THE BIRRARUNG CONFLUENCES

GREAT BIRRARUNG PARKLANDS
STRATEGIC PLANNING REPORT

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Landscape Architecture
Cultural Identity
Ecological Regeneration

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Rights Holders: Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation (WWCHAC)

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Foreword by the Yarra Riverkeeper

The Great Birrarung Parkland, where the Birrarung (Yarra River) lives within a network of parks and wetlands is something we hold dear at the Yarra Riverkeeper Association. Enshrined in legislation in 2017, as part of Wilip-gin Birrarung murron (Yarra River Protection Act), this parkland is the embodiment of a river that is not just water, but land, people, community, and culture – together as one living and integrated natural entity from source to sea.

The desire to make this ideal real is what prompted us to embark on a journey to create a practical 'river' map of the Great Birrarung Parkland co-managed by its Traditional Owners. This report, commissioned by the Yarra Riverkeeper Association, and undertaken by the University of Melbourne is the result of the first part of this journey.

Guiding us on this journey is the concept of 'net gain'. Imagine a fishing net that sits at key confluences along the river – the places where nature and people connect most often – and catches ideas to support the river's environmental, cultural, social, and recreational values to thrive equally. Using this concept and a process of knowledge and idea sharing, this report provides a range of short, medium, and long-term strategies to transform the river's parklands.

The Great Birrarung Parkland is a long-term effort involving many stakeholders working together for the benefit of the river – in places like Gardiners, Darebin, and Merri Creeks. And while rehabilitation and adaptation of key confluences along the river will take time, these are critical if we are to meet current and future challenges like climate change and population growth.

The well-informed and practical ideas presented in this report are an inspiration and a guide for decision-makers responsible for the Birrarung in the conceptualisation of the Great Birrarung Parkland. My hope is that through further collaboration and joint effort, together we can birth these ideas into life so that the Birrarung not only exists but thrives for millennia to come.

Charlotte L. Sterrett
Yarra Riverkeeper

REGISTERED ABORIGINAL PARTIES 2021 & CULTURAL SENSITIVE AREAS

We acknowledge the Wurundjeri Woi-wurrung who are the Traditional Custodians of the land on which this report was written.

We also like to pay respect to the Wurundjeri Elders, past and present, and extend this respect to Aboriginal and Torres Strait people from other communities.

Aboriginal and Torres Strait Islander viewers are advised that this publication may contain images of deceased persons.

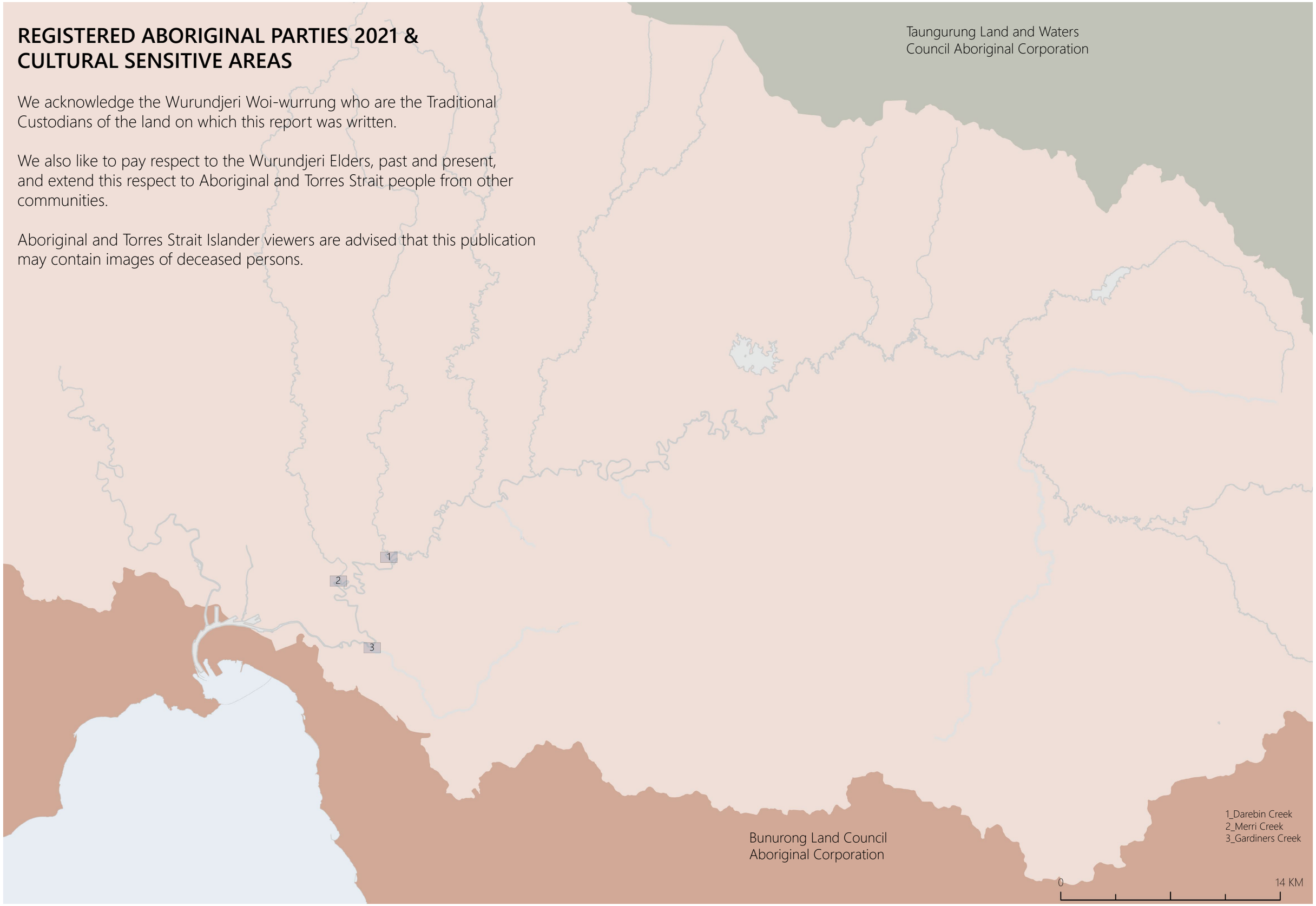
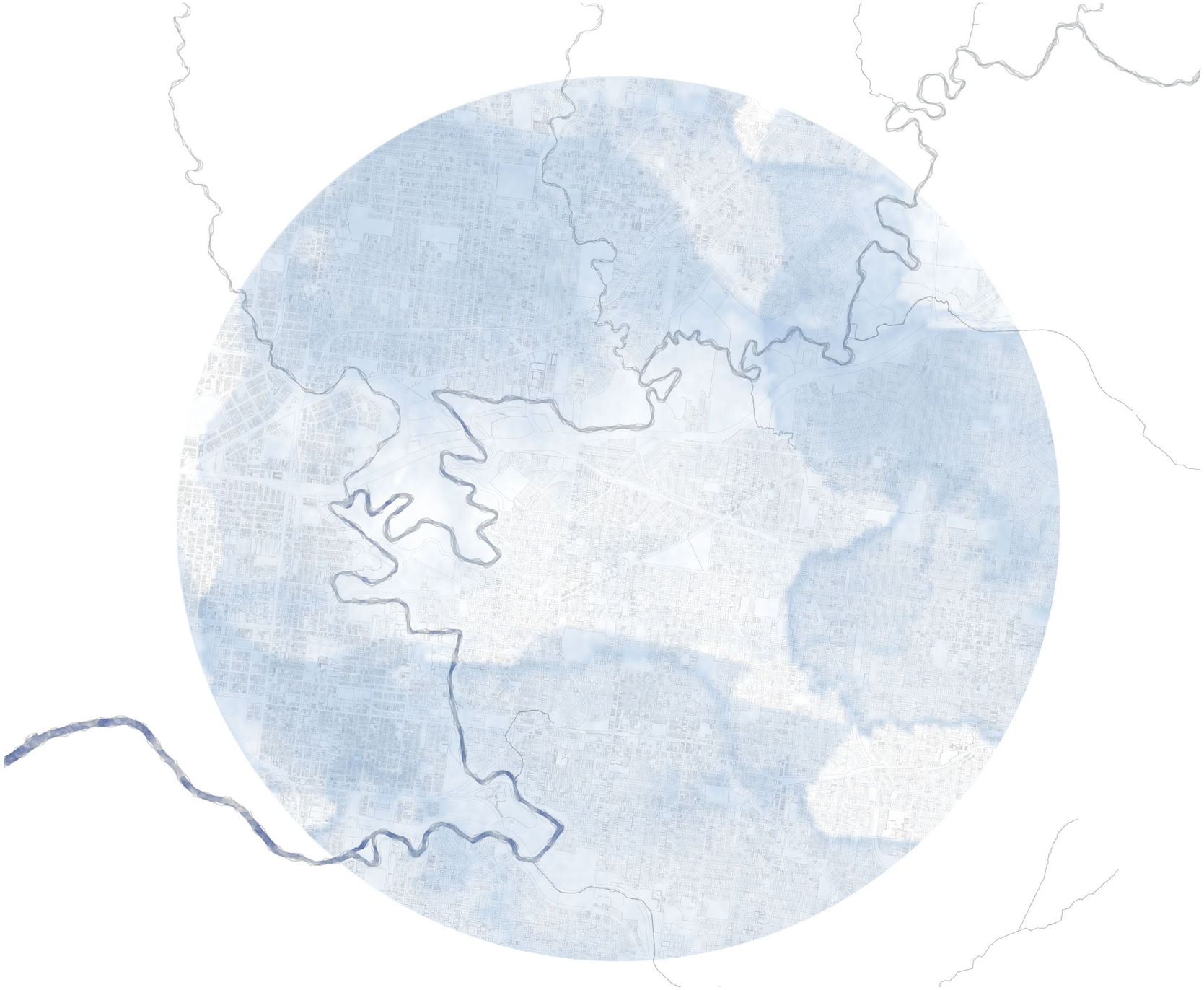


Figure 1. *Map showing Registered Aboriginal Parties boundaries as of 1 July 2021 (full extend not shown in image).*

EXECUTIVE SUMMARY



The Birrarung (Yarra River) plays a fundamental role in Melbourne's identity. The richly textured river landscape includes culturally, historically, and ecologically significant spaces. The river provides habitat for a diverse range of species including platypus and eel populations. Its urbanised catchment supports essential utility and infrastructure benefits including providing freshwater to most Melbournians and drainage for the city. And yet, the water flows, riverbed, and catchment have all been heavily altered and degraded.

This report, commissioned by the Yarra Riverkeeper and undertaken by the University of Melbourne, is a conceptual and practical exploration of the Birrarung. It contributes to bringing forward the Great Birrarung Parkland, which is enshrined in the Yarra River Protection (Wilip-gin Birrarung murron) Act 2017 – a parkland that celebrates water, land, community, and culture.

The report provides readers with practical actions, strategies, and recommendations contributing to the initial development of the Great Birrarung Parkland. It demonstrates a near term strategy to begin to re-conceptualise the river as one living and integrated natural entity from source to sea. It details how to restore key confluences through incremental schematic designs with land stewardship models that are implementable and contribute to the vision for the river.

The research builds upon the concept of 'net gain' where the river can be improved to incorporate environmental, cultural, social, and recreational benefits. Three confluences or 'case studies' have been selected at the following locations: Darebin, Merri, and Gardiners Creeks. They are explored in detail to bring to life the concept of the Birrarung as a living entity. These confluences have served as meeting spaces with a long cultural history. They are sites where ecological and cultural regeneration can benefit the river and its tributaries. Each confluence was approached as a site with its own unique enhanced opportunities. Future research and action could see all confluences with the river experience 'net gain' using a similar methodology.

Each case study includes an analysis of its historical context to show how the river has been used and modified over time, a photographic essay to provide environmental, cultural, social, and recreational impressions of the site, two conceptual design maps (the first to provide key observations and opportunities of the site, the second to propose net gain and regeneration strategies), and progressive adaptations, arranged into near-, mid- and long-term strategies. Viewed together, the resulting information provides a full picture of how to support 'net gain' more fully.

Figure 4. *The veins of Inner Melbourne.*

The process of undertaking this research has not been linear and is the result of conversations with experts, collaborators, stakeholders, and those who care for the Birrarung and waterways while building on existing research and ideas, sharing, and receiving feedback, new conversations, shared knowledge, and discovery.

The identification of opportunities for Traditional Owners to benefit from these adaptation strategies is of primary importance to this research.

Each confluence, therefore, has specific adaptation strategies that embrace the connection to Country and spirituality, support land back agreements, and celebrate the cultural significance of each confluence.

Six universal key recommendation have been identified through the case study assessments:

1. Establish distinct regeneration zones across the district with indigenous identity providing diverse plantings and management practices

2. Improve the tributary and Birrarung aquatic habitat and water quality through watershed management, localised flood zone management and creek bed habitat regeneration.

3. Establish cultural and ecological districts at and around the confluences with community building that creates activity and a place to expand around education, ecology and cultural heritage, with a strong destination.

4. Amplify net gains through the development of multi-functional landscapes that build on the attributes of the Confluence.

5. Negotiate a shared land holding and custodianship model to give back land access, use and ownership to Traditional Owners.

6. Establish public/private re-investment programs and education programs.

We hope that this first report helps to conceptualise complex issues and possible adaptation strategies. This will help people understand what is possible, what needs to be done, and the impact those strategies could have. This is the first step in providing actions to support the restoration and reconciliation of land and people along the Birrarung.

Figure 3. *Layers of the Confluence.*

The Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation (WWCHAC) were co-educators of the Design with Country studio at the University of Melbourne taught in 2021, that helped to educate the educators and research assistants who worked on this document. Engagement with their deep knowledge of country and how to care for it has informed our approach to the sites. We hope that further engagement will continue to play an important role in the development of this project moving forward.

The Birrarung Council speaks for the Birrarung as 'one integrated natural entity'. The Council is a statutory body created by the Yarra River Protection (Wilip-gin Birrarung murron) Act 2017 (Yarra Protection Act). It provides independent advice to the Victorian Government on, and advocates for, protecting and improving the Birrarung.

The Yarra Riverkeeper Association (YRKA) is the community voice of the Birrarung. They are an independent, community-led organisation of advocates who represent and protect this iconic Melbourne waterway. As Melbourne's population grows, the river is coming under increasing environmental pressure, pollution and habitat fragmentation. Riverkeepers are vital to keeping the river healthy.

The Landscape Architecture Program has been part of Melbourne's School of Design since 1978. In 2019, the Faculty of Architecture, Building and Planning celebrated 150 years of built environment education at the University of Melbourne. Landscape Architecture is a unique discipline bridging between the arts and sciences, design and the environment, and engages in core ecological, cultural and social issues in both urban and rural societies.

The Urban Ecology, Development and Design Hub (UED²HUB) works across disciplines (design, planning, construction, engineering, social sciences, and ecology) focusing on collaborative models that integrate multiple scales and work across diverse perspectives. The hub adaptst the design process to position researchers in a proactive role alongside designers, engineers and other stakeholders in shaping urban environments. The hub generates innovative design strategies generating new knowledge to foster social and ecological outcomes for cities.

Consulted Groups

Trevor Phillips, President, Friends of Gardiners Creek Valley Inc.

Luisa Macmillan, Manager, Merri Creek Management Committee
with Michael Longmore and Angela Foley

Danny Reddan, Darebin Creek Management Committee, Inc.

University of Melbourne, Green Infrastructure Research Group

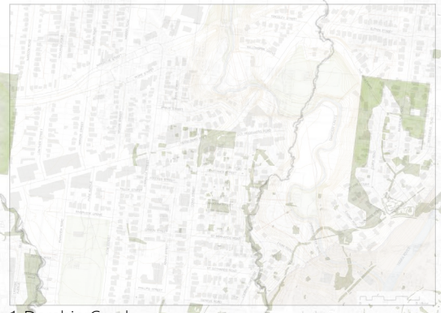
University of Melbourne, Water Infrastructure Research Group

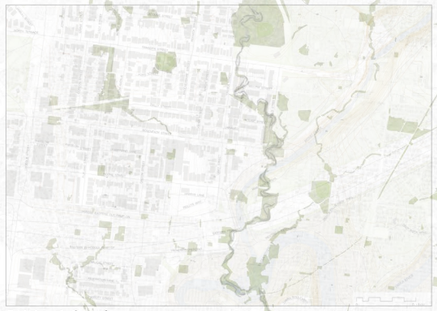
Aviva Reed, Transdisciplinary Visual Ecologist

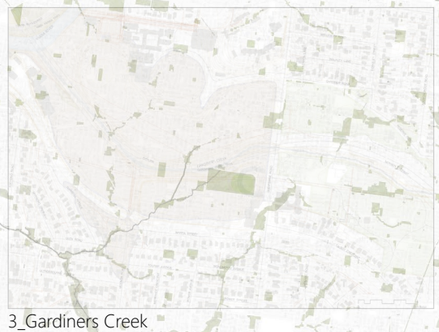
CONTENTS

9 INTERSECTIONS
SITE ANALYSIS

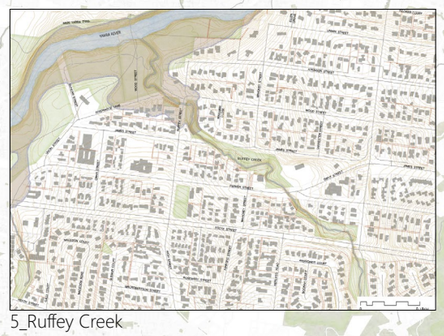
As part of the project we identified and briefly investigated nine tributary confluences with the Birrarung. This study facilitated an understanding of the land use conditions around these intersections.

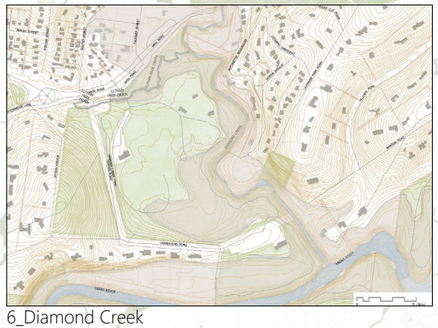

1_Darebin Creek

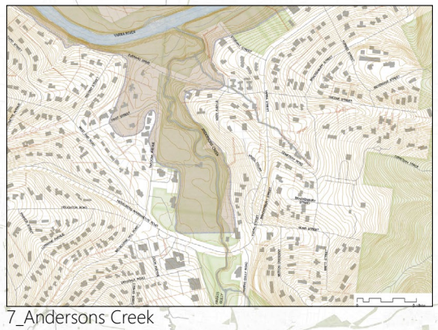

2_Merri Creek

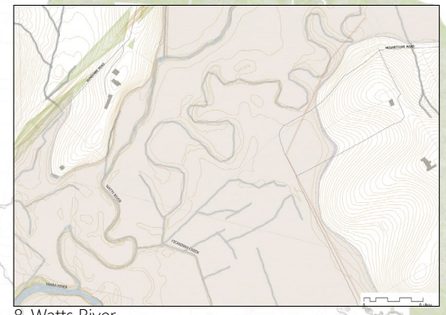

3_Gardiners Creek

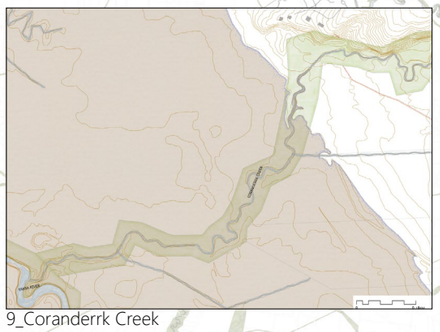

4_Plenty River


5_Ruffey Creek


6_Diamond Creek


7_Andersons Creek


8_Watts River


9_Coranderrk Creek

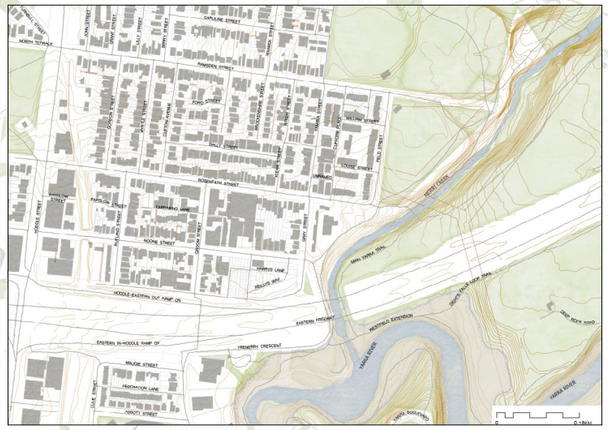
1 2 3 4 5 6 7 8 9

Figure 4. *Confluences map of the Birrarung.*

SELECTED INTERSECTIONS
SITE ANALYSIS

Due to COVID-19 restrictions, we were only able to access the three sites closest to the city. This drove the selection of Gardiners, Merri and Darebin Creeks.

1_Gardiners Creek



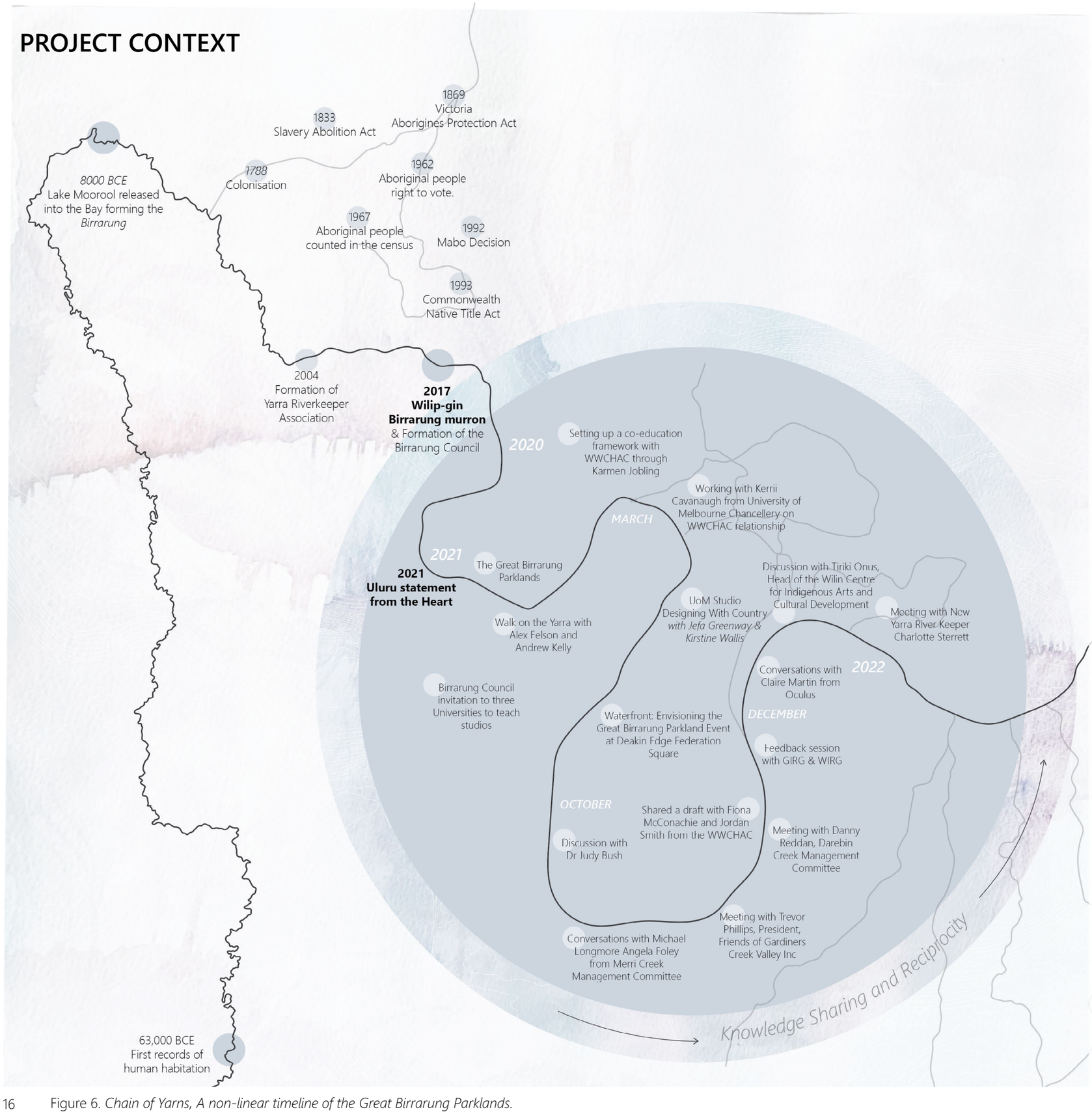
2_Merri Creek

3_Darebin Creek

ROADS
CONTOURS 1M
EASEMENT
PROPERTY VIEW
BUILDING FOOTPRINTS
WATER AREA
100Y ARI EXTEND
METRO OPEN SPACE

Figure 5. *Three confluences.*

PROJECT CONTEXT



CHAIN OF YARNS

In 2021, The Birrarung Council invited postgraduate landscape architecture students to collaborate and develop resiliency planning for the Great Birrarung Parkland. In this capacity we formed a bi-cultural teaching team and established a co-education approach with the Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation (WWCHAC).

Through cultural immersion led by First Nations teachers and guests, students navigated the concept of connection to Country, engaging in deep listening and group exercises. Students generated a series of design and strategic planning proposals that respond to the many factors impacting the health of the river. The studio included a parallel discussion with First Nations design leaders and WWCHAC representatives.

We carefully listened to the diverse ideas and opinions expressed by city managers and professionals, to better understand what the Birrarung means to a variety of people. We further shared design ideas with the WWCHAC representatives for guidance and feedback. Students sought to extend the Birrarung Council's mandate to serve as the voice of the river and to stake claims for the Birrarung as a space for Aboriginal cultural meaning, recreation, wildlife, and habitats.

Following this studio, the University of Melbourne (UoM) staff worked with the Yarra River Keeper Association (YRKA) to negotiate a contract focusing on adaptation planning for selected confluences as the first stage of a long-term adaptation plan being developed through the University of Melbourne. The intention is to continue to coordinate closely with the WWCHAC to foster the Great Birrarung Parkland. UoM staff hired four research assistants including three from the studio, to work with the team to generate design proposals for selected sites that introduce long-term resilience and aligned the diverse interpretations and demands on the river.

We approached each confluence as a site with its own unique conditions and opportunities. These intersections are both culturally and ecologically significant as nexus point where the smaller scale tributaries catchments from the foothills feed into the larger Birrarung catchment. According the Tiriki Onus, Head of the Wilin Centre for Indigenous Arts and Cultural Development, confluences are "spaces for ally-ship, meeting places where the water comes together" and are considered to be "powerful culturally."

The team utilised principles of landscape architecture, ecological regeneration, and net gain developed by the Yarra River Keeper to address near, mid, and long-term planning for Birrarung confluences. This document introduces and pilots the approach across three locations: Gardiners, Merri, and Darebin Creeks.

Figure 6. *Chain of Yarns, A non-linear timeline of the Great Birrarung Parklands.*

EXPLORING THE ORIGIN AND MEANING OF NET GAIN STRATEGIES

The net gain approach in this document is derived from the following documents. It provides the framework for assessing our findings and observations:

- Wilp-gin Birrarung murron (Yarra River Protection) Act 2017
- Burra Charter / Practice Note - Understanding and assessing cultural significance
- Yarra River Ecological Regeneration Guide 2021

The full documents can be found online and we highly recommend reading them alongside this report.

The following pages outline an evolution of the documents listed, our approach, and how we have interpreted net gain in order to apply it to the case studies.

Our definition of net gain:

Net gain is context and site specific, requiring detailed analysis of conditions on the ground as well as an approach towards defining the metrics and supporting both quantitative and qualitative analysis.

Qualitative and quantitative measures need to come together in a holistic way, incorporating different types of knowledge.

We seek to weave into our designs Indigenous knowledge and cultural approaches from the original custodians of the land on which the Birrarung flows. We are also weaving in ecological and scientific knowledge generated over the last few decades.

We are advocating for the cultural and environmental regeneration of the confluences, building on the above mentioned documents. We seek to generate targeted net gain applications that can inform the development of the Great Birrarung Parkland.

It is a complicated undertaking, as cultural and environmental strategies are closely overlapping concepts that need to also be understood separately and distinctly. Many factors are not easily quantified, however, qualitative factors may be just as important.

We hope that this first report helps to conceptualise these complex issues and introduces possible adaptation strategies that can help people understand what is possible, what needs to be done, and the impact those strategies could have on an environmental and cultural values including economic, social and recreation impacts.

We further classified those strategies further into short, mid, and long-term to help stakeholders and decision makers visualise ways in which adaptation strategies and associated net gains can occur at different points in time.

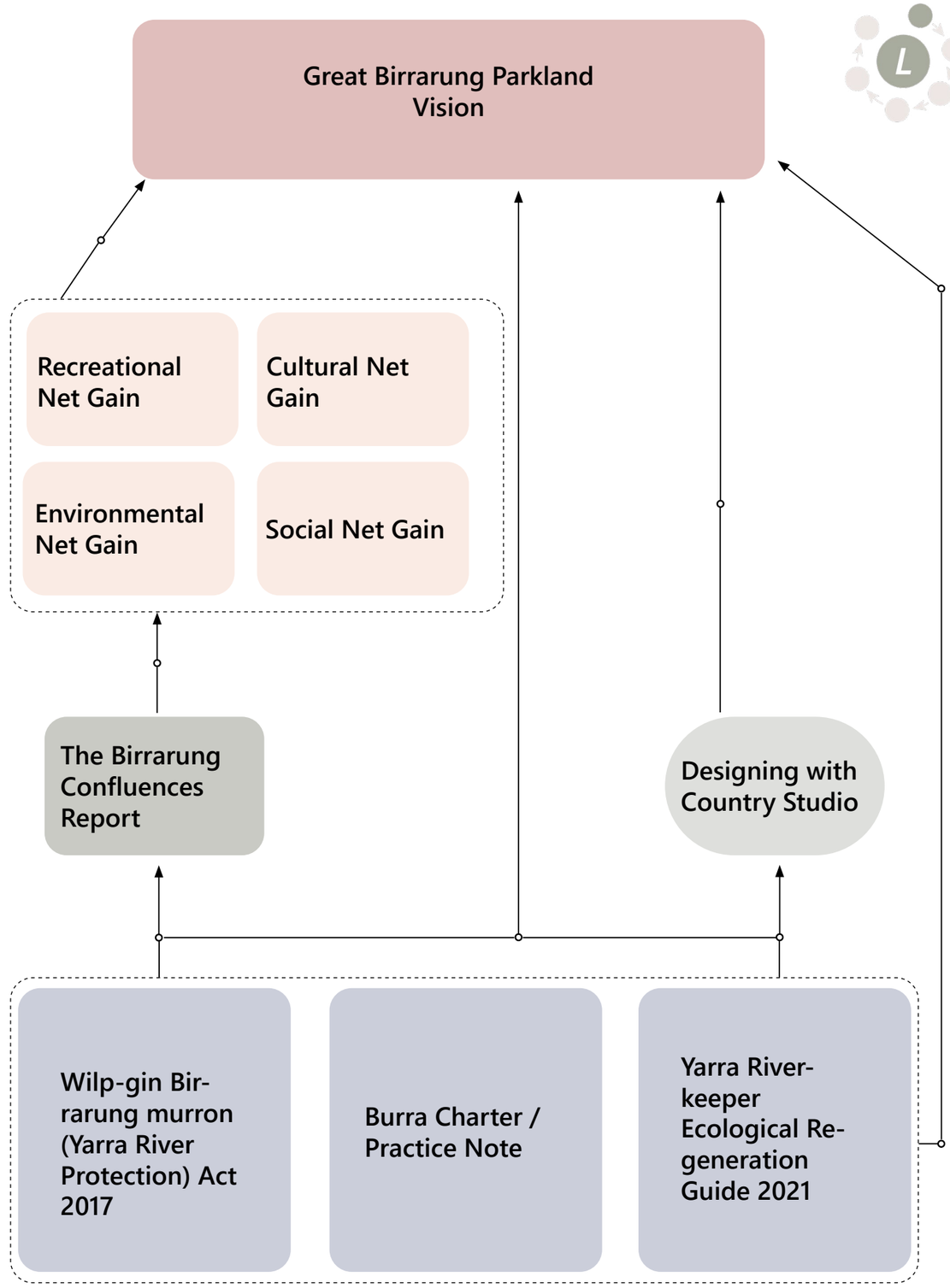


Figure 7. *Net Gain approach and origin.*

KEY POINTS:

1. The following steps are defined in the **Burra Charter Practice Note** in understanding and assessing cultural significance:
   (a) Understanding place
   (b) Assessing cultural significance
   (c) Identifying factors and issues
   (d) Developing an appropriate policy
   (e) Preparing a management plan
   (f) Implementing the management plan
   (g) Monitoring and reviewing

2. **The Yarra Riverkeeper Regeneration Guide** outlines four key components of its plan:
   (a) ecologically healthy cores, such as nature reserves, parks and national parks on the river,
   (b) ecologically healthy corridors that connect these cores, which allows migration of species upstream and downstream in response to climate and urbanisation pressures,
   (c) a landscape-scale view of the Birrarung that treats the river as 'one living and integrated natural entity' (Yarra River Protection [Willip-gin Birrarung murron] Act), and
   (d) a focus on enhancing the ecological processes (and therefore ecological integrity) of the river corridor.

   Different measures of Net Gain:

3. Environmental Net Gain;
   including habitat health and connecttivity, increased biodiversity, or resilience planning

4. Social Net Gain;
   including connection to Country, cross-cultural visibility and acknowledgement, preservation and protection

5. Recreational Net Gain;
   including improved access, characteristic view points, quality of amenities

6. Cultural Net Gain;
   including access to Country, education, natural resource management (cultural burning and watering).

Figure 8. *A View of the Birrarung.*

IMPLEMENTING NET GAIN STRATEGIES

In our research, we started to look at and analyse the sites of the three case studies through the lens of the different characteristics of net gain (see page 20), environmental, social, recreational, and cultural.

The strategies and recommendations outlined in this report implement those broader strategies and illustrate how net gain can be applied to various complex sites and scenarios.

One way that we interpret net gain, is through the metaphor of a physical net used by Aboriginal people to catch fish and eel. Like the physical net, the material collection, and weaving approaches are equally important. The net can have wide spaces or narrow spaces, impacting what is caught. Net gain catches certain ideas but it is equally important to consider what gets through the net. The interaction of the construction of the net with its performance provides an important analogy to consider in relation to applying net gain as a principle for capturing critical factors informing cultural and environmental values.

Figure 9. *Net Gain as a cultural approach.*

OUR PROCESS

The projects proposed in this document focus on how to adapt three selected tributary intersections that flow into the Birrarung, in ways that foster net gain. This research is the result of many conversations with experts, collaborators, stakeholders and those who care for these waterways.

Throughout these exchanges our team built on existing research and ideas, and shared and received feedback on our findings and ideas.

No project like this follows a linear path. New conversations, shared knowledge, and discoveries compelled us to re-evaluate our ideas and periodically deviate in our design process.

This diagram illustrates the process that we followed from our first confluence visits to the final strategic proposals presented in this document.

The stages of our process are detailed below:

L

Learning
- Drawing on past learning and exchanges.
- Collecting stories and artefacts that reveal fragments of each site's past, present and future.

E

Exploring
- Visits to the confluence to explore and observe the qualities, remnants and experience of each
  place.

M

Mapping
- Visualising the areas of opportunity and constraint surrounding each confluence.
- Finding overlays, links, and connections to drive adaptation strategies.

A

Analysing
- Reviewing the mapping data and observations from each site.
- Establishing opportunities to build on existing adaptation and regeneration strategies.

I

Identifying
- Locating areas of high priority and potential to propose detailed and specific strategies.
- Aligning strategies with Net Gain and Regeneration frameworks.

P

Planning
- Prioritising and staging site strategies over short, mid and long-term time frames.
- Considering greatest impact, ease of execution, existing strategies, and stakeholders.

Figure 10. *Our process.*

DAREBIN CREEK CONFLUENCE

Figure 11. *The Darebin Creek Trail.*

DAREBIN CREEK CONFLUENCE

We acknowledge the Wurundjeri Woi-wurrung as the Traditional Custodians of the land of Darebin.

Darebin Creek flows from the northern fringes of Melbourne and continues within the industrial inner-city neighbourhoods before meeting the Birrarung at the trivia of Ivanhoe, Alphington and Kew East. Significant community efforts have been made through regenerative projects to support the environmental growth of the creek, aspiring to achieve ecological stability in the once healthy waterway.

Key Adaptation Strategies:

1. Encourage stakeholder collaboration to establish a satellite extension of Darebin Parkland between Heidelberg Road and Darebin Creek Rail Bridge. The area has excellent potential as a habitat management zone for ecological restoration. An exclosure fence can protect the land, creating opportunities for preserving and regenerating endangered and threatened native species.

2. Establish water sensitive urban design strategies (WSUD) focusing on stormwater management in partnership with Latrobe Golf Club. Incorporate the residential uplands with rain gardens and bioswales re-directing stormwater into water retention systems. Protect vulnerable pressure points such as the emergency sewer relief point.

3. Incorporate ephemeral water hazards and bioswales within the golf course. Encourage habitat links and opportunities for seed collection in collaboration with Darebin parklands. Increase permeability and soil quality in the fairway with native low-lying vegetation and establish bushland habitat in the rough areas of the golf course.

4. Connect the ongoing Art Trail and regeneration project initiated by the heritage-listed Macgeorge House and the Napier Waller Estate to the Darebin Creek Trail. Encourage the connection as an educational resource for further regeneration work.

5. Establish long-term strategies to highlight the Darebin Creek and Birrarung confluence. Aspire to blur the public/private land boundary through a partial land back agreement focusing on cultural and social connections to the waterway.

Opportunities to benefit Traditional Owners:

1. Embrace a cross-cultural narrative that encourage a connection to nature, country and spirituality

2. Establishing land back agreements that enable a direct connection and allow for regeneration of the riparian corridor

3. Encourage the broader community to care for Darebin Creek through education, reciprocity, and stewardship

4. Celebrate the cultural significance of the confluence as a place to feel, connect and listen to Country.

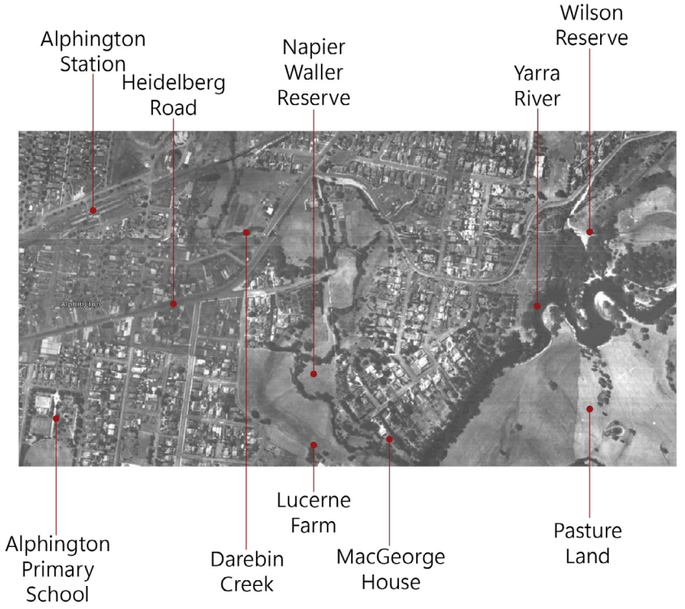


Figure 12. *Historic Analysis of the Darebin Creek.*

Figure 13. *Darebin Creek Existing Conditions Map.*

DAREBIN CREEK CONFLUENCE
HISTORIC ANALYSIS

Darebin Creek has been heavily modified and polluted over the past two hundred years.

The recent history of the catchment is dominated by rubbish tips, dumping sites and toxic industrial waste infiltrating the waterway.

Many culturally significant and sacred sites along the creek have been lost, but their memories are kept alive through oral history passed down by the Wurundjeri Woi-wurrung and the greater Kulin Nation. The stories depict culturally significant meeting places engulfed in a healthy and thriving riverscape.

Today, there are a growing number of regeneration projects that aim to support the ecological stability and resilience of the creek. A growing variety of native flora and fauna can be observed along the catchment such as the endangered matted flax-lily and the growling grass frog.

Historical Timeline

Non-linear Representation of Selected Stories
Past, Present and Future

Footnotes

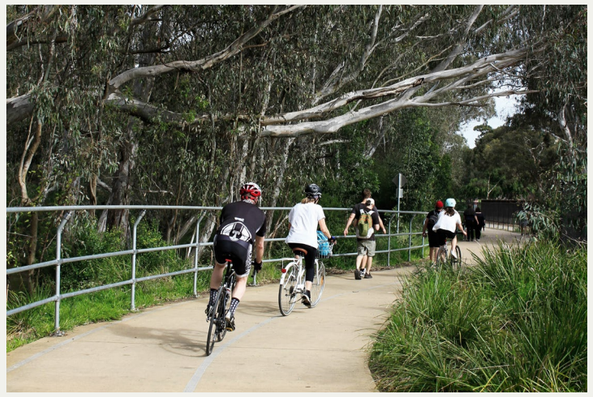
①Aerial view of Heidelberg Road looking south Victoria.
②(Re)making the wetlands in the Darebin Parklands, former Rockbeare Park.
③Where the Basalt and Silurian meet along the Darebin. Christopher Campbell & Bailey.
④The endangered quoll, Australia's native cat, was observed along Darebin Creek in the early 1900's.
⑤Children swimming in the Creek.
⑥Cultural burning has brought back critically endangered species to Darebin Creek such as the Matted Flax-lily.
⑦Emus at Bundoora Park along the dam and wetland system allows stormwater to be collected, filtered and stored for irrigation.
⑧Temporary Nissen Huts were established alongside the Thornbury side of the creek to house post -war migrants in the 50s.
⑨A young child playing by the creek edge.

Figure 14. *Non-linear timeline of the history of Darebin Creek.*

DAREBIN CREEK CONFLUENCE
PHOTO ESSAY

Selected moments from Darebin Creek piecing together an impression of the site.
Site Documented 28 . 09 . 2021

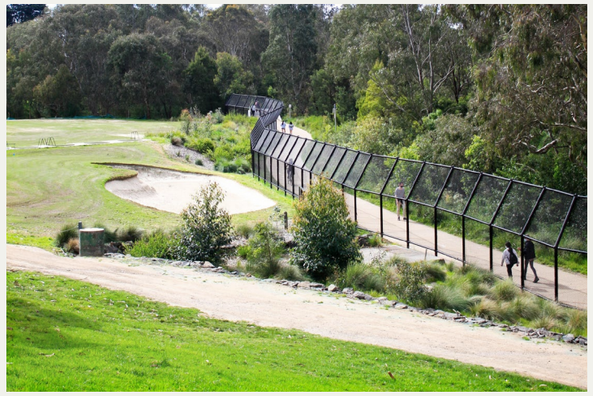
An old friend leaning over, catching her reflection.



Fast and slow adventures.

The banks of Darebin Creek.

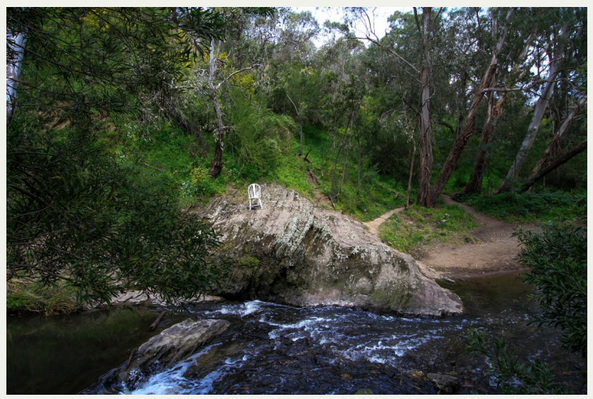
Soft forms at the creek edge.



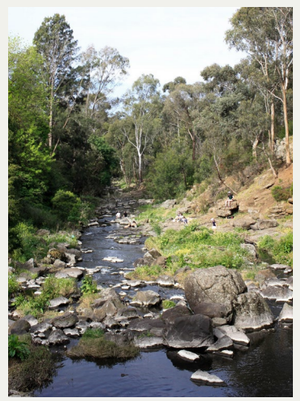
A meandering snake in the landscape.

Abandoned pathways.

Is this the view from the creek?



The daily break, moment for reflection.



Memories of jumping between rocks and splashing in the water.

Figure 15. *Photoessay of the Darebin Creek Confluence.*

DAREBIN CREEK CONFLUENCE
CONCEPTUAL DESIGN MAP 01

Existing conditions and big picture thinking : Key observations and opportunities at the Darebin Creek confluence. For further explanation see Table 1 overleaf.

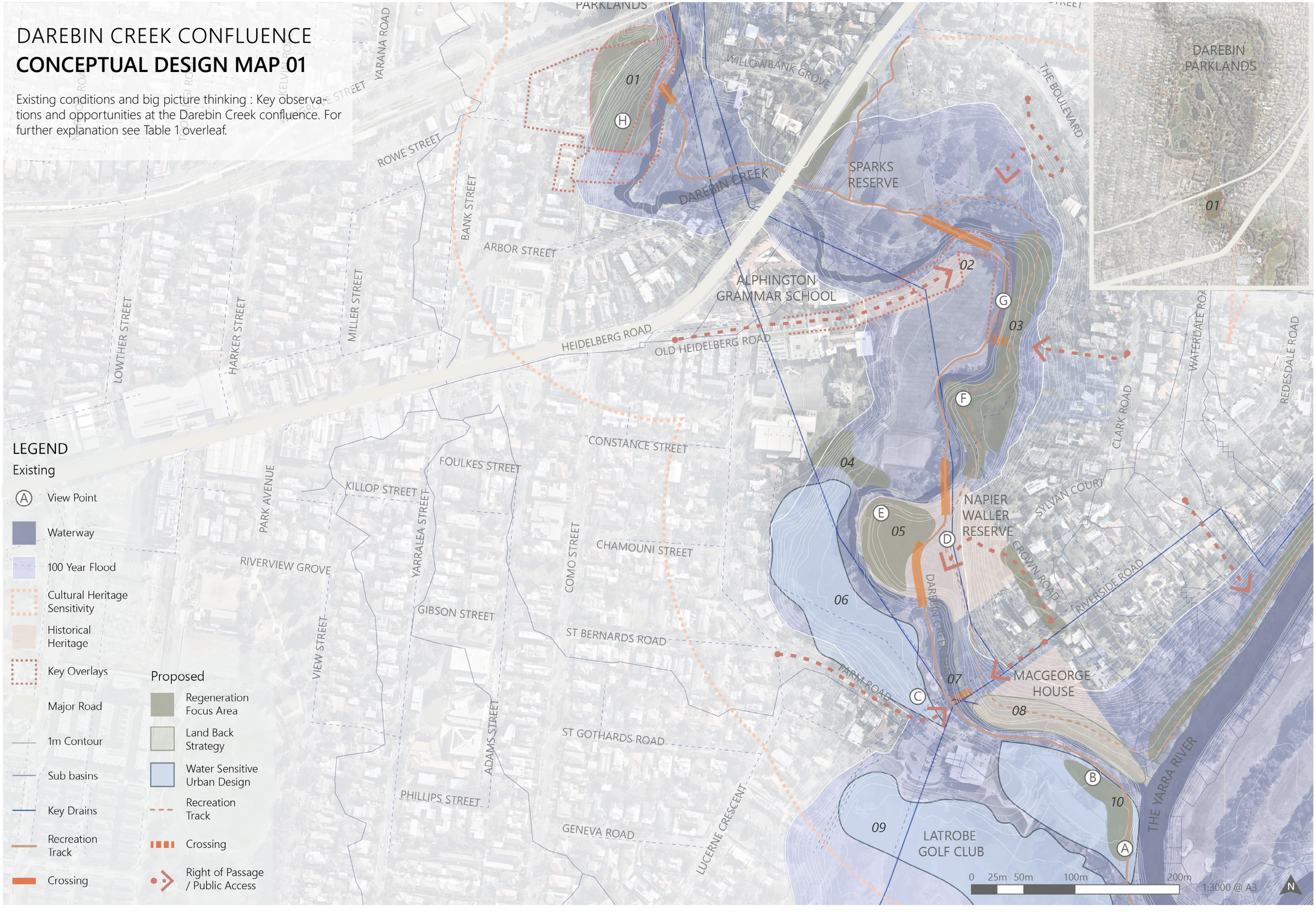


Figure 16. *Darebin Creek Conceptual Design Map 01 - Observations and Opportunities.*

DAREBIN CREEK CONFLUENCE
OBSERVATIONS AND OPPORTUNITIES

Conceptual Design Map 1 (pages 34-36) combines our observations of the current state of the confluence and broadly identifies potential opportunities for net gain, adaptation, and regeneration. These are detailed in table 1 and the photographs on the following page (Figure 16).

AREA	OBSERVATIONS	OPPORTUNITIES
1	Secluded private land with potential to collaborate with the property owner and establish regeneration strategies	Establish satellite extension to Darebin Parklands. The property is suitable for a habitat management zone, focusing on ecological restoration. Explore exclosure fence options for preservation and regeneration of endangered and threatened native species
2	No public access to Darebin Creek Trail on the west bank of Darebin Creek, south of Heidelberg Road	Develop long-term strategy to partner with Alphington Grammar School and LaTrobe Golf Club to establish public access points to the Creek Trail
3	Riparian edge within private residential properties. A partly demolished pedestrian bridge is left in the landscape near public access point	Collaborate with homeowners to establish riparian regeneration strategies to improve water quality, stabilise and protect the creek edge, and develop secluded habitat pockets
4	A stream once connected to Darebin Creek from the north as recorded in the official 1914 MMBW documentation	Establish bioswales and planting filtration strategies
5	Public access to Napier Waller Estate	Extend the Darebin Parklands Spiritual Healing Trail along the Darebin Creek Trail and connect to the Napier Waller Reserve, MacGeorge House, and the Darebin Creek/Birrarung confluence
6	Latrobe Golf Club practice fairway	Develop WSUD strategies to utilise existing topography to redirect and slow down stormwater runoff. Establish water retention system within the golf course for irrigation purposes
7	Location of emergency sewer relief point	Stormwater filtration and redirection strategies along Latrobe Golf Club to prevent extensive water quality pollution within creek system
8	Ongoing regeneration and Art Trail project developed with stakeholders from the Napier Waller Estate and the MacGeorge House	Support project and encourage connection between Art Trail and Darebin Creek Trail. Allow experimental habitat findings to become a tool for further regeneration work along the creek
9	Latrobe Golf Club	Increase permeablility and soil quality in the fairway with native low-lying heathland vegetation and establish native bushland habitat in the rough areas of the golf course
10	No visual connection to confluence	Long-term strategies to enhance the experience of the Darebin - Yarra confluence. Aspirations develop partial land back agreement focusing on cultural and social connections to the waterway

Table 1. *Observations and Opportunities - Darebin Creek.*

DAREBIN CREEK CONFLUENCE
VIEW POINTS

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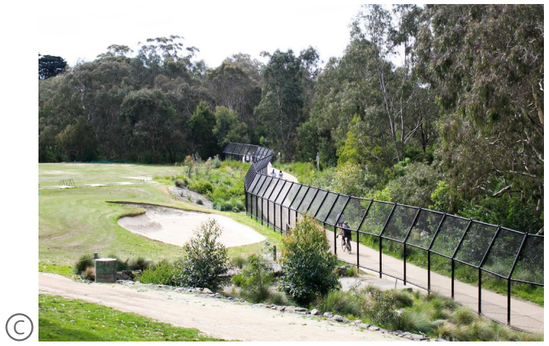

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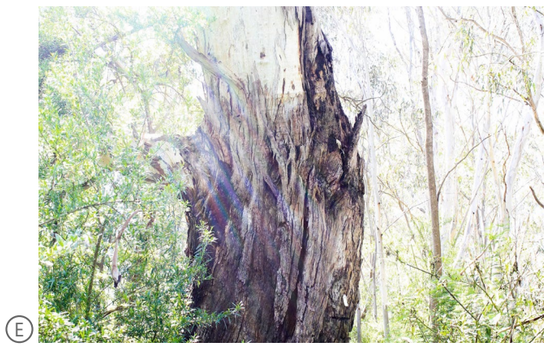

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Figure 17. *Darebin Creek - Important View Points.*

DAREBIN CREEK CONFLUENCE
CONCEPTUAL DESIGN MAP 02

Proposed Strategies : Net gain and regeneration approaches for the Darebin Creek confluence. For further explanation see Table 2 (page 40) and Table 3 (page 42).

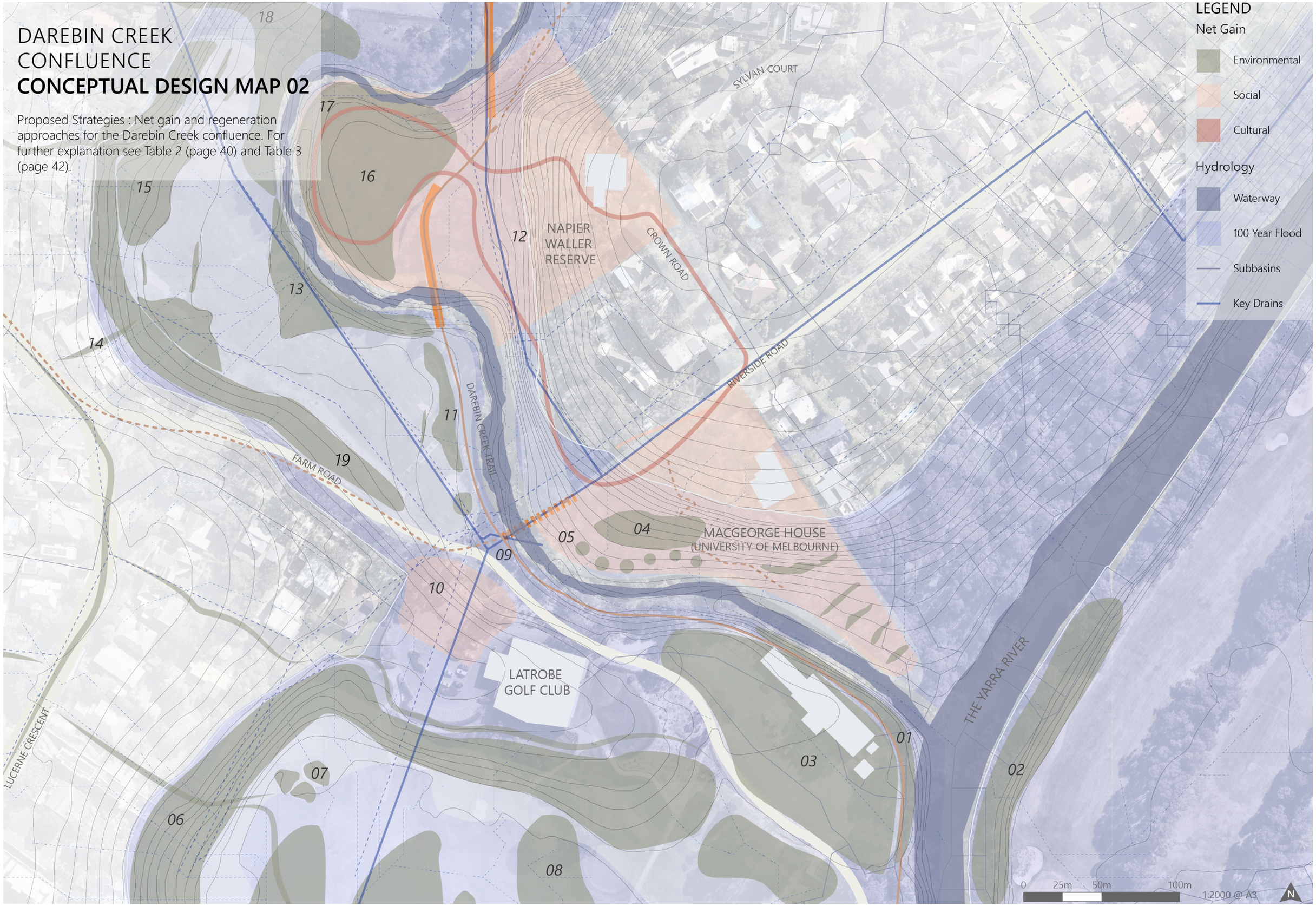


Figure 18. *Darebin Creek Conceptual Design Map 02 - Net Gain and Regeneration.*

DAREBIN CREEK CONFLUENCE
NET GAIN STRATEGY

Conceptual Design Map 2 (pages 38-39) highlights proposed strategies for environmental, social, recreational, and cultural net gain. These approaches are detailed and prioritised in the table below. See pages 18-22 for an explanation of this report's approach to Net Gain Principles.

E Environmental Net Gain
R Recreational Net Gain
S Social Net Gain
C Cultural Net Gain

AREA	NET GAIN	DESCRIPTION	STRATEGY	GOAL	PRIORITY
1	E S C	Riparian edge, confluence	Strategic planting to prevent further erosion	Increase vegetation and habitat. Stabilise creek edge	Short-term
2	E C	Riparian edge, Latrobe Golf	Increase vegetation and tree cover to stabilise riparian edge	Increase vegetation and habitat	Mid-term
3	E	Latrobe Golf Club car park	Increase permeability of surfaces. Establish Rain Garden along south-west car park edge	Slow down and reduce stormwater runoff	Short-term
4	E C	MacGeorge House	Ongoing habitat creation project - experimental habitat design	Develop prototypes specialised for habitat creation in the lower reaches of Darebin Creek	Ongoing
5	R S C	MacGeorge House	Ongoing habitat creation project developing ephemeral pond system	Increase aquatic habitat	Ongoing
6	R S	Proposed creek crossing	Link MacGeorge House with Darebin Creek trail	Create relationship between creek banks and increase opportunity for social and cultural connections	Mid-term
7	E C	Edge of floodplain	Develop bioretention system targeting stormwater runoff from residential zone	Create relationship between creek banks and increase opportunity for social and cultural connections	Mid-term
8	E S	Sand bunkers	WSUD strategies along golf course specifically target stormwater diversion from this point	Slow, reduce, and filter stormwater runoff	Short-term
9	E	Latrobe driving range	Establish native bushland and seed collection zones in rough areas	Slow, reduce, and filter stormwater runoff	Short-term
10	E C	Sewer emergency relief point	WSUD strategies along golf course specifically target stormwater diversion from this point	Slow, reduce, and filter stormwater runoff	Short-term
11	E S	Latrobe golf course car park	Increase permeable car park surfaces and dedicate space to a picturesque bioretention system in memory of the old Lucerne mansion	Increase awareness and involve the local community	Mid-term
12	E S	Latrobe Golf Club practice fairway	Revegetation along fence line	Increase bushland habitat	Short-term
13	S C	Napier Waller Reserve connecting to the MacGeorge House	Art Trail project brings opportunities for cross-cultural connections	Increase awareness and involve the local community	Ongoing
14	E	Stormwater runoff point	Increase vegetation with floodplain species and develop stormwater retention system	Slow, reduce, and filter stormwater runoff	Short-term
15	E	Stormwater runoff paths	Bioswale along selected stormwater runoff paths	Redirect and manage stormwater runoff	Short-term
16	E	Latrobe Golf Club practice fairway	Water retention systems and habitat creation along driving range edge responding to stormwater runoff patterns	Slow, reduce, and filter storwater runoff	Short-term
17	E R C	Napier Waller Reserve	Educational trail highlighting mature trees and native vegetation	Raise awareness by involving local schools and friends groups	Short-term
18	E	Constructed edge condition	Naturalise creek edge	Increase vegetation and habitat	Short-term
19	E	Shared boundary between Alphington Grammar and Latrobe Golf Club	Habitat corridor between Alphington Grammar and creek edge	Link and increase habitat along riparian edge conditions	Mid-term

Table 2. *Net Gain Strategy - Darebin Creek.*

DAREBIN CREEK CONFLUENCE **REGENERATION STRATEGY**

Key areas with potential for regeneration as indicated on Conceptual Design Map 2 (pages 38-39) and site specific strategies. This table is derived from the YRKA's Regeneration Guide and designed to aid in prioritising sites for regeneration with native plant species.

AREA	REMNANT VEGETATION	SITE CONDITIONS	RESTORATION APPROACH	REFERENCE ECOSYSTEM	SITE PRIORITIES
1	Some remnant vegetation	Steep riparian edge with sparse area, exotic grasses, weeds, gravel	Reconstruction	Floodplain Riparian Woodland; high flood risk	Improve riparian edge and clear rubble. Mature River Red Gums along river bank
2	Some remnant vegetation and regeneration	A mix of native and exotic species	Assisted revegetation	Floodplain Riparian Woodland	Improve riparian edge and reduce exotic species; Site has limited use and is part of Latrobe Golf Club
3	No remnant vegetation	Car parks with impermeable	Reconstruction	Floodplain Riparian Woodland	Explore opportunities to increase vegetation between car parks, increasing permeability and urban cooling
4, 5	Some remnant vegetation and regeneration	A mix of native and exotic species	Support ongoing regeneration project	Floodplain Riparian Woodland	Encourage public-private partnerships and extend educational trail to follow the Darebin Creek Trail
6	Minimal - no remnant vegetation	Exotic grasses, bushland, and weeds	Assisted revegetation	Floodplain Riparian Woodland	Opportunity for strategic stormwater management system for Latrobe Golf Course
7, 8, 15	No remnant vegetation	Exotic grasses	Reconstruction	Floodplain Riparian Woodland	Increase vegetation, biodiversity, and habitat; may involve public-private partnerships
11, 13	Minimal - some remnant vegetation along creek edge	Exotic grasses and weeds, some native species along creek edge	Reconstruction	Floodplain Riparian Woodland	Establish native bushland habitat, ephemeral pond system, and seed collection areas
14	No remnant vegetation currently known	Sparse vegetation, mostly trees and exotic grass	Reconstruction	Floodplain Riparian Woodland	Establish stormwater system for the residential uplands; allow subbasin to establish rain garden and bioswale
16, 17	Remnant vegetation, exotic grasses and weeds	Mix of native and exotic tree species, shrubs and weeds	Assisted revegetation	Floodplain Riparian Woodland	Extend and elaborate on existing educational trail; protect River Red Gums
18	No remnant vegetation currently known	Very sparse vegetation, mostly shrubs; gravel; overshadowing from highway	Assisted revegetation	Floodplain Riparian Woodland	Improve habitat connectivity

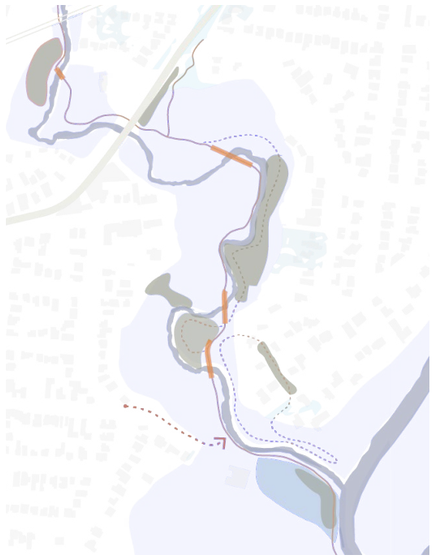
Table 3. *Regeneration Strategy - Darebin Creek.*

Figure 19. *Darebin Creek Confluence View.*

Near Term

3-6 years

Initiate dialogue with key stakeholders (Council, Melbourne Water, and freehold landowners) to explore ecological regeneration and net gain. We will identify and seek to implement pilot projects along the Darebin Creek Trail targeting "low hanging fruit" to give rise to public interest and engagement.



Mid Term

7-14 years

Establish viable long term projects incorporating WSUD, biodiversity enhancements and improved access to the Creek catchment. Implement and manage regeneration projects, and commission art installations prioritising Aboriginal artists. The mid-term stage builds on earlier interventions and seeks to establish shared long term vision for the Darebin Confluence.

Long Term

15-30 years

Establish and reinforce this confluence as a cultural heritage district celebrating the Wurundjeri Woi-wurrung history and to work across the entire catchment.

DAREBIN CREEK CONFLUENCE **NEAR- MID AND LONG-TERM PLAN**

1. Target locations distributed along the recently installed Darebin Creek Trail taking advantage of views and regenerative opportunities to augment biodiversity along the trail and enhance user experiences. Identify low achievable steps with the goal of improving the trail through simple investment strategies.

2. Initiate discussions with the councils tied to the Darebin Creek Trail and Melbourne Water around a "Darebin Creek Trail enhancement project" focusing on improved public access and connectivity as well as catchement health. Build on the public acquisition overlay that extends over freehold land adjacent to Darebin Creek.

3. Continue coordinating with the Darebin Creek Management Committee, Inc focusing on updates to the lower portion of Reach 6 building on the Darebin Creek Management Plan of 2017 and the recent Darebin Creek Valley Planning Workshops in 2021.

4. Work with the University of Melbourne-owned parcel, the Macgeorge House and Estate on Riverside Road in Ivanhoe. It is located at the confluence of the Darebin Creek and the Yarra River bend. This includes implementing an initial pilot project with Melbourne Water focusing on invasives management through the Stream Frontage Management Program. Establish a dialogue with the WWCHAC around a model reconciliation around land access and ownership.

5. Contact Latrobe Golf Course and explore their interest in beautifying the Lower Golf Course Car Park area along the recently constructed Darebin Creek Trail. Introduce the ideas around WSUD strategies increasing vegetation and permeability.

A. Preserve and restore low-lying Napier Waller estate property and restrict public access for preservation purposed.

B. Work with the group of homeowners and freehold land along locations such as Clark Road to implement a floodplain regeneration strategies along riparian edges between the Creek and backing up to private properties. Use this regeneration to establish community support for Rights Holder access.

C. Extensive regeneration and revegetation works are needed on the west bank of the confluence. Work with Melbourne Water and Council to explore options for a combined regeneration along the slope with an associated viewing platform (using the same structure) to strengthen the visual connection to the creek.

D. Work with the Darebin Creek Management Committee, Inc. to initiate a project with the freehold property at 2 Rowe Street (1.17 ha), Alphington and other selected properties utilising exclusion fences with active regeneration and management to restore an Australian landscape. Plant and animal species can be raised and used for reintroductions to the Darebin Parklands to serve as a satellite park extension.

E. Develop the Macgeorge Floodplain Habitat Art and Sculpture Walk as a precedent for tributary intersections along the Birrarung. Working with ecologists and designers, we would implement a series of art installations as habitat including commissioning WWCHAC representatives. This pilot project weaves Aboriginal cultural heritage and land custodianship together with park and recreational spaces, habitat regeneration and catchment management. The approach will expand visitation to the river, fostering cultural tourism destination.

F. Partner with Latrobe Golf Course to establish public access to Darebin Creek Trail from the west bank. Work on Lower Golf Course Car Park to implement a pilot WSUD treatment change set of strategies and introduce biodiversity metrics encouraging increased vegetation and ecosystem structure permeability.

i. Develop a Darebin Lower Reach (Reach 6) Land Use Catchment Strategy. Use net gain and regeneration to identify opportunities and build. Develop supporting easements. Target private land holders in addition to Council, Melbourne Water and crown land. Increase permeability and soil quality. Use native low-lying heathland vegetation and establish native bushland habitat in the floodplains.

ii. Establish Darebin Parklands Wildlife Garden Extensions to expand the Parklands into the neighborhood with satellite habitat patches. Use landscape ecology principles focusing on target species to support food webs that can survive in urbanised riparian zones and uplands. Contribute to city-wide initiatives by introducing critical habitat management zones for native habitats. This can include establishing a seed collection programme and supporting threatened and endangered species.

iii. Develop the Macgeorge and Napier Waller Habitat Art and Sculpture Walk. The Darebin Creek also conveniently connects this land with the Napier Waller House and Reserve. We propose to connect these along the Darebin Creek Trail through a partnership across the Birrarung Council, UoM Landscape Architecture, the Macgeorge Board, the Yarra River Keeper, and WWCHAC as Rights Holders to imagine a future expanded Great Birrarung Parklands.

iv. Develop a Latrobe Golf Course Water sensitive Urban Design Manual introducing ecological design and adaptive management strategies to drive the Golf Club water management. Utilise existing topography to filter and slow down rain. Reconstruct the retention system for golf course irrigation with bioretention and wetland construction. Introduce stormwater and irrigation based green infrastructure and reconnect the golf course to the river through revegetation, species introductions and hydrologic management. Increase permeability and soil quality across the site. Plant native low-lying heathland vegetation and establish native bushland habitat in the rough areas of the golf course fairway. Establish habitat links and a seed collection programme in partnership with Latrobe Golf Club and Darebin parklands. Develop parallel effort on Green Acres Golf Club.

Figure 20. *Darebin Creek Confluence Adaptation Strategies.*

DAREBIN CREEK CONFLUENCE
CONCEPTUAL CROSS SECTION

The creek carries a vast collection of moments. These moments, stories and spaces are loosely connected yet part of a whole. Imagine that you're sitting by the creek. And whilst you're sitting there, you realise that the landscape will present itself differently depending on time, connection and perception. The moment you just shared with the landscape has passed. But this is a reminder to observe the moments and stories surrounding the riverscape along Darebin and beyond.

Figure 21. *Darebin Creek Confluence Conceptual Cross Section.*

MERRI CREEK CONFLUENCE

Figure 22. *Merri Creek towards the Yarra.*

MERRI CREEK CONFLUENCE

We acknowledge the Wurundjeri Woi-wurrung as the Traditional Custodians of the land of the Merri Creek.

Merri Creek originates north of Melbourne, near the small town Wallan. It flows through the south through the inner-city neighbourhoods of Coburg, Brunswick, Northcote and Clifton Hill and meets the Birrarung at Dight Falls.
Multiple community organisations are tirelessly working on revegetating the highly urbanised creek edge, maintaining it as the important wildlife corridor it still is.

Key Adaptation Strategies:

1. Initiate Water Sensitive Urban Design (WSUD) project through creek adjacent neighbourhoods. Restoring first a single lane way into a stormwater filtration greenway, followed by a further stitching together of regenerated laneways and greenspaces, expressing the flows of stormwater runoff into the creek.

2. Map sub-basins and runoff to identify major discharge points, dictating the location of key filtration planting zones. Working to improve water quality and assist aquatic habitat regeneration and management.

3. Through an exemplary process of engagement with the WWCHAC and with the Council and neighbourhood, co-investigate the feasibility of adapting the existing Yarra Recycling Centre and surrounding landscape into a shared cultural centre and landscape.

4. Create an informal education trail through the improvement of signage to provide information on cultural heritage and ecology that celebrates the extensive revegetation works.

5. Establish the Merri Merri Confluence Cultural District from Dights Falls to the Cultural Centre and recreational fields connecting under the existing bridge utilising public land where possible.

Opportunities to benefit Traditional Owners:

1. Highlight the importance of this confluence as a welcoming place for Indigenous people of Australia and all who wish to connect to its spirit.

2. Create an opportunity for an Indigenous-led design project that highlights the Wurundjeri Woi-wurrung cultural perspectives.

3. Through strategically staged interventions, engage in the process of returning land back from the urban to the creek.

4. Highlight the important connection of the upland to the creek, increased awareness leading to improved health of waters, health of country and health of people.

Figure 23. *Historic Analysis of the Merri Creek.*

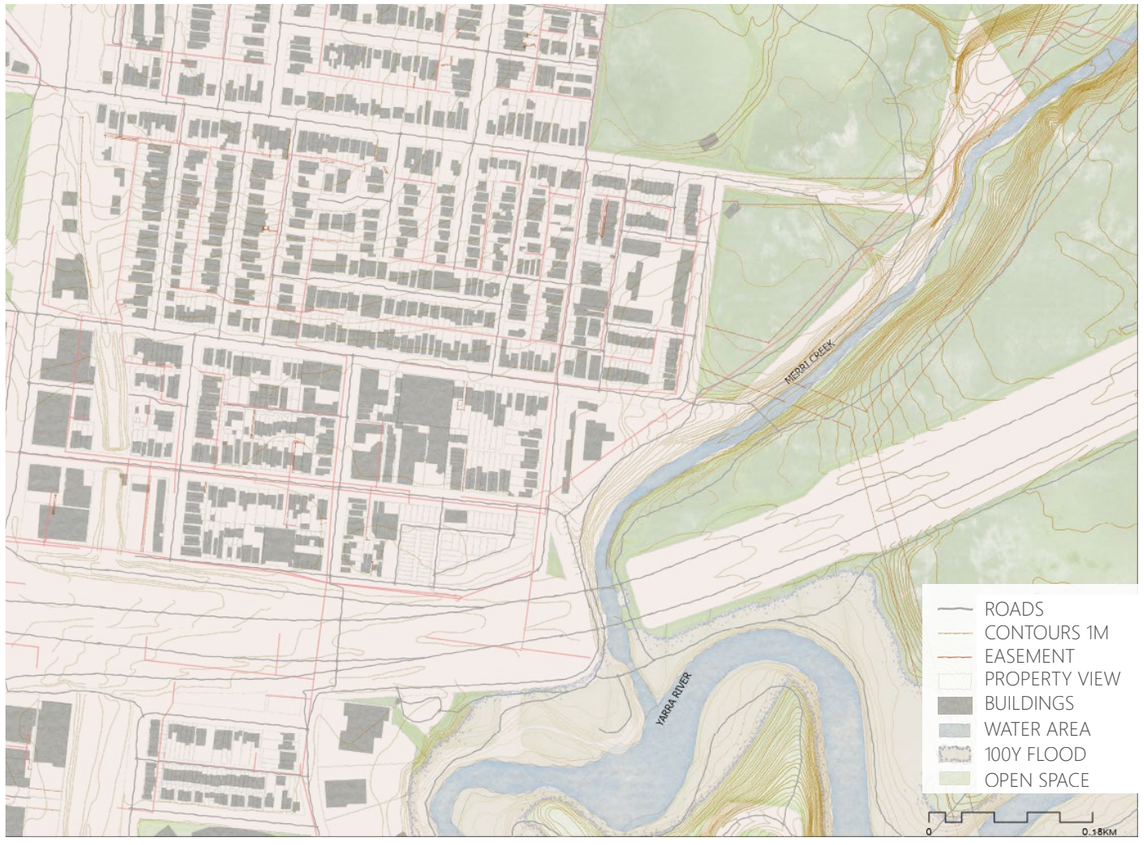


Figure 24. *Merri Creek Existing Conditions Map.*

MERRI CREEK CONFLUENCE
HISTORIC ANALYSIS

The confluence of the Merri and the Birrarung is a highly significant site, its past forever imprinted in the quality of the water, the soil and in the stories of its people.

At time of Melbourne's colonisation the confluence was home to the Wurundjeri Willam Clan who resided in this area.

However, the confluence has been massively impacted and changed since colonisation. This includes impacts from urbanisation such as the destruction of remnant vegetation, construction of the Eastern Freeway, dumping of construction materials, and the displacement of historical artefacts.

Over the last 45 years, the hard work of community members and environmental management groups has drastically restored and improved the quality of the creek and lives of all that resides in its catchment. The success of past and ongoing regeneration efforts empower us to be brave in imagining the many possible futures that a strong combined vision and effort can achieve.

Historical Timeline

Non-linear Representation of Selected Stories
Past, Present and Future

Footnotes

①Photograph of Clifton Hill Looking East with Merri Creek on the Left, 1925.
②Sketch map of Merri Creek Protectorate Station by William Thomas, 1847.
③Dipping beds of sandstone and mudstone of the Melbourne Formaton at Dights Falls.
④Weir and Fishway rebuilt in 2012 allowing fish to coninue upstream.
⑤Sketch of Dights Mill, Melbourne Flour and Milling Company, 1857.
⑥Melbourne's Grey Headed Flying Fox colony relocated to Yarra Bend in 2003.
⑦Merri Creek Flood 1916.
⑧Billibellary, Chief of the Yarra tribe burried at the confluence in 1846.
⑨The Batman Deed (Melbourne Treaty), 1835.
⑩Fishing Nets Installation, by Glenda Nicholls from Weaving the Waterways Exhibition, 2017.
⑪EPA investigation into the death of up to 60 eels found dead between Richmond and Dights Falls, 2005.
⑫Local newspaper reports on the campaigns to protect the Creek.
⑬Swamp Wallaby movements allong the Lower Merri Creek and sightings at Northcote Golf Club .
⑭Regular monitoring of Golden Sun Moth has seen a storng emergence of the species in the Merri Creek

Figure 25. *Non-linear timeline of the history of Merri Creek.*

MERRI CREEK CONFLUENCE
PHOTO ESSAY

Selected moments from Merri Creek piecing together an impression of the site.
Site Documented 26 . 09 . 2021

Rusted remnants of the old Mill protruding from it's grave.

To some, the river is an obstacle, to others, a welcome break.

How far will the river stretch?

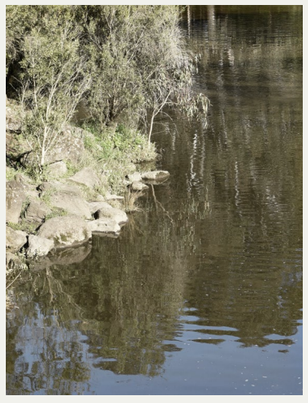
Inaccessibility to pedestrians means a refuge for mosses and lichens.

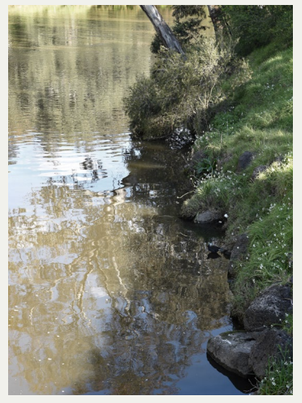
A playground and extreme sports field.

Layers of boundaries and limits.

The creek performs a reflection of its surrounding ecosystem.

Marked with traces of activity.





The edge condition, constructed and constricted.

Figure 26. *Merri Creek Photoessay.*

MERRI CREEK CONFLUENCE
CONCEPTUAL DESIGN MAP 01

Existing conditions and big picture thinking : Key observations and opportunities at the Merri Creek confluence. For further explanation see Table 4 overleaf.

12

HODDLE STREET

CLIFTON HILL

01

QUARRIES PARK

1880 City of Melbourne Quarry

05

HALL RESERVE

MERRI CREEK TRAIL

C

RAMSDEN STREET OVAL

1960 Ramsden Tip Site

09

04

E

A

"Crossing Place"

B

YARRA RECYCLING CENTRE

02

"Black Boys Bridge"

03

MAIN YARRA TRAIL

F19 EASTERN FREEWAY

Merri Creek Aboriginal School

BIRRARUNG

Merri Creek Aboriginal School Land Boundary

YARRA BEND PARK

G

I

07

Burial Ground

08

H

06

TRENERY CRES

William Thomas's Hut 'Assistan Protector's Quarters'

BIRRARUNG RE-ALIGNMNET

F

1838 Dights Mill

10

D

DIGHTS FALLS

11

Deep Rock Swimming Hole

0 25m 50m 100m 200m

1:3000 @ A3

N

LEGEND

Existing

- A View Point
- Waterway
- 100 Year Flood
- Cultural Heritage Sensitivity
- Major Road
- 1m Contour
- Key Drains
- Recreation Track
- Crossing
- Public Access

Proposed

- Regeneration Focus Area
- Land Back Strategy
- Water Sensitive Urban Design
- Stakeholder Collaboration

Figure 27. *Merri Creek Conceptual Design Map 01 - Observations and Opportunities.*

MERRI CREEK CONFLUENCE
OBSERVATIONS AND OPPORTUNITIES

Conceptual Design Map 1 (pages 56-58) combines our observations of the current state of the confluence and broadly identifies potential opportunities for net gain, adaptation, and regeneration. These are detailed table 4 and the photographs on the following page (Figure 27).

AREA	OBSERVATIONS	OPPORTUNITIES
1	Poor water quality and pollution evident at drainage discharge points	Evident final point of pollution discharge, opportunity to follow the runoff channels via the main drain and design filter strategies.
2	Recycling Centre sitting at a key point in the landscape	Key potential Land Back or Negotiation Opportunity. Area zoned as 'Parks and Recreation', however exists as waste management facility, a remaining archetype of a past planning ideology that locates polluting industries along the creek.
3	No access zone below centre	Engage filtration planting strategies and bioengineering solutions to treat stormwater runoff.
4	Interface of functions; disconnected sense of incompatibility; sense of heterotopia	Opportunity to design in a way that celebrates this key relationship of functions and acts as a key circulation point. Utilise diversion strategies in coordination with sensitive planting zones.
5	Recreation fields lack connection to the creek	Consider the history of the fields, connection to creek through wayfinding and curated views. Opportunity to integrate filtration and retention strategies along the fields perimeter.
6	Trenerry Crescent - ecological disaster	Key opportunity for a reconciliation including a land back approach, beginning with greenway restoration and reducing vehicle, while increasing riparian zone.
7	Pedestrian underpass, narrow, uncomfortable, at a key cultural historical point; a relegation from the freeway construction	Implement secondary recreational path, providing access to the bank of the creek, invitation to touch the water, a place to pause and reflect.
8	Confluence - vital place for habitat connectivity, no habitat; large main drain	Key location for habitat design and planting.
9	Isolated habitat stepping stones	To further isolate and improve habitat and diversity in these areas protected by topography.
10	Dights Mill and Channel	Improve signage and access to historical artefacts.
11	Fish Weir	Improve effectiveness of fish weir as a functional ladder for native species.

Table 4. *Observations and Opportunities - Merri Creek.*

MERRI CREEK CONFLUENCE
VIEW POINTS

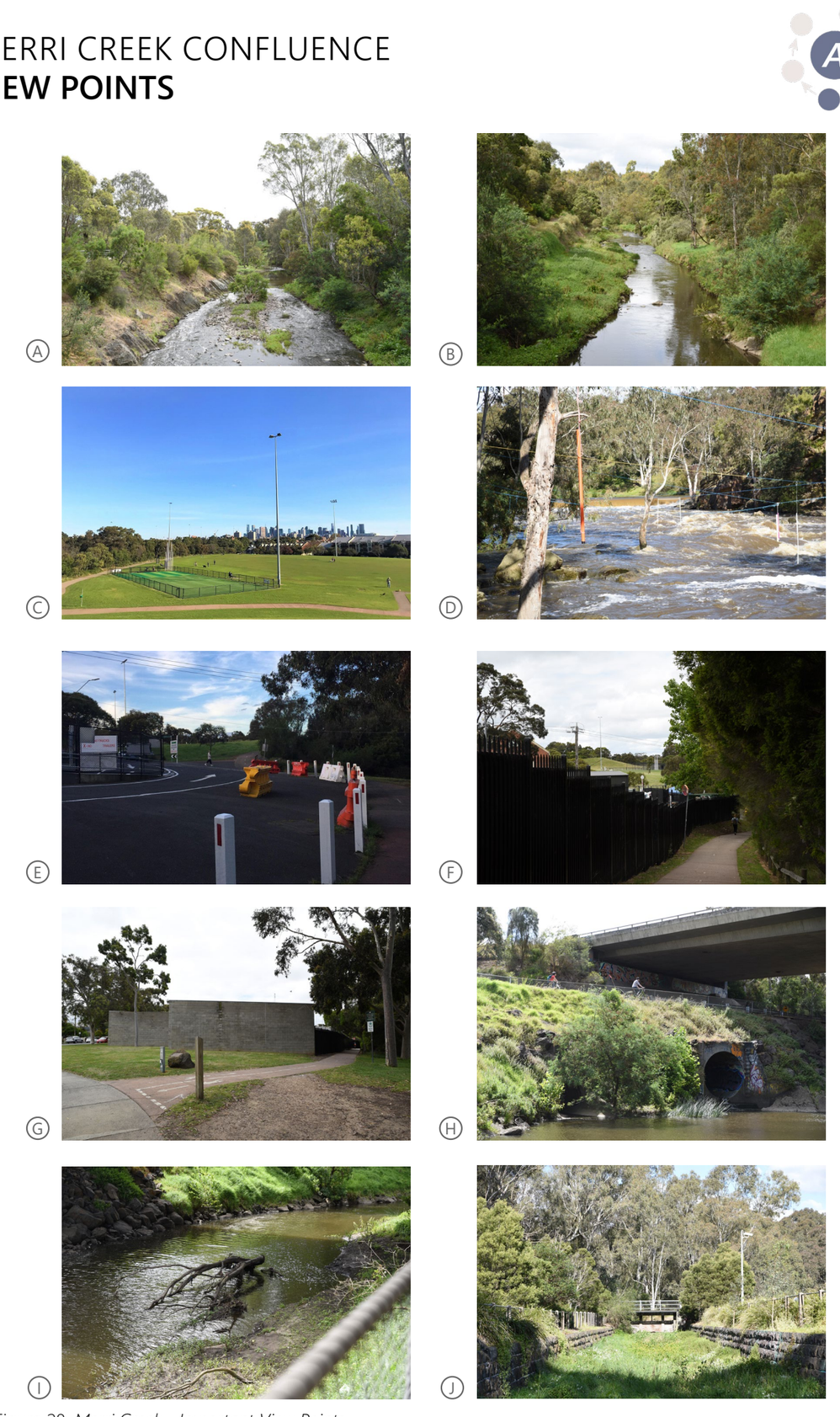


Figure 28. *Merri Creek - Important View Points.*

MERRI CREEK CONFLUENCE
CONCEPTUAL DESIGN MAP 02

Proposed Strategies : Net gain and regeneration approaches for the Merri Creek confluence. For further explanation see Table 5 (page 62) and Table 6 (page 64).

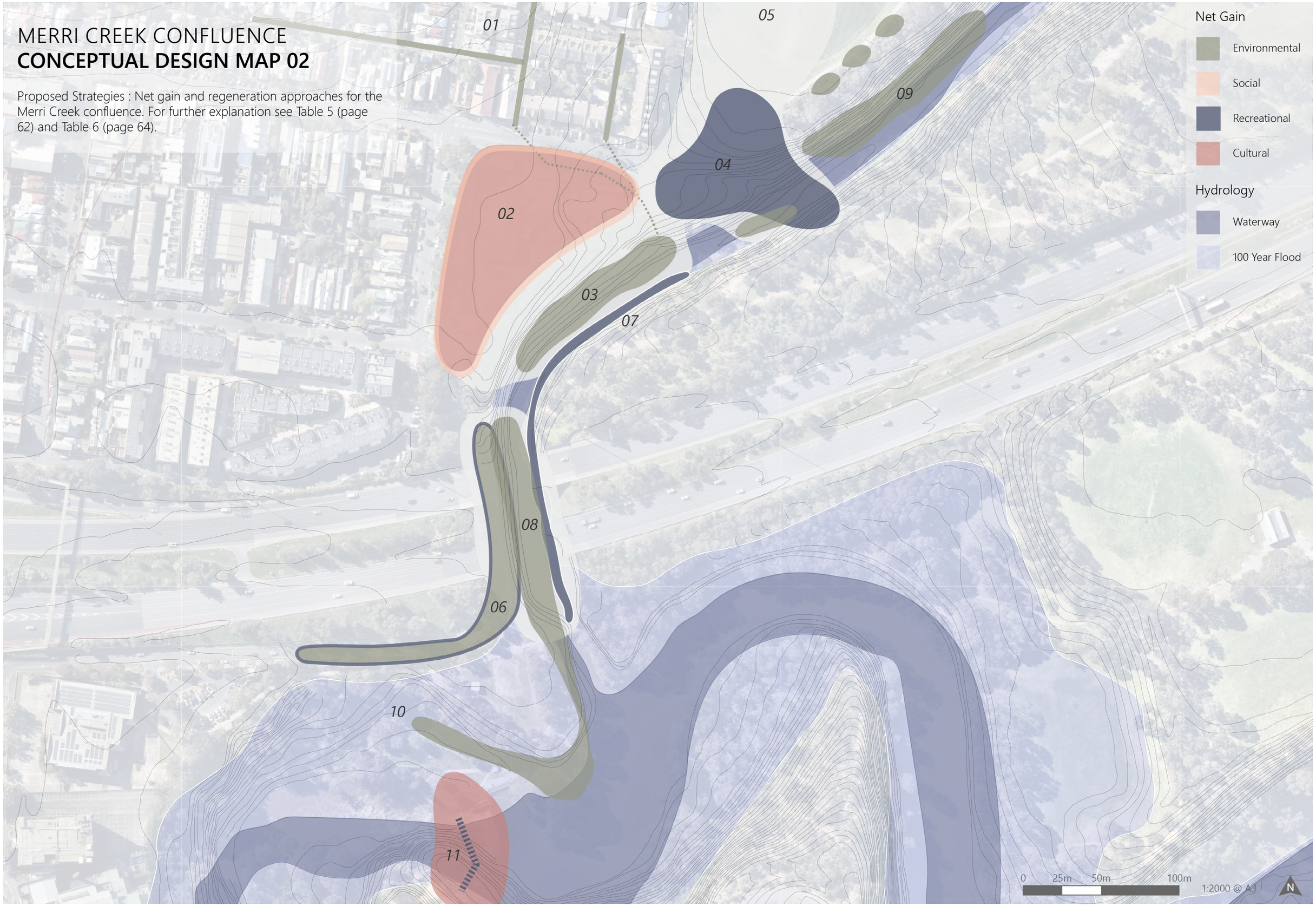


Figure 29. *Merri Creek Conceptual Design Map 02 - Net Gain and Regeneration.*

MERRI CREEK CONFLUENCE
NET GAIN STRATEGY

Conceptual Design Map 2 (pages 60-61) highlights proposed strategies for environmental, social, recreational, and cultural net gain. These approaches are detailed and prioritised in the table below. See pages 18-22 for an explanation of this report's approach to Net Gain Principles.

E Environmental Net Gain
R Recreational Net Gain
S Social Net Gain
C Cultural Net Gain

AREA	NET GAIN	DESCRIPTION	STRATEGY	GOAL	PRIORITY
1	E C	Above ground stormwater filtration and treatment	Capture and filter household runoff, treating water beginning at the roofs to household gardens and following downpipes to adjacent laneways; utilising niches (laneways) for water treatment; identify most effective areas to design filtration planting.	Improve stormwater runoff, health of the waterways. Stitching Green space together through integration of filtration and retention laneways; community places for neighbours; education on stormwater pollution.	Staged Strategy Including Short, Mid and Long Term Design.
2	C R S	Active local Recycling Centre amenity. West Bank.	Critical location, zoned as Public Park and Recreation Zone; site to be redesigned to engage with Aboriginal Cultural values, heritage and knowledge; integration of community centre and waste treatment	Design through partnership, representation and involvement of Traditional Owners as custodians; public facility for innovative recycling and waste management solutions; public engagement through recreation, education and services.	Mid Term - Long Term
3	E	No-Access riparian zone adjacent to Recycling Centre	Bioengineering strategies to design a stratified structure; a series of filtration layers beginning with an inlet garden at the recycling centre; continuing filtration systems through the upland and riparian zones; secondary role as a public art installation in conversation with the existing performance of the large main drain	Regeneration of Riparian Zone; alternative to existing below ground stormwater runoff; open and curate view towards the Cultural/ Community centre (currently recycling centre). A public spectacle that celebrates the creek and it's extensions across the urban fabric	Short Term
4	R	Interface	Design integrating the Creek Diversion strategy. Relationship with the bridge and how the site continues and extends across the bridge - the whole area becomes a cultural destination.	Opportunity to design in a way that celebrates the relationships and acts as a key circulation point.	Mid Term
5	S	Recreation areas	Design edge conditions to integrating the Creek and better respond to connectivity corridors. Diversion strategy from targeted regeneration areas.	Opportunity to design in a way that celebrates the existing relationships	Short Term
6	E	Trenery Crescent	Acquisition of Trenery Crescent as a greenway; Freeway and road network act as barricade to wildlife connectivity; prioritising revegetation and habitat protection at confluence; Maintain road as fire lane	Improve Habitat connectivity and reduce disturbance. Improve visual condition and pedestrian experience at confluence. Integrate recreational path to Cultural/ Community Centre.	Long Term
7	R	Pedestrian underpass and trail. East Bank; across the creek from the Cultural/ Community Centre.	New walking trail responding to existing narrow elevated underpass. Bio engineered vegetated path allowing maintenance access to habitat restoration.	A secondary path for slow and conscious circulation. Moments for rest, contemplation and access to the waters.	Short Term
8	E	Under the bridge main drainage outlet	Confluence identified as key stepping stone for species along the Merri and Yarra, Birrarung. Creek bed restoration to improved habitat quality and aquatic edge condition. Installation of logs and rock habitat in creek Drainage outlet diverted into Filter and Wetland that spills out into the ephemeral zones connecting to delegated Dights Mill Channel.	Strengthen the Corridor and improve species continuity across river and tributary. Express the importance of the confluence through regeneration of creek below underpass	Short Term
9	E	Isolated area	Utilise Diversion Strategy to isolate key habitat and regeneration areas with more sensitive species.	Habitat Stepping Stones in various riparian conditions. Diversity of habitat and opportunity for testing in areas of minimal disturbance.	Short Term
10	C	Dights Mill and Channel	Channel utilised as a water retention wetland filtration node.	Flood mitigation	Mid Term
11	E C	Fish Weir	Restoration	Aquatic species connectivity	Short Term
12	E C	Significant trees (various locations)	Passive irrigation pit installed at significant trees	Focus on protection and advocacy.	Short Term

Table 5. *Net Gain Strategies - Merri Creek.*

MERRI CREEK CONFLUENCE
REGENERATION STRATEGY

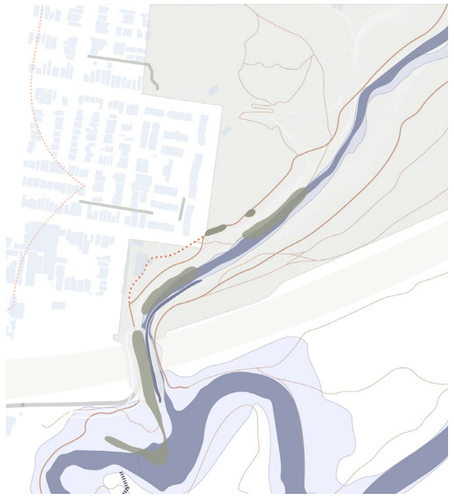
Key areas with potential for regeneration as indicated on Conceptual Design Map 2 (pages 60-61) and site specific strategies. This table is derived from the YRKA's Regeneration Guide and designed to aid in prioritising sites for regeneration with native plant species.

AREA	REMNANT VEGETATION	SITE CONDITIONS	RESTORATION APPROACH	REFERENCE ECOSYSTEM	SITE PRIORITIES
1	None	Non permeable surfaces, heritage bluestone laneways, kerbs and channels. Minimal green streets.	Semi Reconstruction	Plains Grassy Woodland	Increase permeability and capacity for water retention and filtration through planting and bioengineering strategies.
2	None	Urban Facility No Vegetation	Semi Reconstruction	Plains Grassy Woodland	Provide access and connectivity to the creek and through centre as a pedestrian corridor.
3	Minimal - no remnant vegetation	Patchy vegetation – exotic species, mostly shrubs. Gravel. Overshadowing the creek.	Reconstruction	Stream Bank Shrubland	Significant opportunity for stormwater treatment garden, utilise aquatic filtration planting, and serpentine form to emphasize and decelerate flows.
4	Minimal - no remnant vegetation	Grassland to road interface	Semi Reconstruction	Stream Bank Shrubland	Key opportunity to link recreational and aquatic activity, by increasing way finding opportunities and signage.
5	None	Highly Used Grass Fields	Perimeter Reconstruction	Plains Grassy Woodland	Implement planting at perimeter of fields, incorporating native grasses and water retention swales.
6	None	Bitumen road with exotic weeds and primarily grasses finding opportunity in the inches	Reconstruction	Plains Grassy Woodland	Complete reconstruction of the road to greenway leading to an improved riparian zone and extension of the creek bed
7	Minimal - some remnant vegetation	Mix of native and exotic weedy species	Assisted regeneration; support ongoing regeneration	Billabong Wetland Aggregate	Key opportunity to improve the riparian as this is one area with relatively undisturbed banks. Periodically reducing exotic and planting native species.
8	None	Highly degraded creek bed	Reconstruction	Billabong Wetland Aggregate	Reconstruct creek bed and incorporate planting of swamp grasses. As a confluence this area acts as a key step for habitat connectivity and therefore requires a high level of resources and attention.
9	Minimal - some remnant vegetation	Weedy grasses and aquatic / semi-aquatic vegetation	Assisted Regeneration	Billabong Wetland Aggregate	Key opportunity to improve habitat and plant more sensitive species as this area is isolated from human disturbance.

Table 6. *Regeneration Strategies - Merri Creek.*

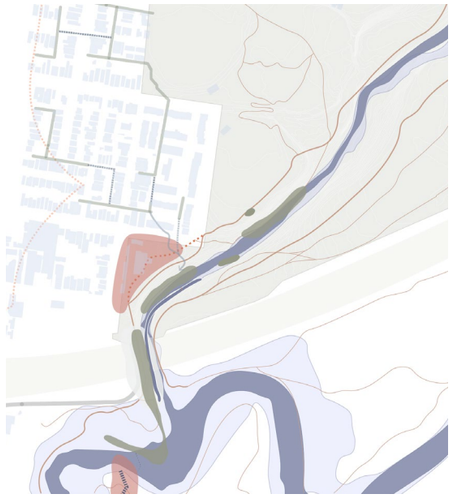
Figure 30. *Merri Creek Fish Weir.*

MERRI CREEK CONFLUENCE
NEAR- MID AND LONG-TERM PLAN



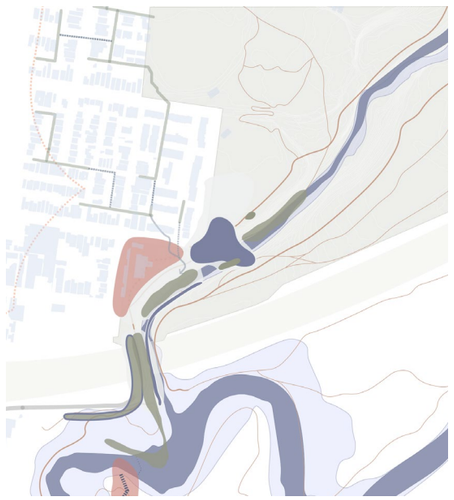
Near Term
3-6 years

The short term is focused on strategic interventions, that give rise to public interest and engagement and set an inspiring example for future projects.



Mid Term
7-14 years

Having created new areas of interest and brought attention to the issue of stormwater drainage, the Mid Term Stage aims to consolidate existing interventions and increase their magnitude to set the stage for a long term vision for the Merri Confluence.



Long Term
15-30 years

The long term vision is to establish and reinforce this confluence as a cultural heritage district celebrating the Merri Creek, the Birrarung and the Wurundjeri Woi-wurrung cultural history.

1. Initiate a WSUD pilot project. Restore a single laneway into a stormwater catchment and filtration greenway. Illustrate the importance of stormwater management at a residential level, build on community engagement and encourage public consciousness and attitudes towards stormwater pollution.

2. Map sub-basins and runoff to identify most effective areas to proactively design filtration planting including location of major discharge points.

A. Building on the pilot project, further stitch green space together through the integration of filtration and retention laneways with existing green streets and parklands to visually express connection of stormwater runoff to creek. Ownership and agency should build on the adjacent residents around custodianship, improving the visual character of the street and building community relationships through the joint management of the amenity.

i. Create the Merri Merri Creek catchment area green district approach building on the Merri Creek Parklands concept and other approaches from the Merri Creek and Environs Strategy 2009-2014 incorporating biodiversity and WSUD. With decreased need for vehicle ownership, we will seek to develop laneway bioretention projects rolled out across pilot locations to create local examples inviting community members to act and manage the projects themselves.

3. Explore ongoing discussions with the WWCHAC around the Merri Creek as well as key stakeholders and initiate a dialogue to inform the co-design around the confluence focusing on public activity regeneration and art installations. Co-investigating the feasibility of adapting the existing Yarra Recycling Centre and surrounding landscape into a shared cultural centre. It is currently zoned as public land for Parks and Recreation.

B. Further develop the Cultural Centre discussions and fund raising are underway. Centre acts as a key node of ecological and cultural gain as an important destination for the community, both for celebrating Wurundjeri Woi-wurrung cultural values and creek restoration.

ii. Build the Cultural Centre and Landscape through an exemplary process of engagement with the WWCHAC and with the Council and neighborhood. Ensure that the project is a healing one for the area, focusing on community, cultural education and ecology. Ensure that water quality and invasive species are addressed. For example, develop a non-invasives zone building on the Friends of Merri Creek program and the Yarra River Keeper Weeding Toolkit (2020) to guide community members in establishing this zone.

4. Develop a review of conservation and open space needs with Council partnership and garnered through public feedback.

5. Create an informal education trail through the improvement of signage to provide information on cultural heritage and ecology that celebrates the extensive revegetation works, primarily completed through the Merri Creek Management Committee and Council efforts supported by the former MMBW and now Melbourne Water. Identify existing remnant vegetation as well as invasive species.

C. Test the closure of Trenerry Crescent Greenway under the bridge seasonally or for periods during the day and/ or over the weekend.

6. Work on water quality and aquatic habitat regeneration and management. Implement litter traps at one or more selected drains, capturing final points of discharge as they enter into the creek.

D. Pursue assisted revegetation approaches in these zones, incrementally reintroducing endemic plantings that utilise existing Merri Creek Planting guides. Regenerate the waterway below underpass, through implementation of access and regeneration.

iii. Establish the Merri Merri Confluence Cultural District from Dights Falls to the Cultural Centre and recreational fields connecting under the existing bridge utilizing public land where possible. Work with private freehold titles where needed. Work with the Eastern Freeway through capital investments and a maintenance tax scheme to support ecological regeneration, public space making and access. Explore the cultural confluence as a location to establish a land back to rights owners framework along with longer term custodianship. Embrace existing cultural and historical landscapes. For example, recognizing the burial Site of Billibellary the Ngurungaeta, clan headman of the Wurundjeri-willam.

Figure 31. *Merri Creek Confluence Adaptation Strategies.*

MERRI CREEK CONFLUENCE
CONCEPTUAL CROSS SECTION

Standing on the bank of the Merri, my feet gently sink into the soil.
Ducks, fish, eels, even the platypus are here.

These waters are alive.

We had big rains this week,
waters from all around the city have come to meet here.
I look up across the bank.
the sound is falling from above.
Like a series of waterfalls speeding up and slowing down,
an amorphous body winds through chains of channels and ponds,
spreading out, breathing long past it's edges.

Little waters quietly collecting in the laneways,
waiting for their signal to transform into powerful streams and rush down to the creek's edge, cascading before me, claiming their place in the river whole.

The flows of the long distance travelers still echo through the channel.
We will wait for them.

Maria Bulmaga, 2021

Figure 32. *Merri Creek Confluence Conceptual Cross Section.*

GARDINERS CREEK CONFLUENCE

Figure 33. *Gardiners Creek Confluence*..

GARDINERS CREEK CONFLUENCE

We acknowledge the Wurundjeri Woi-wurrung as the Traditional Custodians of the land of Gardiners Creek.

Gardiners Creek meets the Birrarung in the suburb of Hawthorn, in Melbourne's east. Along it's length some sparse remnants of the riparian remain, however the confluence of Gardiners Creek is heavily urbanised and modified. This stretch is overshadowed by the Monash Freeway and heavy pillars gouge into the creek bed.

The popular Gardiners Creek Trail snakes above the waterway offering sweeping views over the confluence and a busy thoroughfare for cyclists and pedestrians alike. Surrounded by Scotch College, St Kevin's College, The Kooyong Lawn Tennis Club and sports fields, there is limited public park land adjacent to this section of the Creek.

Collaboration with neighboring landowners and stakeholders will play a vital role in improving this constrained urban waterway.

Key Adaptation Strategies:

1. Incrementally replace exotic species with native tree planting along the riparian, strengthening the banks that are highly prone to flooding.
2. Trap litter and debris at the weir, reducing downstream damage and rubbish flowing into the Birrarung.
3. Implement water sensitive urban design tactics on both public and private land within the catchment to reduce and slow stormwater runoff into the waterways.
4. Restore some natural floodplain functionality in co-operation with Scotch College and St Kevin's College.
5. Retrofit the freeway with built habitat, planting, water treatment for freeway run off and public art. Enhance the user experience with public art that focuses on place and provides opportunities for Indigenous storytelling.

Opportunities to benefit Traditional Owners:

1. Return a sense of identity to Kooyongkoot Creek.
2. Improve environmental conditions to benefit plants, animals, insects, habitat, water quality, and people.
3. Return some land to the creek and negotiate Indigenous land access.
4. Collaborate on cultural water allocation.
5. Celebrate the confluence through art, expression and storytelling.

Figure 34. *Historic Analysis of the Merri Creek.*

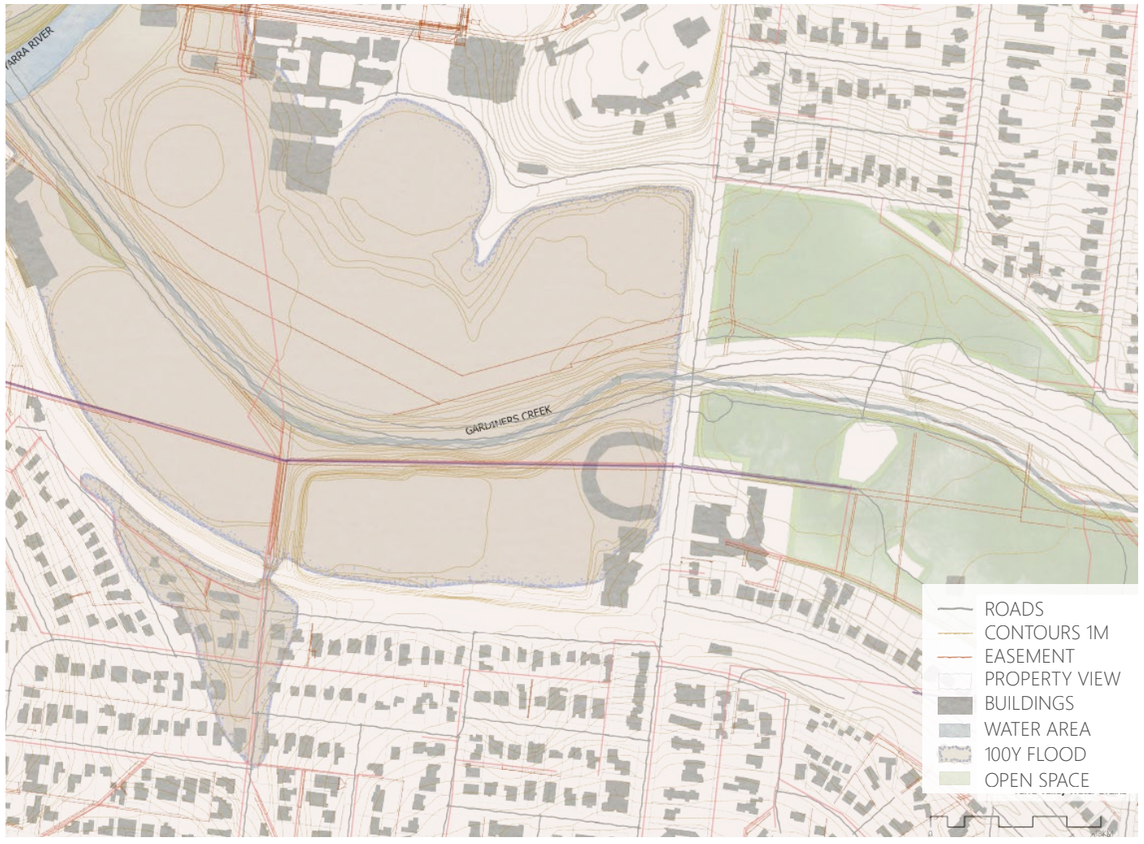


Figure 35. *Merri Creek Existing Conditions Map.*

GARDINERS CREEK CONFLUENCE
HISTORIC ANALYSIS

Kooyongkoot Creek, otherwise known as Gardiners Creek, once supported a thriving ecosystem brimming with life.

In a relatively short time this waterway has been hemmed by development and modified - reducing biodiversity, natural functions and polluting the water that flows through it.

The confluence of the Birrarung and Kooyongkoot Creek was a site where Indigenous groups camped and sourced plentiful food.

It remained more or less in a natural state, as a functioning ecosystem, up until the 1950's when rapid degradation was led by farming, infrastructure, and channelising.

Though this mistreatment has in many ways reduced the creek to a drain, reflecting on its dynamic past state prompts us to consider how we may return life to Kooyongkoot Creek.

Historical Timeline

Non-linear Representation of Selected Stories
Past, Present and Future

Footnotes

① Short-finned eel. "Indigenous groups camped along the river and creek banks where they sourced food including plants, fish, mussels, eels and waterfowl."
② Pacific black duck.
③ Australian Greyling.
④ Mussels.
⑤ Kooyongkoot: 'haunt of the waterfowl'.
⑥ "John Gardiner, and a sea captain named John Hepburn and a Durham cattle-breeder named Joseph Hawdon, arrived from Sydney late in 1836 with a herd of cattle."
⑦ A post settlement artist expression.
⑧ "During the 1830s people had to cross the creek or Yarra by boat to reach John Gardiner's property, but by 1861 there were two bridges."
⑨ The confluence prior to the imposition of heavy infrastructure.
⑩ "In the 1950s Gardiners Creek was still more or less in its original state, with its various tributaries."
⑪ The floodplains perform their natural function.
⑫ Monash Freeway over the creek was completed in the 1990s. The bicycle/pedestrian path opened in 1995.

Figure 36. *Non-linear timeline of the history Gardiners Creek.*

GARDINERS CREEK CONFLUENCE
PHOTO ESSAY

Selected moments from Gardiners Creek piecing together an impression of the site.
Site Documented 26 . 09 . 2021

Interrupted reflections.

Foundations laid straight into the riverbed.

Brick by brick the creek is hemmed in.

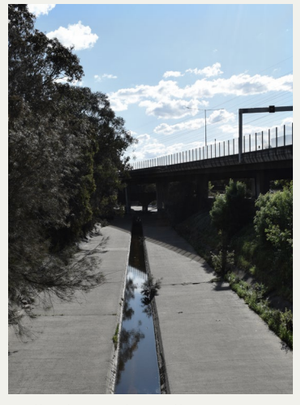
Who was here first?

School holiday adventurers.

The weedy canopy jostles for light.

Filtered sunlight, hidden depths.

The bridge under a bridge. An open air gallery.



Sunning himself as the channelled creek spills over.

Figure 37. *Gardiners Creek Photoessay.*

GARDINERS CREEK CONFLUENCE
CONCEPTUAL DESIGN MAP 01

Existing conditions and big picture thinking : Key observations and opportunities at Gardiners Creek confluence. For further explanation see Table 7 overleaf.

ST KEVINS BOATSHED
YARRA BOULEVARD
SCOTCH COLLEGE
ST KEVIN'S COLLEGE
KOOYONG ROAD
GLENFERRIE ROAD
HA SMITH RESERVE
MONASH FREEWAY
KOOYONG LAWN TENNIS CLUB
MALVERN BRAVES BASEBALL CLUB
KOOYONG STATION

LEGEND

Existing

- View Point
- Waterway
- 100 Year Flood
- Significant Cultural Heritage
- Cultural Heritage Sensitivity
- Major Road
- Rail Line
- 1m Contour
- Sub basins
- Key Drains
- Recreation Track
- Crossing
- Public Access

Proposed

- Regeneration Focus Area
- Land Back Strategy
- Naturalise Waterway
- Water Sensitive Urban Design
- Seasonal Flood Plain
- Stakeholder Collaboration
- Recreation Track
- Crossing
- Right of Passage / Public Access

0 25m 50m 100m 200m

1:3000 @ A3

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Figure 38. *Gardiners Creek Conceptual Design Map 01 - Observations and Opportunities.*

GARDINERS CREEK CONFLUENCE
OBSERVATIONS AND OPPORTUNITIES

Conceptual Design Map 1 (pages 78-79) combines observations of the current state of the confluence and broadly identifies potential opportunities for net gain, adaptation, and regeneration. These are detailed in table 7 and the photographs on the following page (Figure 38).

AREA	OBSERVATIONS	OPPORTUNITIES
1	The elevated section of the Gardiners Creek Trail can only be accessed at either end.	Create better access and connectivity.
2	Sweeping views of the Birrarung can be viewed from the pedestrian and cycalist bridge above.	Provide opportunity to take in and appreciate these views.
3	Clusters of sub bassins.	Explore water sensitive urban design opportunites in these dense catchment areas.
4	Existing remnant vegetation on this edge of St Kevin's College.	Better revegetaion outcomes are often achieved when intact remnants reamin. Protect and enhance.
5	This corner of the confluence, on Scotch College land is relatively open with no major structures.	Explore alternate uses and collaboration possibilities with Scotch College.
6	Large expanses of impermeable surfaces sit adjacent to the river within the flood zones.	Provide opportunities to increase permeability with alternate materials and surfaces.
7	The Gardiners Creek Trail acts as a pedestrian and cyclist thoroughfare. It is busy, often crowded and lacks program other than moving from one point to another.	Design places to pause and engage in different activities may help to activate this space.
8	There is limited public land adjacent to this section of Gardiners Creek. Much of the riparian is private land held by Scotch College, St Kevin's College and the Kooyong Lawn Tennis Club.	Collaborate with adjacent stakeholders to achieve the best outcomes for Gardiners Creek.
9	Much of the creeks southern banks are dominated by weedy, non-endemic vegetation.	Replace weedy species to improve habitat and biodiversity.
10	A significant proportion of the original flood plains are dominated by sports fields.	Use opportunity to restore some floodplain functionality.
11	Between the confluence with the Birrarung and Glenferrie Road, the majority of Gardiners Creek is overshadowed by the freeway above.	Accentuate the moments where the river emerges from under the freeway.
12	The undercroft of the freeway is in many ways a blank canvas.	Find opportunities for retrofit the underside of the freeway to enhance this space.
13	Where the creek has been narrowed, the weir creates a temporal atmosphere with interesting movement, sound and lighting effects.	Accentuate and work with these interesting qualities.
14	This section of Gardiners Creek is channelised in concrete and highly constrained.	Create and find opportunities for naturalisation.
15	Between many of the sports fields there are large expanses of open space and lawn.	Explore opportunities for planting and water sensitive urban design in these liminal spaces.

Table 7. *Observations and Opportunities - Gardiners Creek.*

GARDINERS CREEK CONFLUENCE
VIEW POINTS


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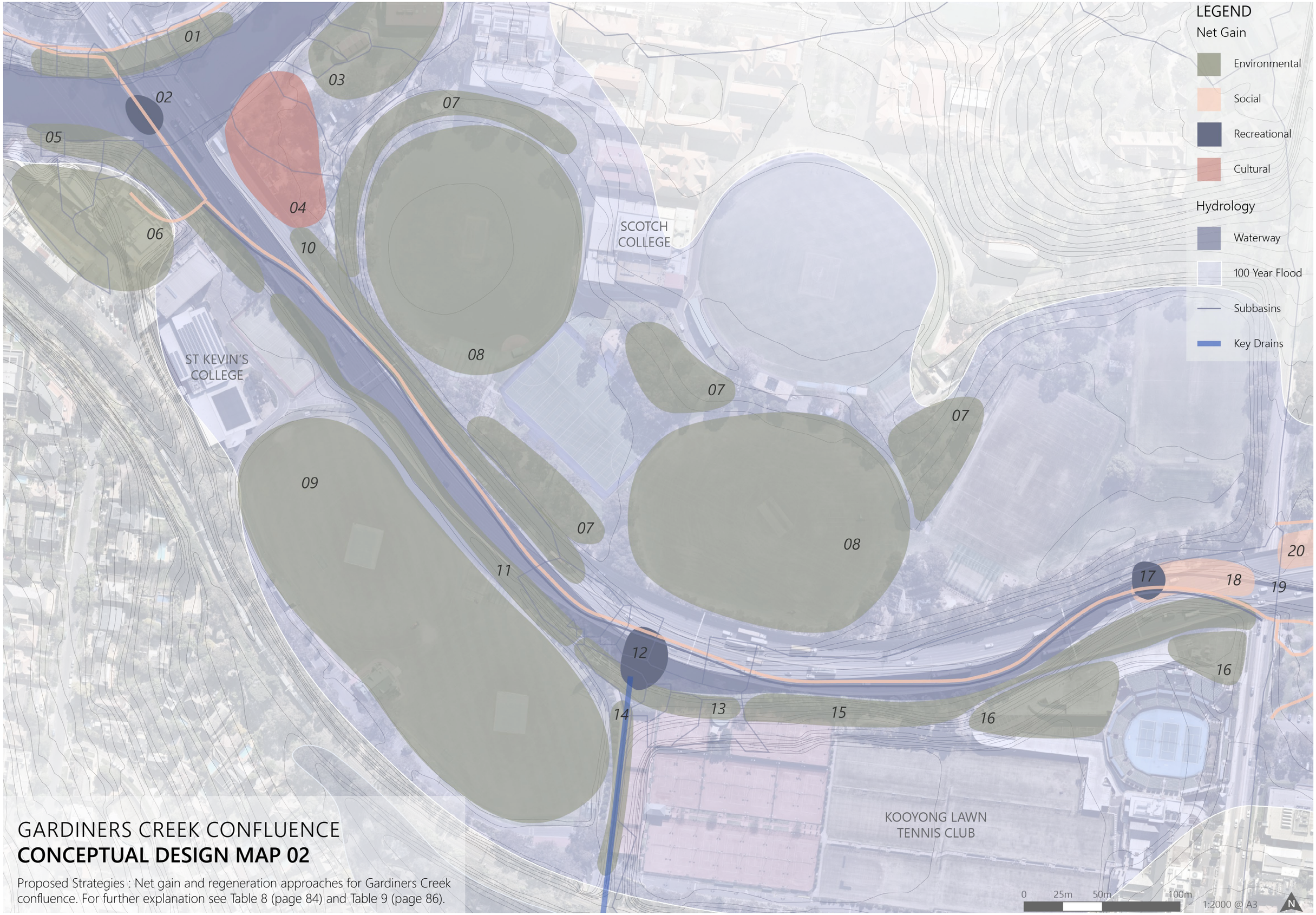
Figure 39. *Gardiners Creek - Important View Points.*



GARDINERS CREEK CONFLUENCE

CONCEPTUAL DESIGN MAP 02

Proposed Strategies : Net gain and regeneration approaches for Gardiners Creek confluence. For further explanation see Table 8 (page 84) and Table 9 (page 86).

Figure 40. *Gardiners Creek Conceptual Design Map 02 - Net Gain and Regeneration.*

GARDINERS CREEK CONFLUENCE
NET GAIN STRATEGY

Conceptual Design Map 2 (pages 82-83) highlights proposed strategies for environmental, social, recreational, and cultural net gain. These approaches are detailed and prioritised in the table below. See pages 18-22 for an explanation of applied approaches to Net Gain Principles.

E Environmental Net Gain
S Social Net Gain
R Recreational Net Gain
C Cultural Net Gain

AREA	NET GAIN	DESCRIPTION	STRATEGY	GOAL	PRIORITY
1	E S C	Riparian Edge	Revegetate and create an entrance planting to the path and the confluence.	Strengthen the riparian edge, increase vegetation cover and habitat connectivity.	Short-term
2	R S C	Existing path with confluence views.	Establish a breakout point in the path	Create points for repose to enjoy the spectacular Birrarung views.	Mid-term
3	E S	Riparian Edge, Scotch College	Increase vegetation around buildings and boat ramps	Increase vegetation and habitat	Short-term
4	E S C	Riparian Edge	Plant low grove under transmission lines	Increase vegetation and habitat	Short-term
5	R S C	Riparian Edge, Scotch College	Propose Indigenous land access to the confluence in collaboration with Scotch College. Discuss opportunities for indigenous water rights from the Scotch water allocation from Gardiners Creek. Further discussion with the WWCHAC is required.	Increase Indigenous land access and water rights in line with land-back strategies.	Mid-term
6	E	St Kevin's College	Increase permeability of surfaces	Slow and reduce storm water runoff	Mid-term
7	E S	Edge of Scotch College oval	Increase vegetation with floodplain species	Return some floodplain functionality	Mid-term
8	E	Scotch College oval	Allow seasonal flooding	Return some floodplain functionality, slow runoff into the waterways	Mid to long-term
9	E	St Kevin's ovals	Remove alter some of the berms to allow seasonal flooding	Return some floodplain functionality, slow runoff into the waterways	Long-term
10	E S C	Riparin edge, Scotch College	Increase vegetation, specifically tree cover	Increase vegetaion and habitat	Short-term
11	E S C	Riparian edge, St Kevin's College	Progressively repace weedy species with native vegetation	Improve riparian vegetation and habitat connectivity	Short to mid-term
12	R S	Key view point, the creek emerges from under the freeway	Create proposed bridge and path breakout	Increase access and create points for repose	Mid-term
13	E S C	Riparian edge, view point	Plant riparian and rain gardens	Capture and slow runoff from subbasins	Short-term
14	E S R	Existing path	Build new public access route and entrance plantings	Increase access to the recreational path	Mid-term
15	E S C	Riparian edge	Revegetate riparian edge	Strengthen the riparian edge, increase vegetation and habitat connectivity	Short-term
16	E C	Kooyong Tennis Club Car Parks	Implements land back strategy OR permeable surfaces and increased vegetation	Increase infiltration, slow storm water runoff, increase vegetation and habitat connectivity	Mid to long-term
17	R	View of weir	Establish a breakout point in the path	Create points for repose to enjoy the ephemeral qualities of this space	Mid-term
18	E S	Concrete channelised creek and weir	Install litter trap, bollards to catch debris, a series of pools and weirs	Reduce litter and debris flowing into the yarra and the damage this causes. Light touch naturalisation to improve aesthetics and ammenity.	Short to mid-term
19	E S C	Monash Freeway	Explore possibilities for retroffitting the freeway - built habitat under the freeway, planting, water treatment for freeway run off and public art.	Utilise existing hard infrustructure to increase habitat and improve water quality. Enhance the user experience with public art that focuses on place and provides opportunities for Indigenous story telling.	Mid-term
20	E S C R	Underutilised carpark under the freeway	Reclaim this land to develop an environmental community centre and gathering space.	Develop a place for gathering, learning, and to support the health and rehabilitation of the creek and surrounds.	Mid-term

Table 8. *Net Gain Strategies - Gardiners Creek.*

GARDINERS CREEK CONFLUENCE **REGENERATION STRATEGY**

Key areas with potential for regeneration as indicated on Conceptual Design Map 2 (pages 82-83) and site specific strategies. This table is derived from the YRKA's Regeneration Guide and designed to aid in prioritising sites for regeneration with native plant species.

AREA	REMNANT VEGETATION	SITE CONDITIONS	RESTORATION APPROACH	REFERENCE ECOSYSTEM	SITE PRIORITIES
1	Remnant or revegetated areas exist either side	Sparse area with exotic grasses, weeds, gravel	Reconstruction	Floodplain Riparian Woodland	Improve connectivity through the corridor. Public land. Limited use of current site.
5	Some remnant vegetation	Patchy vegetation - a mix of native and exotic species but some remnant vegetation that should be preserved and enhanced	Assisted revegetation	Floodplain Riparian Woodland - High flood risk. Focus on trees rather than midstory and ground covers.	Improve riparian and reduce exotic species. Private land – St Kevin's College. Transmission line easement – no trees above 3m. Limited use of current site.
7	No remnant vegetation currently known	Sparse vegetation, mostly trees and exotic grass	Reconstruction	Floodplain Riparian Woodland	Improve floodplain function by planting floodplain species surrounding the sports fields. Private land - Scotch College.
11	Minimal - no remnant vegetation	Mostly exotic vegetation. Willow and ash species. Exotic grass and other weedy ground covers.	Reconstruction	Floodplain Riparian Woodland - High flood risk. Focus on trees rather than midstory and ground covers.	Opportunity to progressively replace exotic vegetation with endemic species. This bank is more naturalised than the north and receives more light. It is likely to have better outcomes.
10	No remnant vegetation	Very sparse vegetation, mostly shrubs. Gravel. Overshadowing from the highway.	Reconstruction	Floodplain Riparian Woodland - High flood risk. Focus on trees rather than midstory and ground covers.	Improve habitat connectivity and improve bank aesthetics. Private land - Scotch College.
13	Minimal - no remnant vegetation	Mostly exotic vegetation. Willow and ash species. Exotic grass and other weedy ground covers.	Reconstruction	Floodplain Riparian Woodland	Key opportunity to improve the riparian as this is one area with relatively natural banks and not overshadowed by the freeway. Reduce exotic species. Private land – St Kevin's College.
14	No remnant vegetation	Avenue planting of monocultures either side of the pathway. **visit to check species	Reconstruction	Floodplain Riparian Woodland	Increase vegetation, biodiversity and habitat. May involve public-private partnerships.
15	Minimal - no remnant vegetation	Mix of native and exotic weedy species	Reconstruction	Floodplain Riparian Woodland	Opportunity to progressively replace exotic vegetation with endemic species. Public and private land - Kooyong Lawn Tennis Club.
16	No remnant vegetation	Car parks with impermeable surfaces and no vegetation	Reconstruction	Floodplain Riparian Woodland	Opportunities for plantings between car parks, increasing vegetation, permeability and urban cooling.

Table 9. *Regeneration Strategies - Gardiners Creek.*

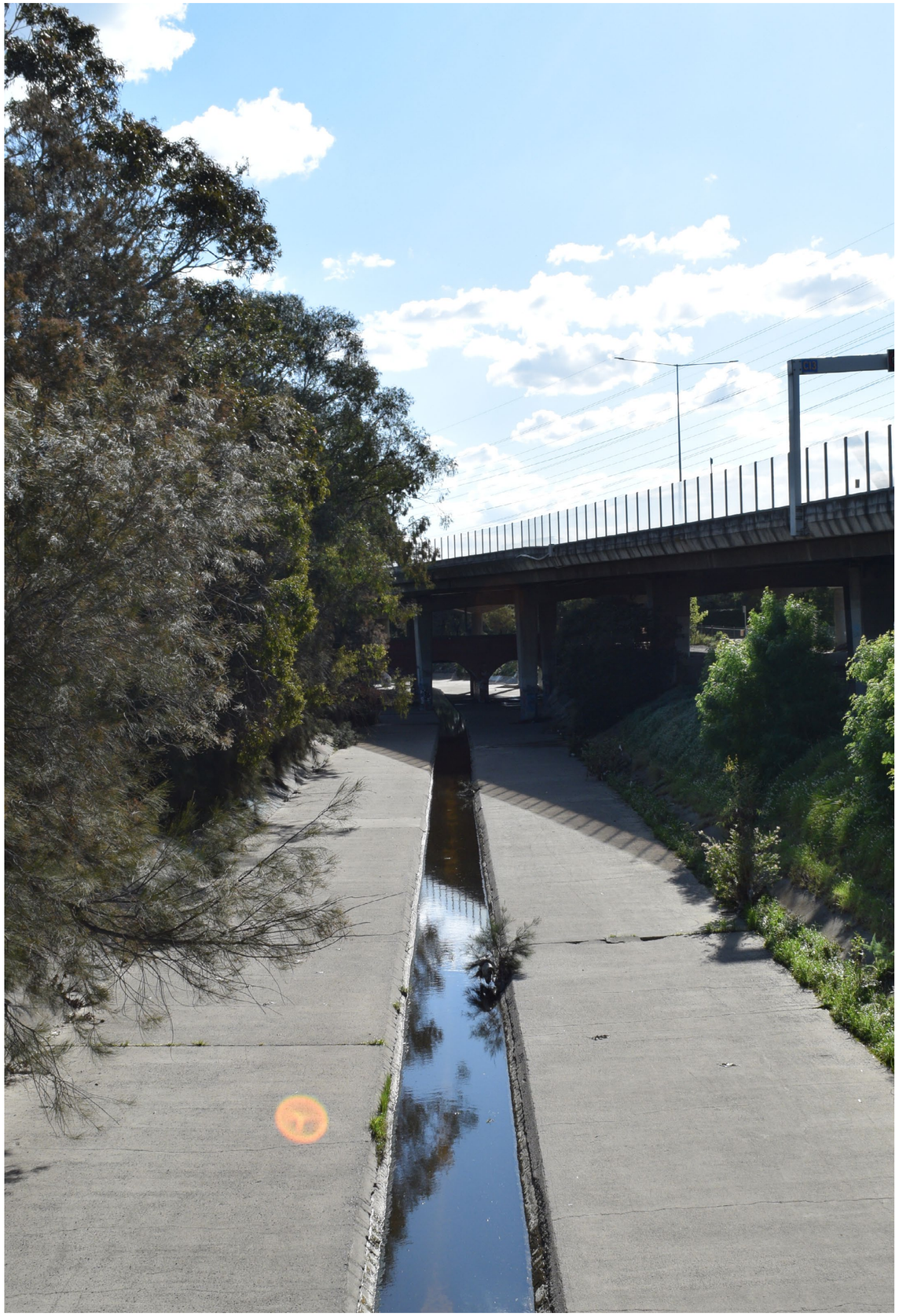
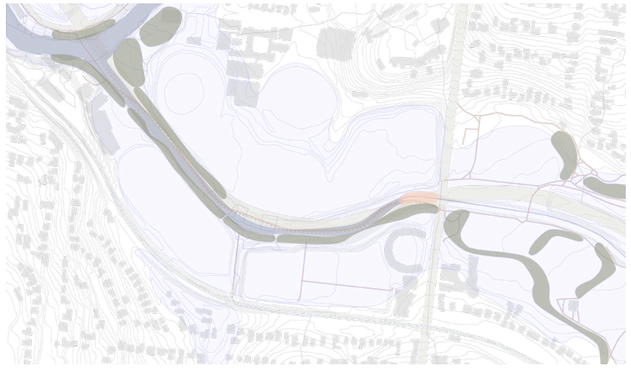


Figure 41. *Gardiners Creek channeled in concrete.*

Near Term
3-6 years

The short term is focused on rebranding Gardiners Creek and its floodplain as an urban riparian greenway in need of healing with biological potential. Seek to increase connectivity. After creating a vision, near term opportunities for implementing physical greening strategies will be targeted.



Mid Term
7-14 years

The mid-term is about working with adjacent landowners and with Traditional Owners to establishing longer term and larger scale adaptations including WSUD, biodiversity, and cultural heritage based strategies. The mid-term Strategy aims to promote access points and contribute to a broader transformation of land uses.

Long Term
15-30 years

The long term vision is to establish and reinforce this confluence as a cultural heritage district celebrating the Wurundjeri Woi-wurrung history and the ecological potential of Gardiners Creek.

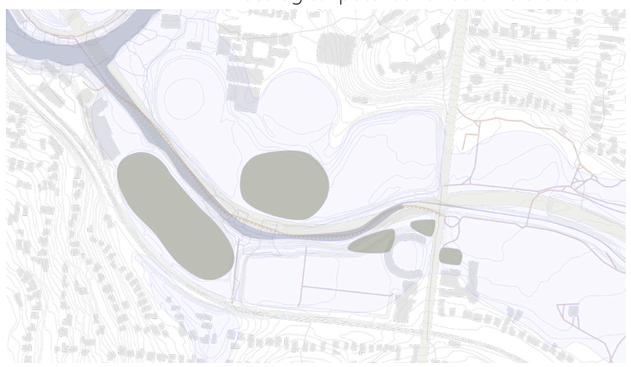


Figure 42. *Gardiners Creek Confluence Adaptation Strategies.*

GARDINERS CREEK CONFLUENCE **NEAR- MID AND LONG-TERM PLAN**

1. Target locations distributed along the Gardiners Creek Trail and riparian floodway particularly by the Freeway undercroft, where vegetation can be installed (building on an additive green-gray infrastructure technique such as the practices under development for Moonee Ponds Creek).

2. Identify opportunities for new access points to Gardiners Creek and create planting strategies along these upland trail entry points to indicate connections.

3. Target areas that take advantage of views, cultural heritage, or provide destinations along the creek trail that enhance user experiences and break up the monotony of the current trail.

4. Build on existing planning and develop new catchment based planning for the area that considers WSUD strategies within the floodplain and catchment area. Identify low hanging fruit where there are existing relationships.

A. Collaborate with adjacent stakeholders to increase vegetation in liminal spaces and explore opportunities for planting, water treatment, habitat and art between buildings and fields.

B. Continue to revegetate and incrementally replace weedy species with endemic plantings along the riparian corridor.

C. Increase recreational path width and improve access through a new entry point between St Kevin's and the Kooyong Lawn Tennis Club.

D. Establish path break-outs in key locations to slow movement, increase safety, and offer opportunities to appreciate key views and the surrounds.

E. Collaborate with Scotch College to create an opportunity for Indigenous land access to the confluence and cultural flows.

F. Develop a series of pools and weirs at the channelised edge as a light touch approach to naturalisation, celebrating and enhancing the temporal conditions of this site.

G. Install a trash collector device at the inlet point of key streams. Utilise bollards amongst the pools and weirs to stop large debris from flowing downstream in high rainfall events.

H. Initiate the car park permeability pilot project. Increasing vegetation and permeable surfaces in car parks adjacent to the creek.

i. Establish the Creek bed as an experimental research and testing corridor for regeneration to augment biodiversity along the trail with the goal of improving the trail through investment strategies such as a sports field floodplain projects.

ii. Establish projects such as the car park permeability project in multiple locations and utilise these projects for multiple benefits including creating and highlighting new entry points to the trail. Recognizing changing pressures, such as changing vehicle ownership trends, we willexplore any opportunities to reclaim some car parks as public land for the river.

iii. Establish a long term "land back" or shared ownership model for aboriginal land.

iii. Establish a large public/private re-investment program for reconstructing the functionality of the river through stratregic watershed management, localized flood zone management and habitat regeneration within the creekbed.

iv.. Establsh a sports field floodplain pilot project working with public and private landowners to increase permeability and water capture, restoring some natural processes to the creek and reducing pressure during high rainfall events.

GARDINERS CREEK CONFLUENCE
CONCEPTUAL CROSS SECTION

Across scales and time, the temporality and transformation of Gardiners Creek is explored. Incremental layering of vegetation, water treatment and community engagement draws life and movement back into the space. Edges are softened, boundaries blurred, and the sports field floodplains are once again allowed to perform their natural function and flood. The reduction of pollution and weeds invites animals and insects to reclaim this place.

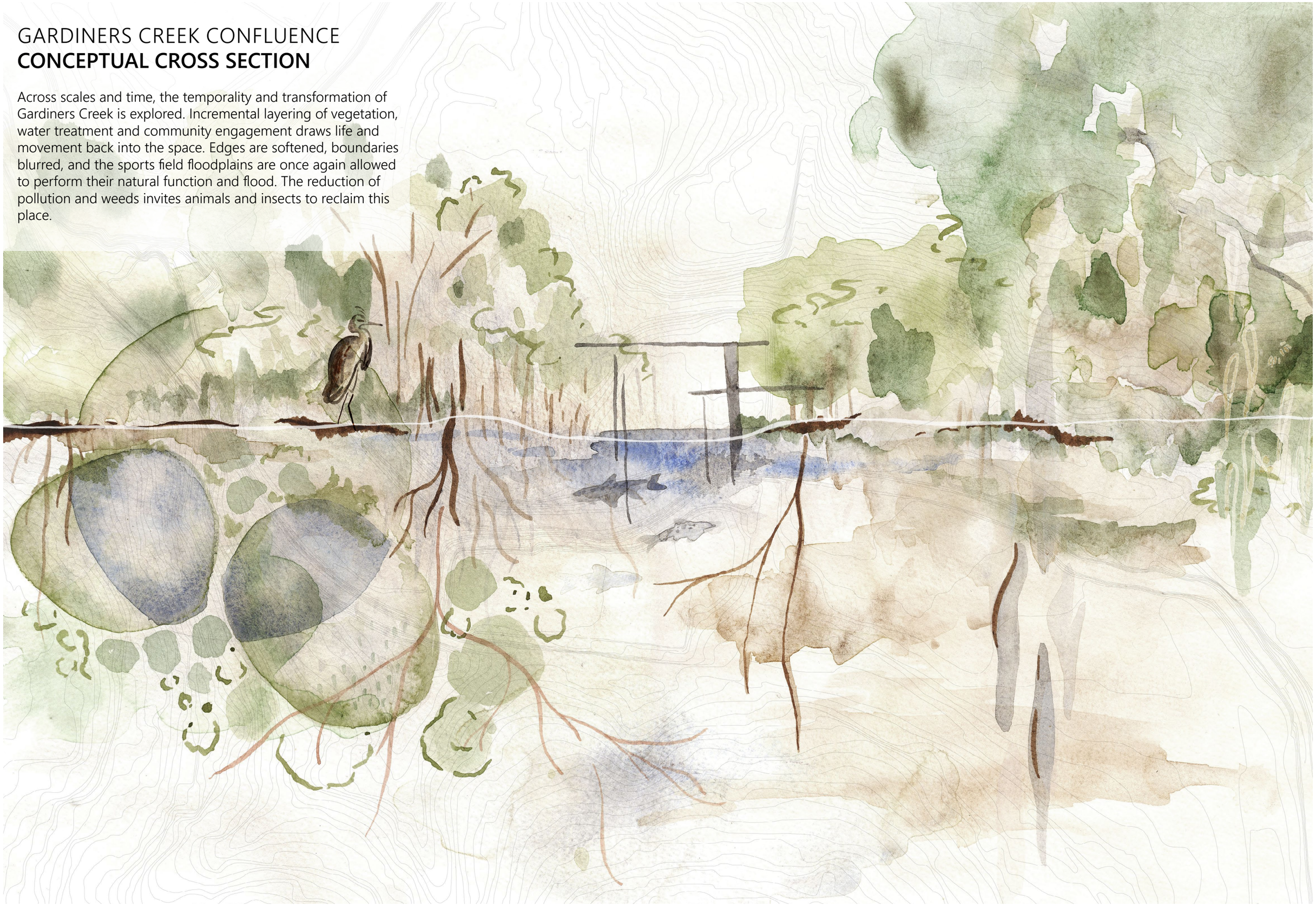


Figure 43. *Gardiners Creek Confluence Conceptual Cross Section.*

RECOMMENDATIONS

Based on our site analyses, mapping, and design investigations, we have identified key recommendations. These recommendations are not only relevant for the three case study sites – they can be adapted and implemented throughout the whole Birrarung catchment.

There is a movement afoot towards reconciliation with Indigenous heritage. This report acts as a precedent study for what could be possible.

Recommendations are to be viewed as a guiding tool that enables practitioners and decision-makers to assess the potential for regeneration at their own respective sites, and serve as a starting point for design and planning considerations.

Recommended actions are based on current site conditions and categorised by timeline hierarchy

N Near-term 2025 - 2028

M Mid-term 2029 - 2036

L Long-term 2037 - 2052

as well as impact scale

L Local

Co Confluence

Ca Catchment

Recommended actions:

1. **Establish distinct regeneration zones across the district with indigenous identity providing diverse plantings and management practices** — N Co

- Identify underutilised areas with the potential for regeneration.
- Gradually replace exotic species within those zones with native plant species.
- Aim to strengthen the riparian edge, increase overall native vegetation cover and habitat connectivity.
- Develop maintenance and management strategies that support the health of regenerated plantings.

2. **Improve the tributary and Birrarung aquatic habitat and water quality through watershed management, localised flood zone management and creek bed habitat regeneration.** — N Ca

- Slow and reduce stormwater runoff.
- Return functionality to flood plains.
- Include strategic filtration planting and increase aquatic habitat connectivity along creek edge.
- Manage rubbish and establish rubbish clean up days.

3. **Establish cultural and ecological districts at and around the confluences with community building that creates activity and a place to expand around education, ecology and cultural heritage, with a strong destination.** — M L

- Develop a design language and program through a co-design process with Traditional Owners that fosters aboriginal identity and meaning and celebrates history and ecology.
- Reclaim underutilised build space and infrastructure to piece together spaces for education, gathering and learning.

4. **Amplify net gains through the development of multi-functional landscapes that build on the attributes of the Confluence.** — M Ca

- Design to celebrate and showcase the beauty of the confluence.
- Create relationship between creek banks and increase opportunity for social and cultural connections.

5. **Negotiate a shared land holding and custodianship model to give back land access, use and ownership to Traditional Owners.** — L Co

- Implement Indigenous land access and water rights in accordance with land sovereignty and custodianship.
- Design through involvement and partnership of Traditional Owners.

6. **Establish public/private re-investment programs and education programs.** — L Co

- Build community engagement through knowledge sharing and education.
- Engage local homeowners and neighbourhoods as part of the river district to contribute through custodianship of their land.
- Engage with schools, tertiary institutions, and practices to establish ongoing connection to research and industry.

CONCLUSION

We see an opportunity to reconceptualise the Birrarung as the Great Birrarung Parkland providing enhanced value and benefits culturally, ecologically, socially and economically.

There is an opportunity to dream and to act through careful land cultivation and custodianship; through communication, creativity, and innovation to achieve a vision that is transformative. The Birrarung provides a historic, current, and future lifeline for Melbourne and the region. Our vision builds on this ongoing significance. The river corridor informs greenway wedges, supports habitat corridors and biodiversity.

This rich ecological corridor and catchment is filled with cultural history and contemporary Wurundjeri Woi-wurrung importance.

Recognising the need to coalesce around a shared recognition of aboriginal rights to the land and need for healing of the river and landscapes across the catchment, we encourage dialogue across councils, city, state as well as individual homeowners. It is time to embrace and encourage custodianship of the land formed around cultural historical knowledge combined with contemporary practices and technology for the benefit of all peoples, animals and plants and living and non-living beings.

Re-establishing a contemporary aboriginal custodianship of the land will require collaboration across all Australians, including non-aboriginal and aboriginal people working towards a common goal. Respecting and building on knowledge that has been passed down through generations will be necessary. Respecting significant cultural spaces and embracing a deeper awareness of seasonality is essential. The journey forward will take time. We hope that the proposals in this document will encourage dialogue and further exploration into further design and implementation of the ideas while contributing to the broader vision of the Great Birrarung Parkland.

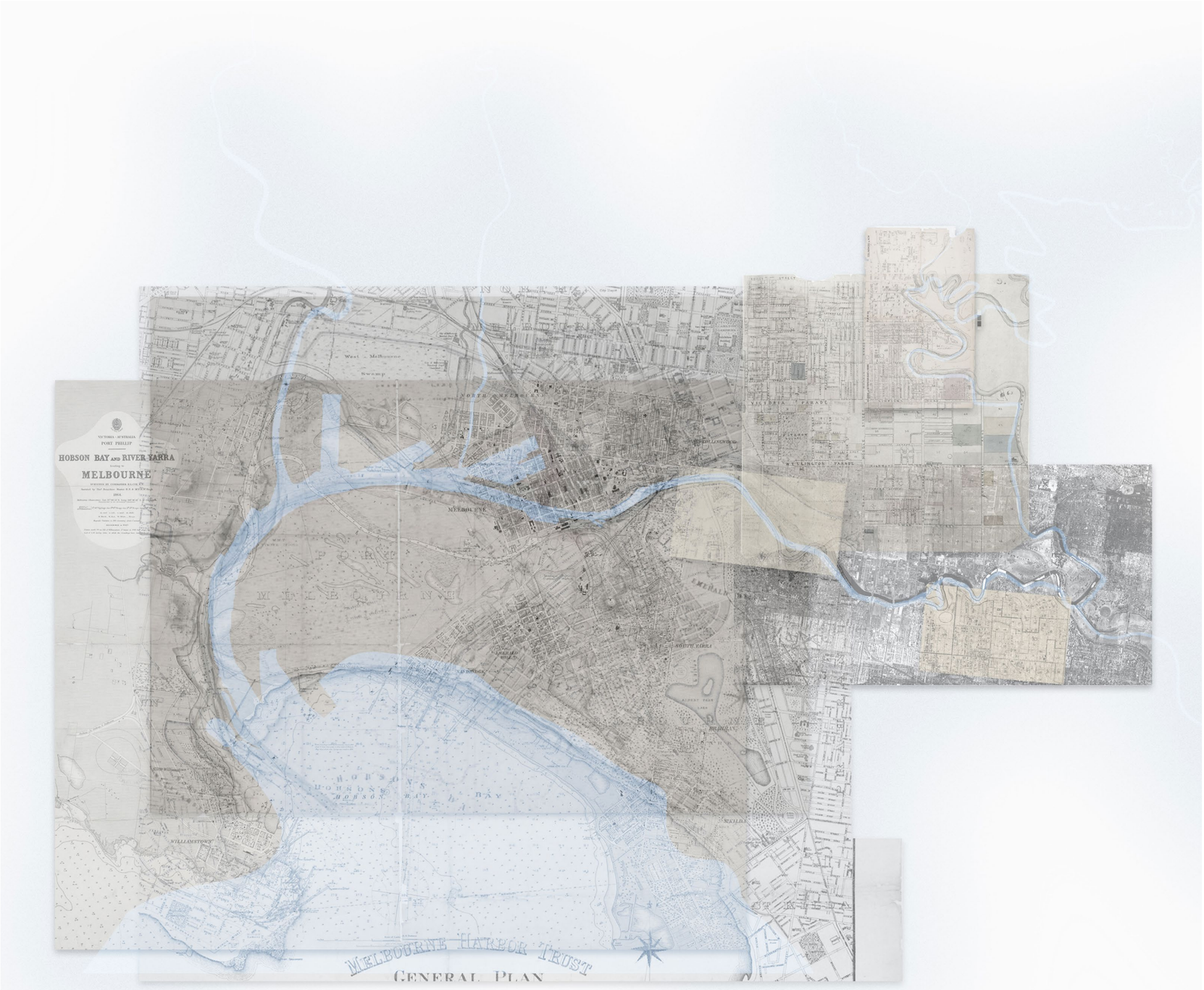


Figure 44. *Historic Alteration of the Course of the Birrarung.*

GLOSSARY

Adaptation: Designing for environmental changes in order to mitigate negative effects.

Assisted regeneration: Regeneration of sites with some indigenous plant species. This requires biological modification such as the introduction of plants and weed management.

Berm: A level strip of land bordering the creeks.

Bioengineering: Use of local plant materials to provide engineering solutions; mimicking nature.

Bioretention: The process of capturing stormwater runoff for treatment and the removal of contaminants and sedimentation.

Bioswale: Vegetated channels designed to slow down and temporarily hold stormwater to remove pollution.

Catchment: A topographically defined area of land where stormwater runoff collects and drains off into a common outlet, in this case the creek.

Channelised: Modification to the creek (e.g. concreting over) in order to control drainage, flooding, and direction.

Co-design: Involving stakeholders and users in the design process, often referring to the inclusion of Indigenous voices.

Confluence: Intersection of a tributary with a larger river, in this case the Birrarung.

Cultural water allocation: Water entitlements owned and managed by First Nations for spiritual, cultural, environmental, social and economic benefits.

Discharge points: The point where stormwater discharges into a drain or waterway.

Ephemeral: Temporary or intermittent. Used to describe water courses that dry up periodically.

Erosion: Gradual removal and relocation of soil and rock from the creek banks caused by natural processes, e.g. water flow.

Filtration: Removing or reducing particulate matter in contaminated or polluted water.

Floodplain: An area of relatively flat land adjacent to a waterway that becomes covered in water when the waterway overflows.

Green infrastructure: Natural and designed ecological systems that provide benefits from nature. Examples include parks, streetscapes, green roofs, rain water harvesting and wetlands.

Greenway: A corridor of open space that serves as a route and is environmentally green.

Hydrologic management: The controlling and monitoring of water hazards such as floods or extensive erosion.

Habitat connectivity: The quality and extent of connections between separate patches of habitat, allowing the movement of species and ecological processes.

Habitat management zone: An area that is managed and protected for conservation purposes.

Land Back: Land back refers to a reckonning with Australia's Indigenous and colonial history, protecting culturally and spiritually significant sites and resuming old ways of caring for Country.

Litter trap: A floating device installed along waterways to capture litter, vegetation, and debris before it floats further downstream.

Natural regeneration: Regeneration of sites with intact remnant vegetation. This may require improved management such as weed control over time.

Naturalise: Reverting built channels to a more natural state, often to replicate or mimic the conditions of the original waterway. Also referred to as 'daylighting'.

Net Gain: A driver of change or a by-product of major change that seeks to leave the natural environment in a measurably better state than it is currently.

Permeability: The property of a material that allows water and gas to pass through it. Often referring to materials that reduce stormwater runoff by allowing water to infiltrate.

Pervious surfaces: Surfaces designed to allow rainwater to pass through and infiltrate into the underlying soil.

Planting filtration: The use of plants to remove or reduce contaminants in water.

Rain garden: A garden designed to reduce stormwater runoff by increasing the amount of water absorbed by the soil. They often feature a small depression to capture runoff.

Reconstruction: Regeneration of sites with no remnant vegetation and significant soil disturbance. This requires both physical and chemical modification such as the introduction of plants or seeds, and topsoil.

Regeneration: The process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed.

Remnant vegetation: Patches of original, indigenous vegetation.

Resilience: The capacity of ecosystems, infrastructure or communities to respond to and quickly recover from disturbances.

Restoration: An activity with the goal of achieving substantial ecosystem recovery, relative to a reference model.

Riparian: Area which functions as the interface and connection between the creek and the land.

Species continuity: The uninterrupted succession of generations of a species.

Stormwater runoff: Rainfall flowing over urban land and impervious surfaces including streets and building rooftops without being able to penetrate the ground.

Subbasin: A small portion of the larger creek catchment within which all stormwater runoff will flow into the same location along the creek.

Swale: An open vegetated channel that collects and directs stormwater runoff to a drainage network.

Tributary: A stream, river, or creek flowing into a larger river, e.g the Darebin is a tributary of the Birrarung, Yarra River.

Uplands: Ground elevated well above sea level, often but not always mountainous.

Water retention system: A closed system designed to hold stormwater to be used on site.

APPENDIX

Burra Charter
Practice Note_Understanding and assessing cultural significance

The Burra Charter Practice Note is a guide for practitioners that answers the question of what cultural significance is and how it gets assessed.
It defines cultural significance as the all ecompassig word for (all) cultural values in a specific place, including aesthetic; historic; scientific; social; and spiritual values, and there 'tangible and intangible aspects'. The charter acknowledges that 'for indigenous people, natural and cultural values may be indivisible', and that such an assessment is closely related to a place and its history and characteristics.

The following steps are defined in the Burra Charter Practice Note in understanding and assessing cultural significance:
(1) Understanding place
(2) Assessing cultural significance
(3) Identifying factors and issues
(4) Developing an appropriate policy
(5) Preparing a management plan
(6) Implementing the management plan
(7) Monitoring and reviewing

Yarra River Ecological Regeneration Guide 2021. Written by Andrew Kelly and Daniel Miller, with assistance from Tom Frawley and maps by Karen McGregor
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The regeneration guide provides a methodology for assessing regeneration options. The approach synthesizes a number of national and international restoration guides customizing them to Australia. The approach includes defining the regenereation area, the remnant vegetation and other site conditions and the proposed restoration approaches and reference ecosystems. Goals, objectives and site priority considerations are made explicit.

Regeneration, in this case, referes to a set of processes and actions, rather than defining the outcome, according to The National Standards, it is 'the process of assisting with the recovery of an ecosystem that has been degraded, damaged, or destroyed'.
The Yarra Riverkeeper Regeneration Guide outlines four key components of its plan:

1) ecologically healthy cores, such as nature reserves, parks and national parks on the river,
2) ecologically healthy corridors that connect these cores, which allows migration of species upstream and downstream in response to climate and urbanisation pressures,
3) a landscape-scale view of the Yarra that treats the river as 'one living and integrated natural entity' (Yarra River Protection [Willip-gin Birrarung murron] Act), and
4) a focus on enhancing the ecological processes (and therefore ecological integrity) of the river corridor.

The guide proposes to set one long-term goal, in this case the recovery of the landscape. The end goal can then be broken down into steps, or smaller short-term goals that can help evaluate and refine the long-term aim as they are successfully achieved.
We have adopted this process and defined short, mid, and long-term goals for each site respectively.

YARRA PROTECTION PRINCIPLES

Wilp-gin Birrarung murron (Yarra River Protection) Act 2017

Cultural	Social	Environmental	Recreational	Management
(1) Aboriginal cultural values, heritage and knowledge of Yarra River land should be acknowledged, reflected, protected and promoted. *(2) The role of the Traditional Owners as custodians of Yarra River land should be acknowledged through partnership, representation and involvement in policy planning and decision-making.* *(3) The cultural diversity and heritage of post-European settlement communities should be recognised and protected as a valued contribution to the identity, amenity and use of Yarra River land.*	*(1) The existing amenity of Yarra River land, including its natural features, character and appearance, should be protected and enhanced for the benefit of the whole community.* *(2) Community consultation and participation should play an essential and effective role in the protection, improvement and promotion of Yarra River land.*	*(1) If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation or for failing to assess the risk-weighted consequences of the options.* *(2) Environmental practices and procedures should ensure that biodiversity and ecological integrity is maintained or enhanced in ways that are proportionate to the significance of the environmental risks and consequences being addressed.* *(3) If approaches to managing environmental impacts on one segment of the environment have potential impacts on another segment, the best practicable environmental outcome should be sought.* *(4) There should be a net gain for the environment in the area of Yarra River land arising out of any individual action or policy that has environmental impact on Yarra River land.*	*(1) Community access to, and use and enjoyment of, Yarra River land should be protected and enhanced through the design and management of public open space for compatible multiple uses that optimise community benefit.* *(2) Public open space should be used for recreational and community purposes that are within the capacity of that space, in order to sustain natural processes and not diminish the potential of that open space to meet the long-term aspirations of the community.*	*(1) There should be coordination between all levels of government and government agencies when designing policies and programs and making decisions in relation to Yarra River land.* *(2) When designing policies and programs, the best practicable measures available at the time should be used.* *(3) Implementation of natural resource management should aim for continuous improvement and extend beyond compliance with relevant laws and requirements.*

YARRA RIVERKEEPER REGENERATION GUIDE

Report prepared by Dr Bruce Lindsay and Bradley Moggridge for the Birrarung Council

Adapting Wilip Gin Birrarung Murron Principles and Yarra River Keeper Net-Gain Frameworkto Project Framework

Environmental 'net gain' infers the need to establish appropriate and effective measures of 'gain', or cultural improvement. For the Birrarung specifically, ecological and social indicators can be constructed to contribute to this measure of 'net gain', which can relate to places, species, landscape features, or ecological and cultural processes.
The report indicates three measures tied to relevant policy principles:

(1) Quantitative measures of 'gain'. reflective of scienctific and technical input and 'values' generated by said input

(2) Qualitative measures of 'gain', strongly influenced by models of ecological restoration and schema for recovery of ecological systems; respomsive to trajectories of changes interferred into the 'vision' for the Yarra (Birrarung) and the 'living river' model

(3) Cultural measures of 'gain', reflective of the river corridor as Wurundjeri Woi-wurrung country (the cultural landscape) and that the project of measurable improvement must concurrently be the 'healing' and proper 'care' of country under Wurundjeri auspices

Environmental Net Gain

(1) Increased species richness & biodiversity
(2) Improved connectivity & corridors
(3) Disturbance mitigation
(4) Critical habitat protection
(5) Threat management (pests)
(6) Resilience planning
(7) Develop characteristic biotic communities
(8) Performance of characteristic ecosystem functions
(9) Improved habitat connectivity

Social Net Gain

(1) Cross-cultural connection to country
(2) Visibility and acknowledgement
(3) Preservation and Protection of Yarra River Land
(4) Initiating quality community consultation and involvenet in design and restoration planning and delivery.

Recreational Net Gain

(1) Improved access paths
(2) Designated areas for visitation
(3) Emphasis on characteristic view points to establish connection to place
(4) Improved accessibility and safety of public spaces
(5) Quality amenity and services
(6) multi-use spaces that respond to diverse community needs.

Cultural Net Gain

(1) Access to country
(2) Re-establishing ceremony and education on country
(3) Natural resource management on country such as cultural burning and cultural watering

A key proposition of the emerging field of 'indigenous science' is the importance of pluralistic measures of environmental conditions and environmental improvement. Conventional science can be, and increasingly is, integrated or synthesized with Aboriginal knowledge systems producing pluralistic environmental knowledge and practice. These can include high-level, conceptual pathways for bringing together Aboriginal epistemic devices (ways of knowing), such as what has been referred to as 'deep time', with scientific models of environmental change or recovery, or creating practical joint assessment and planning processes bringing together cultural and scientific models of environmental management.

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