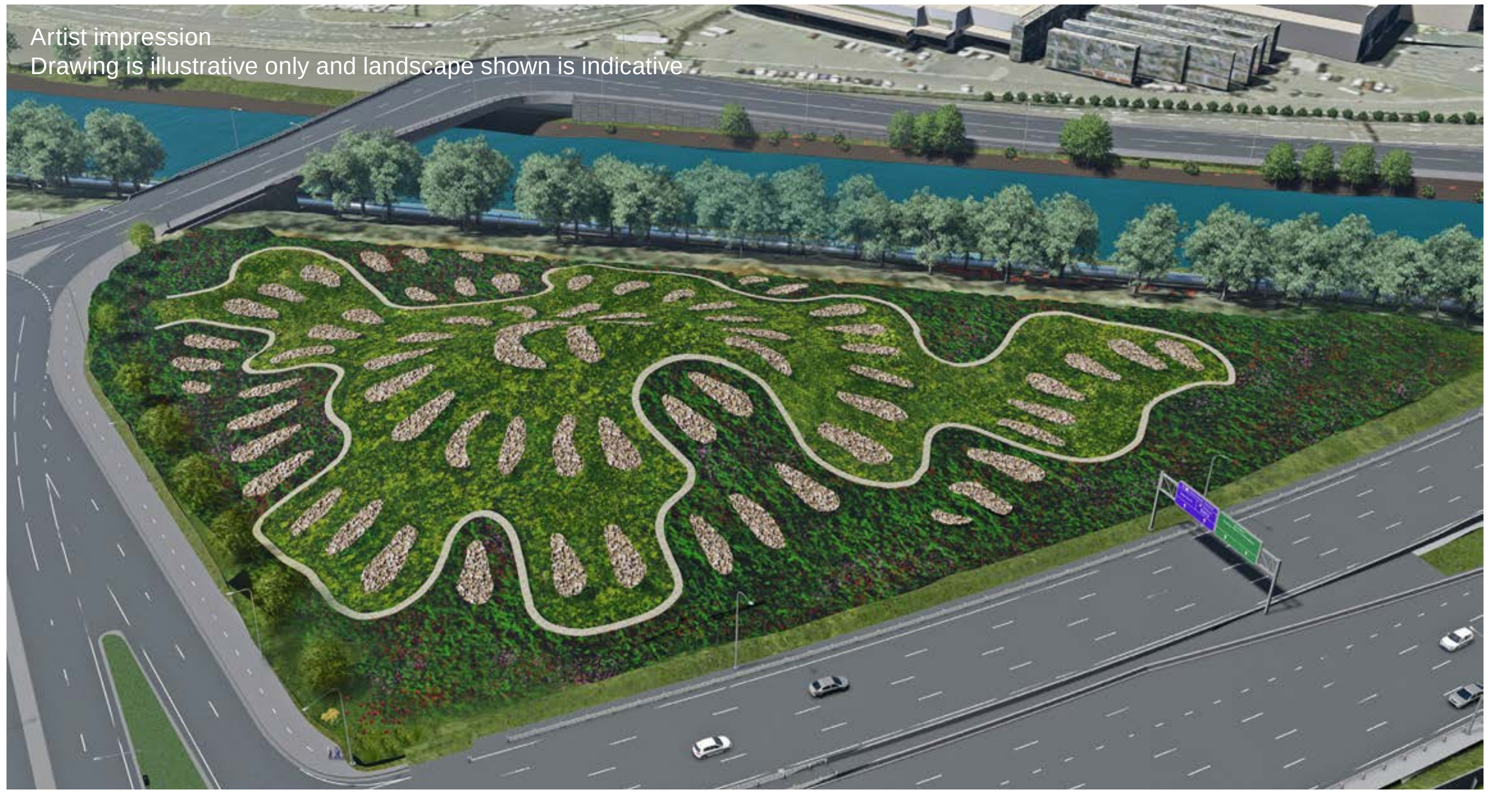


Figure 5-29. Overview of Tempe Lands Mound

Figure 5-31. Location Plan

Figure 5-30. View of Tempe Lands Mound from ATL entry

Figure 5-32. Aerial view of Northern Lands Mound

Figure 5-33. Aerial view of Northern Lands Mound


Figure 5-34. Location Plan

Figure 5-35. View of Northern Lands Mound looking north

5.8.5 Walls

Artwork title: Follow the glistening of the mullet

The walls refer to the features provided on the retaining walls at the following location:

– Viaduct retaining walls

– Qantas Drive Bridge retaining walls.

The mullet fish can be found swimming within the connecting water systems that flow through the headlands of Botany Bay into the Cooks and Georges Rivers. During Autumn, when the coastal wattle starts to bloom around Gamay Botany Bay, the 'mullet run' begins. The mullet run signifies the people preparing to fish as they see the splashes from schools of mullet on the bay's surface.

As the mullet swims, it stirs up the water and the splashes take forms reflective of the cultural objects (bara) that were used to catch the fish.

As the mullet swims, it carries the history of the area within its form. In this motif the mullet fish's body takes shape around the outline of a stingray, carrying the history that Botany Bay was known as 'Stingray Harbour' by European settlers. The mullet fish's head is formed from the shape of the Sydney boomerang made by Aboriginal people in La Perouse, symbolising Country and the 'handmade' as local people used their hands to fish.

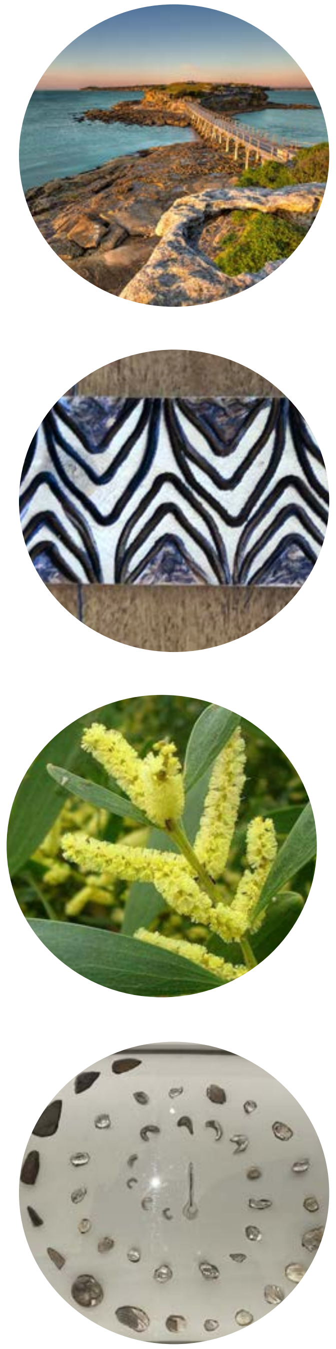


Figure 5-36. When the coastal wattle bloom, the mullet return to Gamay Botany Bay from the Georges and Cooks Rivers.

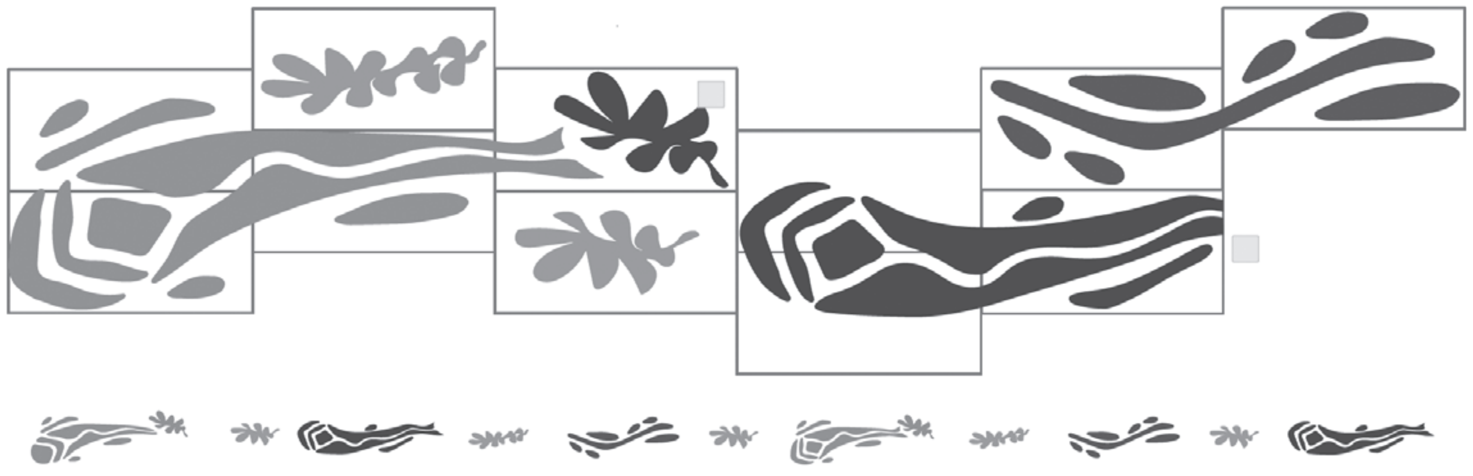


Figure 5-37. Modular mullet, wattle and flow

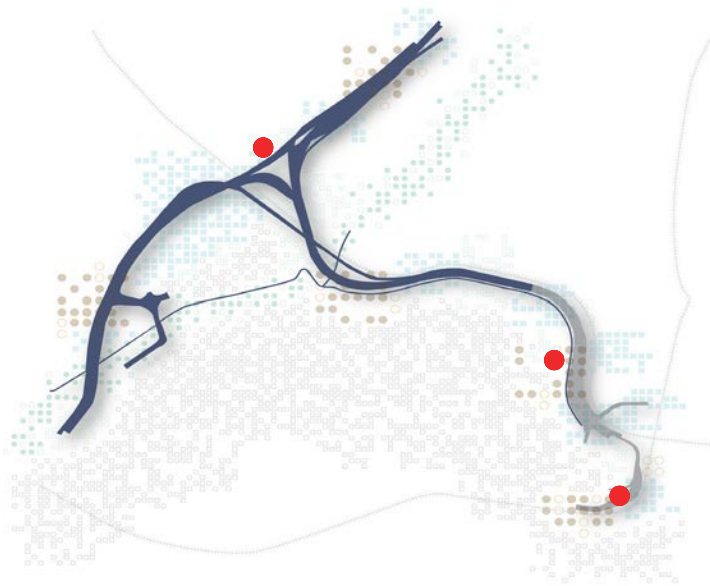


Figure 5-38. Location Plan

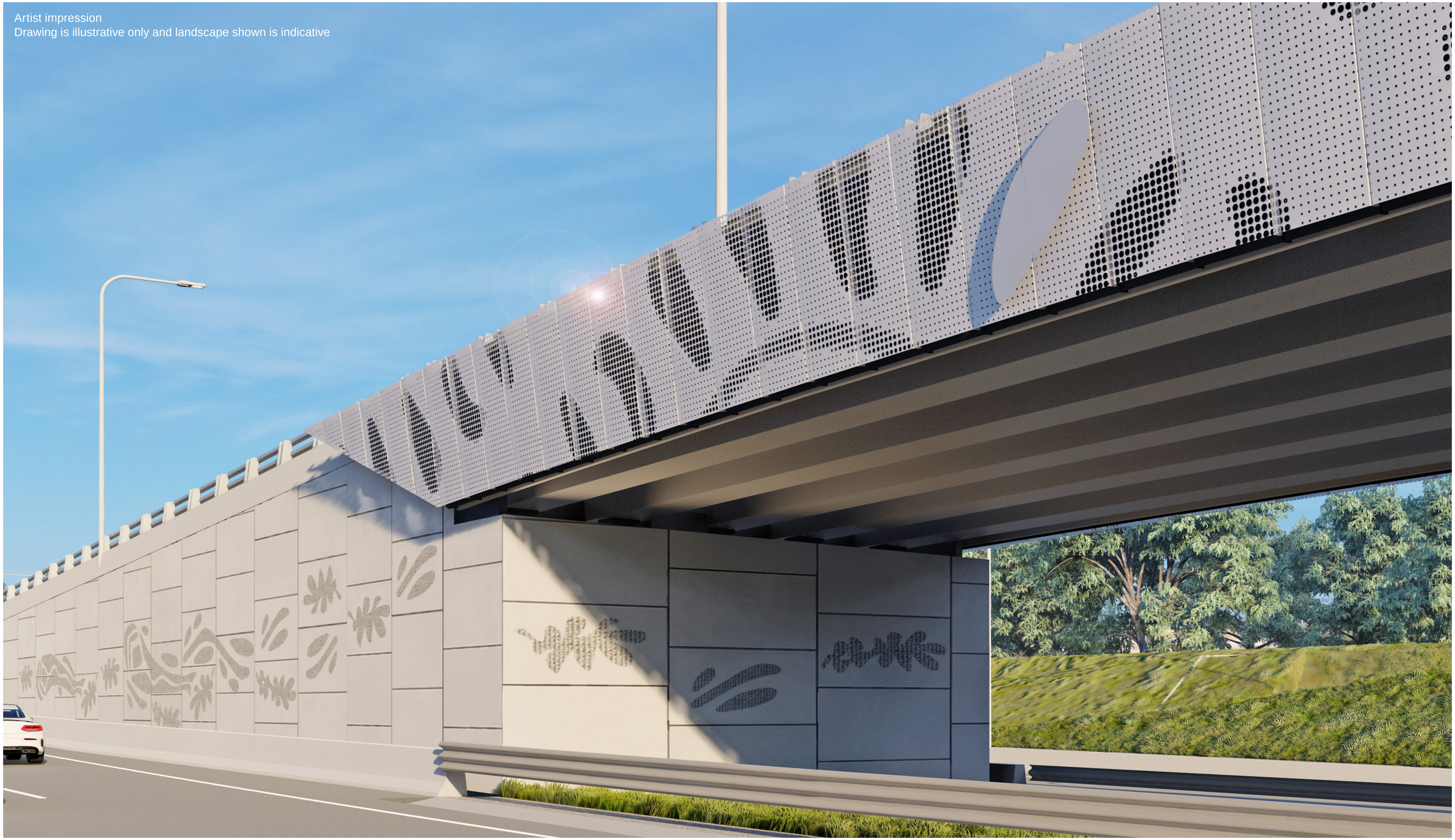


Figure 5-39. View of the viaduct

Figure 5-40. View of Type 3 retaining wall along the viaduct looking south

Figure 5-41. View of Type 3 retaining wall along Qantas Drive looking south

Figure 5-42. Viaduct art screen

5.8.6 Screens

Artwork title: Follow the glistening of the sun

The screens refer to the feature element provided along the viaduct.

Connecting each element of the artwork installation across the Gateway site are the viaduct screens that deepen people's understanding of Country and its connection with the surrounding waters and cultural practices.

A neutral silver colour was selected for this element. This colour brings the colours of the sky into the composition referencing the silver of the mullet, the blue of the water, and the ochres of the earth. These references shift over days and seasons as the changing sunlight travels across the viaduct. This extends the storytelling of connecting to Country by bringing the natural environment directly into the expression of these stories reinforcing place and the memories, culture, and identity of this part of Country. .

Figure 5-43. Interwoven with core elements of the weaving patterns, boomerangs and the nawi (canoe) to create the pathway to and from Botany Bay.

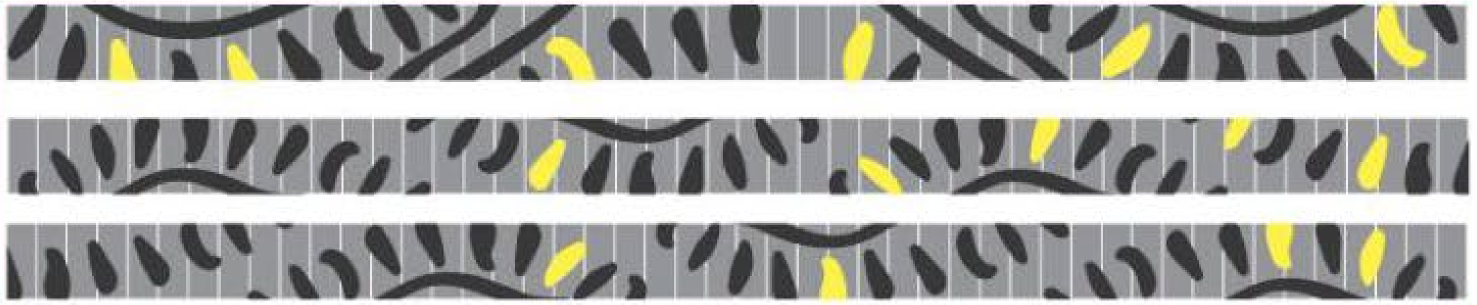


Figure 5-44. Element overlay

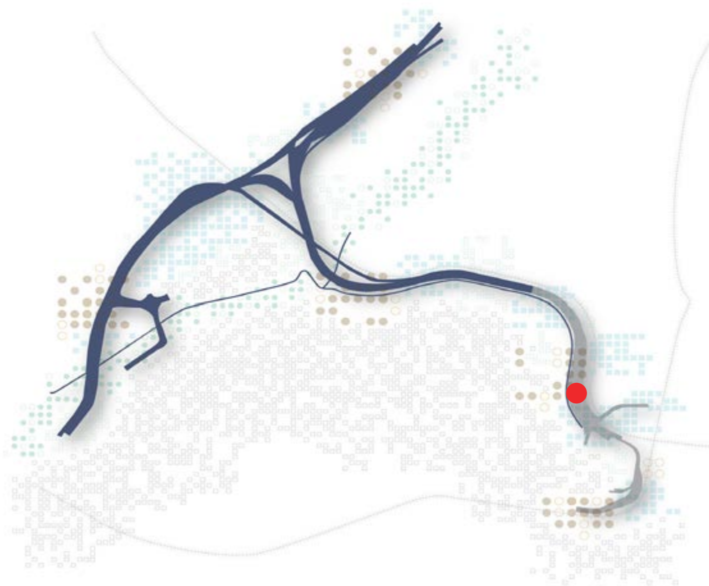


Figure 5-45. Location plan

Figure 5-46. View from O'Riordan St

Figure 5-47. View from Qantas Drive looking east

Figure 5-48. View from Seventh St looking north

Figure 5-49. View from O'Riordan St

Figure 5-50. View from Qantas Drive looking east

Figure 5-51. View from Seventh St looking north

Figure 5-52. View of viaduct from Qantas Drive

Figure 5-53. View along Qantas Drive looking south

5.8.7 ATL

The ATL is a canvas which reflects the rich history of the past, but experienced in the present.

The ATL is a major placemaking opportunity. Interpretative elements reference the history of this area as a demonstration of the evolution of transport in Australia.

The story is conveyed through landscape, materiality and graphics as one travels along this path.

Approach

The overall approach to the ATL storytelling aims to capture the evolution of this area as whole through the historically significant elements of:

– Alexandra Canal / Shea's Creek (water)

– Botany Rail Line (land)

– Sydney Airport (air).

The ATL alignment provides two types of surface experiences:

– A water-side (canal)

– A land-side (rail).

Both of these are overlaid by the larger airport experience.

The design provides heritage interpretation of the canal, rail and the airport stories to reflect the history and evolution of the place over time, from pre-industrial to post industrial eras within the greater context of the Project site.

Together, they reflect the strong influence each change in mode of transport associated with the movement of people and cargo has contributed on the physical, economic, and social transformation of this area, to become the hub of Sydney's transportation industry.

Methodology

The corridor experience along the ATL changes from open vistas along the Alexandra Canal with direct views to passing aircraft to a much more enclosed roadway environment, in proximity to the Botany Rail Line as it heads to the Domestic Terminals.

As users traverse along the path, visual cues are embedded on the ground which lead to the rest areas, one along each side of the canal.

Rest areas

These rest areas are not only places to pause, but also act as transition points and opportunities to provide storytelling through elements such as interpretative panels and pavement treatments.

The stories of the ATL have been developed through a collaborative approach involving both Aboriginal and non-Aboriginal voices. These convey the history of this place and its significant infrastructure such as:

– Archaeological interpretation

– Interpretation of the stories of Aboriginal history such as the nawi (canoe), which was the first form of transportation

– Canal as a creek during industrial times

– Canal as a conduit of navigation

– Interpretation of railway tracks

– History of the airport

– Women in history.

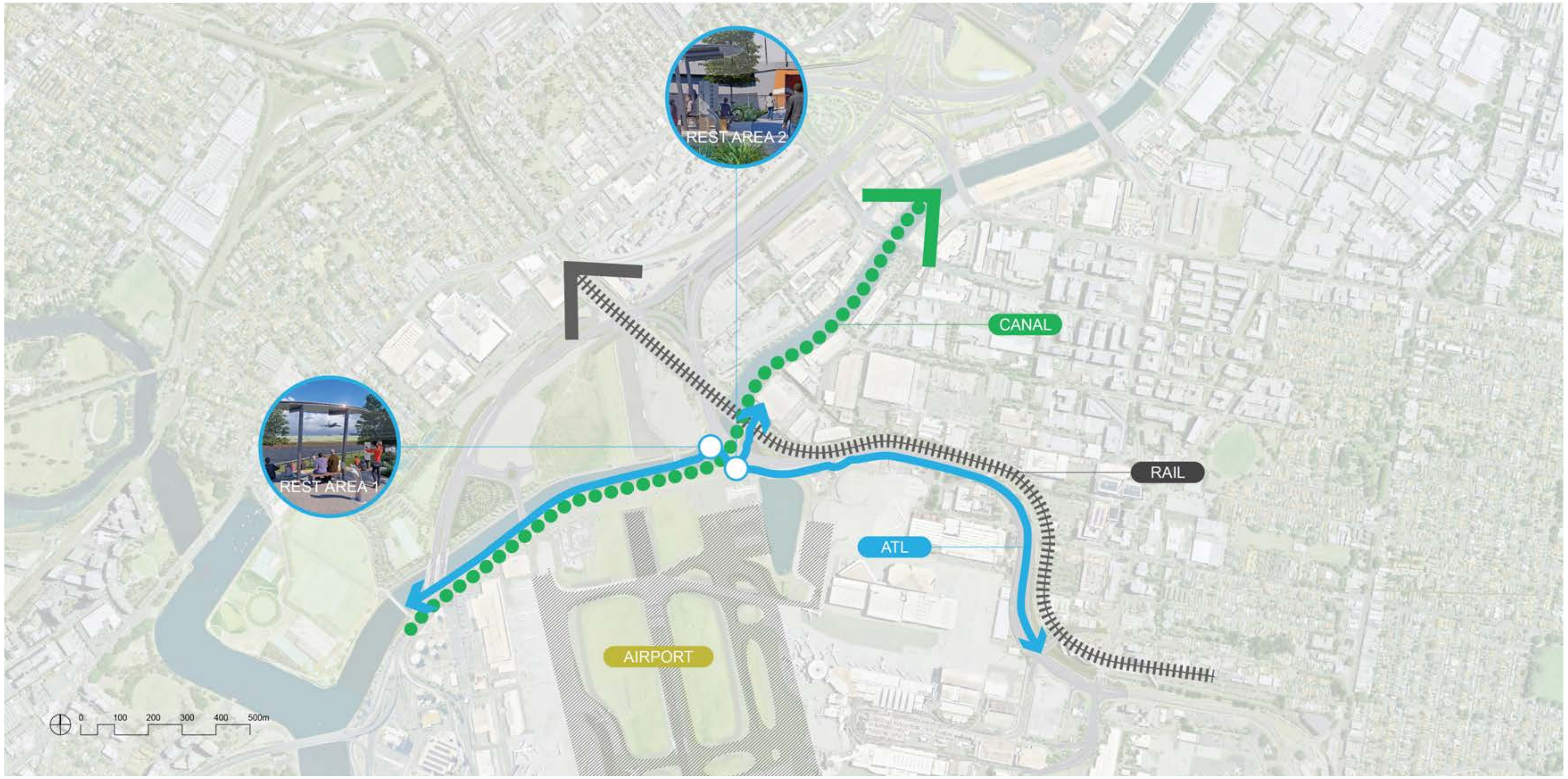


Figure 5-54. ATL experience configuration

Provide heritage interpretation of the canal, Rail, and the Airport stories to reflect the history and evolution of the place over time from pre-industrial to post-industrial (and future) eras within the context of Sydney Gateway.

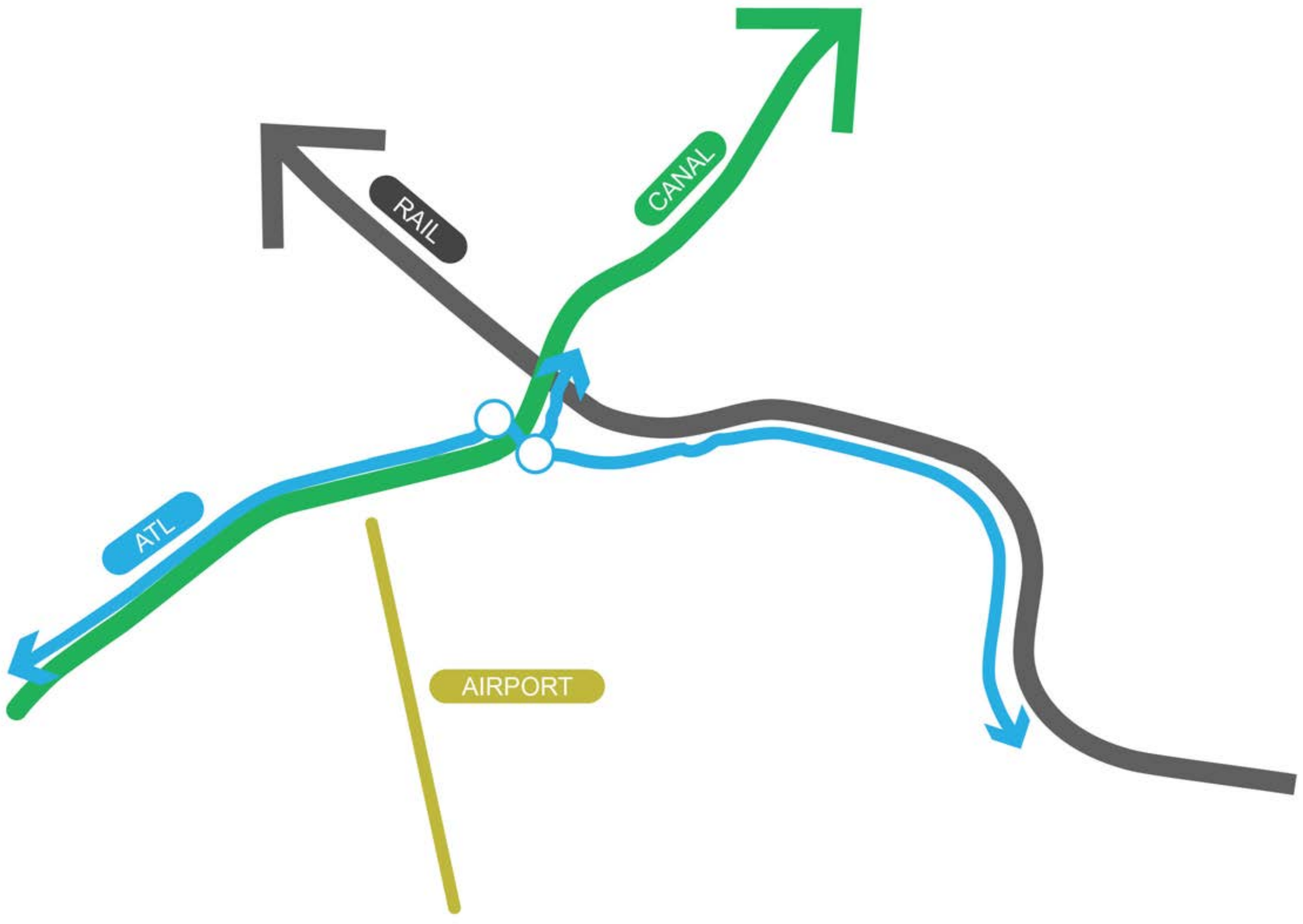


Figure 5-55. ATL approach

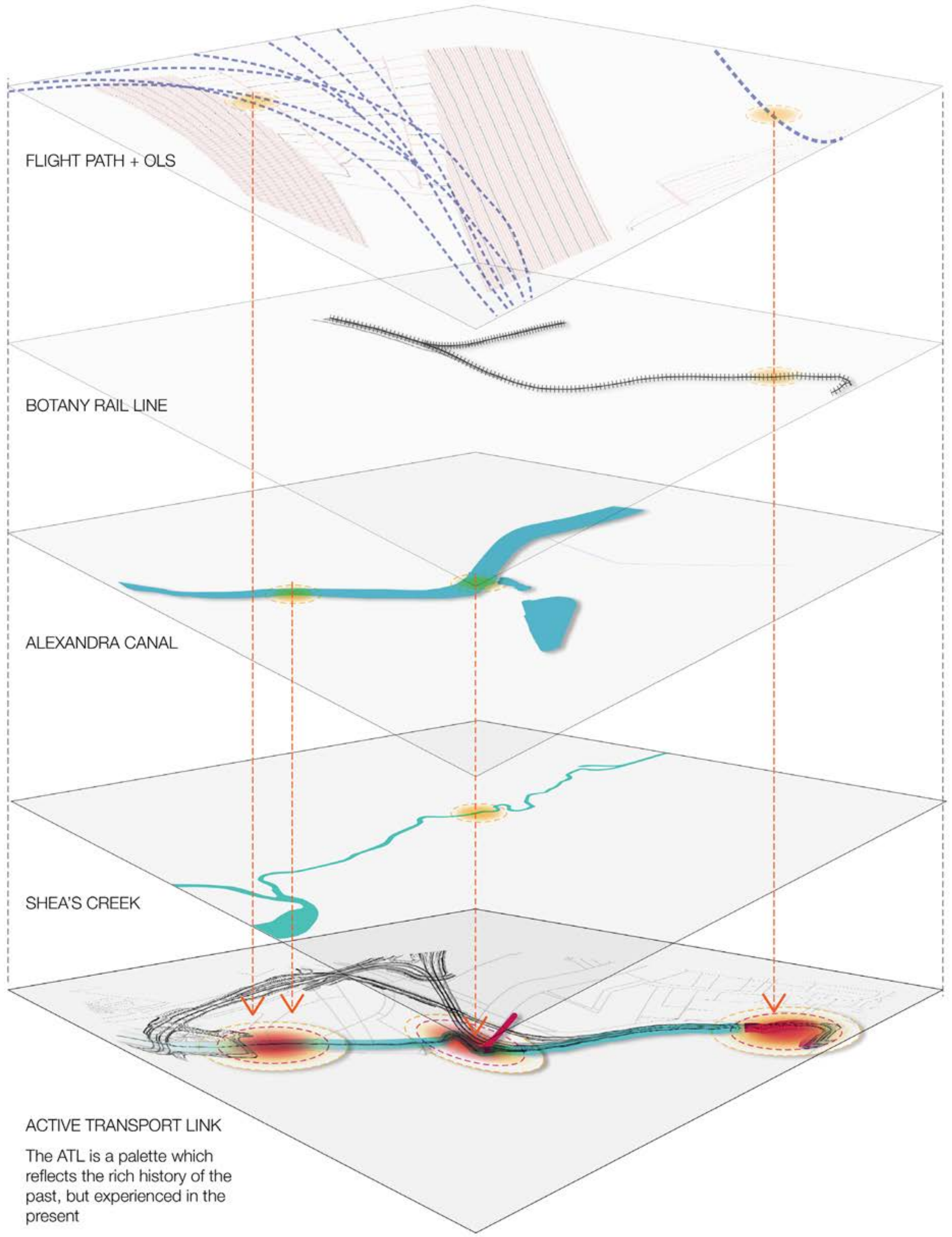


Figure 5-56. ATL experience palette

ATL corridor feature areas strategy

The ATL corridor provides one of the major opportunities for the Project to strengthen the north-south green links between Tempe Reserve, southern Sydney with inner Sydney and the CBD. Alexandra Canal cycleway is the only existing cycleway which is located along the southern side of Alexandra Canal. The new ATL upgrade will increase publicly accessible and useable open space.

The interpretation concept of the ATL corridor references its configuration and the transition point between a canal-side experience to a road / rail-side experience. This transition occurs as the ATL crosses the canal. The rest areas on each side of this crossing serve as points for elaboration of these themes. Overlaid onto this expression is the constant presence of the airport and an interpretation its features such as the runways and the OLS envelope. This aerial framework is expressed along the ATL as a series of pavement markers.

Figure 5-57. Location plan

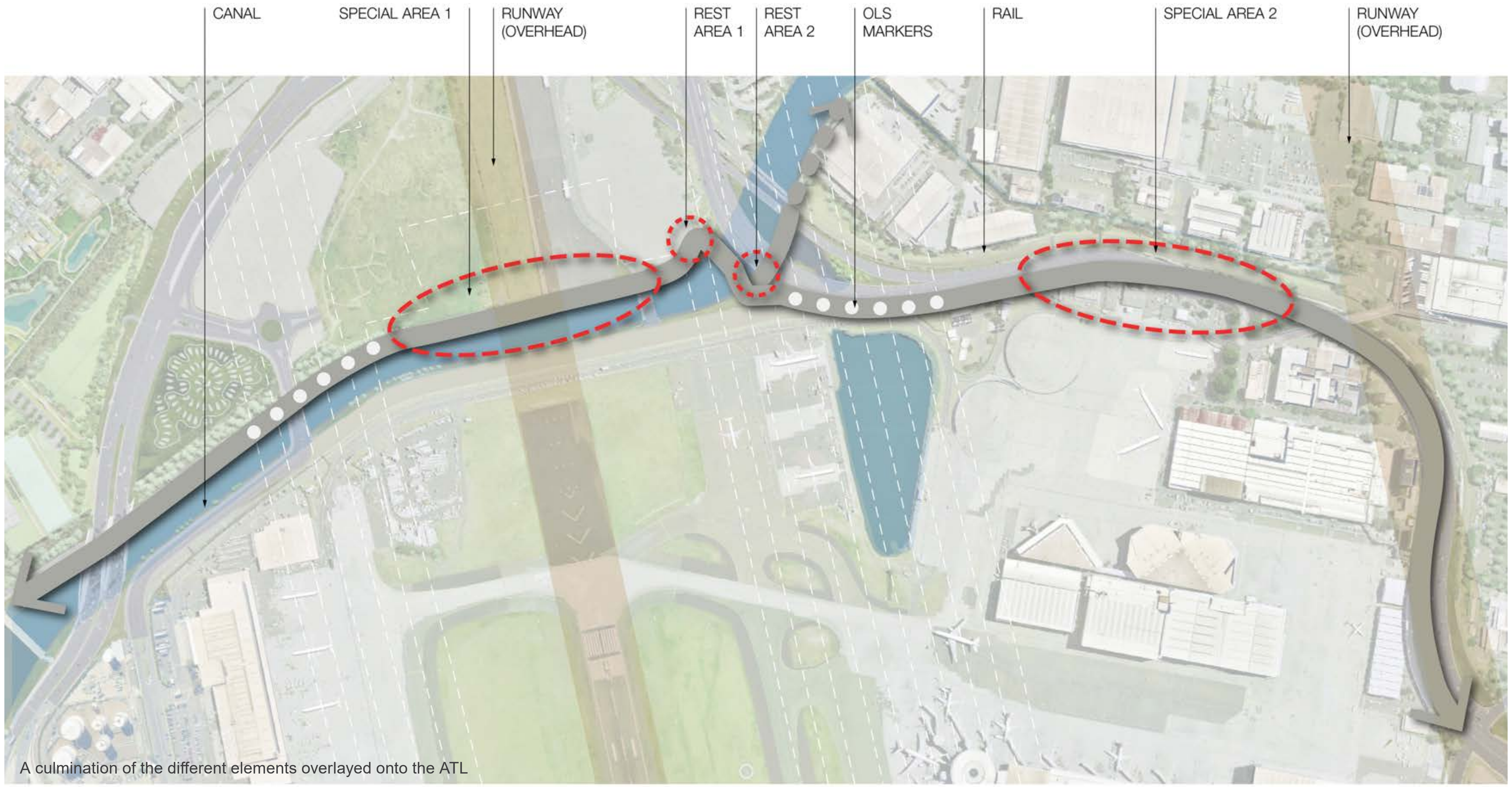


Figure 5-58. ATL corridor strategy

Special areas 1 – tracing the canal

The interpretation concept for this location tells the story of the transformation of the canal over time and its reconstruction and expansion over the years to become what it is today.

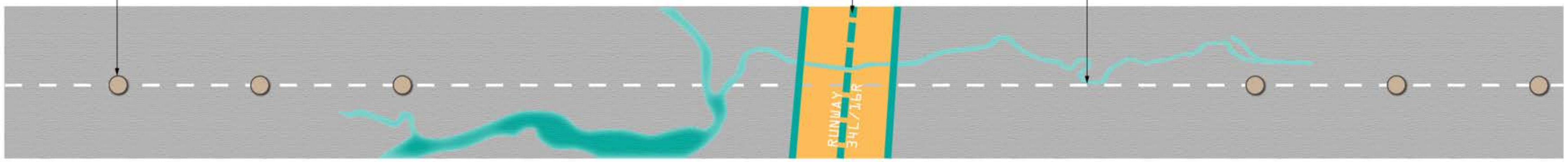
As users travel along this section of the ATL, OLS overlay contours are expressed along the pavement through a series markers along either side of runway 34L/16R. The runway is identified by a set of special pavers.

This is also where the alignment of the old canal (Shea's Creek) diverged from the current alignment. The Shea's Creek alignment is illustrated on the ATL surface as a trickling motif, defined by colour and stencilling, across the OLS and runway markers. These provide a reminder the forces that have shaped the canal - a result of late 19th century engineering works and the 20th century expansion of the airport.

MARKER
Where the major OLS directly overlays the ATL, continuous for the length of ATL, located away from the centre to avoid clash with other pavement graphics. The marker tells the story of the transformation of Sydney Airport

RUNWAY
Inline with the centre of runway 34L/16R

TRACING THE CANAL
As the OLS transitions to the runway, the route of the old canal (Shea's Creek) emerges. As ATL uses passes over the runway, they are seeing a slice of the past with the present



SPECIAL AREA 1- CONCEPT
(COLOURS INDICATIVE)
OLS and the runways is a constant, repeatative element along the ATL, experienced in the present with aircraft flying overhead, while elements of the past (Creek, Rail) emerges and intersects

Figure 5-59. Special areas 1

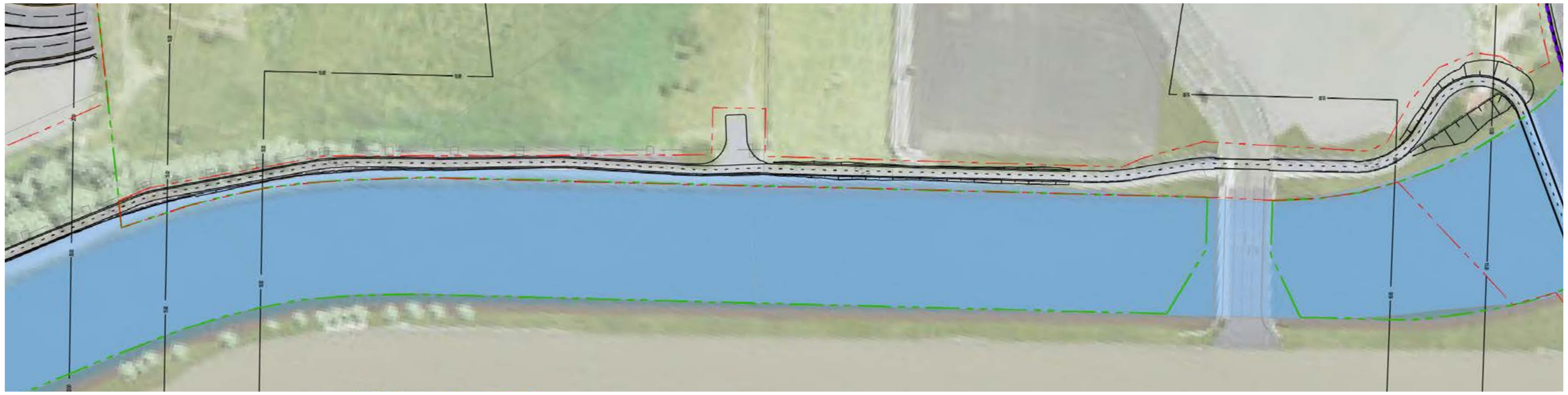
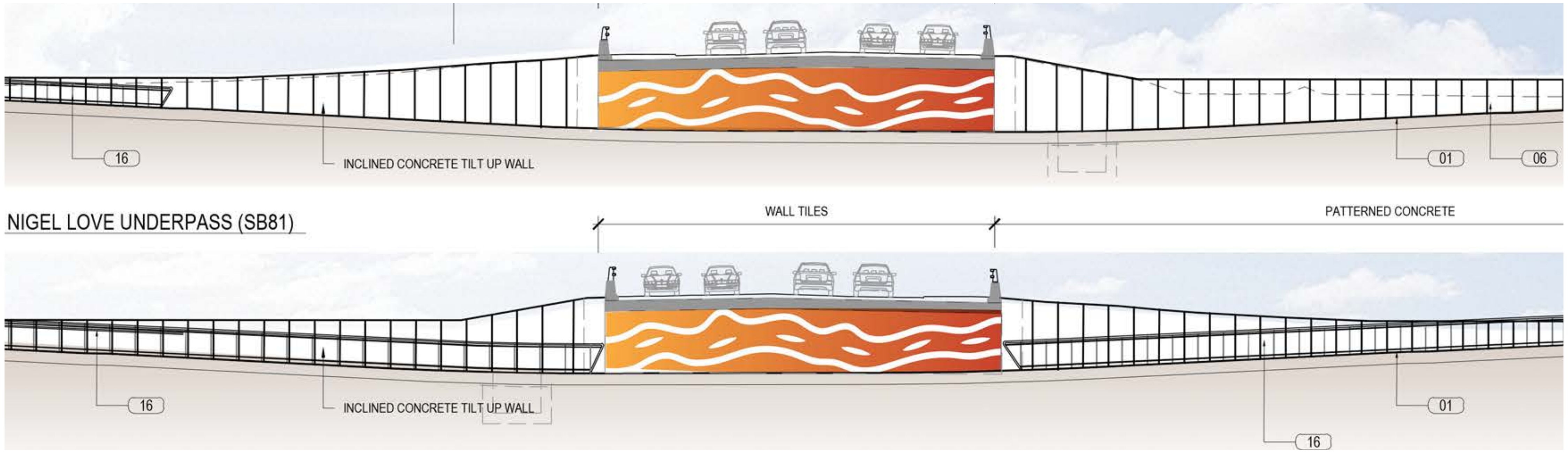


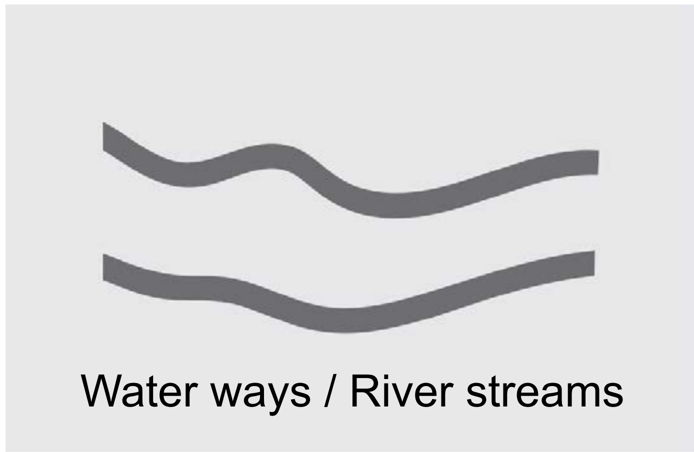
Figure 5-60. Special areas 1 - tracing the canal

Nawi (canoe)

The story of the nawi (canoe) references the nawi as the first form of transportation on this site and their use mostly by Aboriginal women as a shortcut across the Bay from La Perouse to Kurnell.

The artwork uses focused colour, in tones of reds and yellows to reference the ‘firefly’ story. The story, as noted earlier, tells of the experience settlers first seeing a number of small lights on the water and thinking they were fireflies; only to realise, upon coming closer, that they were Aboriginal women in nawi’s with small fires in the centre. These colours also provide a reference to the colours of Country and the red earth below our feet.





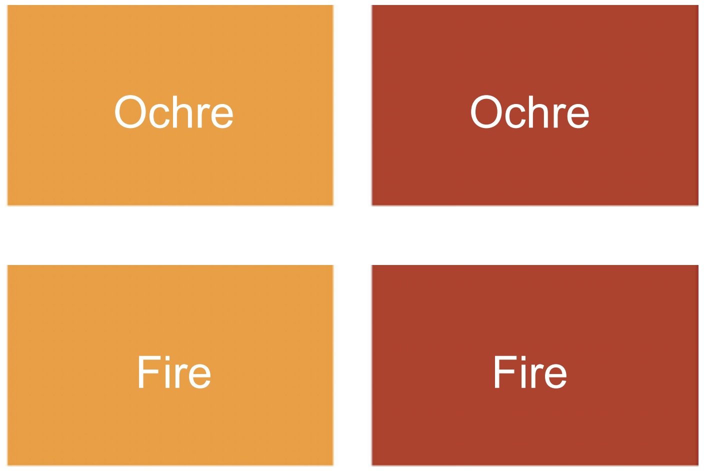


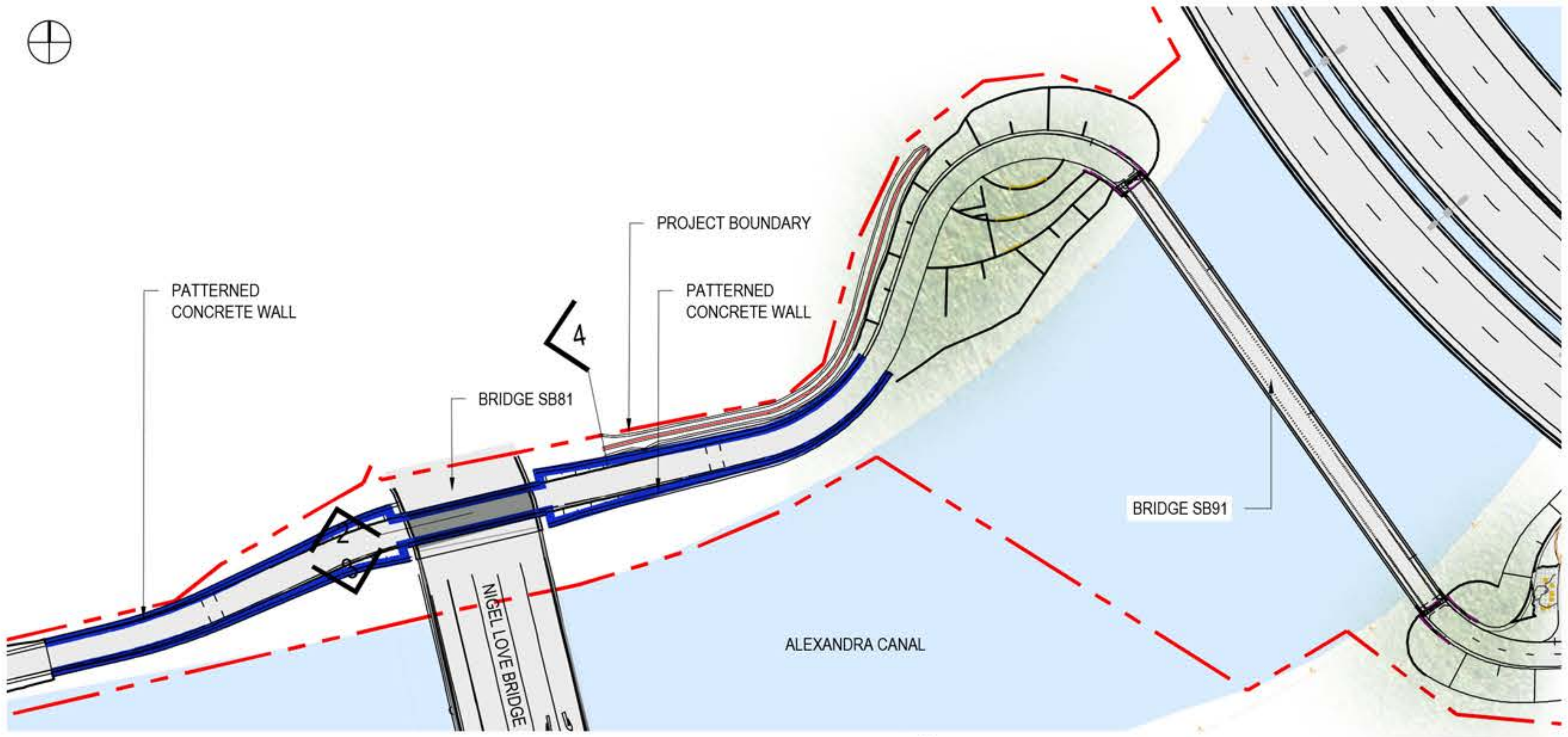
Figure 5-61. Nawi (canoe)

Nigel Love underpass (SB81)

Nigel Love underpass is an underpass structure located at Alexandra Canal under the northern abutment of existing Nigel Love Bridge. It provides connections along the ATL corridor to the east. The underpass will be constructed directly below the existing four lane North Precinct Road and outside the Nigel Love Bridge approach slab and wing walls to eliminate any interaction with the existing bridge structure.

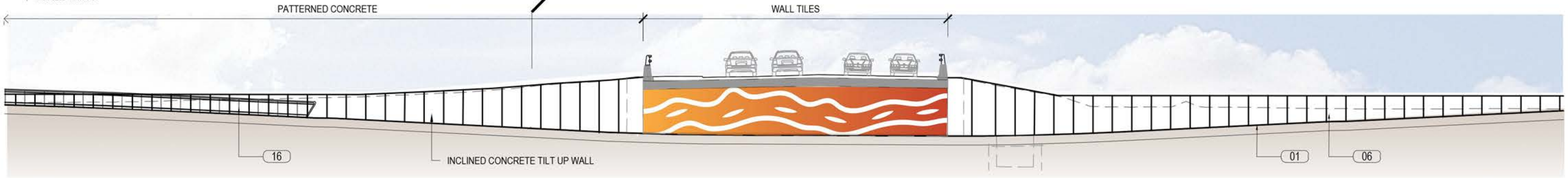
Superstructure		
Structure	**Parapets**	**Safety / headlight screens**
Enclosed concrete structure with asymmetric wing walls at entrance and exit points.	Full height concrete parapets about 1.4 metres high are provided above the underpass structure to continue with the parapet aesthetic of the existing Nigel Love Bridge.	Not required.
Wall finished in gloss wall tiles arranged in a contemporary pattern.		
About four metres wide opening to provide clear and visual permeability for the ATL users and incorporate CPTED measures.	Handrails and cyclist rub rails provided for safety	
Substructure		
Abutments	**Piers and headstocks**	
Part of the superstructure.	Not required.	
Integrated art		
Artwork provided along the underpass walls.		

Figure 5-62. View along Nigel Love underpass

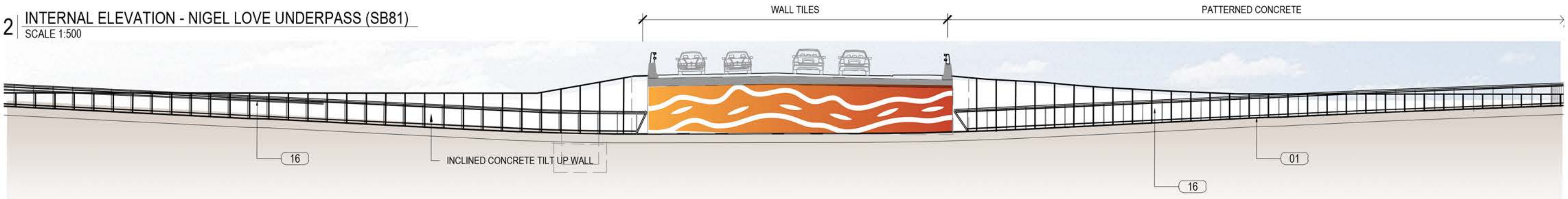


1 | PLAN - NIGEL LOVE UNDERPASS (SB81)
SCALE 1:1000

4 | SECTION - NIGEL LOVE UNDERPASS (SB81)
NTS



2 | INTERNAL ELEVATION - NIGEL LOVE UNDERPASS (SB81)
SCALE 1:500



3 | INTERNAL ELEVATION - NIGEL LOVE UNDERPASS (SB81)
SCALE 1:500

- 01 GROUND LINE
- 02 CONCRETE BRIDGE PIER WITH INTEGRATED HEADSTOCK
- 03 CONCRETE HEADSTOCK
- 04 CONCRETE SUPER T GIRDER
- 05 BRIDGE ABUTMENT
- 06 CONCRETE REINFORCED SOIL WALL
- 07 LANDSCAPED BATTER
- 08 ANTI-THROW SCREEN WITH MESH INFILL PANELS
- 09 CONCRETE TRAFFIC BARRIER WITH TWIN RAIL
- 10 SHADOW DETAIL
- 11 TYPE F BARRIER
- 12 OBSTACLE LIMITATION SURFACE
- 13 LIGHTING COLUMN
- 14 BRIDGE ARCH
- 15 DESALINATION MAIN
- 16 HANDRAIL/BALUSTRADE
- 17 CABLE STAYS
- 18 STEEL TROUGH GIRDER
- 19 CONCRETE PIER
- 20 HEADLIGHT SCREEN
- 21 BOX CONCRETE GIRDER
- 22 WEATHERED STEEL
- 23 ART SCREEN

Figure 5-63. Underpass – typical plan, elevation, section

Figure 5-64. Nigel Love underpass

Rest area 1 – the amphitheatrical experience

As Shea's Creek disappears, and on approach to Bridge 91 (SB91) is rest area 1, which is an open area great for plane spotting, with views to both the canal and International aircrafts landing on Runway 16R.

Working with the contours, this rest area has casual, stepped, amphitheatre like seating and shelter, with small scale landscaping.

Key features include:

- Shelter
- Bubbler
- Bicycle pump and bike rack
- Interpretative signage
- Integrated feature lighting on shelter, handrail and seating
- Special paving
- Feature landscaping to include some shade trees with coloured planting.

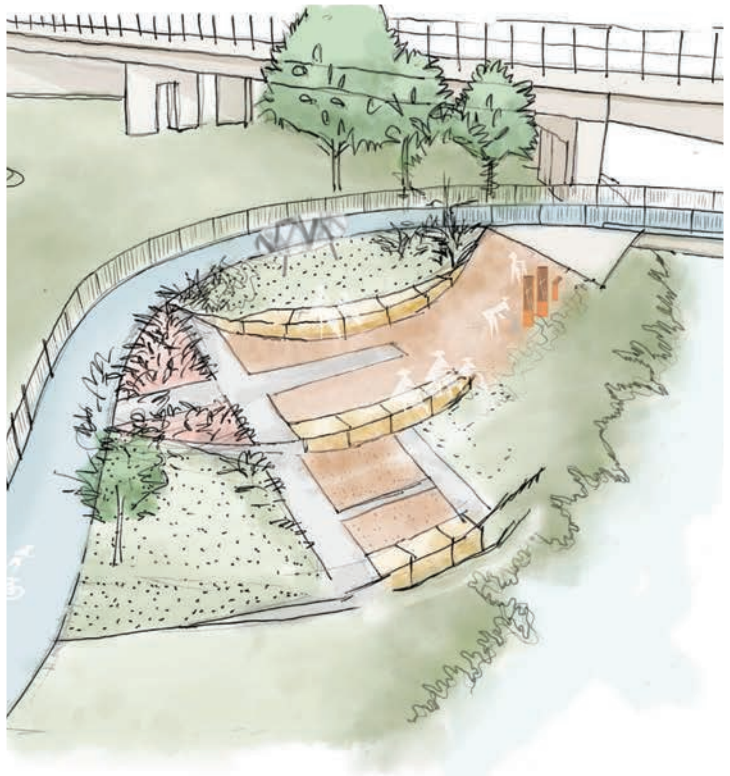


Figure 5-65. Rest area 1 sketch

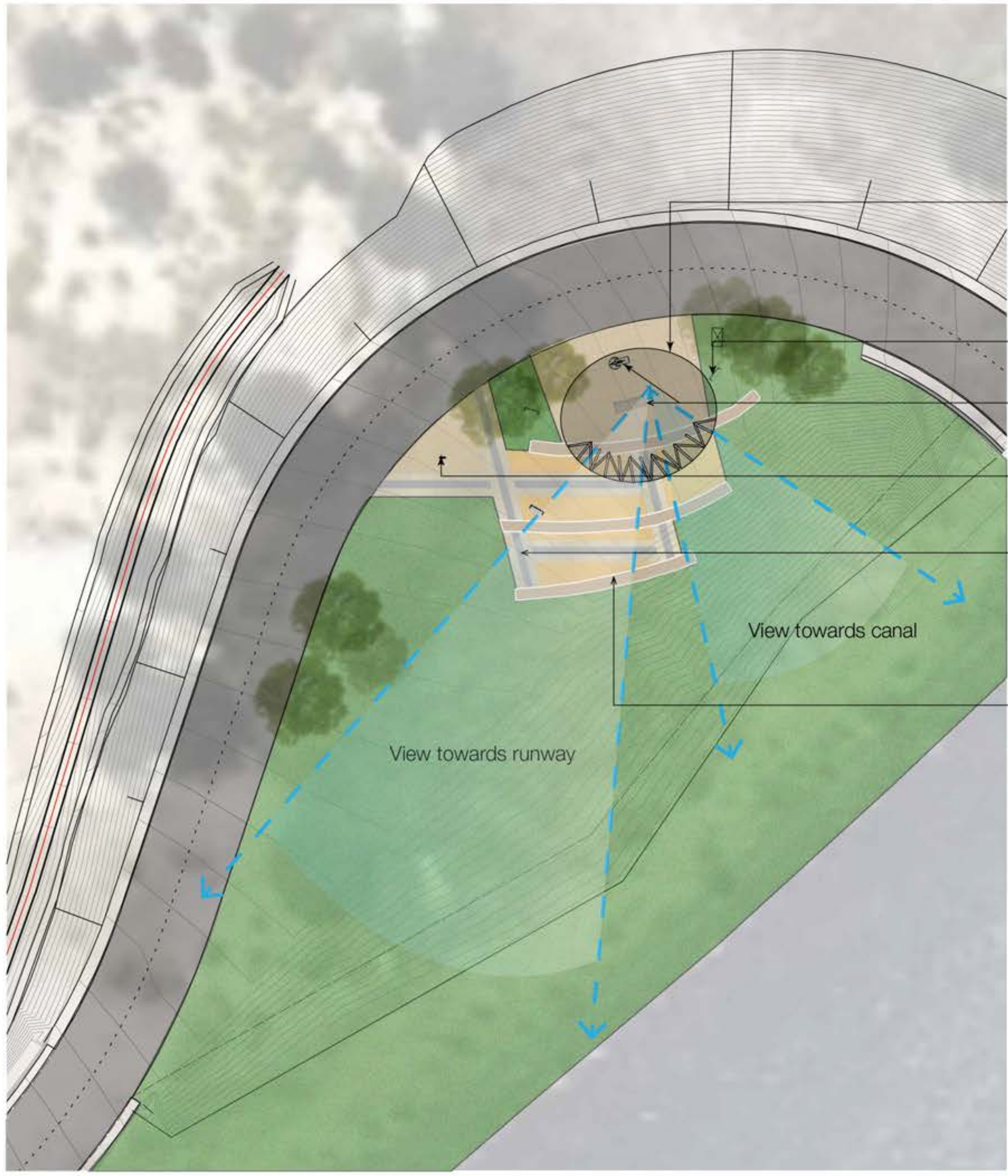





Figure 5-66. Rest area 1

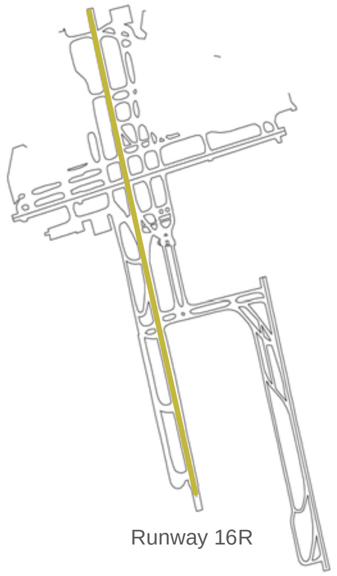


Figure 5-67. Location plan

Figure 5-68. View of rest area 1

Figure 5-69. View of rest area 1

Rest area 2 – the transitional experience

Rest area 2 is the transition point along the ATL, from a canal environment to a roadway environment. As users make this transition, the story of the transformation of the Alexandra Canal, the Botany Rail Line and Sydney Airport will be interpreted through special paving and interpretation panels.

The special paving consists of pavers which have earthy tones to differentiate between this area from the man pathway. The accompanying interpretative panels will tell stories of the Botany Rail Line and Sydney Airport and how they both have shaped the canal of today.

Seating in this area will be in the form of block seating arranged within the special paving area. The outer edge of the shelter canopy is perforated in a pattern which references the web girder of the nearby Shea's Creek underbridge.

Key features include:

– Shelter
– Bubbler
– Bike rack
– Interpretative signage
– Integrated feature lighting on shelter, handrail and seating
– Special paving
– Feature landscaping to include some shade trees with coloured planting.

Figure 5-70. Rest area 2 sketch

Figure 5-71. Rest area 2

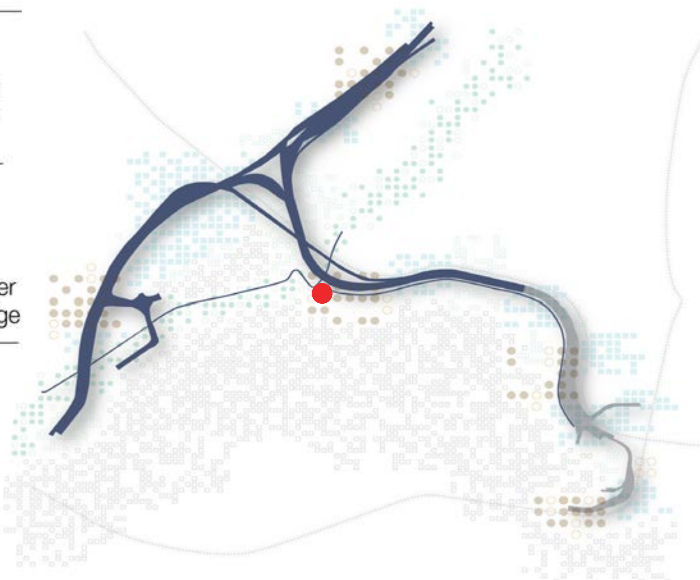


Figure 5-72. Location plan

Figure 5-73. View of rest area 2

Figure 5-74. View from shared path looking west

Figure 5-75. Aerial view of the ATL

Special area 2 - barge to rail

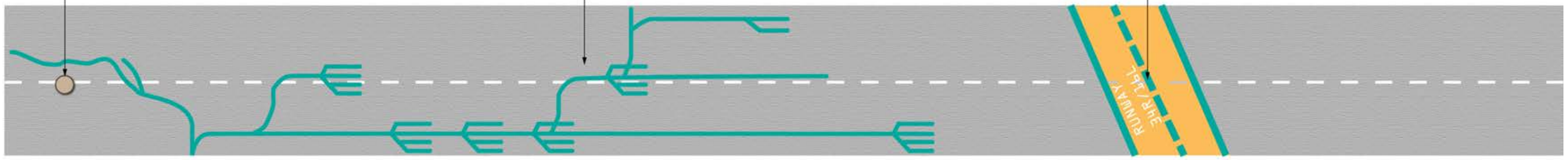
As users head towards the Domestic Terminals, the ATL corridor closely follows both the road and rail alignments.

Similar to special area 1, OLS markers continue along the ATL at significant contour intervals. Where Runway 16L intersects the ATL, the freight line is a visible reminder of the significance of rail as the primary means of freight transport by the early 20th century . The development of the rail line was heavily impacted by the expansion of the airport, and since air transit plays such a significant role in the transportation of people and freight today, it is a constant element along the ATL.

MARKER
Where the major OLS directly overlays the ATL, continuous for the length of ATL, located away from the centre to avoid clash with other pavement graphics. The marker tells the story of the transformation of Sydney Airport

BARGE TO RAIL
The canal merges in with the alignment of the Botany Rail Line, as the Canal ceased to be a viable form of transport

RUNWAY
Inline with the centre of runway 16L



SPECIAL AREA 2 - CONCEPT
(COLOURS INDICATIVE)

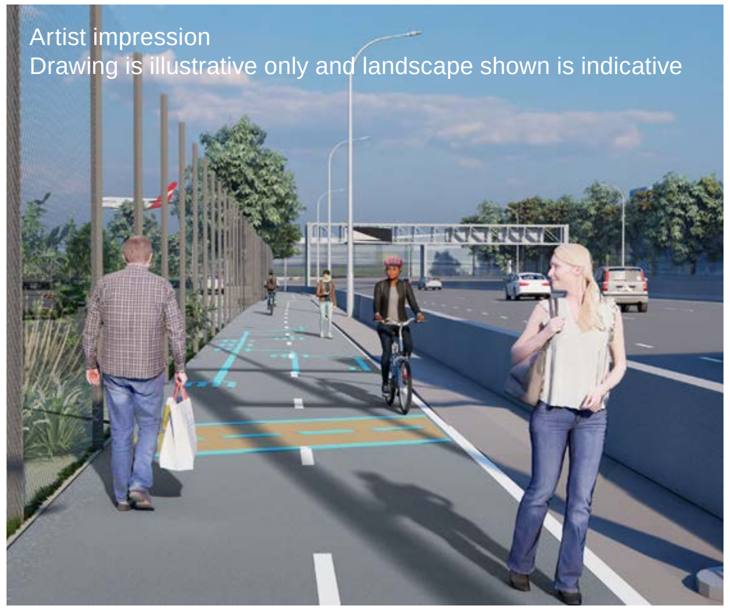


Figure 5-76. Special area 2

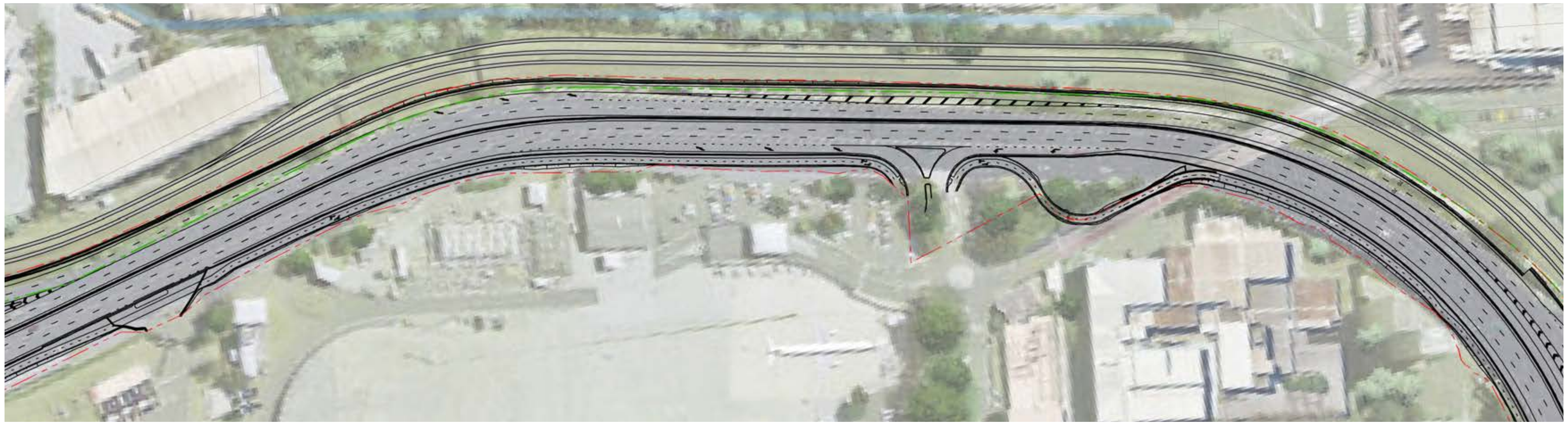


Figure 5-77. Special area 2 – barge to rail

Interpretative elements

Interpretive signage plaques and pavement markers have been incorporated in the design at the special areas. These use the motifs that have been developed as part of the artwork to provide for continuity in the interpretation of the history of Aboriginal and non-Aboriginal heritage including:

- The weaving pattern
- The mullet
- The coastal wattle
- The fish hooks and flints
- The coastal edge
- The nawi (canoe)
- Alexandra Canal
- Sydney (Kingsford Smith) Airport Group
- Cooks River Container Terminal
- Mascot (Shea's Creek) Underbridge
- Botany Rail Line.

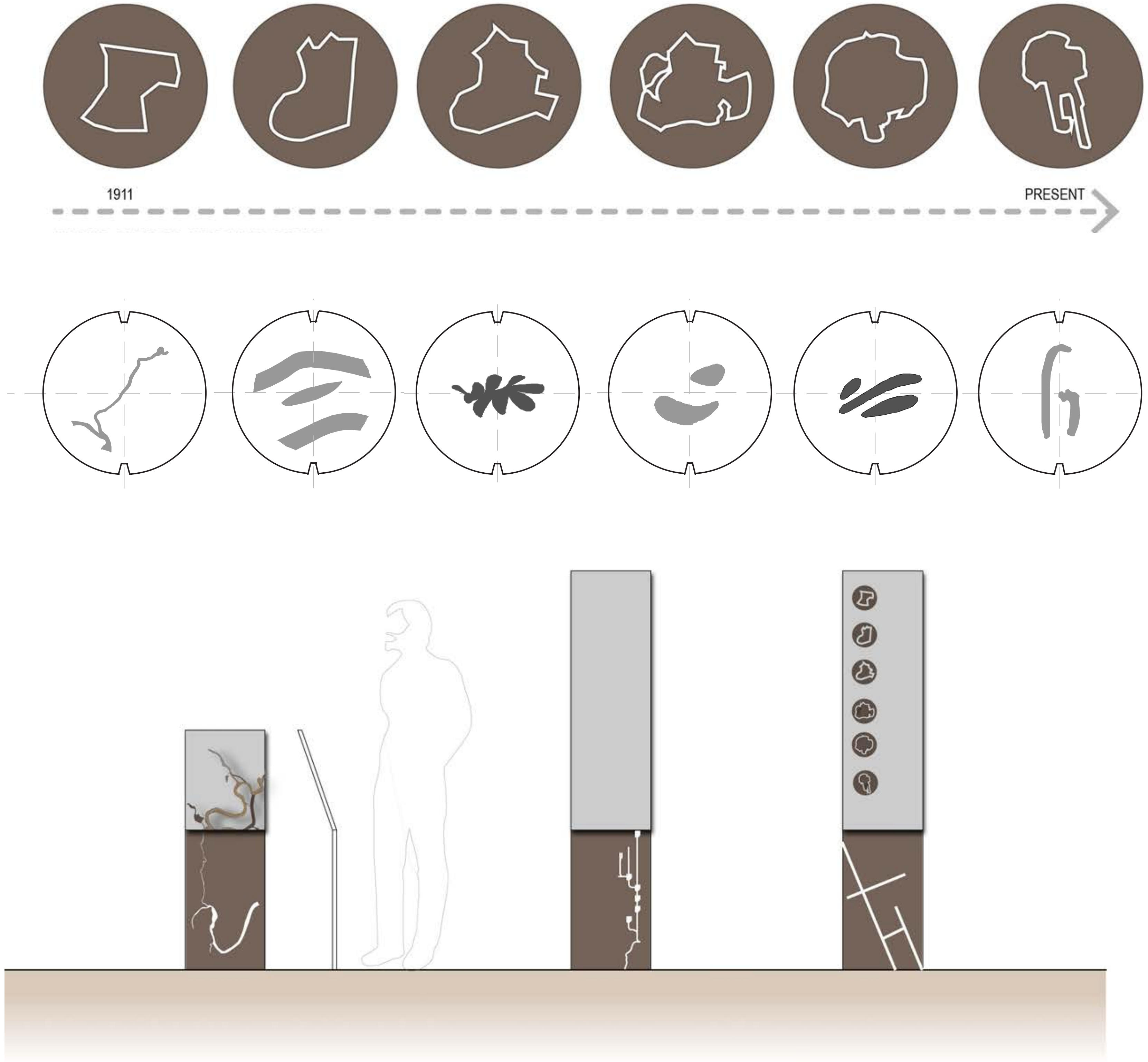
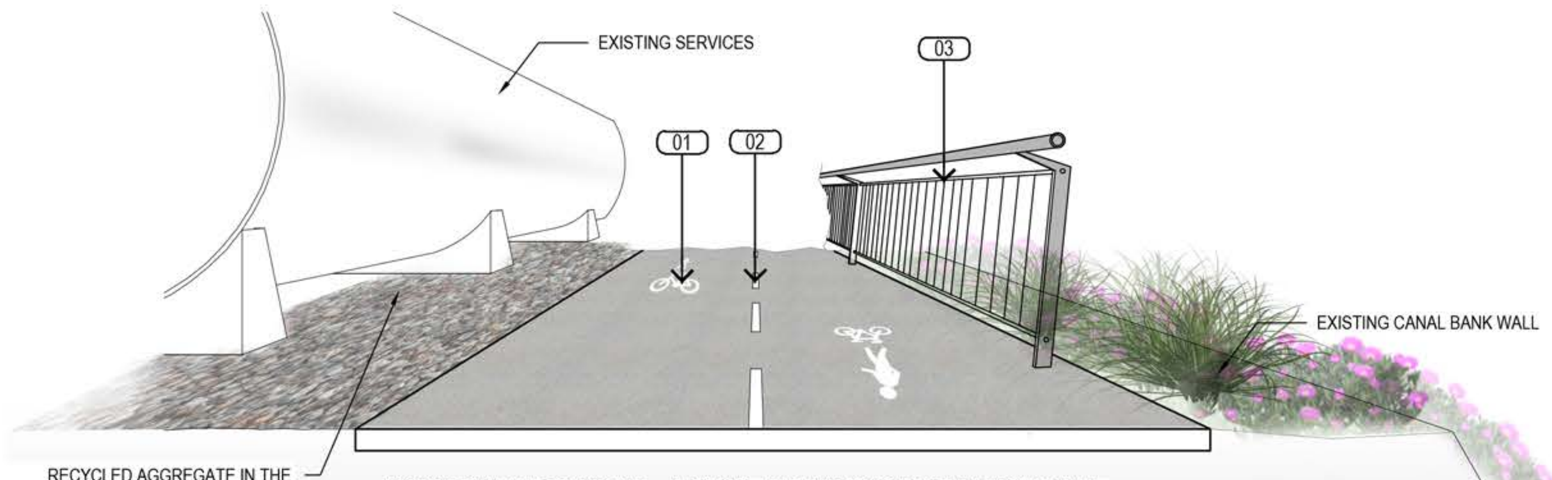
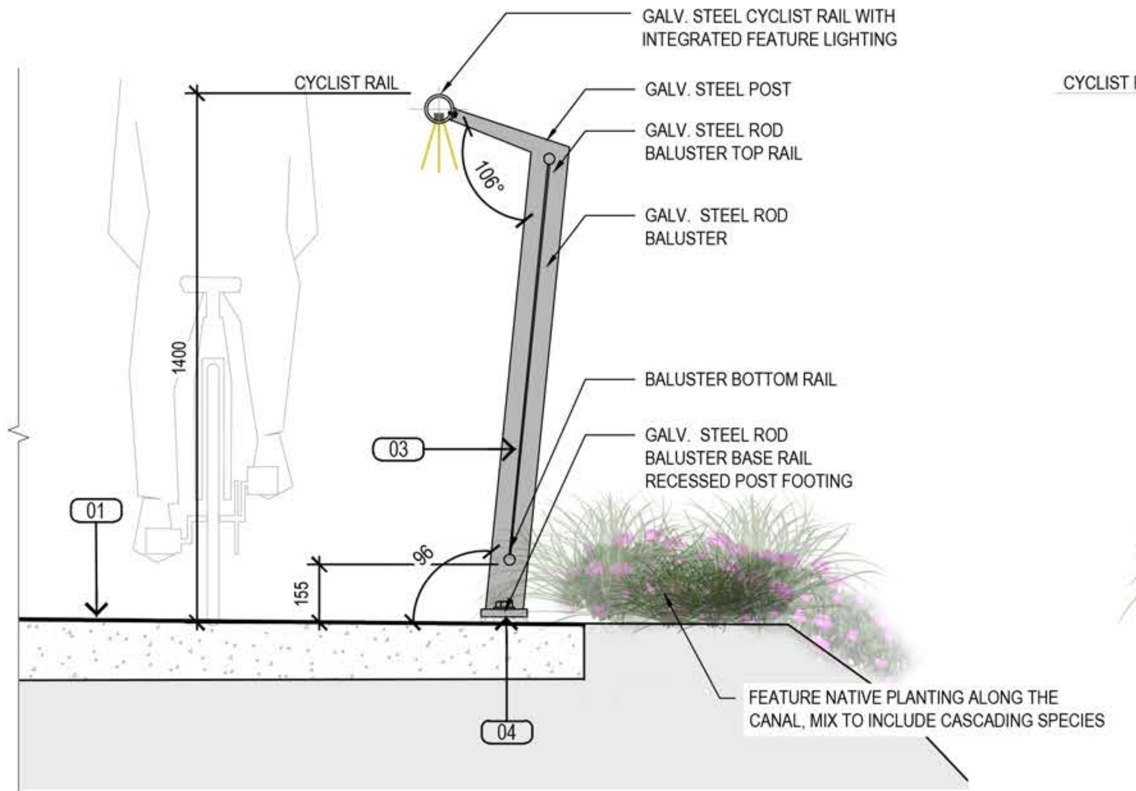


Figure 5-78. Interpretative elements

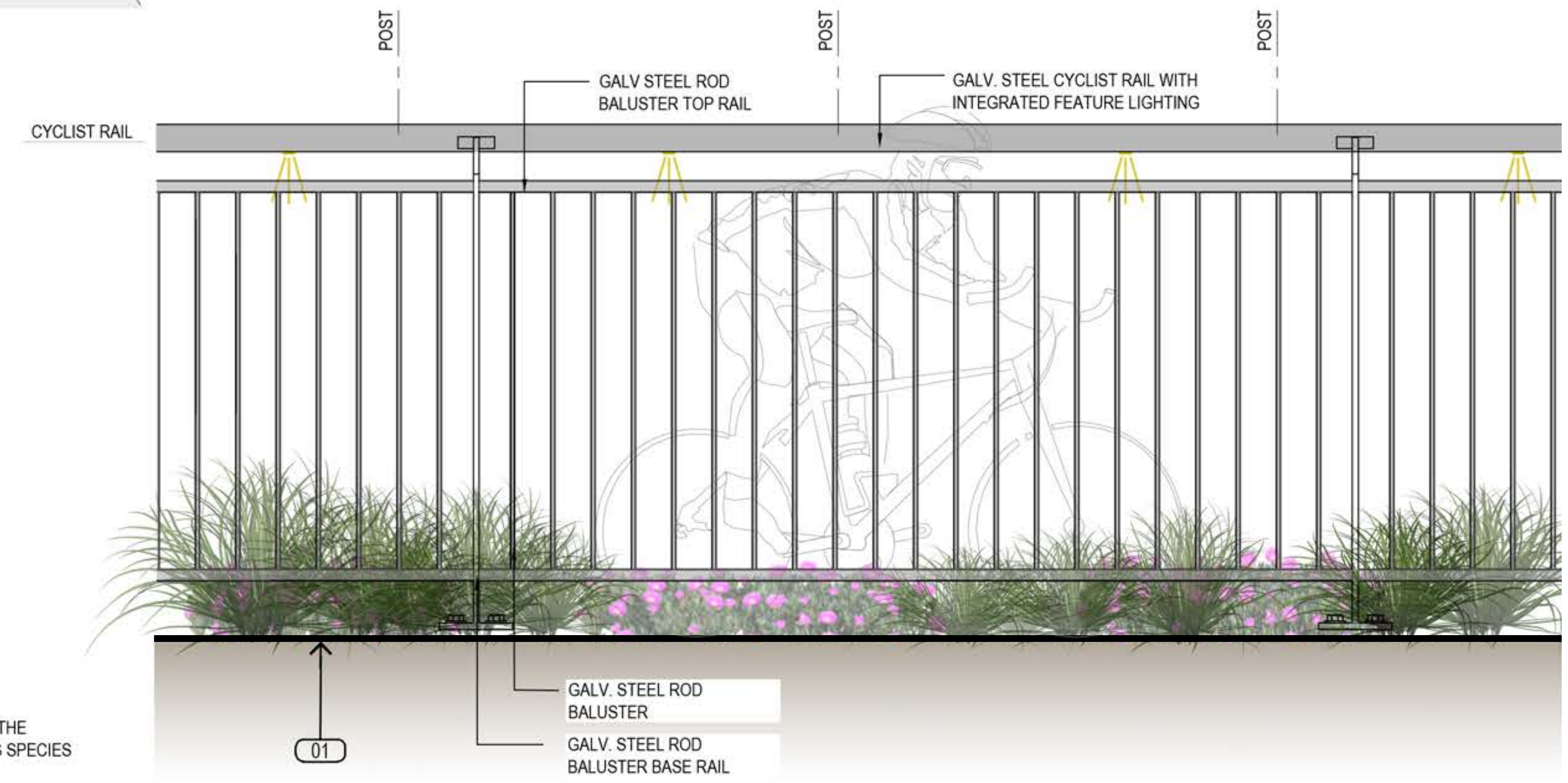


1 | AXONOMETRIC VIEW - ACTIVE TRANSPORT BALUSTRADE
SCALE 1:50

4 | ARTISTS IMPRESSION
NTS



2 | DETAIL - ACTIVE TRANSPORT BALUSTRADE
SCALE 1:20



3 | ELEVATION - ACTIVE TRANSPORT BALUSTRADE
SCALE 1:50

01 CONCRETE PAVEMENT
02 LINE MARKING
03 CYCLIST BALUSTRADE
04 BALUSTRADE FOOTING

A proprietary item, similar in design, such as Moddex or equivalent is being considered to be used for the construction of the handrail.

Figure 5-79. ATL – balustrade details

Figure 5-80. View from shared path looking beyond SB91

5.9 Collaborative process

The story of the collaborative process is summarised in this section. It provides an understanding of the journey taken by the team in interpreting the site's significance, scale and complexity. This effort was undertaken in a collaborative way between the urban design team, artists, curators and Cultural Advisors.

Inputs were provided by Project managers from JHSWJV, architects CM+ in association with Context Landscape, artists Dennis Golding and Carmen Glynn Braun, Cultural Advisors Uncle Steve and Aunty Phyllis and curators from Cultural Capital.

Along with their own self-conducted research, Dennis and Carmen worked closely with Uncle Steve and Aunty Phyllis to select culturally relevant symbols, meanings and stories of place and, through workshops with the technical teams, progressively developing them into design elements.

The relevance of these design elements and their meaningful 'Connection to Country' was an insightful and widely discussed part of the design development journey. The designs were slowly refined through an iterative process, taking into account the technical aspects of their application to the infrastructure elements, until a final solution was reached.

Intensive collaborative design workshops were held regularly, both virtually and at the Mascot Project offices. During these sessions, various scales and application methods for the cultural design elements were investigated by the urban design team in conversation with the artists and Cultural Advisors.

This was a truly collaborative design process. Not only an exchange of knowledge, talent and skills, but also a rewarding cultural exchange.

Figure 5-81. Artists and design teams workshop timeline

First meeting

4th May, 2021 → 13th May, 2021 → 25th May, 2021 → 21st June, 2021 → 4th June, 2021 → 28th May, 2021 → 21st June, 2021 → 23rd June, 2021 → 29th June, 2021 → 2nd July, 2021 → 7th July, 2021

The diagram below illustrates the progressive development of the artwork journey, highlighting the big moves that were carried out at various stages of the design development.

– The first approach incorporated the overlay of the initial objects and symbols of the coastal line, wattle, boomerang, fish hooks, weave, mullet and the nawi (canoe)

– These symbols were then stylised into a series of motifs that referenced these objects and symbols, and colour

– The motifs were further developed into patterns and translated on to the canvasses of the Project elements

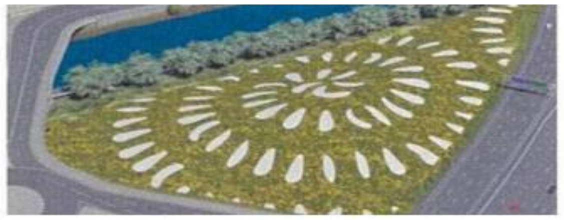
– The patterns were refined and abstracted to provide for a stronger graphic outcome and a richer narrative. The mullet, for example, carried embedded references to the sting ray and boomerang

– The artwork patterns were then integrated into both landforms and built elements with refinement that included consideration of the tectonics of construction.

The artists are currently working with Gujaga Foundation to incorporate language into the design to storytelling of this place.


Initial Element Overlay


Stylised Weave


Expanded + Shaped Weave


Coast Line + Weave

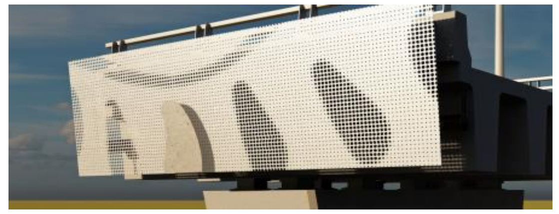

Integrated with landscape


Initial Element Overlay

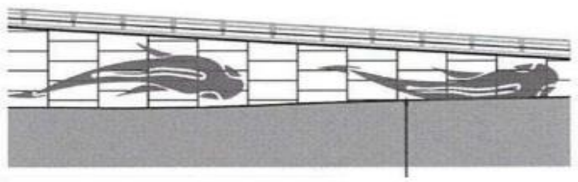

Stylised Multi-colour Pattern


Unified Colour Approach

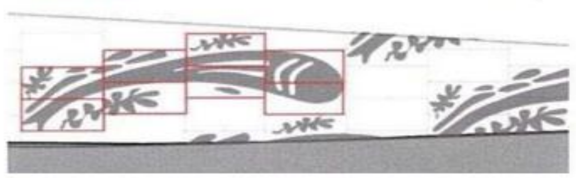

Pattern Definition Development

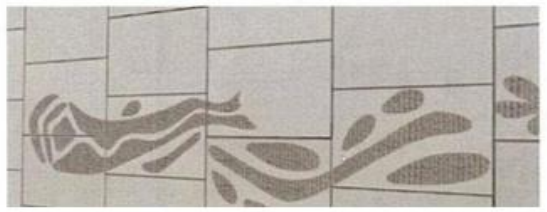

Shimmer to express artwork


Initial Element Layout

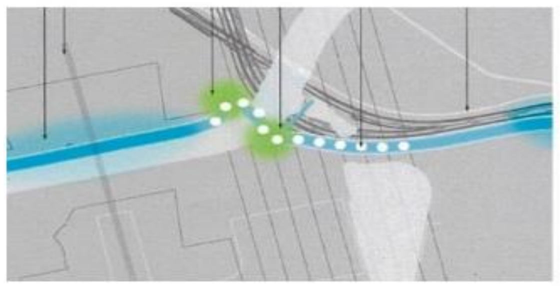

Realistic Mullet

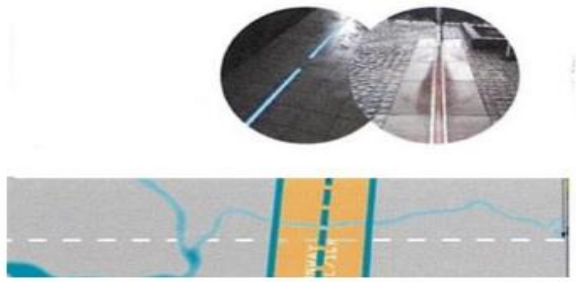
8 moulds


Stylised Mullet + Wattle

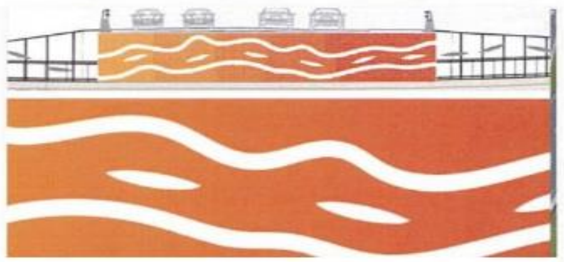

Modular Mullet + Wattle + Flow

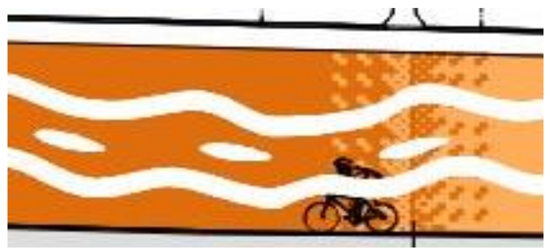

Working with the tectonics of construction


Overall Approach to Zones


Developed Zones + Themes


Feature Area Development


Underpass Coast Line + Nawi


Application through tile work

The Big Moves

Figure 5-82. View of Tempe Lands Mound from ATL entry

6. Urban design concept plans

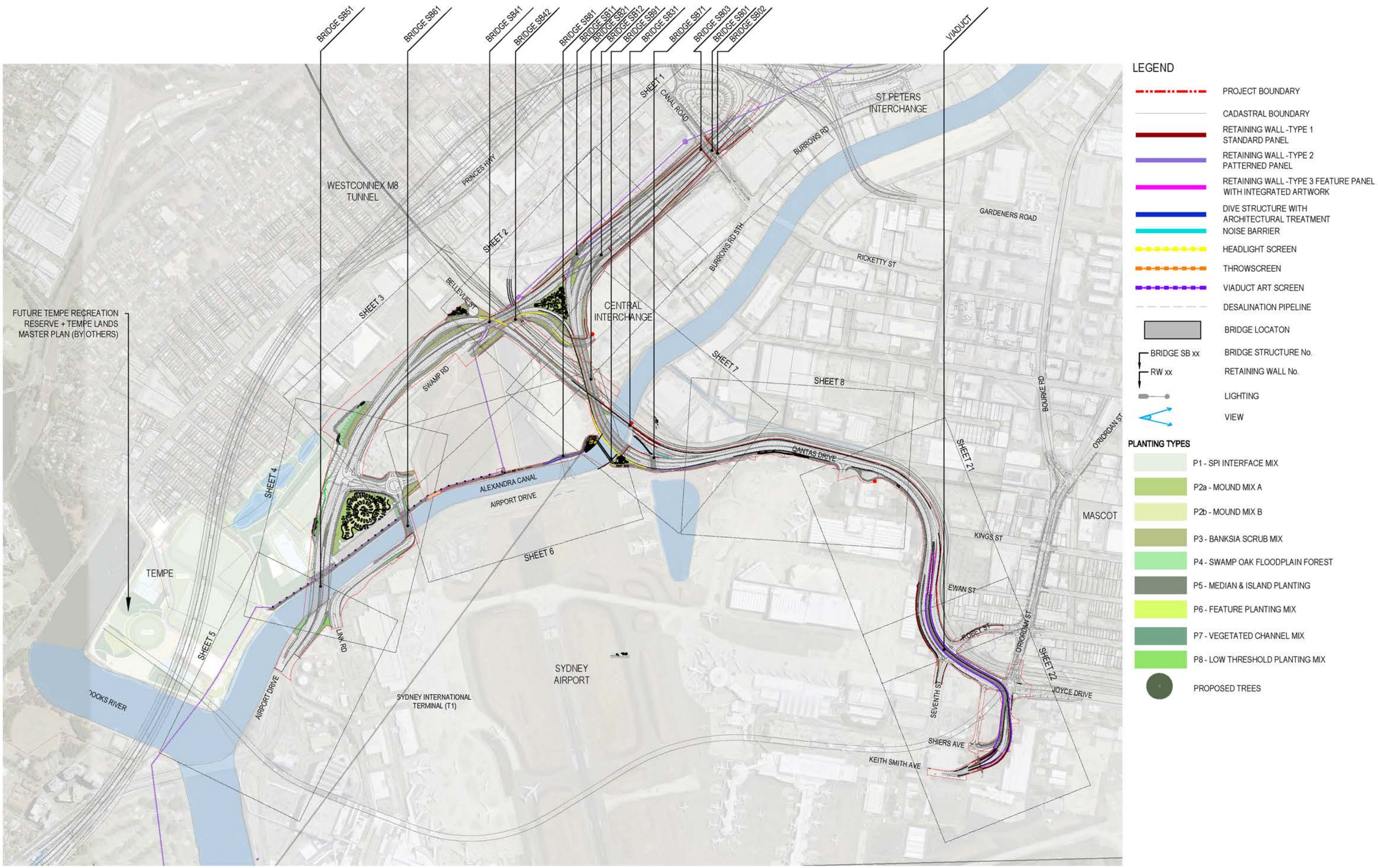
Figure 6-1. Aerial view of the Project

Figure 6-2. Existing aerial view looking south towards Sydney Airport

Figure 6-3. Proposed view looking south towards Sydney Airport, with central interchange Northern Lands Mound

Figure 6-4. Proposed view looking towards central interchange

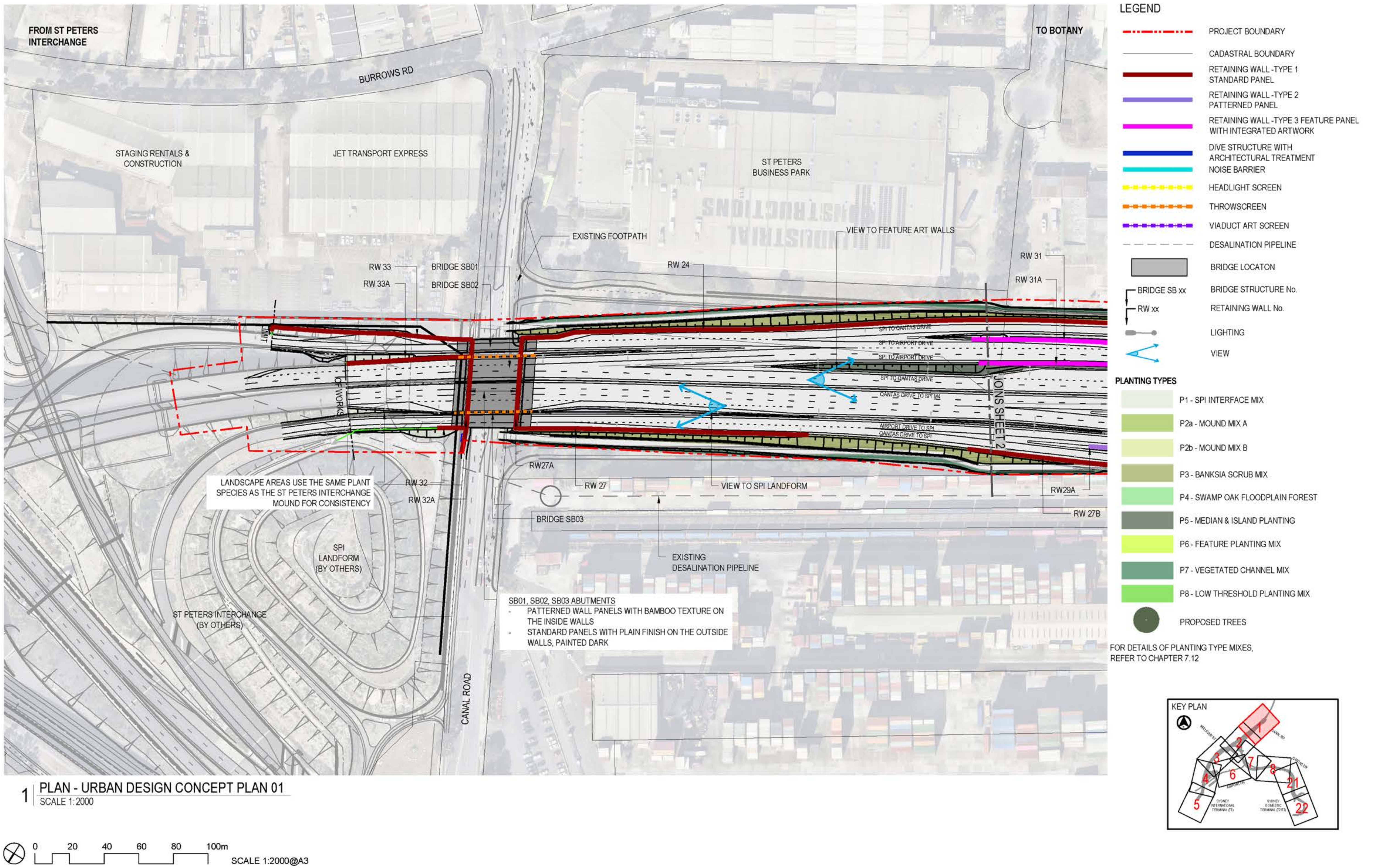
JOHN HOLLAND | SEYMOUR WHYTE | CM+ | CONTEXT | culturalcapital



1 | KEY PLAN - URBAN DESIGN CONCEPT PLAN
SCALE 1:10000

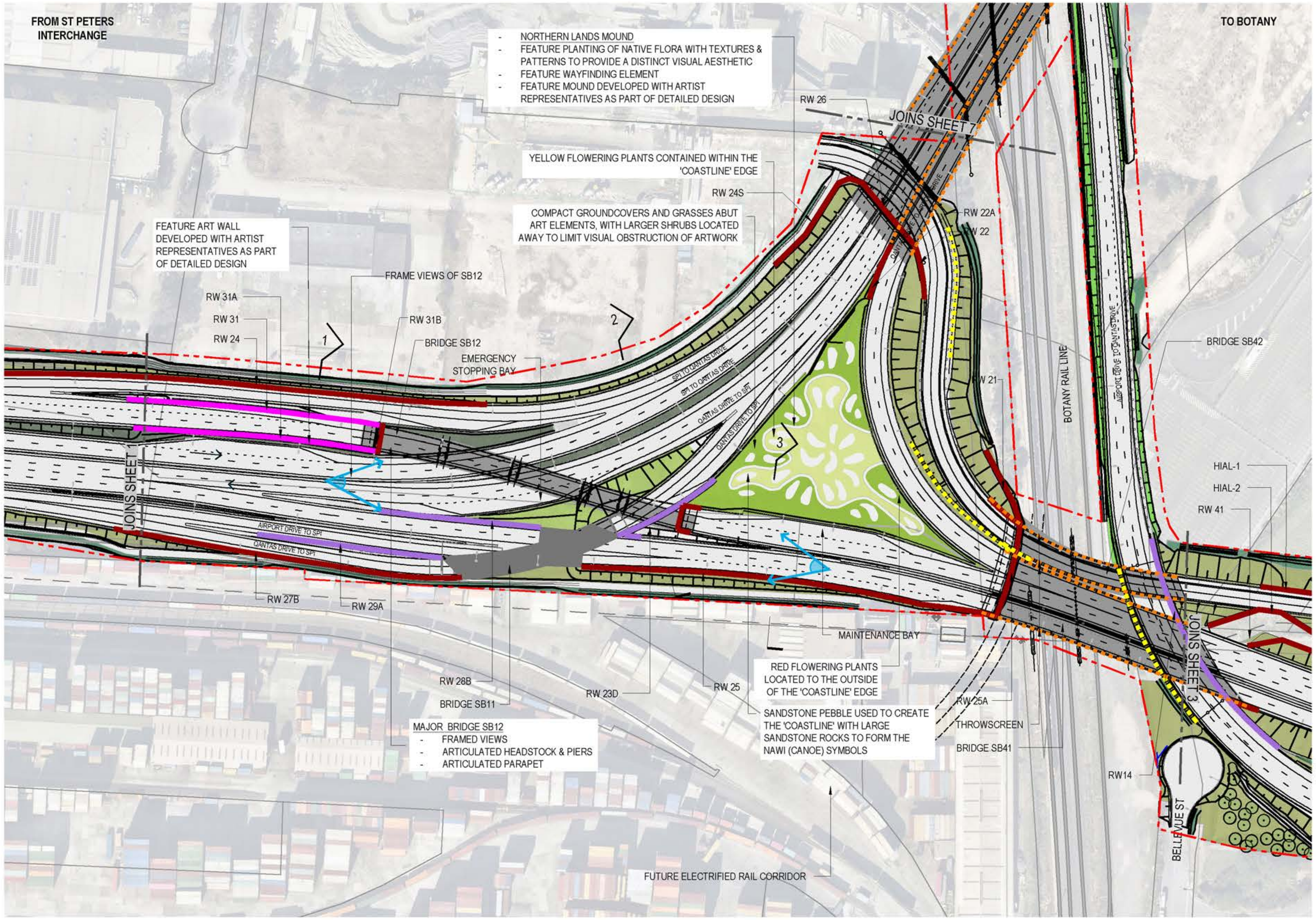
0 100 200 300 400 500m SCALE 1:10,000@A3

Figure 6-5. Urban design and landscape concept plan - key plan



1 PLAN - URBAN DESIGN CONCEPT PLAN 01
SCALE 1:2000

Figure 6-6. Urban design and landscape concept plan - 1 of 10



LEGEND

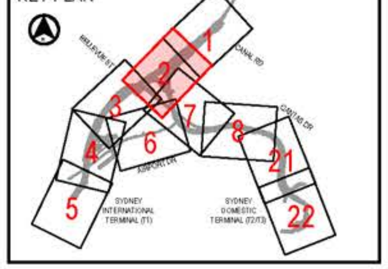
- PROJECT BOUNDARY
- CADASTRAL BOUNDARY
- RETAINING WALL - TYPE 1 STANDARD PANEL
- RETAINING WALL - TYPE 2 PATTERNED PANEL
- RETAINING WALL - TYPE 3 FEATURE PANEL WITH INTEGRATED ARTWORK
- DIVE STRUCTURE WITH ARCHITECTURAL TREATMENT
- NOISE BARRIER
- HEADLIGHT SCREEN
- THROWSCREEN
- VIADUCT ART SCREEN
- DESALINATION PIPELINE
- BRIDGE LOCATON
- BRIDGE SB xx — BRIDGE STRUCTURE No.
- RW xx — RETAINING WALL No.
- LIGHTING
- VIEW

PLANTING TYPES

- P1 - SPI INTERFACE MIX
- P2a - MOUND MIX A
- P2b - MOUND MIX B
- P3 - BANKSIA SCRUB MIX
- P4 - SWAMP OAK FLOODPLAIN FOREST
- P5 - MEDIAN & ISLAND PLANTING
- P6 - FEATURE PLANTING MIX
- P7 - VEGETATED CHANNEL MIX
- P8 - LOW THRESHOLD PLANTING MIX
- PROPOSED TREES

FOR DETAILS OF PLANTING TYPE MIXES, REFER TO CHAPTER 7.12

KEY PLAN



1 | PLAN - URBAN DESIGN CONCEPT PLAN 02
SCALE 1:2000

0 20 40 60 80 100m
SCALE 1:2000@A3

Figure 6-7. Urban design and landscape concept plan - 2 of 10

JOHN HOLLAND | SEYMOUR WHYTE | CM+ | CONTEXT | culturalcapital

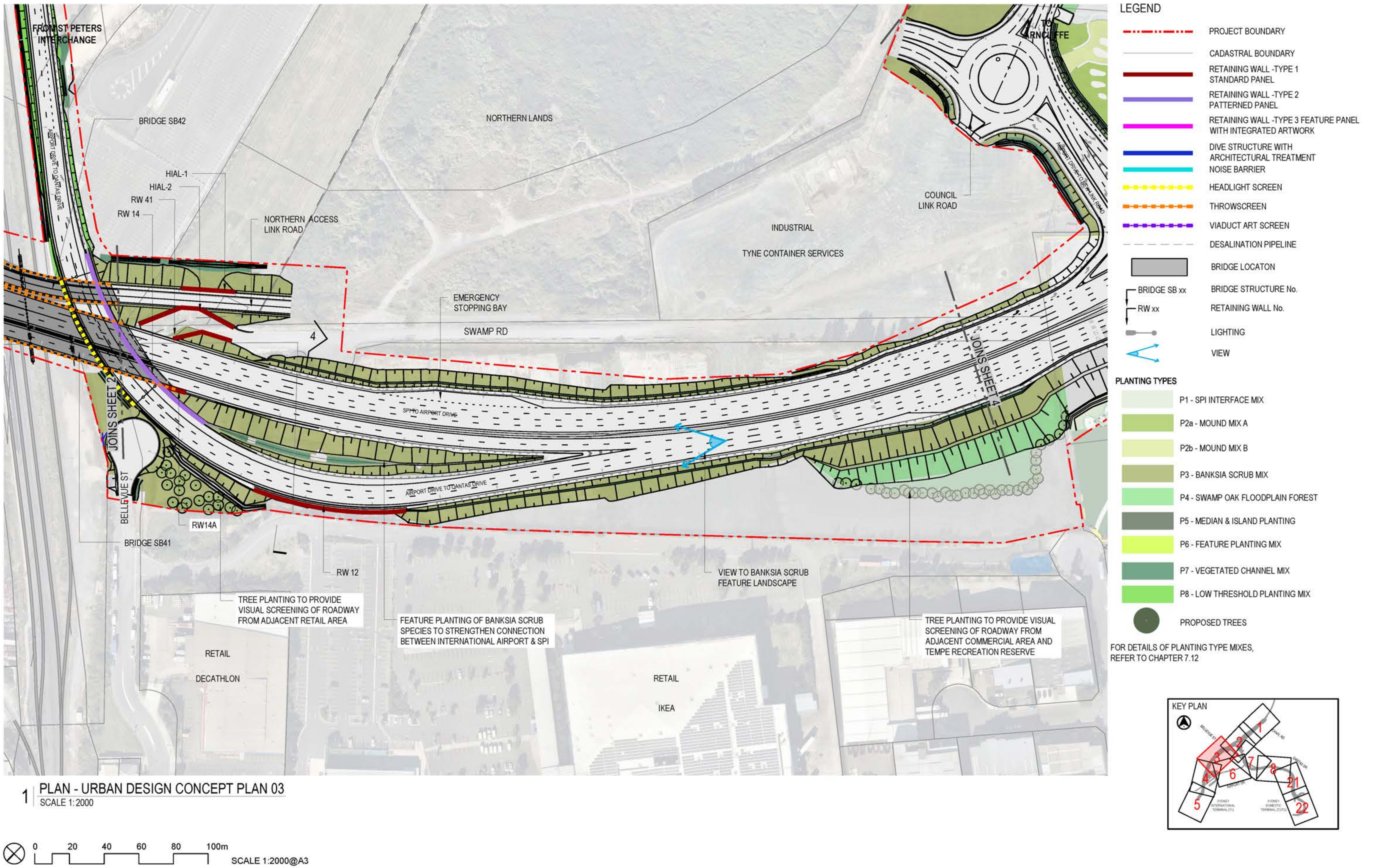


Figure 6-8. Urban design and landscape concept plan - 3 of 10

JOHN HOLLAND | SEYMOUR WHYTE | CM+ | CONTEXT LANDSCAPE ARCHITECTURE | culturalcapital

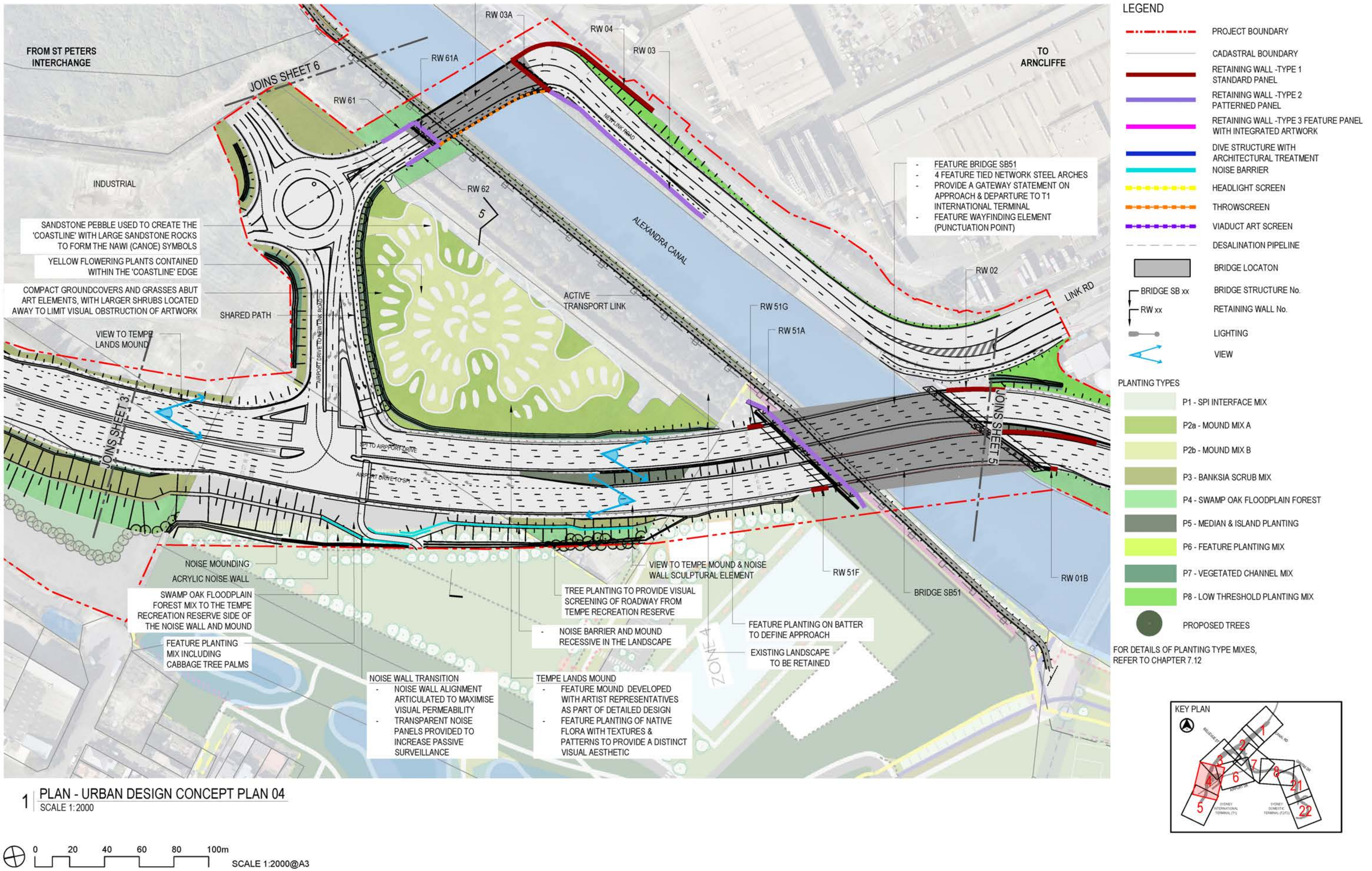


Figure 6-9. Urban design and landscape concept plan – 4 of 10

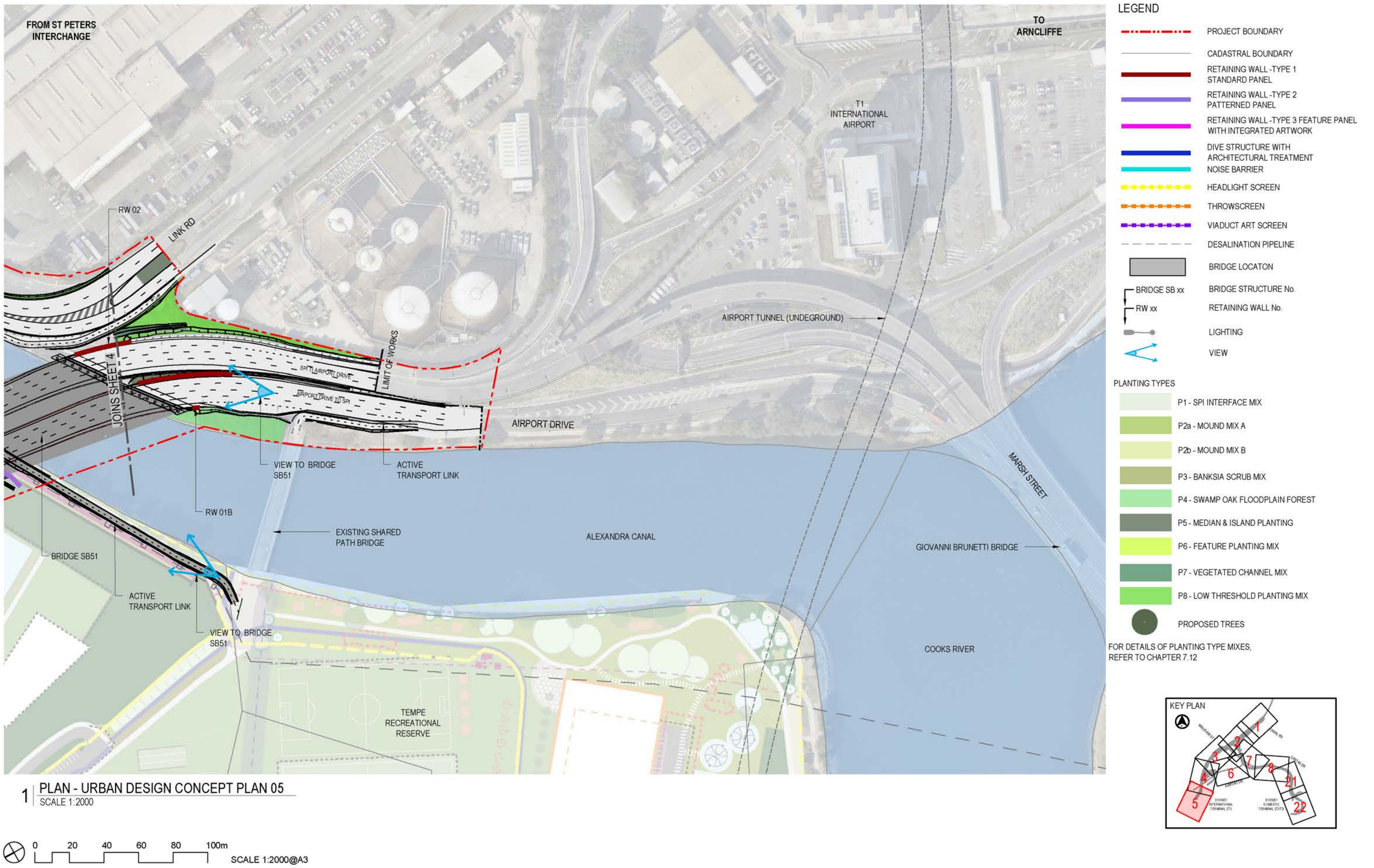
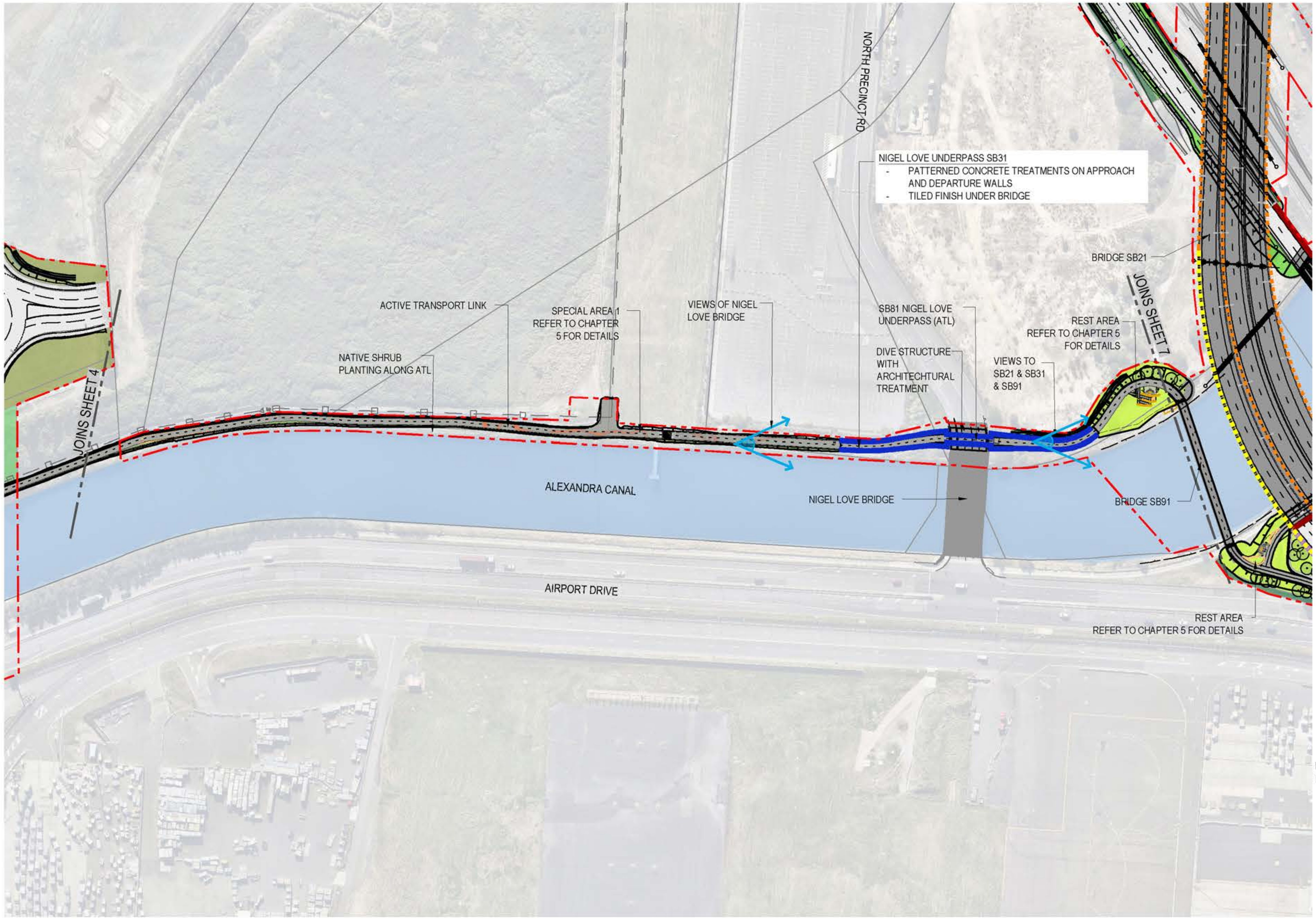


Figure 6-10. Urban design and landscape concept plan - 5 of 10



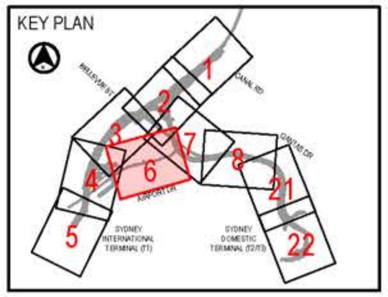
LEGEND

- PROJECT BOUNDARY
- CADASTRAL BOUNDARY
- RETAINING WALL -TYPE 1 STANDARD PANEL
- RETAINING WALL -TYPE 2 PATTERNED PANEL
- RETAINING WALL -TYPE 3 FEATURE PANEL WITH INTEGRATED ARTWORK
- DIVE STRUCTURE WITH ARCHITECTURAL TREATMENT
- NOISE BARRIER
- HEADLIGHT SCREEN
- THROWSCREEN
- VIADUCT ART SCREEN
- DESALINATION PIPELINE
- BRIDGE LOCATON
- BRIDGE SB xx — BRIDGE STRUCTURE No.
- RW xx — RETAINING WALL No.
- LIGHTING
- VIEW

PLANTING TYPES

- P1 - SPI INTERFACE MIX
- P2a - MOUND MIX A
- P2b - MOUND MIX B
- P3 - BANKSIA SCRUB MIX
- P4 - SWAMP OAK FLOODPLAIN FOREST
- P5 - MEDIAN & ISLAND PLANTING
- P6 - FEATURE PLANTING MIX
- P7 - VEGETATED CHANNEL MIX
- P8 - LOW THRESHOLD PLANTING MIX
- PROPOSED TREES

FOR DETAILS OF PLANTING TYPE MIXES, REFER TO CHAPTER 7.12



1 | PLAN - URBAN DESIGN CONCEPT PLAN 06
SCALE 1:2000

0 20 40 60 80 100m SCALE 1:2000@A3

Figure 6-11. Urban design and landscape concept plan - 6 of 10

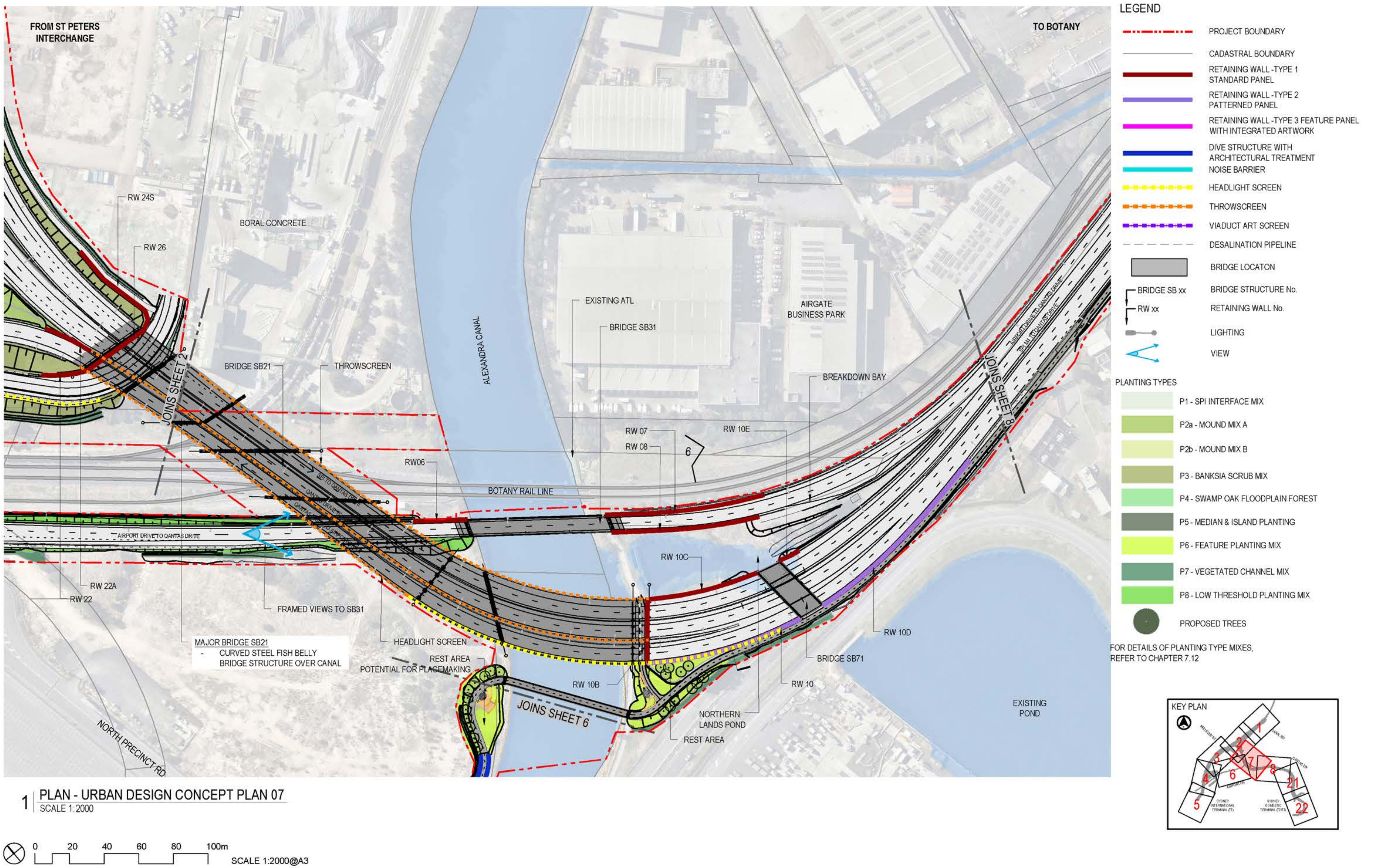


Figure 6-12. Urban design and landscape concept plan - 7 of 10

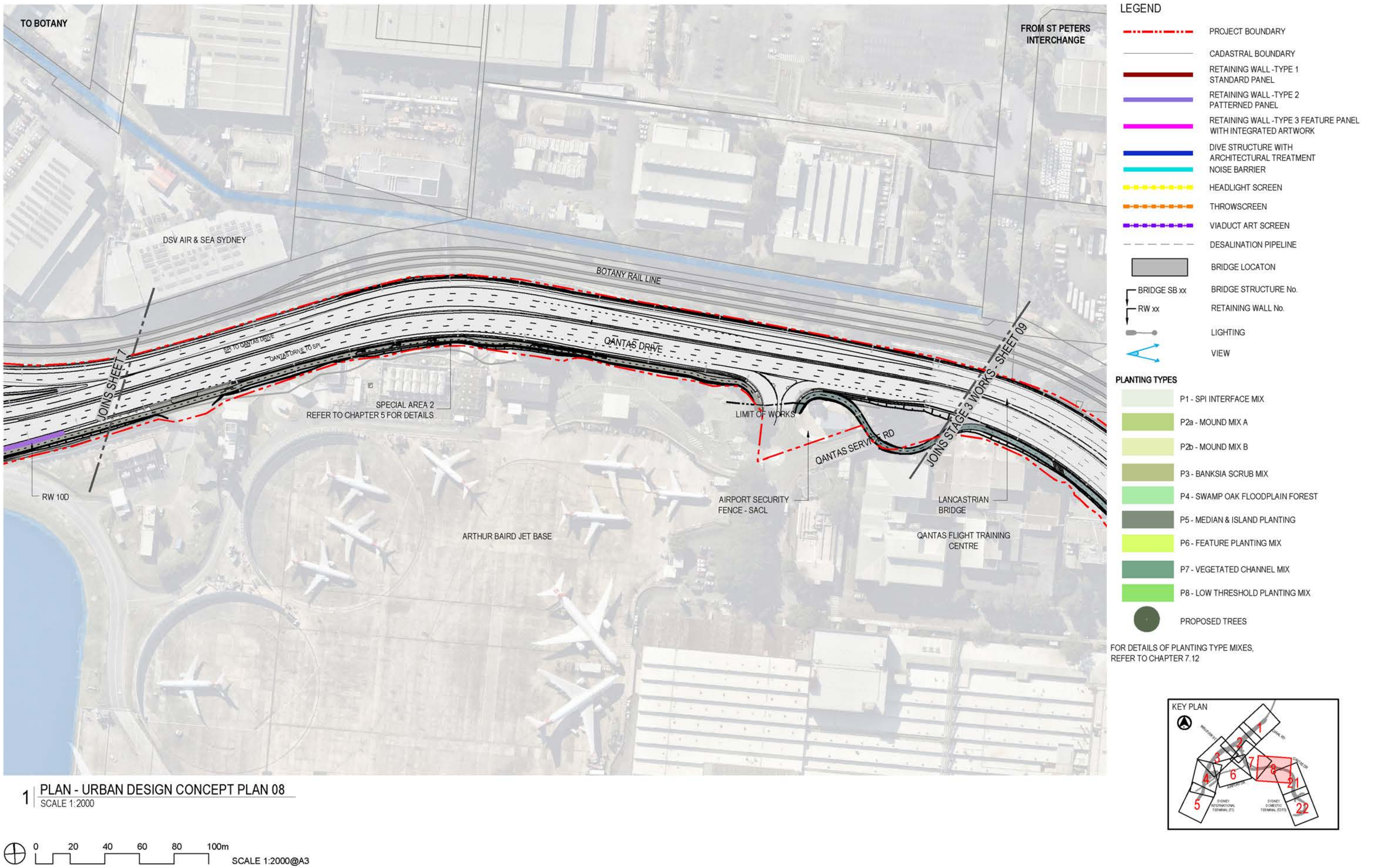
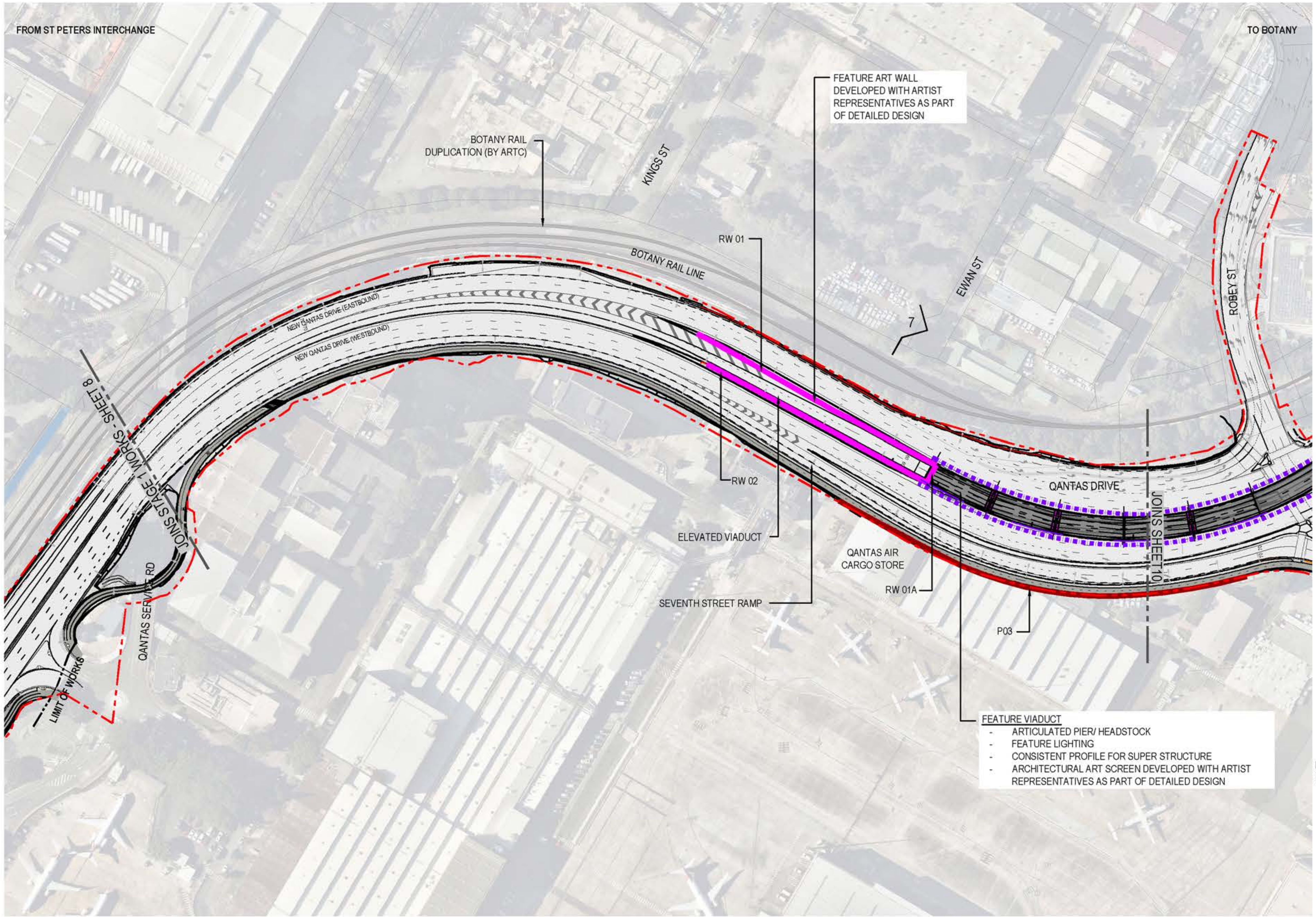


Figure 6-13. Urban design and landscape concept plan - 8 of 10



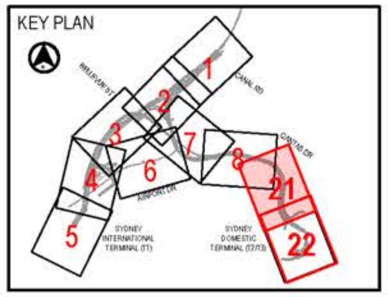
LEGEND

- PROJECT BOUNDARY
- CADASTRAL BOUNDARY
- RETAINING WALL -TYPE 1 STANDARD PANEL
- RETAINING WALL -TYPE 2 PATTERNED PANEL
- RETAINING WALL -TYPE 3 FEATURE PANEL WITH INTEGRATED ARTWORK
- DIVE STRUCTURE WITH ARCHITECTURAL TREATMENT
- NOISE BARRIER
- HEADLIGHT SCREEN
- THROWSCREEN
- VIADUCT ART SCREEN
- DESALINATION PIPELINE
- BRIDGE LOCATON
- BRIDGE SB xx — BRIDGE STRUCTURE No.
- RW xx — RETAINING WALL No.
- LIGHTING
- VIEW

PLANTING TYPES

- P1 - SPI INTERFACE MIX
- P2a - MOUND MIX A
- P2b - MOUND MIX B
- P3 - BANKSIA SCRUB MIX
- P4 - SWAMP OAK FLOODPLAIN FOREST
- P5 - MEDIAN & ISLAND PLANTING
- P6 - FEATURE PLANTING MIX
- P7 - VEGETATED CHANNEL MIX
- P8 - LOW THRESHOLD PLANTING MIX
- PROPOSED TREES

FOR DETAILS OF PLANTING TYPE MIXES, REFER TO CHAPTER 7.12

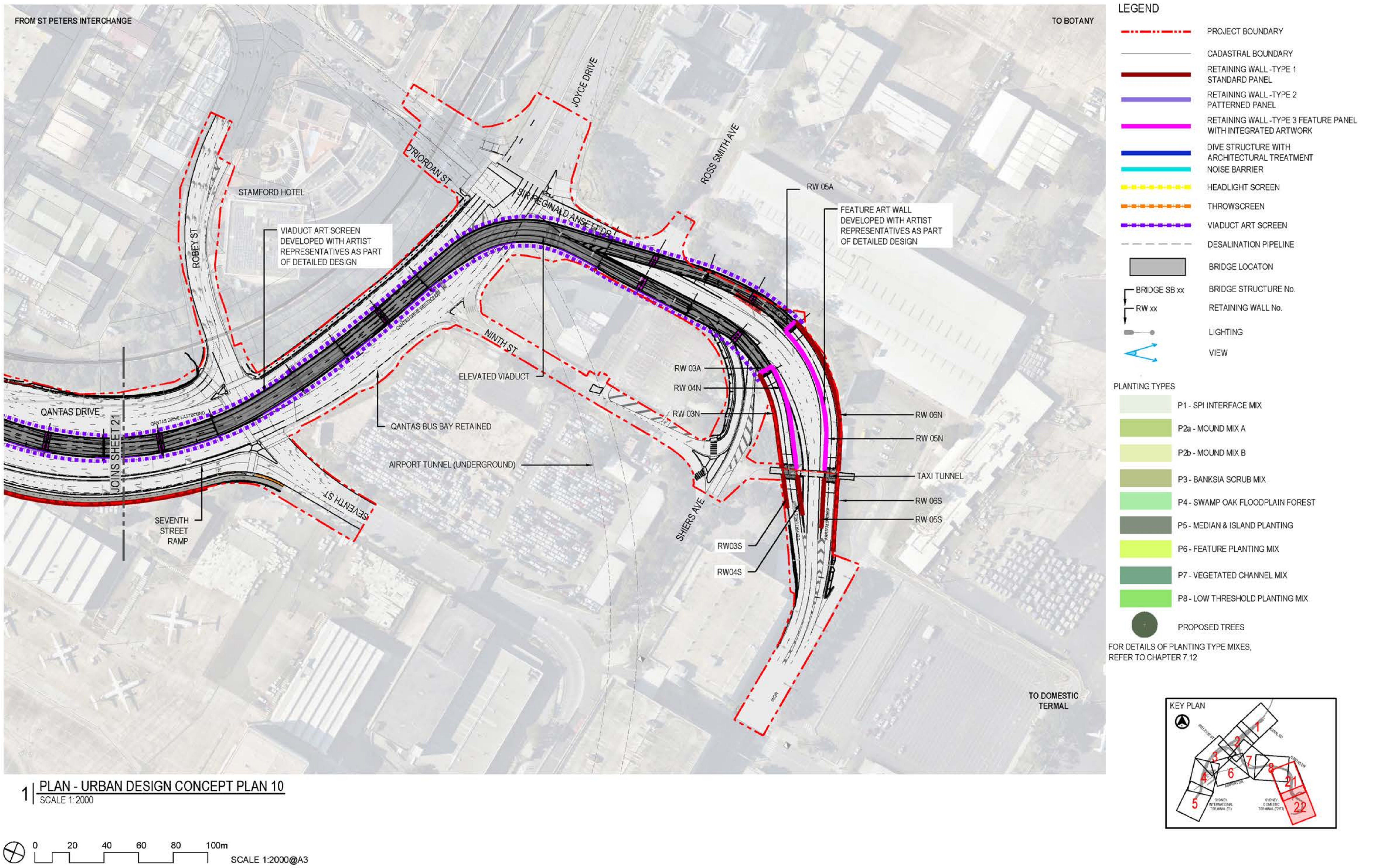


1 | PLAN - URBAN DESIGN CONCEPT PLAN 09
SCALE 1:2000

0 20 40 60 80 100m
SCALE 1:2000@A3

Figure 6-14. Urban design and landscape concept plan - 9 of 10

JOHN HOLLAND | SEYMOUR WHYTE | CM+ | CONTEXT | culturalcapital



1 | PLAN - URBAN DESIGN CONCEPT PLAN 10
SCALE 1:2000

Figure 6-15. Urban design and landscape concept plan - 10 of 10

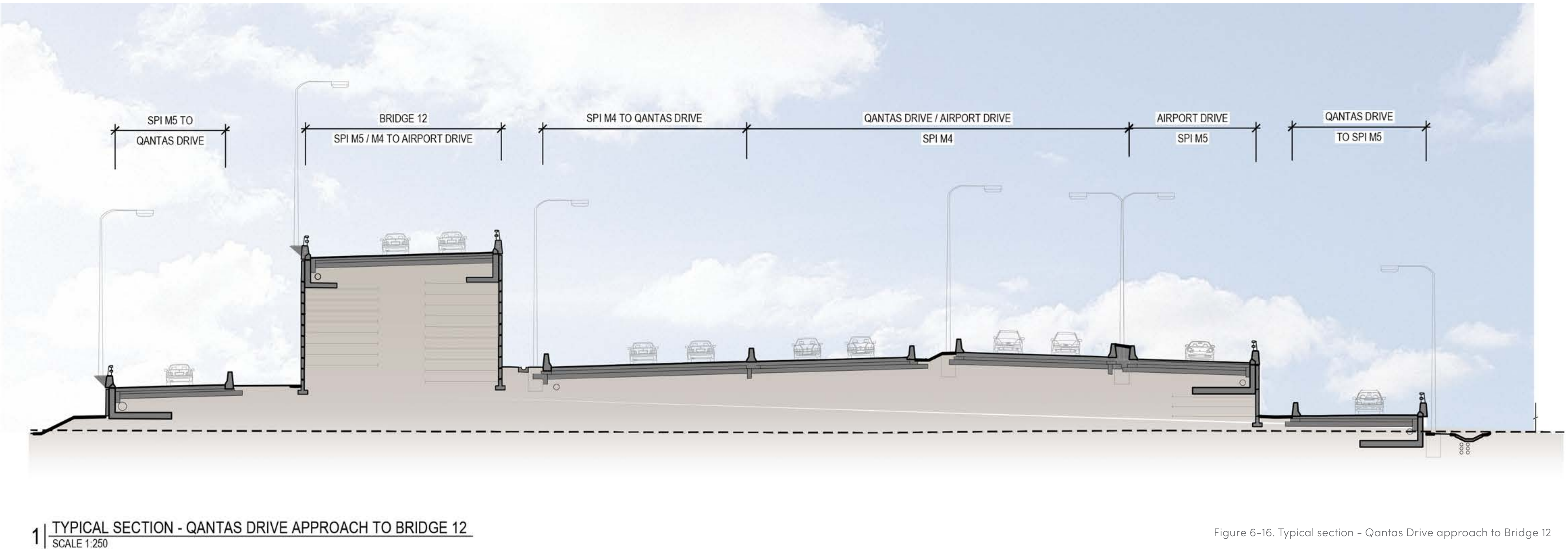


Figure 6-16. Typical section - Qantas Drive approach to Bridge 12

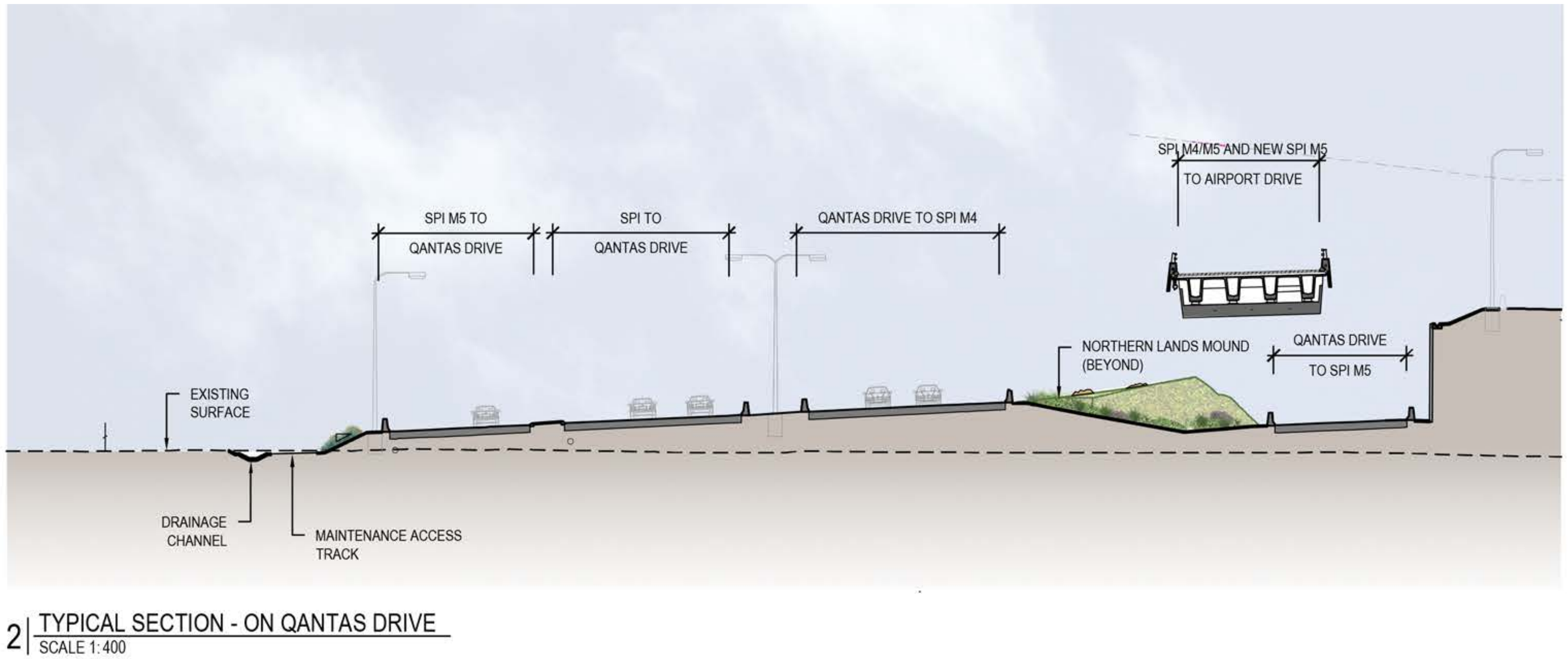


Figure 6-17. Typical section - Qantas Drive

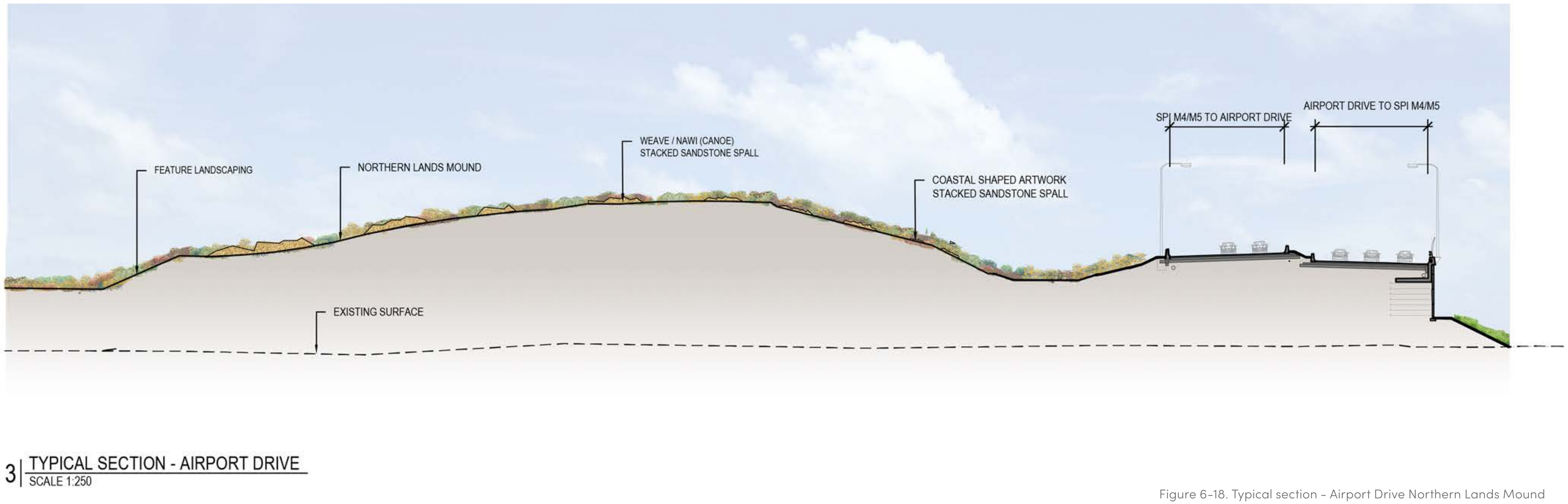


Figure 6-18. Typical section - Airport Drive Northern Lands Mound

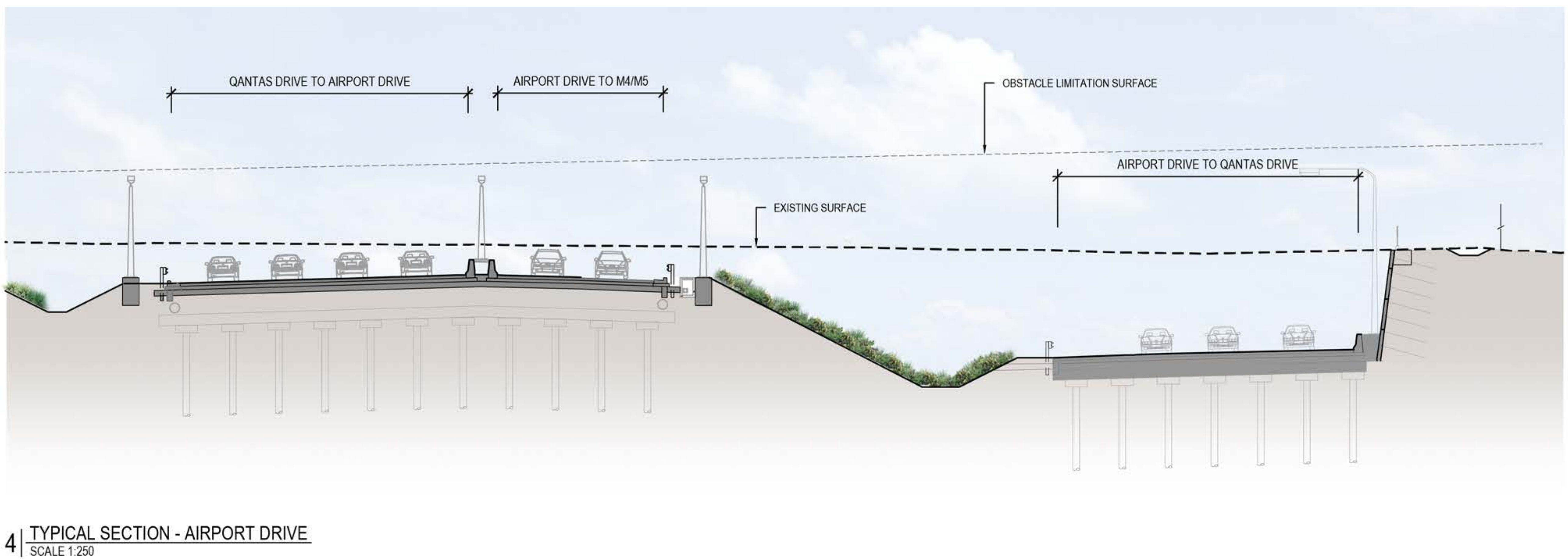


Figure 6-19. Typical section - Airport Drive

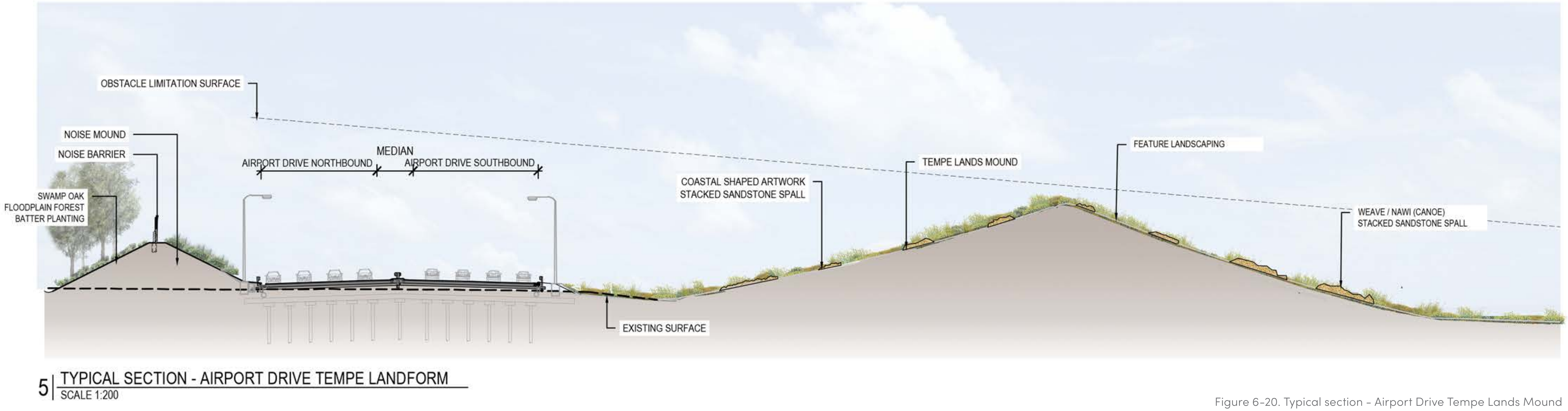


Figure 6-20. Typical section - Airport Drive Tempe Lands Mound

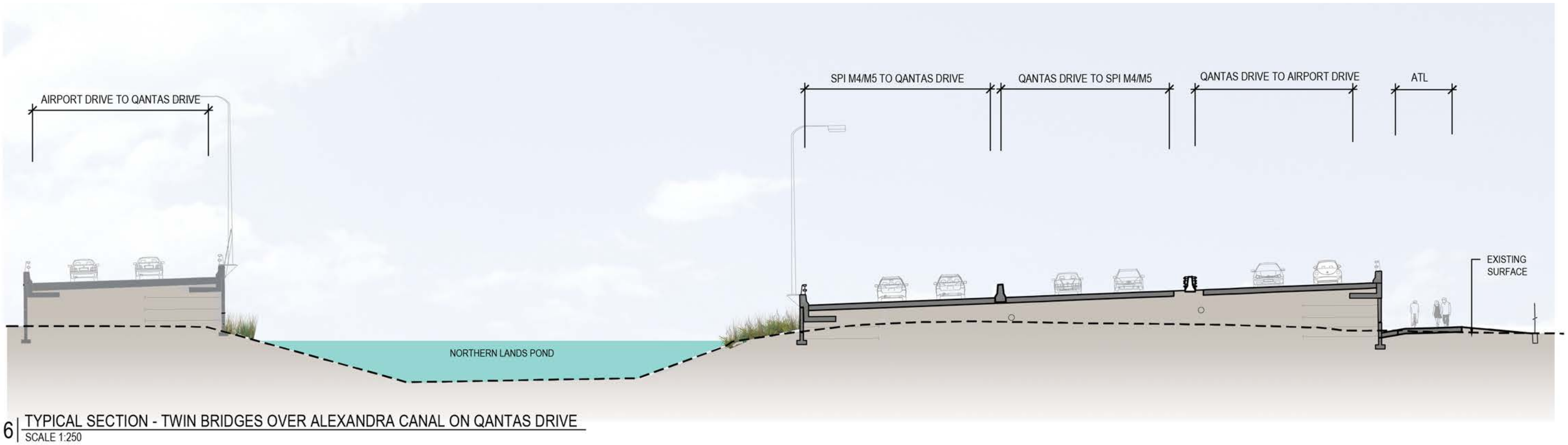
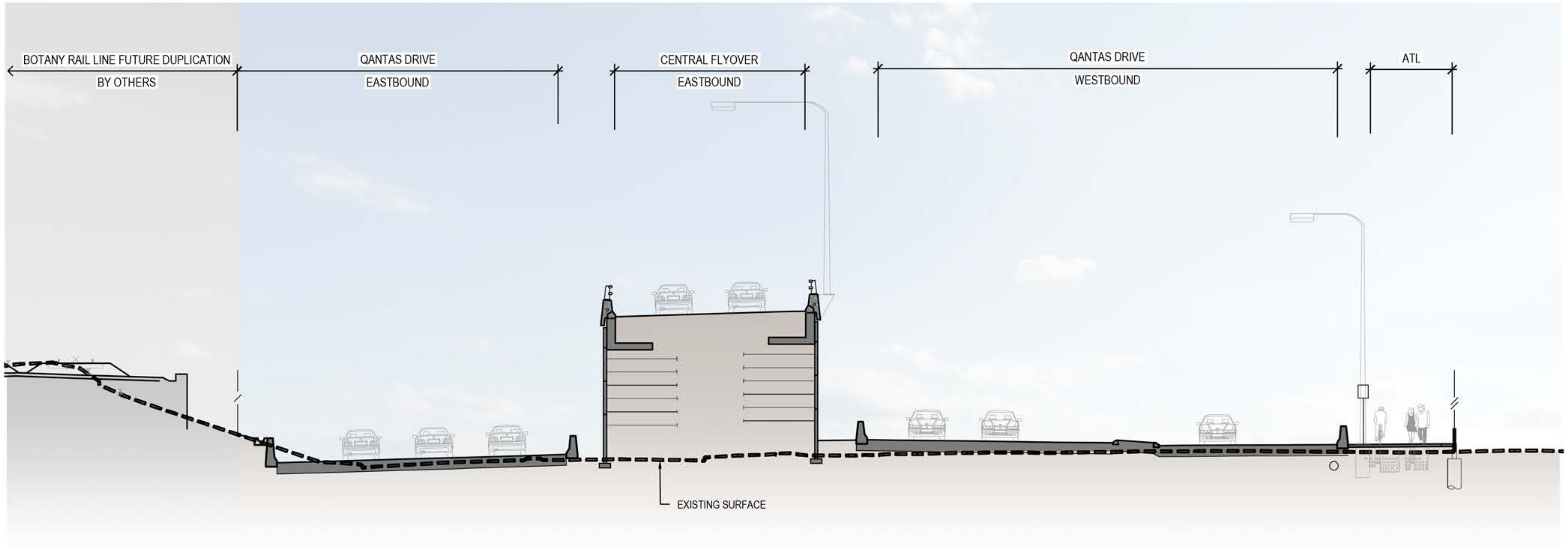


Figure 6-21. Typical section - Twin bridges over Alexandra Canal on Qantas Drive



7 | TYPICAL SECTION - ON QANTAS DRIVE CENTRAL FLYOVER
SCALE 1:200

Figure 6-22. Typical section - central flyover on Qantas Drive

Figure 6-23. Aerial view looking north with showing Tempe Masterplan overlay

Figure 6-24. Aerial view from St Peters Interchange

Figure 6-25. View looking south on Airport Drive at Tempe Lands Mound

Figure 6-26. View looking north on Airport Drive at Tempe Lands Mound

Figure 6-27. View looking north View looking north on Airport Drive

Figure 6-28. View of SB51 with feature tied network arches

The Project will provide enhanced vehicular and active transport connectivity to the airport, Sydney's largest hub, and enhance the 'gateway' experience.

Figure 6-29. Aerial view of Stage 3 of the Project showing connection into Stage 1 works

7. Design elements

The EIS / MDP outlines the major components of the design elements of the Project infrastructure. Drawing on the EIS and the urban design vision, objectives and concept design illustrated in the previous chapters of this report, the Project design elements have been categorised into two types:

- Continuous elements
- Punctuation elements.

The continuous elements are experienced as continuous connecting threads and provide for horizontal continuity and linear identity across the Project. They include:

- Bridges
- Retaining walls
- Noise walls
- Throwscreens and headlight screens
- Fencing and signage
- Corridor landscape.

The punctuation elements are developed as punctuation points, providing lateral identity within the visual field of the Project and serve as wayfinding points and visual references within this complex piece of infrastructure. They include:

- Northern Lands Mound
- Tempe Lands Mound
- Feature arched bridge at SB51.

As illustrated in the concept design, public art and historic and cultural interpretation has been woven into the design of the Project elements to reinforce the identity and sense of place. A co-design approach across all disciplines, has been realised in the design, including the integration of providing an Aboriginal narrative to the Project.

The design of all the Project elements has been undertaken so that they are perceived as a family of elements to provide a cohesive and unified design outcome for the Project.

Figure 7-1. Aerial view of the Project looking south with central interchange in the foreground

7.1 Bridges

Bridges are important design elements for the Project. Due to the nature of their physical characteristics, elevated geometries and long spans, they are highly visible elements, which can be seen from various locations and distances.

The Project has a complex network of roads traversing each other at different levels, a number of bridges are required to be provided along the alignment to ensure smooth and continuous travel.

The design has been refined based on the guiding principles outlined in the EIS / MDP and by simplifying the number of bridge structural types and adopting consistent detailing from a ‘kit of parts’ to ensure an elegant structural design is provided.

Bridges are also a key driver to incorporate placemaking initiatives and enhance the aesthetic identity on the Project, hence additional principles have been developed to ensure these initiatives are achieved.

Principles	Strategies
Structural systems are to be elegant and efficient	– Minimise number of bridge types, and maximise consistency in design and detailing of the bridge components.
Structural systems are to be elegant and efficient integrated for aesthetic benefit, including deck edges, soffits, headstocks, piers and above deck structures	– Provide opportunities to articulate the bridge components such as piers, headstocks etc, so that they have an architecturally treated profile and are read as one entity. – Provide architectural treatments to conceal services where they occur. Use the bridge components to frame views to feature landmarks. – Use light posts as integral elements of the whole composition.
All bridge types are capable of aesthetic refinement	– Provide a consistent kit of parts that can be applied to the bridge components across the Project – Provide architectural treatments as super graphic elements to highlight landmarks and provide for wayfinding.
Steel bridges generally offer the best aesthetic outcomes	– Minimise the depth of the structure and refine the bridge abutments, where possible – Provide seamless transitions between different structural types, where it is unavoidable to provide a consistent structure.
Use lighting to create symbolic qualities and wayfinding	– Use bridge components such as parapets, skirtings, abutment walls, handrails or feature elements such as arches to incorporate feature lighting.
Use colour for memorable visual effects and wayfinding	
Identify and design for where the bridges would be viewed from, including aeroplane windows.	
Integrated art	– Provide opportunities for cultural and heritage interpretation by integrating art, including Aboriginal art into the bridge design elements. – Provide opportunities to incorporate art on the bridge components such as abutments – Provide opportunities for adding form, texture, colour and pattern to enhance the visual aesthetic.
Maintenance	– Ensure materials and design accommodate maintenance including access to bridge components, appropriate selection of robust materials – Integrate maintenance access elements such as fall protection within the designed elements.

7.1.1 Family of forms – kit of parts

Bridge forms and structure

The design, form, materials and finishes of feature bridges allow for variety and create visual interest. They are provided as punctuation points to serve as visual markers as part of the user experience.

Attributes for feature bridges:

– High standard of bridge architecture

– Bridge aesthetics that provide a unique identity and appearance through form

– Feature lighting integrated to provide a holistic design.

The design, form, materials and finishes of the canal bridges are to be consistent across the Project to ensure visual continuity.

Attributes to canal bridges:

– Clean lines

– Sympathetic to the structural forms:

  - Superstructure

  - Integration to abutments

– Single span across canals

– Articulated steel girders (fish belly)

– Consistent outer edge appearance with articulated barriers and parapet profiles.

The design, form, materials and finishes of the road bridges are to provide a consistent aesthetic across the Project to ensure visual continuity.

Attributes to road bridges:

– Clean lines

– Sympathetic to the structural forms:

  - Superstructure

  - Integration to abutments

  - Integration with piers

– Super T girders with articulated headstocks

– Consistent outer edge appearance with articulated barriers and parapet profiles.

Parapets and piers

7.1.2 Bridge types and hierarchy

Further to the bridge types outlined in the EIS, they can be simplified into the following:

- Canal bridges and underpass – low-lying structures over Alexandra Canal mostly experienced by the ATL users providing interesting and open views of the landscape setting
- Road bridges and viaduct – mostly experienced by the motorists through open and closed views.

Broadly there are 14 bridges on the Project as follows:

- SB01 Bridge over Canal Road (towards City)
- SB02 Bridge over Canal Road (middle)
- SB03 Bridge over Canal Road (towards Airport)
- SB11 Underpass on Qantas Drive under Airport Drive
- SB12 Bridge over Qantas Drive
- SB21 Bridges over Alexandra Canal and Rail Line
- SB31 Bridge over Alexandra Canal T1 to T2 / T3 connection
- SB41 Bridge over Rail Line and Airport Drive North
- SB42 SYD Link Road Bridge
- SB51 Bridge over Alexandra Canal near international terminal
- SB61 Bridge over Alexandra Canal near Link Road
- SB71 Bridge over existing pipe culvert
- SB81 Nigel Love underpass
- SB91 Bridge on ATL over Alexandra Canal
- Viaduct flyover to domestic terminals.

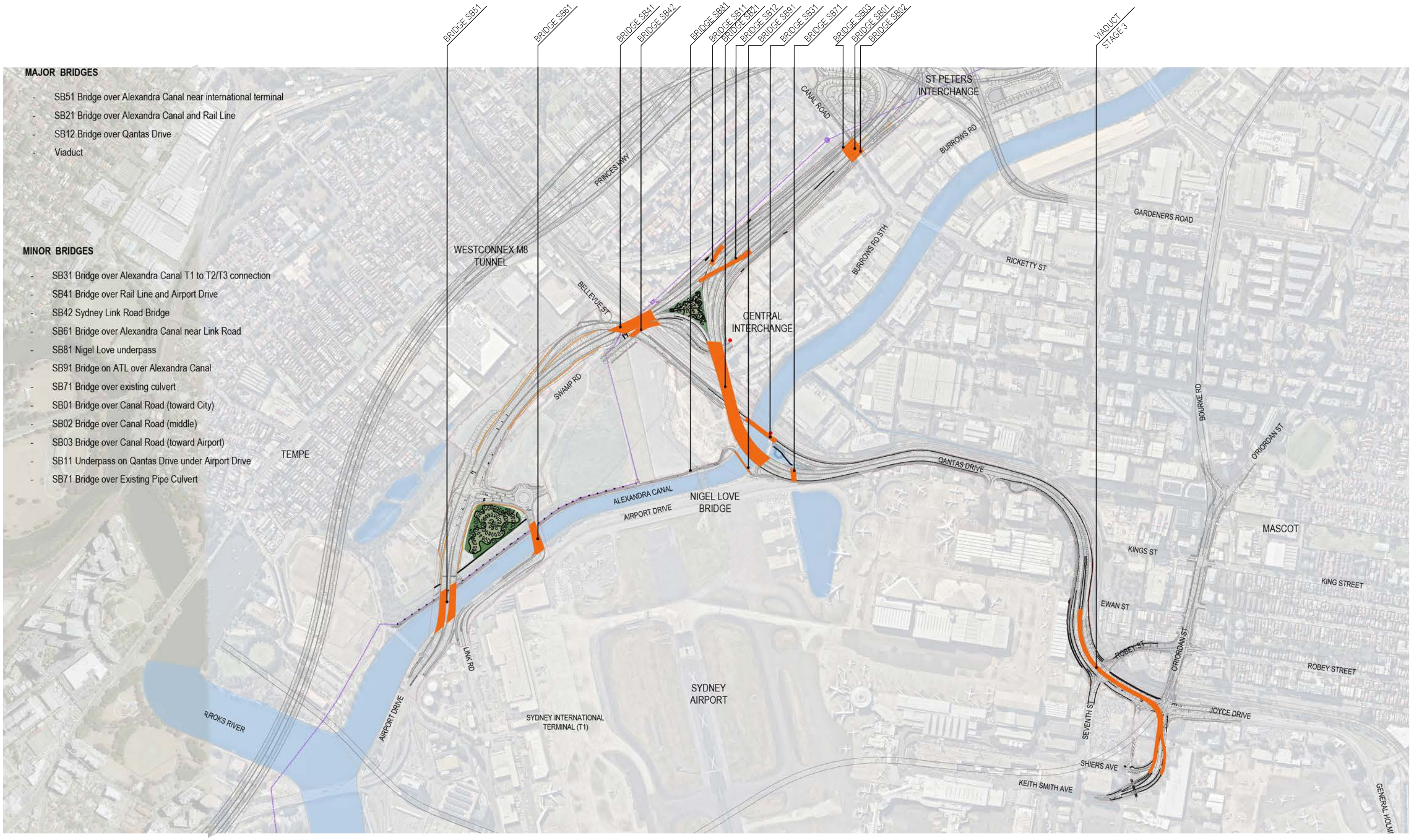
Based on their visual experience and importance, a bridge hierarchy has been developed and the bridges have been categorised into major bridges and other bridges and grouped as follows:

Major bridges

- SB51 Bridge over Alexandra Canal near International terminal
- SB21 Bridge over Alexandra Canal and Rail Line
- SB12 Bridge over Qantas Drive
- Viaduct.

Minor bridges

- SB31 Bridge over Alexandra Canal T1 to T2 / T3 connection
- SB41 Bridge over Rail Line and Airport Drive
- SB42 Sydney Link Road Bridge
- SB61 Bridge over Alexandra Canal near Link Road
- SB81 Nigel Love underpass
- SB91 Bridge on ATL over Alexandra Canal
- SB11 Bridge over existing pipe main.
- SB71 Bridge over existing pipe culvert
- SB01 Bridge over Canal Road (toward City),
- SB02 Bridge over Canal Road (middle)
- SB03 Bridge over Canal Road (toward Airport)



1 KEY PLAN - BRIDGES
SCALE 1:10000

0 100 200 300 400 500m
SCALE 1:10,000@A3

Figure 7-2. Project bridges key plan

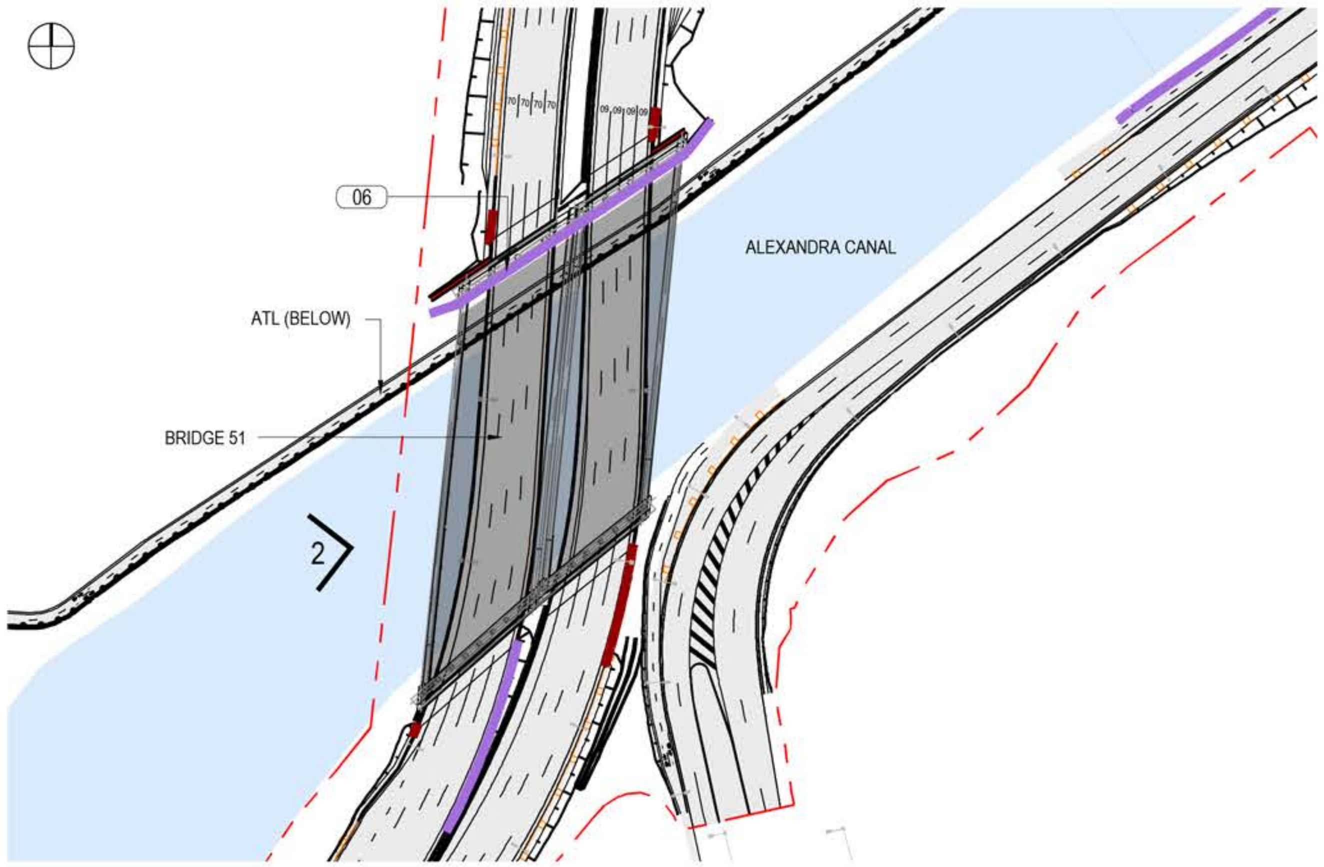
7.2 Major bridges

7.2.1 Bridge over Alexandra Canal near international terminal (SB51)

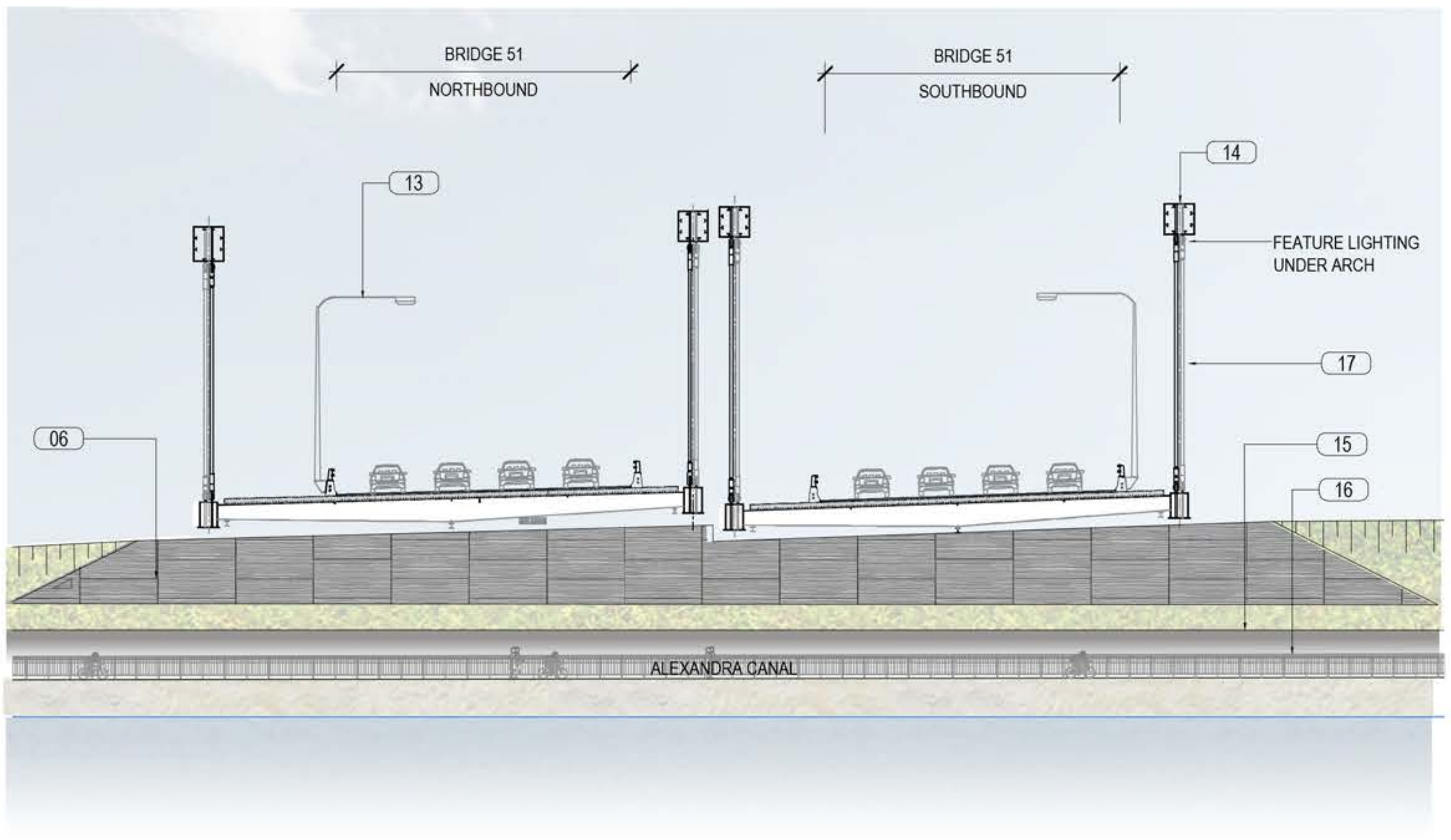
SB51 is located at Alexandra Canal along the northbound and southbound approaches to and from the international terminal. It comprises four feature tied network arches in a lightweight long span. Each carriageway carries four lanes of traffic. The profile of the arches vary in height and are articulated to be thicker at the bottom and thinner at the top to provide a dynamic and interesting aesthetic. The arch will enhance the ‘gateway’ experience to the international terminal and will be highly visible from a number of areas.

Superstructure		
Structure	**Parapets**	**Safety / headlight screens**
Tied network arch steel structure with four top and bottom steel box chords about 16-18 metres high and about 25 metres apart for each carriageway.	The bottom steel box chords are about 1.4 metres deep with twin rail barriers on the bridge deck.	Not required.
Bridge is straight, but the road alignment is curved.		
Steel stays within the arch about 100 millimetres thick.		
Cross beams support the bridge deck.		
Substructure		
Abutments	**Piers and headstocks**	
In general the abutments are cast-in-place sill beams on bored piles within reinforced soil walls.	Not required.	
Integrated art		
The arch and its articulated profile will service as a sculptural element.		
Feature Lighting		
Provided to highlight the arched profile		

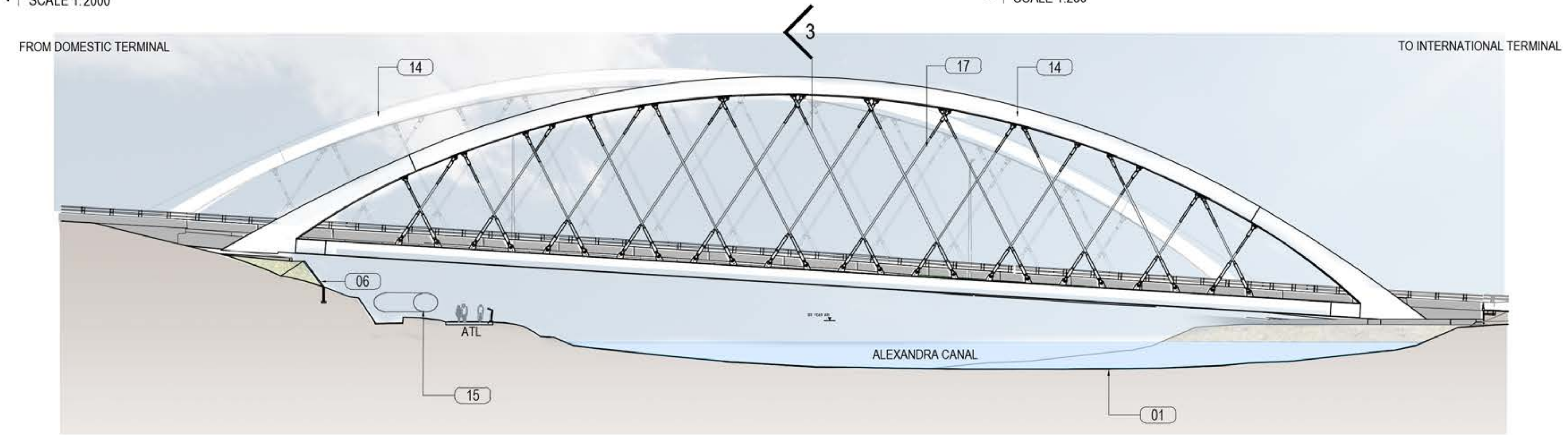
Figure 7-3. Aerial view of SB51 looking towards Tempe Lands Mound



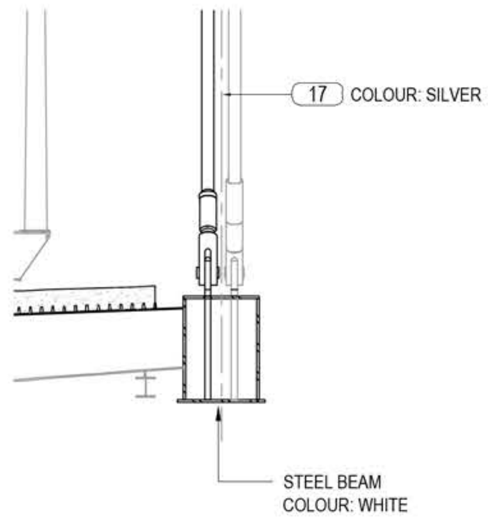
1 | PLAN - TWIN ARCH BRIDGES OVER ALEXANDRA CANAL NEAR INTERNATIONAL TERMINAL (SB51)
SCALE 1:2000



3 | TYPICAL SECTION - TWIN ARCH BRIDGES OVER ALEXANDRA CANAL NEAR INTERNATIONAL TERMINAL (SB51)
SCALE 1:250



2 | ELEVATION - TWIN ARCH BRIDGES OVER ALEXANDRA CANAL NEAR INTERNATIONAL TERMINAL (SB51)
SCALE 1:500



4 | TYPICAL EDGE DETAIL
SCALE 1:100

- 01 GROUND LINE
- 02 CONCRETE BRIDGE PIER WITH INTEGRATED HEADSTOCK
- 03 CONCRETE HEADSTOCK
- 04 CONCRETE SUPER T GIRDER
- 05 BRIDGE ABUTMENT
- 06 CONCRETE REINFORCED SOIL WALL
- 07 LANDSCAPED BATTER
- 08 ANTI-THROW SCREEN WITH MESH INFILL PANELS
- 09 CONCRETE TRAFFIC BARRIER WITH TWIN RAIL
- 10 SHADOW DETAIL
- 11 TYPE F BARRIER
- 12 OBSTACLE LIMITATION SURFACE
- 13 LIGHTING COLUMN
- 14 BRIDGE ARCH
- 15 DESALINATION MAIN
- 16 HANDRAIL/BALUSTRADE
- 17 CABLE STAYS
- 18 STEEL TROUGH GIRDER
- 19 CONCRETE PIER
- 20 HEADLIGHT SCREEN
- 21 BOX CONCRETE GIRDER
- 22 WEATHERED STEEL
- 23 ART SCREEN

Figure 7-4. SB51 – typical plan, elevation, section

Figure 7-5. Existing view of Alexandra Canal from existing shared path bridge

Figure 7-6. Proposed view of SB51 over Alexandra Canal from existing shared path bridge

Figure 7-7. Proposed view along SB51 southbound

Figure 7-8. Proposed view along SB51 northbound

Figure 7-9. View of SB51 from ATL looking south

Figure 7-10. View of SB31

7.2.2 Bridge over Alexandra Canal and rail line (SB21)

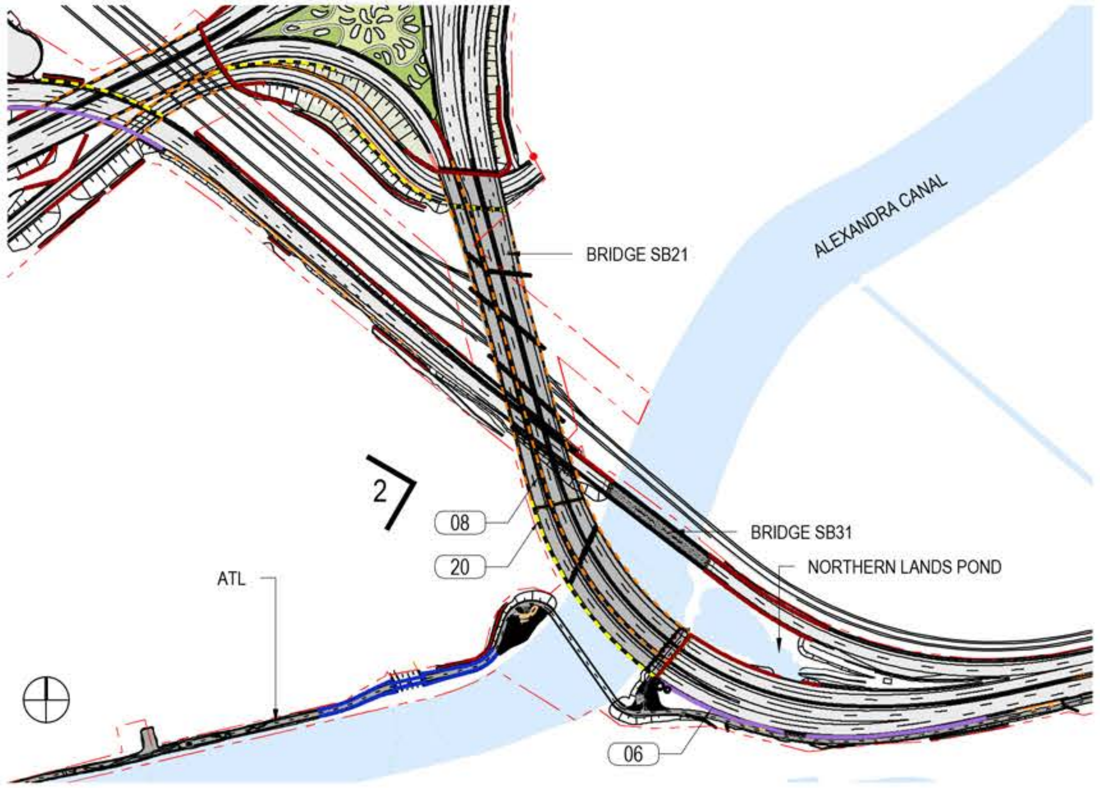
SB21 spans over the Alexandra Canal along the southbound and northbound directions to and from Terminals 2 / 3. The overall bridge length is about 350 metres and the alignment consists of two portions, totaling 8 spans:

- The portion over the railway line and the Terminals 2 / 3 Link Road (Airport Drive) is straight and is about 195 metres over five spans
- The portion over the canal and the ATL is curved and is about 155 metres over three spans
- The largest span is about 92 metres over the canal.

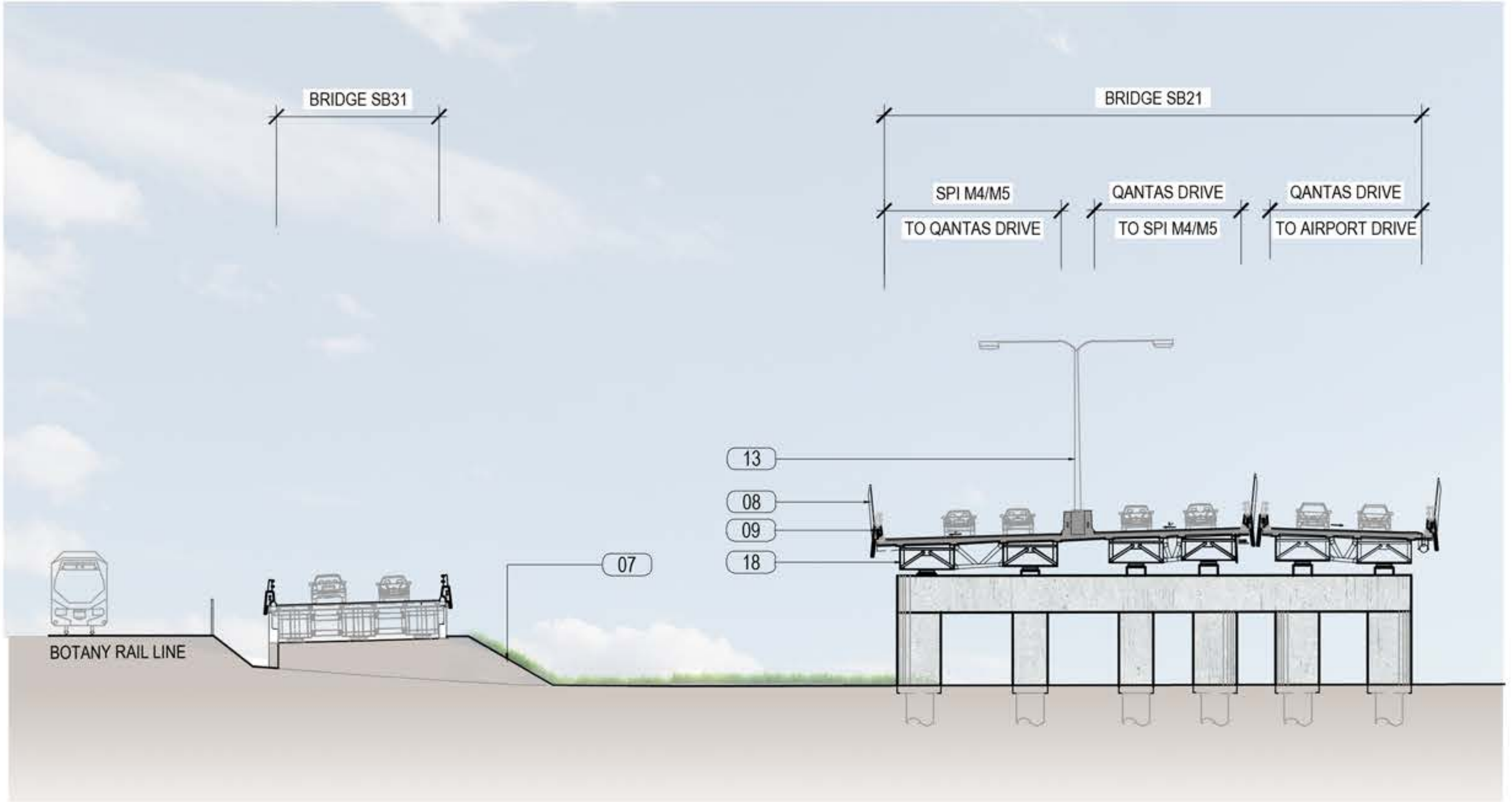
The main span over Alexandra Canal is formed of varying depth 'fish belly" steel trough girders with a composite deck, the rest of the superstructure is made of weathering steel with a composite deck and trough girders. There are three carriageways, two northbound and one southbound

Superstructure		
Structure	**Parapets**	**Safety / headlight screens**
Main span (Span 8) over Alexandra Canal: – A smooth curved 'fish belly" steel trough girders about four metres at mid span and two metres at end spans – End spans seamlessly tie into the Railway spans.	Simple tapered parapets with twin rail barriers, deep enough to conceal services.	Throwscreens over the railway line on all sides of all carriageways.
Spans over railway, ATL and Airport Drive (Spans 1-7): – Steel trough girders about 1.45 metres deep made of weathering steel with a composite deck, with transitions to the fish belly at the end span of span eight.		Headlight screen on the southern side of the southbound carriageway.
The bridge has a smooth, curved profile.		Seamless transition between headlight screen and throwscreen.
Substructure		
Abutments	**Piers and headstocks**	
In general the abutments are cast-in-place sill beams on bored piles within reinforced soil walls.	Blade piers (solid) to suit railway requirements over the railway spans (piers 2-5).	
	Blade piers (with openings) over Airport Drive and ATL (piers 1,6,7)	
	Single long span over Alexandra Canal.	
Integrated art		
Provided along parts of Abutment B.		

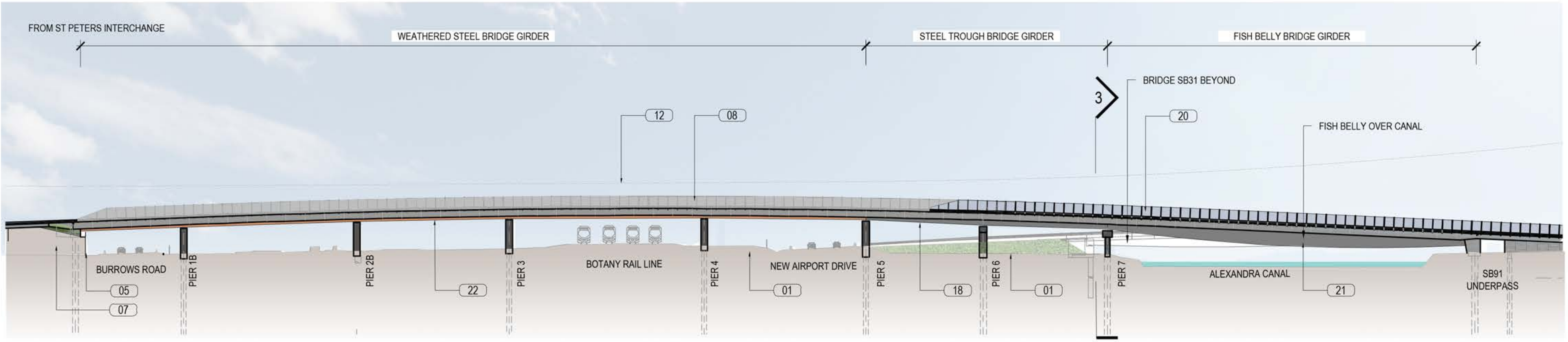
Figure 7-11. SB21 – undercroft



1 | PLAN - BRIDGE OVER ALEXANDRA CANAL & RAIL LINE (SB21)
SCALE 1:5000



3 | SECTION - BRIDGE OVER ALEXANDRA CANAL & RAIL LINE (SB21)
SCALE 1:400



2 | ELEVATION - BRIDGE OVER ALEXANDRA CANAL & RAIL LINE (SB21)
SCALE 1:1000

01	GROUND LINE	06	CONCRETE REINFORCED SOIL WALL	11	TYPE F BARRIER	16	HANDRAIL/BALUSTRADE	21	BOX CONCRETE GIRDER
02	CONCRETE BRIDGE PIER WITH INTEGRATED HEADSTOCK	07	LANDSCAPED BATTER	12	OBSTACLE LIMITATION SURFACE	17	CABLE STAYS	22	WEATHERED STEEL
03	CONCRETE HEADSTOCK	08	ANTI-THROW SCREEN WITH MESH INFILL PANELS	13	LIGHTING COLUMN	18	STEEL TROUGH GIRDER	23	ART SCREEN
04	CONCRETE SUPER T GIRDER	09	CONCRETE TRAFFIC BARRIER WITH TWIN RAIL	14	BRIDGE ARCH	19	CONCRETE PIER		
05	BRIDGE ABUTMENT	10	SHADOW DETAIL	15	DESALINATION MAIN	20	HEADLIGHT SCREEN		

Figure 7-12. SB21 – typical plan, elevation, section

Figure 7-13. Existing view of Alexandra Canal from Nigel Love Bridge

Figure 7-14. Proposed view of SB21 and SB31 over Alexandra Canal from Nigel Love Bridge

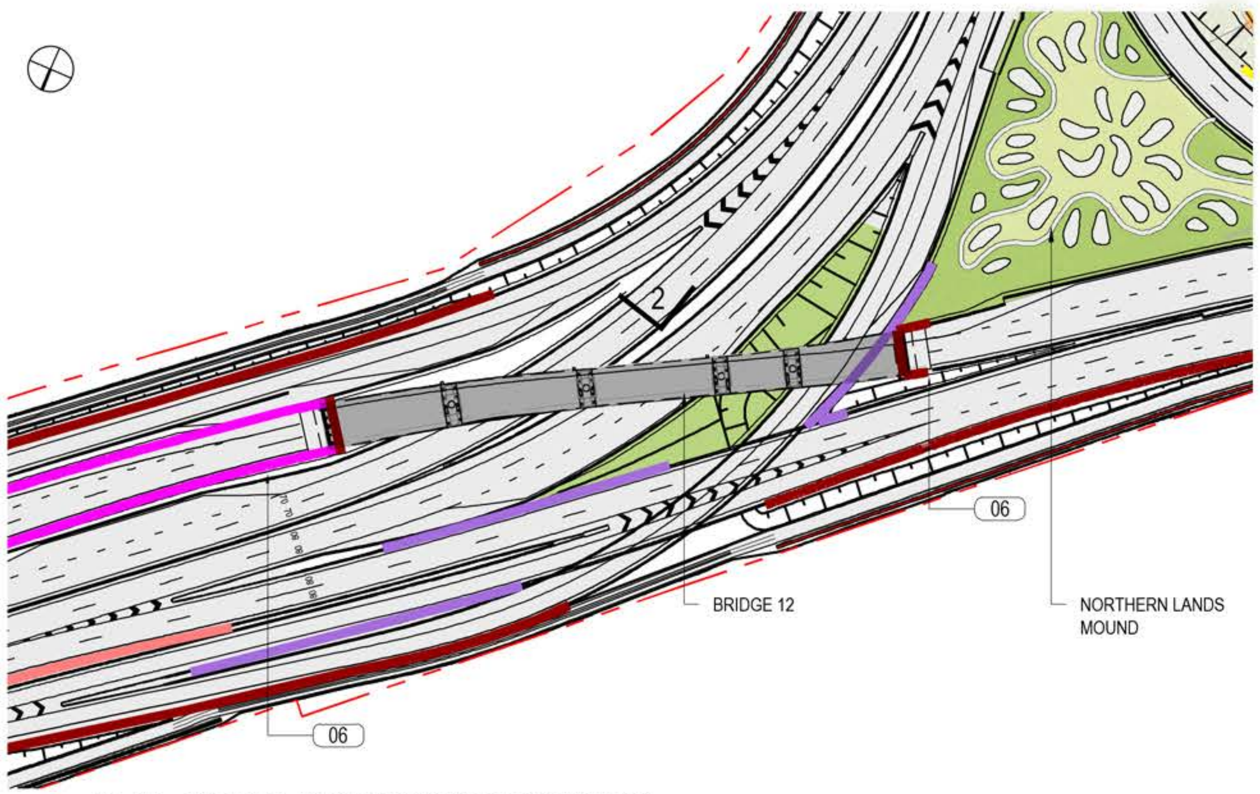
Figure 7-15. View of SB21 from Airport Drive looking east

7.2.3 Bridge over Qantas Drive (SB12)

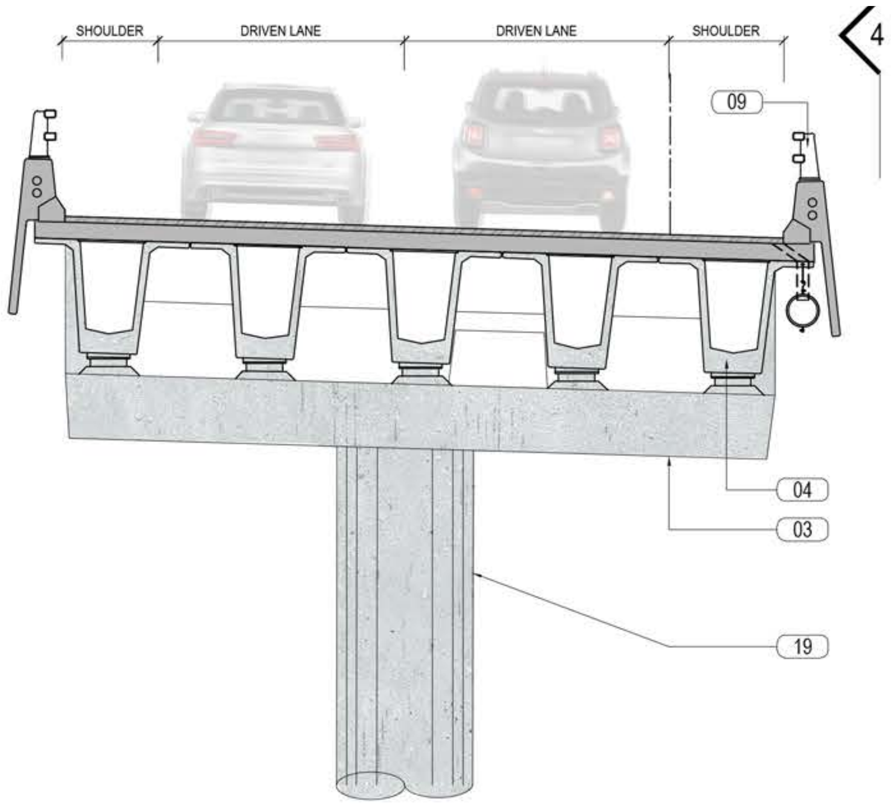
SB12 is located over Qantas Drive at the central interchange. It comprises of one carriageway with an overall length of about 155 metres over five spans. The carriageway carries two lanes of traffic. The bridge serves as the southbound access from SPI to the international terminal. The bridge provides for framed views of SPI and SB21 / SB31 as one traverses along Qantas Drive under SB12.

Superstructure		
Structure	**Parapets**	**Safety / headlight screens**
1.5 metres deep simply supported Super T girders.	Simple, clean tapered parapets designed to conceal services and reduce visual impact of the Super T girders	Not required.
Span arrangements are well proportioned with equal middle spans where the roadway passes.	Services are concealed.	
Substructure		
Abutments	**Piers and headstocks**	
Abutments are formed with piles and headstock behind reinforced soil wall	Simple circular profile for the piers.	
	An articulated and architecturally treated headstock, which includes a flap to conceal the inverted T profile of the headstock and provide a clean aesthetic to provide an integrated pier-headstock.	
Integrated art		
Provided along the sides of the northern abutment walls.		

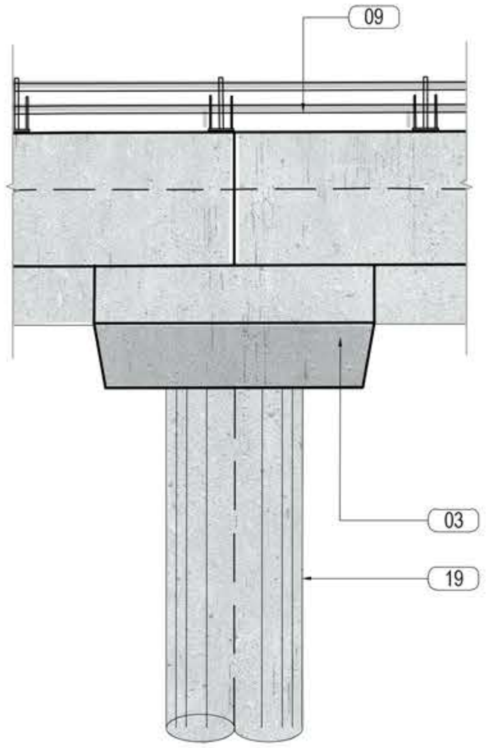
Figure 7-16. View of SB12 with Northern Lands Mound in the foreground



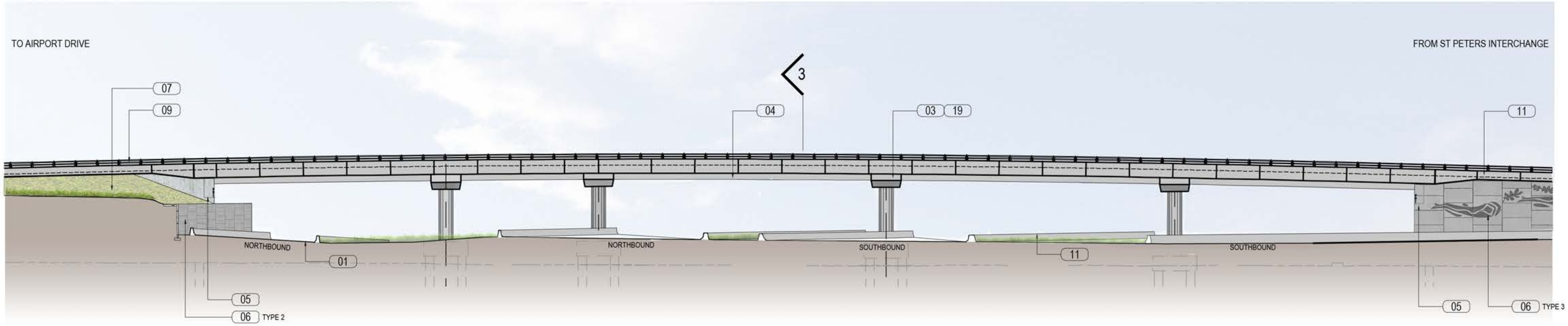
1 | PLAN - BRIDGE OVER QANTAS DRIVE (SB12)
SCALE 1:2000



3 | TYPICAL BRIDGE SECTION
SCALE 1:100



4 | TYPICAL ELEVATION - BRIDGE PIER
SCALE 1:100



2 | ELEVATION - BRIDGE OVER QANTAS DRIVE (SB12)
SCALE 1:500

01 GROUND LINE	06 CONCRETE REINFORCED SOIL WALL	11 TYPE F BARRIER	16 HANDRAIL/BALUSTRADE	21 BOX CONCRETE GIRDER
02 CONCRETE BRIDGE PIER WITH INTEGRATED HEADSTOCK	07 LANDSCAPED BATTER	12 OBSTACLE LIMITATION SURFACE	17 CABLE STAYS	22 WEATHERED STEEL
03 CONCRETE HEADSTOCK	08 ANTI-THROW SCREEN WITH MESH INFILL PANELS	13 LIGHTING COLUMN	18 STEEL TROUGH GIRDER	23 ART SCREEN
04 CONCRETE SUPER T GIRDER	09 CONCRETE TRAFFIC BARRIER WITH TWIN RAIL	14 BRIDGE ARCH	19 CONCRETE PIER	
05 BRIDGE ABUTMENT	10 SHADOW DETAIL	15 DESALINATION MAIN	20 HEADLIGHT SCREEN	

Figure 7-17. SB12 – typical plan, elevation, section

Figure 7-18. View towards SB21 with type 3 retaining wall in the foreground

Figure 7-19. View of SB12 from Qantas Drive

7.2.4 Viaduct

The viaduct is located on Qantas Drive and extends from about 400 metres south of Qantas Catering Bridge to Domestic Terminals 2 / 3. It is a 545 metre long bridge with about 16 spans and is designed to relieve congestion and improve access to the airport domestic terminals.

The viaduct is 10.4 metres wide between barriers over Qantas Drive. It widens to about 12 metres between barriers as it curves over to Sir Reginald Ansett Drive. It then bifurcates over Sir Reginald Ansett Drive where it splits into the arrivals ramp and departures ramp, which are 6.8 metres wide between barriers each.

The viaduct passes over two local road intersections at Robey Street / Seventh Street and O'Riordan Street / Sir Reginald Ansett Drive. Equal span lengths cannot be achieved due to operational and physical constraints.

A key feature of the viaduct is the consistent vertical profile of structural elements along its length. A consistent depth of 1500 millimetres for the Super T and steel box girders has been used. The piers and headstocks have a consistent design aesthetic and, although they vary in size, they have been designed as a family of forms to be proportional to the overall composition of the bridge. To provide a more refined appearance to the structure, and to celebrate this location as a 'gateway' experience, a continuous perforated metal art screen has been introduced along both sides.

The art screen extends the weaving narrative of the mounds to this location. It will form a major part of the user experience for those travelling both along the ground and the elevated road surfaces of the viaduct. The art screen features perforated aluminium screen panels with an artwork pattern that is integrated into the design of the screen. The panels will have a powdercoated finish with an anodised look, which will provide a reflective quality to the screen that will pick up on the nuances of the natural light. A neutral colour has been provided which will have the ability to project and capture light and shadow through and from the perforations during various parts of the day and night. A three dimensional element has been introduced by projecting some of the weave patterns to provide an additional layer of expression for the artwork.

The artwork references the weaving patterns and the nawi (canoe) which are abstracted into the art form to create a timeless and a powerful expression for the screen. The artwork sequence has been developed to be flexible and is random enough that it can be easily incorporated into the panels.

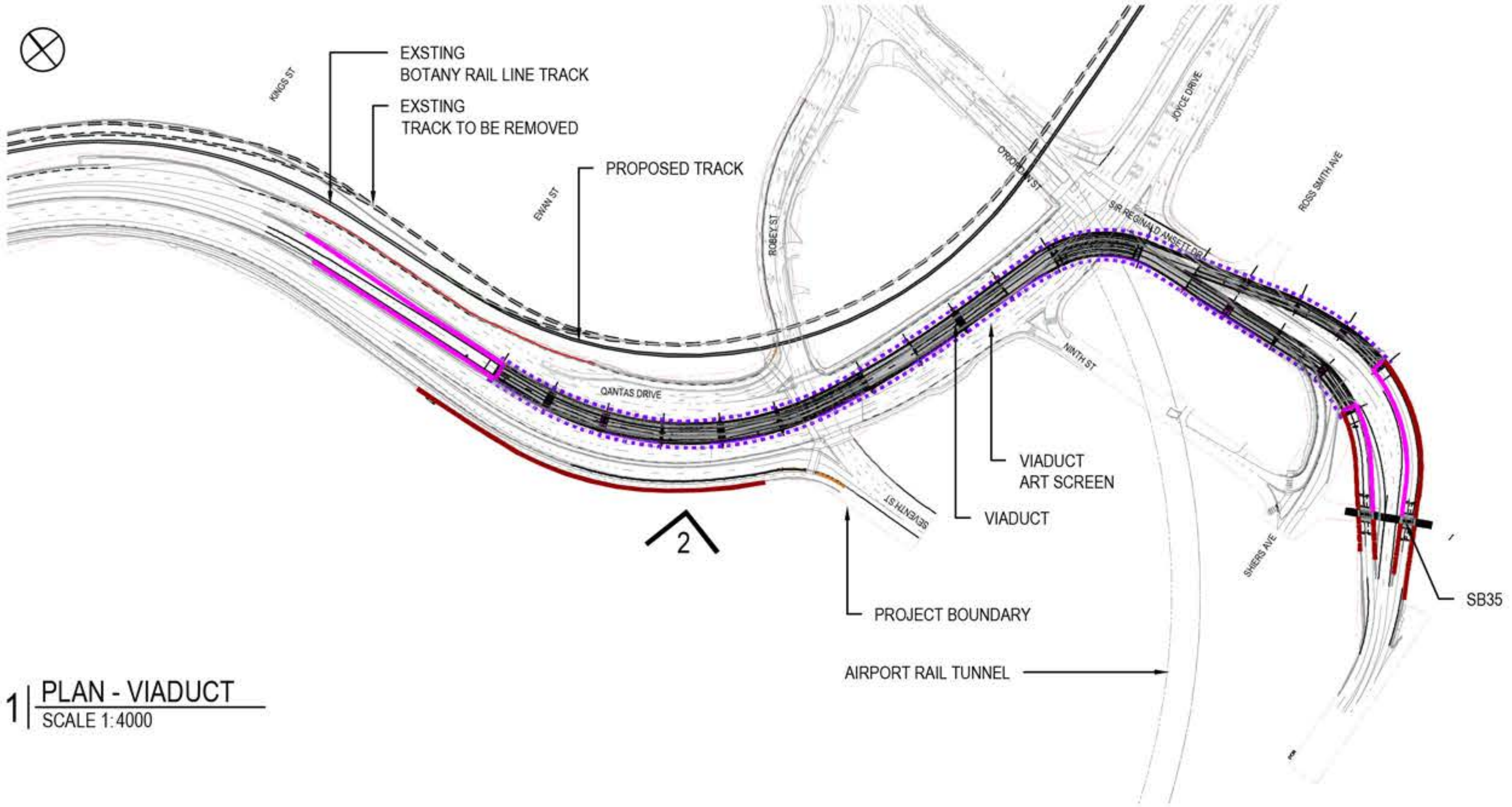
Feature lighting in the form of backlighting has been incorporated into the design which provides a temporal experience and strengthens the relationship between the viaduct and the arch bridges creating synergies between the domestic and international terminals.

Figure 7-20. Aerial view of Stage 3 showing the viaduct

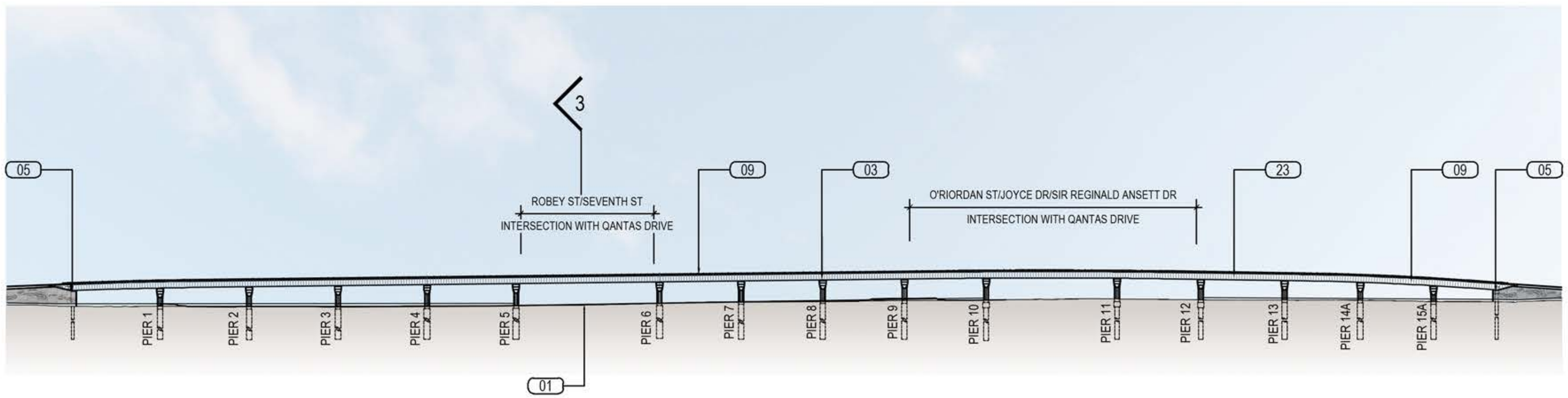
Superstructure		
Structure	**Parapets**	**Safety / headlight screens**
The bridge structure comprises 1500 millimetre Super T's over various spans.	Feature art screen in metal to provide a sinuous visual aesthetic to the superstructure and to conceal services.	Not required.
Substructure		
Abutments	**Piers and headstocks**	
Abutments are formed with piles and headstocks behind reinforced soil walls.	Articulated piers and headstocks developed form a consistent family of forms.	
Integrated art		
Artwork incorporated at the abutments and retaining walls, and an art screen along the length of the viaduct to provide Aboriginal cultural and heritage interpretation developed by artist representatives.		

Artist impression
Drawing is illustrative only and landscape shown is indicative

Figure 7-21. View along Qantas Drive looking south



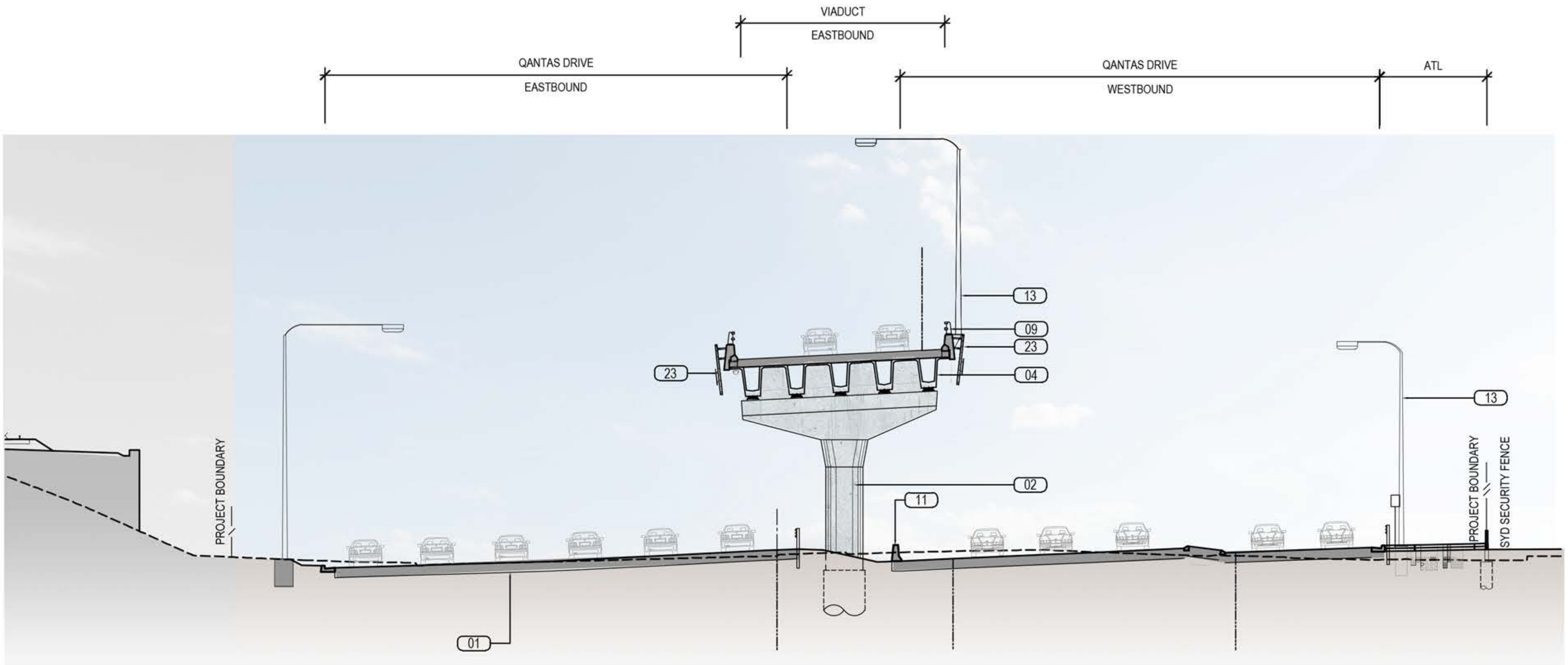
1 | PLAN - VIADUCT
SCALE 1:4000



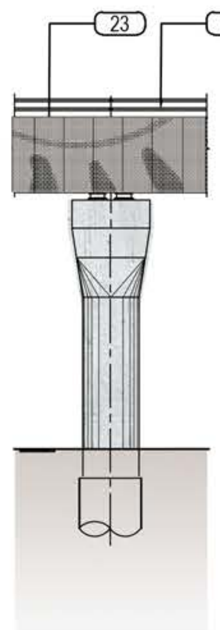
2 | ELEVATION - VIADUCT
SCALE 1:2000

- 01 GROUND LINE
- 02 CONCRETE BRIDGE PIER WITH INTEGRATED HEADSTOCK
- 03 CONCRETE HEADSTOCK
- 04 CONCRETE SUPER T GIRDER
- 05 BRIDGE ABUTMENT
- 06 CONCRETE REINFORCED SOIL WALL
- 07 LANDSCAPED BATTER
- 08 ANTI-THROW SCREEN WITH MESH INFILL PANELS
- 09 CONCRETE TRAFFIC BARRIER WITH TWIN RAIL
- 10 SHADOW DETAIL
- 11 TYPE F BARRIER
- 12 OBSTACLE LIMITATION SURFACE
- 13 LIGHTING COLUMN
- 14 BRIDGE ARCH
- 15 DESALINATION MAIN
- 16 HANDRAIL/BALUSTRADE
- 17 CABLE STAYS
- 18 STEEL TROUGH GIRDER
- 19 CONCRETE PIER
- 20 HEADLIGHT SCREEN
- 21 BOX CONCRETE GIRDER
- 22 WEATHERED STEEL
- 23 ART SCREEN

Figure 7-22. Viaduct - typical plan, elevation



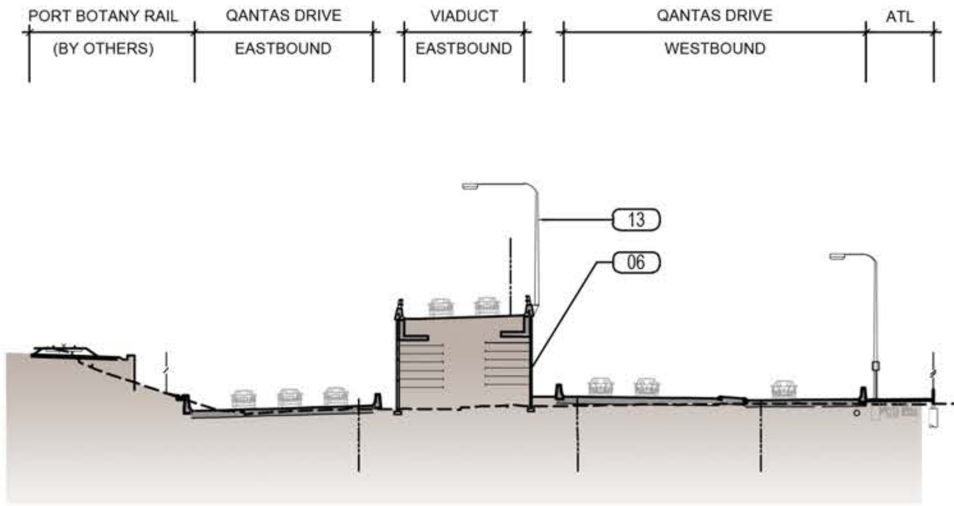
3 | TYPICAL SECTION - VIADUCT
SCALE 1:250



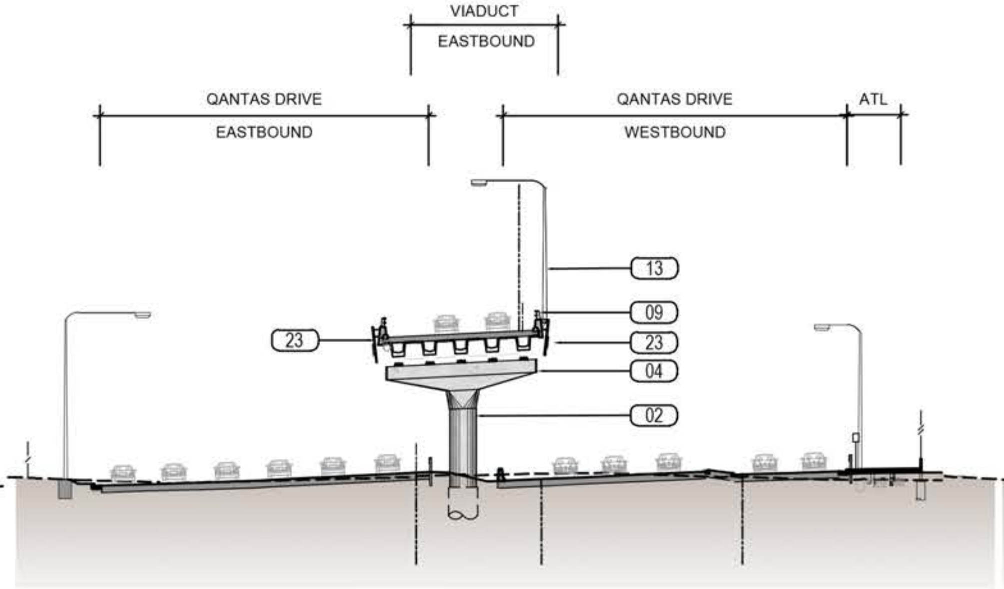
3 | TYPICAL ELEVATION - PIER
SCALE 1:250

01 GROUND LINE
02 CONCRETE BRIDGE PIER WITH INTEGRATED HEADSTOCK
03 CONCRETE HEADSTOCK
04 CONCRETE SUPER T GIRDER
05 BRIDGE ABUTMENT
06 CONCRETE REINFORCED SOIL WALL
07 LANDSCAPED BATTER
08 ANTI-THROW SCREEN WITH MESH INFILL PANELS
09 CONCRETE TRAFFIC BARRIER WITH TWIN RAIL
10 SHADOW DETAIL
11 TYPE F BARRIER
12 OBSTACLE LIMITATION SURFACE
13 LIGHTING COLUMN
14 BRIDGE ARCH
15 DESALINATION MAIN
16 HANDRAIL/BALUSTRADE
17 CABLE STAYS
18 STEEL TROUGH GIRDER
19 CONCRETE PIER
20 HEADLIGHT SCREEN
21 BOX CONCRETE GIRDER
22 WEATHERED STEEL
23 ART SCREEN

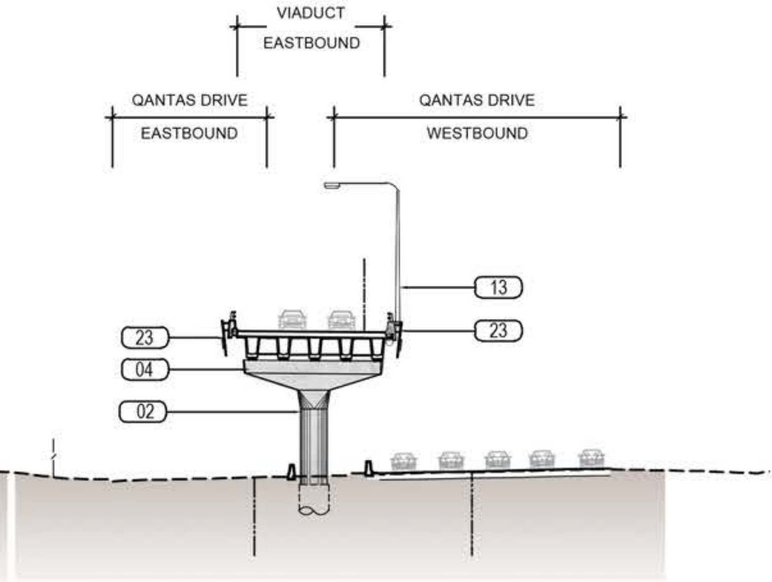
Figure 7-23. Viaduct - typical section



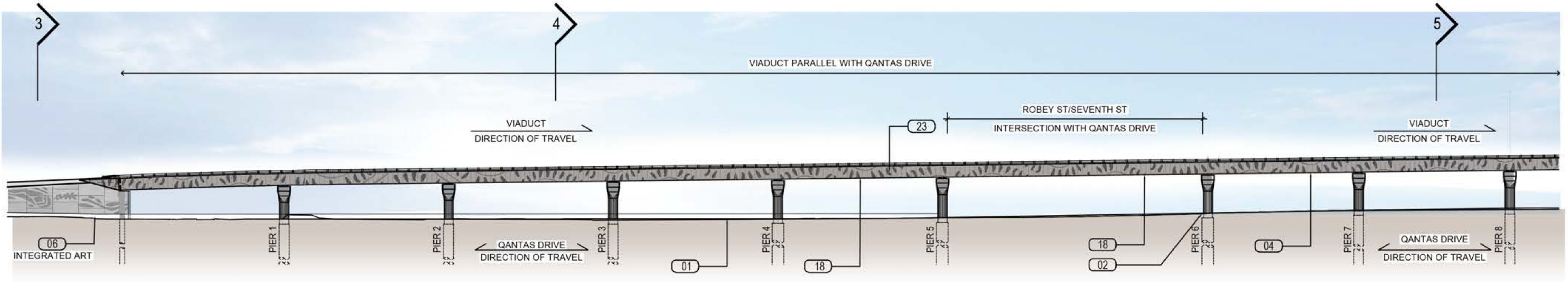
3 BRIDGE SECTION - QANTAS DRIVE ABUTMENT
SCALE 1:1000



4 BRIDGE SECTION - QANTAS DRIVE
SCALE 1:1000



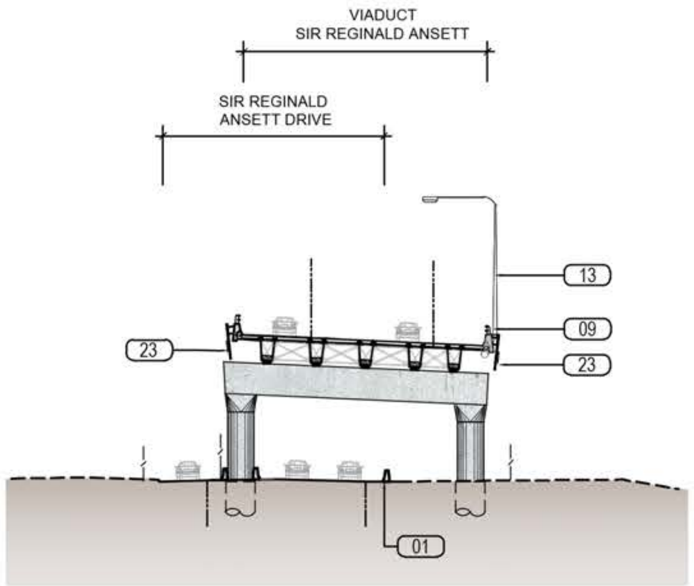
5 BRIDGE SECTION - QANTAS DRIVE
SCALE 1:1000



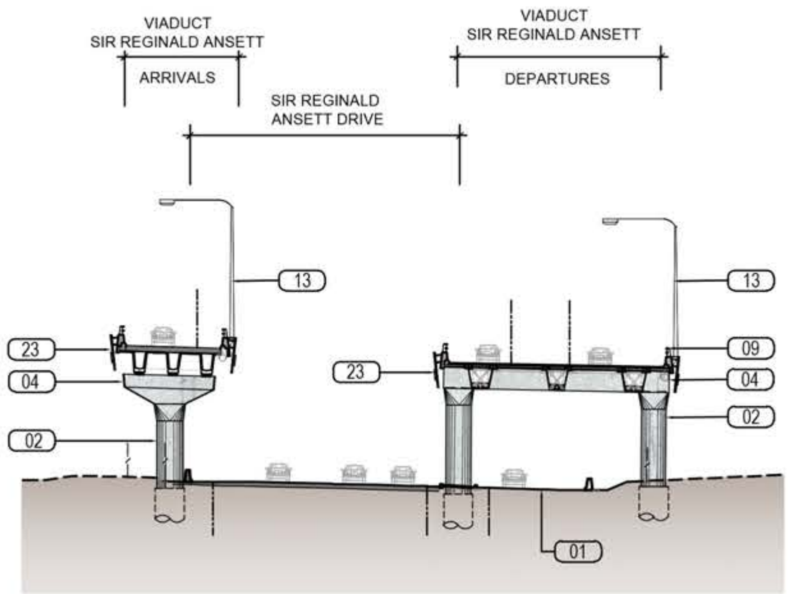
1 VIADUCT ELEVATION - QANTAS DRIVE
SCALE 1:1000

- 01 GROUND LINE
- 02 CONCRETE BRIDGE PIER WITH INTEGRATED HEADSTOCK
- 03 CONCRETE HEADSTOCK
- 04 CONCRETE SUPER T GIRDER
- 05 BRIDGE ABUTMENT
- 06 CONCRETE REINFORCED SOIL WALL
- 07 LANDSCAPED BATTER
- 08 ANTI-THROW SCREEN WITH MESH INFILL PANELS
- 09 CONCRETE TRAFFIC BARRIER WITH TWIN RAIL
- 10 SHADOW DETAIL
- 11 TYPE F BARRIER
- 12 OBSTACLE LIMITATION SURFACE
- 13 LIGHTING COLUMN
- 14 BRIDGE ARCH
- 15 DESALINATION MAIN
- 16 HANDRAIL/BALUSTRADE
- 17 CABLE STAYS
- 18 STEEL TROUGH GIRDER
- 19 CONCRETE PIER
- 20 HEADLIGHT SCREEN
- 21 BOX CONCRETE GIRDER
- 22 WEATHERED STEEL
- 23 ART SCREEN

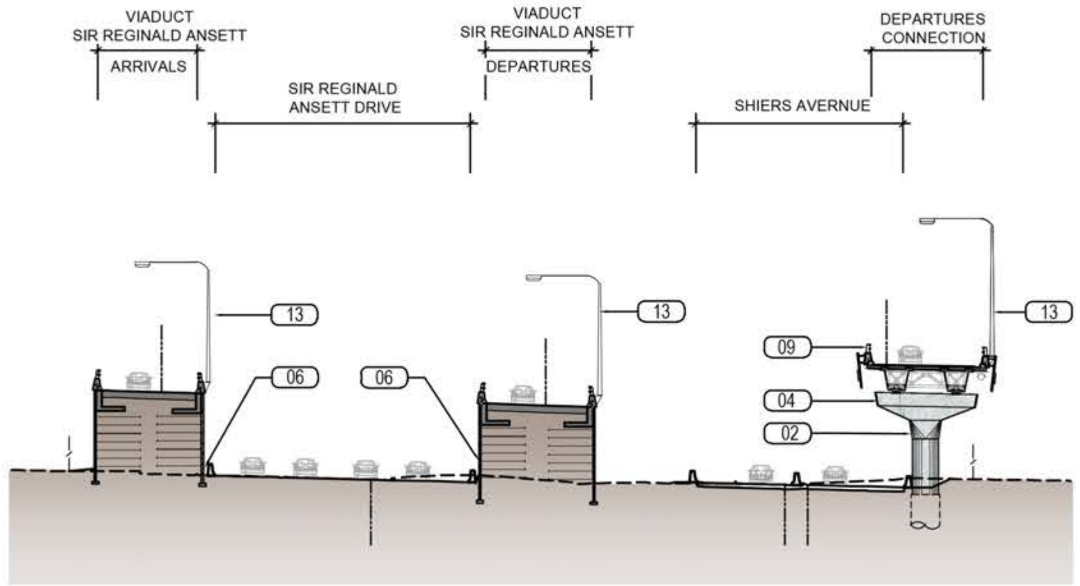
Figure 7-24. Viaduct - typical section Qantas Drive



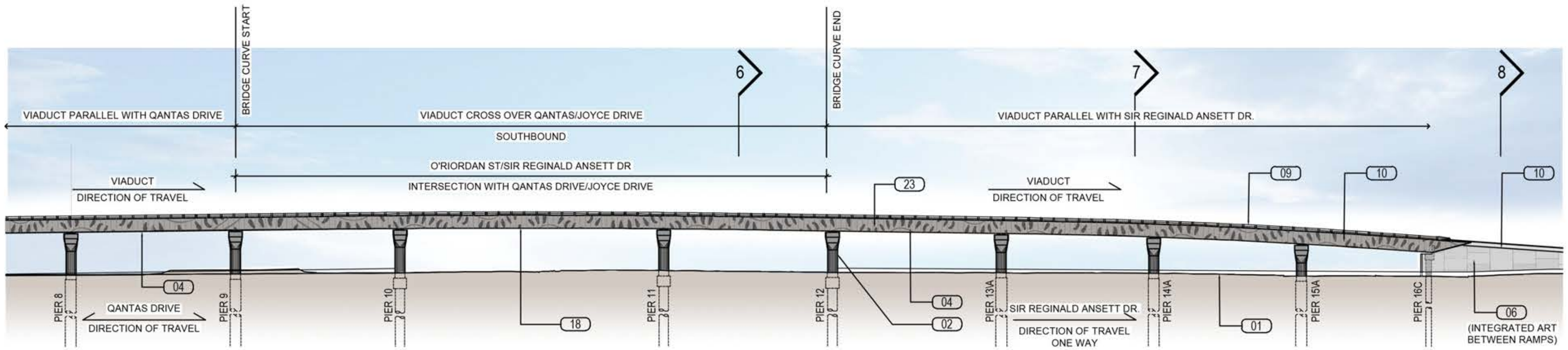
6 | BRIDGE SECTION - SIR REGINALD ANSETT DR.
SCALE 1:1000



7 | BRIDGE SECTION - DOMESTIC AIRPORT
SCALE 1:1000



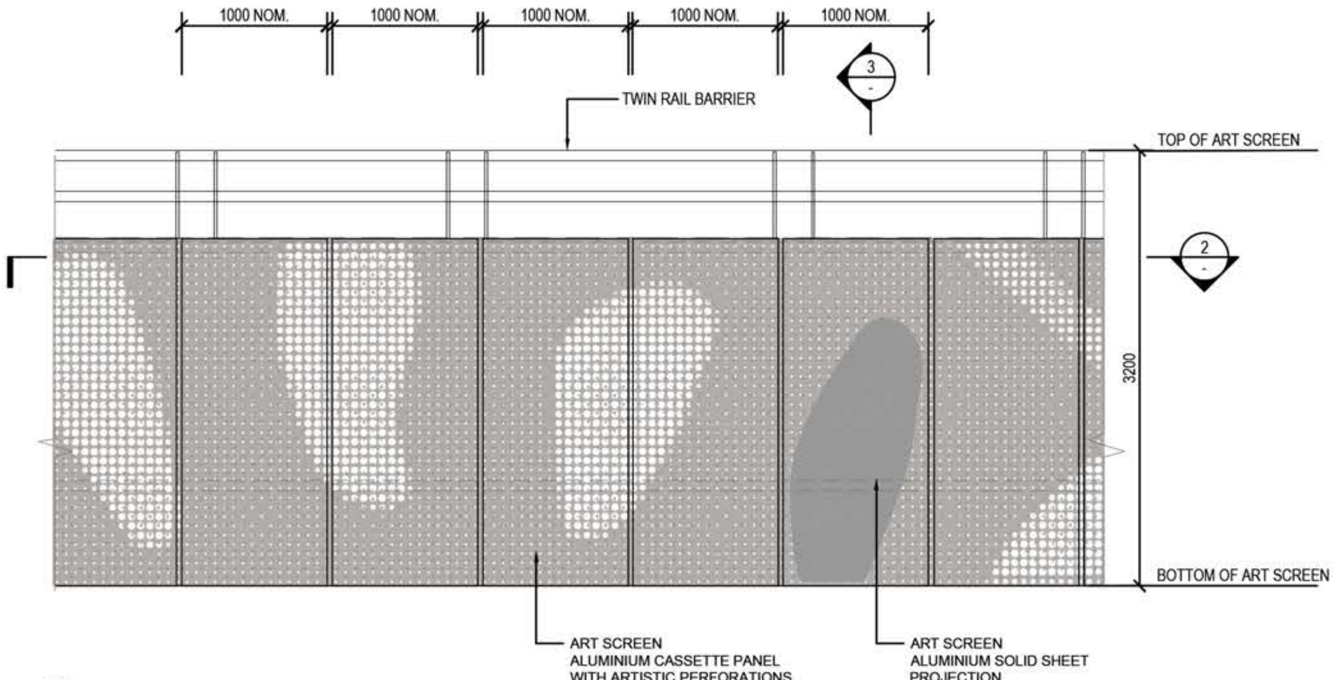
8 | BRIDGE SECTION - DOMESTIC AIRPORT ABUTMENT
SCALE 1:1000



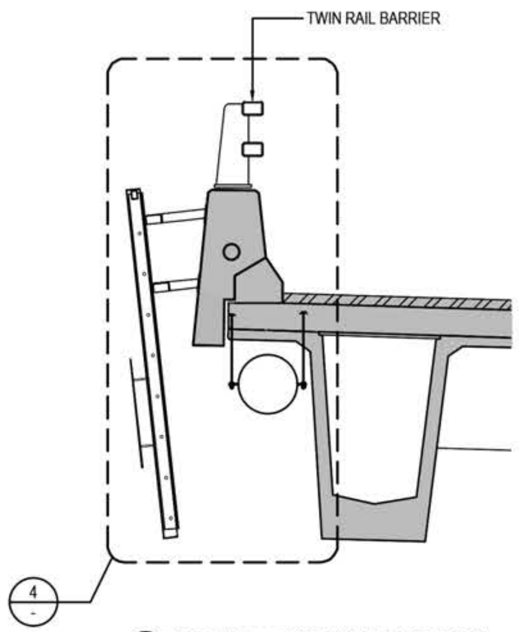
2 | VIADUCT ELEVATION - QANTAS DRIVE
SCALE 1:1000

- 01 GROUND LINE
- 02 CONCRETE BRIDGE PIER WITH INTEGRATED HEADSTOCK
- 03 CONCRETE HEADSTOCK
- 04 CONCRETE SUPER T GIRDER
- 05 BRIDGE ABUTMENT
- 06 CONCRETE REINFORCED SOIL WALL
- 07 LANDSCAPED BATTER
- 08 ANTI-THROW SCREEN WITH MESH INFILL PANELS
- 09 CONCRETE TRAFFIC BARRIER WITH TWIN RAIL
- 10 SHADOW DETAIL
- 11 TYPE F BARRIER
- 12 OBSTACLE LIMITATION SURFACE
- 13 LIGHTING COLUMN
- 14 BRIDGE ARCH
- 15 DESALINATION MAIN
- 16 HANDRAIL/BALUSTRADE
- 17 CABLE STAYS
- 18 STEEL TROUGH GIRDER
- 19 CONCRETE PIER
- 20 HEADLIGHT SCREEN
- 21 BOX CONCRETE GIRDER
- 22 WEATHERED STEEL
- 23 ART SCREEN

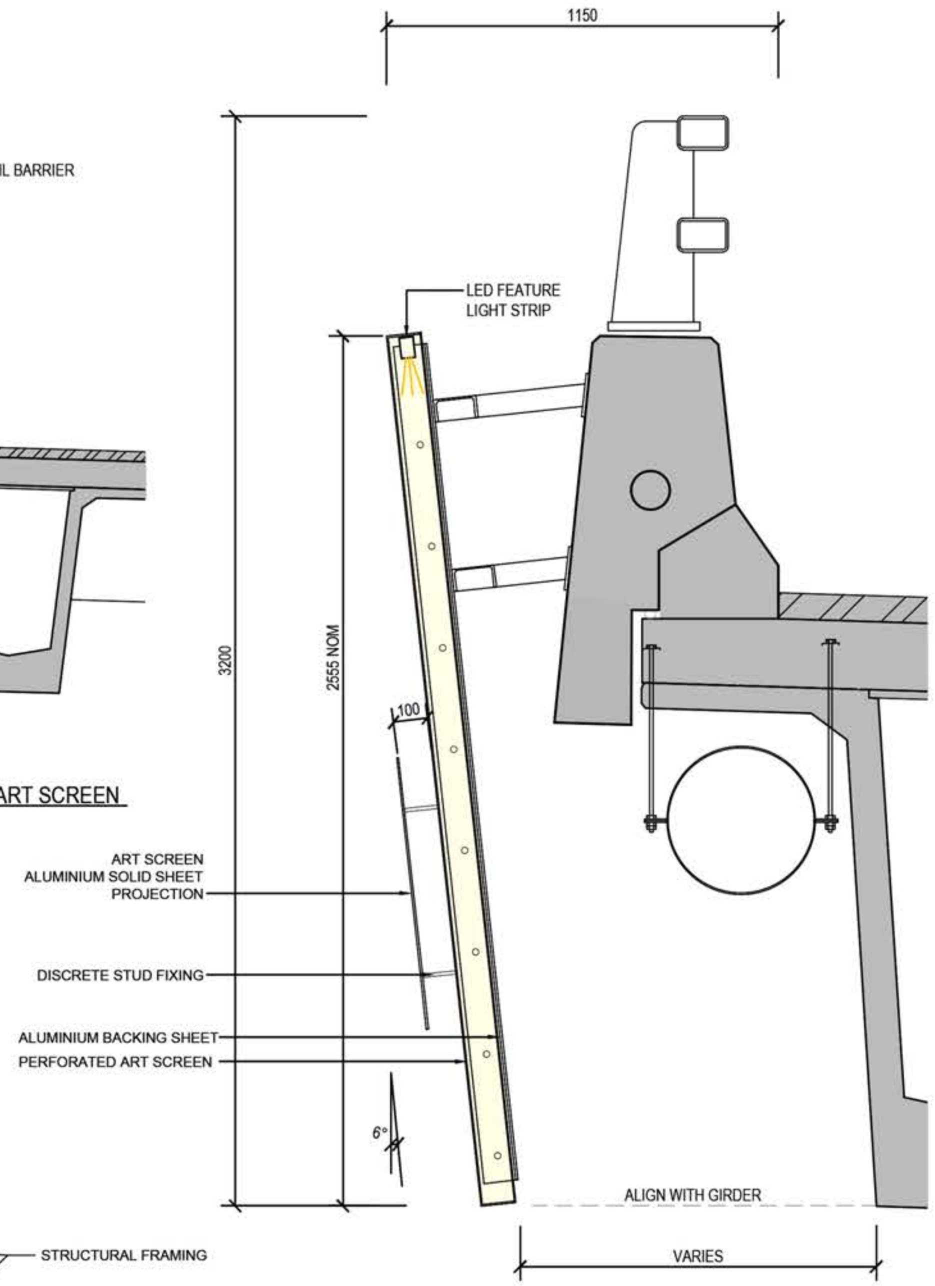
Figure 7-25. Viaduct - typical section Sir Reginald Ansett Drive to domestic terminal



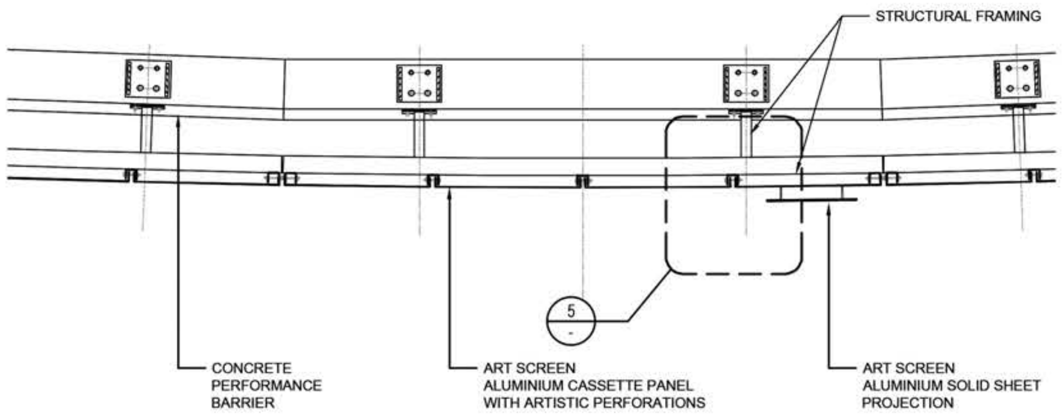
1 TYPICAL VIADUCT ART SCREEN - ELEVATION
SCALE 1:25



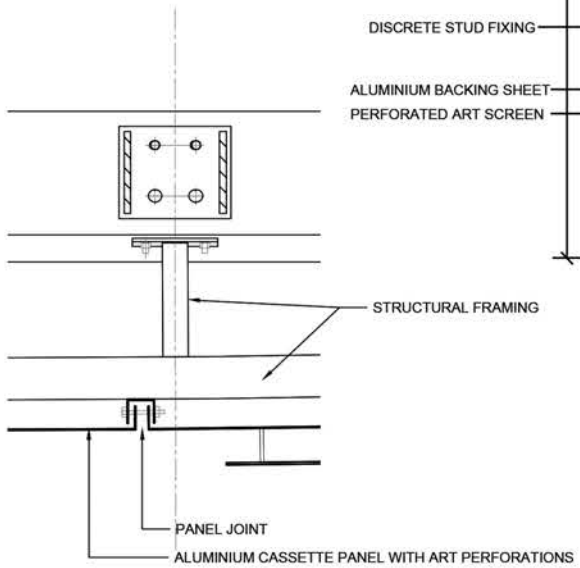
3 SECTION - TYPICAL ART SCREEN
SCALE 1:25



4 SECTION - TYPICAL ART SCREEN
SCALE 1:10



2 TYPICAL VIADUCT ART SCREEN - PLAN
SCALE 1:25



5 TYPICAL ART SCREEN - DETAIL
SCALE 1:10

Figure 7-26. Viaduct art screen- typical details

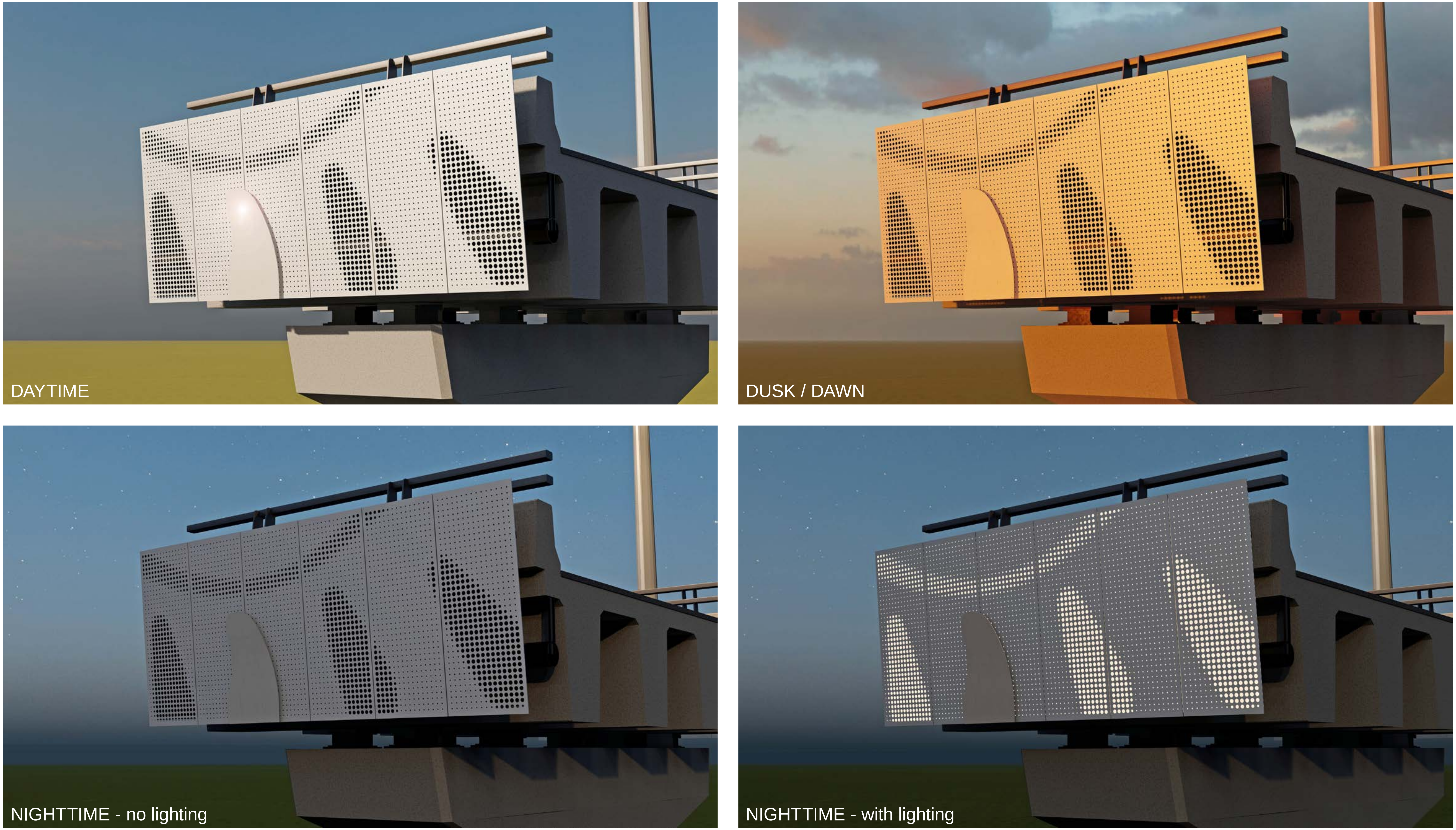


Figure 7-27. Lighting – Daytime to nighttime transitions

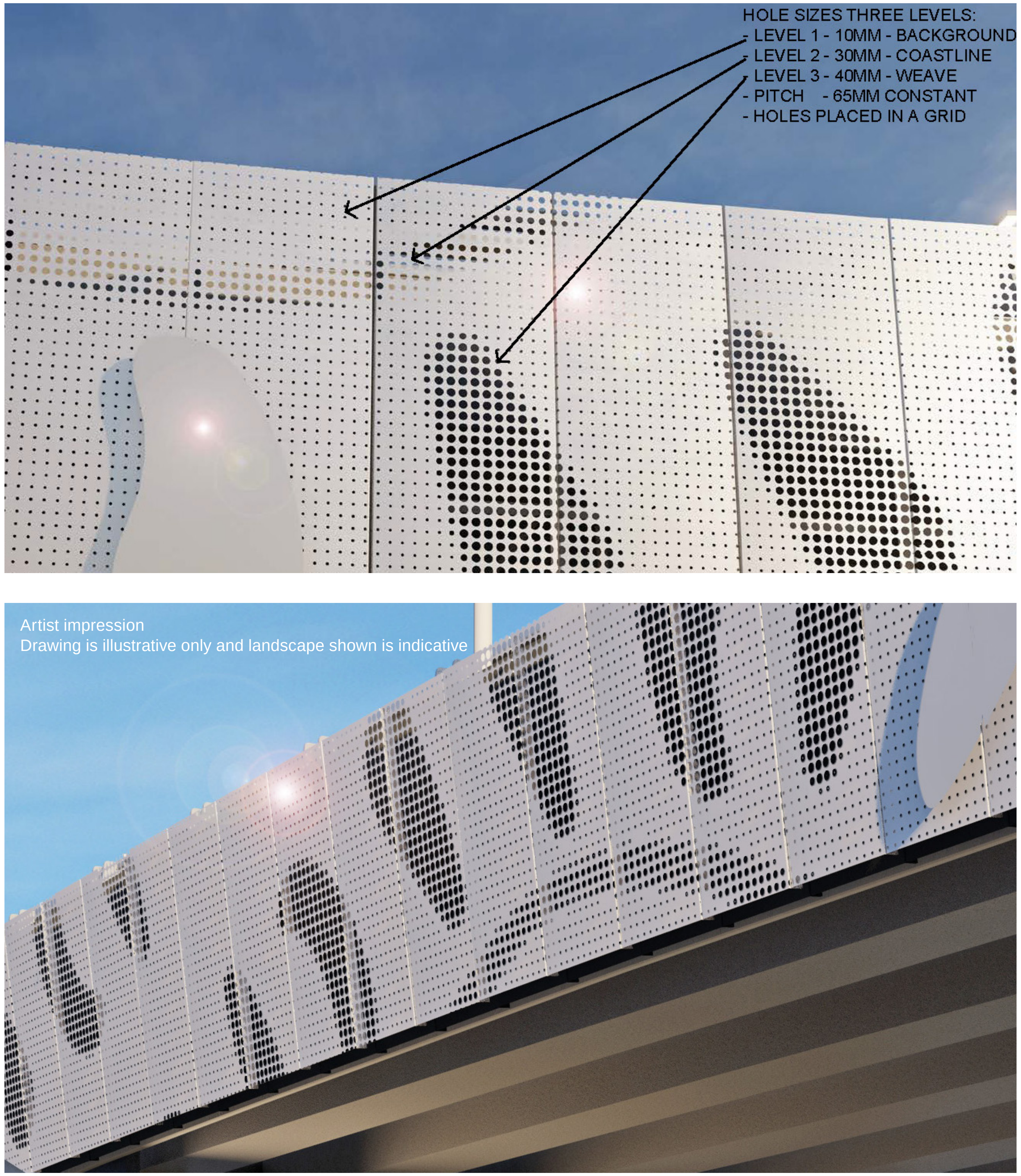


Figure 7-28. Viaduct art screen - perforations concept

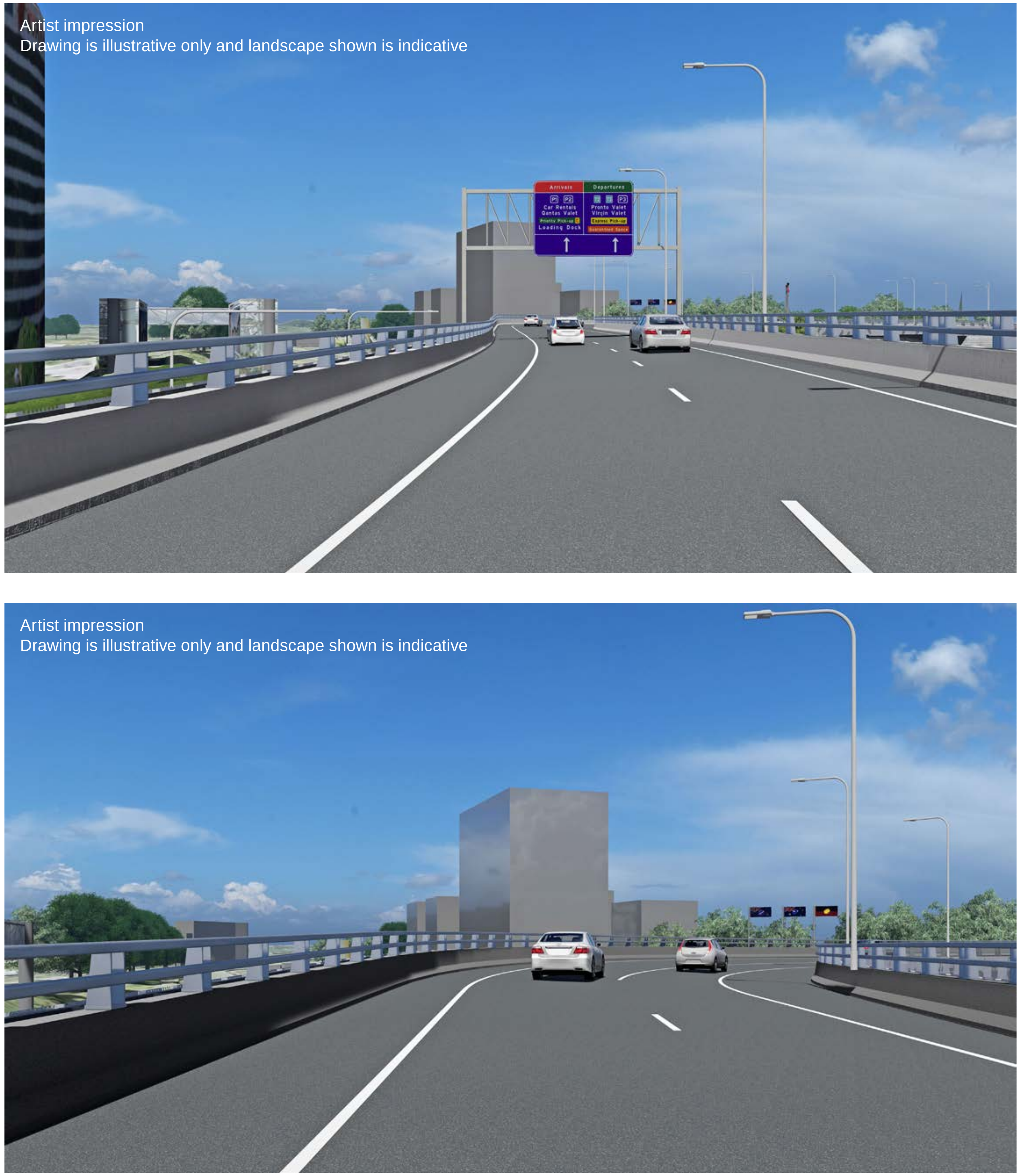


Figure 7-29. View from viaduct looking east

Figure 7-30. Existing view along Qantas Drive looking south

Figure 7-31. Proposed view along Qantas Drive looking south with viaduct

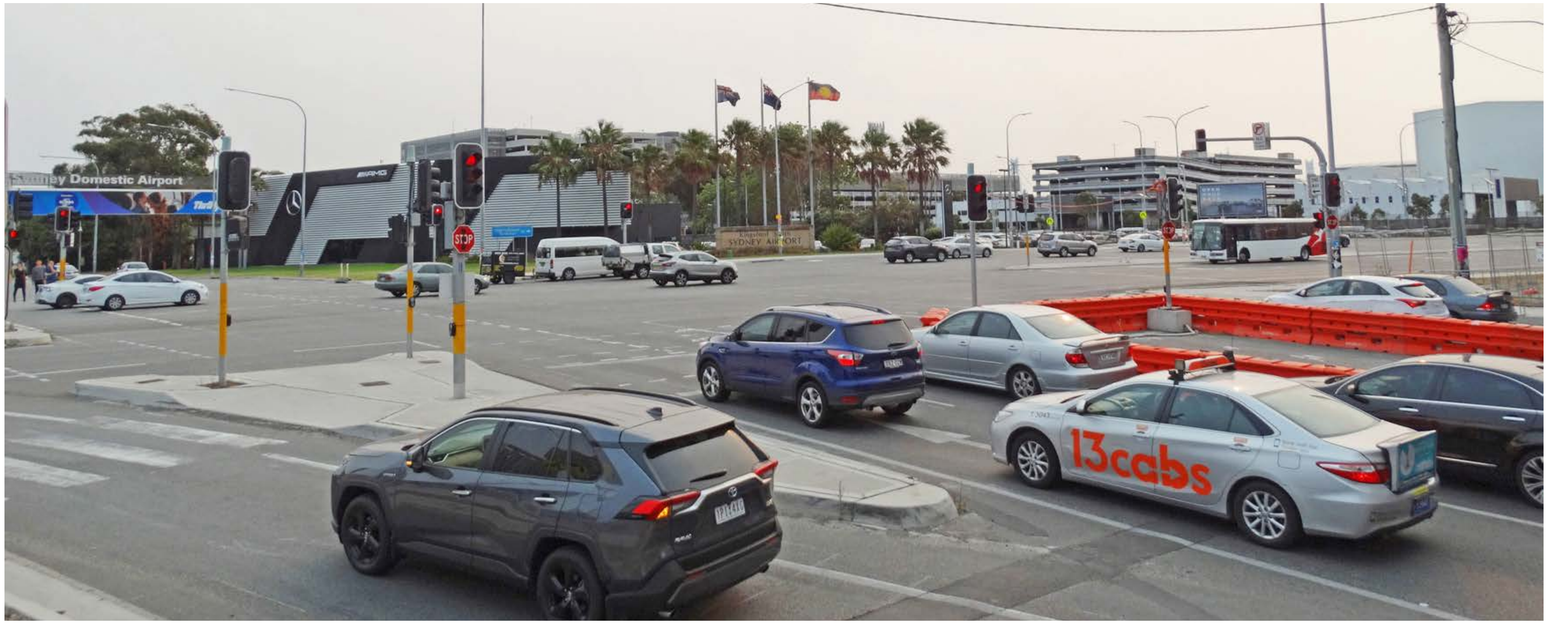


Figure 7-32. Existing view at intersection of O'Riordan Street and Qantas Drive

Figure 7-33. Proposed view at intersection of O'Riordan Street and Qantas Drive with viaduct

7.3 Minor bridges

7.3.1 Bridge over Alexandra Canal T1 to T2/T3connection (SB31)

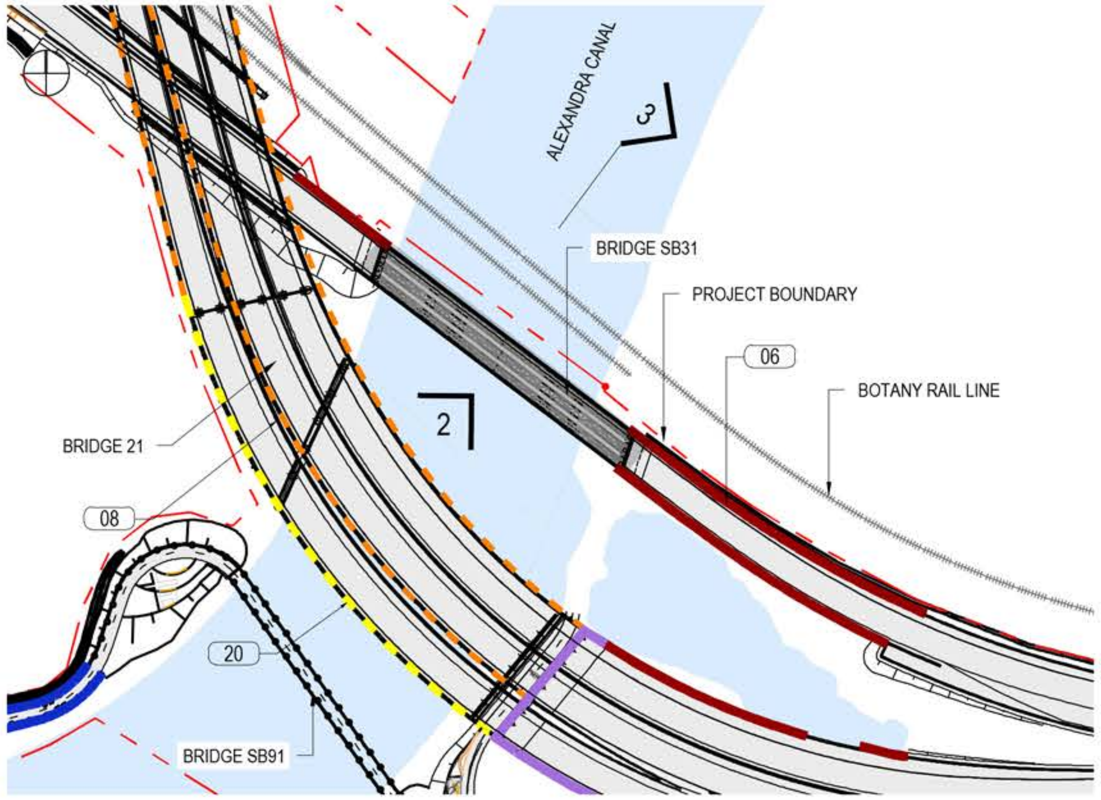
SB31 is a low-lying bridge over the Alexandra Canal, and connects the T1 to Terminals 2 / 3. The bridge spans approximately 83 metres and carries two lanes of traffic, each 3.5 metres wide and is supported by a variable depth 'fish belly' steel trough girder with a composite deck. The ATL path runs under the bridge on the southern side.

Superstructure		
Structure	**Parapets**	**Safety / headlight screens**
Variable depth 'fish belly' steel trough girder with a composite deck	Simple, clean tapered parapets with twin barriers designed to conceal services	Not required.
Bridge and road alignment are straight		
About 80 metres long.		
Substructure		
Abutments	**Piers and headstocks**	
In general the abutments are reinforced soil walls.	Not required.	
Integrated art		
Architectural treatments and finishes to the abutment walls which are visible from the ATL, an architectural patterned wall is proposed for this wall.		

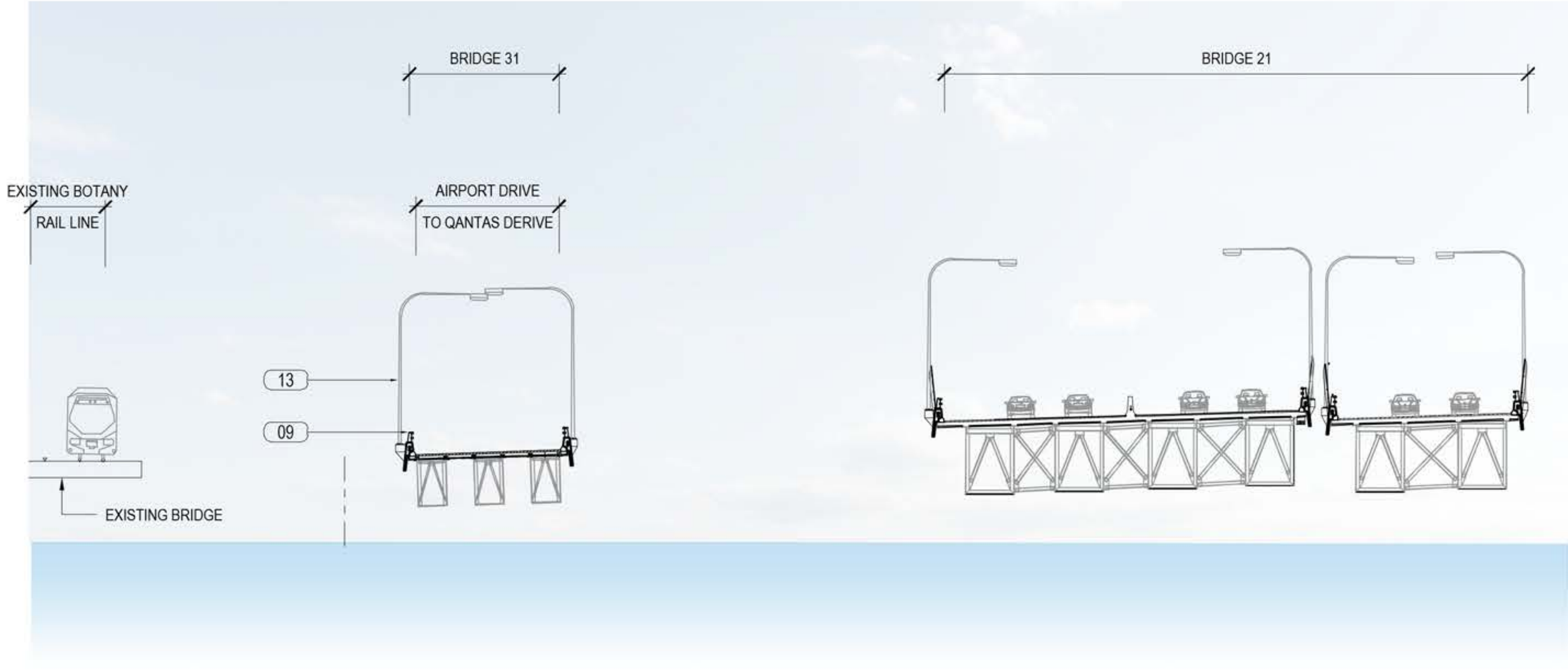
Artist impression
Drawing is illustrative only and landscape shown is indicative

Figure 7-34. View of bridge from north

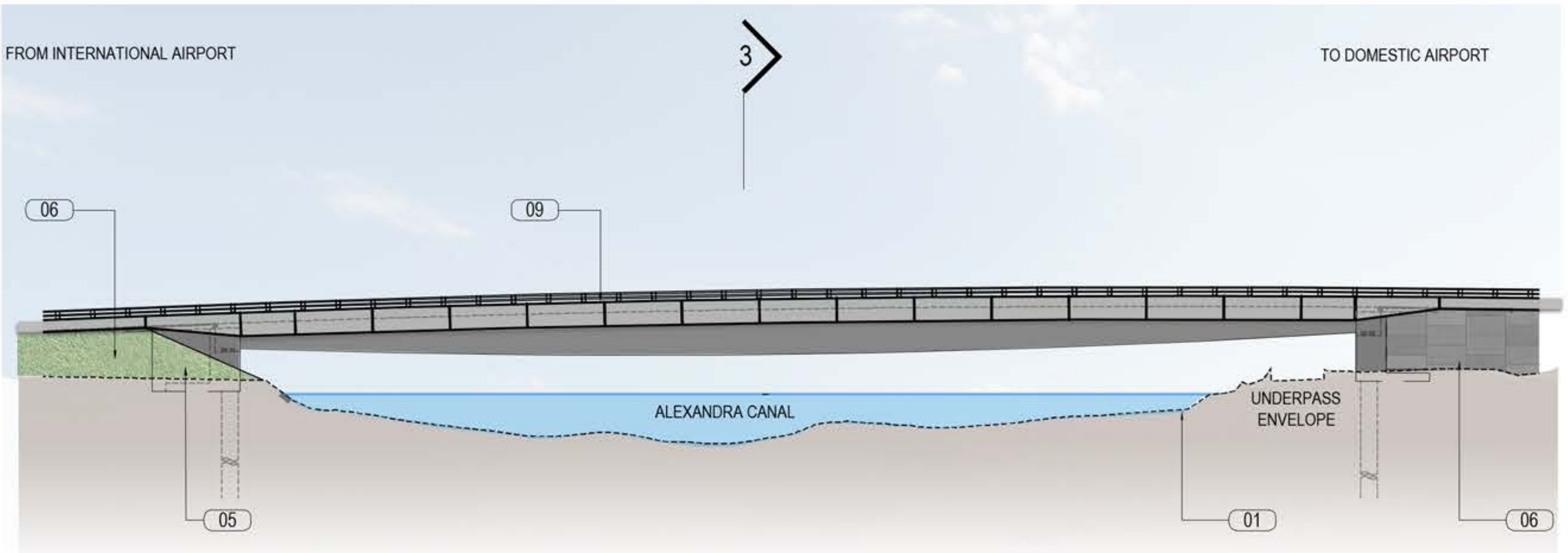
JOHN HOLLAND | SEYMOUR WHYTE | CM+ | CONTEXT LANDSCAPE ARCHITECTURE | culturalcapital



1 | PLAN - BRIDGE OVER ALEXANDRA CANAL (SB31)
SCALE 1:2000



3 | TYPICAL SECTION - BRIDGE OVER ALEXANDRA CANAL (SB31)
SCALE 1:200



2 | ELEVATION - BRIDGE OVER ALEXANDRA CANAL (SB31)
SCALE 1:500

- 01 GROUND LINE
- 02 CONCRETE BRIDGE PIER WITH INTEGRATED HEADSTOCK
- 03 CONCRETE HEADSTOCK
- 04 CONCRETE SUPER T GIRDER
- 05 BRIDGE ABUTMENT
- 06 CONCRETE REINFORCED SOIL WALL
- 07 LANDSCAPED BATTER
- 08 ANTI-THROW SCREEN WITH MESH INFILL PANELS
- 09 CONCRETE TRAFFIC BARRIER WITH TWIN RAIL
- 10 SHADOW DETAIL
- 11 TYPE F BARRIER
- 12 OBSTACLE LIMITATION SURFACE
- 13 LIGHTING COLUMN
- 14 BRIDGE ARCH
- 15 DESALINATION MAIN
- 16 HANDRAIL/BALUSTRADE
- 17 CABLE STAYS
- 18 STEEL TROUGH GIRDER
- 19 CONCRETE PIER
- 20 HEADLIGHT SCREEN
- 21 BOX CONCRETE GIRDER
- 22 WEATHERED STEEL
- 23 ART SCREEN

Figure 7-35. SB31 – typical plan, elevation, section

7.3.2 Bridges over Rail Line and Airport Drive (SB41, SB42)

SB41 and SB42 are next to each other and are therefore grouped together. They cross over the existing and future railway line corridors. SB41 consists of two carriageways and provides access to and from the SPI and international terminal. SB42 consists of one carriageway and provides access to and from Burrows Road future access road.

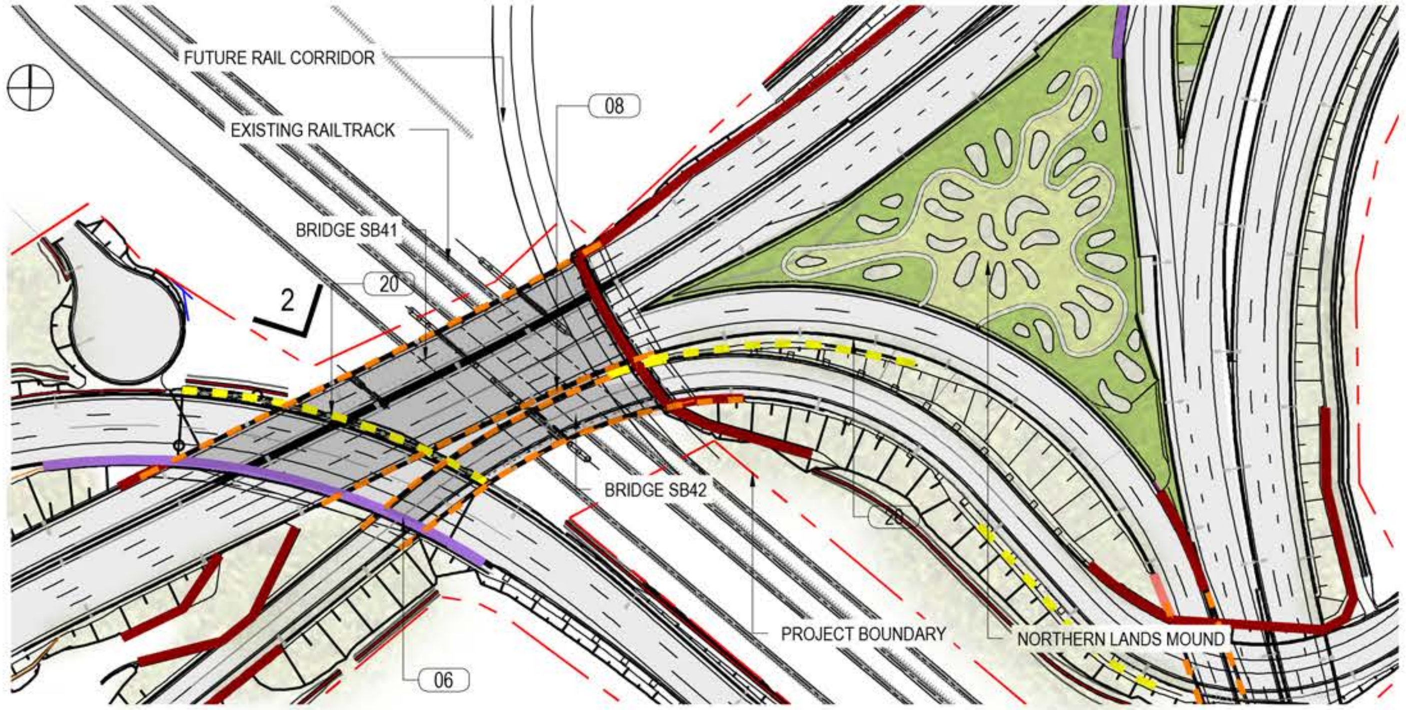
SB41 and SB42 and have a consistent visual aesthetic, which reduces the visual clutter as a result of many elements occurring adjacent to each other.

An orange colour is proposed for the headlight screen to complement its industrial setting of being next to the Botany Rail Line and the weathered steel aesthetic of the SB21 bridge beyond.

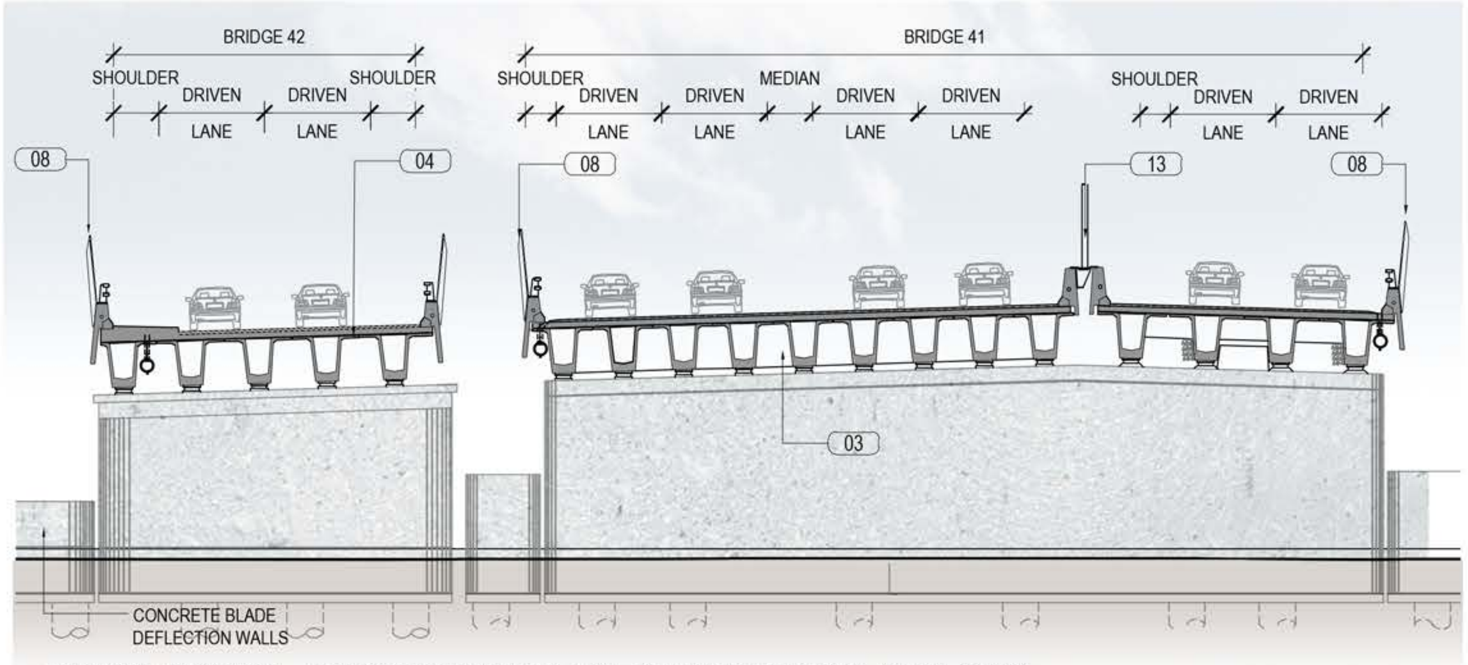
Superstructure		
Structure	**Parapets**	**Safety / headlight screens**
The bridge structure comprises of about 1.5 metres Super T's over various independent decks and varied spans for each deck based on their geometries.	Simple tapered parapets with twin rail barriers, deep enough to conceal services.	Headlight screen provided on northern side to prevent glare to train drivers. The screen is articulated along the curved alignment of the northern wall.
Substructure		
Abutments	**Piers and headstocks**	
Abutments are formed with piles and headstocks behind of reinforced soil wall. A patterned panel retaining wall is provided on the southern side.	Integrated blade piers and deflection walls to suit railway requirements.	
Integrated art		
NA		

Figure 7-36. View of SB41 and SB42 from Airport Drive

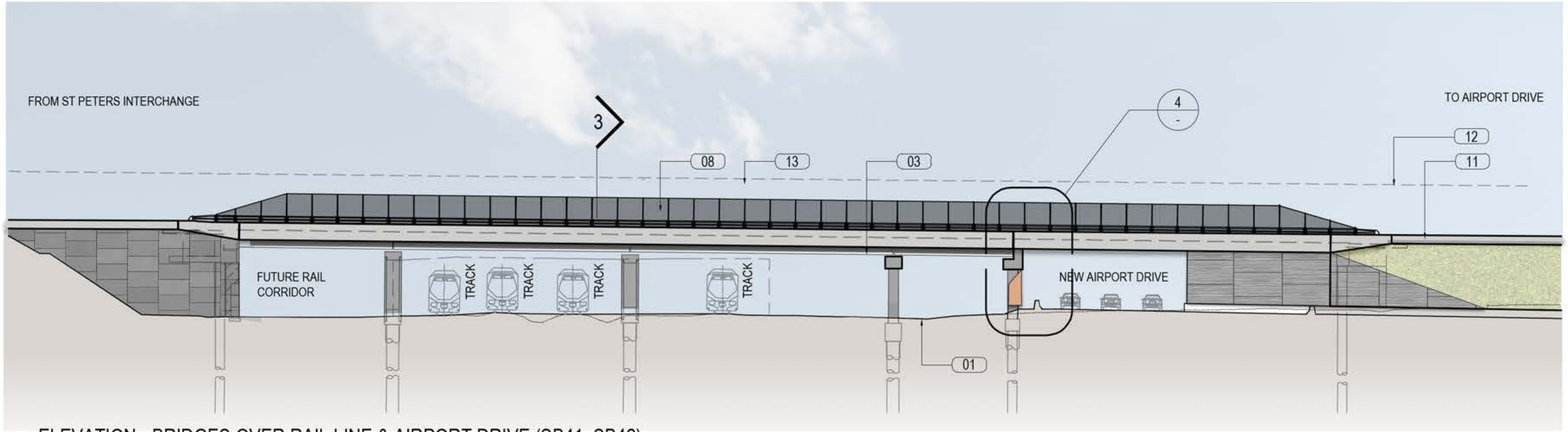
JOHN HOLLAND | SEYMOUR WHYTE | CM+ | CONTEXT | culturalcapital



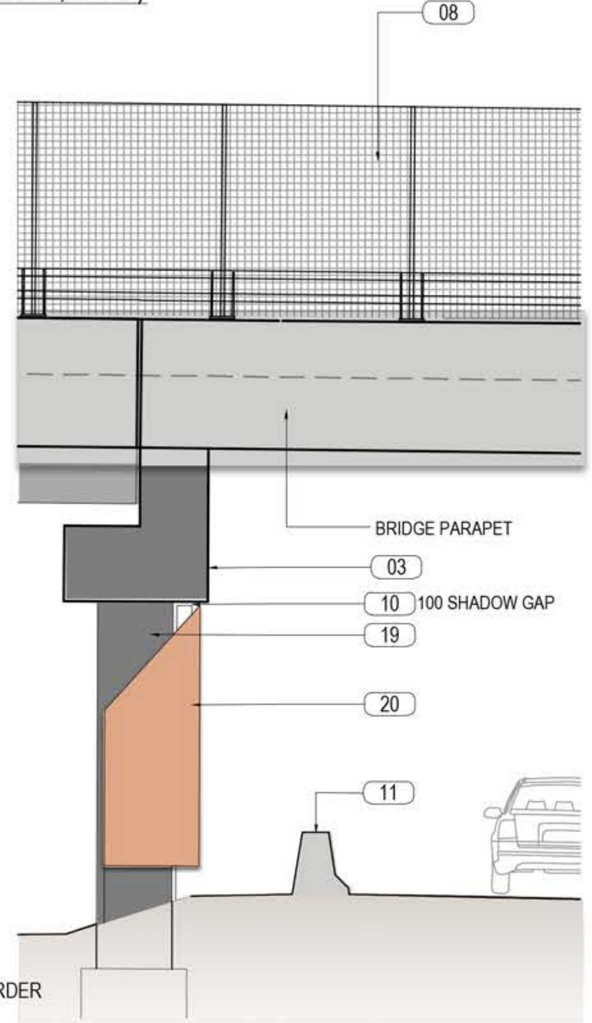
1 PLAN - BRIDGES OVER RAIL LINE & AIRPORT DRIVE (SB41, SB42)
SCALE 1:2000



3 TYPICAL SECTION - BRIDGES OVER RAIL LINE & AIRPORT DRIVE (SB41, SB42)
SCALE 1:250



2 ELEVATION - BRIDGES OVER RAIL LINE & AIRPORT DRIVE (SB41, SB42)
SCALE 1:500



4 PARAPET DETAIL
SCALE 1:100

- 01 GROUND LINE
- 02 CONCRETE BRIDGE PIER WITH INTEGRATED HEADSTOCK
- 03 CONCRETE HEADSTOCK
- 04 CONCRETE SUPER T GIRDER
- 05 BRIDGE ABUTMENT
- 06 CONCRETE REINFORCED SOIL WALL
- 07 LANDSCAPED BATTER
- 08 ANTI-THROW SCREEN WITH MESH INFILL PANELS
- 09 CONCRETE TRAFFIC BARRIER WITH TWIN RAIL
- 10 SHADOW DETAIL
- 11 TYPE F BARRIER
- 12 OBSTACLE LIMITATION SURFACE
- 13 LIGHTING COLUMN
- 14 BRIDGE ARCH
- 15 DESALINATION MAIN
- 16 HANDRAIL/BALUSTRADE
- 17 CABLE STAYS
- 18 STEEL TROUGH GIRDER
- 19 CONCRETE PIER
- 20 HEADLIGHT SCREEN
- 21 BOX CONCRETE GIRDER
- 22 WEATHERED STEEL
- 23 ART SCREEN

Figure 7-37. Underpass – typical plan, elevation, section

7.3.3 Bridge over Alexandra Canal near Link Road (SB61)

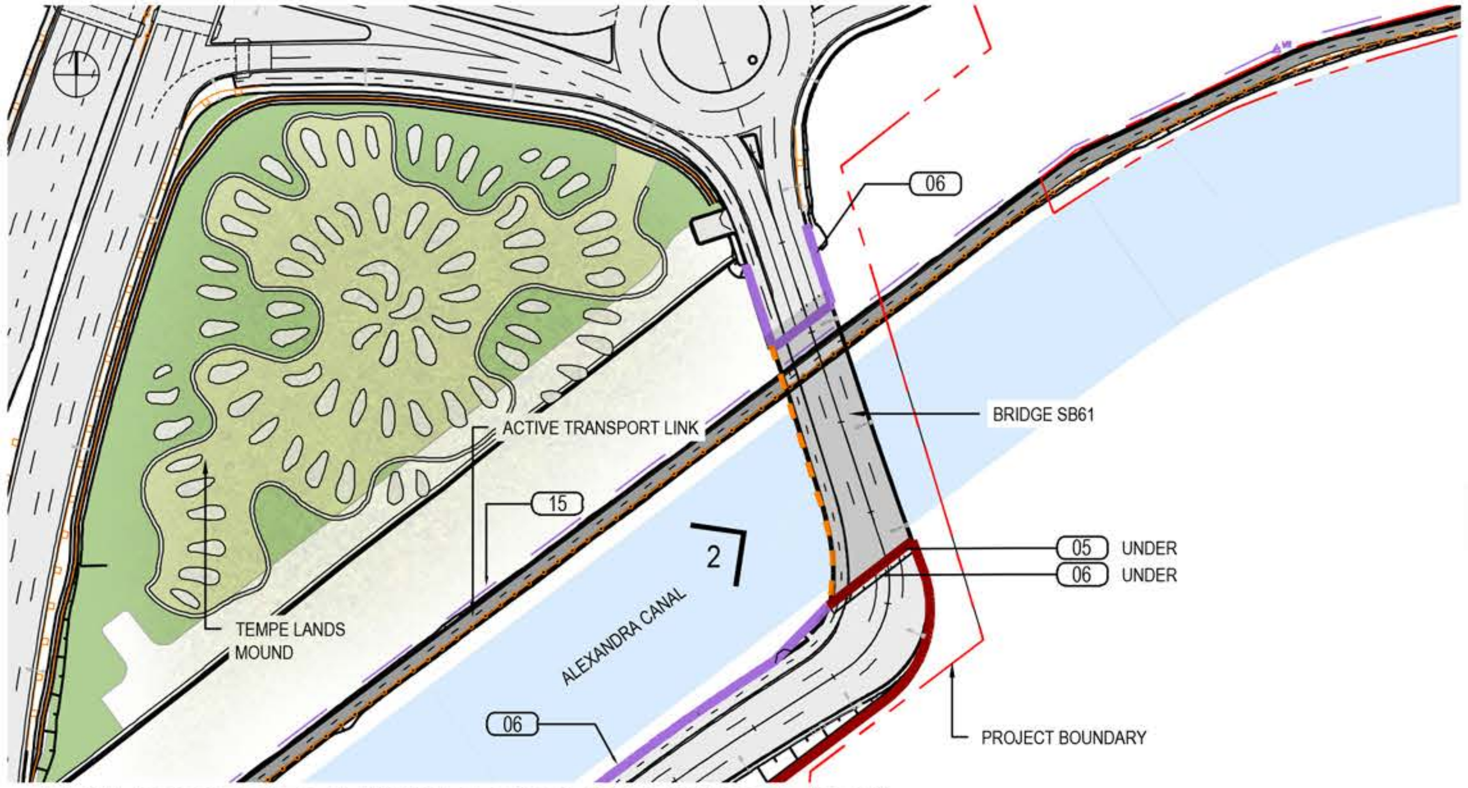
SB61 is located at Alexandra Canal, which provides service access (New Link Road) from the main alignment to the airport service areas. The overall length of the bridge is about 74 metres.

Superstructure		
Structure	**Parapets**	**Safety / headlight screens**
Comprises of five constant depth steel trough girders.	Simple tapered parapets with twin rail barriers, parapet depth to conceal services.	Throwscreens (western side only)
	Services are located in between the girders.	

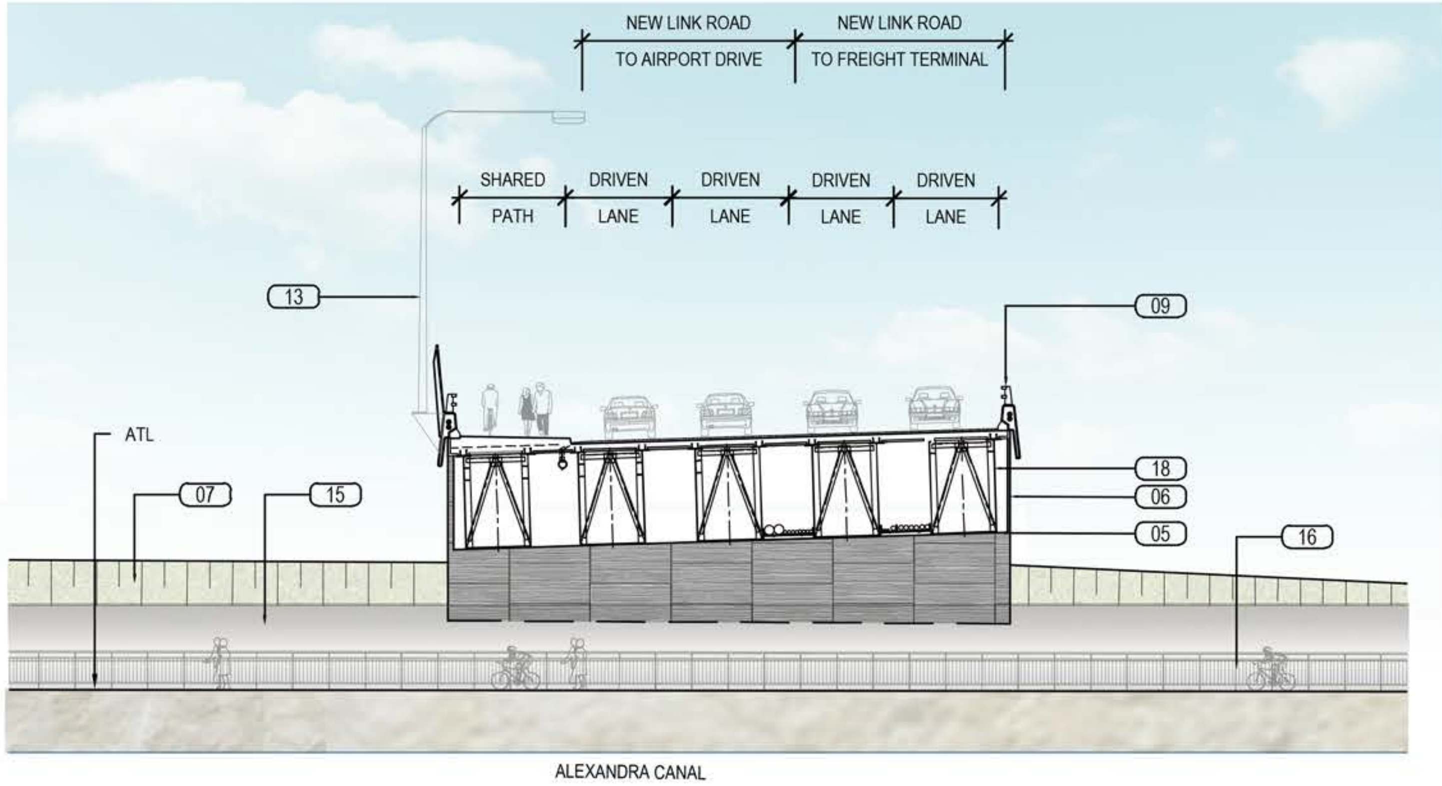
Substructure	
Abutments	**Piers and headstocks**
Abutments are generally cast-in-place sill beams on bored piles within reinforced soil walls.	Not required.

Integrated art
Not required

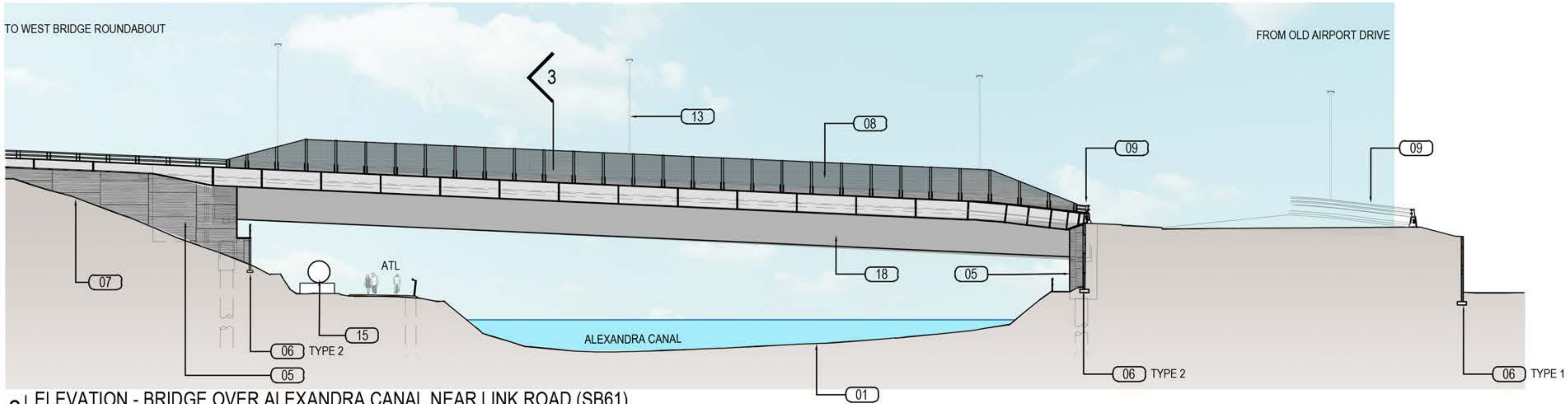
Figure 7-38. View of SB61 from ATL



1 | PLAN - BRIDGE OVER ALEXANDRA CANAL NEAR LINK ROAD (SB61)
SCALE 1:2000



3 | TYPICAL SECTION - BRIDGE OVER ALEXANDRA CANAL NEAR LINK ROAD (SB61)
SCALE 1:250



2 | ELEVATION - BRIDGE OVER ALEXANDRA CANAL NEAR LINK ROAD (SB61)
SCALE 1:400

- 01 GROUND LINE
- 02 CONCRETE BRIDGE PIER WITH INTEGRATED HEADSTOCK
- 03 CONCRETE HEADSTOCK
- 04 CONCRETE SUPER T GIRDER
- 05 BRIDGE ABUTMENT
- 06 CONCRETE REINFORCED SOIL WALL
- 07 LANDSCAPED BATTER
- 08 ANTI-THROW SCREEN WITH MESH INFILL PANELS
- 09 CONCRETE TRAFFIC BARRIER WITH TWIN RAIL
- 10 SHADOW DETAIL
- 11 TYPE F BARRIER
- 12 OBSTACLE LIMITATION SURFACE
- 13 LIGHTING COLUMN
- 14 BRIDGE ARCH
- 15 DESALINATION MAIN
- 16 HANDRAIL/BALUSTRADE
- 17 CABLE STAYS
- 18 STEEL TROUGH GIRDER
- 19 CONCRETE PIER
- 20 HEADLIGHT SCREEN
- 21 BOX CONCRETE GIRDER
- 22 WEATHERED STEEL
- 23 ART SCREEN

Figure 7-39. SB61 – typical plan, elevation, section

7.3.4 Bridge on ATL over Alexandra Canal (SB91)

SB91 is a single span, shared path bridge located over the Alexandra Canal, and connects to the Nigel Love underpass.

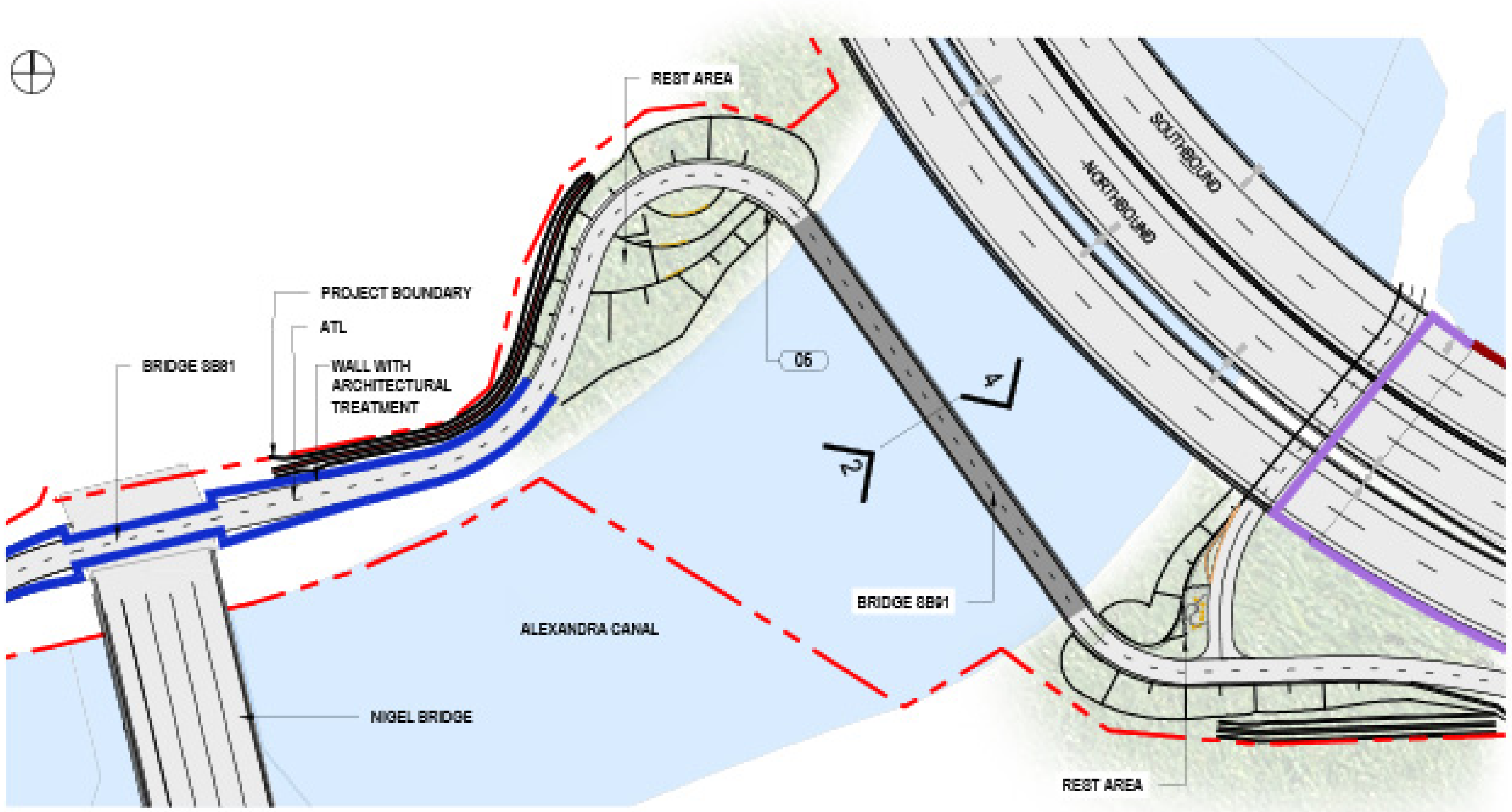
Superstructure		
Structure	**Parapets**	**Safety / headlight screens**
The bridge spans 74 metres and has a total width of 3.5 metres	Simple tapered parapets, depth to conceal services.	Shared path balustrade
The steel trough girder depth varies between approximately 1.5 metres at abutments to approximately three metres at mid span		
Substructure		
Abutments	**Piers and headstocks**	
Abutments are placed two metres back from the Alexandra Canal walls.	Not required	
Integrated art		
Not required		
Feature lighting		
Feature lighting integrated with handrail		

Figure 7-40. Aerial view of SB91

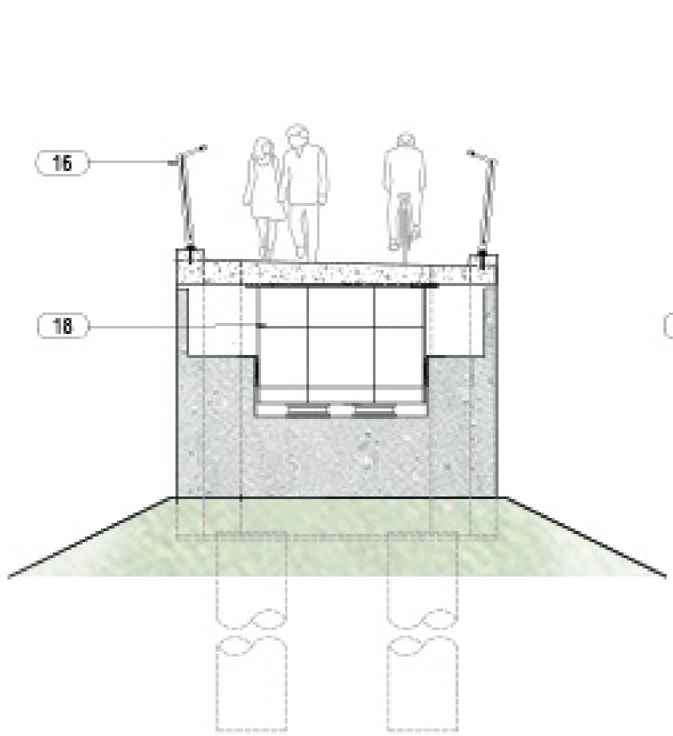
Figure 7-41. View of SB91 from shared path looking north

Figure 7-42. View of underpass from north

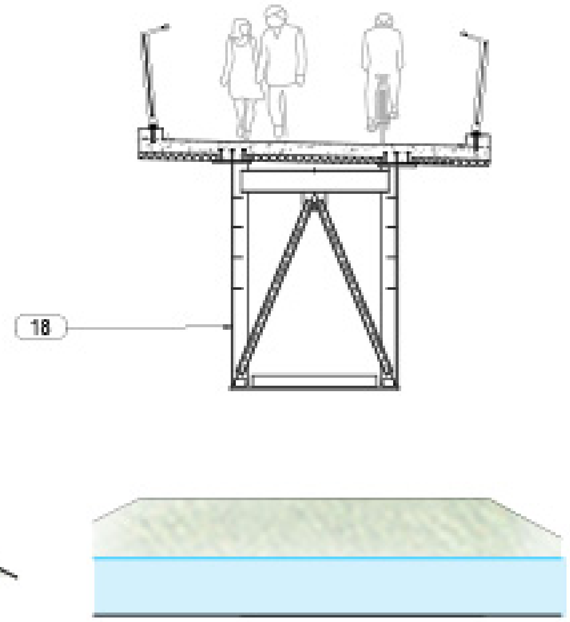
Figure 7-43. View of underpass from rest area 2



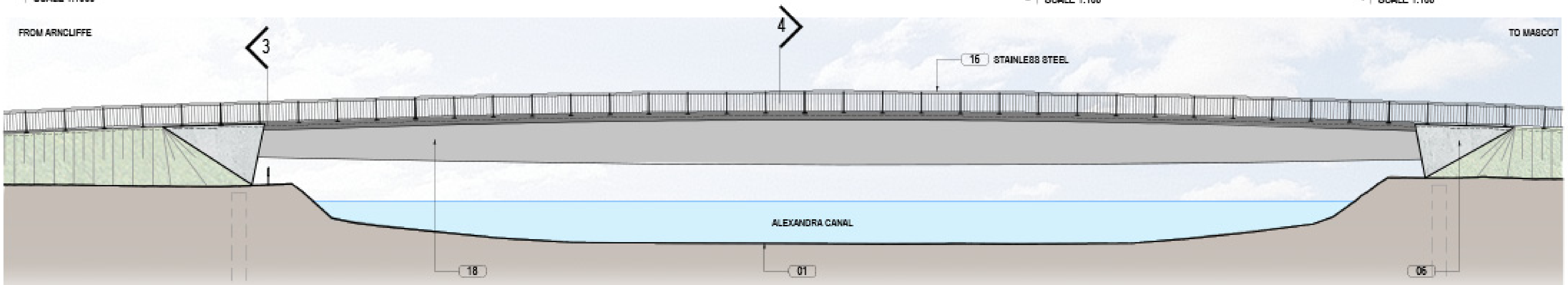
1 | PLAN - FOOTPATH BRIDGE (SB91)
SCALE 1:1000



3 | TYPICAL SECTION
SCALE 1:100



4 | TYPICAL SECTION
SCALE 1:100



2 | ELEVATION - FOOTPATH BRIDGE (SB91)
SCALE 1:250

- 01 GROUND LINE
- 02 CONCRETE BRIDGE PIER WITH INTEGRATED HEADSTOCK
- 03 CONCRETE HEADSTOCK
- 04 CONCRETE SUPER T GIRDER
- 05 BRIDGE ABUTMENT
- 06 CONCRETE REINFORCED SOIL WALL
- 07 LANDSCAPED BATTER
- 08 ANTI-THROW SCREEN WITH MESH INFILL PANELS
- 09 CONCRETE TRAFFIC BARRIER WITH TWIN RAIL
- 10 SHADOW DETAIL
- 11 TYPE F BARRIER
- 12 OBSTACLE LIMITATION SURFACE
- 13 LIGHTING COLUMN
- 14 BRIDGE ARCH
- 15 DESALINATION MAIN
- 16 HANDRAIL/BALUSTRADE
- 17 CABLE STAYS
- 18 STEEL TROUGH GIRDER
- 19 CONCRETE PIER
- 20 HEADLIGHT SCREEN
- 21 BOX CONCRETE GIRDER
- 22 WEATHERED STEEL
- 23 ART SCREEN

Figure 7-44. SB91 – typical plan, elevation, section

7.3.5 Underpass on Qantas Drive under Airport Drive (SB11)

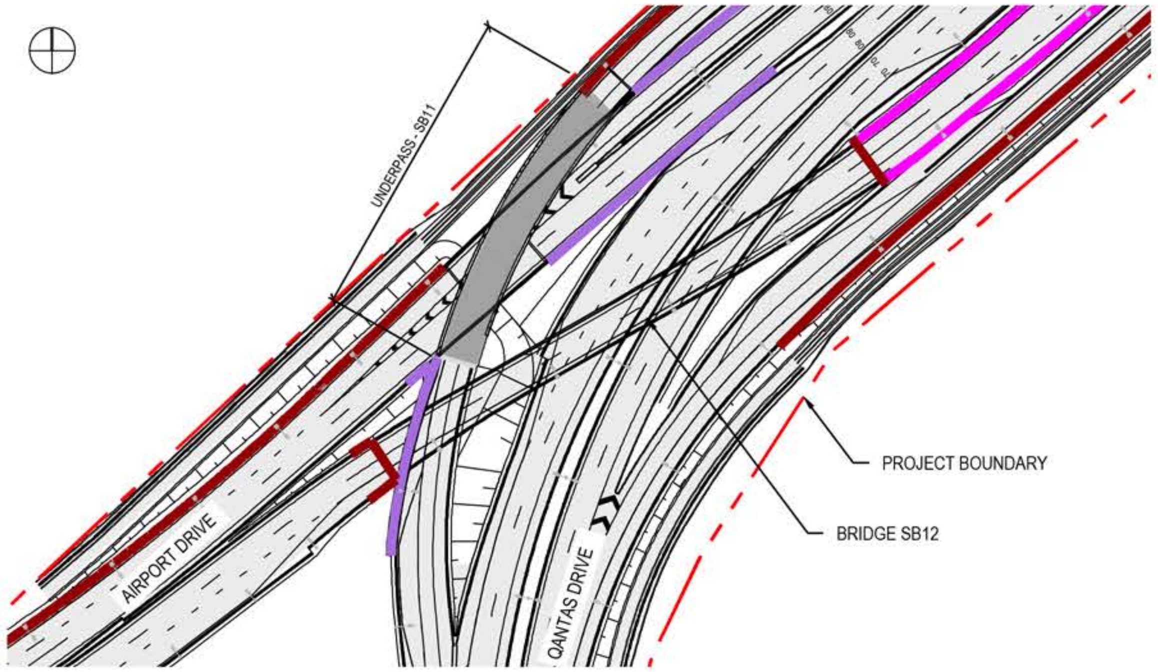
SB11 is located at the central interchange and provides a northbound link to SPI from Qantas Drive. Airport Drive passes over this bridge. The underpass is about 80 metres long and 10 metres wide and has a curved alignment.

A series of openings run along the northbound wall ranging from two to five metres, to provide added visual openness

Superstructure		
Structure	**Parapets**	**Safety / headlight screens**
Cast in place reinforced concrete box	Standard twin rail and concrete barriers along Airport Drive.	Not required
Substructure		
Abutments	**Piers and headstocks**	
Integrated with superstructure with articulated openings to maximise visual permeability and reduce a tunnel effect	Not required.	
Integrated art		
No proposed art.		

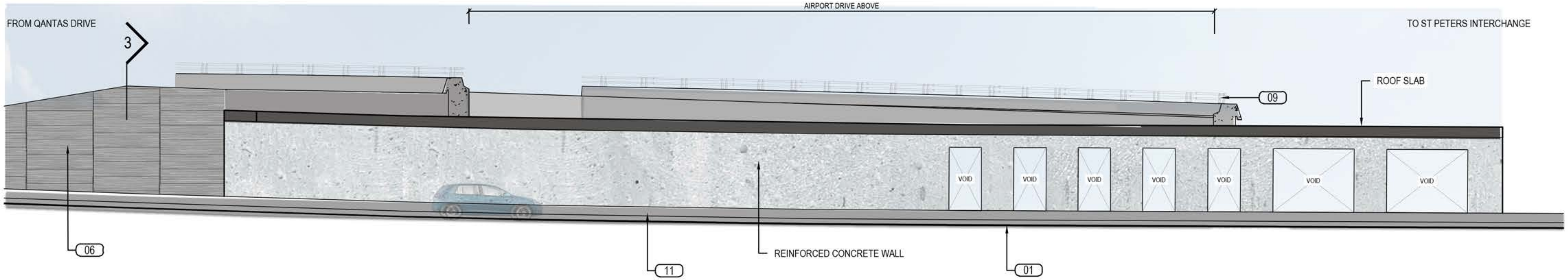
Figure 7-45. SB11 – view of underpass

Figure 7-46. SB11 – view of underpass



1 | PLAN - UNDERPASS ON QANTAS DRIVE (SB11)
SCALE 1:2000

3 | PERSPECTIVE VIEW - UNDERPASS ON QANTAS DRIVE (SB11)
NTS



2 | LONG SECTION - UNDERPASS ON QANTAS DRIVE (SB11)
SCALE 1:250

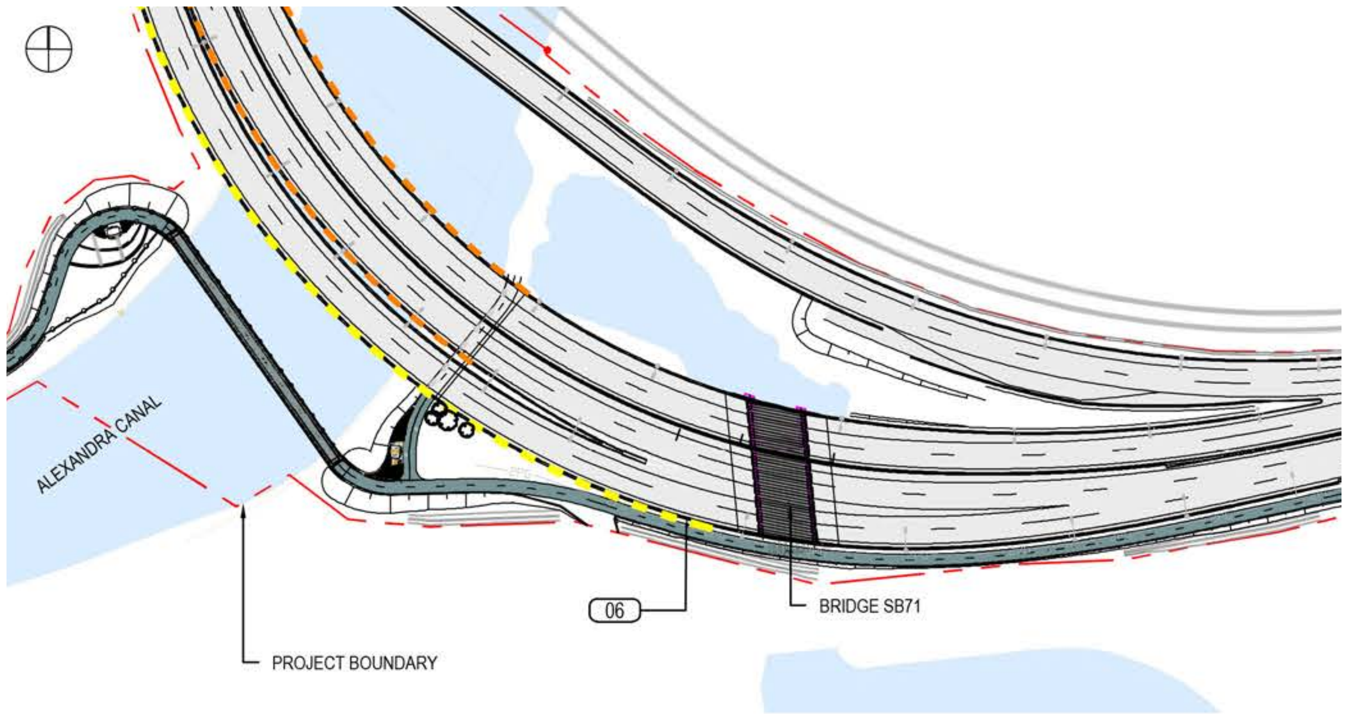
- 01 GROUND LINE
- 02 CONCRETE BRIDGE PIER WITH INTEGRATED HEADSTOCK
- 03 CONCRETE HEADSTOCK
- 04 CONCRETE SUPER T GIRDER
- 05 BRIDGE ABUTMENT
- 06 CONCRETE REINFORCED SOIL WALL
- 07 LANDSCAPED BATTER
- 08 ANTI-THROW SCREEN WITH MESH INFILL PANELS
- 09 CONCRETE TRAFFIC BARRIER WITH TWIN RAIL
- 10 SHADOW DETAIL
- 11 TYPE F BARRIER
- 12 OBSTACLE LIMITATION SURFACE
- 13 LIGHTING COLUMN
- 14 BRIDGE ARCH
- 15 DESALINATION MAIN
- 16 HANDRAIL/BALUSTRADE
- 17 CABLE STAYS
- 18 STEEL TROUGH GIRDER
- 19 CONCRETE PIER
- 20 HEADLIGHT SCREEN
- 21 BOX CONCRETE GIRDER
- 22 WEATHERED STEEL
- 23 ART SCREEN

Figure 7-47. SB11 – typical plan, elevation, section

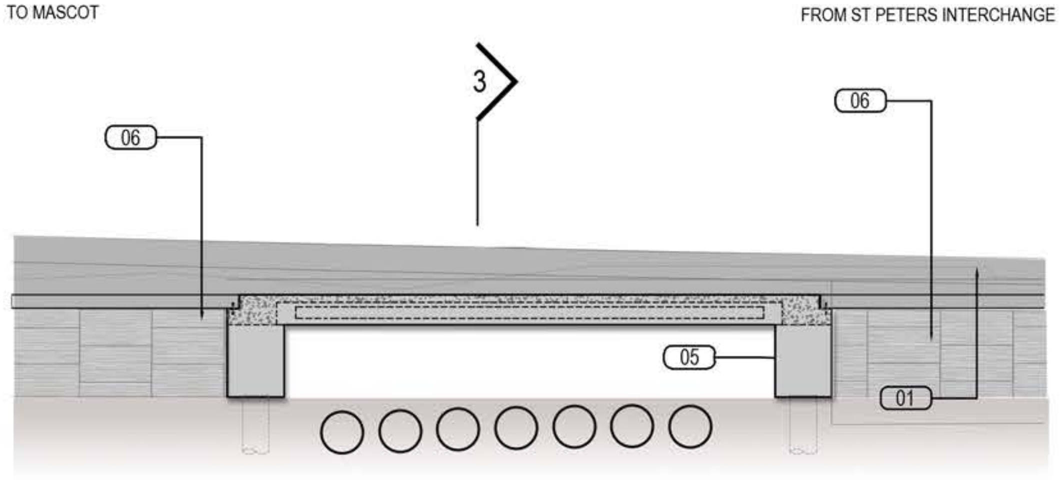
7.3.6 Bridges over existing pipe culvert (SB71)

Bridge SB71 is approximately 36 metres wide, with four lanes of traffic in the westbound carriageway and two lanes of traffic in the eastbound carriageway. The bridge is located adjacent to the ATL just to the east of SB21 at the end of the headlight screen.

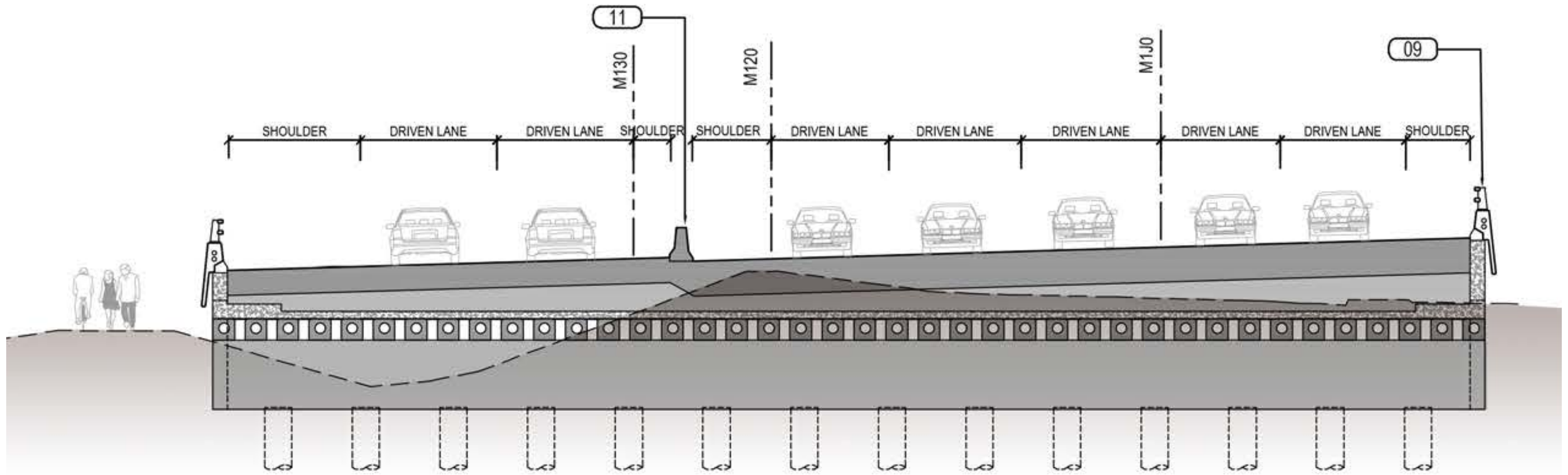
Superstructure		
Structure	**Parapets**	**Safety / headlight screens**
Single span standard depth planks	Simple tapered parapets with twin rail barriers.	Not required
Substructure		
Abutments	**Piers and headstocks**	
Abutments supported on a single row of piles	Not required.	



1 | PLAN - BRIDGE OVER EXISTING PIPE CULVERT (SB71)
SCALE 1:2000



2 | ELEVATION - BRIDGE OVER EXISTING PIPE CULVERT (SB71)
SCALE 1:200



3 | TYPICAL SECTION - BRIDGE OVER EXISTING PIPE CULVERT (SB71)
SCALE 1:200

- 01 GROUND LINE
- 02 CONCRETE BRIDGE PIER WITH INTEGRATED HEADSTOCK
- 03 CONCRETE HEADSTOCK
- 04 CONCRETE SUPER T GIRDER
- 05 BRIDGE ABUTMENT
- 06 CONCRETE REINFORCED SOIL WALL
- 07 LANDSCAPED BATTER
- 08 ANTI-THROW SCREEN WITH MESH INFILL PANELS
- 09 CONCRETE TRAFFIC BARRIER WITH TWIN RAIL
- 10 SHADOW DETAIL
- 11 TYPE F BARRIER
- 12 OBSTACLE LIMITATION SURFACE
- 13 LIGHTING COLUMN
- 14 BRIDGE ARCH
- 15 DESALINATION MAIN
- 16 HANDRAIL/BALUSTRADE
- 17 CABLE STAYS
- 18 STEEL TROUGH GIRDER
- 19 CONCRETE PIER
- 20 HEADLIGHT SCREEN
- 21 BOX CONCRETE GIRDER
- 22 WEATHERED STEEL
- 23 ART SCREEN

Figure 7-48. SB71 – typical plan, elevation, section

7.3.7 Bridges over Canal Road (SB01, SB02, SB03)

Bridges SB01, SB02 and SB03 are adjacent to each other and are therefore grouped together. They are a single span bridge spanning over Canal Road.

Superstructure		
Structure	**Parapets**	**Safety / headlight screens**
Single span simply supported bridges comprising of Super T girders.	Simple tapered parapets with twin rail barriers.	Provided on the outside edges of SB01 along the full length of the bridge.

Substructure	
Abutments	**Piers and headstocks**
Abutments comprise piles with column extensions, abutment beams and reinforced soil walls.	Not required.

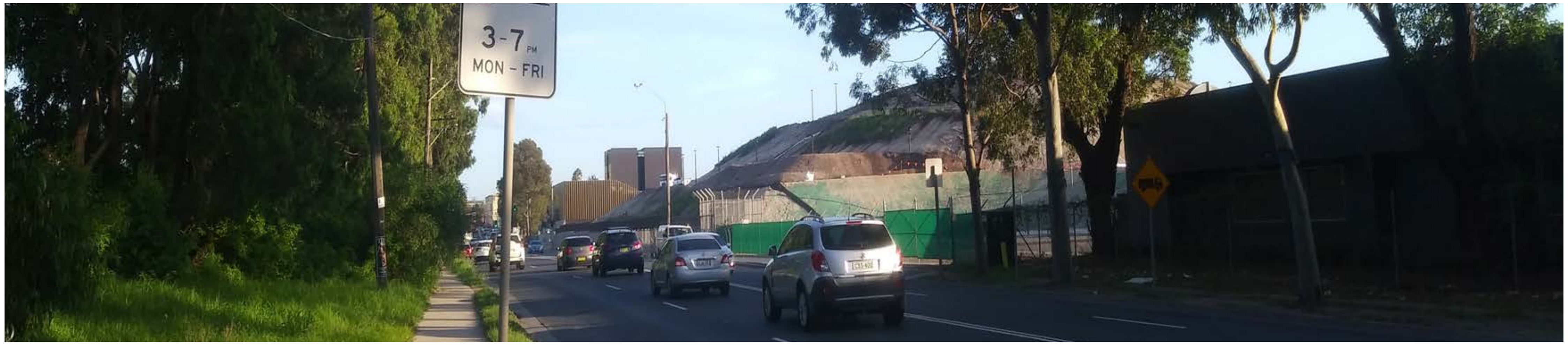
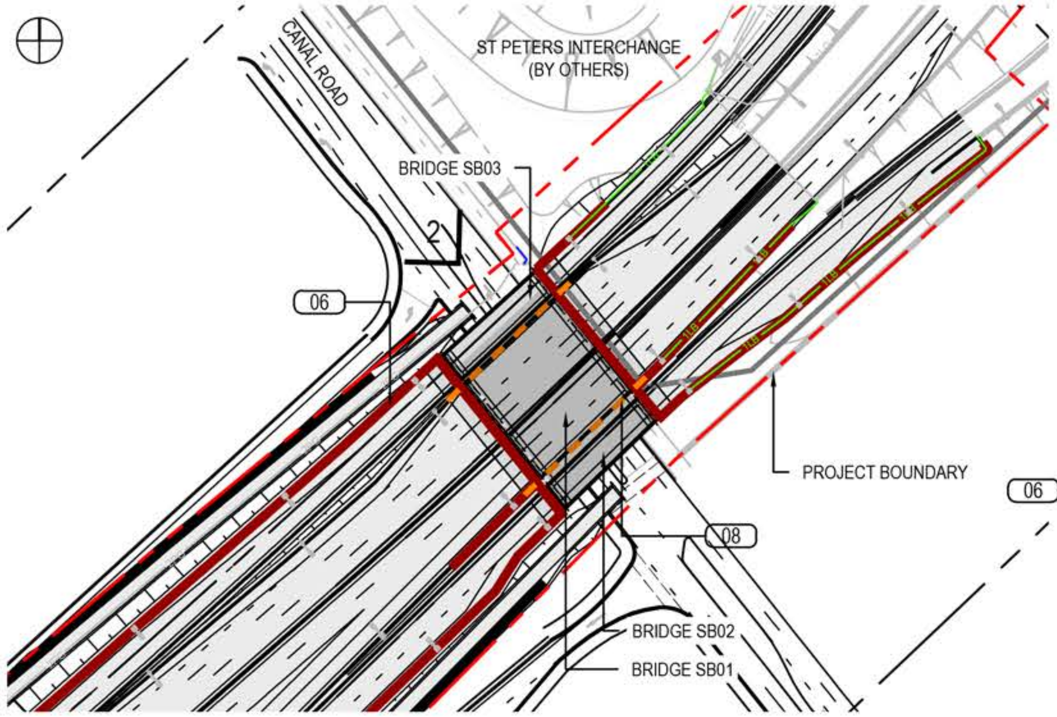
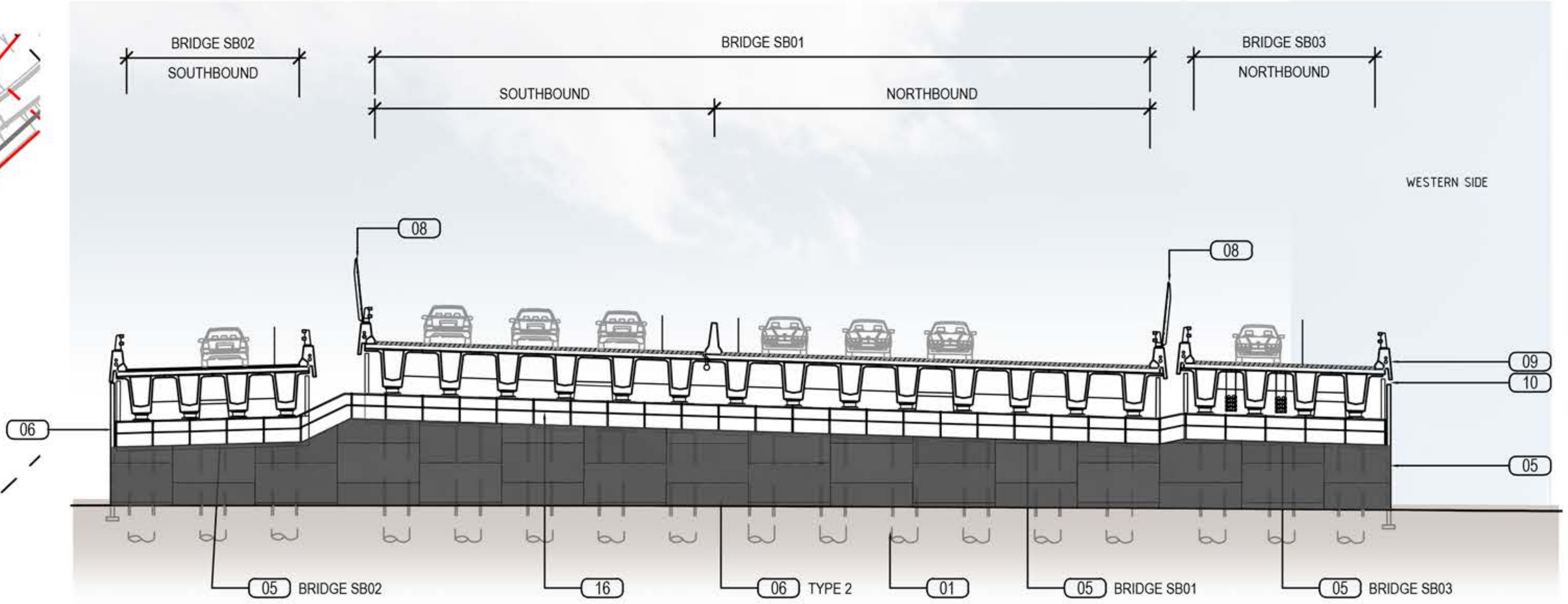


Figure 7-49. Existing view along Canal Road

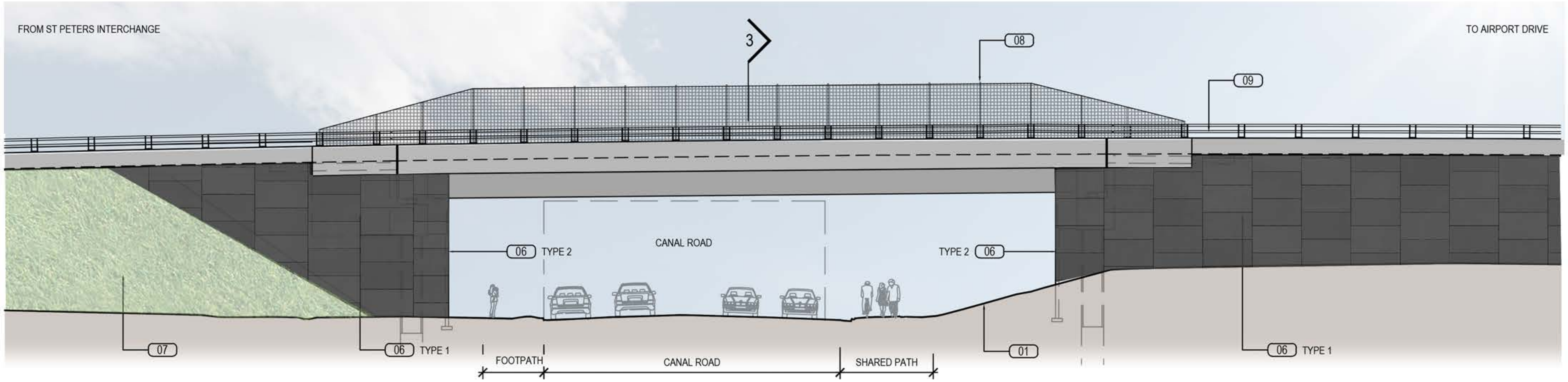
Figure 7-50. View of SB01, SB02 and SB03 from Canal Road



1 | PLAN - BRIDGES OVER CANL ROAD (SB01, SB02, SB03)
SCALE 1:2000



3 | TYPICAL SECTION - BRIDGES OVER CANAL ROAD (SB01, SB02, SB03)
SCALE 1:250



2 | ELEVATION - BRIDGES OVER CANAL ROAD (SB01, SB02, SB03)
SCALE 1:200

- 01 GROUND LINE
- 02 CONCRETE BRIDGE PIER WITH INTEGRATED HEADSTOCK
- 03 CONCRETE HEADSTOCK
- 04 CONCRETE SUPER T GIRDER
- 05 BRIDGE ABUTMENT
- 06 CONCRETE REINFORCED SOIL WALL
- 07 LANDSCAPED BATTER
- 08 ANTI-THROW SCREEN WITH MESH INFILL PANELS
- 09 CONCRETE TRAFFIC BARRIER WITH TWIN RAIL
- 10 SHADOW DETAIL
- 11 TYPE F BARRIER
- 12 OBSTACLE LIMITATION SURFACE
- 13 LIGHTING COLUMN
- 14 BRIDGE ARCH
- 15 DESALINATION MAIN
- 16 HANDRAIL/BALUSTRADE
- 17 CABLE STAYS
- 18 STEEL TROUGH GIRDER
- 19 CONCRETE PIER
- 20 HEADLIGHT SCREEN
- 21 BOX CONCRETE GIRDER
- 22 WEATHERED STEEL
- 23 ART SCREEN

Figure 7-51. SB01, SB02, SB03 – typical plan, elevation, section

7.4 Bridge type summary table

Bridge no.	Description	Hierarchy	Structural type	Urban design elements / features
SB51	Bridge over Alexandra Canal near international terminal	Major	Steel network tied arches (4 numbers)	– Feature steel arches that serve as a sculptural element and provide a 'gateway' experience – Feature lighting to underside of the arch to accentuate its profile.
SB31	Bridge over Alexandra Canal T1 to T2 / T3 connection	Minor	Steel box girders	– Variable depth 'fish belly' steel trough girder with a composite deck.
SB21	Bridges over Alexandra Canal and Rail Line	Major	Steel box girders with blade walls	– Fish belly steel box over the canal section of the bridge that provides a smooth profile to the curved aesthetic of the bridge. – Consistent design for the blade walls for the portions of the bridge that pass over the railway and New Airport Drive. – Throwscreens / headlight screens
SB12	Bridge over Qantas Drive	Major	Super T girders with piers and headstocks	– Parapets with skirting element and articulated piers and headstocks developed using a family of forms. – Feature abutments / retaining walls
SB81	Nigel Love underpass	Minor	Concrete box structure	– Feature walls with potential to integrate art in the underpass
SB41 SB42	SYD Link Road Bridge and Bridge over Alexandra Canal near international terminal	Minor	Super T girders with blade walls	– Consistent profile for the Super T girders. – Retaining walls / headlight screens / throwscreens
SB61	Bridge over Alexandra Canal near Link Road	Minor	Steel box girders	– Consistent profile for the steel box girders.
SB01 SB02 SB03	Bridge over Canal Road (towards City, middle and Airport)	Minor	Super T girders	– Consistent profile for the Super T girders.
SB11	Underpass on Qantas Drive under Airport Drive	Minor	Concrete box structure	– Consistent profile for the concrete box structure.
SB91	Bridge on ATL over Alexandra Canal	Minor	Steel box girders	– Inverted 'fish belly' composite concrete deck and steel trough girder
Viaduct	Viaduct	Major	Super T girders with piers and headstocks	– Consistent profile for the bridge superstructure. – Articulated piers and headstocks developed using a family of forms. – Feature art screen – Feature abutments / retaining walls

Legend	
(red)	Steel network tied arch
(pink)	Super T
(yellow)	Steel box girders
(green)	Concrete box structure

As part of the urban design optimisation process, the above bridge summary table demonstrates that the number of bridge structural types have been minimised to three main types namely Super T, steel box and tied network arches to provide a clean and uncluttered design for the bridges.

7.5 Retaining walls

Like the bridges, the retaining walls are also important design elements on the Project and will be perceived to be highly visible elements, from some locations and distances.

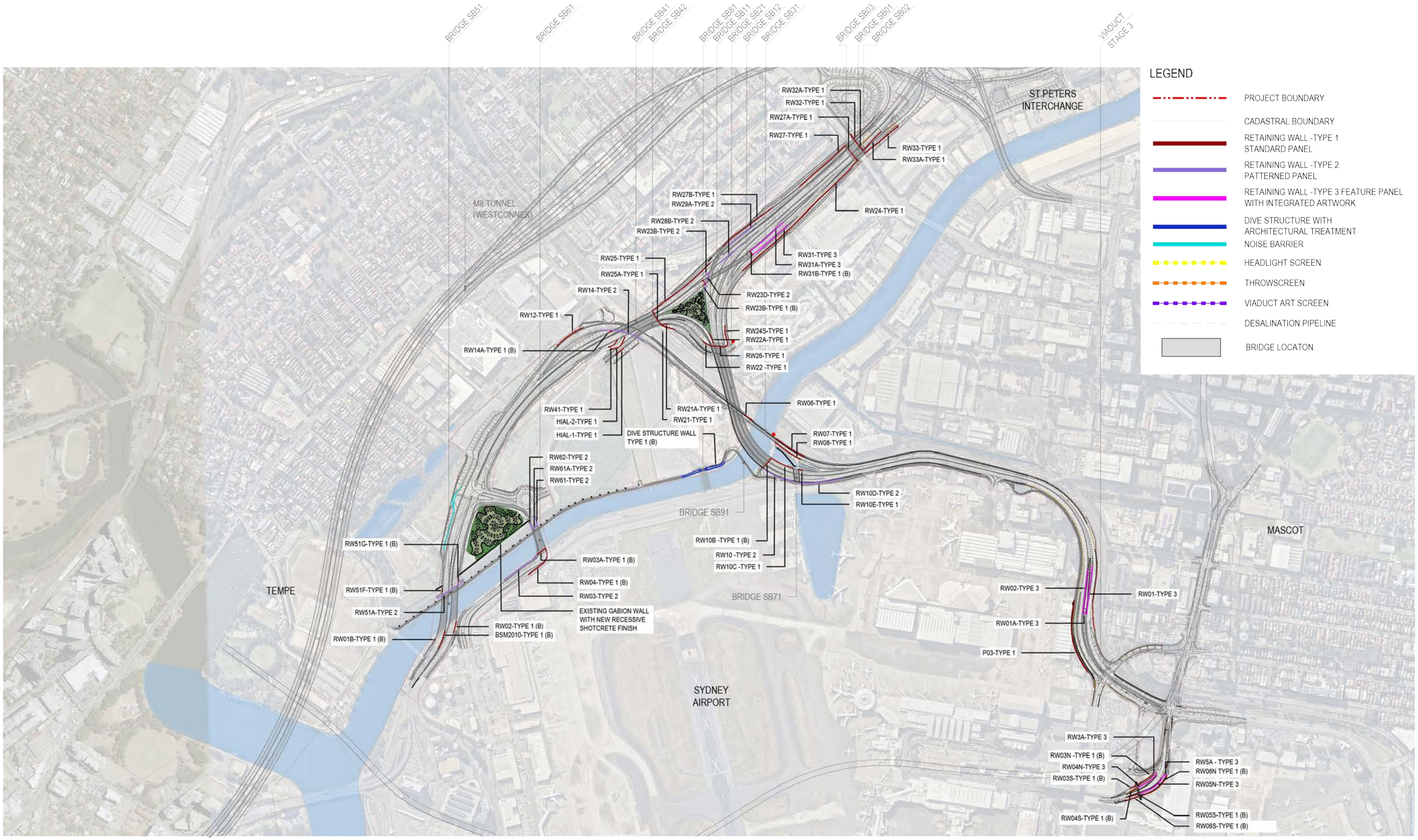
Retaining walls enhance the 'gateway' experience for users and serve as a good backdrop for heritage and cultural interpretation.

Anti-graffiti

Type 2 and 3 retaining walls are proposed to have an anti-graffiti coating. A paint system will be developed as part of the anti-graffiti strategy for all other elements (other retaining wall types and other structures), which will serve as an anti-graffiti mitigation measure to minimise graffiti and vandalism.

Principles	Strategies
Consistency Provide a design that is part of a family of elements.	Minimise number of retaining wall types, and maximise consistency in design and detailing of the retaining wall components.
Unobtrusive appearance Ensure the retaining walls are visually unobtrusive allowing the landscape and environmental attributes of the area to be fully appreciated as part of the user experience.	Provide opportunities to create patterns and textures on the retaining wall finishes. Provide a continuous profile without kinks and offsets. Provide landscape where possible to soften the appearance of the hard elements. Provide a coping to ensure clean and continuous lines are achieved.
Coordinated design of retaining walls Ensure the materials and finishes of the retaining walls are consistent across the Project to ensure visual continuity, with variety at specific locations to punctuate the design or provide visual interest, as a wayfinding measure.	Provide a consistent kit of parts that can be applied to the retaining wall components across the Project. Provide opportunities to incorporate accent treatments to the base retaining wall aesthetic in places where they are highly visible.
Integrated art Provide opportunities for cultural and heritage interpretation by integrating art, including Aboriginal art into the retaining wall design elements.	Provide opportunities to incorporate art on the retaining walls. Provide opportunities for adding form, texture and colour and pattern to enhance the visual aesthetic.
Maintenance Ensure maintenance access is provided for the retaining walls.	Provide allowance for safe access to the retaining walls for maintenance crew to perform maintenance activities.

JOHN HOLLAND | SEYMOUR WHYTE | CM+ | CONTEXT LANDSCAPE ARCHITECTURE | culturalcapital



1 | KEY PLAN - RETAINING WALLS
SCALE 1:10000

0 100 200 300 400 500m

SCALE 1:10,000@A3

NOTES:
- THIS KEY PLAN ILLUSTRATES ONLY URBAN DESIGN FINISHES.
- ALL TYPE 1 WALLS REFER TO TYPE 1 (A) EXCEPT WHERE NOTED OTHERWISE

Figure 7-52. Project retaining wall key plan

7.5.1 Retaining wall types

All the retaining walls have a base material of concrete with a either a plain or patterned finish, which can be developed to incorporate patterns, textures and colours through art, to be developed with artist representatives.

Where exposed shotcrete has been unavoidable, an architectural treatment has been provided that is recessive in appearance and reduces the visual impact. This occurs only in a limited area between a small section between SB61 and SB51, which is not located in a visually prominent area.

The use of coping has been avoided to reduce the potential visual bulk and visual clutter that would potentially draw unnecessary attention.

RSW retaining wall types have been established based on their visibility, into the following.

Type 1 – Standard panel

These walls are less visible from the Motorway and the surrounding areas, and are predominantly screened by landscape in the foreground. Two types of finishes have been developed to tie into the surrounding context of the RSW wall.

- Type 1A - Painted in a recessive colour to tie in with WestConnex St Peters interchange walls (same finish for the soil nail wall at the exit ramp from Airport Drive to Qantas Drive)
- Type 1B - Natural concrete to tie in with adjacent concrete surfaces to provide a single visual aesthetic

Type 2 – Patterned panel

These walls are visible and experienced at a roadway scale as the users traverse along the roadway and the ATL. These walls are envisaged to incorporate standard Reckli pattern. The pattern includes a textured finish in natural concrete colour. They are provided at the following locations:

- Approaches to and from SPI along the Motorway
- SB41 / SB42 abutment
- SB11
- SB51
- SB61 northern side of the southern abutment.

Type 3 – Feature panel

These walls are located in prominent locations, near to carriageways to signify a ‘gateway’ experience. Artwork patterns and textures have been developed in consultation with the artists as described in Chapter 5. They are provided at the following locations:

- SB12 northern abutments
- Viaduct abutments.

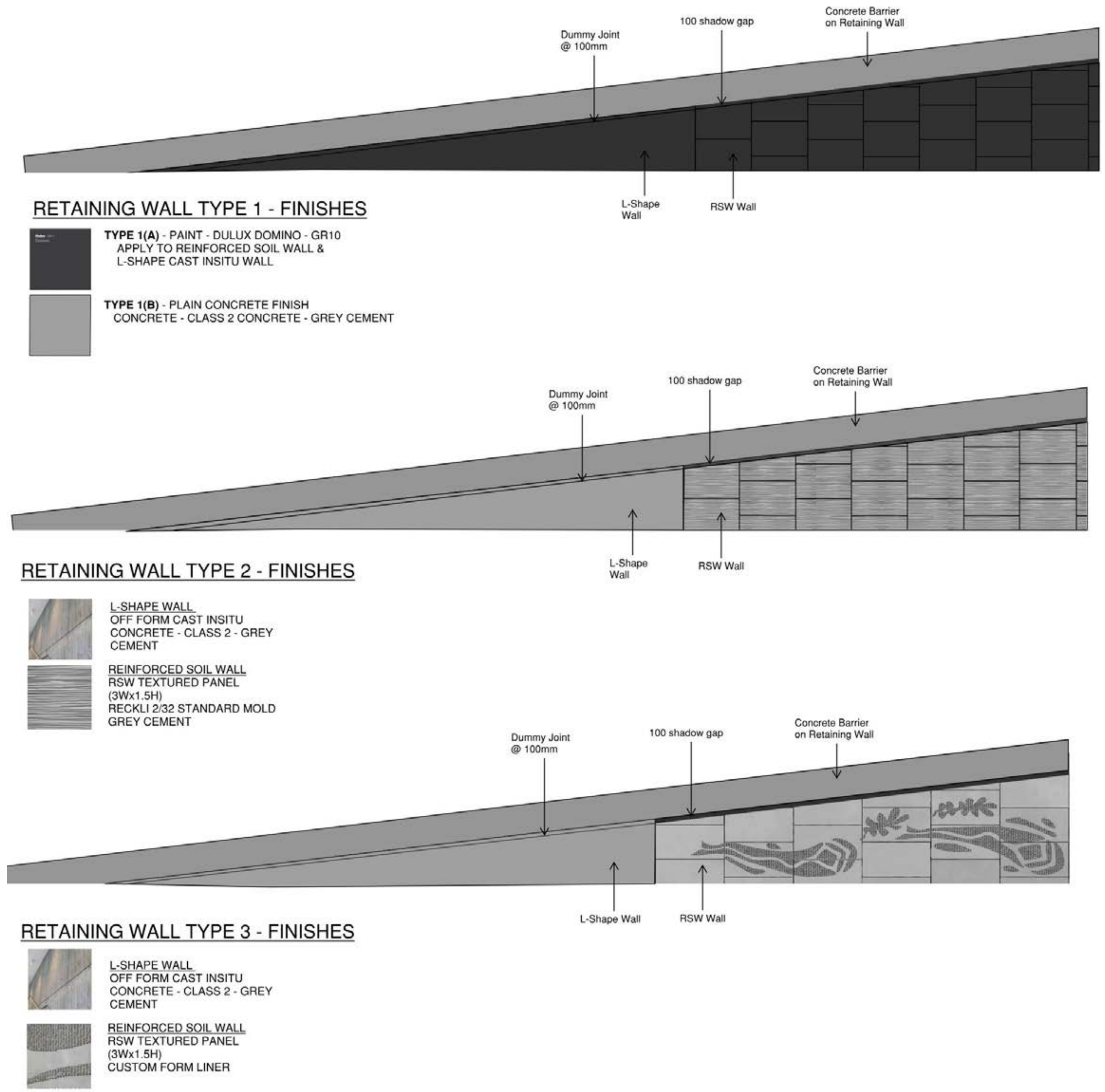
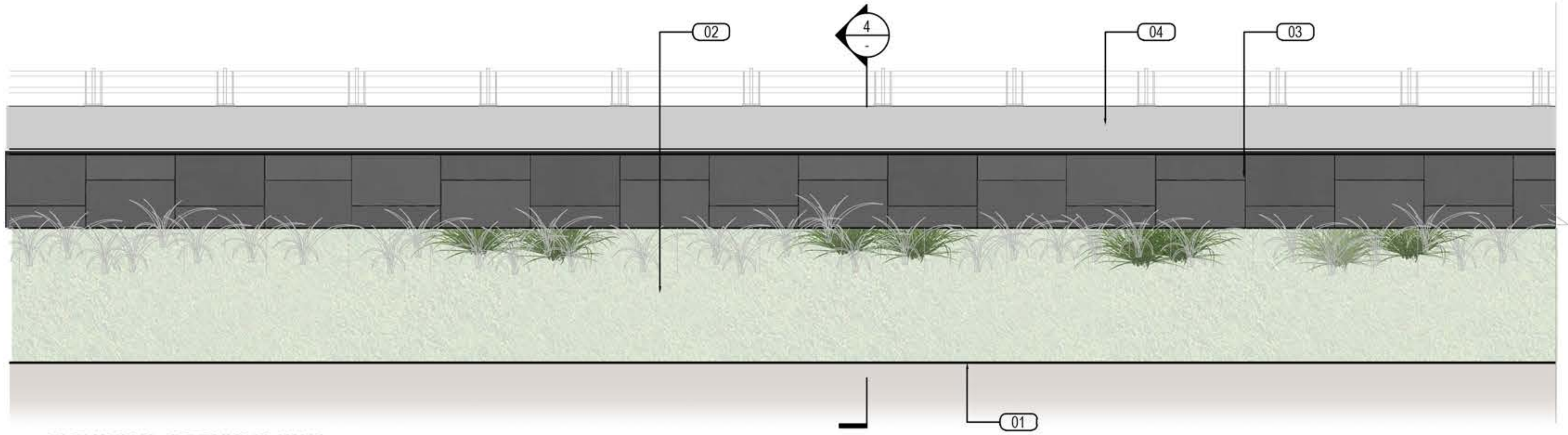


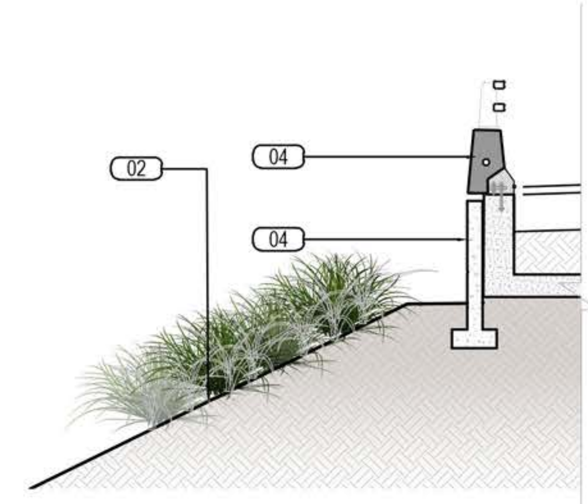
Figure 7-53. Retaining wall types

Figure 7-54. View of type 3 retaining wall along Qantas Drive

Figure 7-55. View of retaining wall along viaduct

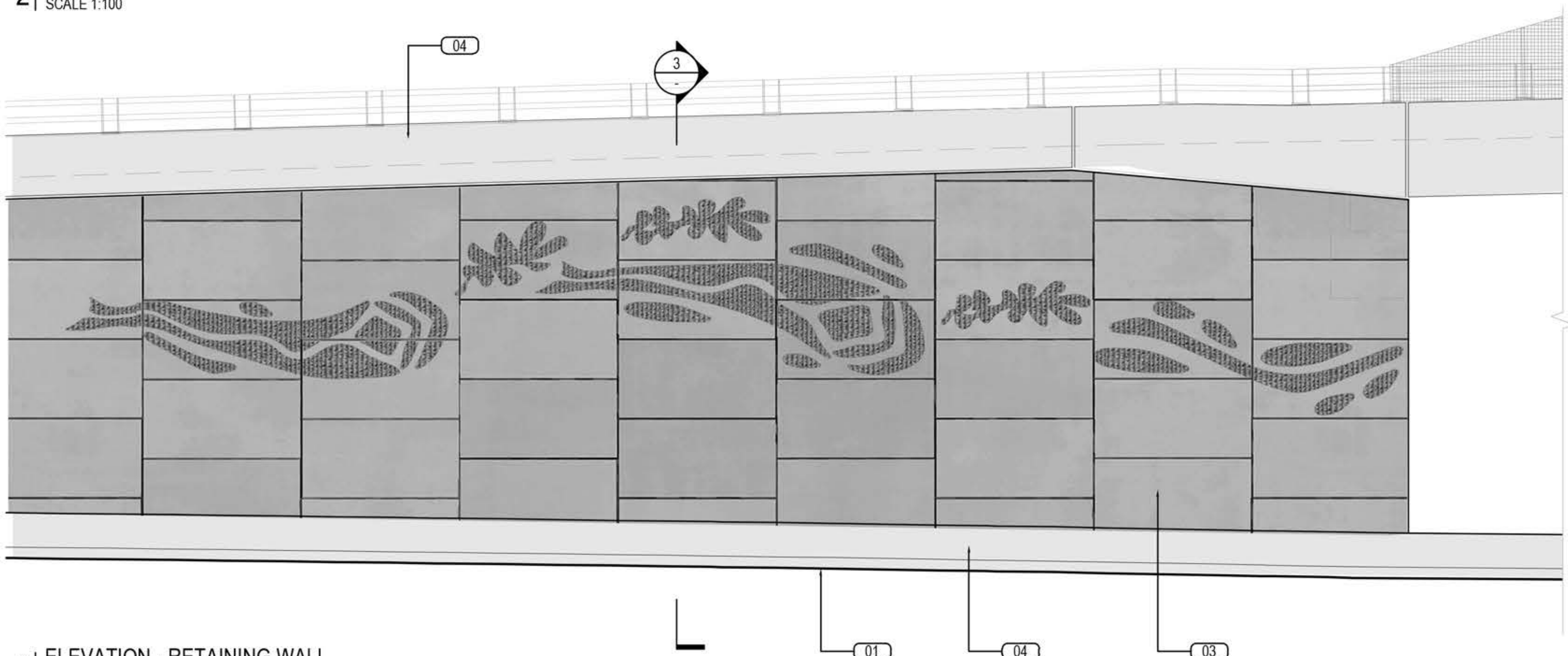
Figure 7-56. View of viaduct from Qantas Drive

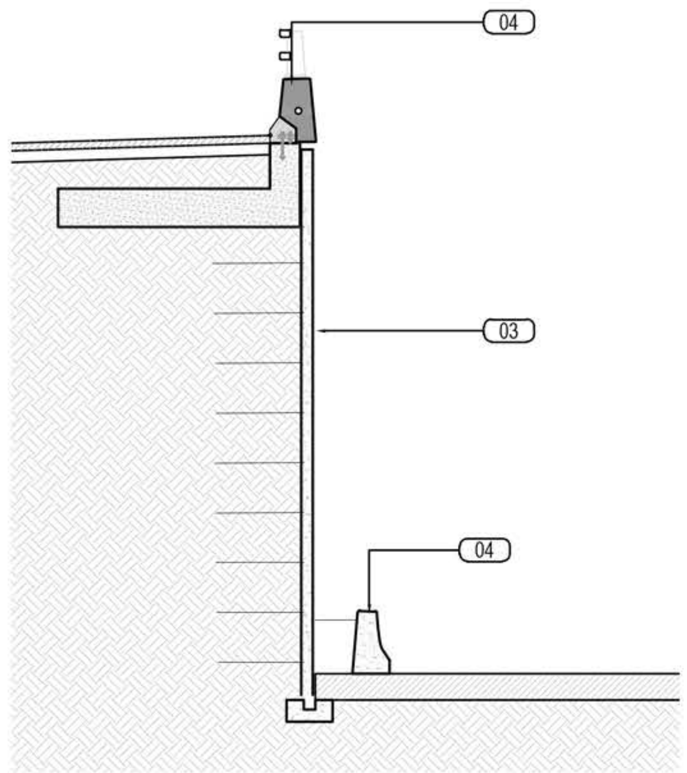




4 | SECTION - RETAINING WALL
SCALE 1:100

2 | ELEVATION - RETAINING WALL
SCALE 1:100





1 | ELEVATION - RETAINING WALL
SCALE 1:100

3 | SECTION - RETAINING WALL
SCALE 1:100

- 01 GROUND LINE
- 02 LANDSCAPED BATTER
- 03 PRECAST RETAINING WALL
- 04 CONCRETE BARRIER

Figure 7-57. Retaining wall details

7.5.2 Retaining wall type summary

	Hierarchy	Urban design elements / features
 	TYPE 1	– Low impact retaining wall - recessive aesthetic – Type 1A - standard paint finish – Type 1B - natural concrete
	TYPE 2	– Medium impact retaining wall - recessive aesthetic – Standard patterned finish
	TYPE 3	– High impact retaining wall - bold aesthetic – Feature art wall developed with artist representatives as part of detailed design, to provide cultural and heritage interpretation

7.6 Throwscreens and headlight screens

7.6.1 Throwscreens

Throwscreens are visually prominent elements that are associated with the overall bridge aesthetics. They have been designed as simple elements attached to the sides of the bridges and have been detailed with tapered T-posts with mesh infill panels.

The requirements to provide throwscreens are as follows:

- To prevent access between bridges where they are too close to each other
- Along bridges that pass over railway lines
- Along bridges that have shared paths to prevent objects from being thrown over.

Throw screens are provided at the following locations:

- At SB21 over the railway line
- At SB41 and SB42 on the inner sides of the roadway
- At SB01, SB02 and SB03 on the inner sides of the roadway.

The throwscreens are attached to the side of the barrier when they are on the outside ends of the bridge. When they are provided on the inner sides, they are attached on top of the barrier.

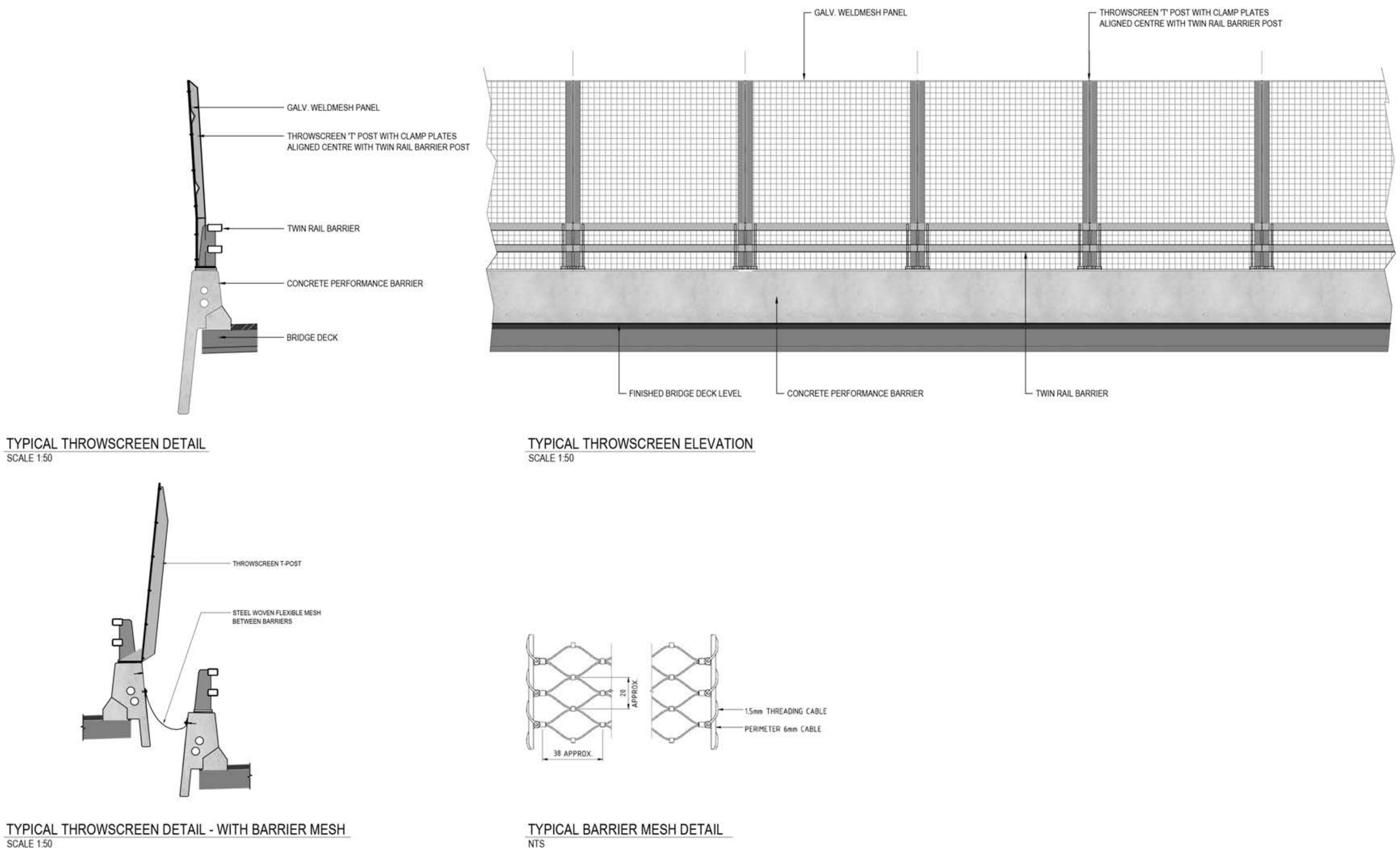


Figure 7-58. Throwscreen concept

7.6.2 Headlight screens

Headlight screens are required to be provided where there is potential to cause glare from the vehicles or interrupt visibility of the runway for plane operations while landing and taking off, to ensure safe operations for pilots.

Based on a high level analysis it is envisaged that the headlight screens will need to be provided at the following locations:

- Along the southern side of SB21
- Along the northern side of the roadway edge on the future access road from Northern Lands to Tempe Lands.

The design of both throwscreens and headlight screens adopt a modular approach with a similar aesthetic. They feature tapered posts with infill mesh (for throwscreens) or opaque / translucent acrylic (for headlight screens). Smooth transitions are provided where the headlight screens become throwscreens (at the SB21 interface of canal / roadway with railway).

An anti-graffiti strategy has been developed for the acrylic headlight screens and noise walls as part of detailed design. It outlines the methodologies to remediate, repair or replace the panels depending on the severity of the impact.

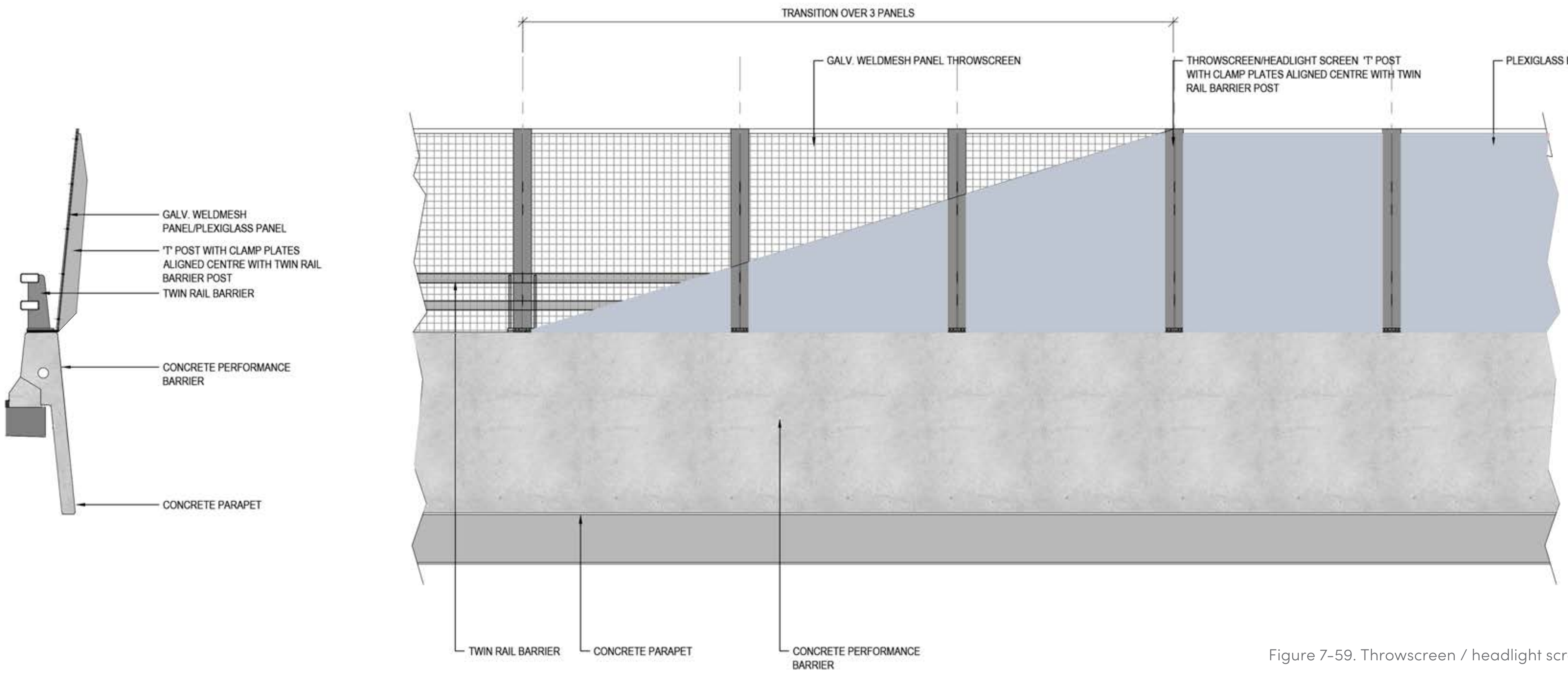
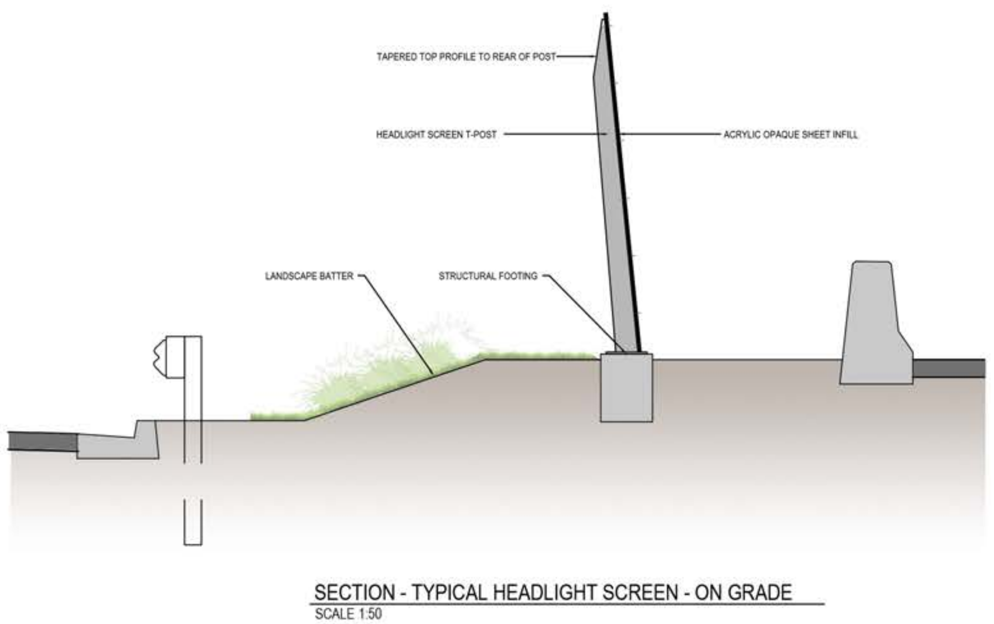


Figure 7-59. Throwscreen / headlight screen transition



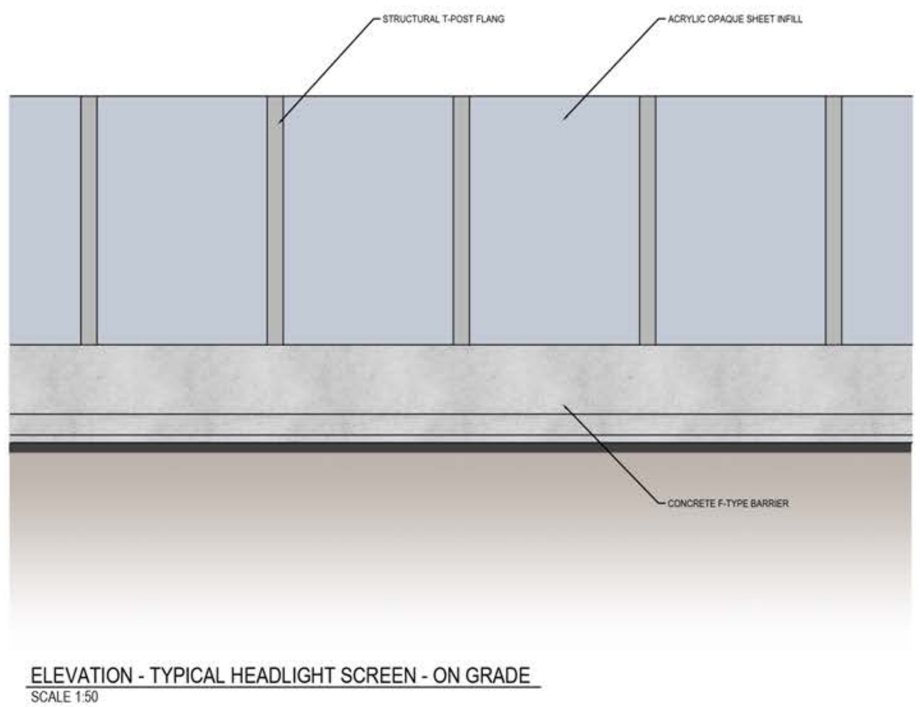


Figure 7-60. Headlight screen on grade

7.7 Noise walls

Noise walls are provided at one location, extending for a length of about 450 metres along the northbound carriageway just to the north of Alexandra Canal near SB51. There are noise wall is located within the approaches to and from the International Terminal, along with the feature arches of SB51 and the Tempe Lands Mound, which form part of the 'gateway' experience. The design is configured in two parts to meet the noise attenuation requirements and has the following components:

- Part 1 – Noise wall and mound
- Part 2 – Noise mound only.

A gap has been provided between Part 1 and Part 2 to allow for an ATL crossing which improves connections for pedestrian and cyclist access between the Airport and the Tempe Recreation Reserve precincts The overall composition comprises about a three metre high concrete noise wall with a two metre high noise mound. The noise wall aesthetic has been kept recessive and incorporates four metre wide nominal precast concrete panels in a dark colour. The elevation adopts a gentle, undulating profile, providing a smooth and consistent overall aesthetic.

The height of the noise wall has been reduced by introducing the mound, which will help to minimis its visual impact. The profile has been designed to meet operational and turbulence requirements. Acrylic panels are provided at the noise wall gap at the ATL crossing to mark this transition. The design is articulated to have an overlapping arrangement and the change in material provides more legibility and definition to this transition, creating a dynamic visual aesthetic. The acrylic panels include a combination of an opaque portion and a transparent portion, which provides for passive surveillance and visual permeability.

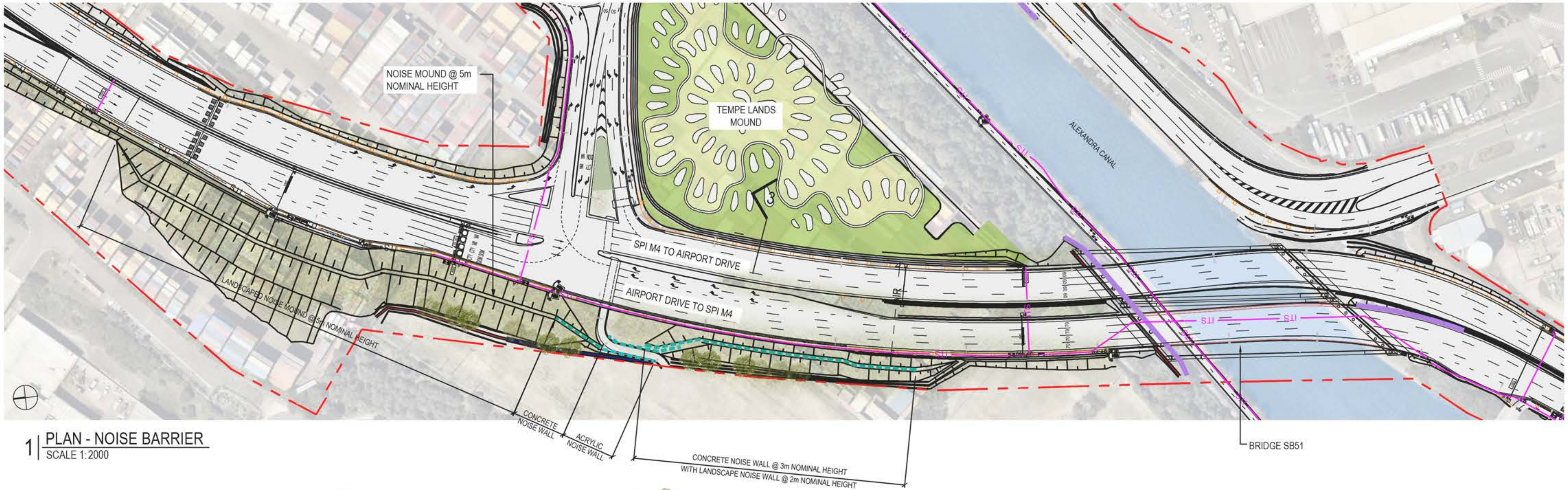
Feature gymea lilies is provided to help frame the views at the approaches to and from the ATL crossing and tie in with the visual event of the Tempe Lands Mound. Feature planting in the form of Banksia Scrubs is provided in front of the noise wall along the roadway side to complement the feature mound landscape on the other side. Buffer planting as screen planting is provided to the back of the noise wall to tie in with the Tempe Recreation Reserve and wetlands landscape (being developed by others). .

Figure 7-61. View of noise wall from northbound lanes

Figure 7-62. Noise wall – aerial view from north

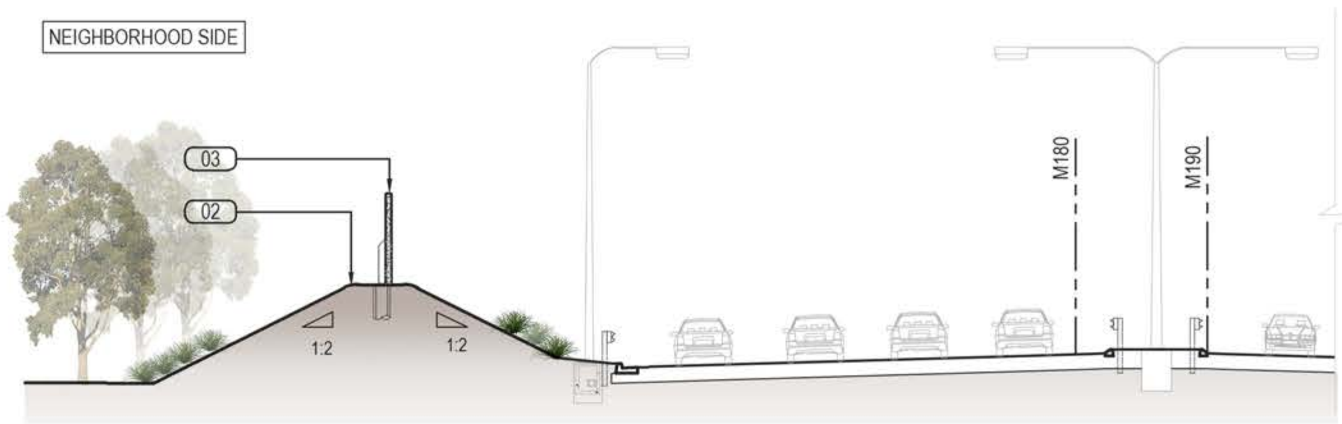
Figure 7-63. View of noise wall from pedestrian crossing

Figure 7-64. Noise wall – view from northeast



1 | PLAN - NOISE BARRIER
SCALE 1:2000

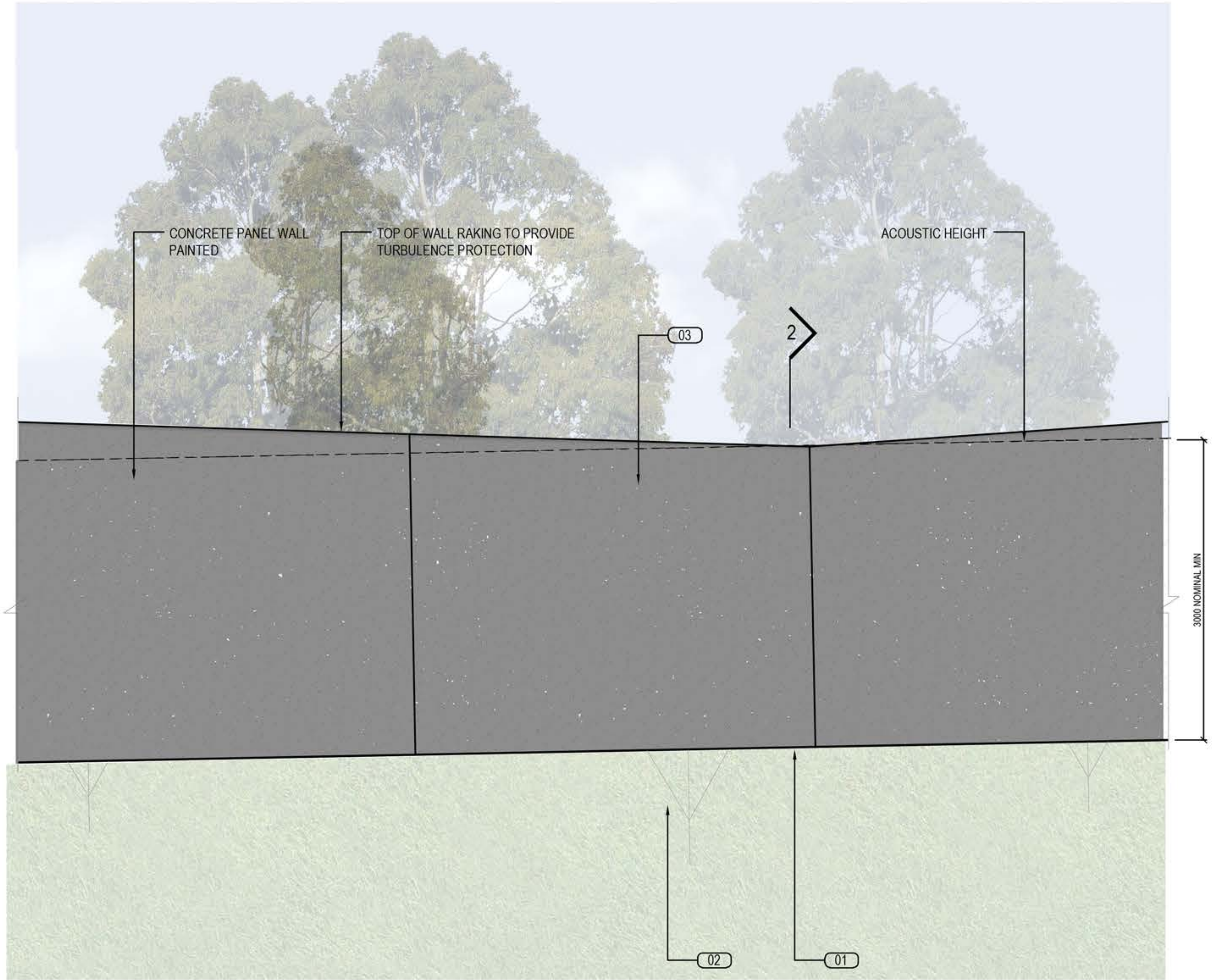
2 | ELEVATION - NOISE BARRIER ALONG AIRPORT DRIVR (NORTHBOUND)
SCALE 1:500



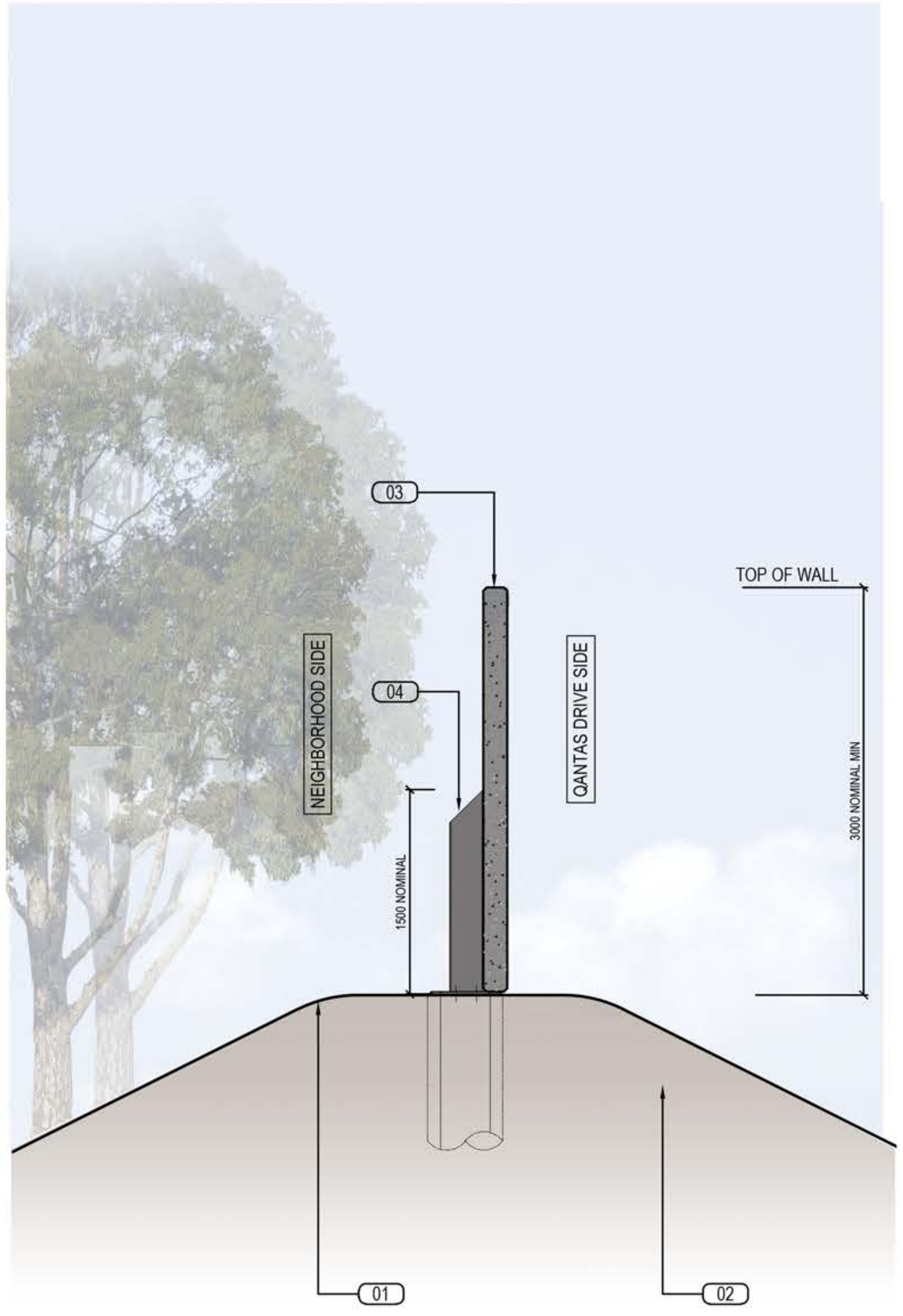
3 | SECTION - NOISE BARRIER
SCALE 1:250

- 01 GROUND LINE
- 02 LANDSCAPED NOISE MOUND
- 03 CONCRETE NOISE WALL
- 04 ACRYLIC NOISE WALL

Figure 7-65. Noise wall – typical plan, elevation, section



1 | ELEVATION - NOISE BARRIER ALONG AIRPORT DRIVE (NORTHBOUND)
SCALE 1:50



2 | SECTION - NOISE WALL/NOISE MOUND
SCALE 1:50

01 GROUND LINE
02 LANDSCAPED NOISE MOUND
03 CONCRETE NOISE BARRIER
04 STRUCTURAL SUPPORT TO ENGINEERS DETAILS

Figure 7-66. Noise wall – details

Figure 7-67. Noise wall – eye level view looking north

Figure 7-68. Noise wall – eye level view looking south

Figure 7-69. Noise wall and mound – view from neighbourhood side

Figure 7-70. Noise wall – View of noise wall at ATL crossing - neighbourhood side

7.8 Safety in Design (SiD)

A SiD process has been carried out in developing the design. The process has considered the ongoing safety of workers / users during the construction, operation and maintenance as well as the decommissioning phases of the Project. Key SiD hazards and risks related to urban design have been identified through a preliminary workshop and strategies to avoid or mitigate the risks have been illustrated in this report as part of design development. Key urban design hazards include the following:

- CPTED hazards
- Operational hazards from bird strikes.

7.8.1 CPTED principles and strategy

CPTED is a crime prevention strategy that focuses on the planning, design and structure of places. This strategy is based on the following:

- Reduce opportunities for crime by using appropriate design and place management principles
- Easier for the public and law enforcement entities to navigate and understand the spaces they occupy
- Discourage offenders from seeing these same places as opportunities for crime and anti-social behaviour.

CPTED seeks to influence the design of buildings and places by:

- Increasing the perception of risk to criminals by increasing the possibility of detection, challenge and capture
- Increasing the effort required to commit crime by increasing the time, energy or resources which need to be expended
- Reducing the potential rewards of crime by minimising, removing or concealing 'crime benefits'
- Removing conditions that create confusion about required norms of behaviour.

There are four principles that need to be used in the assessment of development applications to minimise the opportunity for crime:

- Surveillance
- Access control
- Territorial reinforcement
- Space management.

These principles are identified in the *Crime Prevention and the Assessment of Development Applications Guidelines*, under *Section 79C of the Environmental Planning and Assessment Act* 1979 issued by the (former) Department of Urban Affairs and Planning

Strategy

Specific areas of the Project where CPTED is most relevant are the areas where pedestrians and cyclists have access to the Project corridor. The main focus for the CPTED review of the Project is to ensure all pedestrian and cyclist connections tie into the existing network along the corridor and have clear sightlines.

Key strategies that have guided the approach to all built elements employed in the design and their application include:

- Maximising natural surveillance and sightlines for shared path users and pedestrians under/over bridges and near bridge abutments
- Preventing access to operational areas through fencing and built edges
- Provision for lighting along all paths (refer to principles for lighting)
- Design of clear, predictable routes to avoid entrapment locations supported by wayfinding and signage.

SiD application

- The alignment of the new shared paths and footpaths are designed to be simple, elegant and legible and align seamlessly with the existing elements. Kinks, corner pockets or any abrupt starts or terminations are avoided
- The shared paths are designed to provide a continuous connection between bridges, and along Alexandra Canal and integrate with existing shared path network
- The shared paths are designed to provide sufficient visual distances at changes in direction. The changes in direction are designed to have smooth transitions and adequate sightline distances to avoid accidental contact with other users
- The design allows for adequate lighting in areas that will be accessed by people, including the underpass under Nigel Love Bridge. Feature lighting has also been provided to enhance the user experience and deter the possibility of crime
- Clear sight lines are considered when planting vegetation along the shared paths, particularly in areas where there is a change or direction, at approaches to special areas, change in differing spatial conditions, such as foreshores and bridge approaches
- The shared paths are designed to create placemaking opportunities with the provision for heritage and cultural interpretation, being developed with artist representatives
- Appropriate tree, shrub and groundcover species are selected to minimise bird strike and reduce the attractiveness of landscaping to the wildlife, which may pose a risk to aircraft operations at Sydney Airport.

ATL underpasses

The CPTED strategy for the ATL underpasses is as follows:

- Tapering of the walls at the Nigel Love Underpass to open up the visual envelope on approaches to the underpass
- Providing wide openings at the underpasses at Nigel Love and Alexandra Canal, with minimum widths of over 4m (with 6m wide openings at Alexandra Canal underpass)
- Maintaining end to end visibility by maintaining a generally straight alignment at Nigel Love Bridge underpass
- At the Alexandra Canal underpass, where the alignment is not straight, special nodes such as rest areas with amenities are proposed which will provide for passive surveillance
- Providing a rest area as a node near Nigel Love Bridge underpass with amenities such as shelter, seating, lighting and a bubbler, which will allow for passive surveillance
- Integrating Aboriginal artwork in the design of the walls of the underpasses which extend outside as well, to create interest and provide for heritage interpretation along with the other heritage interpretation elements provided along the length of the ATL
- For lighting, a minimum sublighting category of PE1 is adopted for the underpasses which will provide adequate lighting and visibility at night. The underpasses are illuminated using vandal resistant LED battens fixed to the roof of the structure.

7.9 Signage

The Project requires a number of ITS and directional signage to be provided in a short length.

Consideration has been given to ensure that the signage is located appropriately to provide for safety, whilst minimising their visual impact. They have been grouped together where possible, to avoid visual clutter.

Integrated viaduct signage

Signage is integrated with the overall structure via a corbel attached to the headstock. This helps to reduce clutter to reduce clutter. The mechanism i consistent with the corbel mechanism, which is also used for the light poles.

Figure 7-71. ITS and directional signage

Figure 7-72. Integrated viaduct signage

7.10 Fencing

Fencing

Security fencing for the Project will be provided at all interfaces where there is a need to prevent unauthorised access. Fencing is an integral part of road safety as it defines the security perimeter and prevents access to dangerous and restricted areas.

The primary urban design objective for fencing is to minimise the visual impact of the fences on the surrounding environment. Planting has been provided and fencing has been set back from the cadastral boundaries where possible.

Key strategies are to:

- Ensure a consistent typology and aesthetic that is used in airport environments is provided
- Ensure the design is integrated with the other Project elements design as a family of elements
- Ensure their appearance is recessive in the environment to reduce their visual impact
- Ensure the design does not obstruct major views
- Ensure the design prevents pedestrians from accessing the Motorway and construction sites
- Ensure the design suits their surrounding context
- Allow provision for planting to be incorporated to screen fencing, where possible
- Utilise interfaces with bridges and retaining walls for security perimeter where possible, to minimise the need for continuous perimeter fencing
- Integrate lighting with the fencing design so to minimise clutter, where applicable.

Following types of fencing have been incorporated:

Type 1 – Airport security fence located along Motorway boundaries

- Security fencing 4000 millimetres high rectangular mesh fence on ground
- Finish – High quality powder coated mesh, painted black with Mohawk toothing

Type 2 – Shared path and bridge handrail

- Shared path fencing 1400 millimetres high, tapered posts nominally 1600 - 2400 millimetres apart with circular balusters
- Finish – Hot dipped galvanised
- Light post with shared path handrail.

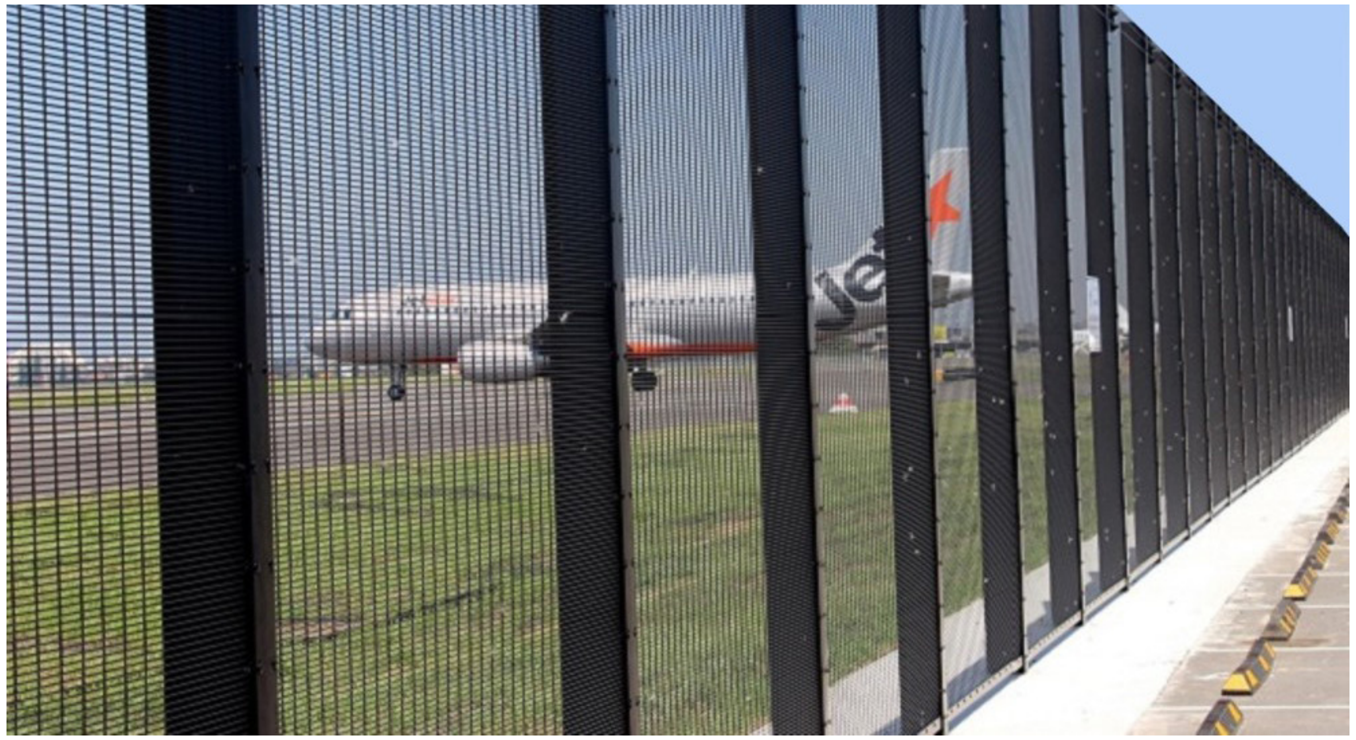


Figure 7-73. Type 1 airport security fence

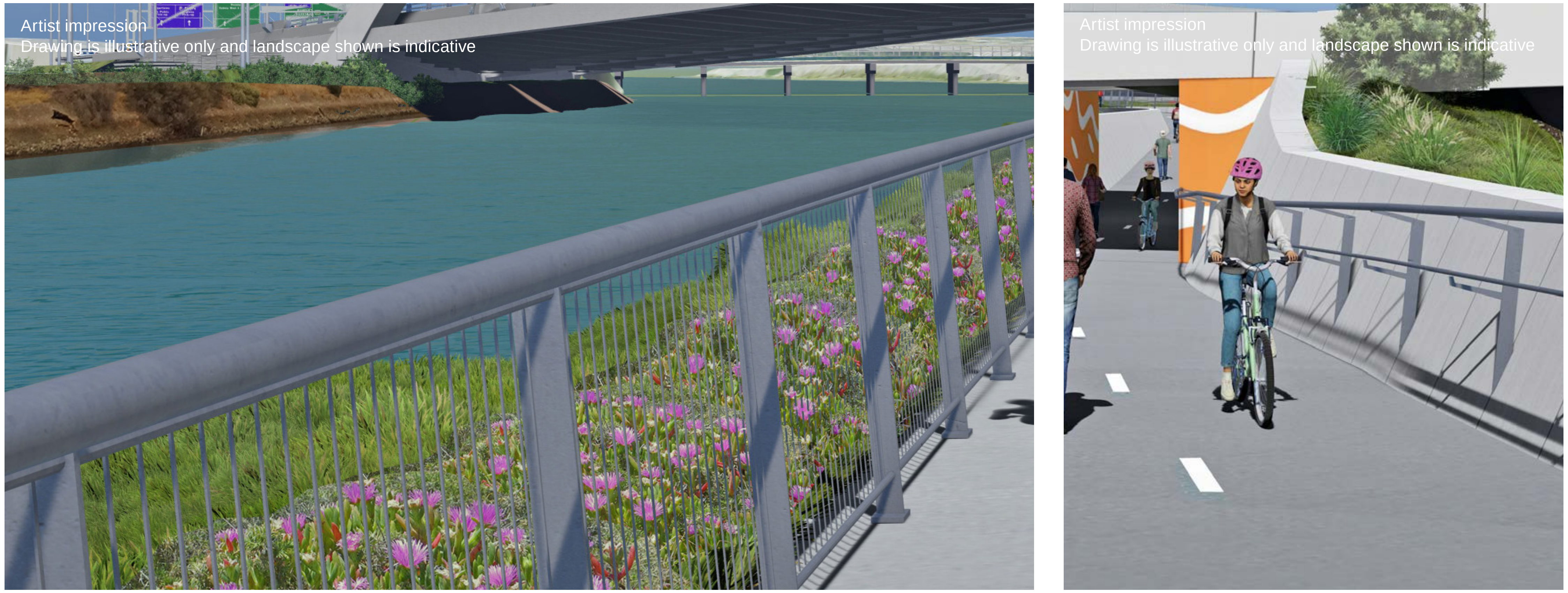


Figure 7-74. Type 2 shared path and bridge fencing

7.11 Lighting

Lighting

Given the proximity of the Project to Sydney Airport, lighting is designed to minimise any adverse or distracting lighting configuration, spillage or intensity to aircraft operations above, respecting the OLS of aircraft operations.

This lighting strategy has been confirmed to adhere to the Lighting in the *Vicinity of Aerodromes: Advice to Lighting Designer* (CASA, 1999) and *National Airports Safeguarding Framework Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports* (DIRD, 2012). Consultation has been conducted with SYD as part of the design process, discussions on feature lighting is currently underway.

The lighting design has been developed with local Councils and Sydney Airport in accordance with all the lighting standards in Airport vicinities, including *Civil Aviation Act 1988 and the Airports Act 1996, and NASF Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports and Australian Standard 4282:2019 Control* of the obtrusive effects of outdoor lighting, and relevant *Australian Standards in the series AS/NZ 1158 – Lighting for Roads and Public Spaces* and will achieve all requirements of the relevant design standards, and guidelines and Condition E65 inclusive.

Various lighting categories have been allocated for the lighting based on their location and condition. For the ATL lighting, these range form Category V lighting when the ATL is along roadways in general, PE1 where the ATL passes through bridge structures, PE3 when the ATL passess over SB91 and PP4 when the ATL is on ground. These categories allocated are in accordance with the local area public domain plans.

LED lighting has been incorporated in preference to fluorescent fittings or high pressure sodium lights where fit for purpose, feasible and cost-effective.

A detailed light spill assessment has been undertaken in accordance with AS/NZS 4282 which included a study on the potential of roadway lighting spill on nearby residential properties. The Project has ensured light spill, obtrusive light and upward waste light is adherent to this standard. The Project is also designed in accordance with SYD's airport lighting operation requirements, in particular Civil Aviation Safety Authority MOS 139. This standard has stringent guidelines around excess spill light and reduced upward waste light. The luminaires used on the Project are LED of the aero-screen flat glass type. These luminaires have tight beam optics which direct light to the roadway and pedestrian pathways.

The Active Transport Link beside the Alexandra Canal has lighting within the handrail. This is designed to an AS/NZS 1158 Category P system. The design category is defined in accordance with Australian Standard AS1158.3.1 table 2.2 selection criteria (pedestrian/cycle activity and fear of crime). The Project has also considered CPTED design measures to avoid dark pockets while provided passive and active surveillance.

The lighting design will reduce the impact on nocturnal fauna in and around Tempe Reserve.

Feature lighting

Feature lighting is provided at the following locations and areas:

- Arched bridge - LED lighting with changeable colours are provided on the undercroft of the haunch to express the arch profile to be perceived as a continuous element. Standard lighting will be provided in white light, with multi-coloured lighting provided to mark events and special occasions. The colours illustrated have been developed with the artists palette.
- Handrail lighting - LED feature lighting in white light is provided along the length of the handrail that is integrated with the handrail. This also provides for improved passive surveillance to manage graffiti.
- Rest areas - Feature LED lighting is provided at the two rest areas on the shelter roofs and the seating. The shelter will feature a white light provided as a halo to highlight the profile and shelter roof. Seating lighting will feature warm light provided as light boxes attached to the sides of the sandstone seating.
- Viaduct Screen - Feature LED backlighting is provided by using a backing sheet with a top luminaire only system, which will express the artwork through the perforations.

Feature lighting has been incorporated at the key thresholds into and out the domestic and international airport on the arch bridge and the viaduct, which strengthens their relationship and elevate the temporal experience. Lighting has also been provided at the underpasses for safety and security.

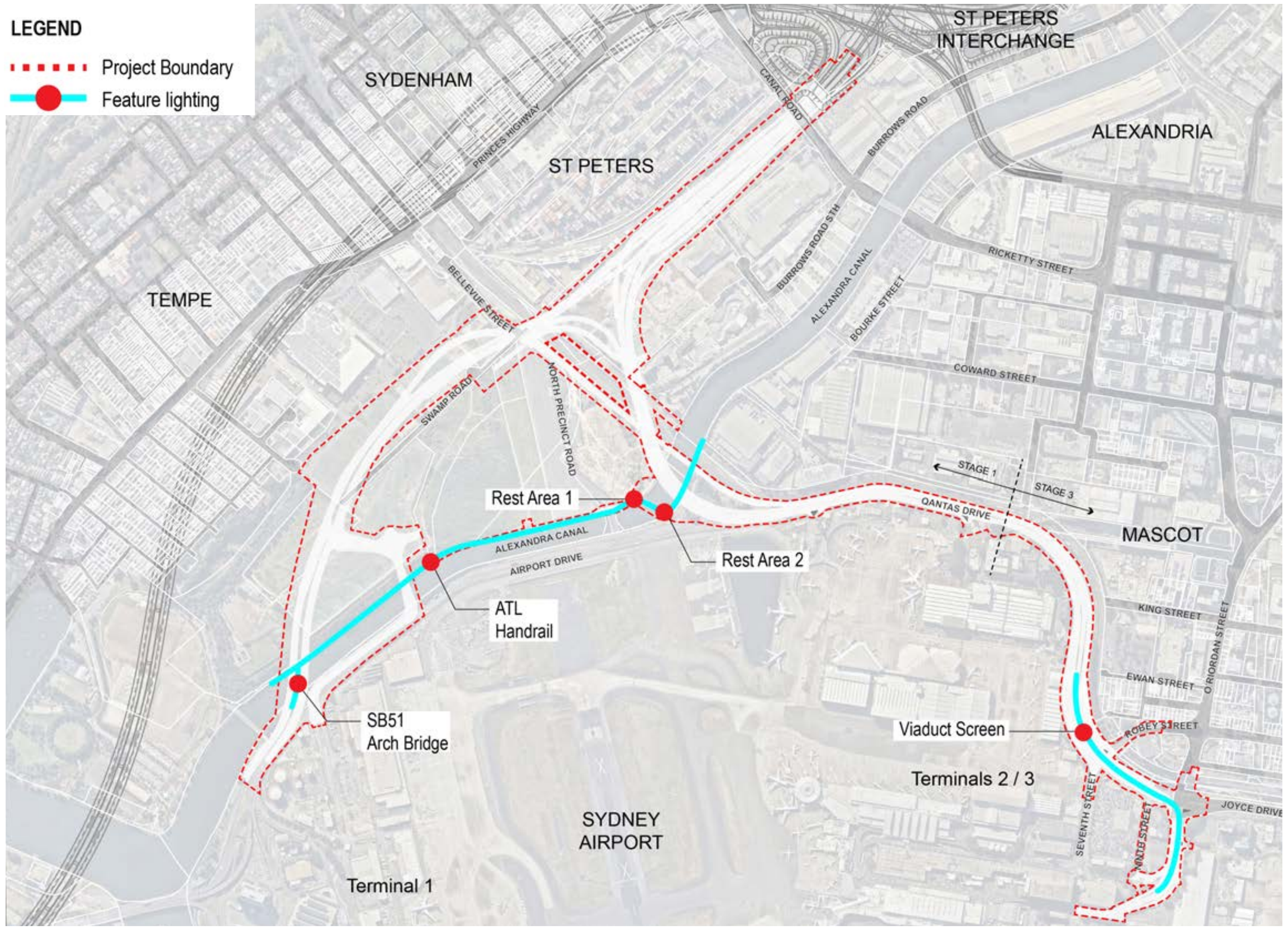
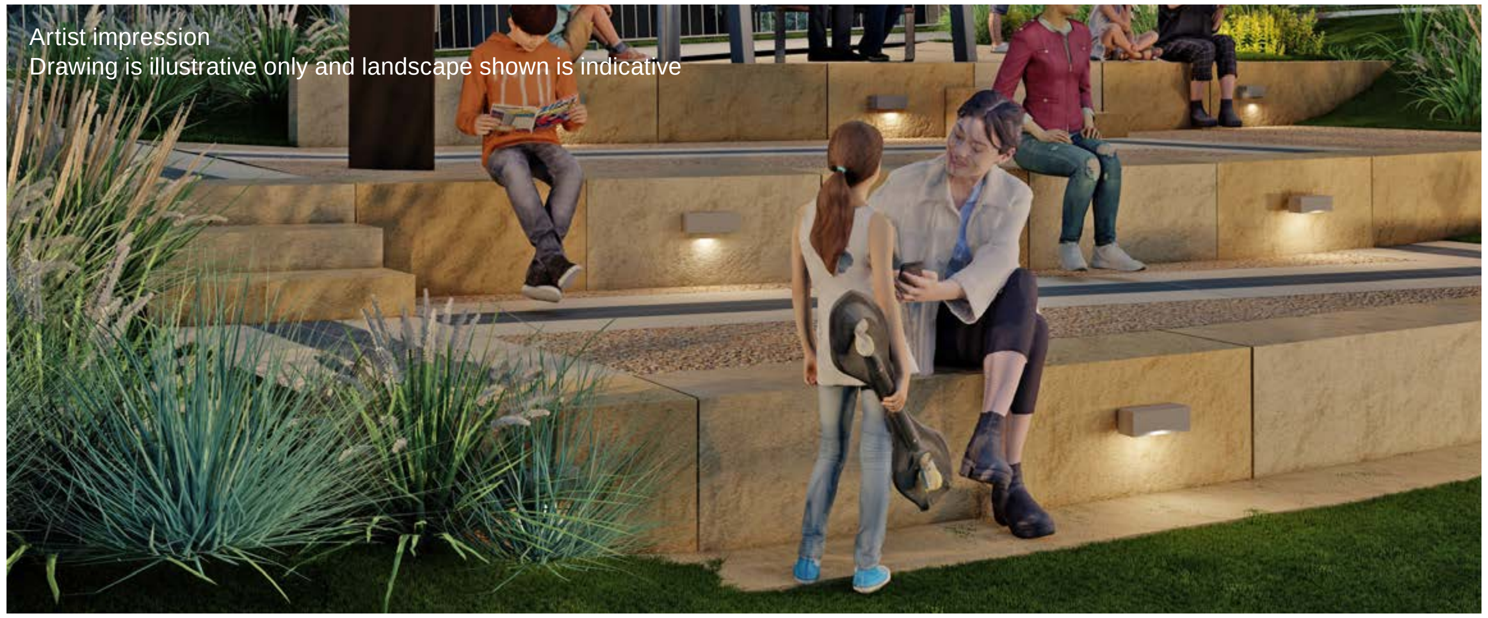


Figure 7-75. Feature lighting

Figure 7-76. View of SB51 - night



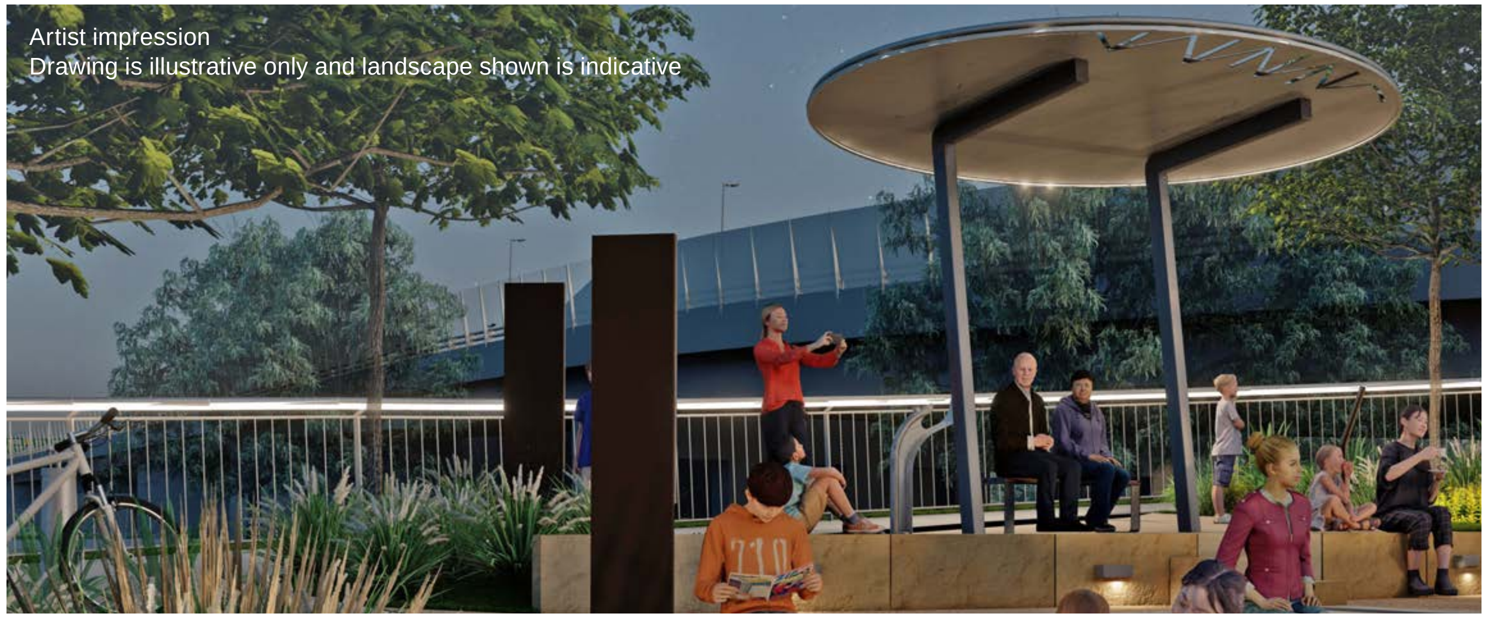


Figure 7-77. Feature lighting

Figure 7-78. View of SB51 from ATL - night

7.12 Landscape introduction

7.12.1 Design description

The landscape design delivers an undulating landscape, both in landform and planting. The land rises and falls with the natural and built environment. Sculptural landforms rise through the road network and the cloud like Banksia Scrub drifts across the batters and verges. The rhythm of these elements creates a continuous landscape in harmony with the place, art and Country.

Figure 7-79. The sculpted vegetation of Eastern Suburbs Banksia Scrub at La Perouse, Botany Bay

7.13 Landscape context

7.13.1 A landscape of change and connection

Twenty thousand years ago, Sydney's climate was cooler and drier, and sea levels were much lower. Botany Bay was no bay at all but consisted of a swampy sand plain where the Cooks and Georges Rivers met before flowing through what is now the Kurnell Peninsula. From around eighteen thousand years ago, warming global temperatures caused the sea level to rise rapidly, and over the next ten thousand years, it devoured the coastal plain.

For hundreds of generations of Aboriginal people along the coast, constant environmental change was normal; the ground literally shifted beneath their feet. The changing climate and landscape brought opportunity as well as challenges for Aboriginal people. By around seven thousand years ago, rising seas had flooded the sandstone river valleys and swampy sand plains of what is now coastal Sydney. Vast quantities of sand accumulated on the new shoreline to form the Kurnell Peninsula, giving birth to Botany Bay. This new shoreline provided greater access to rich marine resources for the Aboriginal people.

The apparently timeless land that Cook and Phillip encountered as they sailed through the heads of Botany Bay in the late 18th century had only existed for a fraction of the period in which Aboriginal people had occupied Sydney. While Europeans were unaware of these developments, Aboriginal people had always lived with change in coastal Sydney. They had forged their intimate familiarity and deep connection with its lands and waters through their accumulated ancestral experience of their surroundings' diverse and shifting moods.

Note. Reprinted (adapted) from Irish, P 2017, *Hidden in Plain View: The Aboriginal people of coastal Sydney*, UNSW Press, Sydney

Figure 7-80. View of the Heads, and part of Botany Bay - from the end of Cooks River, 1822 - 1823 (Source: dictionaryofsydney.org)

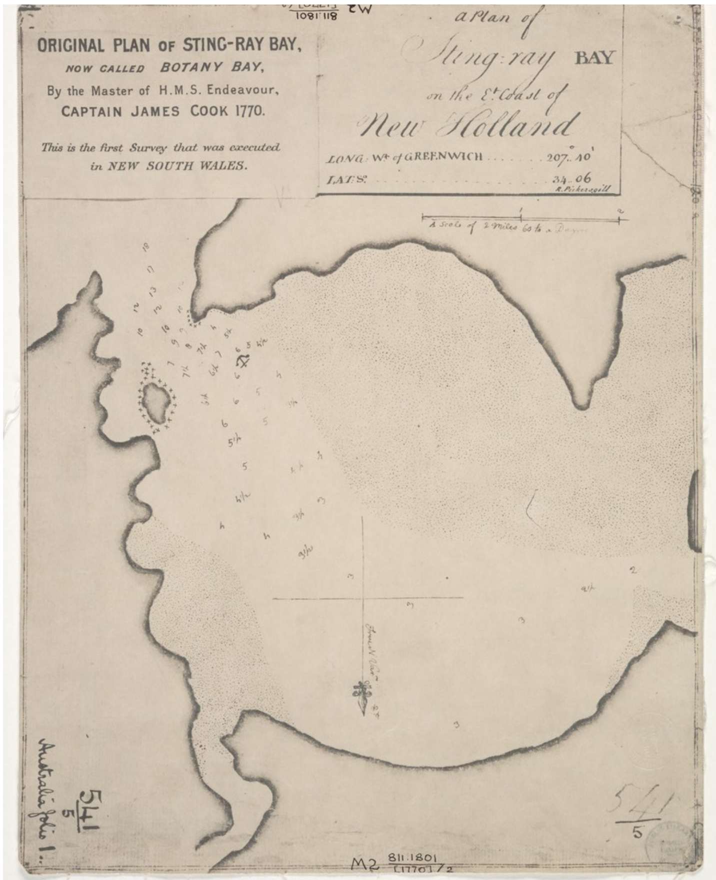


Figure 7-81. Original Plan of Sting-Ray Bay (now called Botany Bay) by Captain James Cook, 1770. True North to bottom of the plan

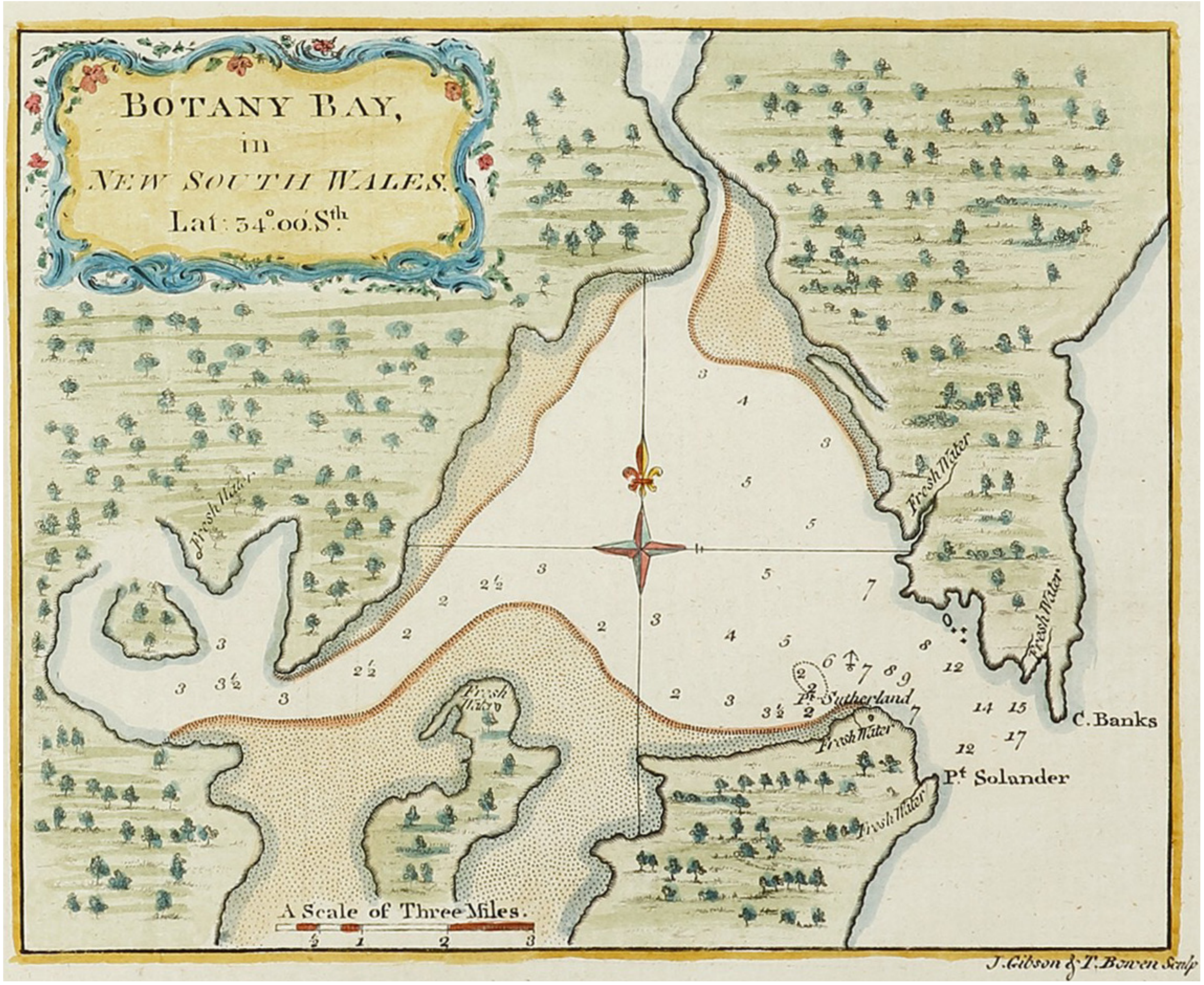


Figure 7-82. Botany Bay, in New South Wales, c1773

7.13.2 Endemic vegetation communities

Before European settlement, Botany Bay and the Cooks River Valley included a diverse and unique ecosystem of species, within an area of varying degrees of ecological succession, from swamps to dense heathland, to low open woodlands and forests. It is an area important to the Aboriginal people, but it also includes the now endangered Eastern Suburbs Banksia Scrub (ESBS) and Swamp Oak Floodplain Forest (SOFF). While the Project's site constraints limit the potential for significant rehabilitation and revegetation, plant species from these communities will be used throughout the landscape design as a representation, and in some cases, an abstraction of the original vegetation patterns of Botany Bay and the Cooks River Valley.

> "Water, sand, rocks and climate shaped the flora and fauna which flourished here: sedges, reeds and paperbarks in the swamps; grass trees, banksias and crimson bottlebrush in the scrub."
>
> Karskens, G., Rogowsky, M 2004, Histories of Green Square, UNSW, Sydney

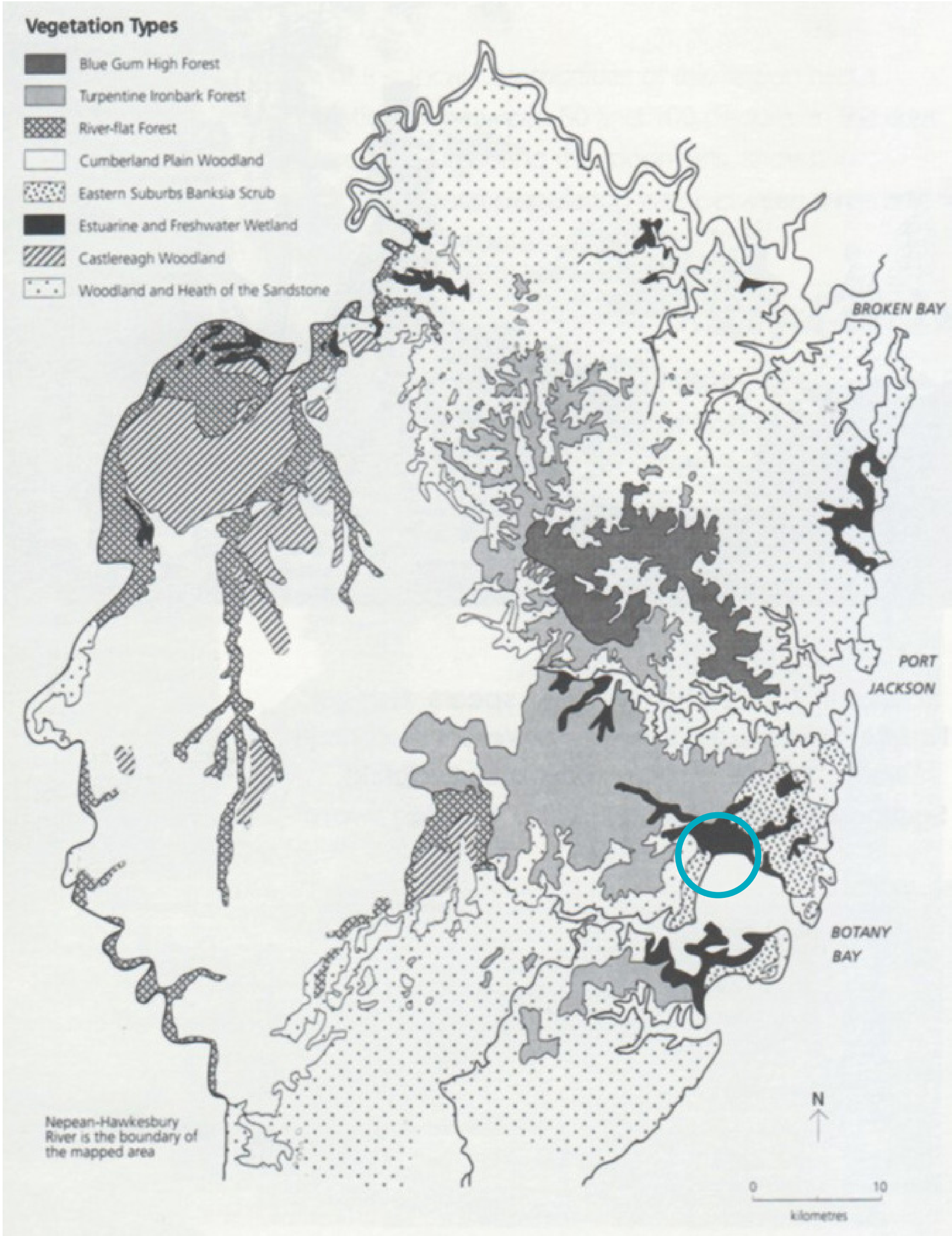


Figure 7-83. Vegetation Types of Sydney. Benson, D., Howell, J 1990, Taken for Granted: The Bushland of Sydney and Its Suburbs, Kangaroo Press, Sydney

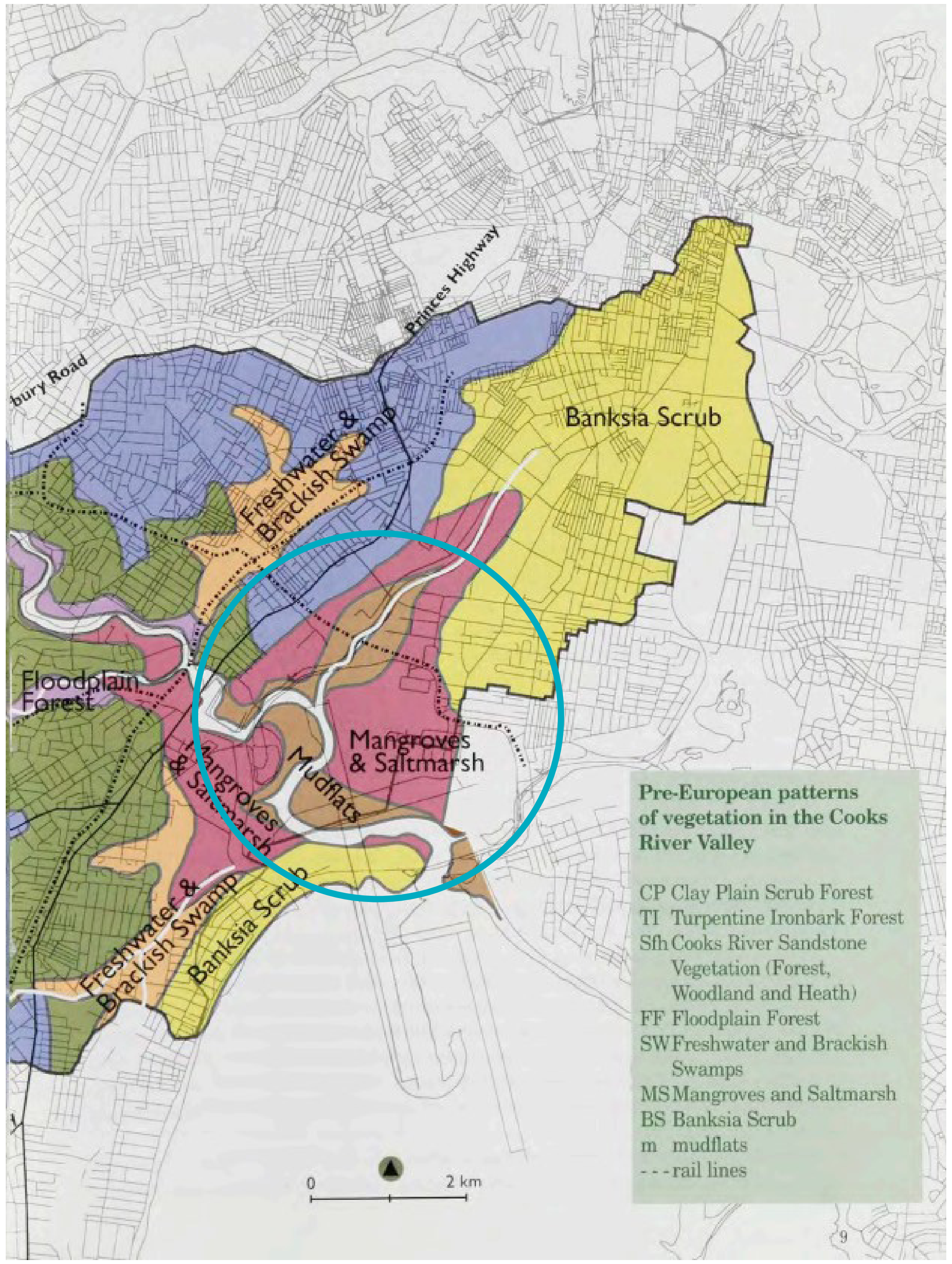


Figure 7-84. Pre European patterns of vegetation in the Cooks River Valley. Bear, V. Benson, D. Ondinea, D 1999, Missing Jigsaw Pieces: The Bushplants of the Cooks River Valley

Project site location

7.13.3 Eastern Suburbs Banksia Scrub

The original landscape of Botany Bay was characterised by extensive sand dunes draining into an extensive system of freshwater swamps. On the wind-blown sand dunes, which extended from behind the coastal beaches westward to the Shea's Creek's estuarine flats (Alexandra Canal) and the Cooks River, the most common vegetation was known as the Eastern Suburbs Banksia Scrub (ESBS).

This heathland was extensively cleared to allow for suburban and industrial development and, today is listed as an endangered ecological community. ESBS consists of varied heath, scrub and low forest vegetation, mostly with a wide variety of shrubs. Plant species from this community will be used throughout the Project to reference the original landscape and reintroduce indigenous (endemic) plant species to this highly disturbed environment.

A feature of this community is its abundance of flowering shrubs and assortment of flower colours. Shades of yellow, cream, white, red, pink and purple appear throughout the year, contrasting with the form and texture of the surrounding foliage. The two mounds will highlight the dominant colours of yellow and red to create swathes of colour that shift and change with the seasons.

Figure 7-85. Example of Eastern Suburbs Banksia Scrub Endangered Ecological Community at Malabar Headland National Park

Figure 7-86. Example of Eastern Suburbs Banksia Scrub Endangered Ecological Community at Gordons Bay

Characteristic species list

- *Acacia longifolia*
- *Acacia suaveolens*
- *Acacia terminalis*
- *Acacia ulicifolia*
- *Actinotus helianthii*
- *Actinotus minor*
- *Allocasuarina distyla*
- *Astroloma pinifolium*
- *Baeckea imbricata*
- *Banksia aemula*
- *Banksia ericifolia*
- *Banksia integrifolia**
- *Banksia serrata**
- *Bauera rubioides*
- *Billardiera scandens*
- *Boronia parvifolia*
- *Bossiaea heterophylla*
- *Callistemon citrinus*
- *Callistemon linearis*
- *Callistemon rigidus*
- *Darwinia fascicularis*
- *Dianella caerulea*
- *Dianella revoluta*
- *Dichelachne crinita*
- *Dillwynia retorta*
- *Epacris longiflora*
- *Eragrostis brownii*
- *Eriostemon australasius*
- *Eucalyptus gummifera**
- *Hakea teretifolia*
- *Hardenbergia violacea*
- *Hibbertia fasciculata*
- *Hibbertia linearis*
- *Kunzea ambigua*
- *Lambertia formosa*
- *Lepidosperma laterale*
- *Leptospermum laevigatum*
- *Leucopogon ericoides*
- *Lomandra longifolia*
- *Melaleuca armillaris*
- *Melaleuca nodosa*
- *Monotoca elliptica*
- *Persoonia lanceolata*
- *Philotheca buxifolia*
- *Philotheca salsolifolia*
- *Pimelea linifolia*
- *Ricinocarpos pinifolius*
- *Styphelia viridis*
- *Westringia fruticosa*
- *Woollsia pungens*
- *Xanthorrhoea resinosa*

The red and yellow shades indicate the plant species flower colour.

The green shade indicates plants species that have different coloured or insignificant flowers.

*Tree species to avoid according to Appendix F: Landscaping Guidelines in Sydney Airport's Wildlife Management Plan refer to section 7.18.5 of this chapter.

Colours and textures of Eastern Suburbs Banksia Scrub

Figure 7-87. Example of Coastal Sand Mantle Heath, part of the Eastern Suburbs Banksia Scrub Endangered Ecological Community at Malabar Headland National Park

7.13.4 Swamp Oak Floodplain Forest

According to the Sydney Gateway Biodiversity Development Assessment Report, this vegetation community occurs in small discrete patches throughout the Project site. The patches were recorded to be in low condition, generally occurring as regrowth on fill material and dominated by *Casuarina glauca* (Swamp Oak).

Plant species from this vegetation community will be used to expand on the small patches and reintroduce the middle and ground stratum of vegetation that is mostly absent in existing regrowth areas. The Swamp Oak Floodplain Forest mix can be found at the interface with Tempe Recreation Reserve along the Active Transport Link on Alexandra Canal and surrounding the pond off Airport Drive at Sydney Airport.

The selection of tree species extends beyond the dominant Swamp Oak to include *Acmena smithii, Callistemon salignus, Glochidion ferdinandi* and *Melaleuca sp.*, all of which also belong to this vegetation community.

The use of this vegetation community at the Tempe Recreation Reserve interface aims to provide a seamless transition from the motorway corridor to the public reserve beyond.

Figure 7-88. Example of Swamp Oak Floodplain Forest Endangered Ecological Community

Characteristic Species List

- *Acmena smithii**
- *Alternanthera denticulata*
- *Baumea juncea*
- *Blechnum (Telmatoblechnum) indicum*
- *Callistemon salignus**
- *Carex appressa*
- *Casuarina glauca*
- *Centella asiatica*
- *Commelina cyanea*
- *Crinum pedunculatum*
- *Cupaniopsis anacardioides*
- *Dianella caerulea*
- *Gahnia clarkei*
- *Geitonoplesium cymosum*
- *Glochidion ferdinandi*
- *Glochidion sumatranum*
- *Homolanthus populifolius*
- *Hypolepis muelleri*
- *Imperata cylindrica var. major*
- *Isolepis inundata*
- *Juncus kraussii subsp. australiensis*
- *Juncus planifolius*
- *Juncus usitatus*
- *Lobelia alata*
- *Lomandra longifolia*
- *Melaleuca alternifolia**
- *Melaleuca ericifolia**
- *Melaleuca quinquenervia**
- *Melaleuca styphelioides**
- *Myoporum acuminatum*
- *Parsonsia straminea*
- *Persicaria decipiens*
- *Persicaria strigosa*
- *Phragmites australis*
- *Selliera radicans*
- *Smilax australis*
- *Stephania japonica var. discolor*
- *Viola banksii*

*Tree species to avoid according to Appendix F: Landscaping Guidelines in Sydney Airport's Wildlife Management Plan refer to section 7.18.4 of this chapter.


Figure 7-89. Example of Casurina glauca

7.13.5 Landscape context

This aerial of the existing site area represents the broader landscape context of the Project. As seen, the site sits within a highly disturbed context of industrial and airport land.

To the west side of the site, public space is more frequent within the residential setting. These public spaces include Tempe Recreation Reserve, Waterworth Park, Gough Whitlam Reserve, Mackey Park and Cahill Park.

In this context, the site sits in an area with a relatively low amount of accessible green space. This gives the site potential to add to the existing green network and provide a link to the space between Tempe Recreation Reserve and Sydney Park.

This Project will form part of a north-south green link corridor which links Tempe Recreation Reserve, Tempe Lands, St Peters Interchange and Sydney Park. Therefore, the landscape design forms a vital link within this corridor through the vegetated landforms, batters and active transport link landscaping.

As shown, the Project site is in proximity to Sydney Airport. The proximity to the airport means the Project needs to follow guidelines to manage the risk of collisions between wildlife and aircraft. Areas of vegetation to be retained are identified in the Urban Design Concept Plans and Tree Management Strategy. Plant species for revegetation activities are primarily derived from the endemic vegetation communities of Botany Bay and the Cooks River Valley catchment, including Eastern Suburbs Banksia Scrub and Swamp Oak Floodplain Forest. Species from these communities have been selected considering the *NASF Guideline C* and Sydney Airport's *Wildlife Management Plan.*

In ongoing consultation with Sydney Airport and their *Wildlife Management Plan*, measures will be taken in this Project to mitigate hazardous wildlife attracting environments close to airport operations.

The site boundary is very narrow along Alexandra Canal, mainly accommodating the ATL path to meet the minimum width needed for a dedicated shared user path. Where possible, native planting has been provided along Alexandra Canal to enhance the character of the riparian corridor with planting from the swamp oak floodplain community. The Sydney Desalination Pipeline bounds to the north of the ATL, and the Canal wall/batter bounds to the south. The only areas with additional space for planting are the locations just to the north and south of the Canal at the ATL bridge over the Canal (SB91). These areas have been enhanced by providing two rest areas along the Canal, incorporating native and indigenous species from the Swamp Oak Floodplain Forest and Eastern Suburbs Banksia Scrub vegetation communities.

The works undertaken as part of Sydney Gateway do not preclude any future revegetation works to be undertaken by others. It is understood that any upgrades to Alexandra Canal will be implemented as part of the Heritage Masterplan developed by Sydney Water, including additional planting along this riparian corridor. The recent work undertaken as part of the Tempe Recreation Reserve sandstone wall upgrade is a good example of the design intent for any revegetation works.

Any areas impacted by construction along the Canal will be reinstated according to typical landscape details developed for the rehabilitation of disturbed landscape.

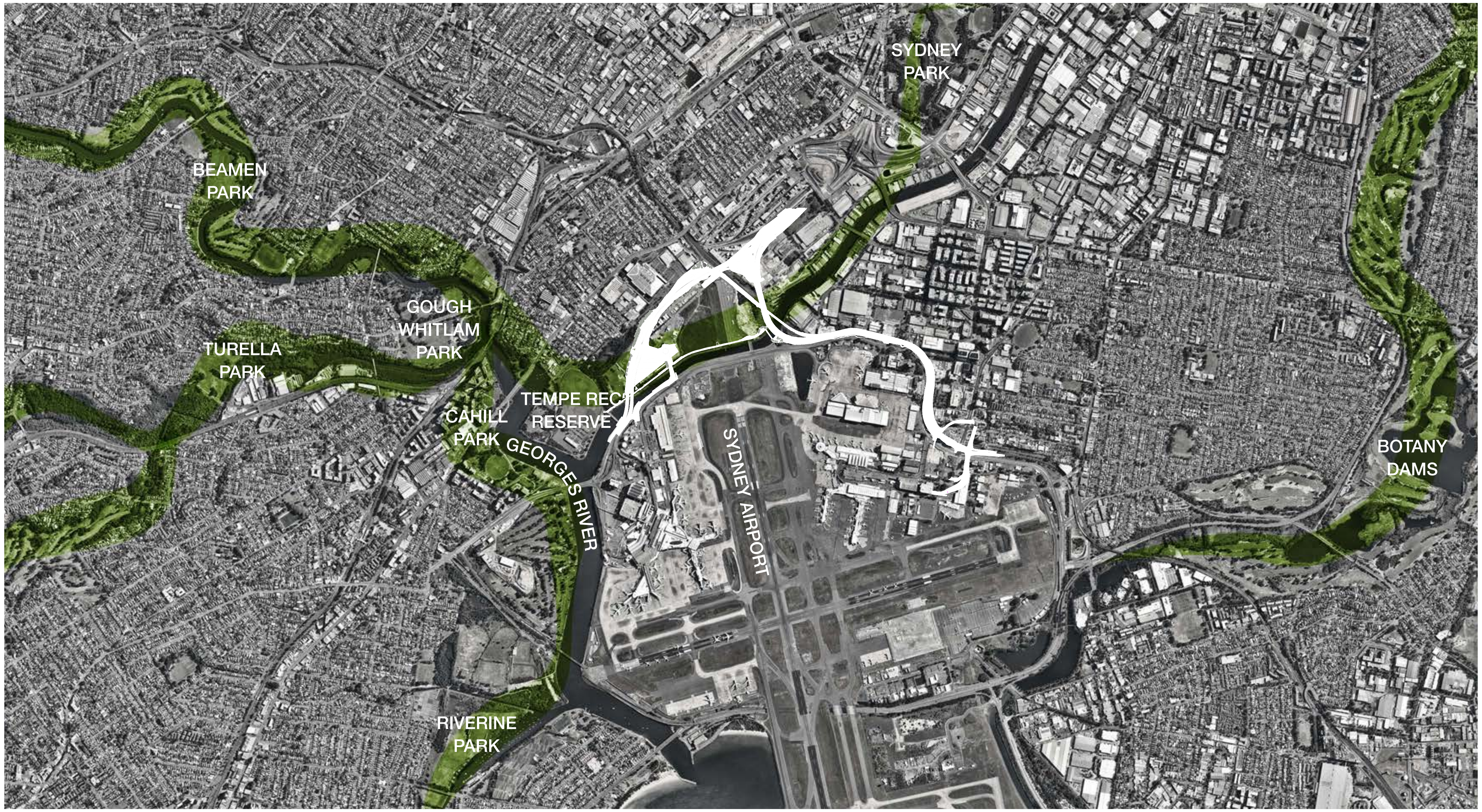


Figure 7-90. Landscape context

7.14 Existing landscape character

There is a long history of the local area being shaped by major infrastructure projects, including Alexandra Canal, the Botany Rail Line and Sydney Airport. This Project represents a new phase in shaping the landscape through infrastructure while maintaining and enhancing the existing fabric of the current landscape.

The existing site is a heavily disturbed, industrial area of Sydney. This area is surrounded by industry, warehouses, service roads, the airport and some public recreational outdoor space within Inner West, Bayside and City of Sydney Council Local Government Areas.

The Alexandra Canal runs through the site, which provides small linear areas of vegetation on its periphery and recreational opportunities. The aim of the landscape in this Project is to introduce areas of buffer planting to soften the motorway corridor and enhance the existing patches of vegetation surrounding the Project site.

Alexandra Canal is a critical piece of infrastructure in the area. There have been several proposals for the redevelopment of the canal over the years. One of these proposals, by Sydney Water, proposes using the Alexandra Canal as a walking, cycling and recreational link. This Project proposes to use the edge of the canal as part of the active transport link, which helps to connect into a future transformation of the canal into an accessible open space.

Figure 7-91. Sydney Airport planting

Figure 7-92. St. Peters Interchange mound

Figure 7-93. Tempe Lands wetlands

Figure 7-94. Sydney Airport planting near Cooks River Avenue

Figure 7-95. Tempe Recreation Reserve

Figure 7-96. Alexandra Canal from desalination pipeline

Figure 7-97. Tempe Golf Range & Academy (closed)

Figure 7-98. Desalination pipeline

Figure 7-99. Sydney Airport planting and Cooks River beyond

Tempe Lands

Previously a shale quarry in the 1920s, Tempe Lands has been extensively remediated to provide a biodiverse haven for native wildlife and vegetation. Tempe Lands is a highly vegetated landscape and provides a biologically diverse environment adjacent to Tempe Recreation Reserve. The relevant planting areas will respond directly to this character.

Tempe Dog Park

The Tempe Dog Park sits adjacent to Tempe Lands and borrows the landscape character from this space. It is a large open green space surrounded by a dense edge of vegetation reflective of the Swamp Oak Floodplain Forest species in the Tempe Lands site. The dog park has been relocated to allow for construction of Sydney Gateway and reinstated once work is complete.

Alexandra Canal

The Alexandra Canal is a landmark of the area and is of high aesthetic and historical significance with its industrial character. The landscape adjacent to the canal is characterised by a tangle of weed, exotic and native plant species with various canopy trees and palms behind the desalination pipe.

Wetlands and Ponds

There is a small existing riparian zone that sits between Alexandra Canal and the Sydney Airport runoff catchment. Revegetation around the pond that runs into Alexandra Canal will respond to the Botany Wetlands and Tempe Lands landscape character.

Figure 7-100. Images of Tempe Lands

Figure 7-101. Images of Tempe Dog Park

Figure 7-102. Images of site at desalination pipeline

Figure 7-103. Images of Botany Wetlands

7.15 Landscape design principles

"20,000 years ago, Botany Bay was no bay at all, but consisted of a swampy sand plain where the Cooks and Georges Rivers met...7,000 years ago, rising seas flooded the sandstone river valleys and swampy sand plains of what is now coastal Sydney, giving birth to Botany Bay." Irish, P 2017, Hidden in Plain View: The Aboriginal people of coastal Sydney, UNSW Press, Sydney

7.15.1 Connection

A connection to Country through an indigenous planting palette that represents the extant vegetation communities surrounding the Project.

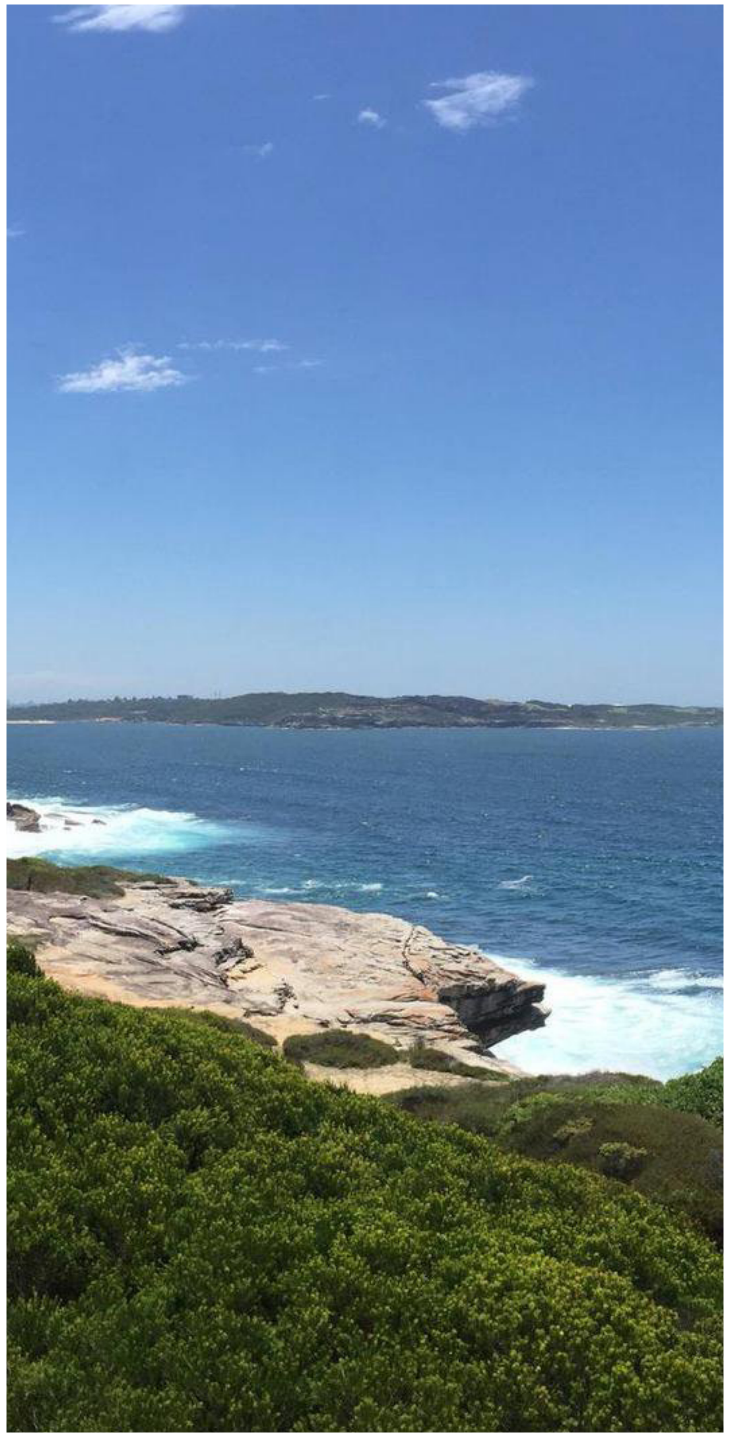


Figure 7-104. View across Botany Bay towards the City from Kurnell Peninsula

7.15.2 Diversity

A diverse planting palette to provide habitat and visual interest along the Project and introduce travellers to the diverse landscapes of Sydney.

Figure 7-105. The floristic diversity of Eastern Suburbs Banksia Scrub

7.15.3 Landform

The reinterpretation of Botany Bay's sandstone valleys, plains and dunes as distinct sculptural landforms, to create a memorable 'gateway' experience.

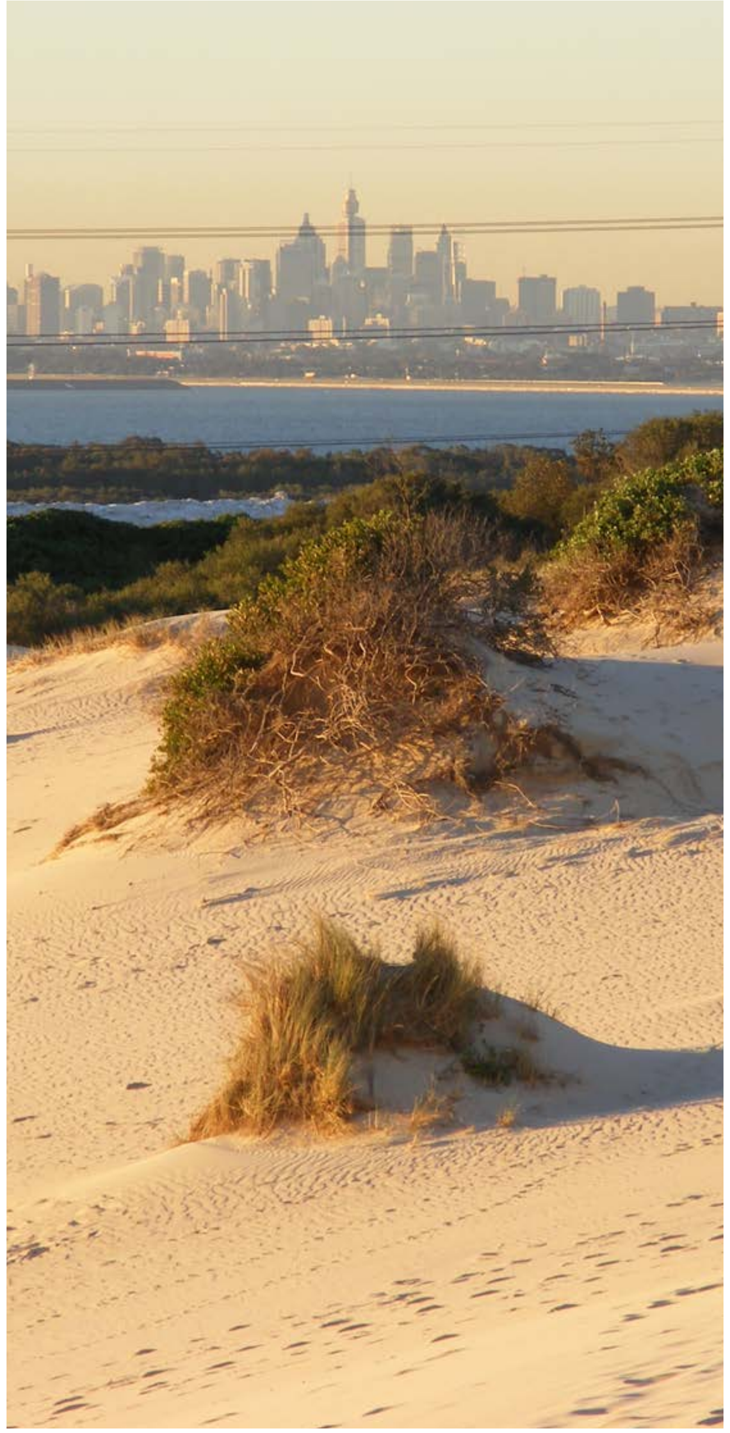


Figure 7-106. View towards the City from Cronulla sand dunes

7.16 Landscape design objectives

Consistent with the EIS / MDP, the design of the landscape is viewed as a vital part of the visual identity for the Project.

Design objectives for the landscape include:

- Heighten the sense of arrival and the 'gateway' experience through a memorable landscape
- Enhance the sense of place by celebrating country and contributing to the landscape character of the local area
- Create a continuous landscape for the Project that connects Botany Bay to St Peters
- Use a variety of groundcovers, grasses, shrubs and trees, allowing for views, sight lines and Sydney Airport's OLS and *Wildlife Management Plan*
- Compensate for the loss of trees removed as a result of the Project through development of a Tree Replacement Strategy
- Create a sustainable landscape that is robust and resilient whilst increasing biodiversity and supporting the local ecology.
- Align with the Premier's Priorities - Greener Places and aim to provide an increase in canopy cover.

7.16.1 Landscape integration

This Project aims to integrate seamlessly into the existing landscape character which surrounds the site. Two of the key landscape areas are the St Peters Interchange (SPI) Mound and Tempe Recreation Reserve.

The St Peters Interchange mound is part of the new M5 works and sits to the northeast of the site boundary. The landscape plan proposes a planting mix that reflects species used on the SPI mound to ensure a subtle transition into this new Project.

Tempe Recreation Reserve is a highly used community open space that includes playing fields, a dog park and the Tempe Wetlands. This space is of high importance to the community and the biodiversity value of the area. Therefore, integrating the Project into Tempe Recreation Reserve is important to ensure the values and functions are maintained and protected.

The landscape plan proposes a transitional landscape area on the land which meets Tempe Recreation Reserve. In this location, there will be the ATL and buffer planting near the motorway. The ATL will provide a publicly accessible link to Tempe Recreation Reserve from Alexandra Canal. The western side of the noise wall features a vegetated batter that will provide natural shade and visual screening to enhance the usability of the adjoining Tempe Recreation Reserve.

The planting in this location will reflect the Swamp Oak Floodplain Forest species, which currently exists within Tempe Lands and Tempe Recreation Reserve.

The design objective of this location aims to provide a landscape area that allows seamless integration into the public space and maintain the existing character of the reserve.

The noise mound incorporates the planting of shrub and tree species from the Swamp Oak Floodplain Forest, to serve as a visual screening element and provide natural shade adjacent to Tempe Recreational Reserve.

Screening in the form of canopy trees has been provided where feasible and permissible under airport operations and site constraints to reduce the visual impact of the roadway from the nearby residential and commercial areas. This screening includes a pocket of canopy trees and large shrubs provided at the cul de sac of Swamp Road.

Figure 7-108. Eastern Suburbs Banksia Scrub

Figure 7-107. A benchmark precedent of diverse native planting on a constructed landform at Remembrance Drive Interchange

Figure 7-109. Swamp Oak Floodplain Forest

7.17 Planting

7.17.1 Planting overview

A cohesive landscape character is achieved by planting the verges, medians and batters along the length of the alignment. Planting of these areas is maximised to enhance the user experience while accounting for the safety and operational requirements of Sydney Airport and the road corridor.

Planting type mixes consist of tubestock shrubs, grasses and groundcovers and containerised accent plants and trees. Trees are a minimum 200-millimetre pot size. Tree species are selected and located considering the *NASF Guideline C* and Appendix F: Landscaping Guidelines in Sydney Airport's *Wildlife Management Plan*.

The planting will be a feature for users and to add to the 'gateway' experience of the Project as people move in, out, over and around the site.

7.17.2 Planting approach

The planting palette for the Project is developed from the Endangered Ecological Communities found within Botany Bay and the Cooks River Valley catchment:

- Eastern Suburbs Banksia Scrub
- Swamp Oak Floodplain Forest
- Sydney Turpentine Ironbark Forest

These diverse vegetation communities are woven together to form a linear tapestry, connecting the forested swamp to the rugged scrub.

Other Australian native species and cultivars will support indigenous plant species local to the area to embellish feature elements such as the sculptural landforms and landscaping along with the ATL.

Eastern Suburbs Banksia Scrub is the predominant vegetation community used in the planting design due to its wide array of shrubs, grasses and groundcovers that are not only beautiful but suitable for use under the OLS. The sculptural forms of the Northern Landform and Tempe Landform draw inspiration from the natural forces that have shaped Botany Bay over thousands of years - wind, water, stone and sand.

The sculptural landforms will be blanketed in the colours and textures of native flora. The colours of red and yellow, prevalent amongst the scrub flowers, are used to give a distinct look to Northern Landform and Tempe Landform, respectively.

Indigenous plant species are supplemented by other red and yellow flowering native plants to accentuate the colour themes.

The revegetation of disturbed areas within the Project boundary will be planted with a mix of plant species from the local and remnant vegetation communities, including Eastern Suburbs Banksia Scrub, Swamp Oak Floodplain Forest and Sydney Coastal Heath. A diversity of plant species is proposed to accommodate a range of site conditions and requirements and minimise maintenance.

Vegetation growth is not considered feasible under the bridge structures due to the need to provide water and sunlight, which is constrained by the structural envelopes required for the bridge structures. Additionally, the Project is located in a densely urban setting with tight Project boundaries and a very limited available open space. In addition to spatial constraints, allowances need to be made for maintenance. With little exposure to rainfall and limited exposure to sunlight, the long-term performance and survival of planting under the bridges is not feasible.

7.17.3 Plant species provenance

Due to the highly disturbed nature of the site, opportunities to collect plants or propagules that are endemic to the site are limited. The Project will primarily use indigenous plant material collected elsewhere but belonging to the extant vegetation communities to reinforce local and remnant vegetation patterns. Cultivars of these indigenous species and other Australian natives will be planted to enhance the existing landscape character, increase biodiversity and achieve the design requirements. Landscape planting and revegetation will be installed following TfNSW Specification R179 and R178, respectively.

7.17.4 Wildlife hazards in the vicinity of Sydney Airport

Land use in the vicinity of Sydney Airport determines habitat quality for certain wildlife and may influence the size and behaviour of hazardous wildlife populations. These populations may use vegetation resources within adjacent land uses and/or may move to and from feeding and roosting sites through aircraft flight paths. Changes to land use around Sydney Airport must be scrutinised, and where risks are likely to arise, be appropriately mitigated and monitored. Sydney Airport has no administrative jurisdiction to approve or reject planning decisions outside of their lands, and therefore relies on cooperation from Local and State Government planning authorities.

Guideline C of the NASF, *Managing the Risk of Wildlife Strikes in the Vicinity of Airports*, aims to provide guidelines to land users regarding the management of wildlife hazards. Guideline C of the NASF was used as the basis of the Landscaping Guidelines in Sydney Airport's *Wildlife Management Plan.* To enable the assessment of specific risks to aircraft at Sydney Airport, the design of the Project needs to be considered and a consultative approach taken to assessing and mitigating hazards. Consultation with Sydney Airport regarding the landscape design and plant species selection for the Project is ongoing.

7.17.5 Sydney Airport landscaping guidelines

Landscaping on and in the vicinity of the airport plays a major role in wildlife hazard mitigation. Birds or flying foxes transiting the airport to reach locations on or near the airport present a safety risk to aircraft. Tall trees may interfere with the OLS and pose a risk to aircraft, while wildlife may use trees and landscaped areas for food, shelter and breeding.

The Landscaping Guidelines in Sydney Airport's *Wildlife Management Plan* list the following principles for projects that incorporate new landscaping in the vicinity of the airport. Many of these principles aim to mitigate and minimise known wildlife risks and integrate risk management measures:

- Landscaping should be the minimum required to soften the impact of physical structures and improve aesthetic amenity.
- The larger the tree, the greater the number of birds it has the potential to support. Therefore, smaller trees and shrubs are preferred. These are also less likely to create OLS issues.
- Clumps of trees or shrubs provide better shelter and food concentration than individual trees or small groups.
- Islands of trees or shrubs surrounded by large grass areas are particularly attractive to birds that can use the island as a base for foraging.
- A variety of plants is preferred so that if a few prove to be strongly attractive to birds, they can be removed without greatly affecting the landscaping.

Figure 7-110. Eastern Suburbs Banksia Scrub species examples

- Low prostrate ground cover is generally low bird attracting as long as it is not a profusely fruiting species. Grass and pasture legumes, in contrast, can attract flocks of seed-eating birds and vertebrate pests such as rabbits.

The Landscaping Guidelines also include a list of trees to avoid at Sydney Airport. While this list is specific to landscaping at Sydney Airport and not landscaping in the vicinity of the airport, the Project has avoided or limited the use of these tree species. Many of the trees listed that are known to attract wildlife are also native and found within the surrounding extant vegetation communities. These include tree species from the *Myrtaceae* family such as *Acmena, Angophora, Banksia, Callistemon, Corymbia* and *Melaleuca*. To ensure the vegetation communities are still represented, plant species selection for the various planting types utilise large shrubs, small shrubs, grasses and groundcovers from these communities throughout the Project.

7.17.6 Tree Management Strategy

The Sydney Gateway Road Project – Tree Assessment Technical Note estimates that about 1,300 trees will need to be removed during the construction of the Project. The Project site offers limited potential for new tree cover due to space constraints. Other issues associated with planting new trees include the constraints related to Sydney Airport's prescribed airspace and the need to select appropriate species to minimise the risk of wildlife strike. Saline soils and contaminated land also present environmental constraints.

According to the definition in the MCoA, a tree is a long-lived perennial plant greater than (or usually greater than) 3 metres in height with one or relatively few main stems or trunks (AS4373-2007 Pruning of amenity trees).

Following the definition in the MCoA, the landscape design reinstates approximately 3,619 planted trees within the Project boundary, thereby providing a net increase in trees and tree canopy. Trees are located on the north side of the Tempe Mound, rest areas, noise wall pedestrian access, Swamp Road cul-de-sac and select revegetation areas. Native species approved for planting in proximity to Sydney Airport include *Acacia longifolia* (Sydney Golden Wattle), *Acacia terminalis* (Sunshine Wattle), *Backhousia citriodora* (Lemon Scented Myrtle), *Casuarina glauca* (Swamp Oak), *Glochidion ferdinandi* (Cheese Tree), Leptospermum laevigatum (Coast Teatree), *Livistona australis* (Cabbage Tree Palm) and Tristaniopsis laurina (Water Gum).

The landscape design has determined the following locations and species for tree planting to deliver a net increase in trees and tree canopy for the Project:

- *Tristaniopsis laurina* (Water Gum) adjacent to the road verge on the north side of the Tempe Mound.
- *Backhousia citriodora* (Lemon Scented Myrtle) and *Tristaniopsis laurina* (Water Gum) surrounding the rest areas.
- *Livistona australis* (Cabbage Tree Palm) at the noise wall pedestrian access.
- *Backhousia citriodora* (Lemon Scented Myrtle), *Leptospermum laevigatum* (Coast Teatree) and *Tristaniopsis laurina* (Water Gum) at the Swamp Road cul de sac.
- *Casuarina glauca* (Swamp Oak), *Tristaniopsis laurina* (Water Gum) and *Glochidion ferdinandi* (Cheese Tree) at the base of the noise mound adjacent to Tempe Recreation Reserve.
- *Leptospermum laevigatum* (Coast Teatree), forestry tubes of *Acacia longifolia* (Sydney Golden Wattle) and *Acacia terminalis* (Sunshine Wattle) as part of site revegetation works.

Replacement trees will be planted at completion of the construction works and in any case within six months following commencement of operation.

Any agreements reached with Council and the Airport Operator as referenced in CoA E83 (d) will be detailed in the Landscape Strategy Report prepared in accordance with CoA E84 which will address the requirements of CoA E83.

7.17.7 Tree planting

The OLS, sight line constraints, wildlife strike landscaping guidelines and soil depth are all factors which limit tree planting on this Project. The majority of tree planting will be adjacent to Tempe Recreation Reserve. The tree planting in this location will provide a vegetated buffer for Tempe Recreation Reserve from the motorway.

All trees to be used in this Project will be specified to meet the quality requirements of *AS2303:2018 Tree Stock for Landscape Use.*

Tree planting on this Project will be strategically located to provide natural amenity and canopy cover to paths and accessible open space areas, while complying with the Project requirements. Trees will provide visual relief to mitigate the scale of built structures and balance the surrounding infrastructure environment.

7.17.8 Existing vegetation protection

By minimising the clearing of vegetation and individual trees where possible, the overall environmental impact of the proposed works will be reduced by:

- Protecting and enhancing extant vegetation communities, including Swamp Oak Floodplain Forest, Eastern Suburbs Banksia Scrub, Sydney Turpentine Ironbark Forest.
- Maintaining the biodiversity and habitat potential of the local ecosystem.
- Maintaining and improving soil stability and salinity levels.
- Contributing to water quality.
- Decreasing the dissemination of weed species, while increasing the dissemination of native species.
- Enhancing the visual quality and landscape character of the local area.
- Maintaining established landscape views for road users and pedestrians.

7.17.9 Revegetation

The landscape design does not propose any compost blankets on embankments. However, should the development of the design or site conditions result in steep embankments, compost blankets may be required.

Given the narrow corridor there are limited opportunities to rehabilitate, regenerate and revegetate disturbed areas. However, any areas that are impacted by construction will be reinstated with hydroseeding using endemic and native species in accordance with typical landscape details that have been developed for reintatement of disturbed landscape areas.

Where space allows, such as along the neighbourhood side of the noise wall, a more developed rehabilitation landscape has been established in accordance with the Sydney Airport landscape guidelines through the planting of endemic species from the Swamp Oak Floodplain Forest vegetation community to reinstate the original character of the area.

Figure 7-111. Eastern Suburbs Banksia Scrub species examples

Casuarinas together with grasses and lillies will serve as pioneer species to allow for re-establishment of the original plant community.

A similar approach of using pioneer species has been adopted for the landscape regeneration of the adjacent Tempe Wetlands.

7.17.10 Planting type plan

The planting design is broken down into a series of Planting Types (P#), which respond to the motorway design, enhance the 'gateway' experience and reference the surrounding landscape and vegetation communities of Botany Bay and the Cooks River Valley.

This plan illustrates the location of the various planting types shown in contrasting colours for legibility. Refer to the Urban Design Concept Plans for more information on the landscape and motorway design.

The creation of an aspirational future north-south green link corridor, linking Cooks River, Tempe Wetlands, Tempe, St Peters and Sydney Park has been supported by this planting plan as far as the narrow Project boundaries allow. As illustrated in the adjacent plan, all street verges and embankments will be predominantly planted with the locally occurring Eastern Suburb Banksia Scrub species (as well as pockets of Swamp Oak Floodplain Forest), creating a continuous and consistent native green corridor within the Project boundaries along the proposed road network which can be incorporated into the wider future north-south green link.

The design of the Project landform and earthworks has been developed according to the wind modelling studies to ensure airport operations are not impacted. The mounds at Tempe Lands incorporate a capping layer to contain and minimise disturbance to contaminated areas during construction, with topsoil and mulch provided for planting to achieve the landscape design intent.

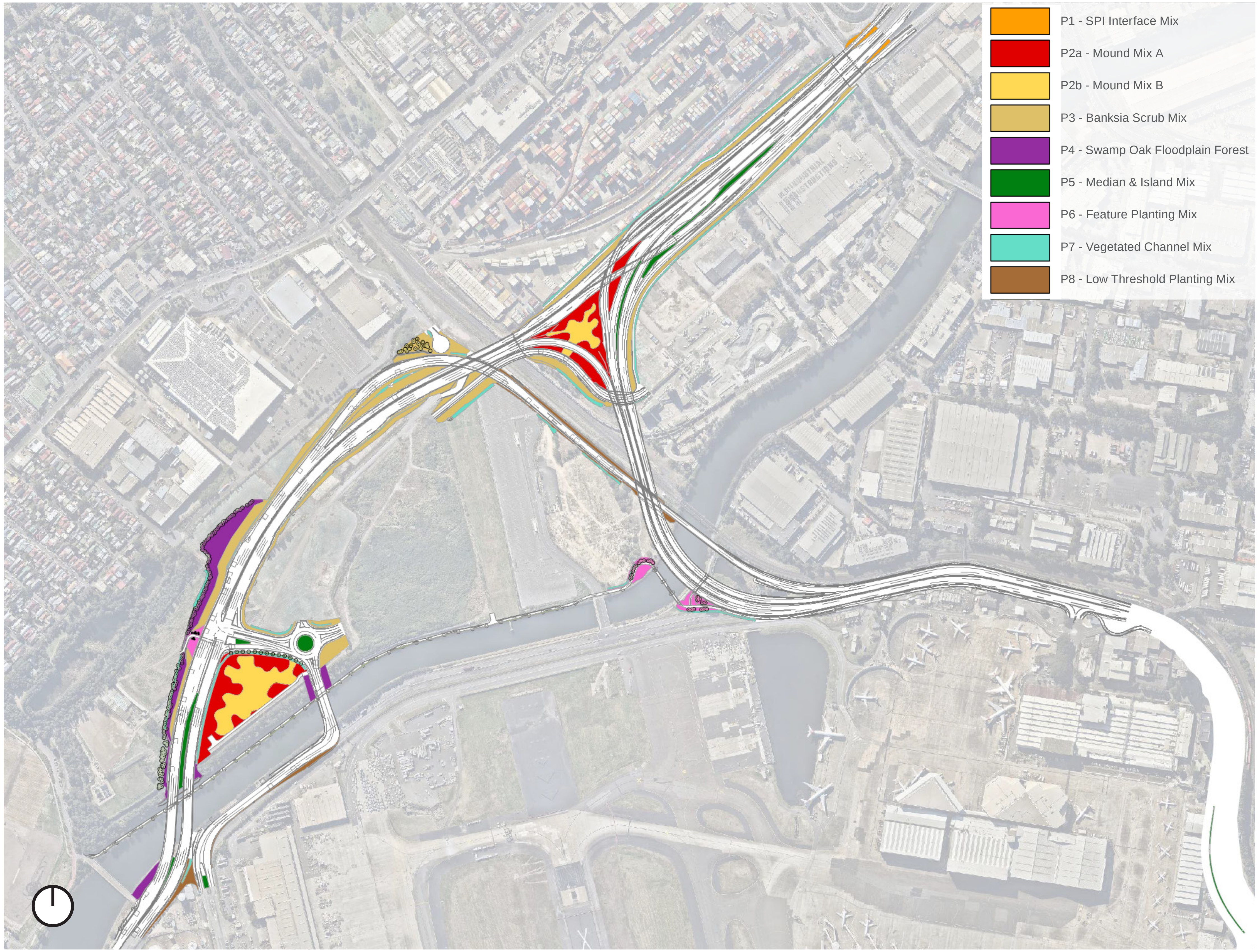


Figure 7-112. Planting type plan

Planting Type: P1 - St Peters Interchange (SPI) Interface Mix

P1 is specified along the landscape batters and median leading from the WestConnex SPI mound at Bridge SB02 to St Peters Business Park. The species selection references the planting on the SPI mound, including shrubs, and grasses from Eastern Suburbs Banksia Scrub and Swamp Oak Floodplain Forest. This mix forms a link between the landscaping of St Peters Interchange and Sydney Gateway.

P1 - St Peters Interchange (SPI) Interface Mix (Typical Species)

Botanical Name	Common Name
Shrubs	
* *Melaleuca thymifolia*	Thyme Honey-myrtle
* *Westringia fruticosa*	Coastal Rosemary
* *Westringia fruticosa 'Zena'*	Zena Rosemary
Grasses + Ground Covers	
* *Dichelachne crinita*	Longhair Plumegrass
* *Ficinia nodosa*	Knobby Club Rush
* *Imperata cylindrica*	Blady Grass
*^*Lomandra longifolia*	Spiny-headed Mat-rush

* Denotes indigenous plant species belonging to Endangered Ecological Communities found within the Botany Bay and the Cooks River Valley

^ Denotes plant species recognised as significant to the area by the Aboriginal Cultural Advisors

** Final plant species selection and quantities subject to availability


Dichelachne crinita


Hibbertia scandens


Imperata cylindrica


Lomandra longifolia


Melaleuca thymifolia


Westringia fruticosa

Planting Type: P2a - Mound Mix A

P2a is a carefully curated mix of red-flowering native shrubs and groundcovers designed to provide a year-round floral display across the mounds. Red-flowering plants are supplemented by key species from Eastern Suburbs Banksia Scrub for diversity and resilience. Plant species are restricted to small shrubs, grasses and groundcovers to stay clear of the OLS.

P2a - Mound Mix A (Typical Species)

Botanical Name	Common Name
Shrubs	
* *Banksia ericifolia*	Heath-leaved Banksia
* *Callistemon linearis*	Narrow-leaved Bottlebrush
Callistemon salignus ‘Great Balls of Fire’	Great Balls of Fire
Callistemon viminalis ‘Better John’ + ‘Little John’	Better John + Little John
Callistemon viminalis ‘Scarlet Flame’	Scarlet Flame
Dodonea viscosa purpurea	Purple Hop Bush
^ *Doryanthes excelsa*	Gymea Lily
* *Eriostemon australasius*	Pink Wax Flower
* *Lambertia formosa*	Mountain Devil
Leptospermum ‘Pink Cascade’	Pink Cascade
Melaleuca linariifolia	
Melaleuca thymifolia	Thyme Honey-myrtle
Philotheca myoporoides syn. Eriostemon	Long-leaf Wax Flower
Grasses + Groundcovers	
* *Carex appressa*	Tall Sedge
* *Carpobrotus glaucescens*	Pig Face
* *Dichelachne crinita*	Longhair Plumegrass
Grevillea gaudichaudii	Gaudichaudii
Grevillea lanigera ‘Mt Tamboritha’	Mt Tamboritha
Grevillea ‘Poorinda Royal Mantle’	Poorinda Royal Mantle
Grevillea rivularis ‘Bronze Rambler’	Bronze Rambler
* *Hardenbergia violacea*	Purple Coral Pea
* *Kennedia rubicunda*	Dusky Coral Pea
*^*Lomandra longifolia*	Spiny-headed Mat-rush
Melaleuca hypericifolia ‘Ulladulla Beacon’	Ulladulla Beacon
* *Pelargonium australe*	Coastal Geranium

* Denotes Indigenous plant species that belong to the Endangered Ecological Communities found within the Botany Bay and the Cooks River Valley

^ Denotes plant species recognised as significant to the area by the Aboriginal Cultural Advisors

** Final plant species selection and quantities subject to availability


Banksia ericifolia


Callistemon salignus ‘Great Balls of Fire’


Callistemon viminalis ‘Better John’


Carpobrotus glaucescens


Dodonea viscosa purpurea


Doryanthes excelsa


Grevillea rivularis ‘Bronze Rambler’


Kennedia rubicunda


Lambertia formosa


Leptospermum ‘Pink Cascade’


Melaleuca linariifolia ‘Claret Tops’


Pelargonium australe

Planting Type: P2b - Mound Mix B

P2b is a carefully curated mix of yellow-flowering native shrubs, grasses and groundcovers designed to provide a year-round floral display across the mounds. Yellow-flowering plants are supplemented by key species from Eastern Suburbs Banksia Scrub for diversity and resilience. Plant species are restricted to small shrubs, grasses and groundcovers to stay clear of the Obstacle Limitation Surface (OLS).

P2b - Mound Mix B (Typical Species)

Botanical Name	Common Name
Shrubs	
*^*Acacia longifolia*	Sydney Golden Wattle
* *Acacia suaveolens*	Sweet-scented Wattle
* *Acacia terminalis*	Sunshine Wattle
* *Callistemon citrinus 'White Anzac'*	White Anzac
* *Correa alba*	White Correa
Dodonea purpurea	Purple Hop Bush
Isopogon anemonifolius	Broad-leaf Drumsticks
* *Phebalium squamulosum*	Scaly Phebalium
* *Persoonia lanceolata*	Lance Leaf Geebung
* *Westringia fruticosa*	Coastal Rosemary
Grasses + Groundcovers	
Banksia integrifolia 'Roller Coaster'	Prostrate Coast Banksia
* *Carex appressa*	Tall Sedge
Ficinia nodosa	Knobby Club Rush
Goodenia ovata 'Prostrate'	Prostrate Goodenia
Grevillea juniperina 'Mongolo'	Molongolo
Grevillea juniperina 'Prostrate Gold'	Prostrate Gold
* *Hibbertia scandens*	Yellow Guinea Flower
* *Imperata cylindrica*	Blady Grass
Lomandra fluviatilis 'Shara'	Shara
*^*Lomandra longifolia*	Spiny-headed Mat-rush
Lomandra longifolia 'Katrinus' + 'Katrinus Deluxe'	Katrinus + Katrinus Deluxe
Lomandra longifolia 'Verday'	Verday
Westringia fruticosa 'Mundi'	Prostrate Rosemary
* Denotes Indigenous plant species that belong to the Endangered Ecological Communities found within the Botany Bay and the Cooks River Valley	
^ Denotes plant species recognised as significant to the area by the Aboriginal Cultural Advisors	** Final plant species selection and quantities subject to availability

Acacia longifolia

Acacia suaveolens

Acacia terminalis

Banksia integrifolia 'Roller Coaster'

Carex appressa

Goodenia ovata 'Prostrate'

Grevillea juniperina 'Prostrate Gold'

Hibbertia scandens

Isopogon anemonifolius

Lomandra longifolia

Phebalium squamulosum

Persoonia lanceolata

Planting Type: P3 - Banksia Scrub Mix

Features shrubs, grasses and groundcovers from Eastern Suburbs Banksia Scrub and Sydney Coastal Heath vegetation communities. This mix is used across landscape batters, median and other landscape areas requiring low-growing vegetation by the OLS. This planting type is also used at the base of landscape batters in areas around Northern Lands Mound and front of the noise wall. Once mature, the plants will appear as mounded drifts of shrubs and grasses. Different foliage shape, size and colour will provide visual interest.

Plant species for the mix - P3 Banksia scrub mix have been selected and provided in accordance with consideration of the NASF Guideline C: Managing the risk of wildlife strikes in the vicinity of airports in consultation with the Airport Operator.

P3 - Banksia Scrub Mix (Typical Species)

Botanical Name	Common Name
Shrubs	
*^*Acacia longifolia*	Sydney Golden Wattle
* *Acacia suaveolens*	Sweet-scented Wattle
* *Allocasuarina distyla*	Scrub She-oak
* *Banksia ericifolia*	Heath-leaved Banksia
* *Correa alba*	White Correa
* *Kunzea ambigua*	Tick Bush
* *Leptospermum laevigatum*	Coast Teatree
* *Melaleuca armillaris*	Bracelet Honey-myrtle
* *Melaleuca nodosa*	Prickly-leaved Paperbark
* *Persoonia lanceolata*	Lance Leaf Geebung
* *Westringia fruticosa*	Coastal Rosemary
Grasses + Groundcovers	
Banksia integrifolia 'Roller Coaster'	Prostrate Coast Banksia
* *Dianella caerulea*	Blue Flax Lily
* *Dichelachne crinita*	Longhair Plumegrass
* *Hardenbergia violacea*	Purple Coral Pea
* *Imperata cylindrica*	Blady Grass
*^*Lomandra longifolia*	Spiny-headed Mat-rush
Lomandra longifolia 'Verday'	Verday
* *Pelargonium australe*	Coastal Geranium

* Denotes Indigenous plant species that belong to the Endangered Ecological Communities found within the Botany Bay and the Cooks River Valley

^ Denotes plant species recognised as significant to the area by the Aboriginal Cultural Advisors

** Final plant species selection and quantities subject to availability


Acacia longifolia


Acacia suaveolens


Allocasuarina distyla


Banksia ericifolia


Banksia integrifolia


Correa alba


Dianella caerulea


Dichelachne crinita


Hardenbergia violacea


Imperata cylindrica


Kunzea ambigua


Leptospermum laevigatum


Lomandra longifolia


Lomandra longifolia 'Verday'


Melaleuca armillaris


Pelargonium australe

Planting Type: P4 - Swamp Oak Floodplain Forest Mix

P4 consists of trees, shrubs, grasses and groundcovers from the Swamp Oak Floodplain Forest vegetation community. A generous band of vegetation is located behind the noise wall as a landscape buffer for Tempe Reserve and the biologically diverse Tempe Lands Mound beyond. This typology will contribute to the green space of the Cooks River Valley catchment.

P4 - Swamp Oak Floodplain Forest Mix (Typical Species)

Botanical Name	Common Name
Trees	
* *Casuarina glauca*	Swamp Oak
* *Glochidion ferdinandi*	Cheese Tree
Shrubs	
* *Crinum pedunculatum*	Swamp Lily
Grasses + Groundcovers	
* *Baumea juncea syn. Machaerina juncea*	Bare Twig-rush
* *Carex appressa*	Tall Sedge
* *Commelina cyanea*	Scurvy Weed
* *Dianella caerulea*	Blue Flax Lily
* *Hardenbergia violacea*	Purple Coral Pea
* *Imperata cylindrica*	Blady Grass
*^*Lomandra longifolia*	Spiny-headed Mat-rush
* Denotes Indigenous plant species that belong to the Endangered Ecological Communities found within the Botany Bay and the Cooks River Valley	
^ Denotes plant species recognised as significant to the area by the Aboriginal Cultural Advisors	** Final plant species selection and quantities subject to availability

Casuarina glauca

Glochidion ferdinandi

Crinum pedunculatum

Commelina cyanea

Dianella caerulea

Hardenbergia violacea

Imperata cylindrica

Lomandra longifolia

Planting Type: P5 - Median & Island Planting

The plant species selection for P5 consists of robust, low-maintenance native grass and groundcover species tolerant of roadside conditions.

P5 - Median & Island Planting (Typical Species)

Botanical Name	Common Name
Grasses + Groundcovers	
* *Dianella caerulea*	Blue Flax Lily
* *Dichelachne crinita*	Longhair Plumegrass
* *Ficinia nodosa*	Knobby Club Rush
* *Hardenbergia violacea*	Purple Coral Pea
* *Hibbertia scandens*	Yellow Guinea Flower
* *Imperata cylindrica*	Blady Grass
*^*Lomandra longifolia*	Spiny-headed Mat-rush
Lomandra longifolia ‘Katrinus’ + ‘Katrinus Deluxe’	Katrinus + Katrinus Deluxe
Lomandra longifolia ‘Verday’	Verday
* *Westringia fruticosa ‘Mundi’*	Mundi

* Denotes Indigenous plant species that belong to the Endangered Ecological Communities found within the Botany Bay and the Cooks River Valley

^ Denotes plant species recognised as significant to the area by the Aboriginal Cultural Advisors

** Final plant species selection and quantities subject to availability

Dianella caerulea

Dichelachne crinita

Ficinia nodosa

Hardenbergia violacea

Hibbertia scandens

Imperata cylindrica

Lomandra longifolia

Lomandra longifolia ‘Katrinus/ Katrinus Deluxe’

Lomandra longifolia ‘Verday

Westringia fruticosa ‘Mundi’

Planting Types: P6 - Feature Planting Mix

P6 includes a mix of trees, grasses, groundcovers and accent plants belonging to the Swamp Oak Floodplain Forest vegetation community. These species are currently found along Alexandra Canal and within the nearby Tempe Lands Mound. Other small to medium-size native trees, shrubs, grasses and groundcovers will provide natural shade and interest for cyclists and pedestrians at the noise wall intersection and ATL rest areas.

P6 - Feature Planting Mix (Typical Species)

Botanical Name	Common Name
Trees	
Backhousia citriodora	Lemon Scented Myrtle
* *Glochidion ferdinandi*	Cheese Tree
* *Tristaniopsis laurina*	Water Gum
Shrubs	
*^*Acacia longifolia*	Sydney Golden Wattle
* *Crinum pedunculatum*	Swamp Lily
^ *Doryanthes excelsa*	Gymea Lily
Grevillea rosmarinifolia	Rosemary Grevillea
Melaleuca thymifolia	Thyme Honey-myrtle
* *Phebalium squamulosum*	Scaly Phebalium
* *Westringia fruticosa*	Coastal Rosemary
Grasses + Groundcovers	
* *Baumea juncea syn. Machaerina juncea*	Bare Twig-rush
* *Carex appressa*	Tall Sedge
* *Carpobrotus glaucescens*	Pig Face
* *Dianella caerulea*	Blue Flax Lily
Ficinia nodosa	Knobby Club Rush
* *Hardenbergia violacea*	Purple Coral Pea
* *Hibbertia scandens*	Yellow Guinea Flower
* *Juncus usitatus*	Common Rush
*^*Lomandra longifolia*	Spiny-headed Mat-rush
Lomandra longifolia 'Katrinus/Katrinus Deluxe'	Katrinus/Katrinus Deluxe
Lomandra longifolia 'Verday'	Verday

* Denotes Indigenous plant species that belong to the Endangered Ecological Communities found within the Botany Bay and the Cooks River Valley

^ Denotes plant species recognised as significant to the area by the Aboriginal Cultural Advisors

** Final plant species selection and quantities subject to availability

Backhousia citriodora

Casuarina glauca

Cupaniopsis anacardioides

Melaleuca thymifolia

Tristaniopsis laurina

Crinum pedunculatum

Doryanthes excelsa

Phebalium squamulosum

Carpobrotus glaucescens

Ficinia nodosa

Hardenbergia violacea

Hibbertia scandens

Juncus usitatus

Lomandra longifolia

Lomandra longifolia 'Katrinus/Katrinus Deluxe'

Lomandra longifolia 'Verday'

Planting Type: P7 - Vegetated Channel Mix

P7 features a selection of grasses, rushes and sedges from P4 to line the swales and contribute to water sensitive urban design initiatives.

P7 - Vegetated Channel Mix (Typical Species)

Botanical Name	Common Name
Grasses + Groundcovers	
* *Carex appressa*	Tall Sedge
* *Dianella caerulea*	Blue Flax Lily
Ficinia nodosa	Knobby Club Rush
* *Juncus usitatus*	Common Rush
*^*Lomandra longifolia*	Spiny-headed Mat-rush
Turf Lined	
Cynodon dactylon	Common Couch

* Denotes Indigenous plant species that belong to the Endangered Ecological Communities found within the Botany Bay and the Cooks River Valley

^ Denotes plant species recognised as significant to the area by the Aboriginal Cultural Advisors

** Final plant species selection and quantities subject to availability

Carex appressa

Dianella caerulea

Ficinia nodosa

Juncus usitatus

Lomandra longifolia

Planting Type: P8 - Low Threshold Planting Mix

The plant species selection for P8 consists of robust low-maintenance grass and groundcover species, that are tolerant of exposed roadside conditions.

P8 - Low Threshold Planting Mix (Typical Species)

Botanical Name	Common Name
Grasses + Groundcovers	
* *Carpobrotus glaucescens*	Pig Face
* *Dichelachne crinita*	Longhair Plumegrass
Ficinia nodosa	Knobby Club Rush
* *Hardenbergia violacea*	Purple Coral Pea
* *Hibbertia scandens*	Yellow Guinea Flower
* *Imperata cylindrica*	Blady Grass
*^*Lomandra longifolia*	Spiny-headed Mat-rush
Lomandra longifolia ‘Verday’	Verday
* Denotes Indigenous plant species that belong to the Endangered Ecological Communities found within the Botany Bay and the Cooks River Valley	
^ Denotes plant species recognised as significant to the area by the Aboriginal Cultural Advisors	** Final plant species selection and quantities subject to availability

Carpobrotus glaucescens

Dichelachne crinita

Ficinia nodosa

Hardenbergia violacea

Hibbertia scandens

Imperata cylindrica

Lomandra longifolia

Lomandra longifolia ‘Verday’

7.18 Feature mounds

7.18.1 Flowering calendar

The flowering calendar details the flowering times of selected red-flowering and yellow-flowering plant species for the feature mounds.

The selection and arrangement of the plant species is designed to ensure that the two colour themes are represented throughout the year.

Melaleuca hypericifolia 'Ulladulla Beacon'

Acacia suaveolens

Leptospermum 'Pink Cascade'

Banksia ericifolia

Melaleuca armillaris

Lambertia formosa

Persoonia lanceolata

Eriostemon australasius

Grevillea rivularis 'Bronze Rambler'

Banksia integrifolia 'Roller Coaster'

Callistemon linearis

Hibbertia scandens

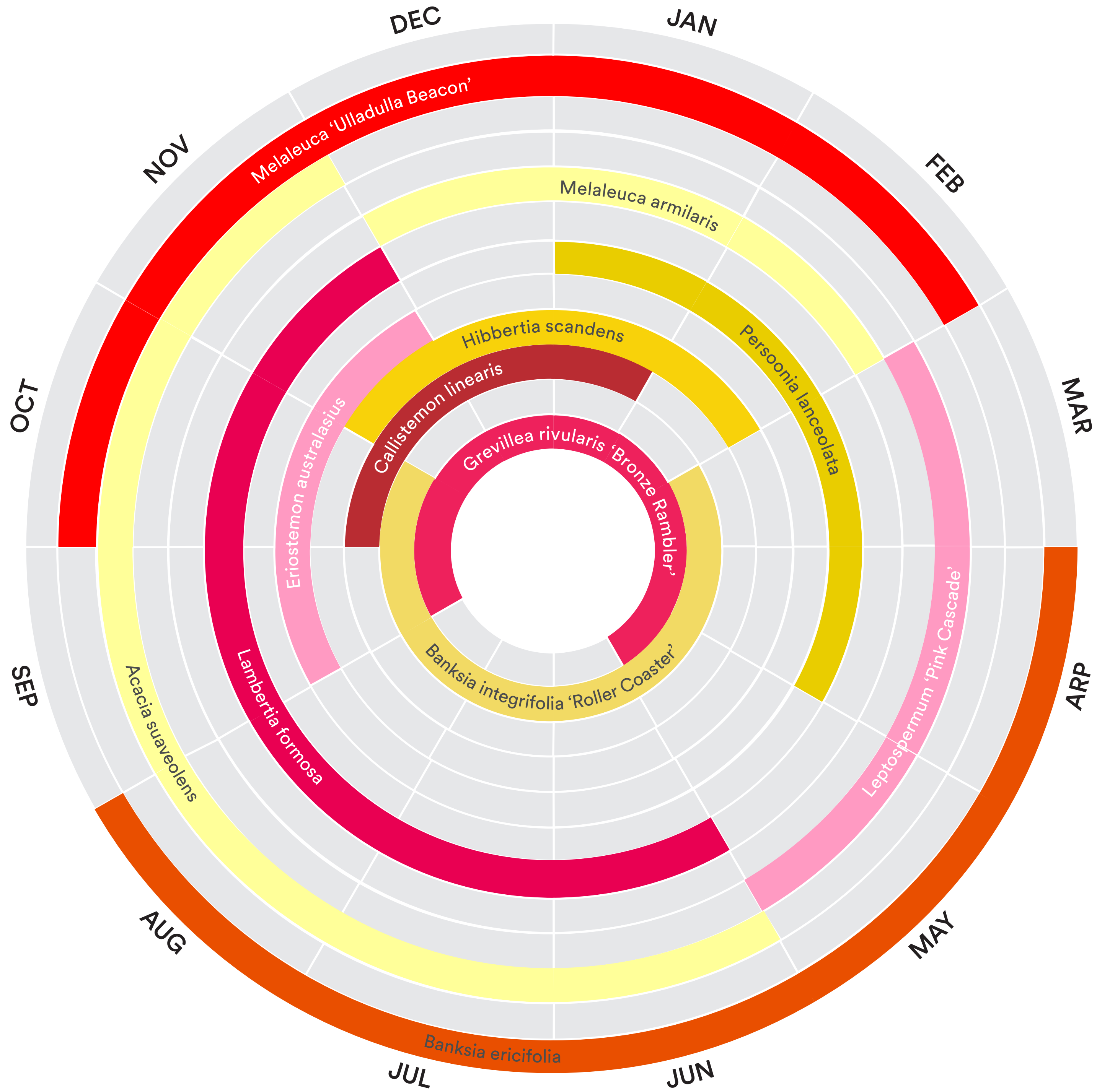


Figure 7-113. Flowering calendar

7.18.2 Northern Lands Mound

The Northern Lands Mound proposes to use several species from the Eastern Suburbs Banksia Scrub vegetation community. The species showcase a diverse range of foliage textures, habit, flowering times and flowering colour to create an iconic 'gateway' experience. Although diverse in these characteristics, the plant species have been carefully selected to ensure a sympathetic and harmonious relationship to the artwork.

Where plant species abut art elements compact groundcovers and grasses will be dominant to ensure a high degree of visibility is maintained to the artwork.

Larger shrubs will be located to limit any visual obstruction to the artwork

Yellow flowering plants will be contained to the inside of the 'coastline' edge.

Sandstone pebble will be used to create the 'coastline' with large sandstone spall to form the nawi (canoe) symbols.

Red flowering plants will be located outside of the 'coastline' edge.

Figure 7-114. Northern Lands Mound concept design

7.18.3 Tempe Lands Mound

The continuation of the artwork on the Tempe Lands Mound is met with the repetition of the planting typologies from the Northern Lands Mound. A synergy between planting and art is maintained through a diversity of species, foliage textures, habit, flowering times and flowering colour. This environmental scale of the artwork and landscape elevates the gateway experience.

Yellow flowering plants will be contained to the inside of the 'coastline' edge.

Sandstone pebble will be used to create the 'coastline' with large sandstone spall to form the nawi (canoe) symbols.

Where plant species abut art elements compact groundcovers and grasses will be dominant to ensure a high degree of visibility is maintained to the artwork.

Larger shrubs will be situated in locations to limit any visual obstruction to the artwork

Red flowering and foliage plants will be located outside of the 'coastline' edge.

Figure 7-115. Tempe Lands Mound concept design

7.18.4 Stonework concept

Different sizes of sandstone spall are used to create the weaving and nawi symbols and the meandering 'shoreline'.

Higher planting will be installed at some distant away from the artworks to maximise visibility of the different artwork elements.

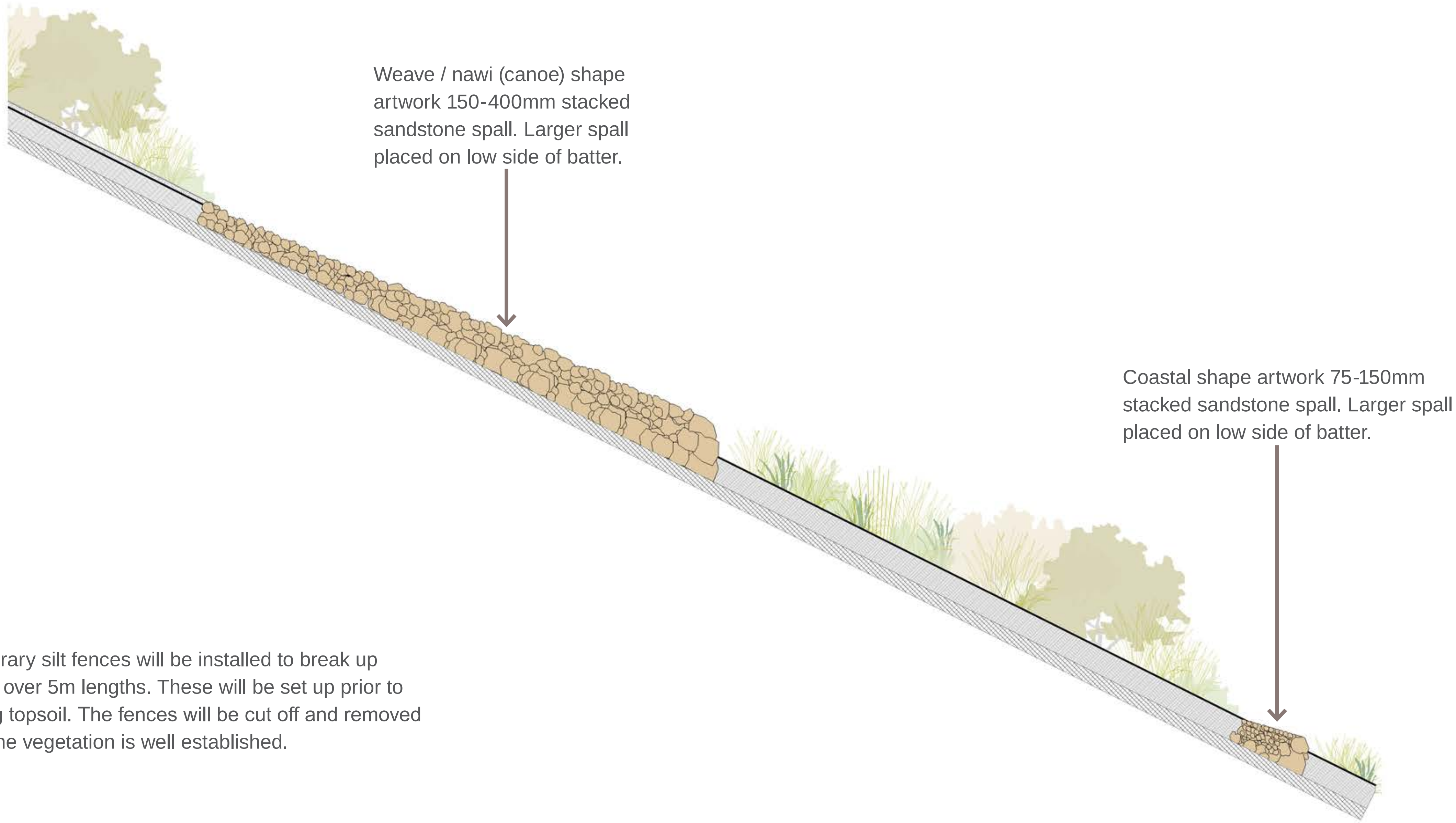
Larger rocks are used for the larger weaving and nawi (canoe) symbols. While smaller rocks are used to form the meandering shoreline with its more detailed curves.

To stabilise the sandstone spall on the embankment, larger stones at the bottom of the slope supporting the smaller stones higher up the slope. This creates a slight terracing effect and provides additional footholds for maintenance workers and will assist in safe access to maintain adjacent planted areas. The rocks will be placed directly on the capping layer.

The sandstone spall used for artworks will have a dual function as intercepting runoff and soil water flow and the "Coastline artwork" will be used to provide maintenance access. These are not subsoil drains and do not penetrate the capping layer but sit on top of the capping layer in the lower topsoil. They are to remove water ponding on top of the capping layer that would lead to slip failure.

The "Coastline shape" artwork will incorporate a drainage line that will act as water conduit layer to intercept downward flowing water in the sandstone spall and then conduct it downward to an installed drain. The downhill ends of these drainage lines will be connected to stormwater drains.

Given the high potential for erosion, a 'Erosion Control Mix', which has been trialed and proven to provide resistance to erosion from overland flow in intense storms, will be used at the lower half of the slope as a minimum. The blend was developed for the award-winning Glenugie Bypass and performed successfully through heavy rain events on slopes of 1:3 – 1:2.5.



Temporary silt fences will be installed to break up slopes over 5m lengths. These will be set up prior to placing topsoil. The fences will be cut off and removed once the vegetation is well established.



7.19 Landscape nodes

7.19.1 Noise wall pedestrian access

This landscape node is a transitional space that provides a pedestrian connection from the motorway to Tempe Recreation Reserve. The node highlights the change in landscape character as one moves from one side of the noise wall to the other. The Planting Type used at this location is the P6 - Feature Planting Mix and includes native plants identified as culturally significant by the Project's Aboriginal Cultural Advisor. This level threshold is also ideal for planting Cabbage Tree Palms (Livistona australis) which are commonly planted by Sydney Airport and are often used as an entry marker in the landscape.

The planting adjacent to the motorway will reflect species from Eastern Suburbs Banksia Scrub. Planting Type P3 - Banksia Scrub Mix will cover most of the motorway to reflect the wider context of vegetation in the area. The northern side of the noise wall connects into Tempe Recreation Reserve. Planting Type P4 - Swamp Oak Floodplain Forest Mix will be used on the northern side to reflect the landscape character within the nearby Tempe Lands Mound.

Figure 7-116. Example of Cabbage Tree Palms used as entry marker to the side of and beyond Sydney Airport wayfinding signage

Figure 7-117. Gymea Lily (*Doryanthes excelsa*), culturally significant to the Dharawal people, used as a feature in the landscape

Figure 7-118. Swamp Lily (*Crinum pedunculatum*) from Swamp Oak Floodplain Forest used as a feature in the landscape

Figure 7-119. Noise mound and wall at ATL crossing

Figure 7-120. Noise wall and mound looking south at ATL crossing

7.19.2 ATL rest areas

The ATL alignment runs along the Alexandra Canal, a characteristic landscape feature of the area. Along the alignment are landscape nodes and rest areas. The rest areas incorporate feature landscaping and interpretation elements. Planting Type P6 - Feature Planting Mix will be used both within and surrounding the rest areas to provide natural shade from small to medium-sized trees and interest from flowering shrubs and groundcovers.

Planting Type P8 - Low Threshold Planting Mix will be used between the edge of the ATL and canal wall to soften this interface and reintroduce native plants to a waterfront edge currently dominated by exotic plants and weeds.

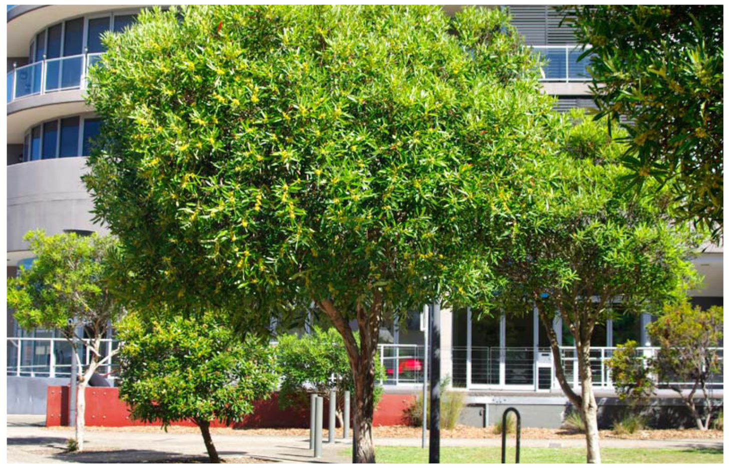


Figure 7-121. Water Gum (*Tristaniopsis laurina*) as small to medium-sized shade tree commonly used as a street tree in the area

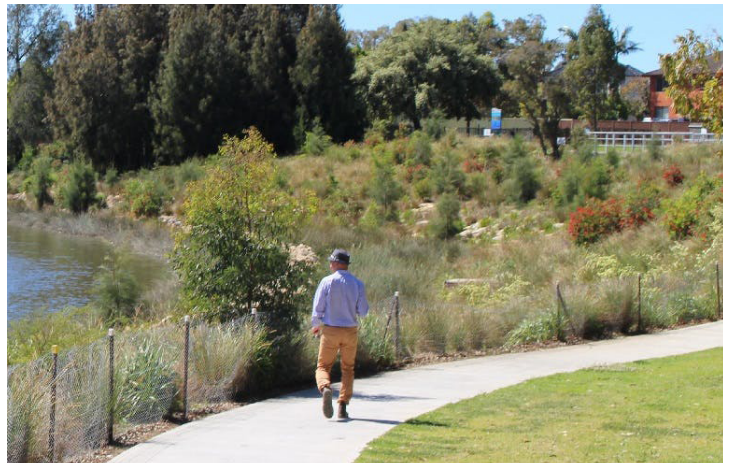


Figure 7-122. Example of planting adjacent to footpath at Powells Creek, Homebush

Figure 7-123. SB91 Example of mixed native planting at the Australian Botanic Garden, Mount Annan

Figure 7-124. Aerial view of SB91

Figure 7-125. SB91 Underpass from the south

7.20 Water sensitive urban design

The constraints of the site limit water Sensitive Urban Design (WSUD) initiatives. However, where possible, initiatives have been incorporated.

Project constraints that limit the WSUD opportunities include minimising wildlife strike hazards presented by riparian environments and the restricted site boundary.

The implementation of these initiatives is demonstrated through erosion control planting on reconstructed banks along Alexandra Canal and vegetated drainage channels utilised across the Project where suitable. A mix of sedges and rushes are specified in Planting Type P7 - Vegetated Channel Mix.

The implementation of vegetated drainage channels will reduce the extent of hard surfaces, reduce runoff velocity, improve water quality and add to the visual amenity of the Project.

7.20.1 Urban Heat Island

Following measures have been adopted the placemaking design to reduce the heat island effect:

- Reducing the extent of concrete / hard paving elements by introducing alternate paving materials such as stone, decomposed granite, which are less absorptive than concrete
- Consideration of lighter colours for the pavement materials so that they are more reflective and conducive to dealing with extreme weather changes including hot days
- Maximising opportunities to provide landscape including tree canopies and planting, particularly at the rest areas.

7.21 Biodiversity protection and recovery

The landscape and revegetation treatments are designed to preserve and, where practicable, enhance the significant native flora, fauna and biodiversity habitat throughout the Project. In particularly, the revegetation of available landscape areas along the Alexandra Canal will be planted with species primarily derived from the Swamp Oak Floodplain Forest vegetation community and other cultivars that enhance the existing landscape character. This approach aligns with the objectives of the Sydney Airport *Environment Strategy 2019-2024.* Mitigation measures are derived from Chapter 22 Biodiversity of the EIS/MDP, Scope of Works and Technical Criteria Appendix B.11 Urban Design and the documents below.

Reference documents:

- *Sydney Gateway Scope of Works and Technical Criteria Appendix B.11 Urban Design*
- *Sydney Gateway Environmental Impact Statement / Major Development Plan - Chapter 22 Biodiversity*
- *Sydney Airport Environment Strategy 2019-2024*
- *Sydney Airport Wildlife Management Plan, 2019*
- *Eco Logical Australia 2015. The New M5 - Biodiversity Assessment Report. Prepared for Roads and Maritime Services NSW*
- *City of Sydney Environmental Action 2016 - 2021 Strategy and Action Plan*
- *City of Sydney Urban Ecology Strategic Action Plan, 2014*
- *City of Sydney and Inner West Council New M5 and St Peters Interchange Environmental Impact Statement - Review of Biodiversity Assessment*
- *AMBS 2011. Marrickville Biodiversity Strategy 2011-2021. Prepared for Marrickville Council by Australian Museum Business Services, Sydney.*

Constraints specific to key features of the Project

Sydney Airport (Terminal 1) Connection

- Vegetation identified as Swamp Oak Floodplain Forest at Tempe Lands (which is located within the Project site)
- Wetland and forested areas in Tempe Lands (adjoining the Project site).

Qantas Drive Upgrade

- Previously mapped vegetation that has the potential to be a threatened community, located between the Project site and Alexandra Canal west of the Qantas Drive Upgrade
- Mature trees along Qantas Drive.

Mitigation measures

- The development footprint should be clearly delineated prior to the clearance of vegetation and other habitat features, to ensure the clearance is kept to the absolute minimum necessary, particularly at and around Tempe Recreation Reserve
- Minimise habitat fragmentation and create habitat linkages
- Minimise habitat pollution, including pollution due to pesticides, fertiliser and road run-off.
- Eliminate invasion by non-endemic species
- The trunks and branches of large trees that are removed should be stored and re-used in the site landscaping, for example, as ground level habitat features and as stags in the water at Tempe Lands
- Site landscaping incorporating appropriate soils / other growing media such as crushed sandstone, and maximising locally native shrubs, grasses and groundcover species that will provide habitat for native fauna
- Appropriate, site-specific measures to prevent sedimentation and pollution of Alexandra Canal, Tempe Lands wetlands and the Cooks River should be incorporated both during construction and operation, including in relation to earthworks, storage of spoil, and bridge construction, to prevent any adverse impacts to water quality.
- Opportunities for biodiversity protection and recovery
- Incorporate plant species that support priority/target species identified by City of Sydney's *Urban Ecology Strategic Action Plan* and Inner West Council's *Marrickville Biodiversity Strategy*
- Incorporate dense reed beds and sedges to maximise the habitat value of WSUD initiatives, while maximising their effectiveness in treating stormwater run-off
- Incorporate fine mesh structures, if feasible, over stormwater inlets to prevent access by Mosquito Fish (*Gambusia holbrooki*), which preys on tadpoles.
- Incorporate fences around stormwater detention basins and other ponds, to restrict access by pests and people
- Create habitat for the endangered Green and Golden Bell Frog through the above ponds / wetlands. Creation of habitat could be a means of restoring a population to this locality and assisting to ensure the conservation of the Lower Cooks River Key Population
- Re-establish vegetation representative of the endangered Eastern Suburbs Banksia Scrub, which was widespread in the locality prior to development, in soft landscape areas of the Project
- Implement offset native habitat planting at Tempe Recreation Reserve and its surrounds
- Construct habitat for the endangered Coastal Saltmarsh community along Alexandra Canal as part of landscaping adjacent to new bridges, in consultation / collaboration with Sydney Water, whom have completed a similar Project at the mouth of the canal in Tempe Recreation Reserve.

7.22 Soil and growing media

Sydney Environmental & Soil Laboratory (SESL) has been engaged as a qualified professional soil scientist with expertise in revegetation and urban landscape construction to provide advice on horticulture and soil interaction for the Project.

The two feature mounds on the Project are predominantly made up of contaminated fill with a capping layer covered in soil, mulch and planting. Based on previous project experience, it is anticipated that both imported subsoil and topsoil will likely be alkaline, so tolerance to this type of soil should be one of the selective criteria for plant species. The capping layer is recommended to be scarified to a minimum depth of 50mm to key the topsoil to a rough subsoil. Scarification of the capping layer will help to reduce the potential of slippage and provide some ability for plants roots to obtain reserve moisture in an effective subsoil layer.

SESL recommends using a ‘interception’ drainage system to prevent potential slip failure and allow water to drain freely. Implementation of an interception drainage system will assist in preventing build up of water in lower slope soils and potential slip failure and allow water to drain freely. These drains are not subsoil drains and do not penetrate the capping layer but sit on top of the capping layer in the lower topsoil. They are to remove water ponding on top of the capping layer that would lead to slip failure. The “Coastline shape” artwork will be used to incorporate these drainage lines.

SESL supports the use of Eastern Suburbs Banksia Scrub to underpin the landscape design as these plant species are generally drought-tolerant, possess low nutrient requirements and include plants with strong shallow root systems that are suitable for the mounds. Many of these plant species are alkaline tolerant and are recommended for selection as imported topsoil and subsoil will likely be alkaline.

Temporary silt fences will be installed to break up slopes over 5m lengths. These will be set up prior to placing topsoil. The fences will be cut off and removed once the vegetation is well established.

7.23 Landscape management

A Landscape Management Plan will be developed on contract, which covers the standards and methods for all typical tasks required for landscape and horticultural maintenance of the Project. The landscape design is consistent with the requirements identified in the EIS / MDP and complies with the requirements described in:

- TfNSW *Landscape design guideline;*
- TfNSW D&C Specifications R178 Vegetation and R179 Landscape Planting
- Relevant local Council guidelines and strategies.

Landscape maintenance and monitoring will commence at the time of plant installation.

Monitoring of the landscape will be undertaken over an establishment period nominated based on species selection, to ensure all plants are provided with equal opportunity to root and grow with the site conditions.

A Maintenance Strategy has been developed as part of the detailed design which will ultimately become the shared responsibility of both TfNSW and SYD (Airport land) for implementation. This strategy includes landscape maintenance, weed management and access to infrastructure.

The design has been developed to comply with WHS requirements in the design, construction and maintenance phases of the Project as part of the detailed design and documentation. Safety in Design considerations are integral part of the design process and have been incorporated in the design.

A comprehensive landscape maintenance regime has been developed as part of the detailed design and documentation.

Safe and adequate landscape setbacks have been provided for structures, roadside furniture and pathways or urban design elements, which have been coordinated with the engineering requirements and is being documented as part of the detailed design.

Weed management control

Weeding and weed control are critical maintenance actions. Maintenance personnel shall be familiar with noxious weed species and able to address their control per the control requirements set out in *Department of Primary Industries (DPI), Noxious and environmental weed control handbook, Fifth edition*.

Maintenance personnel are to prevent the reproduction of weeds by destroying seedlings and established weeds before flowering or other propagules form. Weeds are not to exceed 10% cover in any $50m^2$ area. Herbicide application must occur before the weed seed set. Non-target species and areas must be reinstated if damaged by herbicide application. Herbicide used to be per regulation rates and manufacturer’s recommendations. Dye shall be added to herbicides to show the extent of treated areas.

7.24 Useable open space

The rest areas have been provided as usable open space to enhance the placemaking of the ATL. The nature of other open space areas are mostly earthwork batters, which are vegetated. Due to the scale of the roadway, the tight Project boundary and limited access, it is not considered conducive for these areas to be used as usable open space.

The land within Tempe Recreation Reserve is under the jurisdiction of the Tempe Recreation Reserve Master Plan, prepared by Inner West Council. Sydney Gateway ties into these outside borrowed assets. As part of the Inner West Council agreement, the residual land which was acquired by TfNSW as part of property acquisition will be handed back to the Council as a new and reinstated dog park.

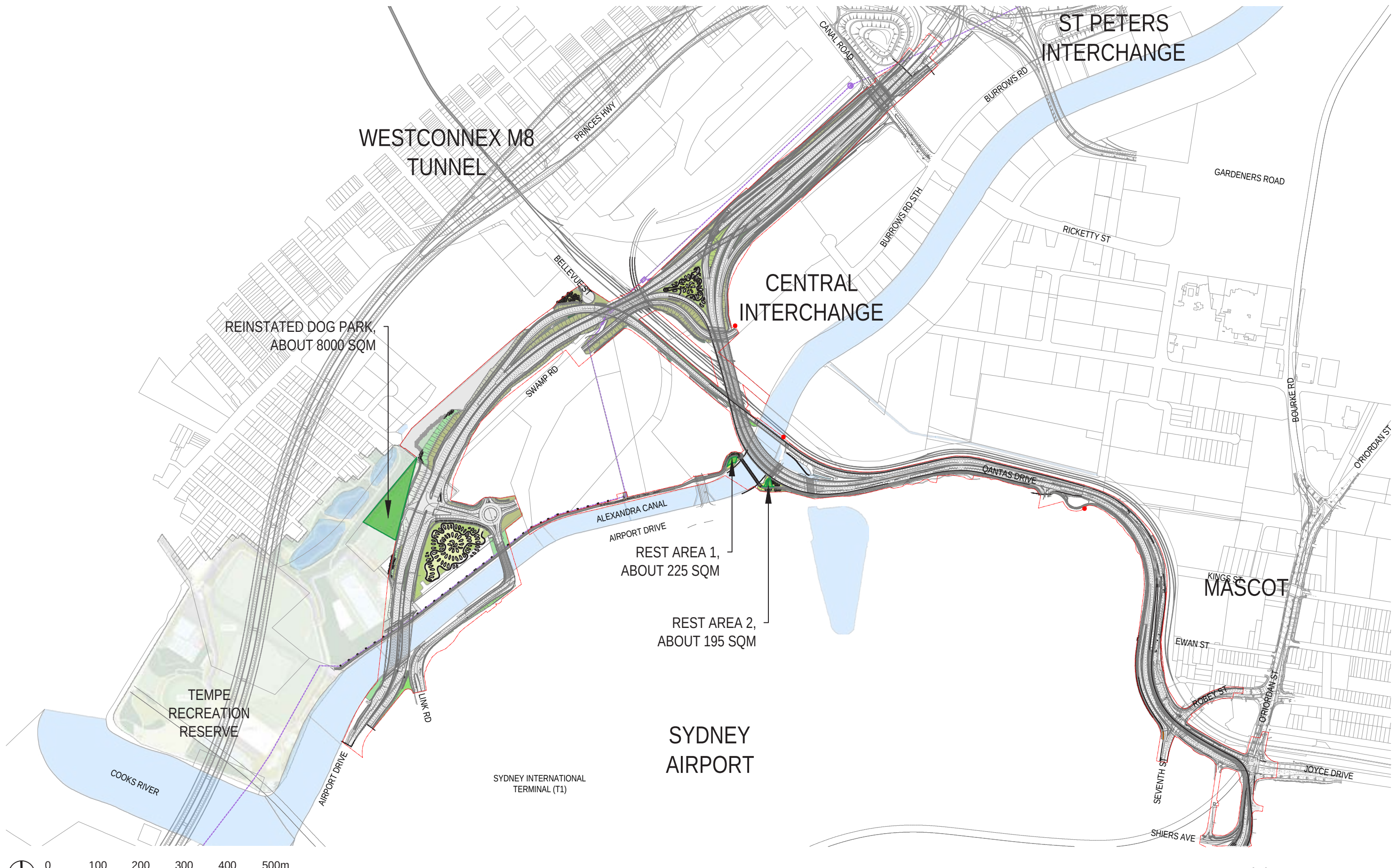


Figure 7-126. Useable open space

7.25 Vegetation growth beneath bridge structures

Vegetation and planting under the bridges is not considered to be feasible, as very few species grow in these environments. An example would be Ivy - Hedera helix – but it can become quite weedy in poor conditions.

Other factors include:

- Light values.
- Soil composition (nutrient content, soil type and water availability) affect and restrict their growth.
- Roadside undercroft environments are also usually low on any maintenance regimes. Maintenance safety is an issue.
- Visual amenity in these zones is of low value with the high speeds and low light in these spaces.
- Drainage.
- Planting needs to be kept low and open to avoid CPTED issues.

The below table illustrates the reasoning for not providing vegetation beneath bridge structures:

Bridge Location	Feasibility of providing vegetation growth beneath bridge structures
Stage 3 Viaduct	Vegetation growth beneath the bridge is not possible as the viaduct is located above Qantas Drive. All of this space is used by road pavement underground utilities and road barriers and planting is not feasible.
SB21	Vegetation growth beneath the bridge is not possible as the bridge is crossing the canal, rail corridor and Boral land. No space is available to the Project to enable planting beneath the bridge.
SB1, 2, 3	Vegetation growth beneath the bridge is not possible as the bridge is crossing the existing Canal Road. No property is available to the project to enable planting beneath the bridge.
SB12	Vegetation growth beneath the bridge is not possible as the bridge is crossing the Qantas Drive to SPI link road. No space is available to the project to enable planting beneath the bridge.
SB11	Vegetation growth beneath the bridge is not possible as the bridge is crossing the Qantas Drive to SPI link road. No space is available to the project to enable planting beneath the bridge.
SB41, 42, 43	Vegetation growth beneath the bridge is not possible as the bridge is crossing the rail corridor. No space is available to the project to enable planting beneath the bridge.
SB61	This bridge crosses the canal. Vegetation and planting has been provided beneath the bridge adjacent to the ATL and up to the canal wall.
SB51	This bridge crosses the canal. Vegetation and planting has been provided beneath the bridge adjacent to the ATL and up to the canal wall.
SB91	Vegetation growth beneath the bridge is not possible as the bridge is crossing the canal and no space is available to the project to enable planting beneath the bridge.

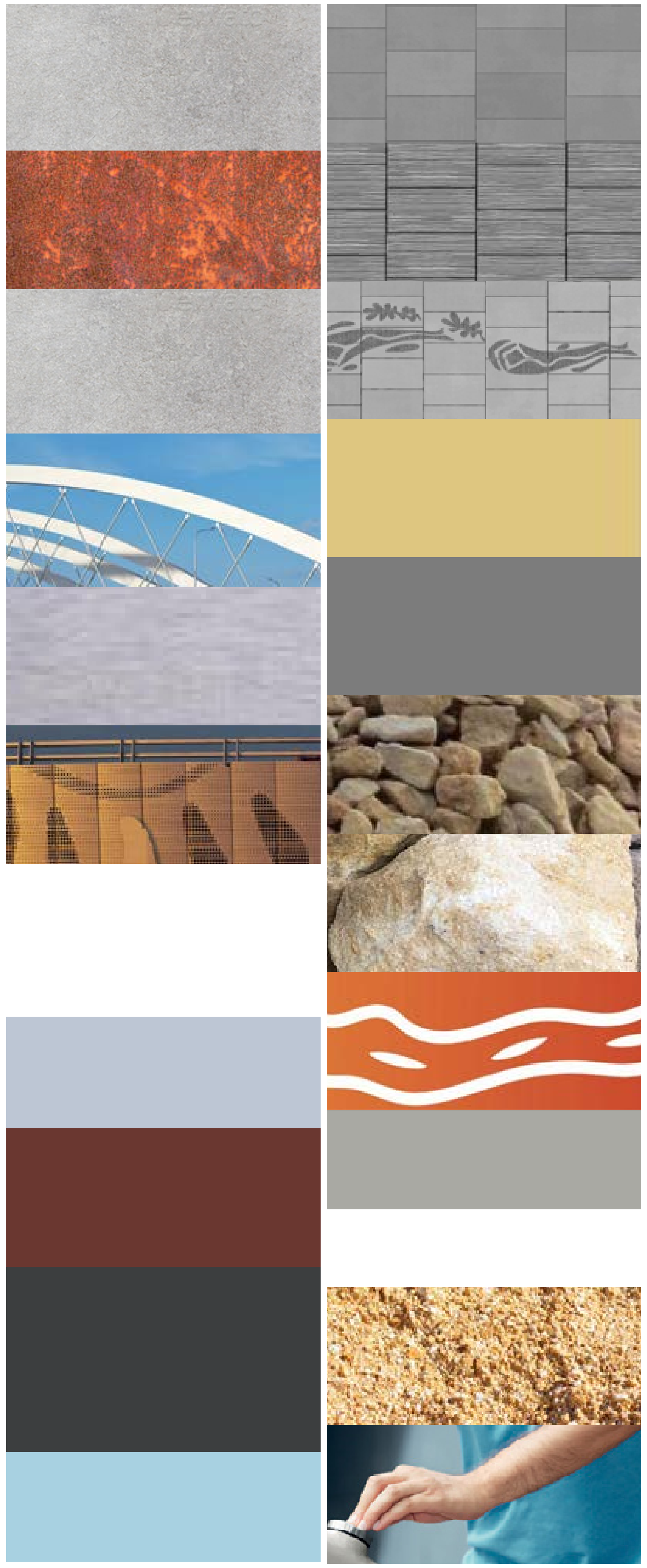

Artist impression
Drawing is illustrative only and landscape shown is indicative

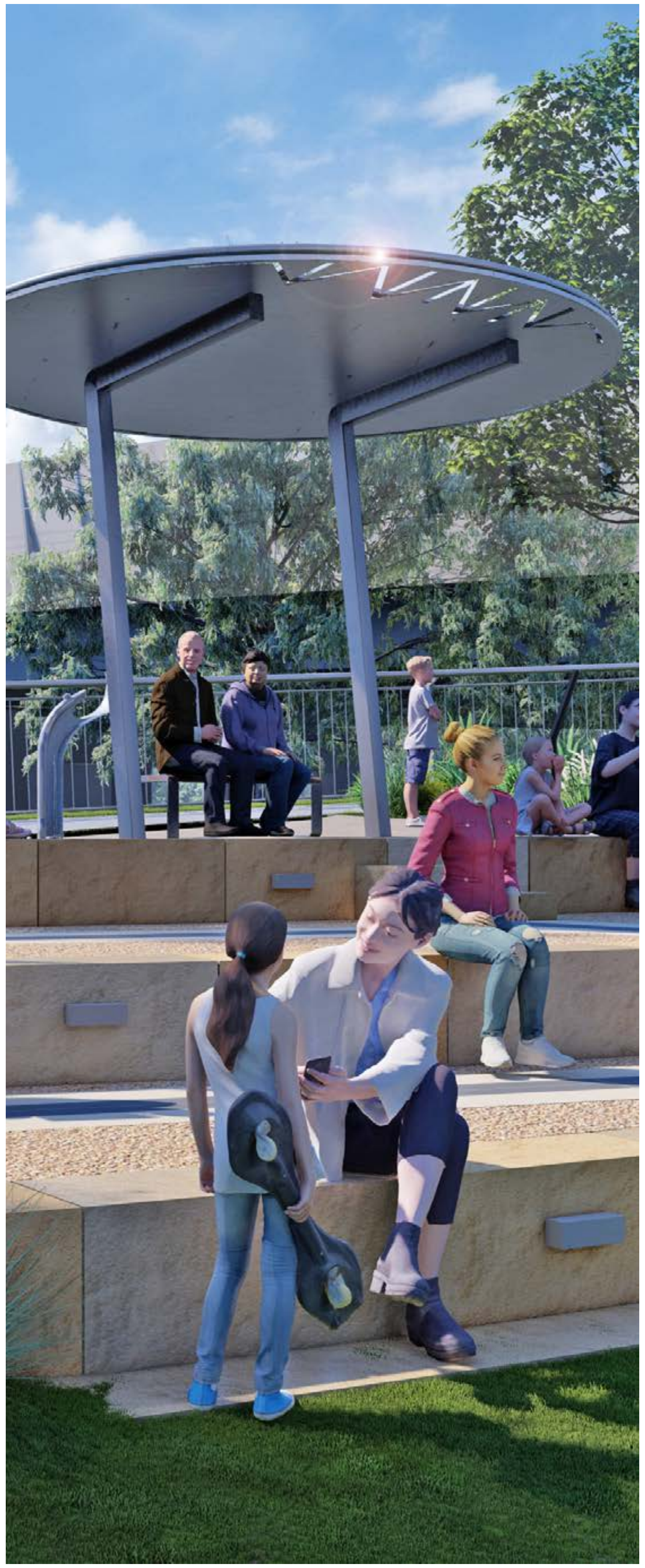
8. Materials and finishes

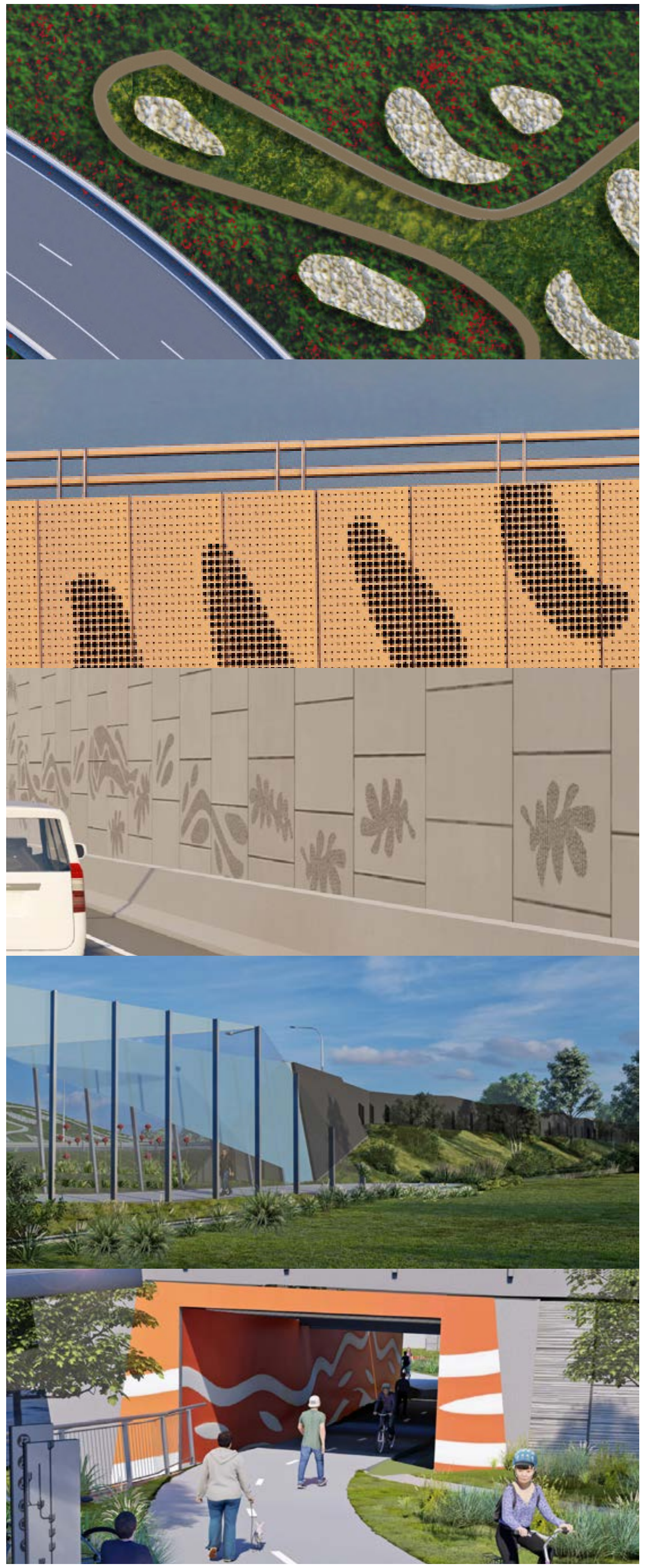
The materials concept features a consistent and robust palette of complementary materials. Their application is based on functionality, durability and the visual prominence of elements within the urban context.

The design uses materials that can leverage the natural light of this place. For example, the art elements on the mounds may turn rose at dusk or dawn; the viaduct screen seen from at certain angles will almost touch the sky and pick up the blue of the day, the silver of the clouds and the warm tones at dusk and dawn; the artwork retaining walls express the light and shadow of the movement of the sun through the variation in the textures and patterns.

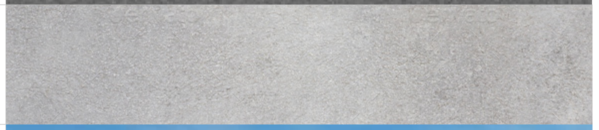
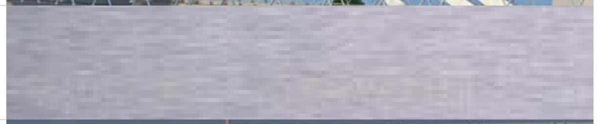
Accent materials with bright colours have been reserved for the ATL and placed where people experience this place at a slower pace with time to sit and enjoy this space. These colours have been selected to express the heritage and cultural significance of this place.

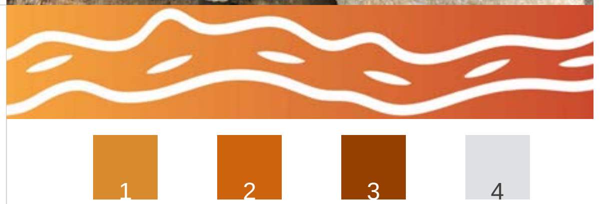
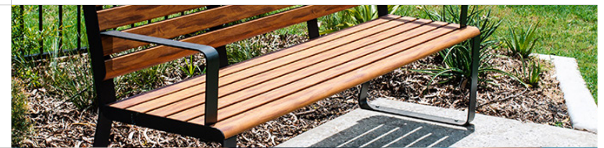






JOHN HOLLAND | SEYMOUR WHYTE | CM+ | CONTEXT | culturalcapital

Element		Material	Colour/Finishes	Specification	Description	Image
Bridges	Piers/Headstocks	Concrete	Natural concrete / Class 2	AS 3610		
	Girders	Concrete	Natural concrete / Class 2	AS 3610		
		Weathered steel	Brown / orange (Corten)		Natural patina steel, brown / orange in colour	
		Steel	RMS Bridge Grey (MIO)	RMS B220	Painted	
	Parapets + skirtings	Concrete	Natural concrete / Class 2	AS 3610		
	Arch	Fabricated steel	Painted white (RAL 9003 or equivalent)	RNS B220		
	Hangers (arch)	Hot dip galvanised steel with HDPE sheath	White	15.7 millimetre diameter weldless, 7 wire ordinary tensile strength as per AS/NZS4672.1 covered with coloured HDPE sheath protection	Individually sheathed and coated with corrosion inhibiting material	
	Balustrade (SB91)	316 Marine grade stainless steel	No. 4 – brushed finish		Balustrade posts, panels, handrails with integrated handrail lighting	
Viaduct	Art screen	Aluminium panels	Powder-coated metallic finish similar to Dulux electro anodised look range	PANEL: 2555(H) at 1010 centres nominal PERFORATIONS: Varied apertues to express artwork pattern	Powder-coated metal panel with perforated pattern and recessive coloured structural frame	
Throwscreen		hot-dipped galvanised (HDG)		STRUCTURE: HDG structural steel T-post INFILL: 358 weldmesh panel		
Headlight screen	Standard screen	STRUCTURE: HDG SCREEN: Acrylic	Plexiglas: Light Grey / opaque	STRUCTURE: HDG structural steel T-post SCREEN: Plexiglas Acrylic		
	SB41 / 42	STRUCTURE: HDG SCREEN: Acrylic	Plexiglas: Light Grey / opaque	STRUCTURE: HDG structural steel framing SCREEN: Plexiglas Acrylic	Headlight screen fixed to bridge piers next to rail corridor	
Noise walls	Standard noise walls	Concrete Class 2	Dulux Domino - GR10 / highbuild acrylic paint		Precast concrete noise wall on top of landscape mound with HDG structure	
	ATL crossing	STRUCTURE: HDG SCREEN: Acrylic	Plexiglas: Steel blue / opaque / transparent	STRUCTURE: HDG structural steel T-post INFILL: Plexiglas Acrylic	Acrylic noise wall panels at ATL to Tempe Recreation Reserve	
Retaining walls	Type 1 (A & B)	Concrete	TYPE 1 (A) - Dulux Domino - GR10 / high build acrylic paint TYPE 1 (B) - Natural concrete / Class 2	PRECAST PANEL: 1500(W) x 3000(H)		
	Type 2	Concrete	Natural concrete / Class 2 Cast in pattern	PRECAST PANEL: 1500(W) x 3000(H) PATTERN: Reckli 2/32 Inn or similar	Articulated horizontal pattern	
	Type 3	Concrete	Natural concrete / Class 2 Cast in pattern	PRECAST PANEL: 1500(W) x 3000(H) PATTERN: Reckli 1/37 B Rib Type J or similar, and custom formliner	Custom pattern formliner	
	Canal wall	Shotcrete	Architectural shotcrete with integral oxide	OXIDE: CSS Desert Buff @ 6% cementitious ratio SURFACE FINISH: Wood Float	Existing canal wall shotcrete repair / replacement	
	Existing gabion wall	Shotcrete	Architectural shotcrete with integral oxide	OXIDE: CSS Onyx @ 8% cementitious ratio SURFACE FINISH: Wood Float	Shotcrete over existing gabion wall	

Element		Material	Colour/Finishes	Specification	Description	Image
Temple Lands and Northern Lands Mounds (hardscape treatments)	'Coastline' edge feature	Sandstone	Sandstone pebble	75-150 millimetres	Placed pebbles to provide feature formation	
	Nawi (canoe) feature	Sandstone	Spall rock	150-400 millimetres	Placed rocks to provide feature formation	
ATL Underpass (SB81, SB21)	Wall treatment	Glazed ceramic tiles	White and orange-red glazed tiles similar to Urban Atelier Ceramic wall tile: - Tile 1: Tangerina/gloss - Tile 2: Laranja/gloss - Tile 3: Castanho/gloss - Tile 4: Branco/gloss	Proprietary tiles White mosaic and orange-red glazed tiles arranged to form artist pattern	Wall treatments to ATL under passes (SB21, SB81)	 1 2 3 4
ATL	Ground treatment (pathway)	Concrete	Concrete with integral 3.6% oxide	OXIDE: Cathay Oxide in Platinum SURFACE: Broom finish	Special areas: Canal interpretation: CCS Stylepave Terracotta Railway interpretation: Stainless steel insert Runway interpretation: Special pavers	
	Balustrade	Hot-dipped galvanised			Balustrade posts & handrails with integrated handrail lighting	
	Cyclist rub rail					
	Desalination pipeline undercroft	Recycled concrete	Natural	Recycled aggregate similar to bark blower		
Rest areas	Ground treatment	Decomposed granite	Gold		Compacted decomposed granite with timber edging	
		Paving	Silkstone charcoal merino	600 x 300 coloured concrete paver		
			Silkstone merino			
	Seating	Sandstone	Natural stone	500 x 500 x 450(H) min block size	Split face sandstone blocks with honed top seating surface	
		Bench	Stainless steel support: Powdercoated black Bench: Aluminium Culry Birch	1200 x 445 x 430(H)	Stainless steel bench, submounted	
	Arqua fountain or Council's equivalent	Stainless 304	Powder-coated/Palladium Silver (Satin GY184C)	MCODE: DF4 770L x 450W x 1125H (mm)	Sculptural, high-tech fountain that supplies water for drinking and refilling containers. Arqua Fountain adheres to DDA and is wheelchair-friendly.	
	Interpretative signage	Weathered steel	Brown / orange (Corten)		Natural patina steel brown - orange in colour	
	Ground marker	Bronze				
	Shade canopy	STRUCTURE: HDG ROOF: aluminium	Brown / orange (Corten)		Laser cut patterned panels	

Note:

Dimensions shown are indicative and are subject to change as part of detailed design.

Figure 8-1. View of the Project from SPI

9. Conclusion

The Project design capitalises on its unique location and has been developed to provide a special `gateway' experience referencing movement, time, the Indigenous connection to the land and the character of this coastal environment.

The design treatments provided will strengthen Sydney Gateway's connection to both the St Peters Interchange and the airport providing a seamless experience between Sydney and the world.

The design builds upon TfNSW's achievement of design excellence for contemporary road infrastructure, and establishes new benchmarks for the urban and landscape design of Motorways.

The Project integrates art into the Motorway design to transform the experience of movement. An Aboriginal narrative has informed the ongoing development of the Project themes and their realisation through the co-design process to enable this piece of infrastructure to become a large scale piece of environmental art and celebrate the large graphic scale of the site and visual fields.

The legacy of this approach, scaled to the city, as 'Connection to Country' and welcome to Australia will strengthen the legibility of this infrastructure and deliver strong placemaking outcomes for both road users and the community. It also captures the essence of Sydney as a global place.

Sustainability has been built into all decisions taken during the tender and will continue to guide the design of the Project through its detailed design and implementation. Design outcomes exemplify the integrated approach taken in resolving the challenges presented by urban design, landscape and engineering requirements. The use of modular components and similar detailing adopted across the Project will ensure a smooth and on-time implementation to deliver an improved operating environment.

The design outcome supports a positive experience at the aviation, Motorway and the ATL scales, allowing users to comprehend the route, easily navigate and 'enjoy the ride'.

The stories that have been incorporated into the artwork about the place can be experienced at these various scales which allows users to grasp the meaning of these stories as they travel through this space.

The key aspect of the driving experience is in establishing reference points, which evokes a sense of progress towards a destination, built on a narrative that continues to provide interest over time and through repeated journeys will mean that the new infrastructure is embraced by the public and provide enduring value.

Figure 9-1. Proposed view looking south towards Sydney Airport

Figure 9-2. Aerial view of SB51 looking towards Tempe Lands Mound

Figure 9-3. View of Tempe Lands Mound

Figure 9-4. View of Tempe Lands Mound south bound

Figure 9-5. View from aircraft looking east about 80 metres above ground

Figure 9-6. View from aircraft looking west about 80 metres above ground

Figure 9-7. View of pilot landing on north / south runway about 200 metres above ground

Figure 9-8. Cockpit view landing at 16R - 100m above Princess Highway at dusk

Artist impression
Drawing is illustrative only and landscape shown is indicative

One of the remarkable aspects of this Project is its immersive nature. It is possible to move both through it and above it. It is a canvas seen from the sky and a sequential narrative seen from the ground. Each of these vantage points has various scales of movement and visual fields. It will be many things to many people.

From the air, one can see that there is a large ‘imprint’ of art on the ground, even if it were to be experienced for a few seconds; of the arches, mounds or the linear elements, from which people will understand that a story is being told.

This story unfolds further when one reaches the ground, the Australian continent and Sydney, and moves through the airport. The image of the art is lost momentarily in the bustle of the airport only to re-emerge as one starts to move across the landscape. The images glimpsed from the air reconfigure on the ground as one passes by the mounds, along the viaduct and though the weave of the roadways telling the story of this place again close at hand. This narrative of place remains vibrant over time enlivened by the changing light of days and seasons. Each journey through this place reveals more and makes the welcome of Sydney Gateway stronger.

Figure 9-9. Cockpit view landing at 16R - 100m above Princess Highway at night