

The background of the entire page is a grayscale photograph of the Sydney Harbour Bridge, viewed from a low angle looking up at its massive steel structure. Overlaid on this image are several large, semi-transparent geometric shapes: a green triangle on the left side, a white triangle pointing downwards in the center, and a white triangle pointing upwards on the right side. The main title is positioned over the central white triangle.

Sydney Harbour Bridge Northern Cycleway Access Project

Initial Design Phase - Report

22 November 2021

Honouring Country

The Country now known as Milsons Point has been for millennia the land of the Cammeraygal people. This Country is celebrated as a diverse landscape of ecologies, communities and histories – so it has been from time immemorial for the many clans who have been the Traditional Custodians of the lands along the Harbour, and throughout Australia.

For thousands of generations, the Cammeraygal lived an abundant and sustainable lifestyle within a complex kinship system of families and clans on this Country. From Lane Cover River in the west to Middle Harbour to the North, and south to Sydney Harbour, the Cammeraygal maintain a continuing cultural connection to Land and Sea Country. This Country is close to their hearts – and telling its story is a process of seeking common ground.

We pay our respects to their Ancestors and Elders past, present and emerging and acknowledge that through honouring Country, we also honour their timeless connections to Country.

It is also here on this Country that we acknowledge our mutual responsibility to safeguard Sydney Harbour and its many sites and places, and its living history. Beyond the protection and enhancement of Country, we also make space so its Traditional Owners are respected, listened to and learned from, and that the understanding of Country and connection form the foundations of decision making.

If we care for Country, Country cares for us.

Let us all consider the deep significance of Country and its future, as we walk along it, leave it, and eventually land our feet back onto it.

"... the [Aboriginal] conception of the spirituality of being is signified by places, not just that in being one can be perceived and remembered as living in particular places, being born in a place, dwelling in places, dying in a place, but by the (supposed) a priori significance of places, their spiritual meanings, which infuse all of these ordinary and not so ordinary, but everyday, experiences with a special sense of place. "

Marcia Langton 2002

Contents

1.0 Country

1.1	Initiation	4
1.2	Interpretation	5
1.3	Implementation	6
1.4	Stories	7

2.0 The Harbour Bridge

2.1	A heritage of structure	9
2.2	Bridge as teacher	9

3.0 The Harbour Bridge Cycleway

3.1	Harbour Bridge Cycleway	10
3.2	Cycleway elevation	12

4.0 Movement

4.1	Moving through Country	14
4.2	Intersections	15

5.0 Structure

5.1	Approach	17
5.2	Construction	18
5.3	Structural members	20
5.4	Structural performance	22

6.0 Place & Time

6.1	The Northern Landing	24
6.2	Time and Place	25
6.3	Sections	26
6.4	Bradfield Park Plan	28
6.5	Touching the Earth	30
6.6	Beyond the Project	31
6.7	Colours, materials & lighting	33
6.8	Leaving Country	34

Project Sydney Harbour Bridge Northern Access Cycleway
Initial Design Phase

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Client Transport for NSW
Date 22 November, 2021

Introduction

We are pleased to present this concept design proposal for the Sydney Harbour Bridge Northern Access Cycleway to Transport for New South Wales, the community of North Sydney, and all the people of Sydney. This work is the result of a competitive design process in which our team worked closely with Transport's project team and their consultants across a range of disciplines, including Indigenous design, structural engineering, heritage and quantity surveying. The work in this document builds on the many years of work conducted by Transport in bringing this project to fruition, most significant of which has been the reference design, which our work used as a point of departure for our subsequent investigations.

This submission has been prepared as a collaborative venture led by **REALMstudios**, in conjunction with the following consultants:

Djinjama	Indigenous Design
PMI Engineers	Structural Design
Aileen Sage	Architecture
Lucas Stapleton Johnson	Heritage
Nick Schlieper	Lighting
Mike Harris	Cycling

We believe that our joint project team's combined local, metropolitan and regional experience in understanding, designing and working with Country, heritage infrastructure, cycleways, complex structures and significant urban places and their evolving conditions provides a substantial foundation from which to develop and deliver this project, and achieve exemplary results.

This document tells the story of the project to date, from our site appreciation, project approach and design responses through to detailed replies to project challenges and briefing requirements.

We hope you enjoy the ride, and we look forward to continuing the journey on this exciting and exemplary project.

REALMstudios

22 November 2021

J Djinjama

Aileen Sage

Dr. Mike Harris



Nick Schlieper

1.1 Country - Initiation

CONNECTING WITH COUNTRY

Our work starts and ends with Country. We work to recognise the deep history of place, its enduring stories and the contemporary perspectives of its Knowledge Holders. This understanding of Country, and the Knowledges it offers, has informed all other considerations that have arisen from it: the Harbour Bridge as an iconic, well-loved product of place; movement as journeys to and through Country; resolution of structure and form understood as, instead of a process that removes identity, a way in which to make Place “more so.”

Finally, the changing relationship of cycleway and site becomes part of the larger cycles of place and time: people, plants and animals, interacting daily, seasonally and generationally.

Designing with Country extends throughout the project, directly informing its evolution and elements, and providing us with the foundations upon which to realise the project.

Aboriginal methods of yarning, storytelling and walking Country have played key roles in ensuring an Indigenous viewpoint frames our understanding of Milsons Points and its stories. Guided by Djinjama, our first act was a journey to, through and around the site, by bicycle. We travelled from our respective neighbourhoods to Bradfield Park, meeting at the project site. Dr. Danièle Hromek of Djinama, who often cycles in her investigations of the Land, refers to this act as cycling Country.

This act of moving through Country is part of Aboriginal lore in which the story originates from the land. For our team, this movement was not a wandering, but rather a focused act of listening, learning and caring for Country. To learn Country through being on and moving through it is to experience it, hear its stories, and know its voices. Narratives are in and of the land – through these journeys, our understandings became founded in Country, and our responses grounded there.

On site, walking Country with together has enabled the team to connect to place, discovering relationships, associations and observations. Being guided, engaging our senses, and listening to the stories of place, we began to gain an understanding of the deep histories of Milsons Point and its surroundings.

ENGRAVING

A rock engraving of a whale at Milsons Point was destroyed in the construction of the Harbour Bridge. Rather than a restoration, our project for the Harbour Bridge Cycleway is founded on a reimagining of this engraving.

Instead of an engraving in rock, we see our work as an inscription in that space between earth and sky. As we learned from Uncle Dennis Foley, pictographs are not just ‘rock carvings.’ They contain within them multiple stories, and diverse pathways to Knowledge and understanding of place and culture, from ecology, sustainability and spirituality through to science, cosmology and kinship.

So too, will our reimagined engraving, this bridge-writing, linking the Sky to Earth, its primary purpose, and its elemental journey. Like the mother bridge it springs from, this etching of lines in the sky is a piece of engineering, delighting in its aerial gymnastics, as it winds its way to earth, around trees and over streets. Where it touches ground, it re-engages Country, in meeting points of Earth and Sky, water and landscape, and people and ideas. Finally, our engraving, this link between here and there, up and down, sky and earth, will, beyond holding stories, engage us in the deep and rich legacy of the Cammeraygal, and their Country



1.2 Country - Interpretation



LAUNCHING AND LANDING

From this high hill of time, we look back at millennia of journeys made by the Cammeraygal and the Gadigal across the Harbour in their canoes, to trade, to fish, to share stories. At dusk or dawn, women would set off in their *nawi*, with their child, and a fire in the base of the canoe. These constellations of illuminated vessels against the dark water were a reflection of the night sky, and an evocation for our project: mother, child, and the illuminated space between them. Their journeys across water, repeated countless times, involved two significant acts: launching and landing. A leaving of the land, Mother Earth, a journey across time and space, and a return to the Earth – this is a seminal reading of this place and its deep history, extending our appreciation today. The departure and the arrival – in between, a moment in time, suspended between two of Sydney Harbour's great headlands, Kiarabilli and Tar-ra, now named Milsons Point and Dawes Point.

The mathematics of movement: envision a couple dozen crossings a day, repeated year after year. After 30,000 years, a momentous legacy – some 250 million crossings, acts of launching and landing etched into cultural memory.

So it was for millennia, so it remains.

The Harbour Bridge, as a heroic piece of infrastructure and iconic cultural marker, is more than a physical part of contemporary Sydney, it is now a part of Country. Connections to Country are everyone's responsibility, providing opportunities to mutually reconsider how Knowledge is learned, practiced and communicated. Country holds its Knowledges in place, as a source to connect and reconnect to the land and to oneself – we understand the Bridge, its genesis, its creation, its construction and its evolution in the same way. Understanding Country as teacher and writer, Djinjama and local Knowledge Holders have helped us understand those elements which constitute the Country in which the site is located. This understanding has directed our design processes by revealing key narratives, ideas and expressions specific to Country.

These readings of Country were delivered to the project team as verbal and visual conversations, reinforcing Indigenous ways of communicating Knowledge as a means of building understandings. From these readings and re-readings of Country, we have developed a series of observations, narrative opportunities and design references framing the Harbour Bridge Cycleway project directly within Country.

These readings transformed the design process into a genuine engagement with Country – for us, a means of having a conversation with Country itself.

ACKNOWLEDGEMENTS

Our Country-led approach, outlined on these pages and in this project, has been guided by Aboriginal Knowledge Keepers. We recognise the ongoing contributions of Dr. Danièle Hromek and Djinjama in the preparation, structure and content of our Designing with Country approach and the understanding of other Aboriginal Knowledges.

Within this narrative, you will encounter stories of Kairabilli, surrounding lands and Sydney Harbour. These are Cammeraygal and Gadigal stories of place – imparted to us by Transport's Aboriginal design consultants, project briefing documents, conversations with local Elders and Knowledge Keepers, and through Djinjama's guidance. We thank Uncle Dennis Foley and Uncle Allan Madden for their guidance.

The cultural values of Aboriginal peoples, remain with the people they belong to and can never be vested or assigned. These stories belong to the Cammeraygal and Gadigal – we only use them with the permission of Cammeraygal Elders and Knowledge Keepers.



1.3 Country - Implementation

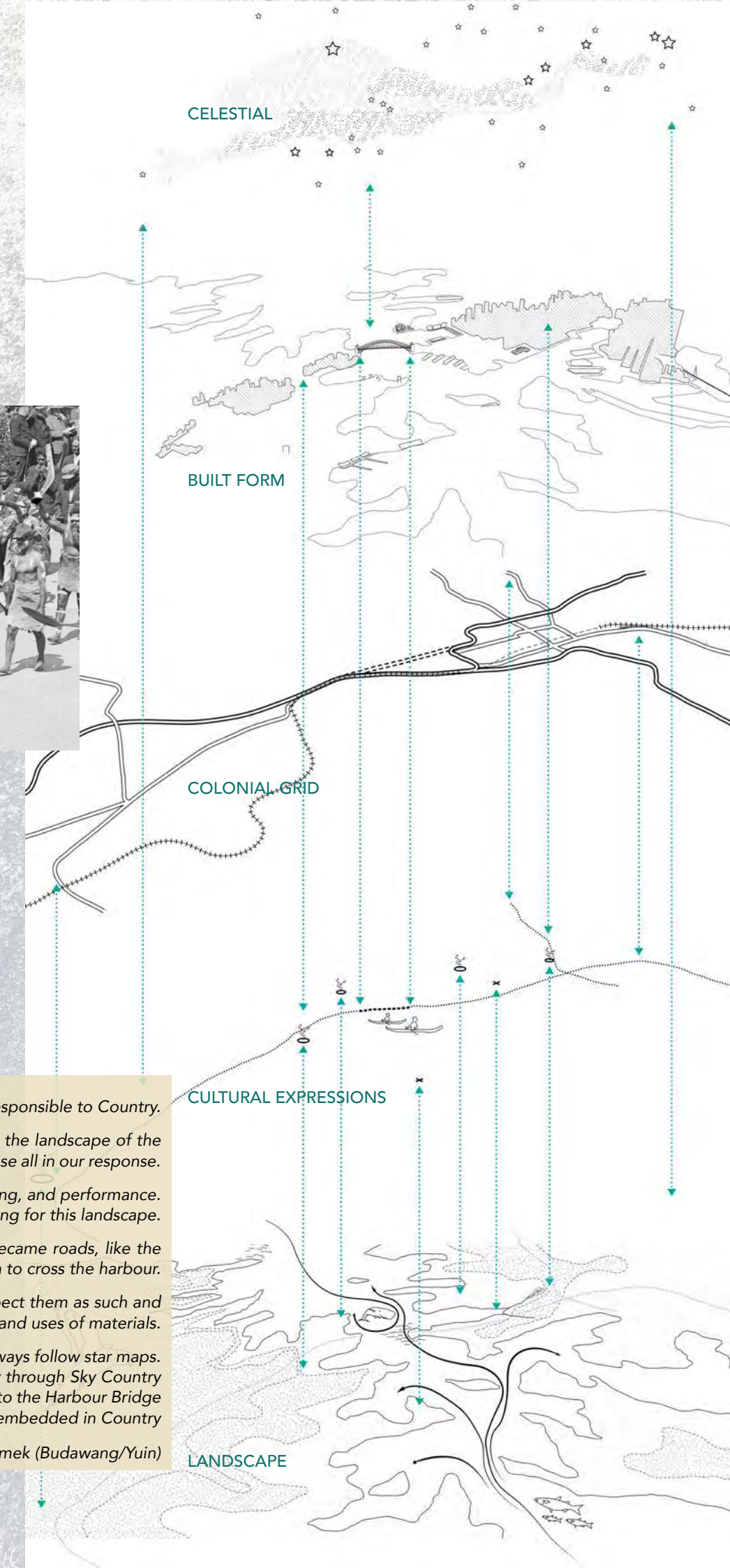
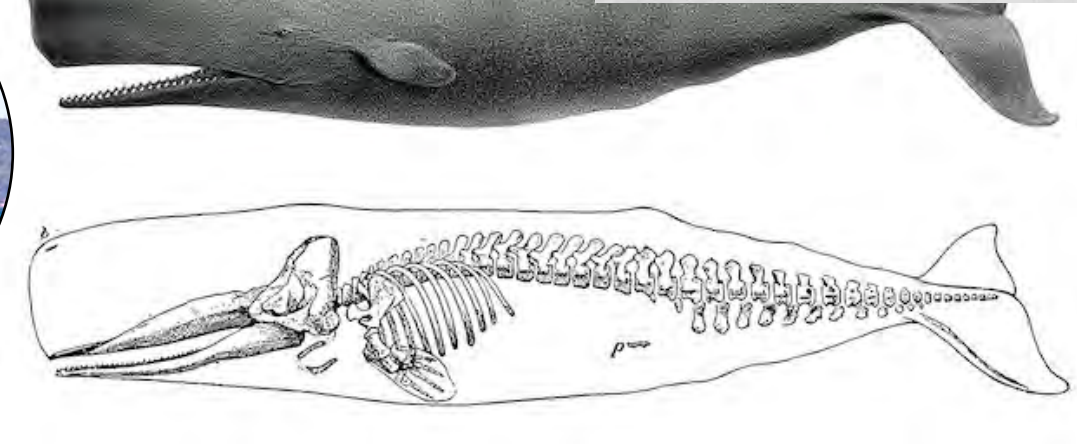
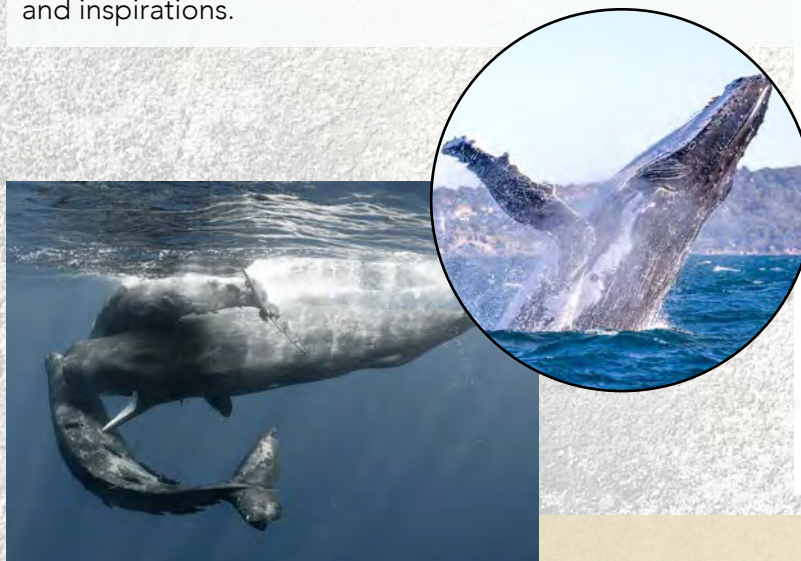
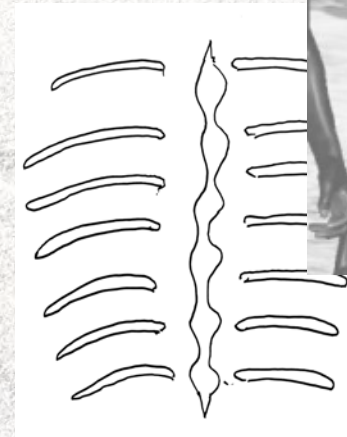
DESIGNING WITH COUNTRY

Country-centred design is a methodology that ensures any acts of design in the built environment evolve with considerations of Country at their heart. As a counterpoint to human-centred design, Country-centred design has allowed us to listen to what Country tells us: ideas about land and water, journeys of departure and arrival, the leaving of earth up into the sky, and the return back to land.

All of these considerations of Country resonate not only with the deep history of place, but also with the form and function of the Harbour Bridge itself. Critically for our design development, these concepts are also central to our thinking about the experience of the Cycleway itself, and how both its use and its physical form have derived from these seminal ideas, reinforcing, reinterpreting and communicating them anew, in contemporary materials and details.

Using Country as the foundational guide for our design processes, we have immersed ourselves in the rich relationships between Country, community, non-humans and people, exploring the connections to be made in this shared space.

As the foundation of the work of the design team, the narratives, values and understandings derived from the myriad readings of Country have become physical reality. By considering Country as our foundational site, from time immemorial to the present day, we have developed all aspects of the project, from its materiality, structure, colours, finishes and lighting, through to the Cycleway's role in telling ongoing stories of place, and informing contemporary cultural acts, interpretations and inspirations.



What we build is a part of Country; we are, therefore, responsible to Country.

If we understand Country as a series of layers, the landscape is the base: landform, waters, ecologies, and the Laws and Knowledges that guide behaviour. In this project the landscape of the Sydney Harbour Bridge, despite alteration, still holds geology, topography of land and waters, and the Laws and memories of ecological communities: we have listened to these all in our response.

The cultural expressions of Aboriginal peoples lie lightly over the landscape, in pathways, campsites, special places and the lore passed along generations through story, song, and performance. Narratives of landscape are held by community, shared by Elders to this project - we value them not just as stories, but as ways of learning, understanding and designing for this landscape.

Non-Indigenous people substantially changed the landscape after their arrival, but often reinforced what Aboriginal peoples had expressed through culture. Pathways became roads, like the Pacific Highway, while the Bridge itself crosses where nawi (canoes) were launched for millennia to cross the harbour.

The built environment, roads, infrastructure and buildings, framed by the colonial grid, reflecting its own culture, is also built from Country. Materials are Country – we respect them as such and adopt the position of doing no harm” to Country, in our choices and uses of materials.

Beautifully, all these layers connect to the celestial parts of Country, sky, stars, air, clouds, sun and moon. All that happens on the land is reflected in the sky. Aboriginal pathways follow star maps. Many Aboriginal peoples understand that Ancestors, when they leave their bodies, go to the campfires in the sky waiting for their next manifestation. In our project, we fly through Sky Country over Water Country, launching from one side of the harbour to other shore. Our understandings of Country, along with narratives from the Elders, have shaped our approach to the Harbour Bridge Cycleway, generating outcomes that are themselves embedded in Country

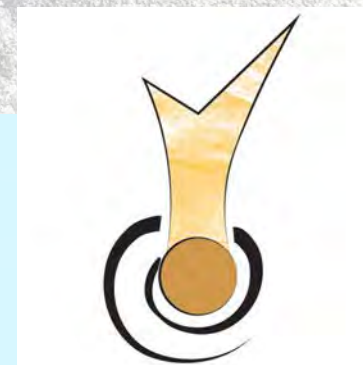
Dr. Danièle Hromek (Budawang/Yuin)

1.4 Stories from Country

THE FIVE NARRATIVES

The Harbour Bridge does not simply occupy ground in Kairabilli and Tar-ra – like the reef that sat below where the Bridge is now, it is a meeting point and a connection between Gadigal and Cammeraygal Countries, and a part of both their stories. Our research into Country and its stories involves both Gadigal and Cammeraygal, their stories, their Elders, their Knowledge.

We have distilled these rich and diverse histories into five main narratives. These narratives form the foundation for our concept design for the Harbour Bridge Cycleway, and influence and inform all aspects of the project, from conceptual approach, relationships and movement through to structure, materials, lighting and the making of place.



The Engravings

Engravings contain, as Uncle Dennis told us, multiple layers of learnings, from signifying place and marking events to telling stories and imparting Knowledge. As an engraving between earth and sky, the Harbour Bridge Cycleway will be all these things and more. Like the whale engraving, we understand the cycleway holistically, as a living entity, but also one with multiple parts, many pathways to learning and many roles to play. It suggests an embossing, a layering, and the revealing of what has been, up until now, unseen.

The Water Story

This is Saltwater Country, deeply linked to the Harbour, fishing and movement over water. Understanding the ebb and flow of tides, launching into them takes you to a specific landing on the other shore – from mother earth, a fluid journey, and back to Land. It is also a place of collecting water, through bowls carved into the sandstone to collect and filter water. A journey to and from earth, the Cycleway looks towards Sea Country, meanders through space, and collects and directs water into the landscape.

The Whale Story

Whales swam into the Harbour, larger predators stopping at the harbour reef, smaller mothers passing through to give birth in the deep local bays. The human figure within the whale outline in engravings is not a local version of the Jonah myth, but rather a depiction of young men riding whales. Whale skeletons were highly valued: the first Gadigal men to cross the Harbour Bridge were painted with whale bones. Uncle Dennis tells us that many of the whale carvings on rock surfaces were templates for three-dimensional engravings, straight sticks forming complex geometries of ribs and spines – prototypical models of efficiency, strength and structure.

The Matrilineal Story

Mother Earth, and Sister Moon, the Morning Star, the Evening Star. These headlands are Matriarchal Country, extant in the many women's sites in the area. Listening to Ancestors, our obligation is to care for all Country: Sky, Water and Land, and all their constituents. Firstly, we listen to and enable women in our work - our design team is two-thirds female. Matriarchal Care informs our key considerations: respect for ground, touching it lightly and honouring those moments of contact. There is a "mother" in the Harbour Bridge, and a new offspring – we acknowledge, respect and care for that bright space between them. Finally, most importantly, we do no further harm, but protect, enhance and engage with place, people and Country.

The Lorikeets, the Wattle and the Mullet

Cultural calendar tells the story of Rainbow Lorikeet, flocking when Mullet comes in. Corresponding with the Wattle blooming, these are visual signifiers of Country and its seasons. Sky and Water Country talk to us, in ways not immediately apparent – requiring listening, looking and learning. The undersides of the lorikeet's wings are as vibrant as the iridescent sheen of the mullet's scales, patterns and structure echoed in the knotted fishnets made by Cammeraygal and Gadigal women to fish the harbour reef. Lorikeets mate for life, the pairs always coming back together - we look up, to the Sky, for them. Mullet travel in schools, a surrounding mass of shimmering surfaces – we ride out, to the water, with them.



Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects.

The Burra Charter

CYCLEWAY VIEWED FROM ALFRED STREET

2.1 The Harbour Bridge

A HERITAGE OF STRUCTURE AND MATERIALS

Launching and landing, leaving Mother Earth for a journey through Sky Country, ending in a return back to Earth – this could well have been the design brief for the Harbour Bridge itself. Its eventual resolution, arrived at after an extended competition, and myriad design iterations, tells a story of arrival and departure, written in concrete, stone and steel: approaches gradually rising up from the ground, approach spans joining to the proud pylons marking the water's edge, and finally the great leap into the sky and across the Harbour of the world-famous steel arch.

The northern approaches, grounded in the earth, are basic railway viaducts, grounded in the earth. The first part of the bridge to be started, the viaducts are supported on mass concrete retaining walls up to 5 metres thick, and cement rendered, divided into bays by pilasters and surmounted by a concrete parapet. They are the solid launching and landing points for the bridge. At Milsons Point, the railway viaduct is not simply infrastructure – it is civic amenity, accommodating station and streets, framing Bradfield Park, creating a meeting point, a community place.

The approach spans, leaping over the headlands of Kairabilli and Tar-ra, support the bridge deck as it rises into the Sky. Most often experienced and understood from below, the spans create great structural canopies over Dawes Point Reserve and Bradfield Park South, from where the magnificent steel trusswork can be fully appreciated. With their majestic support piers and equally magnificent structure, the spans create a space between earth and sky.

Finally, the most recognisable part of the Bridge, the grand arch itself, heroically leaping from Cammeraygal Country to Gadigal Country, at that previous point of crossing, remembering the reef, the whales, the whale riders, and the woman and their children in the nawi, and the illuminated space between them. Here, the Bridge seems no longer attached to Earth – it becomes one with the sky, engraving its curved lines across the sky, both day and night.



The mathematics of movement, chapter 2: add up the daily crossings of cars, trams, buses and trains, repeated year after year. After 100 years, a equally momentous legacy – some 250 million crossings, acts of launching and landing that are an inextricable part of the life of Sydney.



THE BRIDGE AS TEACHER

As a part of Country, the Bridge is our teacher, telling us about the ways in which we might travel across the Sky, how we might reach from Earth to Sky, and how we might launch from Mother Earth to travel in a fluid journey across space, and land back down again. Magically, the multiple sinuous curves of the Bridge, in plan, section and elevation, are achieved without any curved pieces of steel – every single member is perfectly straight. This is the first inheritance from Mother to child: the logic of steel, its economy and efficiency, its malleability, its simplicity and its ability to be crafted, with ingenuity, care and delight, into sensual forms almost impossible to conceive in any other material.

Like the Mother Bridge, her offspring will carry the principles and fundamentals of the parent, but, like every child, deviate from them, creating space between them both, and taking its own path, developing its own structural magic, and expressing its own skeletal framework of efficiency, strength and structure.

Like the Harbour Bridge, the Cycleway is composed of three distinct parts: an aerial portion engraved against the Sky, a part that creates a space between Earth and Sky to also be read and understood from below, and a launching and landing place, where it comes to ground, and the Earth rises up to meet it. Also like the Harbour Bridge, these elements are not discontinuous and separate, but rather one continuous, sinuous evolution of curve, form and structure, rising from a carved and monolithic base, floating over the margins of Bradfield Park, and rising up into the sky to meet the existing cycleway of the Bridge.

At every point, in every joint, every meeting of what is there and how we act, we consider these things: do no harm, touch the earth lightly, think beyond the pavement, and give back more than what you take. This is what the Matrilineal story tells us; this is what Transport's strategic documents require, this is what respect for Country, new and old, compels us to do.

3.1 The Harbour Bridge Cycleway

LAUNCHING AND LANDING

The cycleway does not simply meet the ground. Instead, the Earth rises up to meet the cycleway, creating a meeting point: of Earth and Sky, or steel and stone, of water and landscape, of plants and animals, of people and their stories.

Like the Harbour Bridge, stone meets steel where the structure comes to ground. Informed by our narratives of Earth and Sky, the meeting point is celebrated, shaped and expanded, to become something more than simply the base of a cycling ramp. We know that all Transport infrastructure projects must look beyond the pavement to understand their potential impacts on surrounding public domain and communities.

Driven by our principles of doing no harm, and giving more than we take, this is one of our contributions to Bradfield Park, and the community of North Sydney. The analogue of the viaduct of the Harbour Bridge: an element resolutely of the ground, made of the ground, it is a formed sandstone spiral wall, that meets the ramp as it comes to ground, widening out and becoming part of a larger shared space, in which cars, pedestrians and cyclists all co-exist.

The curved wall frames a series of circular garden beds, sandstone seats and timber platforms, at the centre of which is a copse of Melaleucas, native to this area, surrounded by sedges and native violets. Rainwater collected from this part of the cycleway ramp runs through a groove in the stone, filtering the water before it discharges into the gardens.

The cycleway does not simply land – in the spirit of engraving, it re-writes a re-imagined piece of Country into Bradfield Park, creating a meeting point for many voices and encounters.

FRAMING BRADFIELD PARK

The reference design for the Cycleway ran directly through Bradfield Park, threatening to bisect and inextricably alter this much-loved civic space. Our proposal, guided by considerations for Country, place, heritage, landscape and beneficial relationships with all that is already there, deliberately deviates from the reference design alignment.

We are aiming, as per our guiding principles, within Bradfield Park, to touch the Earth as lightly as we can, and, instead of taking away, contribute to the ongoing evolution of this special place. Our alignment swings further towards Alfred Street, opening up a much larger space between the Bridge and the Cycleway – that illuminated gap between Mother and Child.

Our steel structural solution allows us to support the cycleway on a series of ultra-fine steel columns, that start from a single discrete point, and spread up to hold the Cycleway. Rainwater drains from the cycleway through each of these support points, and is introduced into raingardens within Bradfield Park, where native grasses and local Gynea Lilies will grow, another imprint of Country written in place, touching the Earth lightly, but ensuring that touch gives more than it takes.



BRADFIELD PARK

MEETING POINT

ALFRED STREET

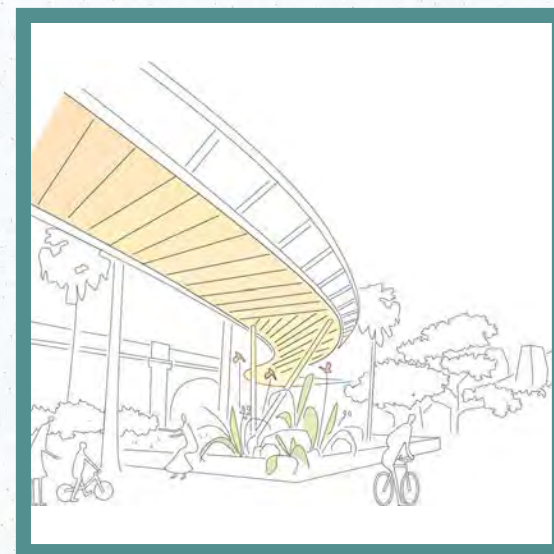
Conservation of a place should identify and take into consideration all aspects of cultural and natural significance without unwarranted emphasis on any one value at the expense of others.

The Burra Charter

HARBOUR BRIDGE STAIRS

KAIRABILLI LOOKOUT

BURTON STREET



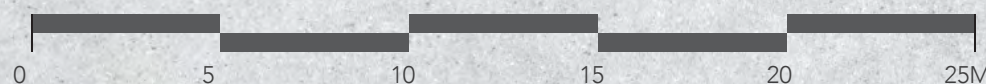
NB. The removal of any part of the parapet is not ideal; however, this stage of the investigation demands this as one of the project parameters. The current design suggests removing the full section of the concrete parapet between piers, avoiding cutting through it anywhere along its length, and allowing replacement of the entire intact section in future. Though outside the scope of this current investigation, an alternate connection option is shown on page 31. The current configuration is based on balancing considerations of place values, Aboriginal cultural heritage, colonial heritage, cycling performance and public safety. Some of these are outlined in the Movement section following. The current design could retain 40% of the parapet, should decisions be made to reduce the required cycling performance at this junction, as well as making cuts into the heritage fabric.

SEPARATION AND DISTANCE

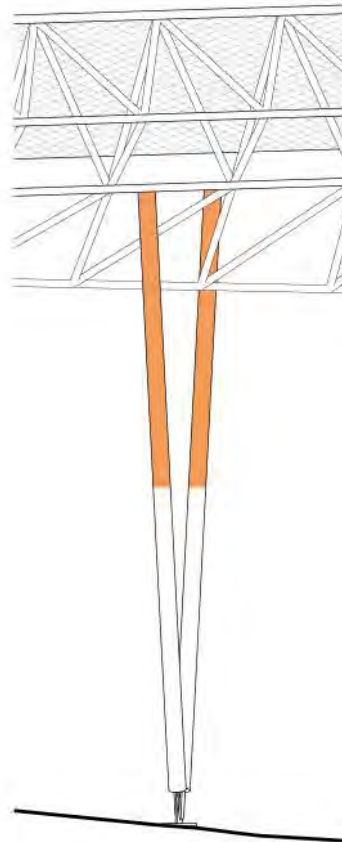
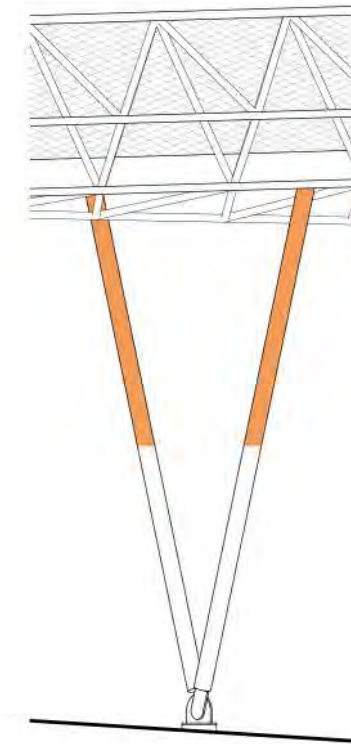
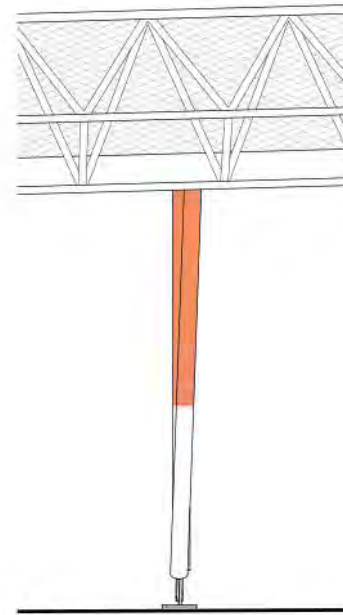
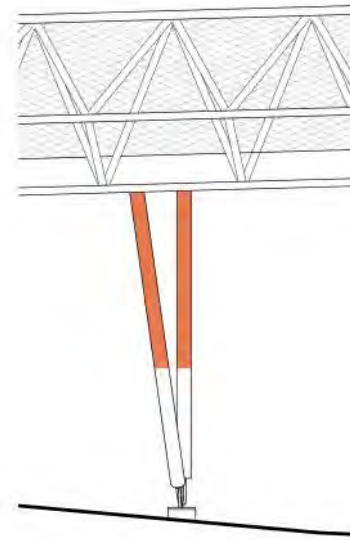
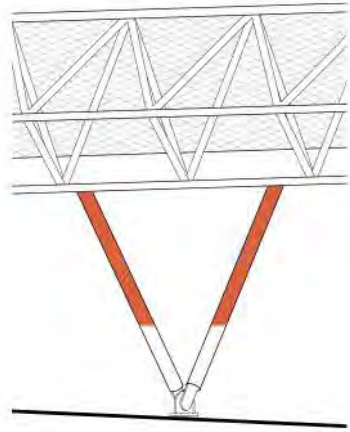
The Mother and her offspring move together for a time, in parallel, with a shared purpose. Inevitably, the offspring finds its own way, seeking its own purpose, its own common ground. At its closest proximity to the Harbour Bridge, the Cycleway runs beside the Harbour Bridge viaduct, though still separated by three metres at its closest point, save for the landing.

The lightweight column configuration that our structural solution allows changes from a single point of contact at Bradfield Park, to a wider-spaced pair of columns, tapering to join at the underside of the cycleway. As the column configuration shifts, the structural support of the cycleway also transforms, from concentrated on the sides above Bradfield Park (where thinness of structural depth allows greater clearance in the Park) to structure concentrated underneath the cycleway deck. Above Burton Street, the bocce court, and the market green, this configuration allows much greater spans, letting the Cycleway dance cleanly over Burton Street and the bocce court.

The Cycleway joins the Bridge by a lightweight deck section connecting the two, running the length of the parapet between the two reinforced concrete piers of the bridge viaduct. The generosity of the space at the junction allows for continuous cycling movement at the transition point. It also creates a shared space for pedestrians and cyclists, as the Harbour Bridge stairs will become usable by pedestrians. To turn this recovered access into an asset for the community, the upper landing of the Cycleway expands into an equally expansive lookout. This is an orientation and observation point, a place to reconnect with the Sea Country of the Harbour and the Whale Dreaming. It is also a place to experience and appreciate more fully the relationship with Earth, Water and Sky, as the Bridge curves away to open the view of these three figures joining together.



3.2 Western Elevation



COLUMNS and COLOURS

The Rainbow Lorikeet pairs for life, two individual birds coming together, parting, departing, but always returning to be back together. The paired columns of our structural solution, developed to touch the Earth as lightly as possible, are also conjoined pairs, separate, but rejoining together as they dance across the landscape. The graduated colours of the undersides of the Lorikeets' wings are also the colours of the columns, transitioning from Earth to Sky.

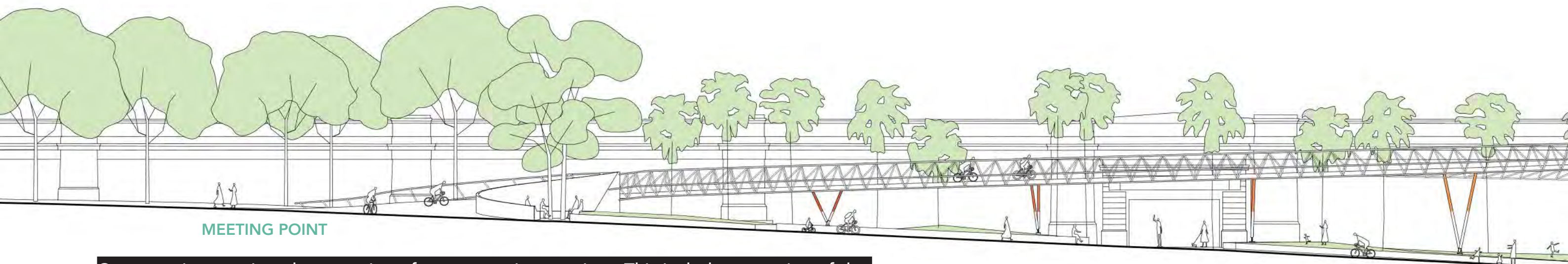
Column 01

Column 02

Column 03

Column 04

Column 05

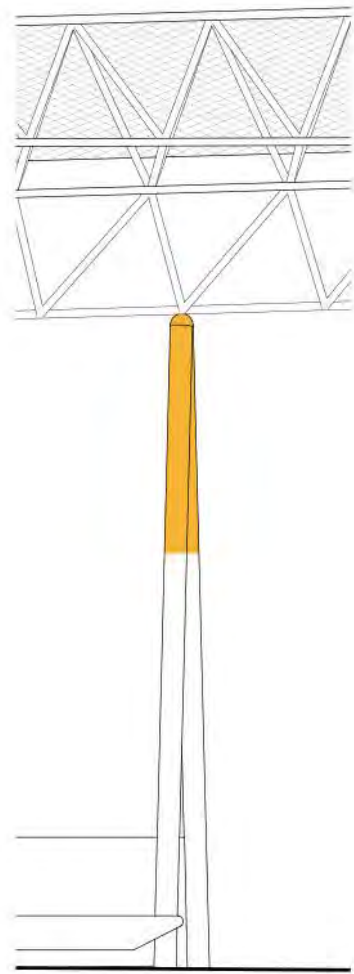


MEETING POINT

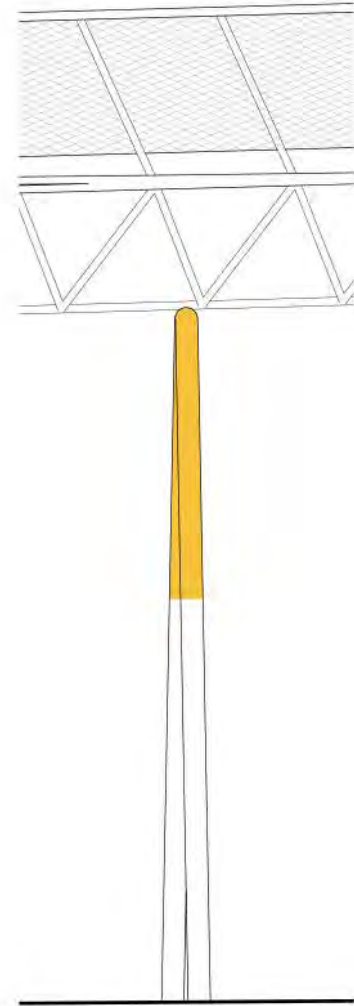
MILSONS POINT STATION

Conservation requires the retention of an appropriate setting. This includes retention of the visual and sensory setting, as well as the retention of spiritual and other cultural relationships that contribute to the cultural significance of the place.

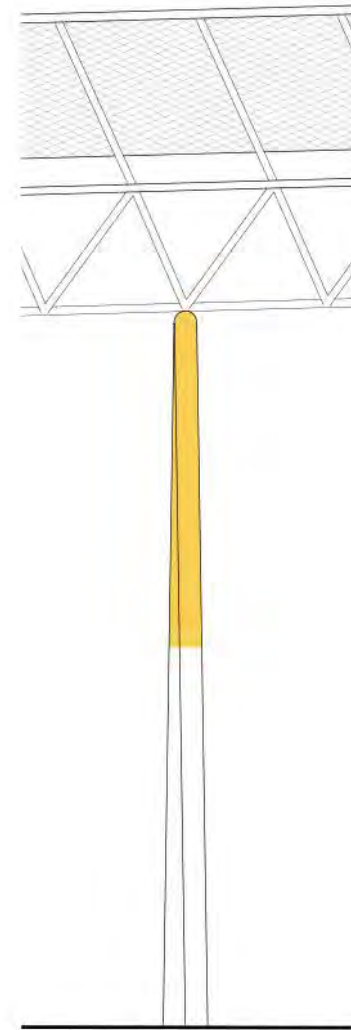
The Burra Charter



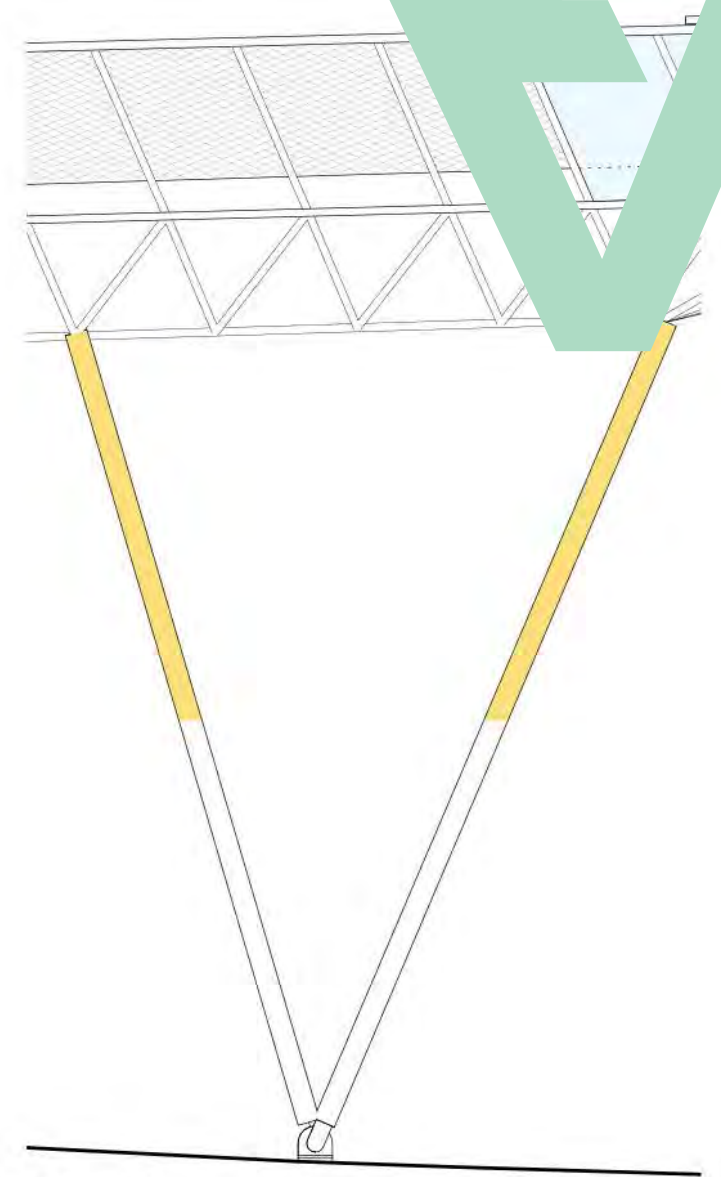
Column 06



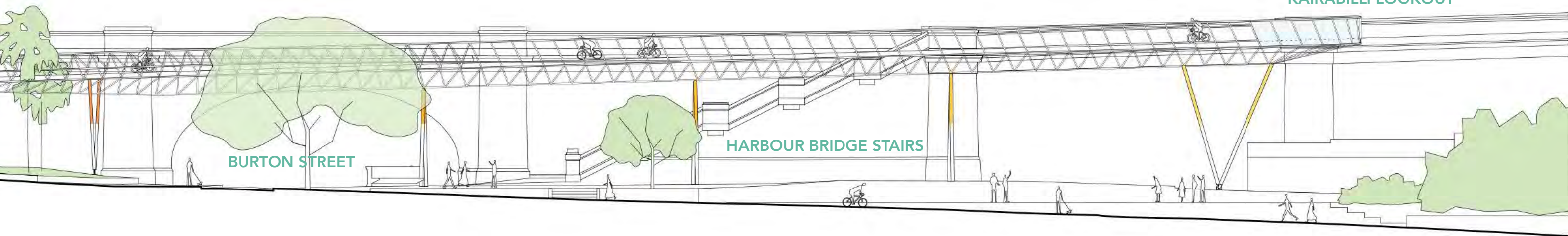
Column 07



Column 08



Column 09



4.1 Movement

MOVING THROUGH COUNTRY

The primary functional purpose of the Cycleway is to connect earth and sky, linking the aerial cycle path on the Harbour Bridge deck with the ground level cycle network of North Sydney. In operational terms, the Cycleway needs to provide the most convenient journey for the widest range of customers: office workers, delivery riders, parents with cargo bikes, MAMIL's, tourists and more. In experiential terms, the Cycleway should be one of Sydney (and the world's) finest riding experiences, capturing, in its short length, a microcosm of experiences of Sky, Water and Earth Countries.

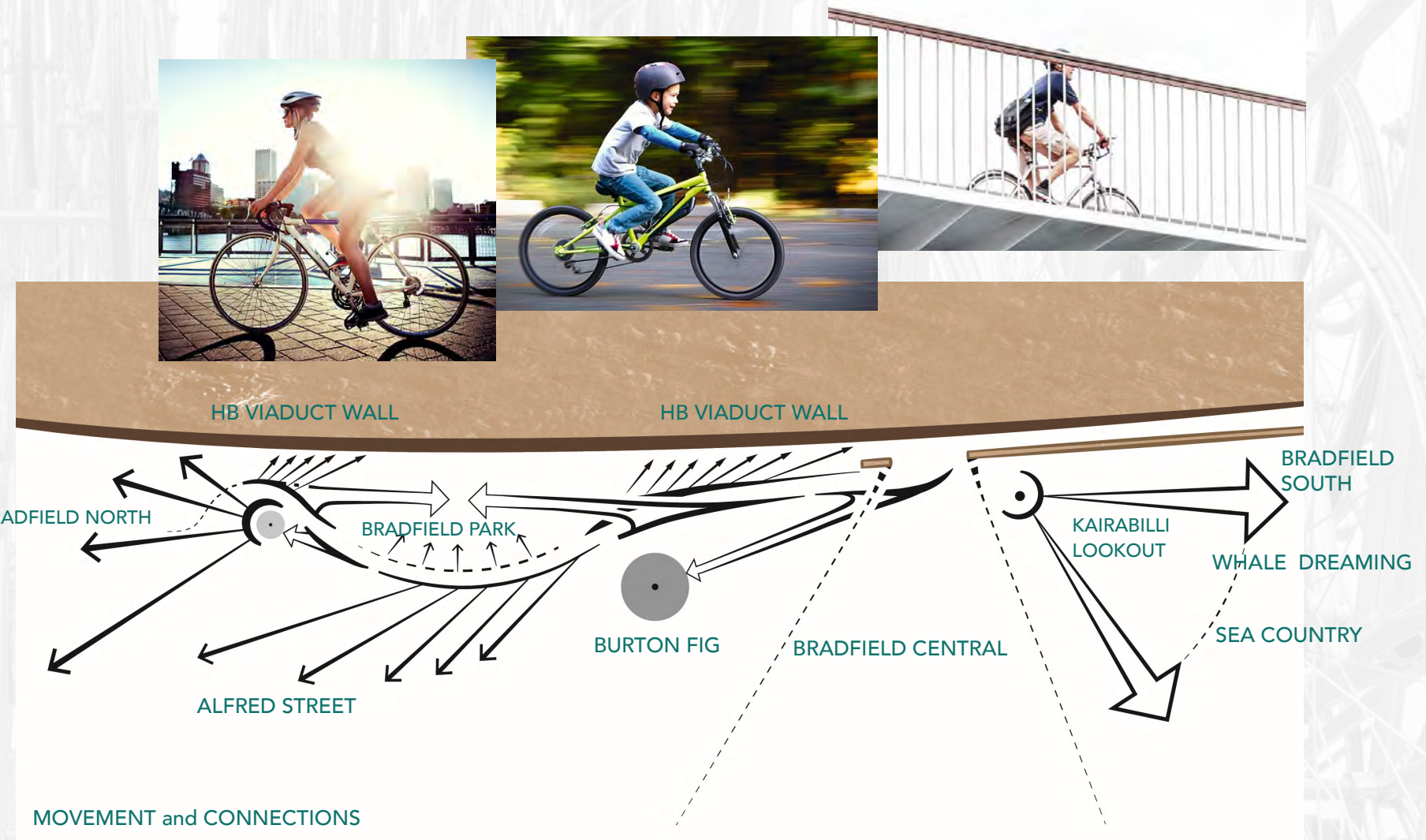
We were guided by Uncle Dennis and Uncle Allen's aspirations for what, beyond a piece of transport infrastructure, the Cycleway could become. Uncle Dennis challenged us to imagine how the project could make people aware of Country, not just through stories, but through lived experience. Uncle Allen's question was briefer, but no less potent: "How do you slow people down?"

The primary experience of the Cycleway will be moving along it, along the sweeping ramp, a sensorially-rich journey over Country between Sky and Earth: breezes, the open air, engagement with the palms, the flow of the path, the cinematic experience of unfolding views as one descends or ascends - the viaduct wall, the Park, people walking below, the Harbour, the city beyond.

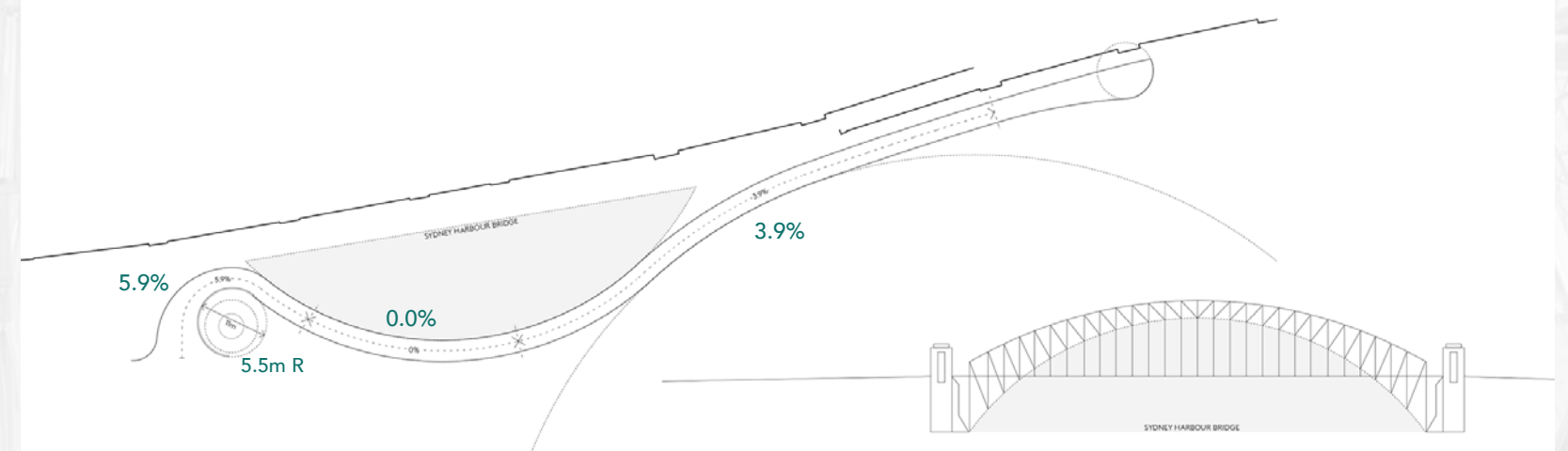
The subtle tunings of the alignment to curate and enhance these experiences have been explored through a series of movement and experience studies. In this work, we explored not only the route of the cycleway, but its spatial compression and openness, view catchments and corridors, and its relationship to the major urban elements and spaces around and under it: the Harbour Bridge, certainly, but also Bradfield Park (North, Central and South), Alfred Street.

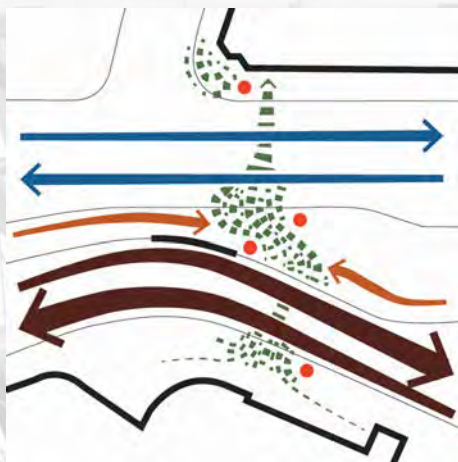
In its role as the conduit between Sky and Earth, the cycleway movement experience is bracketed by two specific places, each offering direct connections to Country: the Kairabilli Lookout at the southern end, a stopping point in the Sky, looking out over the Harbour to Sea Country and the Whale Dreaming. And at the northern landing, Mother Earth coming up to greet the ramp, a curved wall made of sandstone, material of the earth itself, to slowly wind around and down to ground. Within the curve, a place of re-engagement with Country, water meeting plants, people meeting each other, a place to slow down.

We have balanced ramp gradients, curvatures and head clearance under the ramp to achieve optimal results for both riders using the Cycleway and pedestrians moving through the public domain around Bradfield Park. The major curvatures draw their geometry from the arc of the Harbour Bridge, while the expanding pathway width at the northern landing introduces the singular movement of the cycleway into the shared zone of the Alfred Street crossing.



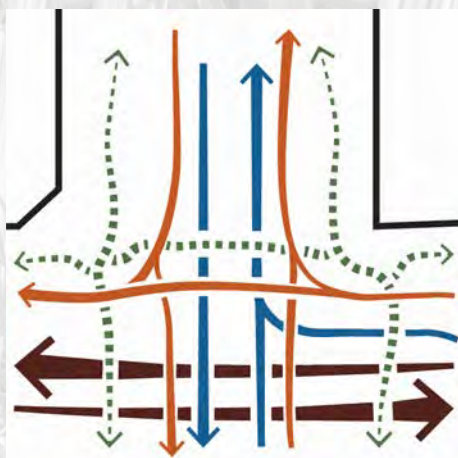
CURVES and GRADIENTS





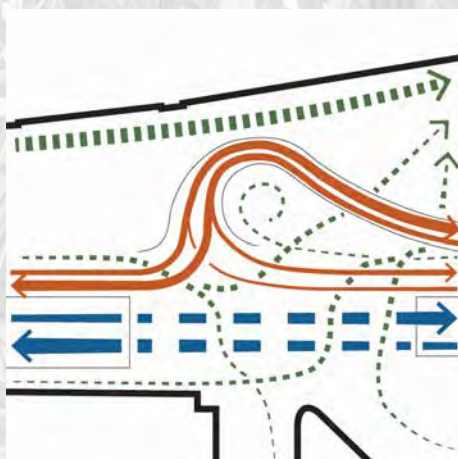
CHALMERS STREET, CENTRAL

SHARED ZONE: 4 X 10M



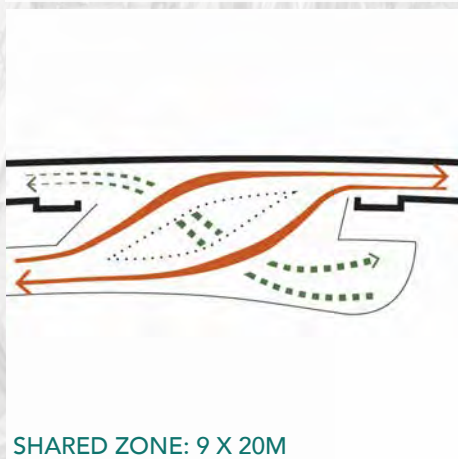
SPIEGELGRACHT, AMSTERDAM

SHARED ZONE: 10 X 24M



NORTHERN LANDING

SHARED ZONE: 10 X 24M (18 X 24 w ALFRED STREET SHARED ZONE)



SOUTHERN LANDING

SHARED ZONE: 9 X 20M

CROSSINGS and MEETINGS

As cyclists numbers increase through intersections problems occur for two reasons: 1) traffic lights hold up movement, and 2) lack of sufficient space for cyclists to pause or manoeuvre. (CROW-Fietsberaad, 2016)

Based on the 'Sustainable Safety' approach in the Dutch CROW Manual (a key reference for the recent TfNSW Cycleway Design Toolbox) to address the issue, we have considered the following strategies:

- An unregulated intersection allowing continuous flows, in which people are empowered to clearly understand the multiple movement choices, and make safe and appropriate decisions.
- Increased space for cyclists and pedestrians to flow, with widened path areas and generous manoeuvring spaces.

To test these scenarios, we undertook an intersection study – illustrated here are two extremes of that study, along with the current configurations of our northern and southern landings and meeting points.

The intersection at Chalmers Street and Central Station is a particularly egregious example, but useful in pointing out contributing factors: constrained space bounded by fences, no manoeuvring space for either cyclists or pedestrians, no optional paths, two sets of signals prioritising cars and trams trap pedestrians in an island that is also the only available cycling path.

Much more complex intersections have been shown to be successful and safe, with far less physical and operational constraints applied. Illustrated here is the intersection of Weteringschans and Spiegelgracht in Amsterdam, and un-signalised multi-directional crossing involving trams, cars, cyclists and pedestrians. A number of similar four-way intersections in Groningen have introduced a phase in which cyclists and pedestrians cross simultaneously in all directions, including diagonally. According to the Municipality of Groningen this arrangement of mixed crossings that require human to human navigation has resulted in a significant reduction in accidents at these intersections (Zafari, 2018). It is important to remember that the greatest threat to cyclists and pedestrians are cars, which are overwhelming at fault (Lindsay, 2013), and not other cyclists and pedestrians. We note that these CROW recommendations include interactions with vehicular traffic, while our proposed shared spaces are primarily about the choreography of cyclists and pedestrians.

Our shared space intersection develops both of these intersection strategies (unregulated and increased space) in generous terms, while also offering significant public domain amenity.

At the northern landing the ramp widens to 10 metres before reaching the footpath intersection; the resulting shared zone for pedestrians and cyclists is 10 metres wide, and extends for 24 metres along Alfred Street. An additional public domain improvement to increase pedestrian safety, amenity and movement would see the street intersection of Cliff, Glen and Alfred Streets become a unified raised shared space, and extending the perceived and usable space of the shared zone by another 8 metres. We note also that primary pedestrian circulation from north to south occurs along the path adjacent to the Bridge viaduct, rather than along Alfred Street.

At the southern landing, the extended parallel zone between the Cycleway and bridge, along with the increased width of the connecting fillet, provide a shared space 9 metres wide, along a length of 20 metres. This allows for continuous cycling movement without reduction in performance, increased sight lines, added separation space and manoeuvrability for cyclists in both directions and generous movement zones for pedestrians moving between the Harbour Bridge stairs and the Kairabilli lookout.

AERIAL VIEW OF CYCLEWAY FROM NORTH



5.1 Structure and Form

STRUCTURAL APPROACH

The structural strategy of the cycleway has been developed to reflect the story and the journey. The path starts at a monolithic masonry structure at ground level, and transforms gradually to a lighter and more transparent steel structure as the cycleway rises to link with the Harbour Bridge. The suspended cycleway structure itself is made up of three inter-related structural sections, each with a distinct structural system.

1. Reinforced concrete base landing

A reinforced concrete forms the base landing of the cycleway. The concrete forms the organic geometry of the ground entrance to the ramp from Alfred Street, providing a grounded base for the steel deck to cantilever from.

2. Balustrade truss

Launching from the concrete base is a lightweight steel structure integrating a warren-style truss within the balustrades. The trusses either side of the central deck are an efficient method of spanning between columns and creating a lightweight structure, while maximising clearance below.

3. Hybrid Transition Structure

The bridge structure organically transitions between the two truss systems, and utilises both the balustrade and deeper deck as trusses to form a stiffer hybrid structure capable of spanning the longer distance over Burton Street.

4. Deck truss

As the bridge rises towards the connection point at the Harbour Bridge, the structure transitions inwards from the balustrade truss to below the bridge deck. A similar warren-style truss below the deck allows a more open balustrade system as the bridge reaches its highest point and links to the Bridge. By using hollow sections to form the top and bottom chords, these chords can be rolled into the curved geometries.

The structure is supported primarily on steel columns, which are in-turn supported on a foundation system of concrete piles and rock anchors. There are several advantages of using steel as the primary structural material from the bridge, compared to concrete:

Prefabrication

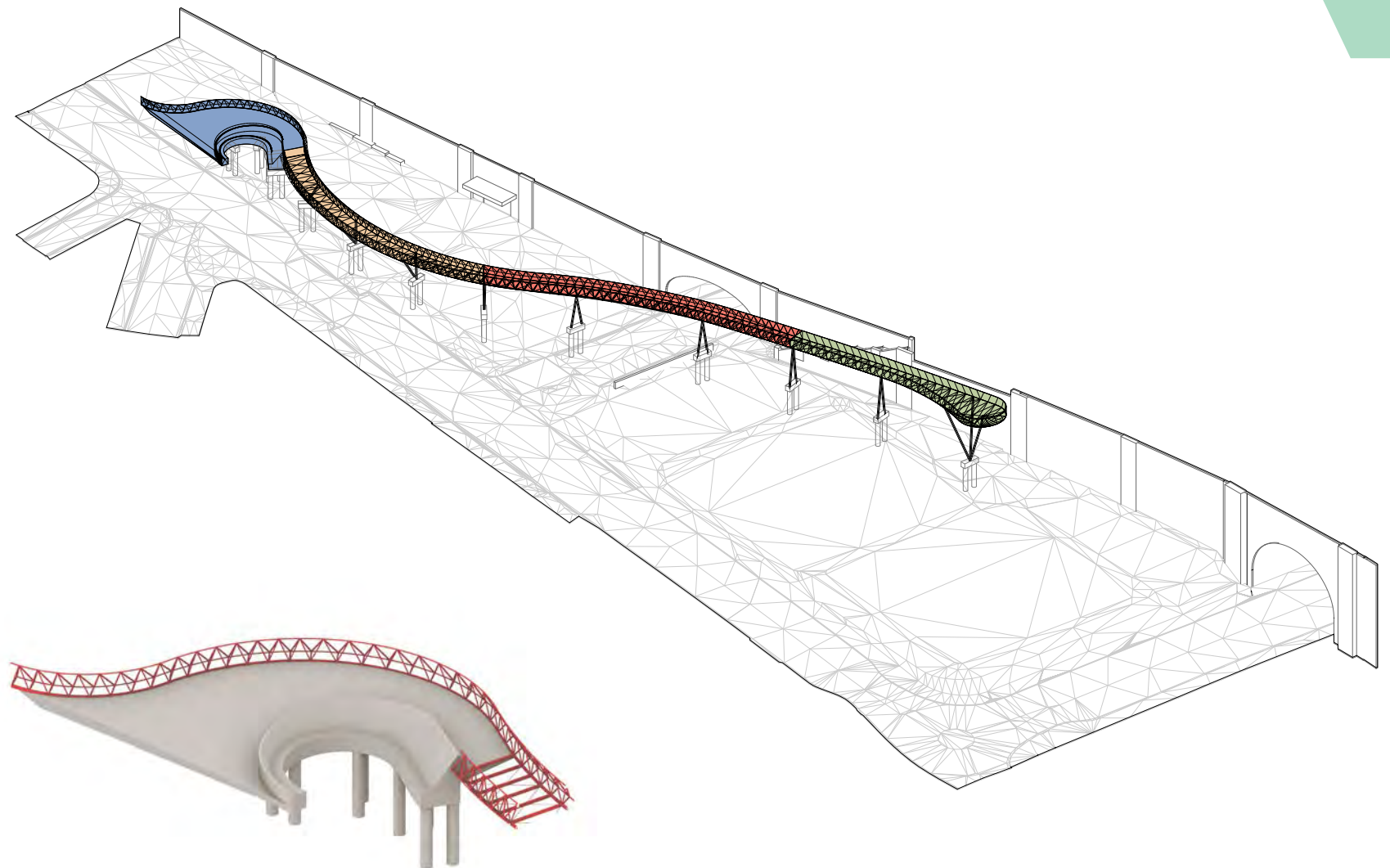
The ability for the structure to be prefabricated off-site into 'column modules' and 'bridge deck modules' with the splices at the minimal bending moment points of the structure. This allows the structure to be erected quickly on site without requiring large amounts of formwork, and with minimal disruption to the roads, footpaths and public domain.

Lightweight

Steel allows the structure to be lightweight in comparison to concrete, allowing for smaller foundations, less excavation and less overall disruption to the existing park and surrounds. A slender steel structure will also touch the ground very lightly, creating less visual impact when viewed at ground level.

Story

The welded steel structure also lends itself to the project narrative, by becoming lighter and more delicate as it approaches the Mother Bridge. By using small sections of steel welded together, the structure achieves an organic free form expression as it transitions along its journey from Ground to Sky.



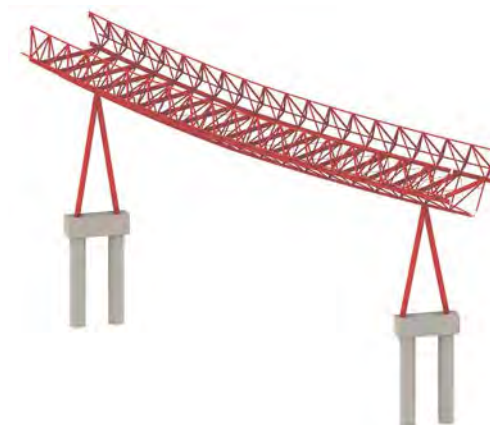
REINFORCED CONCRETE BASE LANDING



BALUSTRADE TRUSS



HYBRID TRANSITION STRUCTURE



DECK TRUSS



5.2 Construction

CONSTRUCTION METHODOLOGY

The following is an indicative construction methodology for the bridge structure:

1. Foundation and concrete elements

Clear site for foundations and install piles and rock anchors to required depth. CFA or Bored piers are expected for a primarily rock subsurface condition. Pour pile caps with cast-in starter bars to accept column baseplates.

2. Install steel column modules

The A-frame or V-frame column arrangements will be pre-welded off-site. The height of these frames will vary from 5-12m. Temporary propping (shown dotted) will be required to provide stability to the modules during construction.

3. Install bridge deck modules

Prefabricated bridge modules will link the column frames with temporary propping. Bridge modules will be craned and bolted into place between columns. It is expected that some of these modules will be oversize elements, and therefore require off-peak installation.

4. Install secondary structure for decking and cladding

Battens and secondary joists will be bolted between primary structural elements to provide fixing points for the deck substrate.

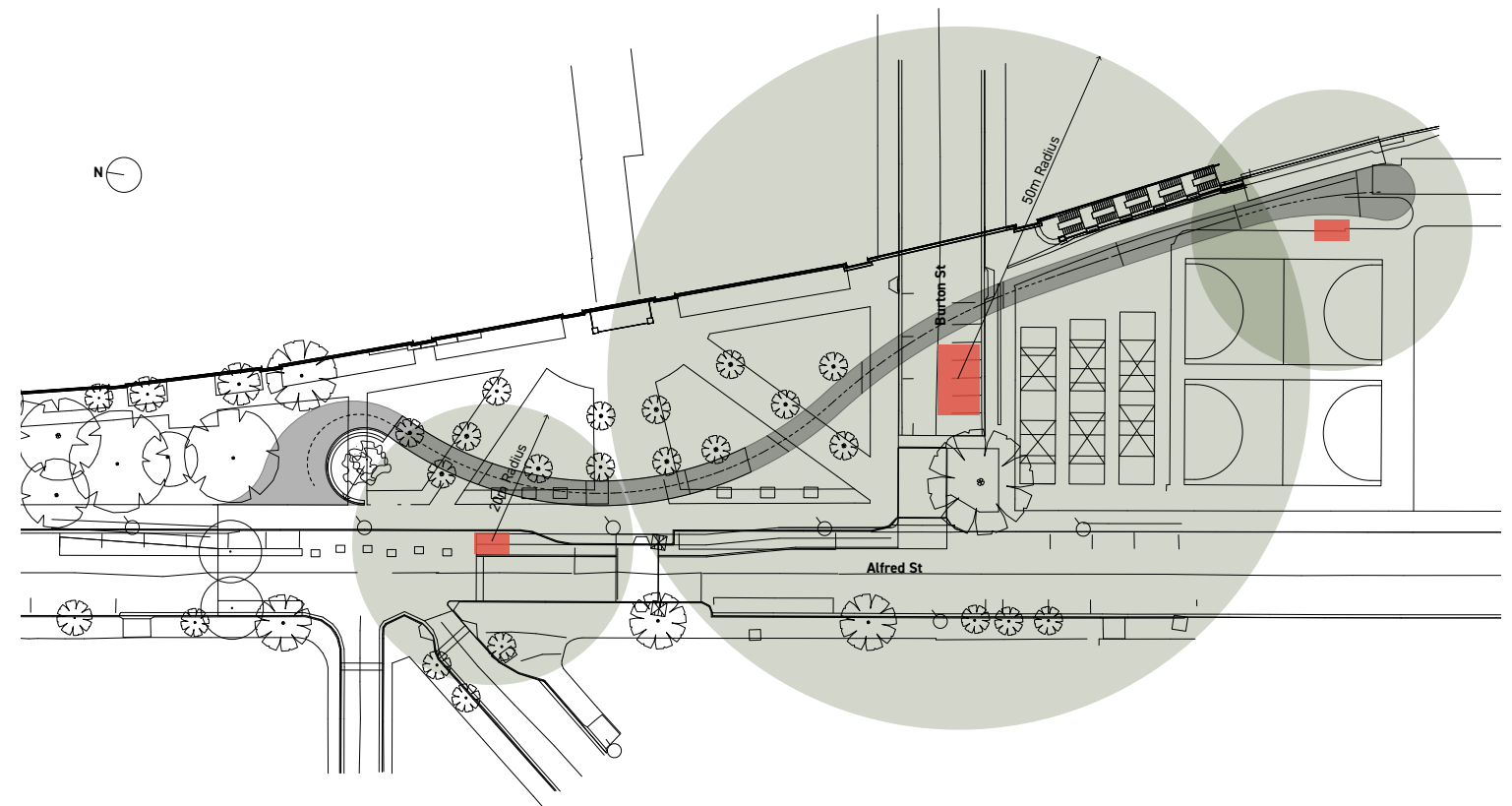
Based on the member sizing for the bridge, the following weights are expected for the bridge deck and column modules.

- Bridge deck module weight ~ 6 Tonnes

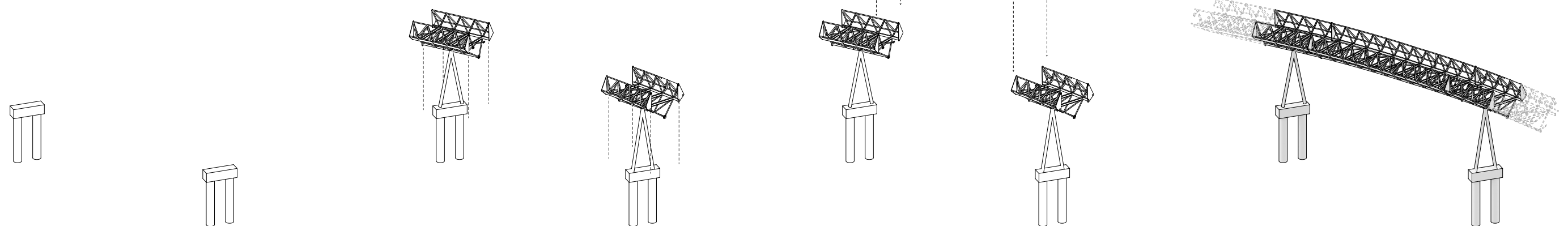
- Column module weight ~ 4 Tonnes

Burton Street seems the likeliest location in which to stage a crane, allowing access to most of the bridge. A 500 ton mobile crane can achieve up to a 50 metre lifting radius with the proposed module loads - refer crane lifting diagram for the indicative lifting radius.

Smaller mobile cranes located on Alfred Street and lane near the market courts could provide local access to the crane lifts at each end of the cycleway.



PROPOSED CRANE LOCATIONS



FOOTINGS

COLUMN MODULES

BRIDGE MODULES

DECKING AND CLADDING

5.2 Construction

DECK BUILDUP

Several deck substrates would be suitable for the cycleway, and three options have been considered in the design development.

1. Hollow section FRP pultrusions supporting FRP panels, with a thin slip proof surface. This deck can be removed to inspect the support structure and the bridge bearings, which might otherwise be difficult to access. An FRP deck offers weight advantages over concrete. This lightness also means that the truss could be delivered to site, and lifted into place fully fabricated, including the deck.

2. Composite FRP grating
Composite FRP gratings are highly durable and non-slip and well suited to urban applications. Structurally they are quite efficient, with bi-directional spanning capabilities, and the deck curvatures can easily be achieved by using smaller panel sizes. The FRP gratings also minimise and simplify any maintenance and replacement requirements over the lifespan of the cycleway. Stainless steel gratings could also be considered as a similar decking solution.

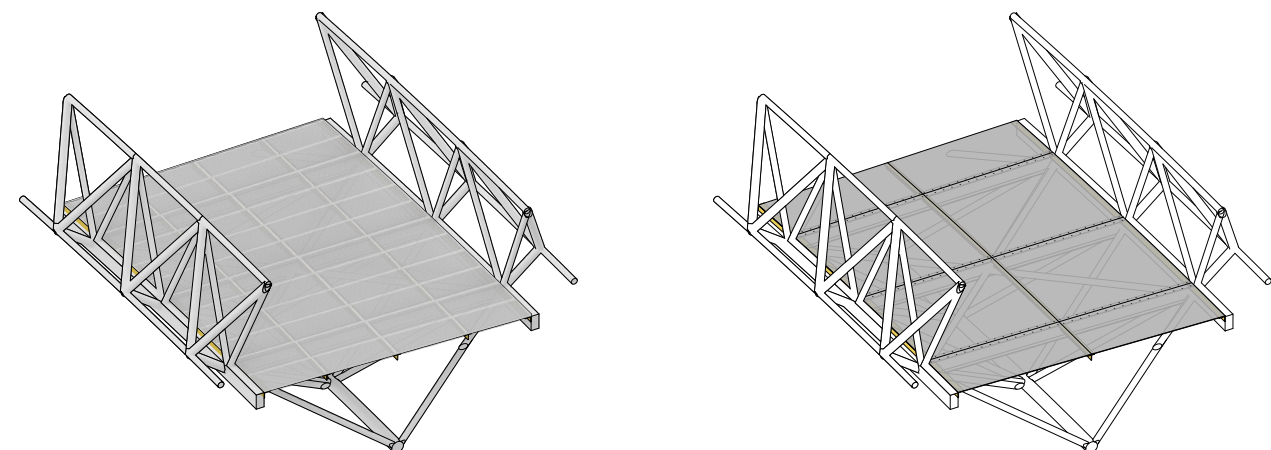
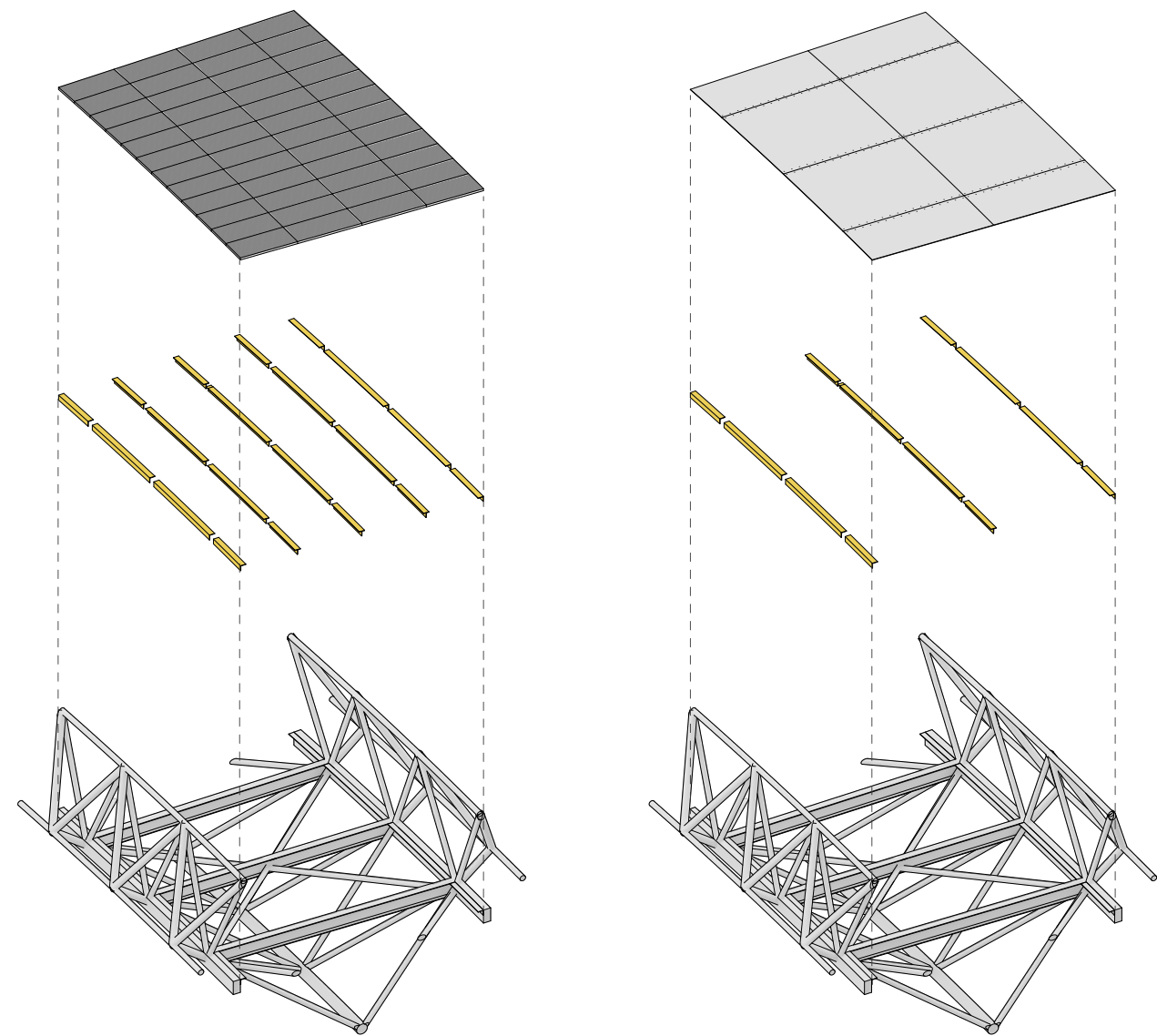
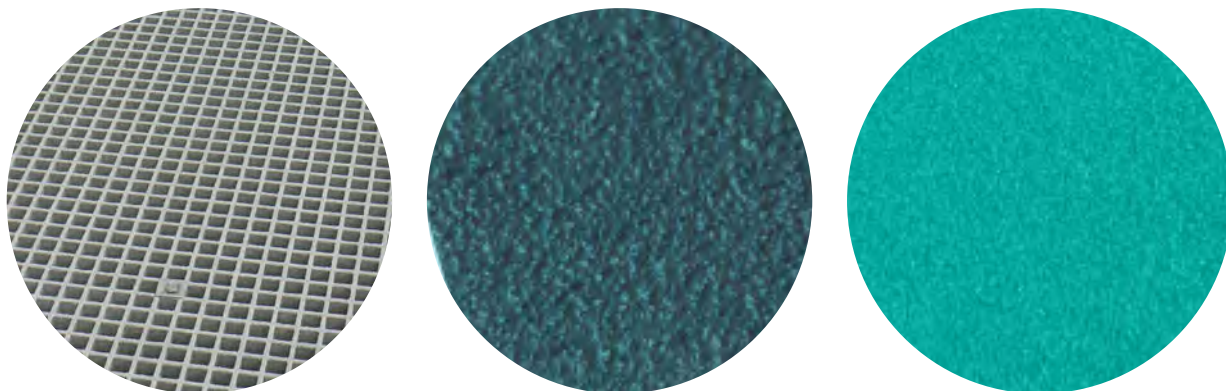
3. Non-slip metal plate
Stainless steel, aluminium or galvanised steel could be used as a non-permeable decking substrate. These plates could span a larger distance directly between floor joists which minimises additional secondary structure. Non-slip treatment of these surfaces are possible, with a textured surface finish.

In the current design, we have notionally indicated coated FRP panels as the deck surface. The structural solutions and construction methodologies outlined allow for any of the options noted above to be accommodated, as well as the more traditional solution of pre-cast concrete panels (which have been ruled out due to weight issues).

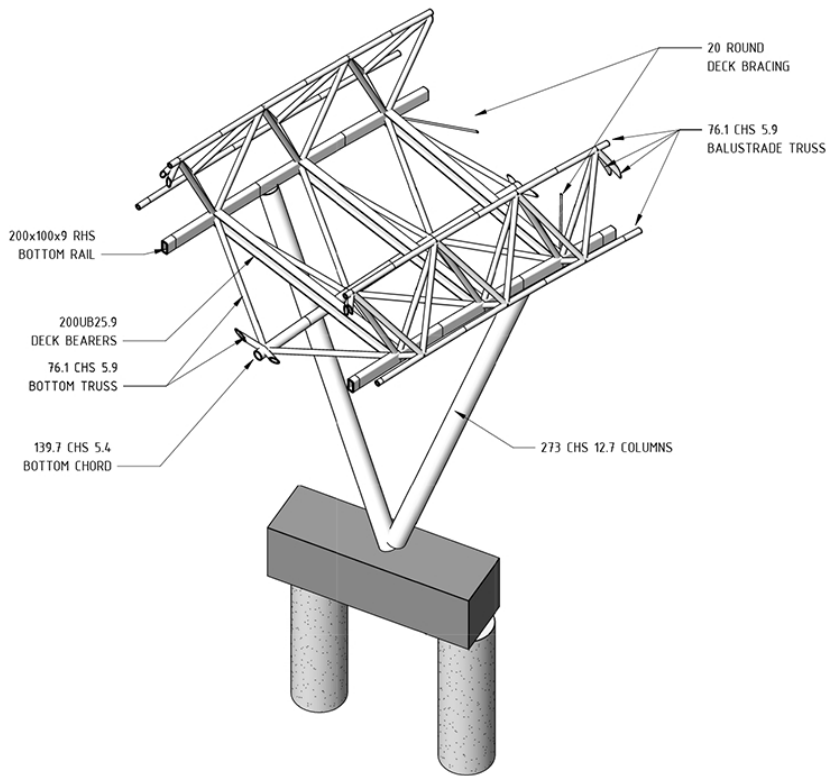
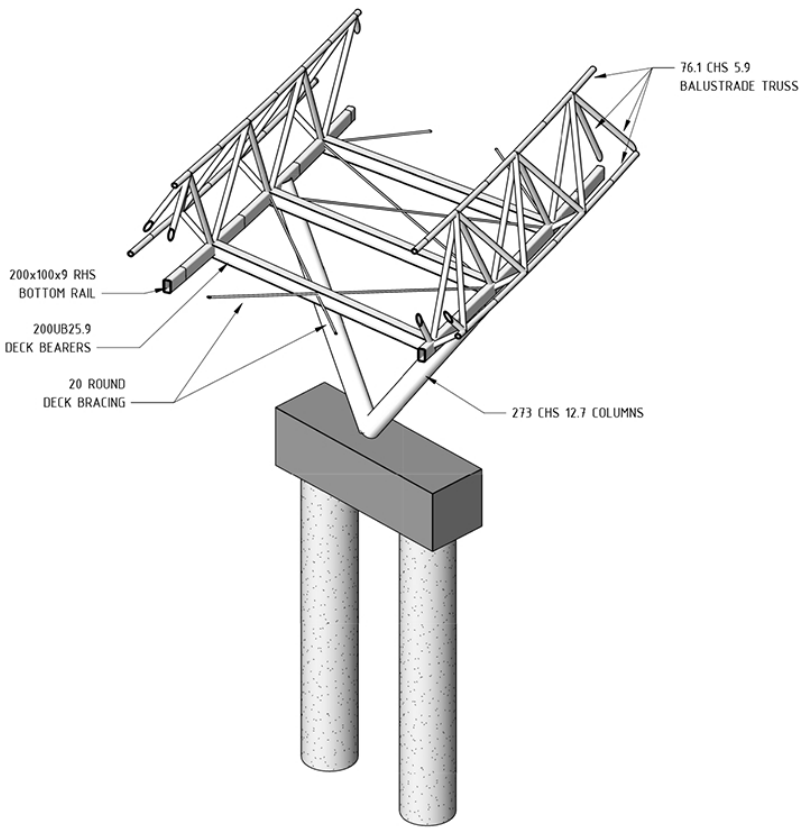
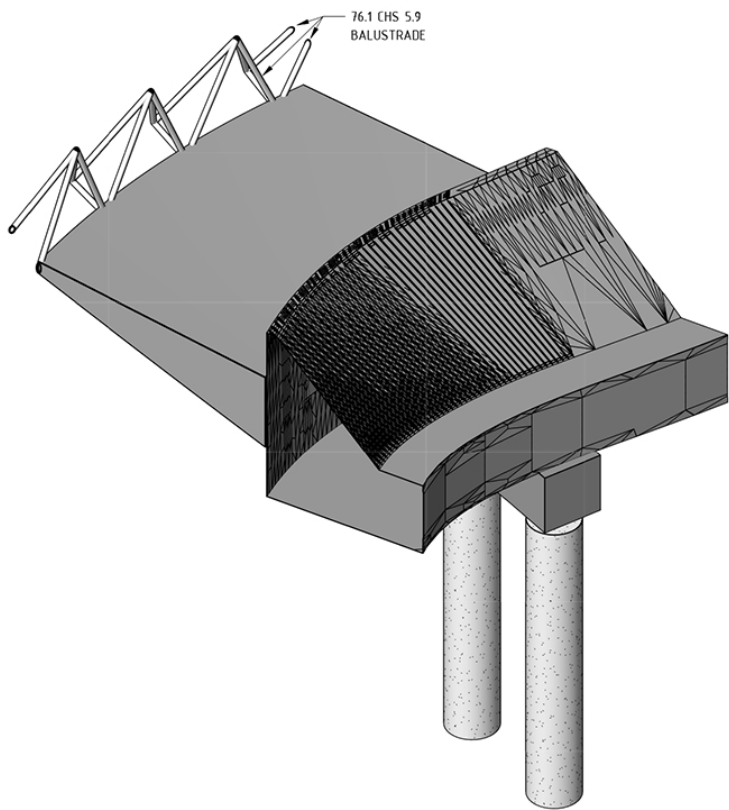
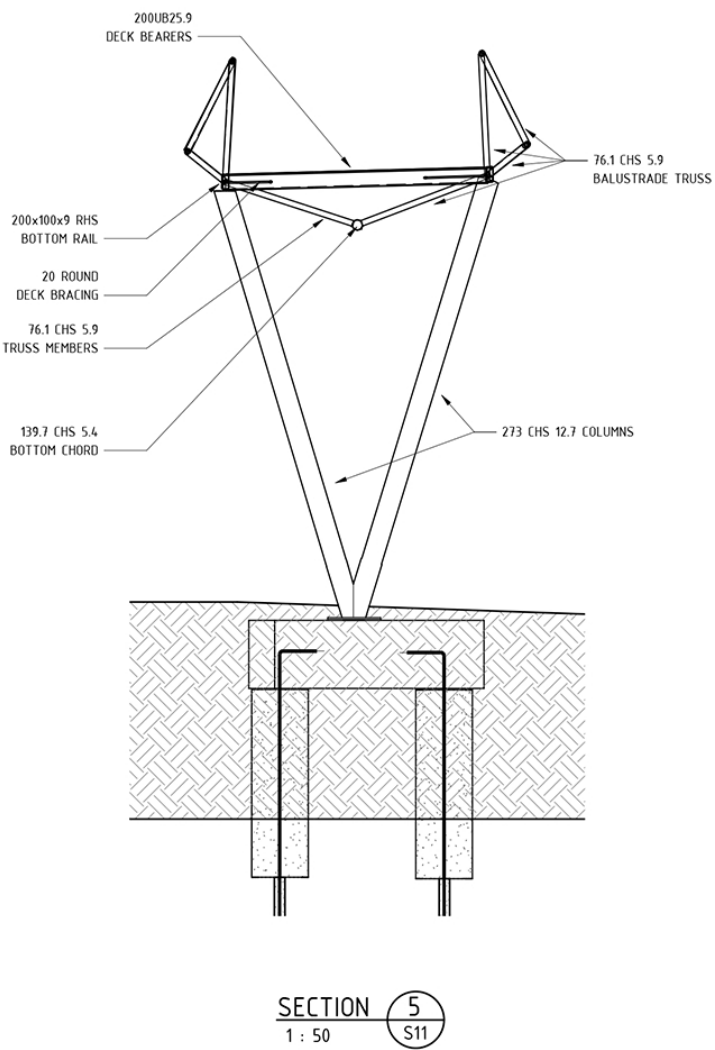
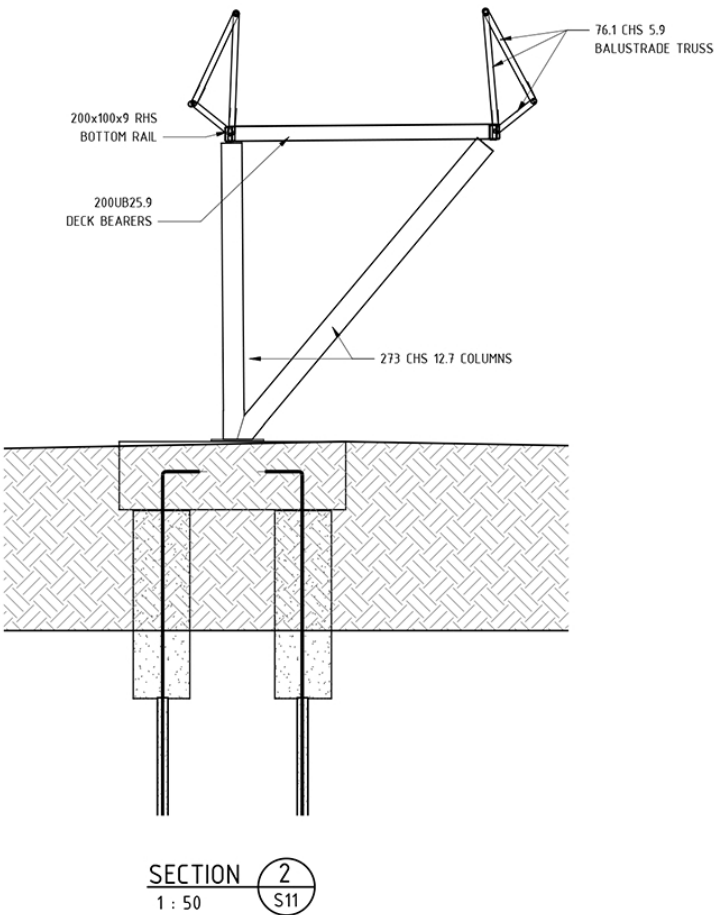
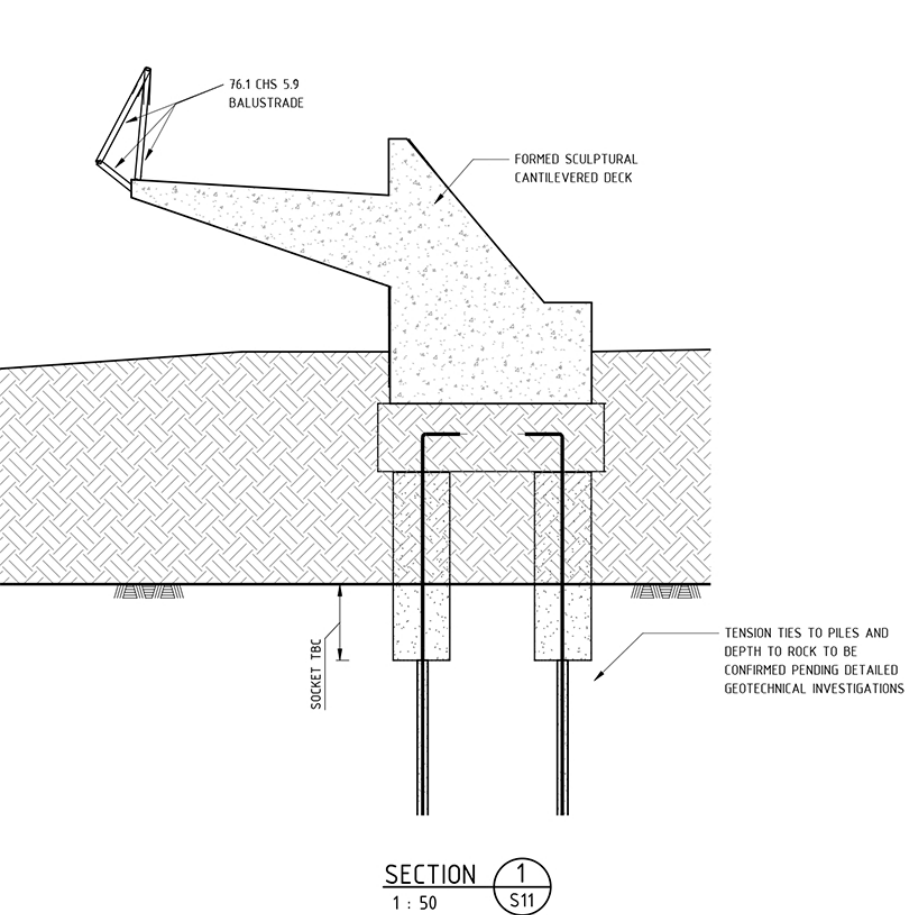
FOOTINGS AND FOUNDATIONS

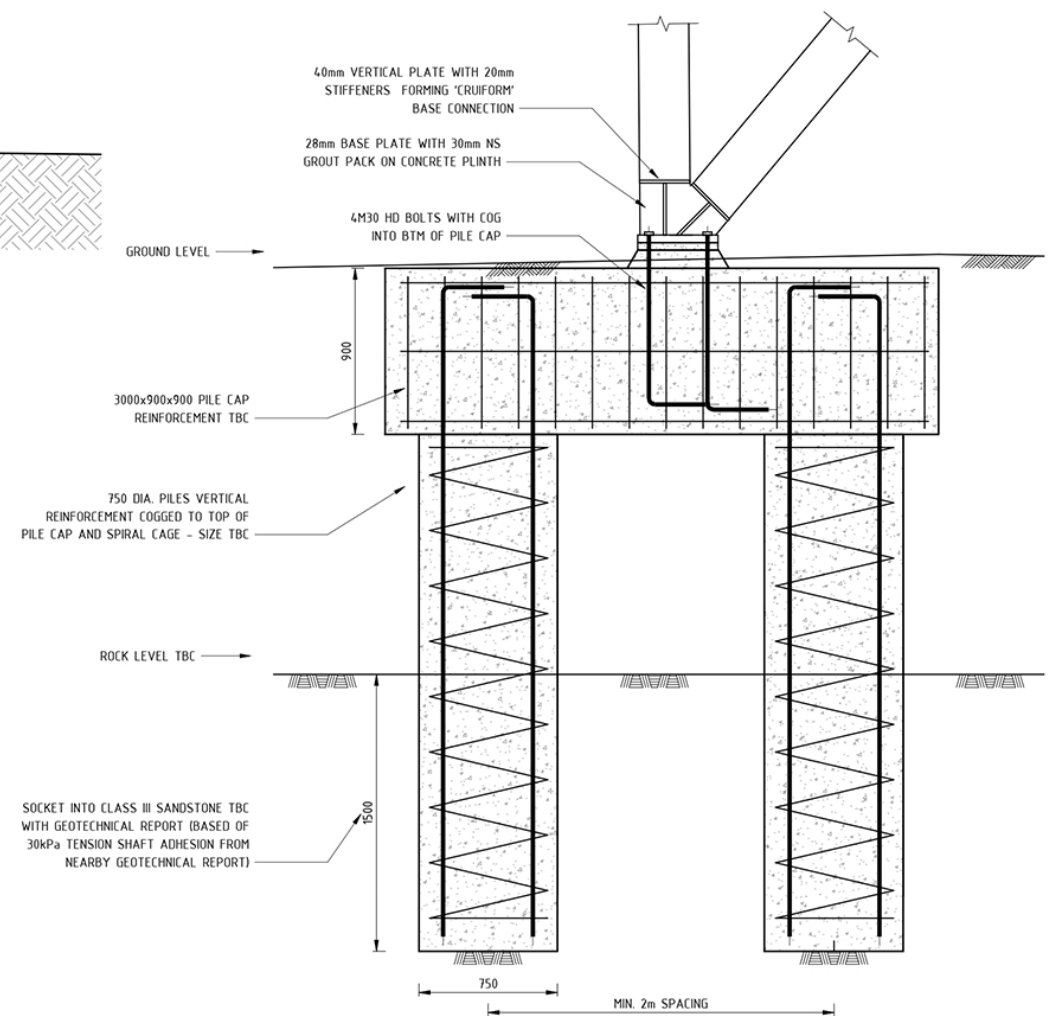
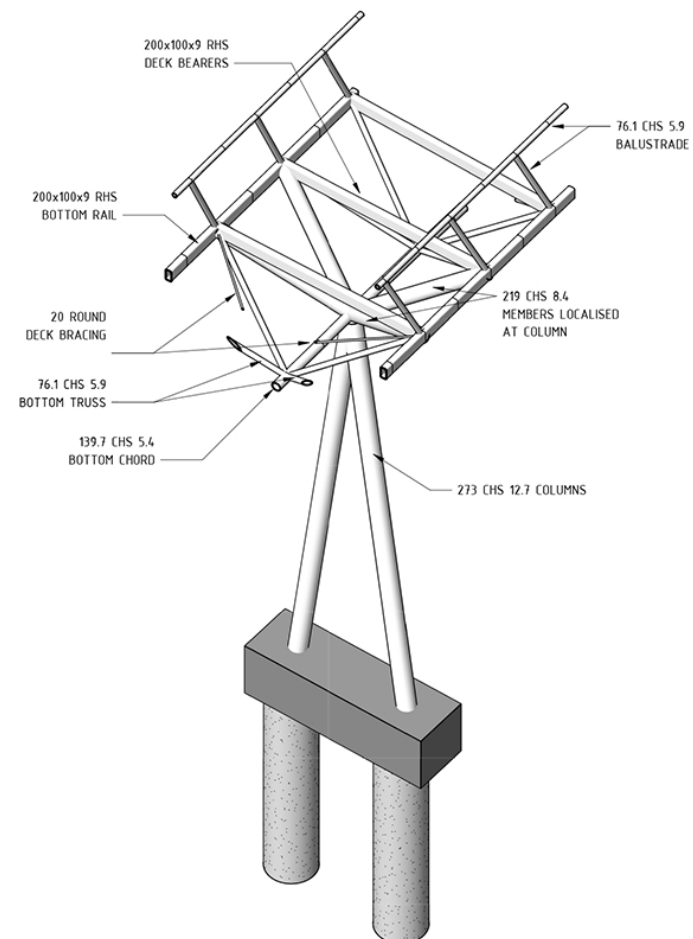
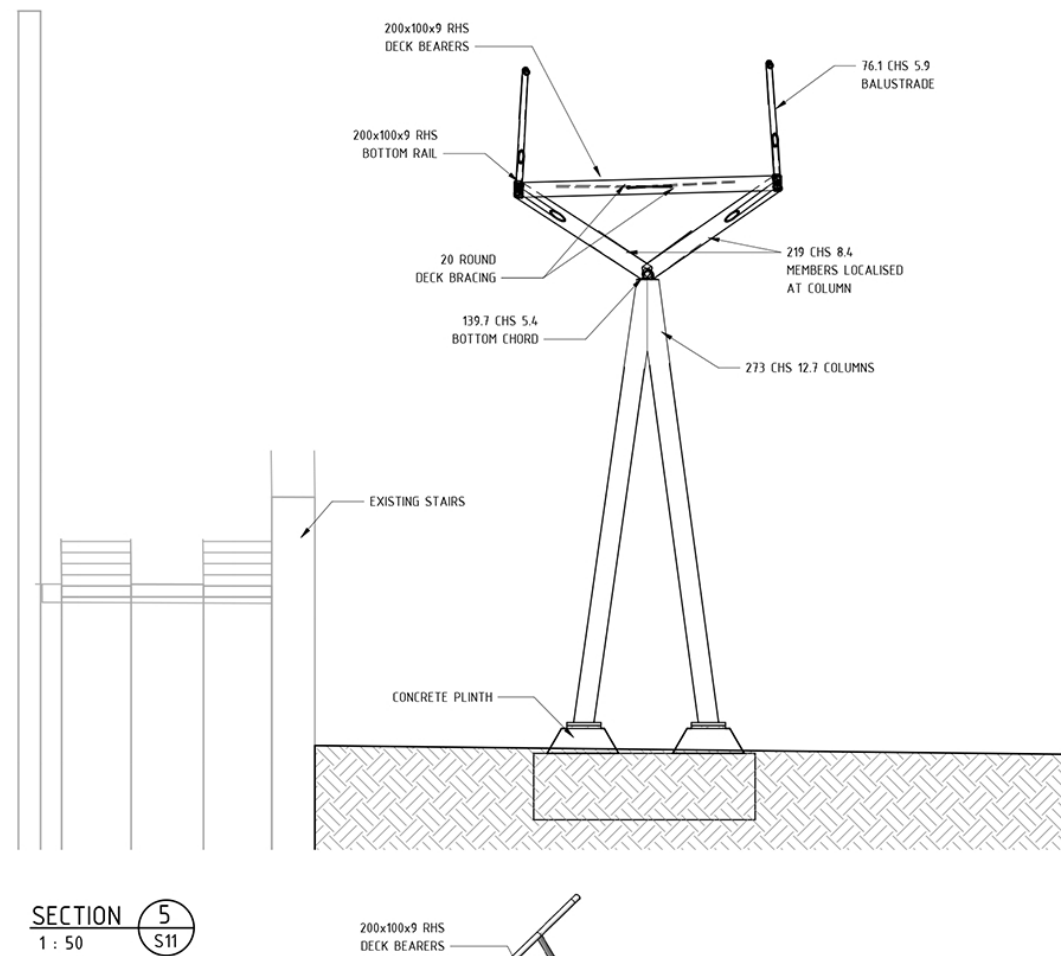
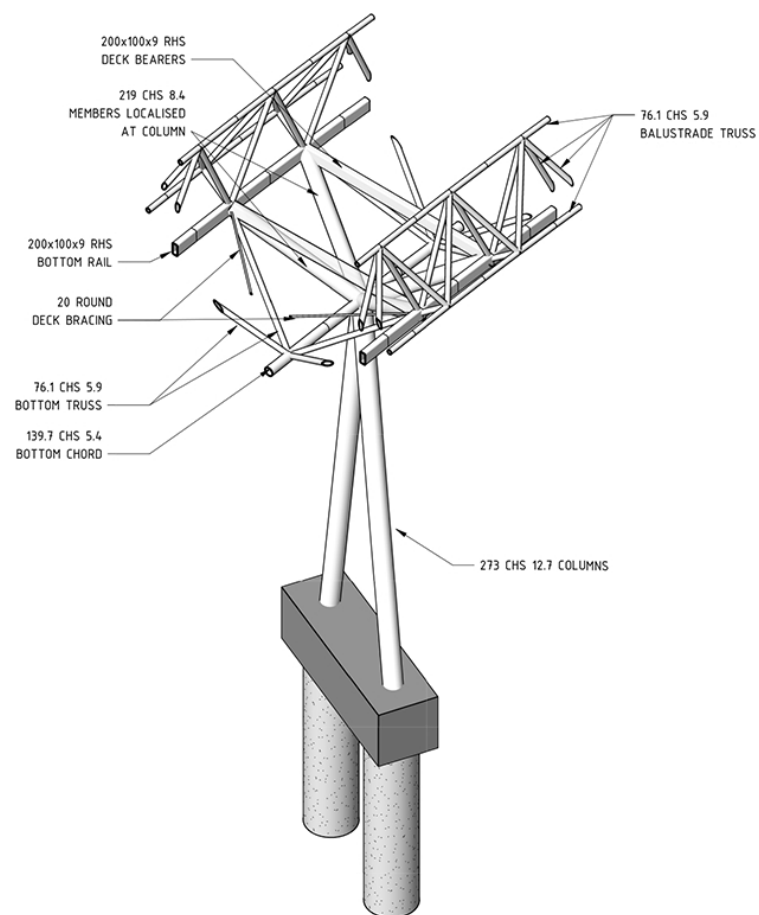
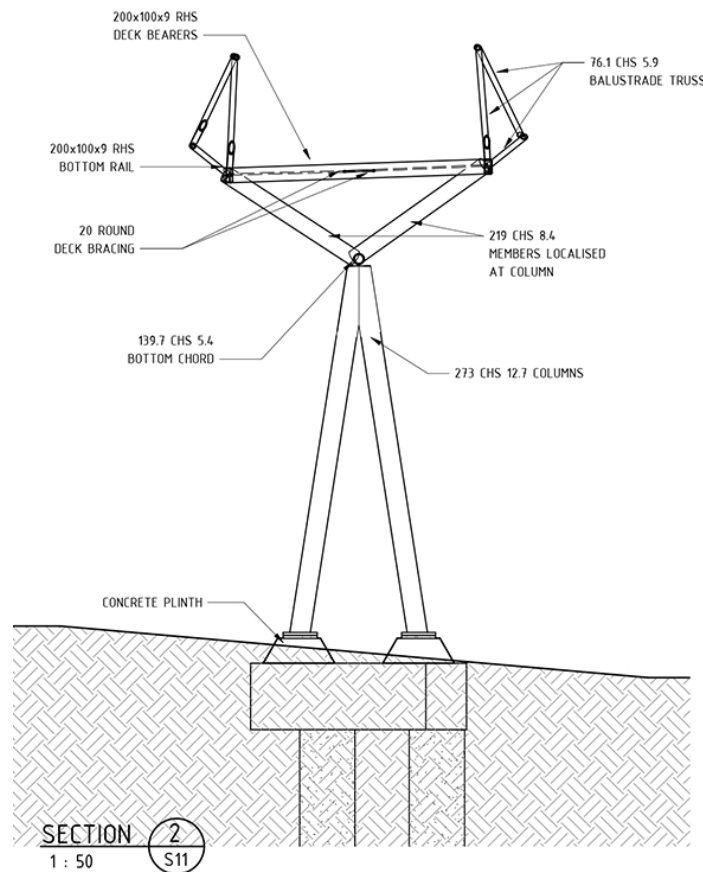
A footings for the bridge supports will typically consist of a series of CFA or bored piles socketed into the underlying bedrock. The ground conditions for the bridge supports are expected to be moderate quality sandstone at a shallow depth.

The piles will typically be socketed 1-1.5m within the rock to achieve adequate shaft adhesion for tension loads. Each support will comprise of a pair of piles spaced approximately 2m apart, and tied together just below ground level with a reinforced concrete pile cap with cast-in anchors for the column connections.



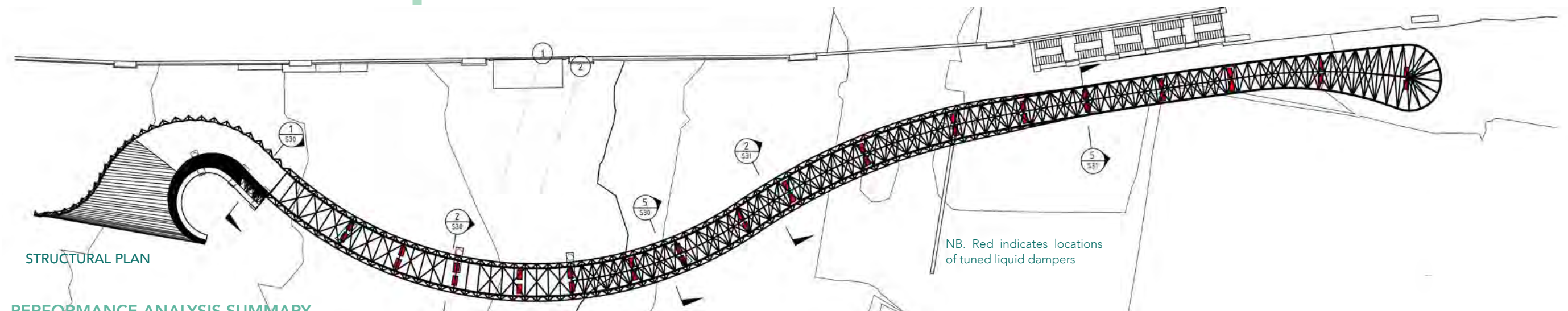
5.3 Structural members





DETAIL 1 S30
1 : 20

5.4 Structural performance



PERFORMANCE ANALYSIS SUMMARY

Deflections

Serviceability deflections of the bridge under 5kPa patch loading along the longest span (over Burton Street) was shown to be 24mm, or Span/900.

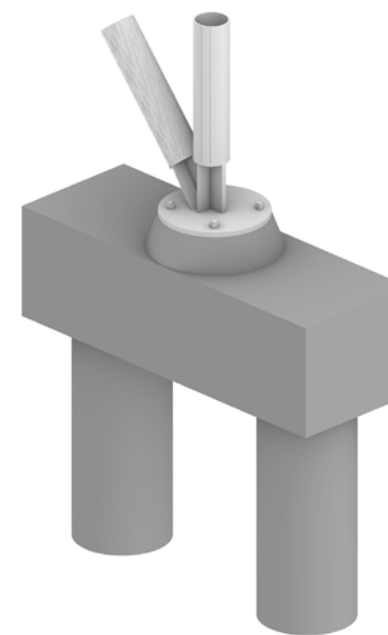
Frequency

The steel bridge structure has a natural vertical frequency response of 5.96Hz and lateral frequency response of 1.57Hz. As per clause 13.4 of AS 5100.2: "For pedestrian bridges with resonant frequencies for vertical vibration less than 5Hz, the vibration of the superstructure shall be investigated as a SLS." And: "Where the fundamental frequency of horizontal vibration is less than 1.5 Hz, special consideration shall be given to the possibility of excitation by pedestrians of lateral movements of unacceptable magnitude."

Given the natural frequencies fall within these limits, vibration is not expected to be a major concern. Additionally, due to the nature of the bridge being a cycleway rather than a pedestrian bridge, there is much lower probability of horizontal excitation. Small tuned liquid dampers along the length of the bridge could be used to further reduce any lateral wind-induced vibrations along the length of the bridge.

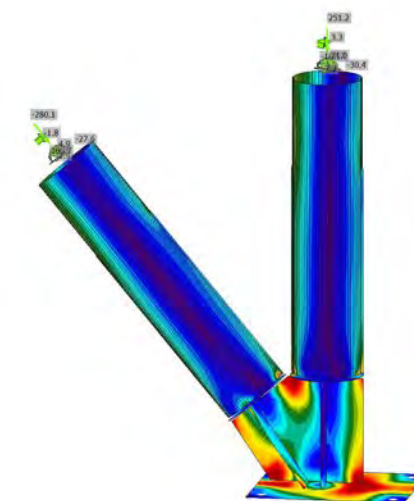
Maintenance

Based on AS 2312.1-2014 2.3 Atmospheric Corrosivity Categories, the structure would be classified Category C5: Very High Marine. As per the code recommendations: "Specified rounded edges for members such as SHS, RHS and CHS sections to minimise any sharp corners which can affect the paint protection. All to be sealed with cap plates as treatment of internal surface is difficult." Paint treatment will provide the most durability for steelwork in such an environment. Multiple paint treatments are possible including Polyurethane - PUR5, Epoxy High Build - EHB6, Acrylic - Two pack - ACC6 which give 15-25 years to first maintenance.



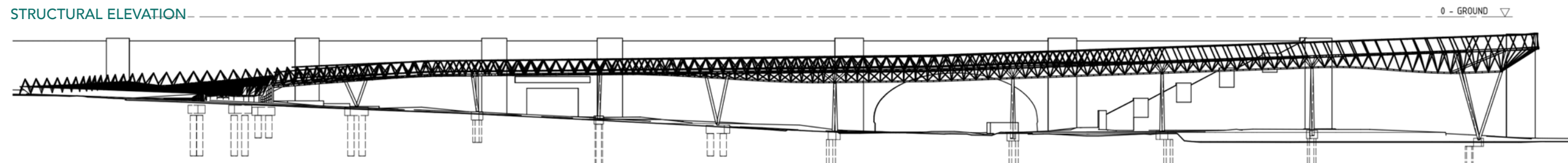
BASE CONNECTION

Typical base connections will consist of a stiffened baseplate, bolted to cast-in anchors within the pile caps. Plinths are recommended to lift the connections out of the ground for maintenance and durability.



FEA ANALYSIS (worst case strength loading)

STRUCTURAL ELEVATION





We are all visitors to this time, this place. We are just passing through. Our purpose here is to observe, to learn, to grow, to love...and then we return home

6.1 Northern Landing



BRADFIELD PARK

THE MEETING POINT

ALFRED STREET

6.2 Place and Time

ARRIVING WITH PURPOSE

We start and end with Country.

At every point in this design process, at every juncture between idea and action, at every potential meeting of what is there and how we might act upon it, the Country, its Knowledges and our understanding of them, have informed and guided us. Beyond stories of place and time, Country calls us to consider these principles: do no harm, touch the earth lightly, think beyond the acts that you engage in, and give back more than what you take.

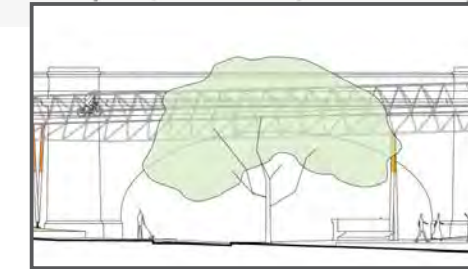
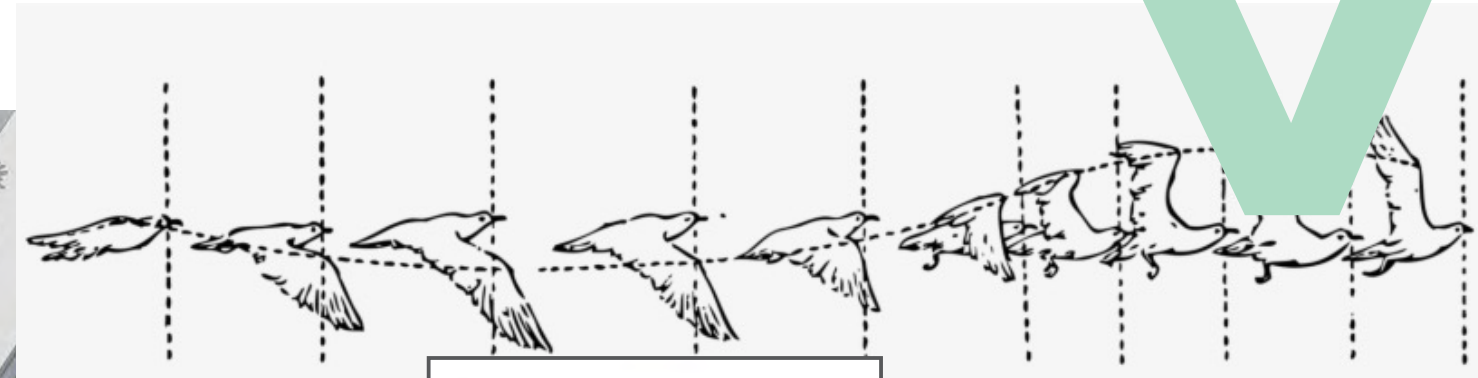
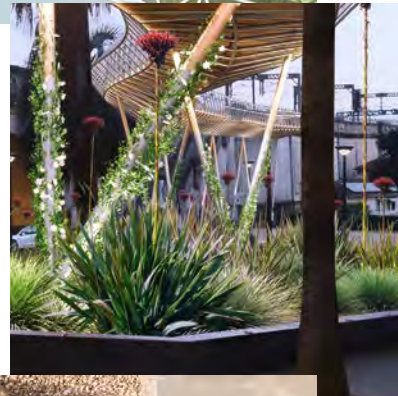
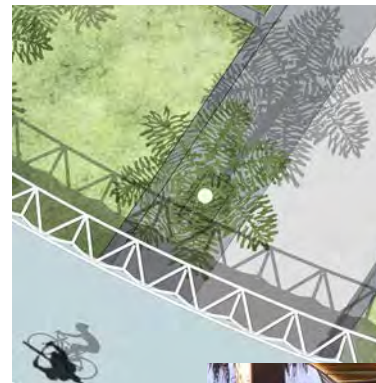
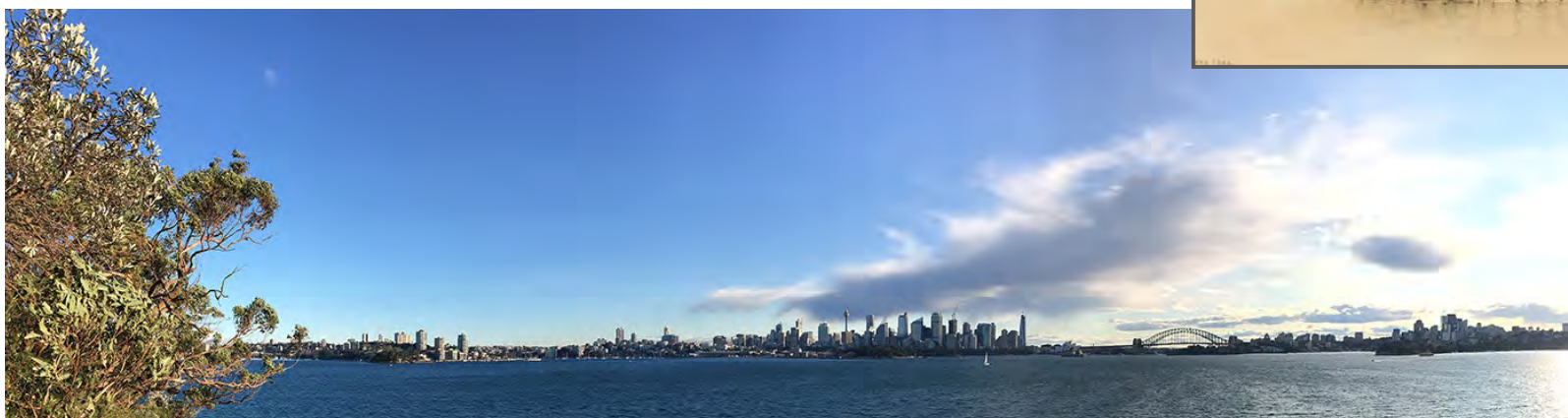
This is what the Matrilineal story tells us; this is what exemplary urban design does, this is what respect for Country, new and old, compels us to do.

Guided by Country, and assisted by some of the finest practitioners in their fields, we have embraced the challenges inherent in respecting and working with the Harbour Bridge, solving cycling connectivity in ways that are both practical and delightful, and calculating exactly how to achieve a delicate dialogue between earth and sky, while dancing lightly across the landscape. In some senses, these perceptual, technical and physical achievements have satisfied the design objectives for the Cycleway.

Beyond these solutions, beyond the cycleway itself, beyond the path, the piers and the pavement, Country obliges us to ask: what do we bring here? What are those things that this project offers, to place, to community, to Country?

These are some answers:

- **The Meeting Place.** The northern landing is more than simply where a cycling bridge connects to a terrestrial bike lane. As our most prominent connection between earth and sky, it presents an opportunity to re-establish a greater connection with Country - a spatial moment where we're made aware of where we are, and cognisant of the greater networks linking this place to the city around us, the world beyond it, and the cosmos. Like the former network of dancing circles evocatively described by Uncle Dennis, this is a new circle, and re-imagined meeting point, for all constituents of the community, old and new, plants, animals and humans.
- **Framing Place.** We did not wish to simply fly over Bradfield Park, assuming no relationship between Cycleway and Park. Our adjusted alignment skirts to the edges of the Park, leaving it open to the sky. Flattening the ramp gradient at the station entry axis makes the Cycleway a frame for the Park, enhancing its space and geometries.



- **Sky Writing.** The cycleway is not just a bridge, a ramp, a piece of structural ingenuity – it is a being in its own right, writing its story across the sky, and on the margins of Bradfield Park. Its form, structure, and transformational sinuosity tell many stories, especially to those on the ground, who look up. Looking down, also, has its rewards, as the filigree structure does not so much cast shadows as imprint a shifting tracery of a whale's skeleton across the ground, new ephemeral engravings to echo the memory of what was lost.
- **Taking Flight.** In this transformational sinuosity, the Cycleway also tells a story of flight, of launching and landing, of journeys up into and back down from the Sky. Like a bird in flight, its structure warps and weaves as it leaves the Earth, and rises into the Sky.
- **Imprinting Country.** It is not enough to simply touch lightly. Any structural solution to the Cycleway will have an impact – one cannot build a bridge without landing it, as John Bradfield and the (former) residents of Milsons Point well knew. Instead of simply making good these points of impact, we treat them instead as points of departure, opportunities to re-imagine Country, propagating native flora where the structure touches ground, nourished by the rainwater collected by the Cycleway, and brought to ground at these points of confluence.
- **Clearing Ground.** Our structural solution is capable of extraordinary spans, transforming to suit ground conditions as it rises. This allows us to fully clear Burton Street, rise high enough to not obscure its archway, and vault cleanly over the bocce court, not needing to put a foot to the ground anywhere it might be disruptive.
- **Building Memory.** Our current solution to attaching to the Harbour Bridge parapet suggests removing a single discrete piece in its entirety, so that it can be replaced in the future. This living fragment of the Harbour Bridge, previously an inaccessible artefact in the Sky, will be brought to ground, and deployed in Bradfield Park, next to the bocce court, as a piece of civic amenity, and an immediate link to new chapter in the Bridge's history.
- **Kairabilli Lookout.** Beyond its fundamental functions, the Cycleway must also, as a new engraving on Country, increase awareness of where we are, and enhance our relationships to this place. The elevated lookout in Sky Country re-establishes connections to Sea Country, to the Whale Dreaming, and to the conjoined stories of Lorikeet, Wattle and Mullet. It also allows us to look back on the Cycleway itself, and appreciate its own writing against Mother Earth, a blue line of water, sky and movement floating over Country.

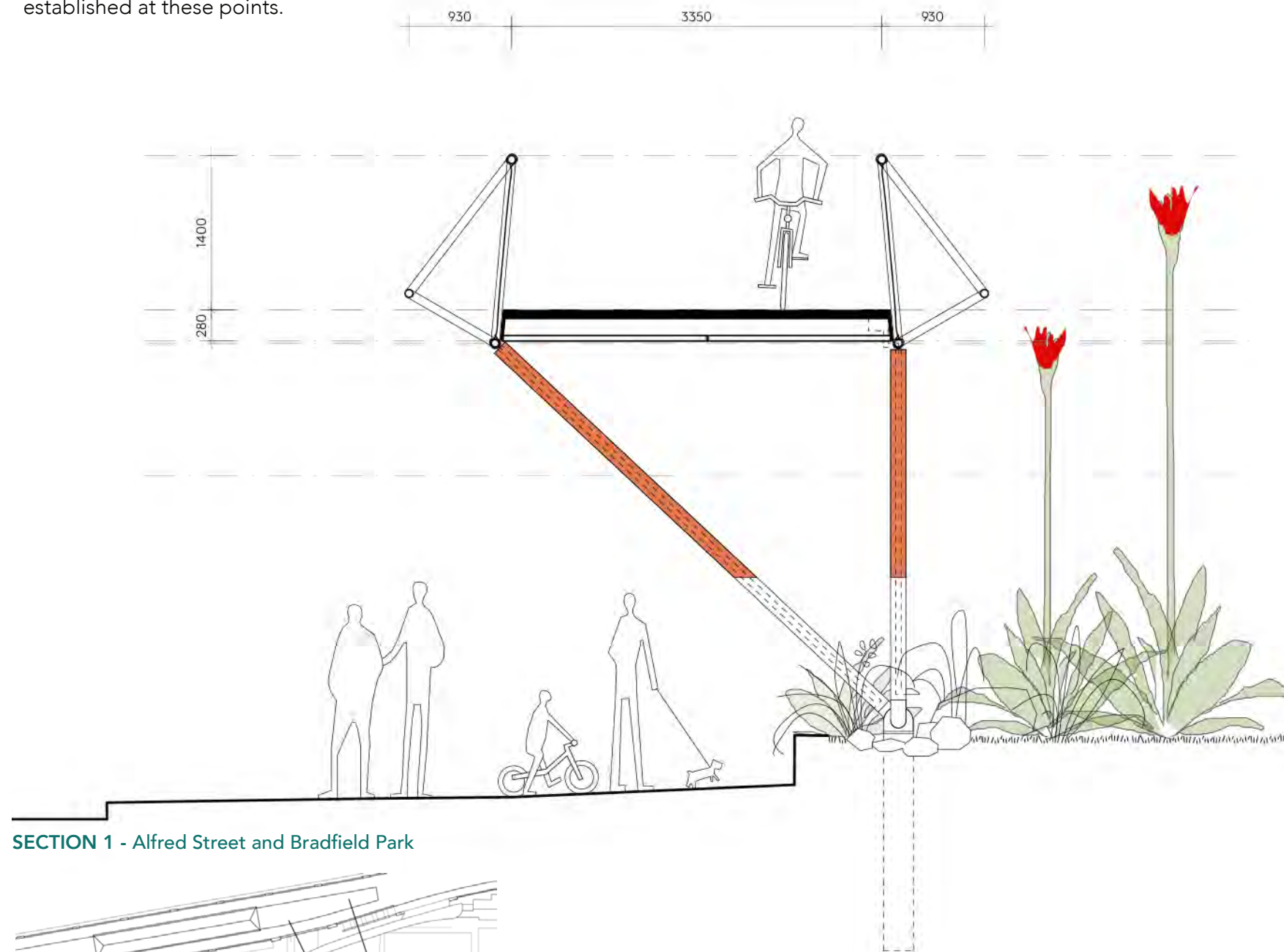
6.3 Sections

MOVING OVER COUNTRY

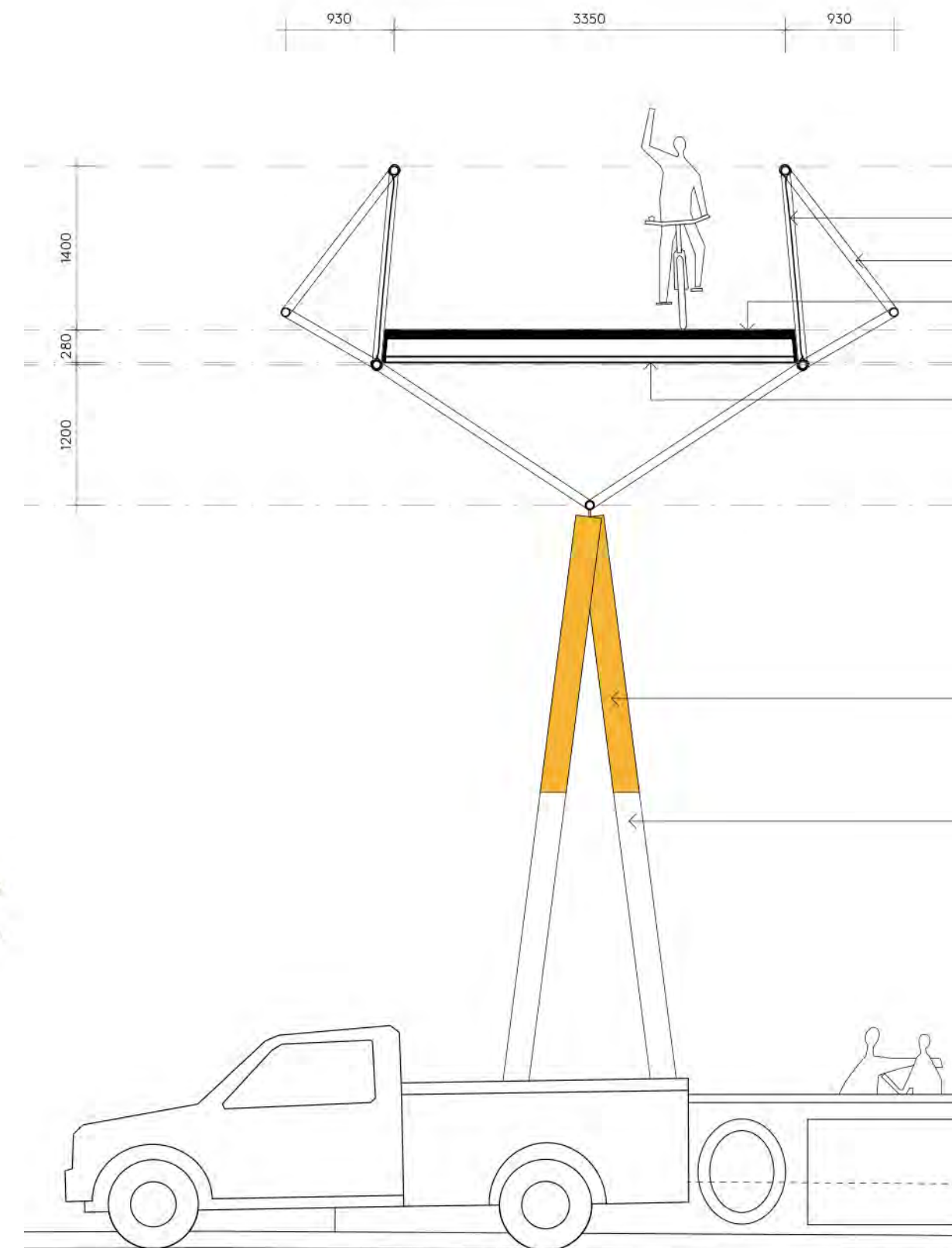
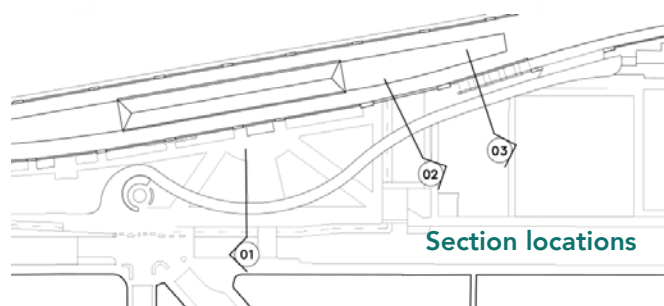
These sections tell our stories of those things created in that space between Earth and Sky by the Cycleway: beyond the ramp and its means of support, there are a number of elements and attributes offered to the Park, the public domain and the community of North Sydney.

Over the edge of Bradfield Park, at Alfred Street, the cycleway creates a canopy, offering shade to the footpath, while maintaining sunlight to the Park.

Rainwater falling on the Cycleway is collected, filtered and directed down its columns to the points of departure on the ground, nourishing the native planting established at these points.



SECTION 1 - Alfred Street and Bradfield Park



SECTION 2 - Burton Street

MOVING OVER COUNTRY

The underside of the Cycleway tells many stories, beyond that of structural delight inherited from the harbour Bridge: the tones and textures of Lorikeet and Wattle, shifting from horizontal to vertical as it rises, and the skeletons of whales, written in sticks, paint and structural steel.

A piece of the Sky brought to ground, the removed portion of the Bridge parapet sits along Burton Street, next to the bocce court, no longer Bridge, but still parapet.

As it rises higher, the Cycleway writes an engraving against the sky - the carving of a whale, the flight of birds, a shimmer of scale shapes against the sunlight.

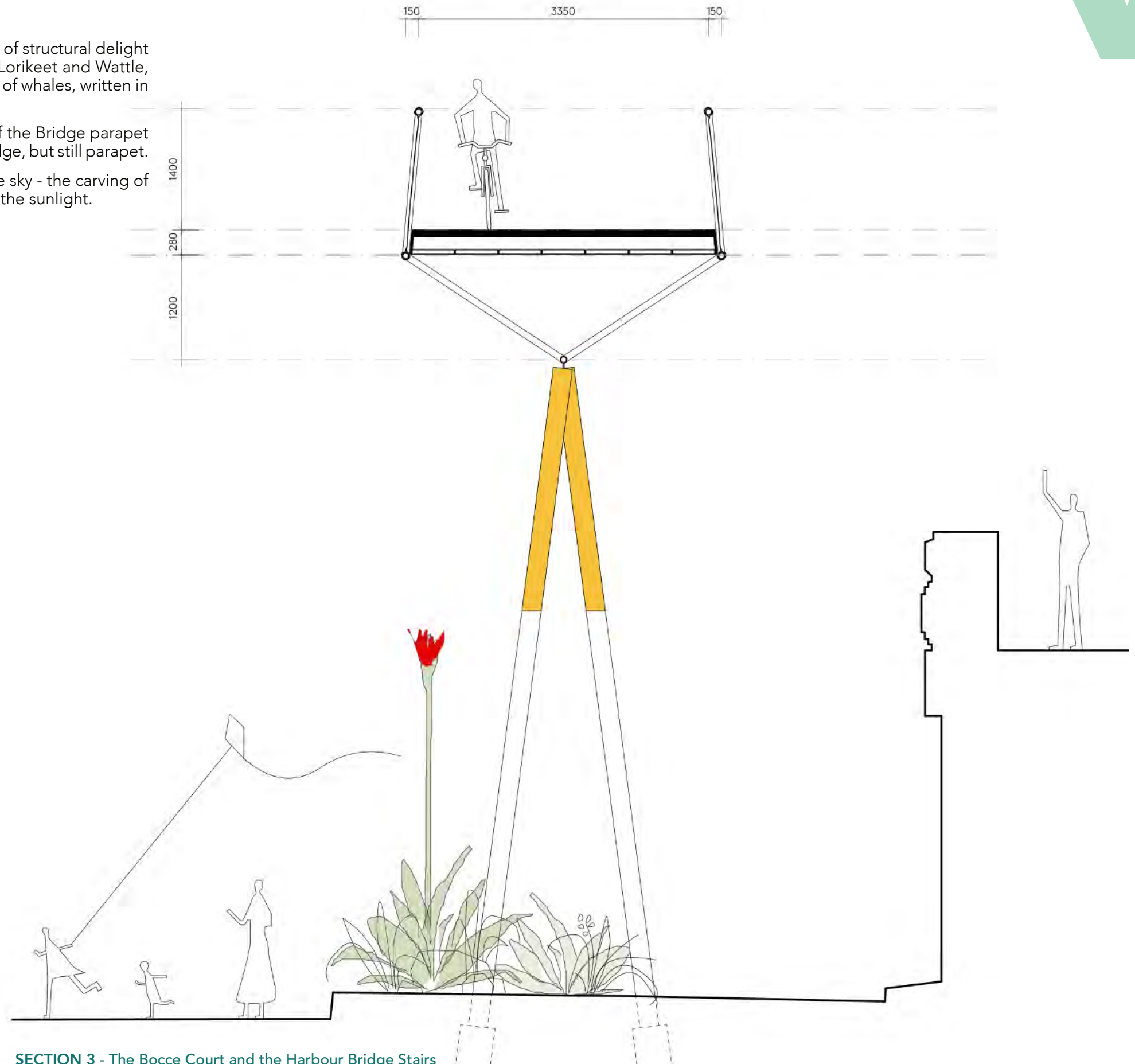
stainless steel X-tend mesh balustrade
micaceous oxide paint finish to steel structure
continuous topping surface to cycleway deck

patterned underside

paint finish to top half of structure

micaceous oxide paint finish to bottom half of structure

removed portion of harbour bridge reinterpreted as landscape seating element



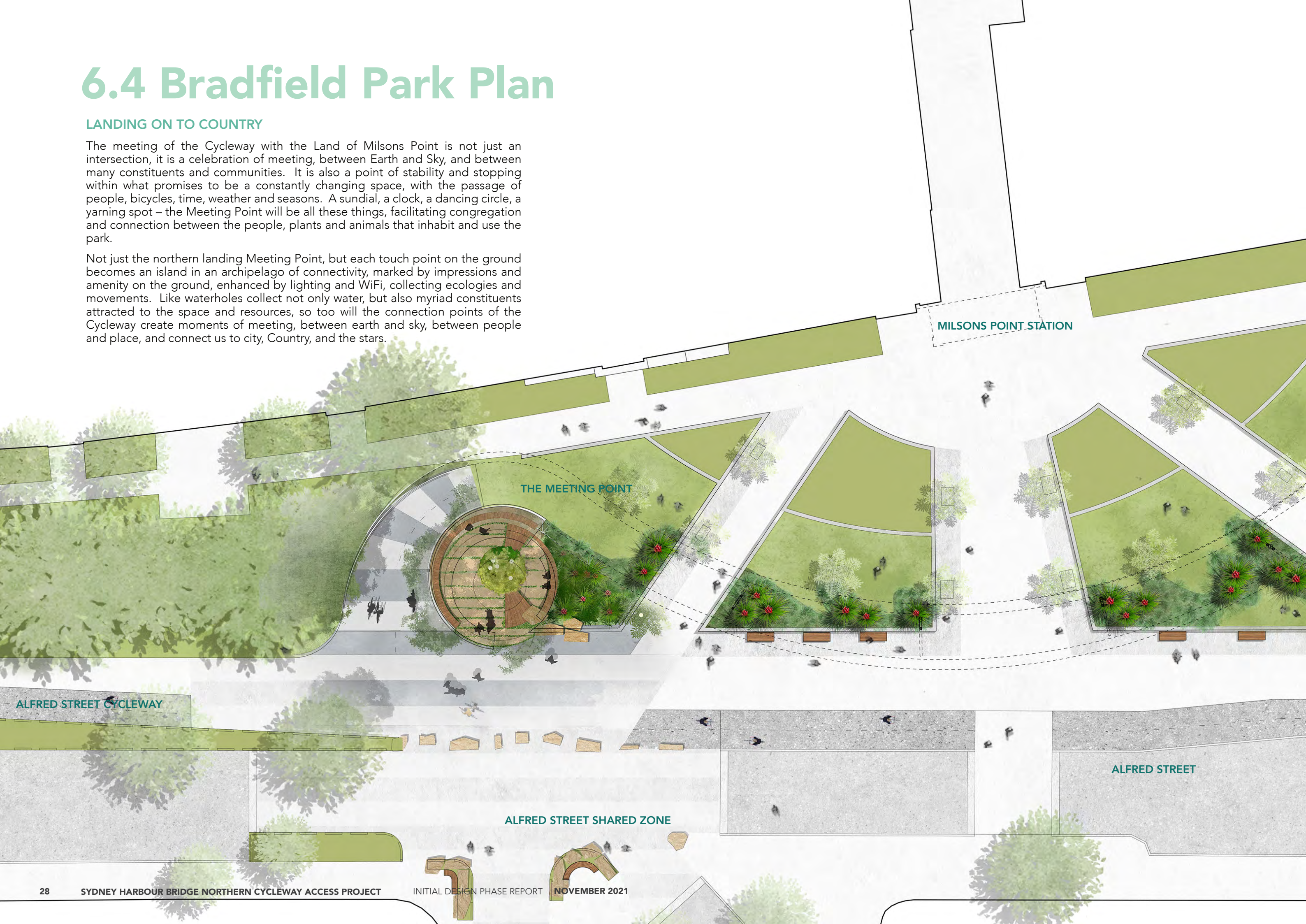
SECTION 3 - The Bocce Court and the Harbour Bridge Stairs

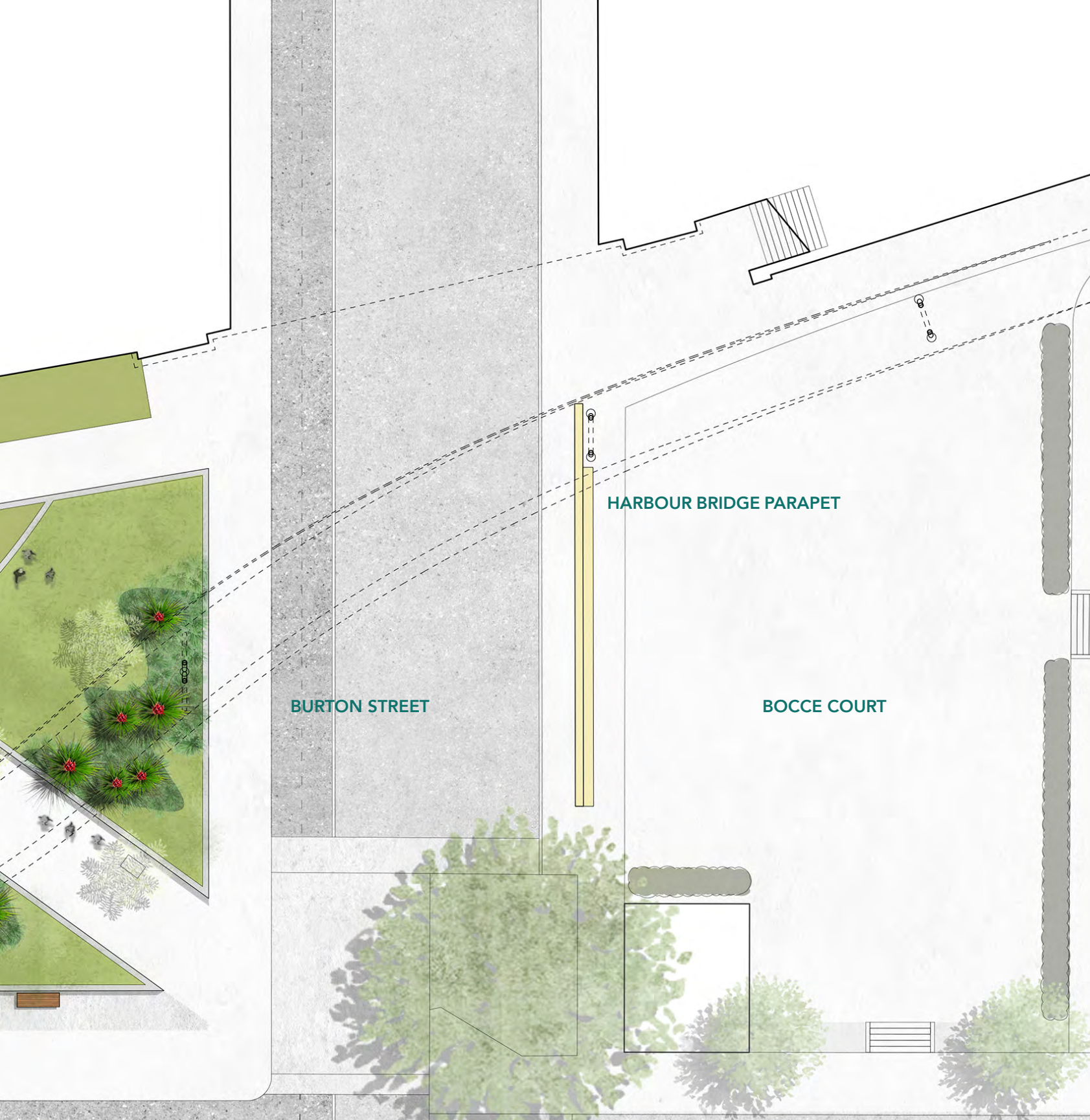
6.4 Bradfield Park Plan

LANDING ON TO COUNTRY

The meeting of the Cycleway with the Land of Milsons Point is not just an intersection, it is a celebration of meeting, between Earth and Sky, and between many constituents and communities. It is also a point of stability and stopping within what promises to be a constantly changing space, with the passage of people, bicycles, time, weather and seasons. A sundial, a clock, a dancing circle, a yarnning spot – the Meeting Point will be all these things, facilitating congregation and connection between the people, plants and animals that inhabit and use the park.

Not just the northern landing Meeting Point, but each touch point on the ground becomes an island in an archipelago of connectivity, marked by impressions and amenity on the ground, enhanced by lighting and WiFi, collecting ecologies and movements. Like waterholes collect not only water, but also myriad constituents attracted to the space and resources, so too will the connection points of the Cycleway create moments of meeting, between earth and sky, between people and place, and connect us to city, Country, and the stars.





MAKING PLACE

The Cycleway implementation will also offer the opportunity to create improvements enhancing the public domain and civic amenity throughout the precinct. While the northern landing creates a generous shared way along Alfred Street for pedestrians and cyclists, this space, surface and detail could be extended across Alfred Street as a continuous raised paved area, intended to be shared equally between pedestrians, cyclists and drivers. This will further dampen traffic speeds, and create greater amenity on both sides of Alfred Street.

The Cycleway alignment, brought closer to Alfred Street, and further away from the Harbour Bridge viaduct, leaves Bradfield Park open to the sky, and frames it as a genuine forecourt to Milsons Point Station. The story of Mother and child, with that illuminated space in between them in the *nawi*, becomes the generous space between Bridge and Cycleway.

The Cycleway structure also becomes a portal, creating a series of apertures through which to view and approach the Bridge viaduct, the archways, the Station entrance and the stair, enhancing the Bridge's silent solidity, and reinforcing the focus on the access points to it and through it.

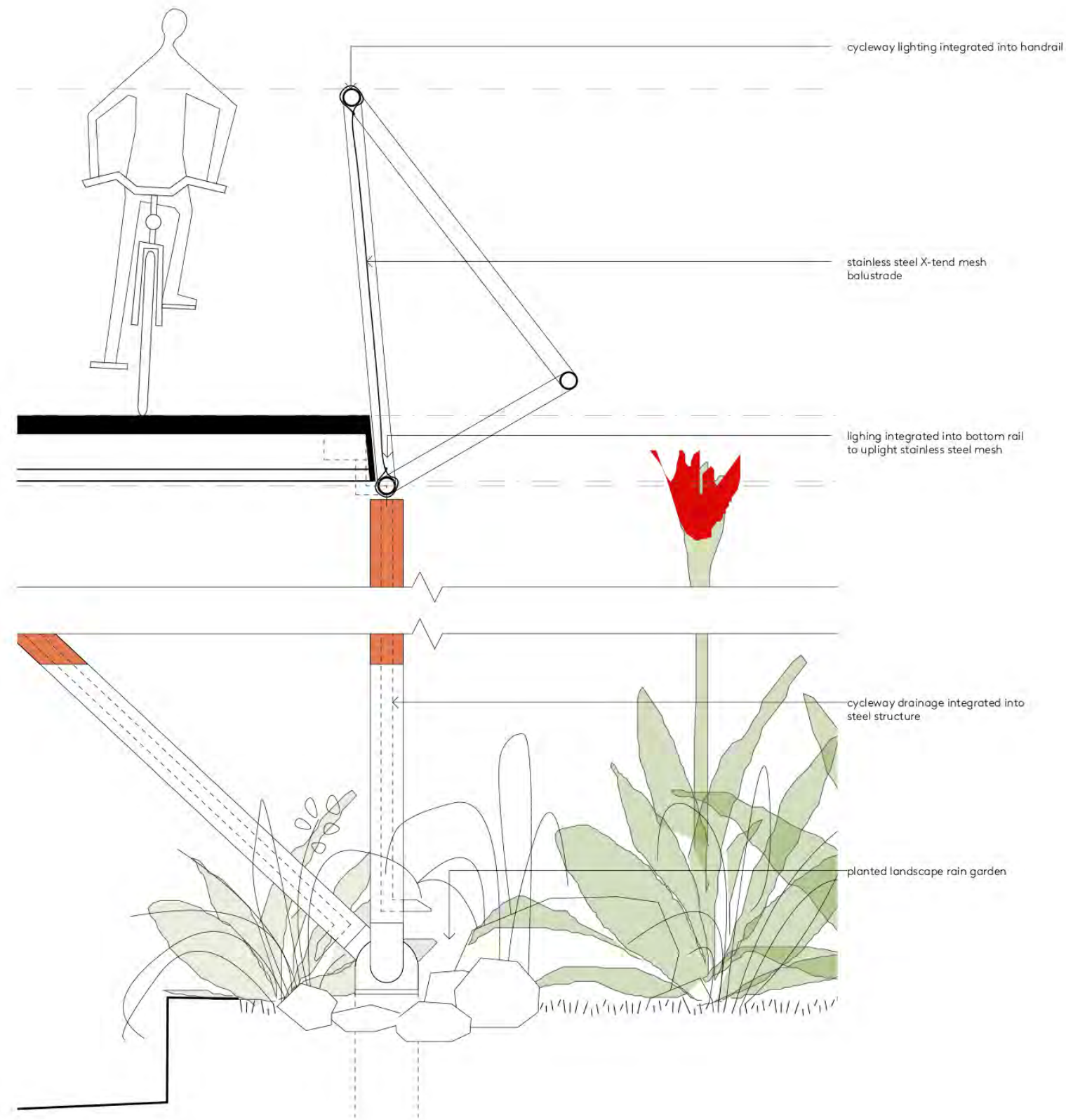
Under the alignment of the Cycleway, responding to the touch points of the columns, an imprint of Country will spring up, irrigated by rainwater collected by the Cycleway. Natives grasses, sedges and Gynea Lilies, all species endemic to Kairabilli, will trace the line of the Cycleway above, and attract the return of native insects, birds and other animals.

Conservation, interpretation and management of a place should provide for the participation of people for whom the place has significant associations and meanings, or who have social, spiritual or other cultural responsibilities for the place.

The Burra Charter



6.5 Touching the Earth



SECTION at Alfred Street footpath

ENHANCING COUNTRY

The touch points of the Cycleway as it skirts Bradfield Park become productive points of departure where Country is re-imprinted within the landscape of the Park. We both emphasise and celebrate these junctions, while also working to minimise the overall impact of new structure on to the ground. This is achieved in several ways:

- The structural solution allows us to maintain small, discrete points of landing on the ground, with the paired columns of the structure expanding outwards and upwards to support the Cycleway.
- Rainwater is collected and reticulated through the columnar structure, and discharged into the native raingardens planted after construction works are completed – the Cycleway becomes an irrigator for the Park.
- The native planting springing up in the irrigated locations become markers, for Country, for recovered species, for rendezvous and recognition.
- The underside of the Cycleway is imprinted with patterns and colours, the lines shifting from horizontal through diagonal and finally to vertical as the structure rises. The colours reference the rich red-oranges shifting to yellow in the feathers on the underside of a lifted wing of a Rainbow Lorikeet – the Cycleway lifts its own wings, for those beneath it.
- The Cycleway illuminates both itself and the Park, creating atmosphere, ambience and marking those places on the ground where it meets the Earth.



6.6 Beyond the Project

BEYOND THE PAVEMENT

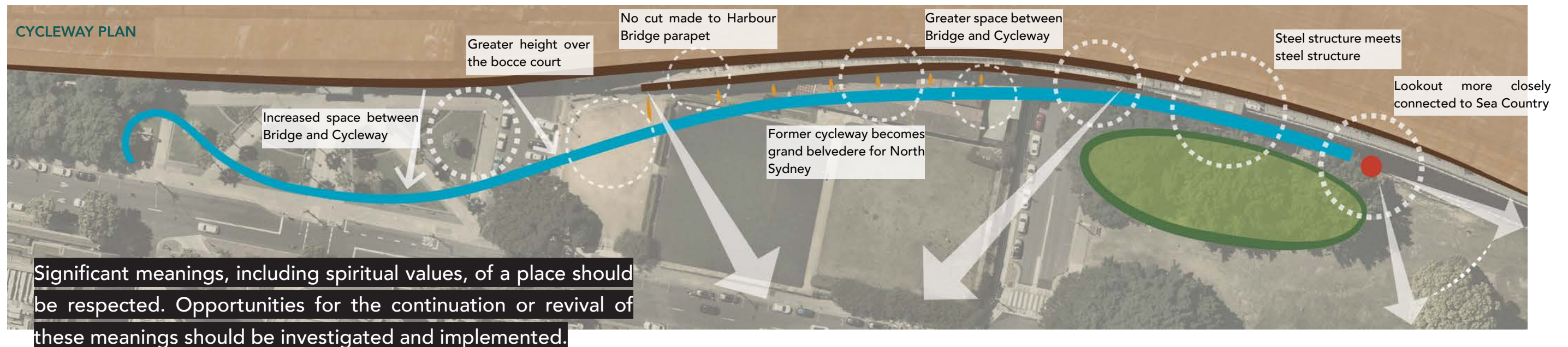
Transport for New South Wales' seminal (and highly influential) guidelines document advocates for the positive impacts of transport infrastructure on the communities, environments and cultures which it services. Notably, its key principles offer that infrastructure projects should actively contribute to urban structure, civic amenity and local economies, while also connecting with Country and incorporating heritage and cultural considerations into the planning and implementation of works.

For us, the Harbour Bridge Cycleway is too significant an opportunity to discount any investigation that might further improve the project, while also enhancing its surrounding physical, social and cultural context.

In this spirit, we have also investigated an opportunity "beyond the project," as the natural extension of many of the major urban design strategies inherent in our approach. The solution involves making the attachment point between Bridge and Cycleway south of the masonry parapet, attaching the steel structure of the Cycleway to the steel structure of the Bridge.

While presenting some technical challenges of its own, this approach would also offer many opportunities for increased improvements to both the Cycleway and the public domain and civic amenity of North Sydney and its constituents. It would also present a chance for a productive collaboration between Transport and North Sydney Council, a relationship which would only strengthen the resulting urban design outcomes.

Some of the benefits of this potential option are outlined in the diagrams below.





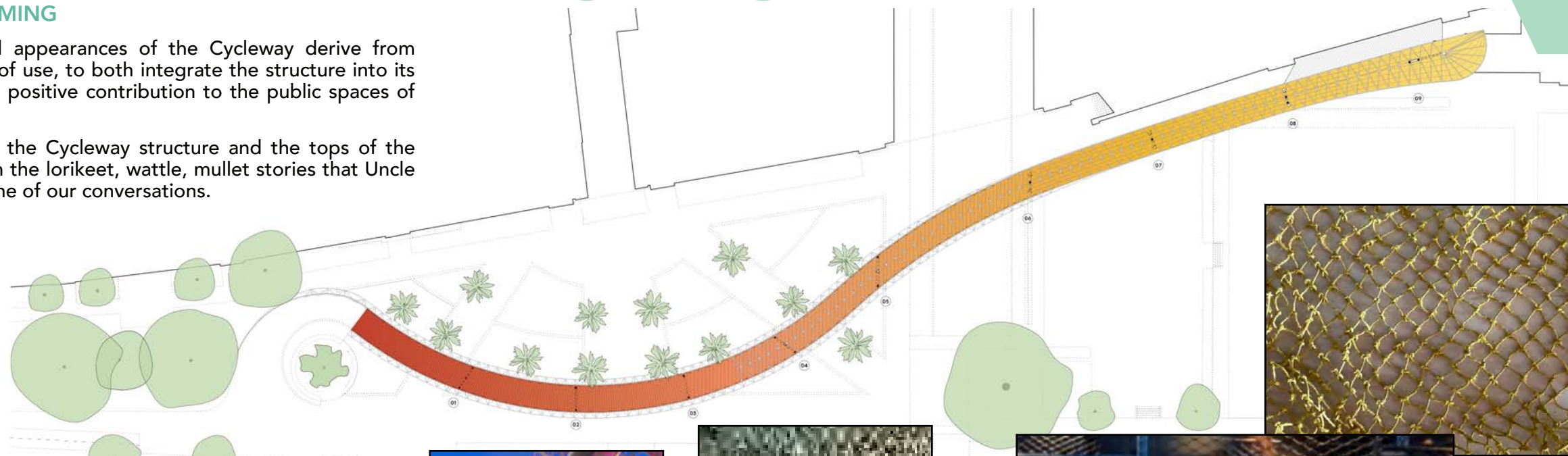
MILSONS POINT STATION ENTRANCE

6.7 Colours, materials & lighting

NATURE, MOVEMENT & FRAMING

The materials, finishes and final appearances of the Cycleway derive from Country, context and conditions of use, to both integrate the structure into its environment while also making a positive contribution to the public spaces of Milson Point.

The colours of the underside of the Cycleway structure and the tops of the columns derive from the are from the lorikeet, wattle, mullet stories that Uncle Dennis shared with the team in one of our conversations.



Specifically, we are interested in capturing the vibrant hues that range between the deep red underside of the lorikeets wing, and the luminous yellows of the wattle in bloom – sings of both taking flight, as well as the change of seasons. These colours would contrast with the base finish of the Cycleway structure, which would be a micaceous paint similar to that of the Harbour Bridge.

The resilient surface of the Cycleway path will be a gradation of greens, blues and greys, referencing the whale story, the mullet story, and the myriad Harbour crossings made over the millennia.

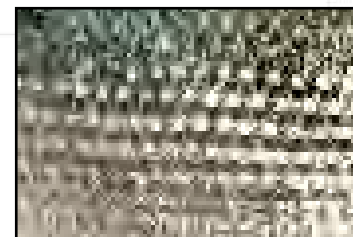
The incised lines on the underside of the Cycleway are inspired by Dharug artist Shane Smithers, who experiments with the shifting orientations of perception and proprioception as one leaves the ground and rises further up into space. It is our preference to develop a relationship with a local artist (or artists) to develop responses suited specifically to the Cycleway project.

The balustrades of the Cycleway are a golden-hued metal mesh. This is directly inspired by the glistening scaled bodies of the schools of mullet, as well as the hand-made nets crafted by the Gadigal and Cammeraygal women to fish off the harbour reef. The mesh is relatively transparent under direct sunlight, but becomes a shimmering canvas for artificial light once dusk settles in.

There are three basic areas address in our approach to lighting the Cycleway: the foreground (the Cycleway itself), the midground (Bradfield Park) and the background (the Harbour Bridge viaduct and station entrance). In this way, the new structure of the Cycleway can be balanced against the existing space and fabric, and harmonise with them after dark.

The Cycleway: Lighting for the cycle path itself will be integrated into the handrails, in order to achieve safe, continuous levels from both sides, while minimising the risk of glare to both cyclists and surrounding buildings. This will also serve to accent one part of the “exoskeleton” of the cycleway, the balustrade. The second part of this exoskeleton, the metal mesh alongside the cycle path, will be internally illuminated, creating an open, airy envelope around the cycling route.

The underside of the pathway will be gently washed by in ground fixtures



between the structural columns, while the columns themselves will be downlit from the underside of the Cycleway, illuminating and highlighting the planting at the base of the columns. This will create a chain of pools of light through the park, mirroring the path of the cycleway.

The Park: To prevent the park from feeling like a leftover space between the Cycleway and the Bridge, we propose to reconfigure its lighting. Springing off the lit plantings at the bases of the pylons, a series of pools of light would frame the station entrance and make the park more welcoming at night. These pools would be created through a combination of the existing types of bollards and pole fixtures, but with a softer colour temperature and a slightly re-arranged set-out.

The Viaduct and Station Entrance: the Bridge viaduct would be lit in a more even fashion – essentially joining the existing patches of uplights together by replacing the circular in-ground fittings with a square-faced flood light-type fixture, also in-ground and located between the existing plantings. Again, a slight adjustment to a warmer colour temperature will be more sympathetic to both the render finish and the whole parkscape. This re-lighting would extend to the underside of the Burton Street archway, tying it into the viaduct. Finally, for the station entrance to function as a secondary frame within the new, larger portal of the Cycleway, the entrance would be lit in a more pronounced way. The escutcheon will be separately spotlit from above the awning, the facade and dentils lit by sources concealed above the awning and the awning itself lit enough on its underside to make it visible at night.

Finally, the underside of the Cycleway as it rises up from the Park will be illuminated with a series of pin lights, not to provide illumination to the ground below, but to create a constellation of tiny lights snaking up into the night sky.

MILSONS POINT STATION ENTRANCE

6.8 Leaving Country

EVERY END IS A BEGINNING

Whether coming or going, a bridge is an impossible place, a line suspended above the land, offering a moment suspended from time, where, between Earth and Sky, one can be comfortably neither here nor there, but solely in the midst of a journey.

But every journey ends, and it is in those ends, where the idea meets the act, that we find new beginnings.

We started with Country, and we end with Country, but only as a means to begin again, having learned some small Knowledges, balanced on the shoulders of Elders, their wisdom and the deep history of place.

This project, for the Harbour Bridge Cycleway, is certainly an opportunity to connect an elevated cycle path with one on the ground.

It is also an opportunity for one last chapter in the mathematics of movement: thousands of projected journeys, with an incremental increase as climate, circumstances and cycling changes, year after year, for an anticipated lifetime of 100 years. Our calculations make it to be around 250 million journeys, before this project is genuinely over, a handy congruence of movement and multipliers.

For us, this project has also been a unique opportunity to connect deep time with the present day, to link the Knowledge and learnings of the oldest culture on Earth with sophisticated engineering tools and hi-tech cycling equipment. It has been an opportunity to join past and present in a project that looks resolutely to the future, bound together in shared Knowledge – of place, of people, of plants and animals.

It has also been an opportunity to join all the combined skills, interests, aptitudes and abilities of our team, across Indigenous design, architecture, engineering, lighting, heritage, cycling, landscape and urban design towards a combined goal. This goal was not to simply make a cycleway linking that high point with this low spot, but rather to understand that point and this spot are parts of the same place, and our role is only to re-connect things, to re-discover those invisible things that sit just below the surface, or just out of our sight.

We have been guided on this journey by Country, and all of her translators, teachers, Knowledge Holders and Elders who have generously shared their Knowledge with us.

The sharing of Knowledge in the pursuit of crafting a piece of the built environment is itself a journey – from the mind to the hand, much like a bridge, that descends from the Sky to the Earth, bringing with it clues to where we are, and how we might be here, together.

We return to Uncle Dennis and Uncle Allan's questions:

"How do we connect people with Country?"

"How do we slow people down?"

Simple – we just build a Bridge.



CYCLEWAY LOOKING SOUTH TO HARBOUR BRIDGE





SPACE AND TIME

The way that [Aboriginal people] perceive landscapes is thus rather like the way that someone with a reasonable astronomical knowledge in Western culture perceives the night sky resplendent with twinkling stars. As one looks at the stars, there is the simultaneous sense of perceiving something that is present, the view itself sensed visually at that time, and of perceiving things that are past, the stars whose deaths many thousands of light years ago are perceived as the twinkling radiances in the black depths of space. And again, at the same time, there is the knowledge behind these perceptions, that we can only know these things because of our understandings of time as past-present-future. The future is implicated in our understanding of the past and the present.

Bawaka Country, et al 2015



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