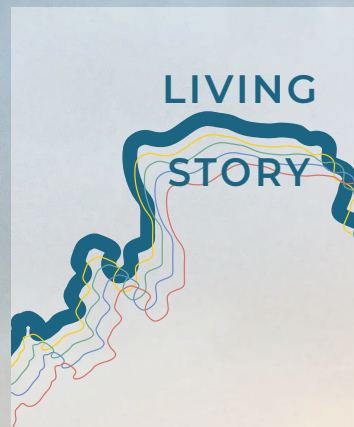


# THE RIVER IS A LIVING STORY

**THE PAST,  
PRESENT, AND  
FUTURE OF  
THE ŌTĀKARO  
AVON RIVER  
CORRIDOR  
THROUGH A  
CULTURAL  
TRAIL**

A COLLECTION  
OF DESIGN IDEAS  
BY MASTERS  
STUDENTS FROM  
THE UNIVERSITY  
OF WASHINGTON  
COLLEGE OF BUILT  
ENVIRONMENTS





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THIS BOOK WOULD NOT BE POSSIBLE WITHOUT THE KNOWLEDGE, TIME, AND GENEROSITY OF THE FOLLOWING PEOPLE. WE HOPE TO HONOR THEIR SUPPORT BY CARRYING WHAT WE LEARNED BACK TO THE UNITED STATES.

ALAN PALMER  
BILLY OSTEEN  
BILL WILLMOTT  
BLAKE LEPPER  
BRIAN NORTON  
COLIN MEURK  
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SIMON SWAFFIELD  
TOM COCHRANE  
UNIVERSITY OF CANTERBURY  
WEI QUAN  
WILLIAM FIELD  
+  
COUNTLESS OTHER COMMUNITY MEMBERS



## TOITU HE WHENUA WHATUNGARONGARO HE TANGATA

THE LAND IS PERMANENT,  
MAN DISAPPEARS.

## THE RIVER IS A LIVING STORY

In partnership with the University of Washington, a team of Landscape Architecture, Architecture, and Urban Planning graduate students embarked on a 10-week study abroad program in Christchurch, New Zealand. Following the 2010/2011 earthquakes and ongoing rebuild processes, students sought to study and most importantly learn from the city's approach to post-earthquake recovery and resilience planning/design. The program, which ran from January to March 2019, provided a unique opportunity to leverage multidisciplinary thinking and place-based narratives to contribute to the community's growing body of knowledge.

Based on Regenerate Christchurch's plan to reinvigorate the Ōtākaro Avon River Corridor and the organization's desire to weave in a cultural trail, students endeavored to uncover the stories and themes that could be told along the river. We hope the ideas contained in this booklet—which range from conceptual designs to activities/programs—inspire imagination and provide the foundation for what's next.

The cultural trail we have proposed has taken many forms—they range from trails of activities and programs to digital signage to collections of memories. The common thread that weaves them all together is a distinct effort to honor the past, present, and future of the river. The following proposals are not *possible* without a clean and healthy river, so let's celebrate its value by stewarding it for future generations.

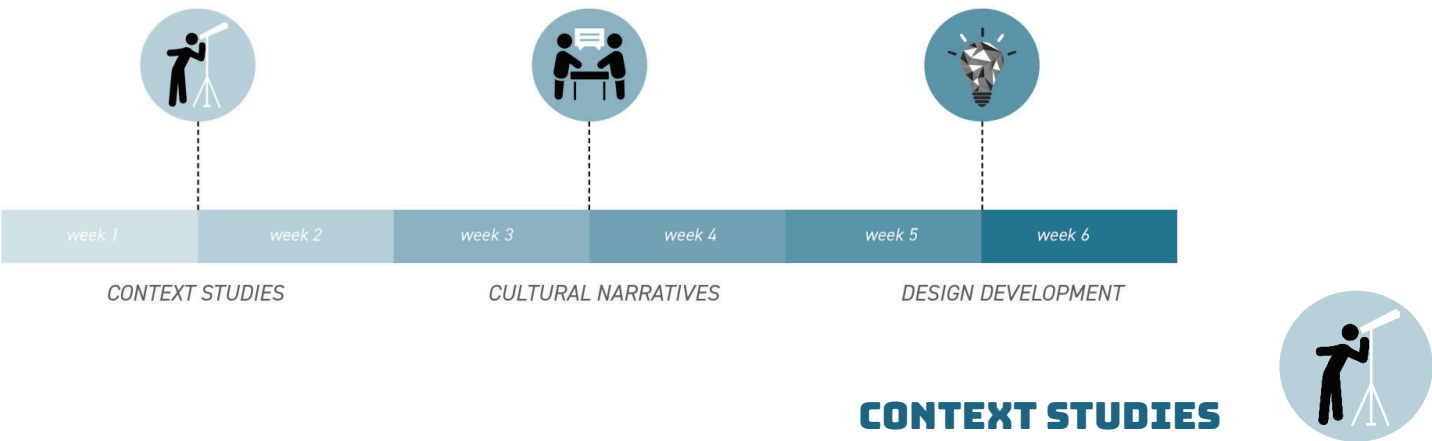


*University of Washington students + faculty 2019, Christchurch*

*From left: Amanda Dinauer, Gabrielle Herbosa, Krista Doersch, Laura Durgerian (Teaching Assistant), Paul Olsen (Architect), Brian Deck, Rebecca Bachman, Ilsa Barrett, Nicco Piacentini, Asya Snejevski, Farzana Rahman, Nancy Rottle (Professor), Ryan Willing, Jen Kriegel, Lisa Johnson, Peter Samuels, Yunxin Du, Yutong Hu*



# STUDIO PROCESS



Upon arriving in Christchurch, the students and instructors of the University of Washington studio spent the first week exploring the Ōtākaro Avon River Corridor by bicycle and on foot to learn more about its layered historical, cultural, and ecological contexts. For the first two days of these explorations, Colin Muerk of Landcare Research New Zealand, who also provided feedback to students throughout the design process, generously provided a tour of existing ecological conditions throughout the Ōtākaro Avon River Corridor and the greater Christchurch area. Colin highlighted existing native habitat restoration areas and those with a high potential for restoration. Colin also gave the studio a lecture on ecological patterns of Canterbury at Landcare Research in Lincoln.

Students continued their explorations of the Ōtākaro and the residential red zone by conducting transects of the 12 kilometer section of river they considered for the cultural trail, photographing the river corridor at 200 meter intervals. The photos reveal changes in the river's character from city to estuary. See *Appendix A: River Panoramas* for transect photos.

The following week, the studio met with Hugh Nicholson, an urban designer and former project lead on Regenerate Christchurch's Ōtākaro Avon River Corridor Regeneration Plan. Hugh played a particularly significant role for the studio, as he first proposed this project and was instrumental in introducing the studio to resources throughout Christchurch. Hugh spoke about the lasting impacts of the earthquakes felt by Christchurch residents, as well as opportunities and challenges with regard to an Ōtākaro Avon cultural trail.

The same day, Liz Brown, Assistant Vice-Chancellor Māori at the University of Canterbury, presented to the studio about Māori relationships with land and cultural narratives relating to those relationships.

Together, these experiences formed a foundation of perspectives and knowledge that students would bring into their subsequent cultural narrative research.



1, 2, 3: Learning Christchurch's ecosystems with Colin Muerk in Riccarton Bush, Travis Wetland, and the Port Hills

## CONTEXT STUDIES

## EXPLORING CULTURAL NARRATIVES & THEMES

In the second week of the studio, students broke into research teams to explore cultural narratives that could be included in an Ōtākaro Avon River cultural trail. These teams were: Mahinga Kai, Cultural Landmarking/Tūrangawaewae, Human Experience, Settlement and Colonization, and Waterways and Wetlands, comprised of a group of three students (Yunxin Du, Yutong Hu, and Farzana Rahman) who are addressing stormwater management at Waikākāriki-Horseshoe Lake as part of their Master in Landscape Architecture capstone project.

After an initial research period, the studio held a workshop attended by guests from across Christchurch's community planning and design communities. Attendees generously provided feedback to students on their proposed narratives and identified additional narratives with sticky notes on a large basemap.

Students then synthesized feedback and added narratives into a revised interpretive framework matrix, which was sent to workshop guests for comments. See *Appendix B: Cultural Narrative Studies*.



1, 2, 3, 5: Guests, instructors and students discuss cultural narratives at the workshop  
4: Students developed a transect map illustrating existing conditions of the Red Zone area



DESIGN DEVELOPMENT



Having synthesized their cultural narratives research, students began design work within four groups: Mahinga Kai: Food + Ecology, Tākaro: Rlver of Play, Memory, Connection + Being, and Waikākāriki Futures. In the two weeks that followed, students in each group worked together and across groups to discover design themes and programming that would make for an interconnected, cohesive, and meaningful Ōtākaro Avon cultural trail. This collaborative work included a mid review attended by Craig Pauling of Boffa Miskell and Hugh Nicholson, both of whom had attended the cultural narrative workshop. Both guests helped students to better understand how they could most effectively move themes and concepts forward. The studio celebrated their mid review by paddling the Ōtākaro in waka with Craig Pauling, gaining a perspective of the river that many students had not yet experienced.

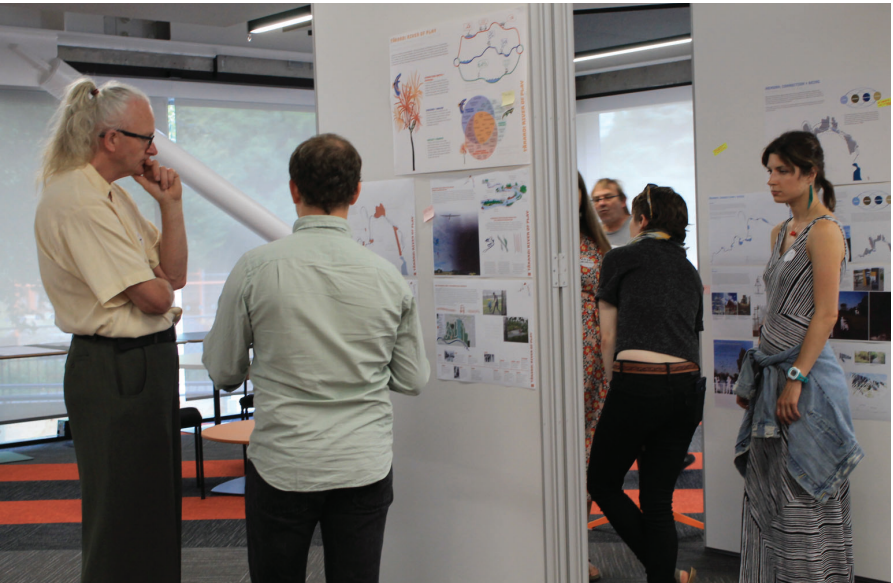
In the two weeks following the mid review, the studio worked to focus and develop their ideas. This process included guest critiques by Evan Smith and Kyle Sutherland of the Avon-Ōtākaro Network, as well as Simon Swaffield, Professor Emeritus of Landscape Architecture at Lincoln University. Furthermore, students worked within separate content, graphics, and video development teams to build final deliverables.

Finally, the studio held a public open house on the University of Canterbury campus. This event served as an opportunity for the studio to share their design work with the Christchurch community, including the many collaborators who contributed significantly to the project. Attendees provided feedback to students and expressed ideas about how students' design concepts could contribute to a future Ōtākaro Avon cultural trail.

This booklet and accompanying video summarize the students' work. The studio's hope is that, together, their ideas provide inspiration to the greater Christchurch community, so that all people can come together to enjoy the Ōtākaro Avon as a place for celebrating culture and life in, on, and around the water.



1, 2: At the mid review, students receive feedback from Craig Pauling and Hugh Nicholson  
3, 4: Students present their design themes and concepts at the mid review



Project collaborators and other Christchurch community members provided students with feedback at the studio's final open house event

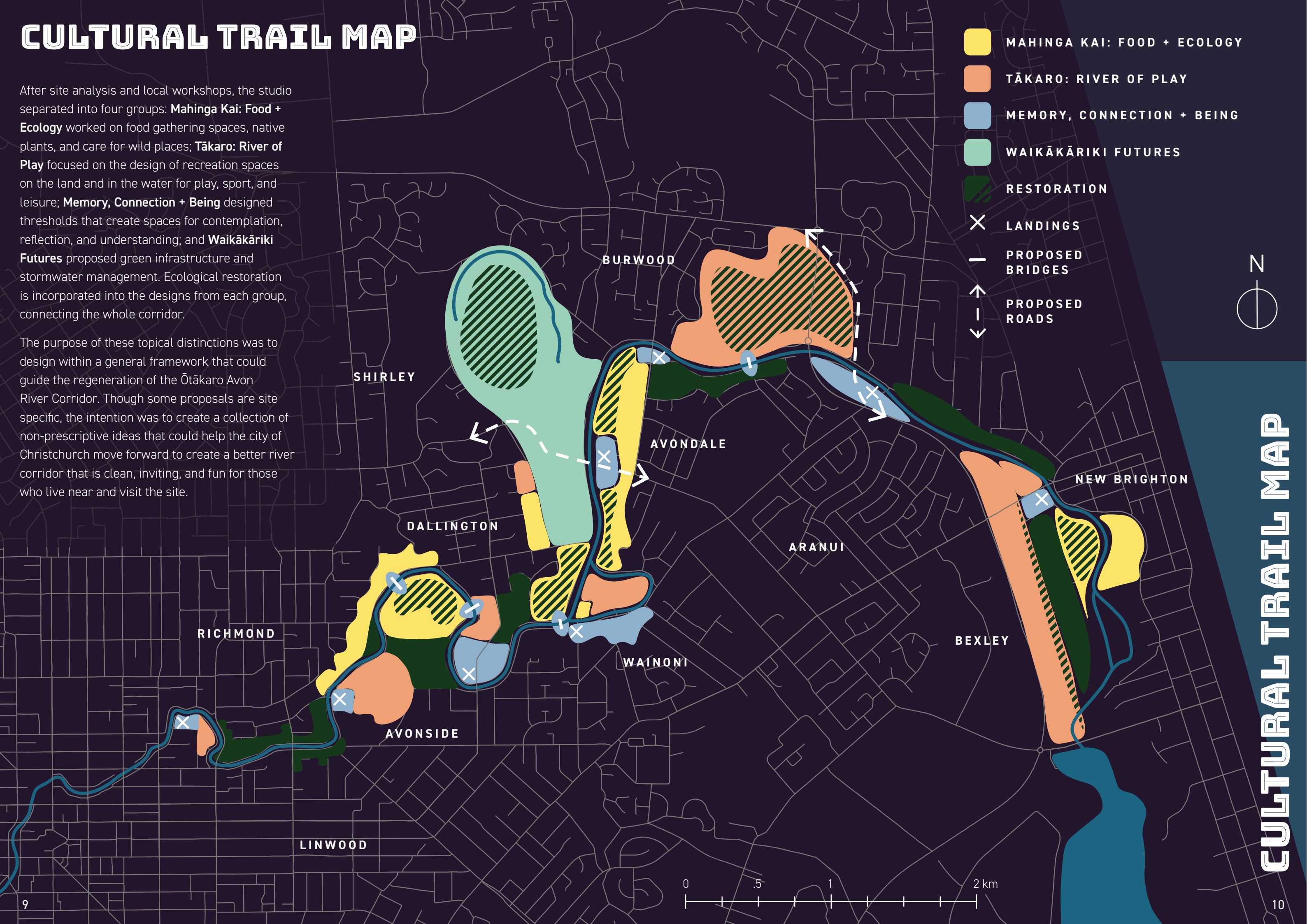


# CULTURAL TRAIL MAP

After site analysis and local workshops, the studio separated into four groups: **Mahinga Kai: Food + Ecology** worked on food gathering spaces, native plants, and care for wild places; **Tākaro: River of Play** focused on the design of recreation spaces on the land and in the water for play, sport, and leisure; **Memory, Connection + Being** designed thresholds that create spaces for contemplation, reflection, and understanding; and **Waikākāriki Futures** proposed green infrastructure and stormwater management. Ecological restoration is incorporated into the designs from each group, connecting the whole corridor.

The purpose of these topical distinctions was to design within a general framework that could guide the regeneration of the Ōtākaro Avon River Corridor. Though some proposals are site specific, the intention was to create a collection of non-prescriptive ideas that could help the city of Christchurch move forward to create a better river corridor that is clean, inviting, and fun for those who live near and visit the site.

- MAHINGA KAI: FOOD + ECOLOGY
- TĀKARO: RIVER OF PLAY
- MEMORY, CONNECTION + BEING
- WAIKĀKĀRIKI FUTURES
- RESTORATION
- LANDINGS
- PROPOSED BRIDGES
- PROPOSED ROADS



CULTURAL TRAIL MAP



# CONCEPT MAP

## THE ŌTĀKARO AVON CORRIDOR AS A NETWORK OF EXPERIENCES

The four design teams developed distinct concepts while also working together as a studio to create a cohesive conceptual framework for the Ōtākaro Avon River Corridor. What emerged was a diverse and well distributed network of interpretive activities and experiences along the river. Through the variety of focal topics, we were able to explore more deeply and intertwine an interpretive trail of adventure.

Some overarching goals for the project include cleaning the river for future generations through native restoration along the corridor, enhancing connections to neighboring communities, and creating opportunities to engage and strengthen cultural stories of the river. Our design work focused primarily between the landings designated by Regenerate Christchurch. We worked under the assumption that a set of common amenities would be included at each landing:

- wayfinding information
- river access/docks
- community board
- gathering/picnic area
- shelter
- memory and memento station
- trash/recycling/compost
- solar charging stations
- water fountain
- WC with changing rooms + showers
- bike + car parking
- bike maintenance stations

TĀKARO: RIVER OF PLAY

MAHINGA KAI: FOOD + ECOLOGY

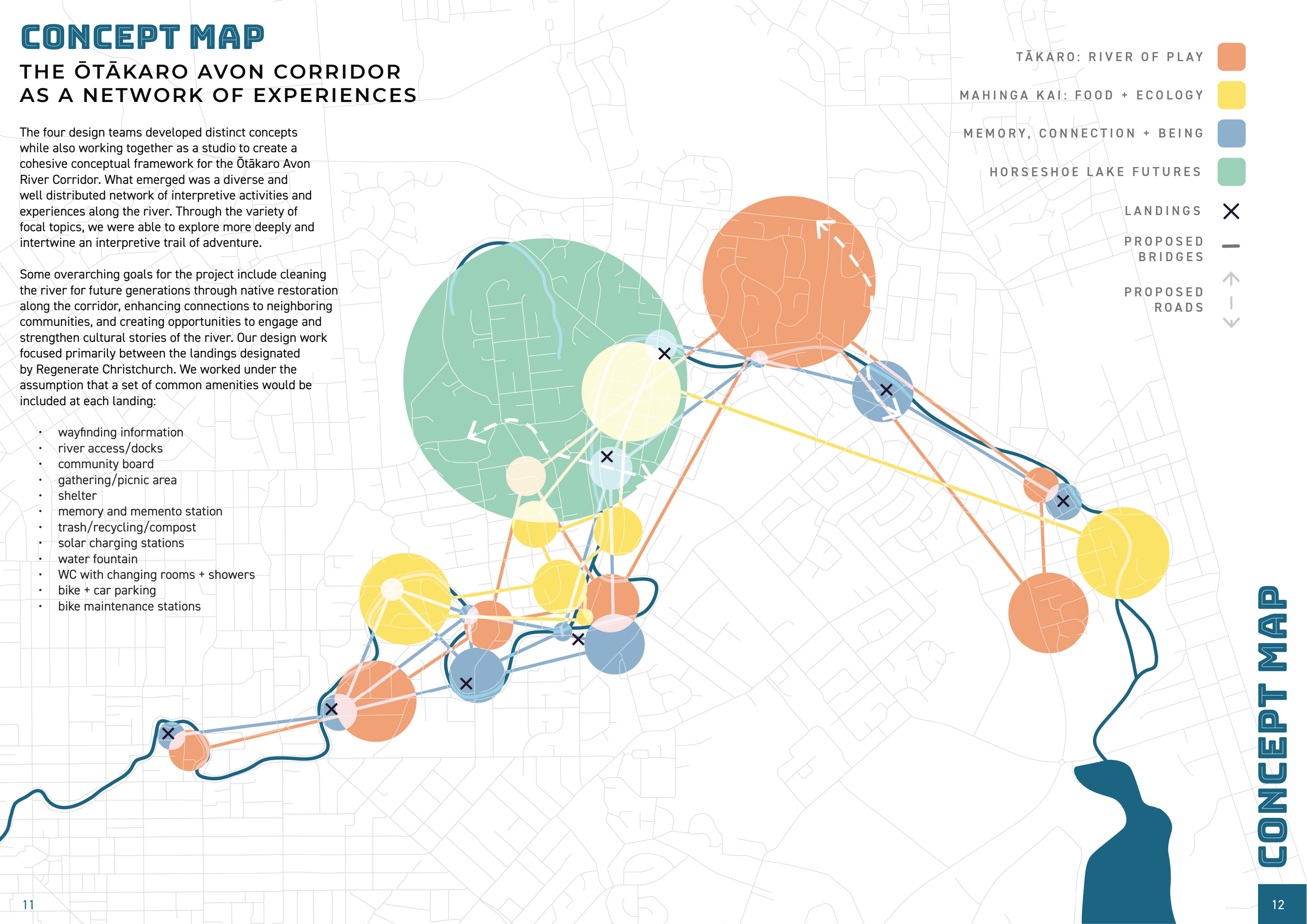
MEMORY, CONNECTION + BEING

HORSESHOE LAKE FUTURES

LANDINGS

PROPOSED BRIDGES

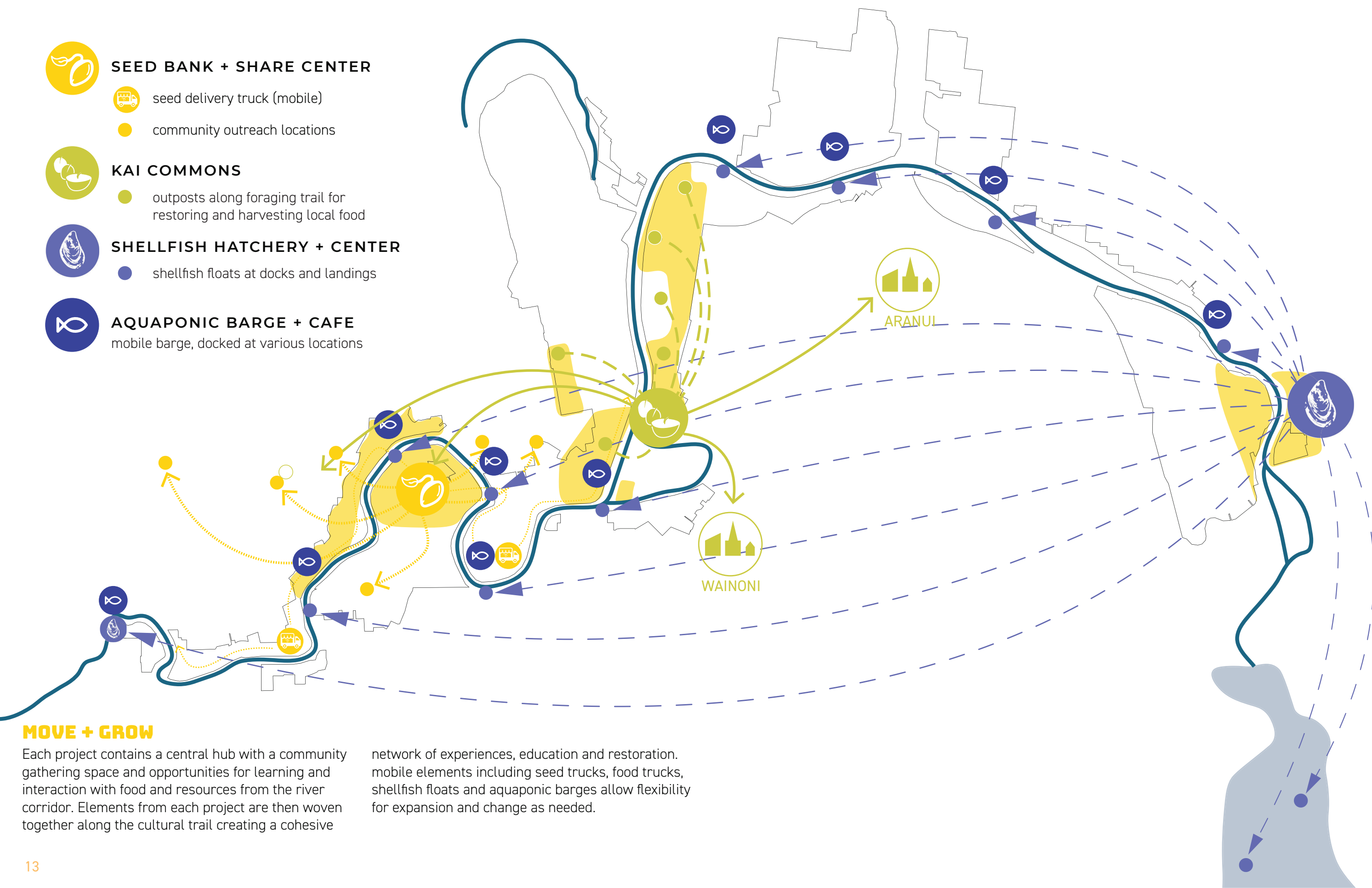
PROPOSED ROADS





# MAHINGA KAI: FOOD + ECOLOGY

CULTIVATING SYMBIOTIC RELATIONSHIPS  
BETWEEN THE ENVIRONMENT + PEOPLE



## MOVE + GROW

Each project contains a central hub with a community gathering space and opportunities for learning and interaction with food and resources from the river corridor. Elements from each project are then woven together along the cultural trail creating a cohesive

network of experiences, education and restoration. mobile elements including seed trucks, food trucks, shellfish floats and aquaponic barges allow flexibility for expansion and change as needed.



SITE + CONCEPT INTRODUCTION

As a regenerative food commons, the river provides educational opportunities that have the power to cultivate relationships across communities. It allows people to holistically and symbiotically practice a new habit of engaging with Mahinga Kai, a significant and historical aspect along the Ōtākaro, which will allow for a more diverse natural habitat and a healthier daily life.

DESIGN GOALS

- 1. Engage community using food to educate, strengthen relationships and promote stewardship
- 2. Give back to the land through active restoration
- 3. Provide references that exhibit historic narratives of Mahinga Kai and early settlers

PROGRAMS INVOLVED

AQUAPONICS  
HYDROPONICS  
FLOATING  
KITCHENS  
URBAN FARMS  
ORCHARDS  
SEED SHARE  
SHELLFISH  
HATCHERY  
ARTS + CRAFTS  
TUNA DRY RACKS  
RIVER PURIFIERS  
CAMPSITES

RESTAURANTS  
CAFES  
BBQ PITs  
GATHERING  
SPACES  
BOAT HOUSES  
RIVER DOCKS  
RESTROOMS  
FLEXIBLE SPACES  
OUTDOOR  
CLASSES  
SIGNAGE  
EATERIES  
RESTORATION

SITE ANALYSIS

The initial phase of design involved an in-depth understanding of the Ōtākaro river throughout the course of its history, then locating significant cultural and environmental locations that provides accessibility and inclusivity. Since the river has been deemed unsafe to live by the Council, we explored ways in which neighborhoods throughout the corridor could maintain an active and healthy lifestyle while promoting a sense of *kaitiakitanga* (stewardship, shared responsibility and respect for the natural environment).

As a place primarily used as Mahinga Kai, we've investigated how food and habitat related spaces could recall historical and cultural significance, enhance the lives of those who live along the corridor, and revitalize the nature of the river and its surrounding natural habitat.



Avonside Loop panorama courtesy of Farzana Rahman + Ryan Willing



Wainoni Boathouse panorama courtesy of Yuntong Hu + Brian Deck



New Brighton Estuary panorama courtesy of Lisa Johnson + w Snejneviski



AVONSIDE LOOP

This site enabled a more concentrated exploration of design within the Regeneration area. It was also within close vicinity to existing community organizations, schools and, more importantly, Tautahi, a traditional settlement site. Being close to the city center allows more accessibility to those visiting the Ōtākaro Avon River, which could provide a stronger relationship between the residents along the river and the city. Potentially this site would provide an opportunity to connection with other explorations as well.



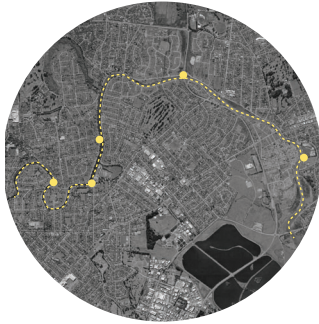
WAINONI BOATHOUSE

Kai Center is part of a connected network of food growing and social gathering spaces along the Ōtākaro Avon River. Location allows the food hub to connect with waterway transportation centers, neighborhood proximity, existing park space, and urban agriculture. A destination and a departure point for exploring social-mission urban farms, foraging along edible fruit tree parks, volunteering in native habitat restoration



NEW BRIGHTON ESTUARY

The site connects the Ōtākaro Avon River to the coast and serves as a hub for surrounding communities including New Brighton, offering access to the river and a space for events such as seafood markets. The experimental shellfish hatchery provides an interactive educational experience while propagating native shellfish to help clean the river and restore declining populations. The goal is to promote engagement with the river and a stronger understanding of the cultural and ecological importance of our waterways.



AVON CORRIDOR

The ability to be "site-less" and thus move across the whole corridor allows the aquaponic barge to fulfill changing needs of each community as christchurch rebuilds, grows and evolves. The barges can easily be replicated, scaled and moved. These resilient design is also highly adaptable to effects of future natural disasters and climate change.

Aerial shots courtesy of Google Earth



Concept diagram - metabolic network between programs along the cultural trail

FOOD NETWORK

With the intention of creating a holistic thematic experience, educational components are categorized by the unique phases of food and habitat development. Though programmatically distinguished, these varying educational hubs would aim to collaborate with one another and symbiotically benefit each other.



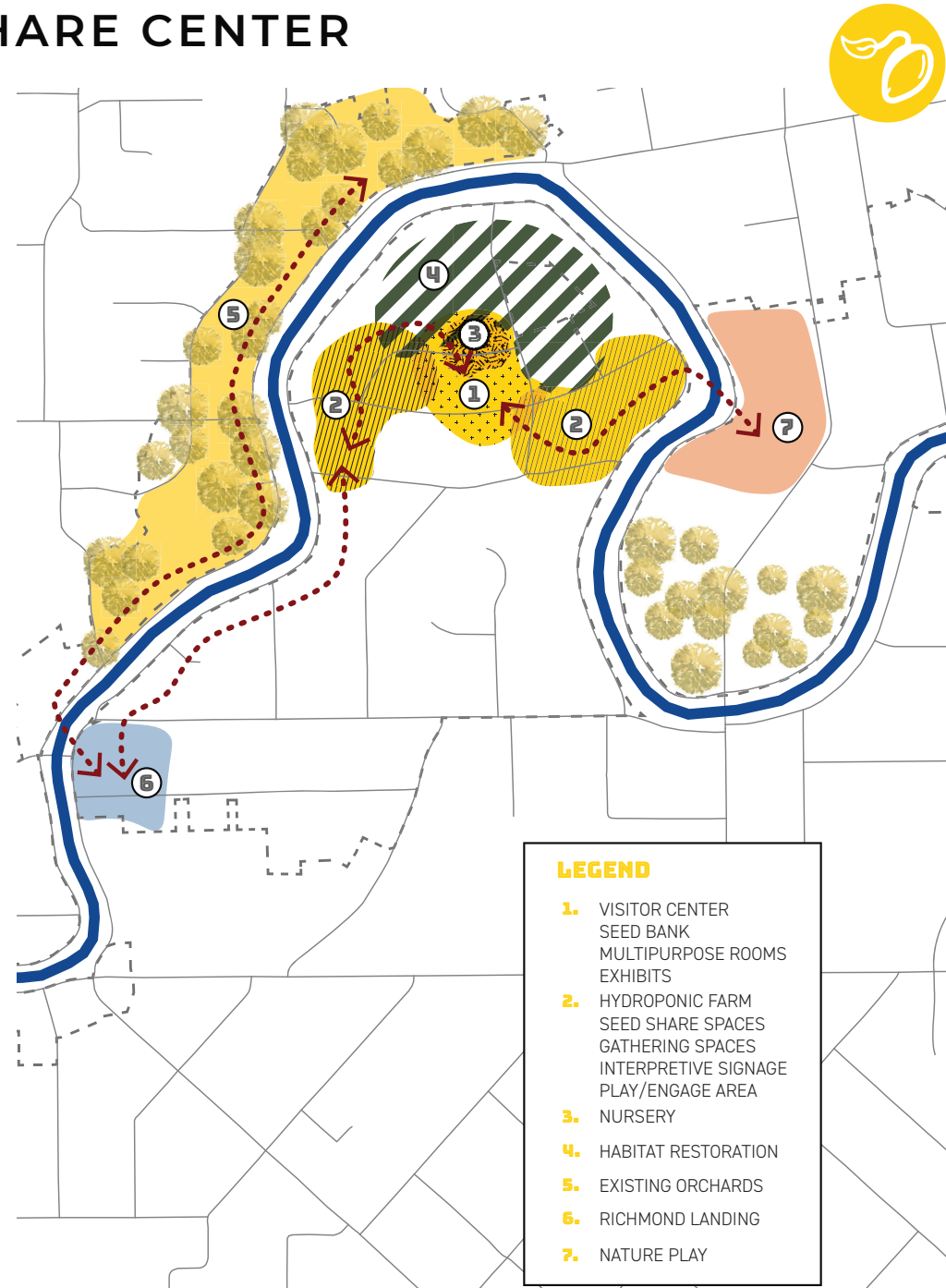
SEED BANK + SHARE CENTER

PLANTING THE SEED

Serving as an introduction to the Mahinga Kai component of the cultural trail, the seed bank would provide an educational and engaging experience. Everybody could participate and learn about native plants, the uses of raw materials, and the natural habitats that inhabit the Ōtākaro Avon River. This would help communities remain connected to the river, the environment and each other.

CULTIVATING RELATIONSHIPS

The Seed Bank would not only provide a storage facility for native flora and fauna, but it would also act as a catalyst between the local communities and the environment. Learning about the efforts of the community and their immediate response with each other after the earthquakes were very inspirational to the process. It was a priority for the design exploration to maintain these relationships and enhance them.



Schematic site plan indicating spatial diagram of program spaces + walking paths



Connecting to local communities + schools . Information + guidance from Avon Ōtākaro Network (Evan Smith + Kyle Sutherland)



LIVING IN A LIQUIFACTION PRONE AREA

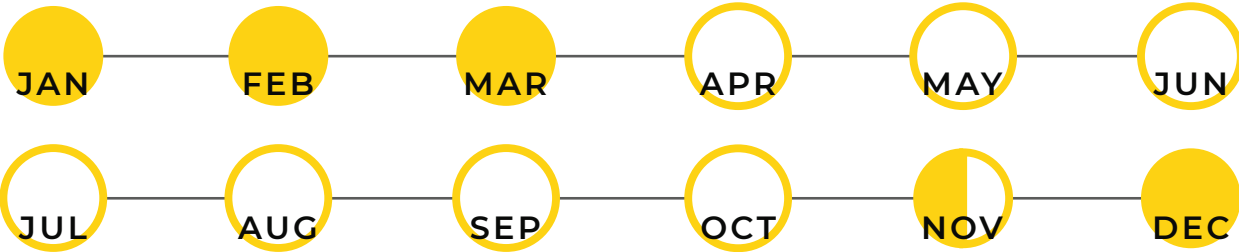
Because this area is prone to liquefaction caused by soft soil conditions within the ground, this design explores non-invasive ways in which lightweight structures could help densify and pressurize the soil into a more uniformly distributed settlement that helps provide stability. In this design, we investigate the utilization of Combined Soil Stabilization with Vertical Columns (refer to visual perspective above).

RESILIENCY IN GROWTH AND ADAPTABILITY

In an effort to maintain a functional purpose year round, the seed bank operates differently throughout the year to accommodate the growth phases of plants. While it would serve its local community today, the hope is that it would grow alongside the Avonside population growth as well. In order to maintain a connection within larger vicinities of various communities, the seed bank would be flexible enough to be applied in various locations and utilize the cultural trail as a route for mobile services to operate as a seed truck pop-up truck.

SUMMER:  
OUTDOOR EVENTS  
COMMUNITY HARVEST  
STORAGE IN SEED BANK  
SEED TRUCK DELIVERY

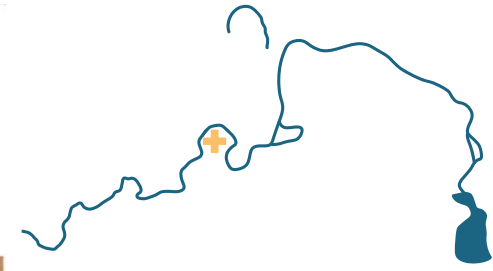
AUTUMN:  
PLANT FOR WINTER  
HYDROPONICS  
CLASSES BEGIN



WINTER:  
PLANTING ORCHARD + FRUIT TREES  
RESTORATION ACTIVITIES

SPRING:  
PLANT FOR SUMMER  
SEED TRUCK DELIVERY

Programmatic function of the Seed Bank throughout the year. Information provided by Tui Garden New Zealand



Serpentine Pavilion . Sou Fujimoto



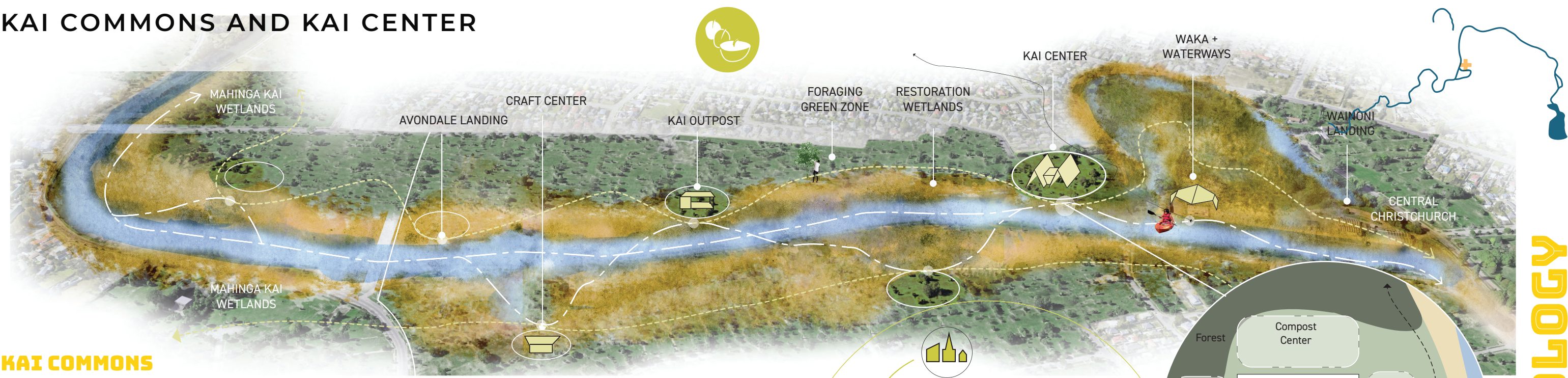
Nest We Grow . Kengo Kuma



Vertical Hydroponic Towers



KAI COMMONS AND KAI CENTER



KAI COMMONS

Kai Commons is an abundant food landscape of cultivated and foraged foods. Sites within the commons engage larger communities, schools, and local food business possibilities. Restoration activities, foraging for fruit, and community gardening support community food systems.



“GARDENING EARTH, GARDENING SOUL”



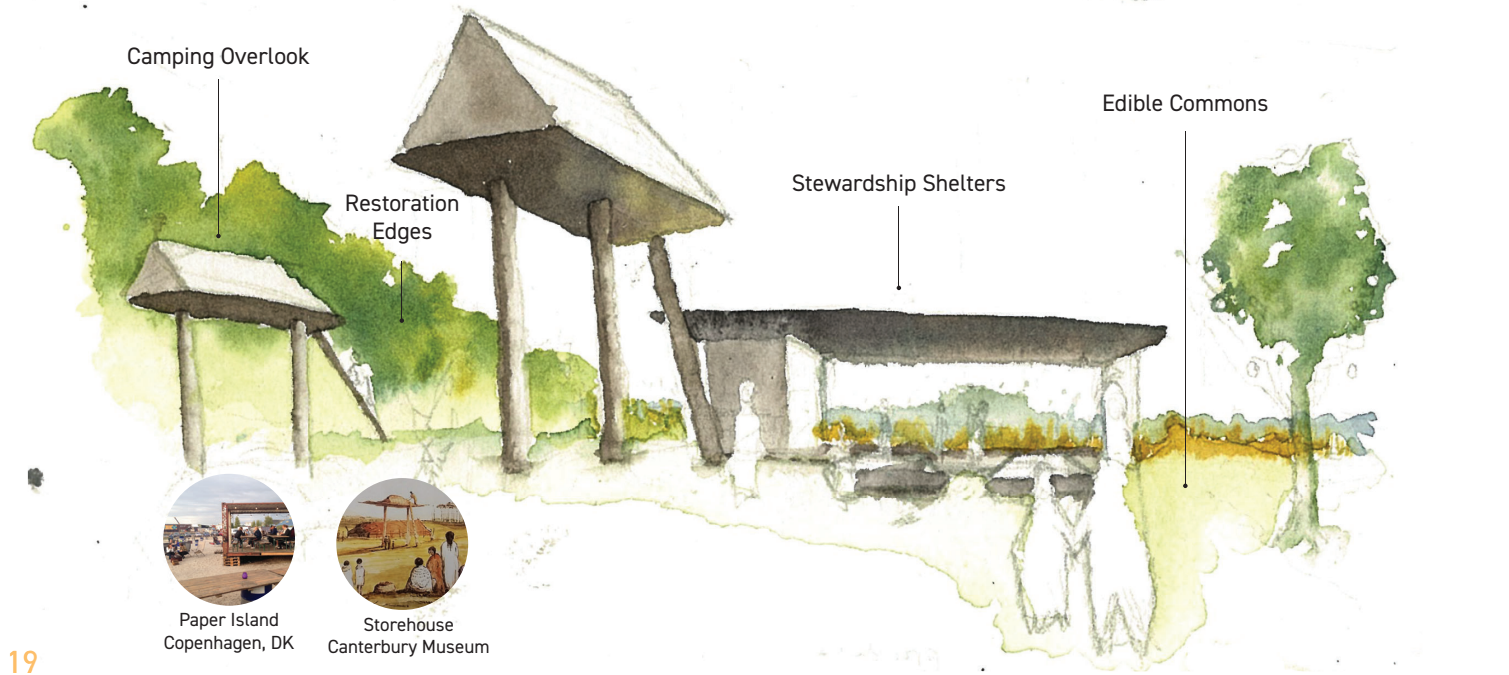
“CATCH TWO FISH, RELEASE ONE”



“FOR US AND OUR KIDS”

KAI OUTPOST

Kai Outposts are outdoor rooms within the Kai Commons that support community food activities around restoration, gardening, harvesting, foraging, cooking, preserving, exchanging, and gathering. Stations provide infrastructure and off-grid services that can support ongoing farming, recreation, and camping opportunities



KAI CENTER

Kai Center is a demonstration facility for learning about natural systems, gaining practical skills, and connecting with community over resilient equitable food culture. Community development is enabled by business opportunities around social-mission food identity. Open space and facilities support recreational use and host seasonal public events.



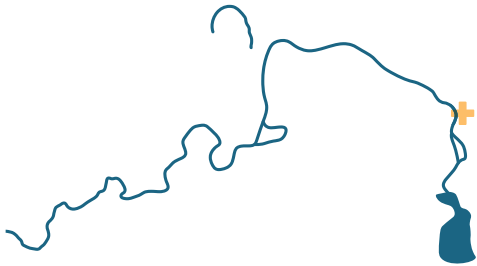


# A GATEWAY TO THE COAST

## CULTIVATING CONNECTIONS

This site was designed to provide connection from the Ōtākaro Avon River to the coast and acts as a community hub, offering educational experiences, events such as fish markets and access to the river to surrounding communities such as New Brighton. The majority of the site will be re-vegetated with native plantings and contain a trail network developed from

the existing roads. The interactive shellfish hatchery provides educational experiences and employment opportunities while propagating freshwater mussels, saltwater mussels and cockles. The dock responds to the changing water levels and offers access to fishing and boating and is a landing for the aquaponic barge.



### SHELLFISH HATCHERY

An interactive, educational hatchery with traditional eel weirs incorporated into the building design to acknowledge the adjacent historical eel fishing site



### RIVERSIDE FISH MARKET

A waterfront community gathering space with a fish market that connects the river to the coast and local fisheries



### MUSSEL FLOATS

The mussels clean the river while providing ongoing data on how they react to pollutants and change in salinity in the river



DOCK FOR RIVER ACCESS AND EVENTS

SHELLFISH HATCHERY

NATIVE PLANT RESTORATION

TRAIL SYSTEM



MAHINGA KAI: FOOD + ECOLOGY



SHELLFISH HATCHERY + CENTER

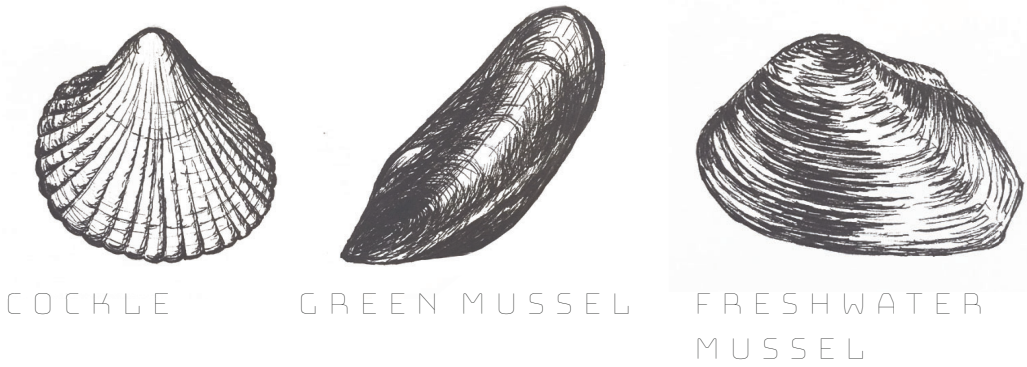
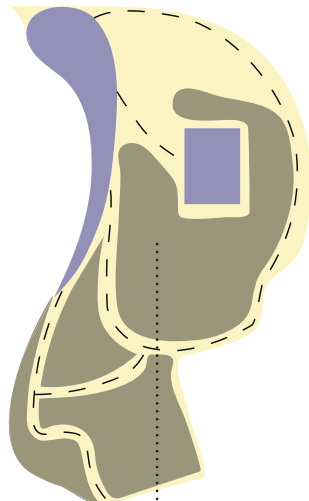
ENGAGING THE COMMUNITY TO WORK TOWARD A HEALTHIER RIVER

Fairmont Waterworks in Philadelphia is a precedent for the Shellfish Hatchery concept. The observational hatchery will propagate freshwater mussels, saltwater mussels and cockles while providing education about customary harvesting practices and uses as well as the ecosystem benefits and life-cycles of the shellfish. After the shellfish are mature enough they are moved to the river and placed at the docks along the corridor,

with different species depending on the salinity levels. Here they work to clean the river and act as an ongoing experiment; testing reactions to changing river conditions. As the hatchery operation grows the shellfish will be moved to other waterways to help clean water, restore declining populations and to be harvested for food.

MUSSELS AND COCKLES WERE ONCE A VALUABLE MAHINGA KAI RESOURCE FOR MĀORI PEOPLE. THE KĀKAHI, OR FRESHWATER MUSSEL IS ONE OF THE MOST POWERFUL FILTERING MUSSELS IN THE WORLD, CLEANING OVER A LITER OF WATER PER HOUR. IN 2014, KĀKAHI WERE DESIGNATED AS AT RISK OR DECLINING IN NEW ZEALAND.

FROM THE HATCHERY



COCKLE

GREEN MUSSEL

FRESHWATER MUSSEL

TO THE RIVER

Each dock, located near landings and bridges, will have bags of fresh or saltwater shellfish working to clean the waterway.

- SALTWATER MUSSELS AND COCKLES
- FRESHWATER MUSSELS



PROPAGATE



Freshwater mussels, saltwater mussels and cockles will be propagated in the hatchery in a setting that is open for public viewing

EDUCATE



Interactive displays and signage in the hatchery and along the river engage the public on the importance of shellfish and the current state of the river

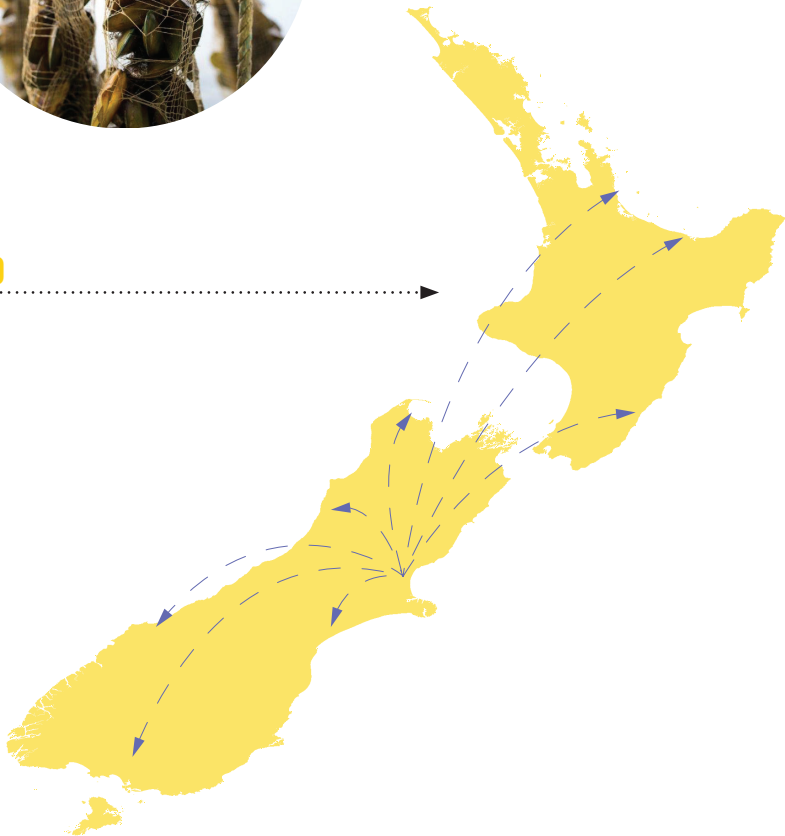
RESTORE



The shellfish from the hatchery work to clean waterways and increase declining shellfish populations

EXPANDING OUTWARD

The Shellfish hatchery provides opportunities to repopulate other estuaries, rivers and lakes in New Zealand





# AQUAPONIC BARGE & CAFE

## DESIGN CONCEPT

This design was inspired by the need to cultivate a clean river for the future, while providing immediate services that are flexible and can adapt to a changing and growing Christchurch. The cafe serves freshly harvested food from the aquaponics system, allowing visitors the experience of eating local fish as we wait for the water quality in the river to be clean

enough to harvest fish directly from the wild. The barge, which this system sits on, can be easily scaled, moved and replicated in order to meet changing social and economic needs of the city, as well as potential challenges due to climate change and natural disasters.



## CAFE

An avenue for visitors to experience eating native foods, and enjoying the river.

## WETLAND

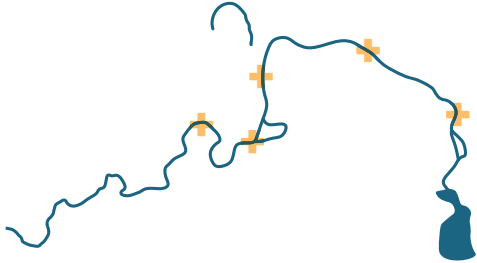
The constructed wetland takes contaminated river water and treats it so that it can be used for aquaponic system, clean water is also returned to the river.

## AQUACULTURE

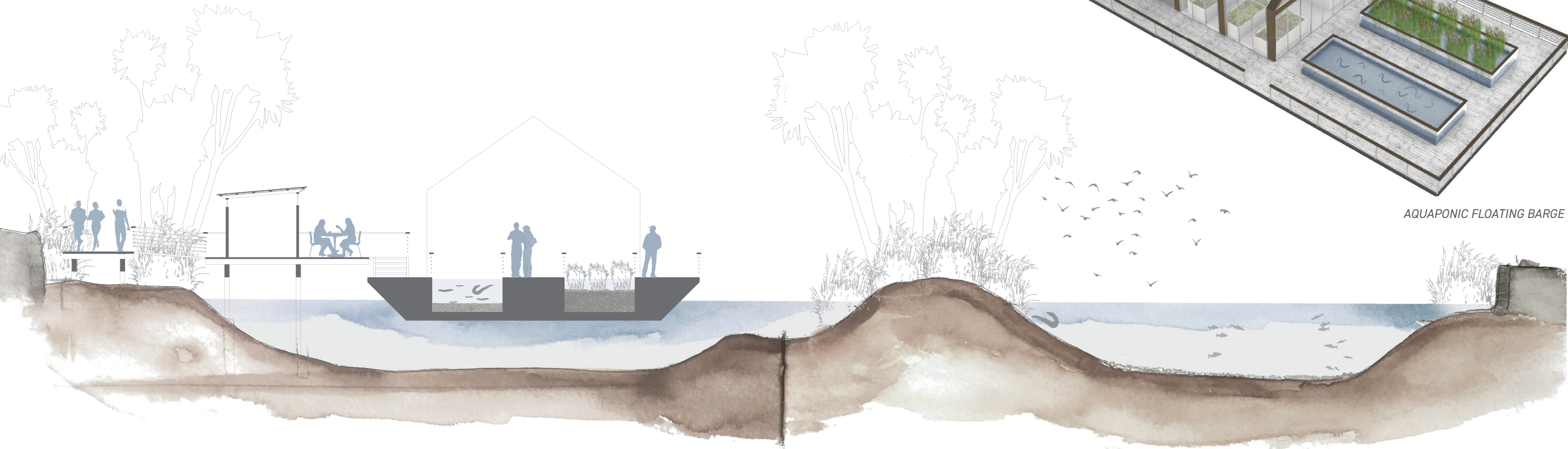
Native aquatic species are grown to be eaten at cafe and distributed to the public.

## GREENHOUSE

Produce is consumed in cafe and distributed to the public.



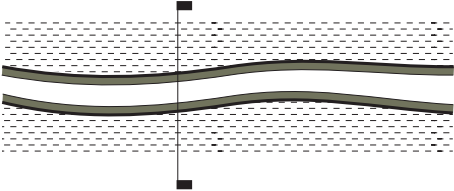
## CLEANING THE RIVER & PROVIDING A RESILIENT SOURCE OF FOOD FOR ITS PEOPLE



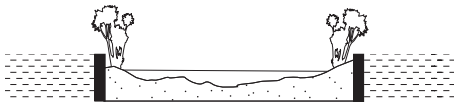
AQUAPONIC FLOATING BARGE

## RESTORING THE ECOLOGY

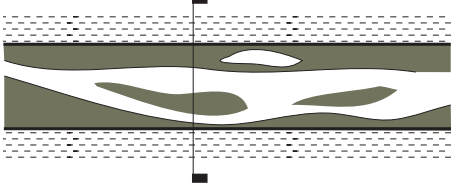
In addition to cleaning the water, it is important to restore the habitat diversity that supports healthy aquatic animal populations. This is essential in creating a future where the Ōtākaro Avon Corridor's cultural trail can successfully be used as a source of native foods.



NARROW STOPBANK



Widening the stop bank will allow the river habitat to become more complex and thus more resilient and productive.



WIDENED STOPBANK



## RESTORING THE WATER QUALITY

The barge allows visitors to experience the ecology of the river by offering native animals as food options; it also filters river water through a constructed wetland and returns it to the river. This will help to create a river with clean enough water to harvest fish directly from the wild.



kōura (freshwater crayfish)



tuna (longfin eel)

## PRESENT

River water is too contaminated to harvest food.

## INTERMEDIATE

aquaponic barge allows people to eat native fish and invertebrates while river is being cleaned

## 50+ YEARS

river water is clean enough to harvest native fish and invertebrates from the wild.



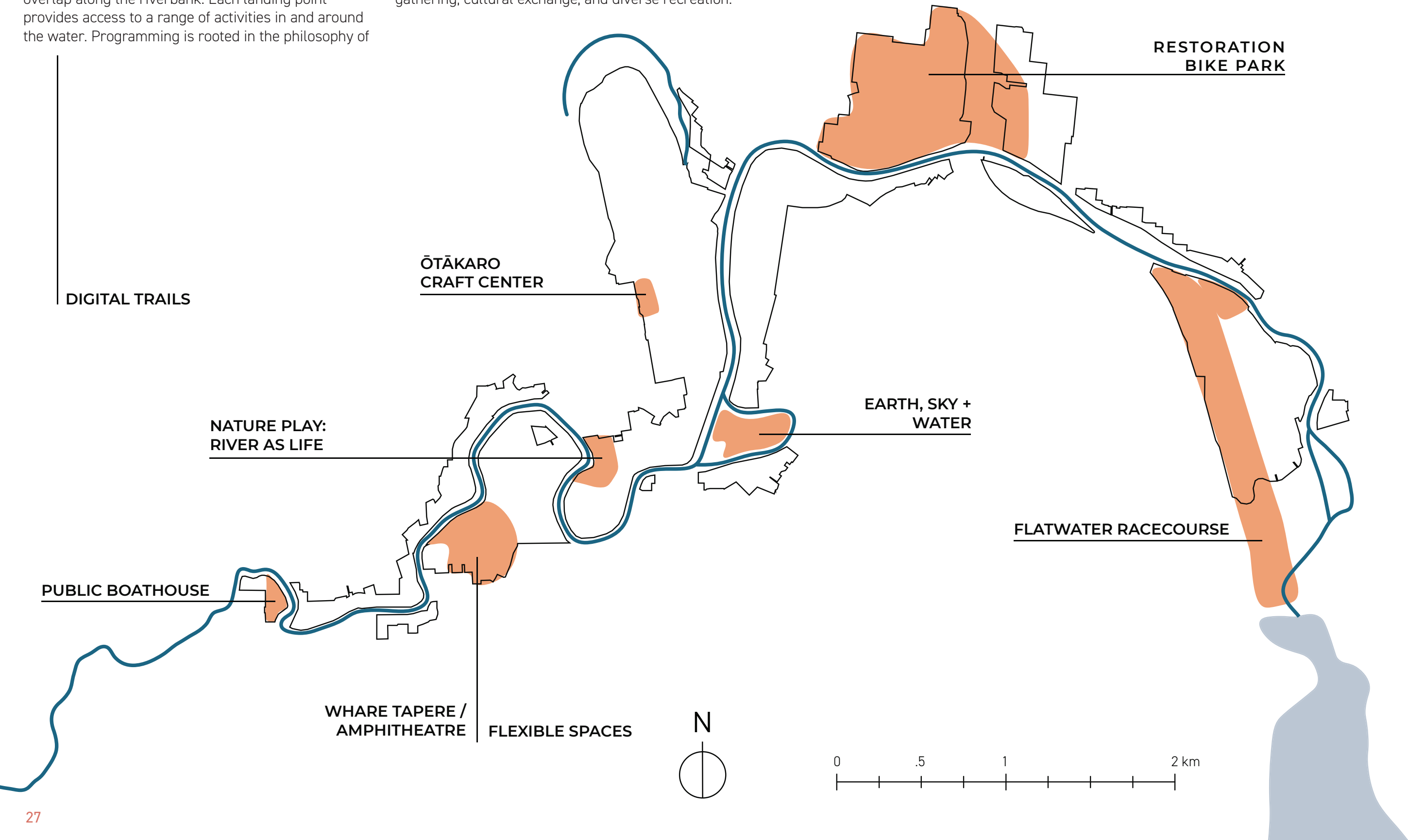
# TĀKARO: RIVER OF PLAY

## WEAVING ACTIVITY INTO THE ŌTĀKARO AVON CORRIDOR

We envision an active corridor that embodies this meaning with opportunities to strengthen physical and mental skills, discover and engage with the environment, and observe and reflect in a restored habitat. A network of interwoven trails loop and overlap along the riverbank. Each landing point provides access to a range of activities in and around the water. Programming is rooted in the philosophy of

learning through play, enhanced by digital applications and physical signage. Guests of all ages will connect with the rich history of Christchurch and take part in building a shared vision for sustainable and healthy futures. Ōtākaro Avon River becomes a place for gathering, cultural exchange, and diverse recreation.

TĀKARO IS A MĀORI  
WORD THAT TRANSLATES  
TO “PLAY”



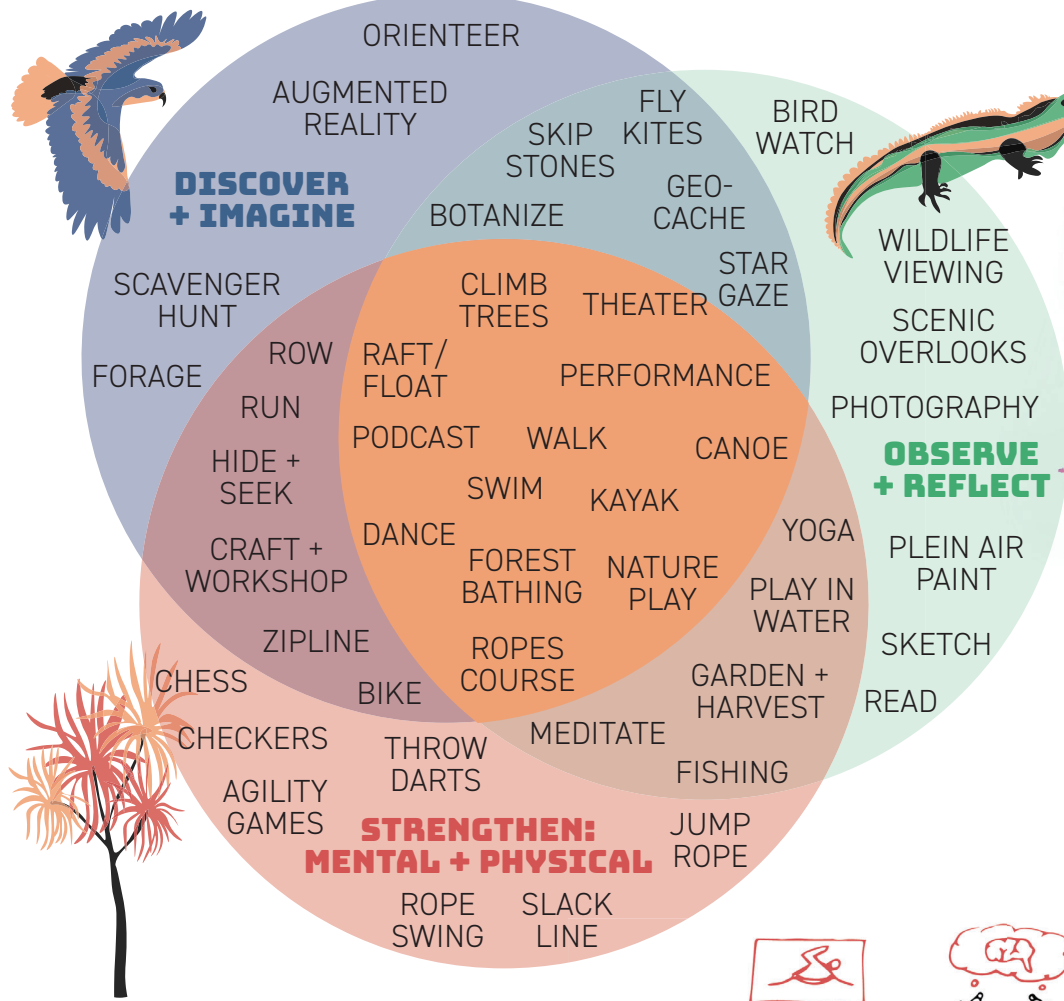


TĀKARO: RIVER OF PLAY

WEAVING ACTIVITY THROUGHOUT THE ŌTĀKARO AVON CORRIDOR

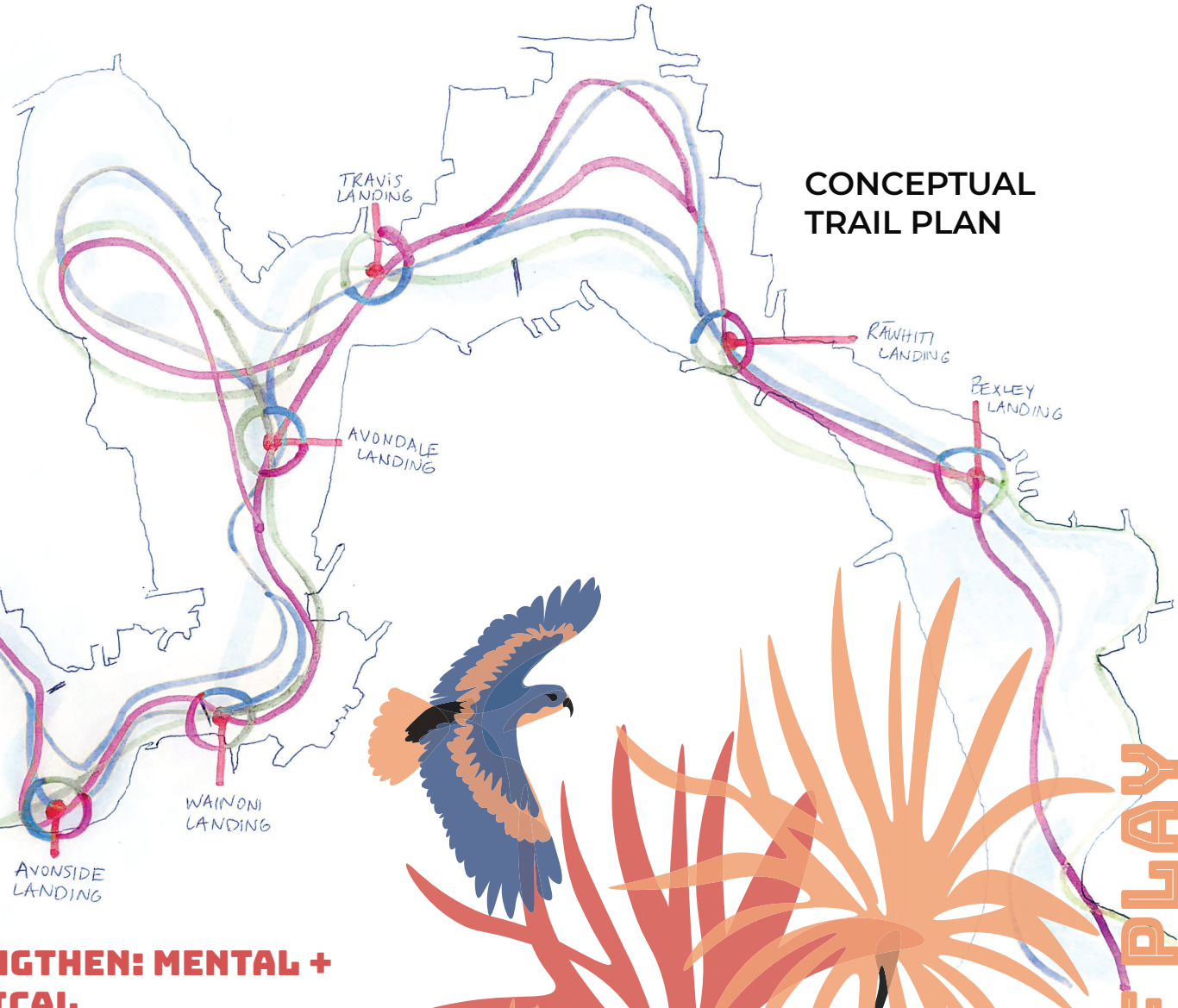
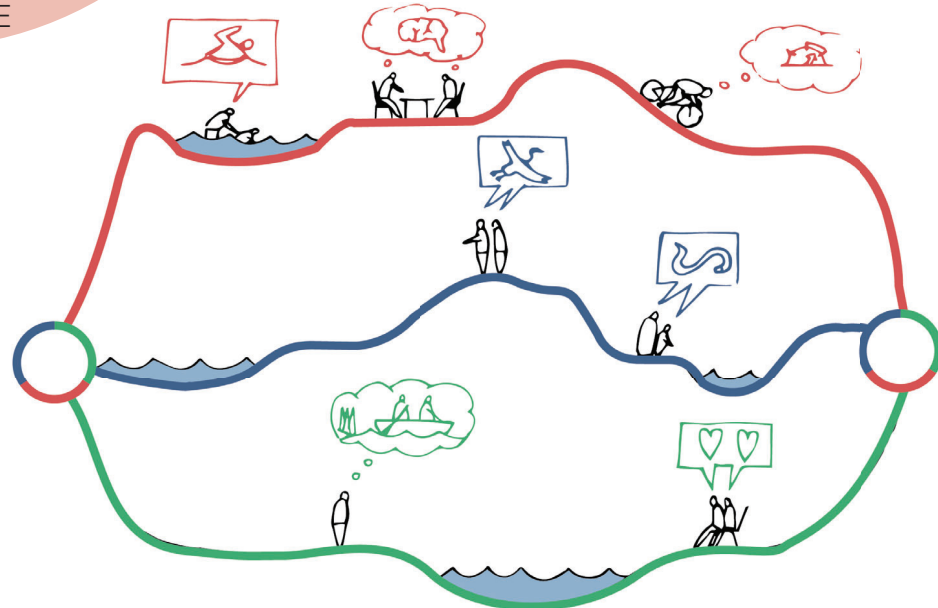
Inspired by the traditions of play embedded in mahinga kai practices, we designed a system of three recreation and play trails woven throughout the Ōtākaro Avon corridor. Each trail is accessible from every landing along the river. In between, the trails overlap in some places and diverge in others. Throughout, people

of all ages have the opportunity to find the trail and activities that suit their desired recreation. The diverse activities throughout are connected to both Māori and western traditions through interpretive elements and the activities themselves.



CONCEPT DIAGRAM DEMONSTRATING THREE INTERWOVEN TRAILS

POSSIBLE ACTIVITIES ALONG THREE INTERPRETIVE TRAILS



CONCEPTUAL TRAIL PLAN

STRENGTHEN: MENTAL + PHYSICAL

In many Māori communities, mahinga kai traditions included an emphasis on play that helped multiple types of physical and mental strength. This trail offers opportunities for people to strengthen their bodies and minds through sports, games, and other activities.

DISCOVER + IMAGINE

As native ecosystem is restored and new activities introduced, it is important to provide children and adults opportunities to discover and spark their imaginations. This trail encourages novel exploration of the corridor's landscape and history.

REFLECT + OBSERVE

Visitors to the cultural trail will seek opportunities to watch, touch, and reflect on the ecologies and cultural traditions being restored in the Ōtākaro Avon corridor. This trail encourages a pace, proximity to nature, and activities that encourage this attentive contact with the river.

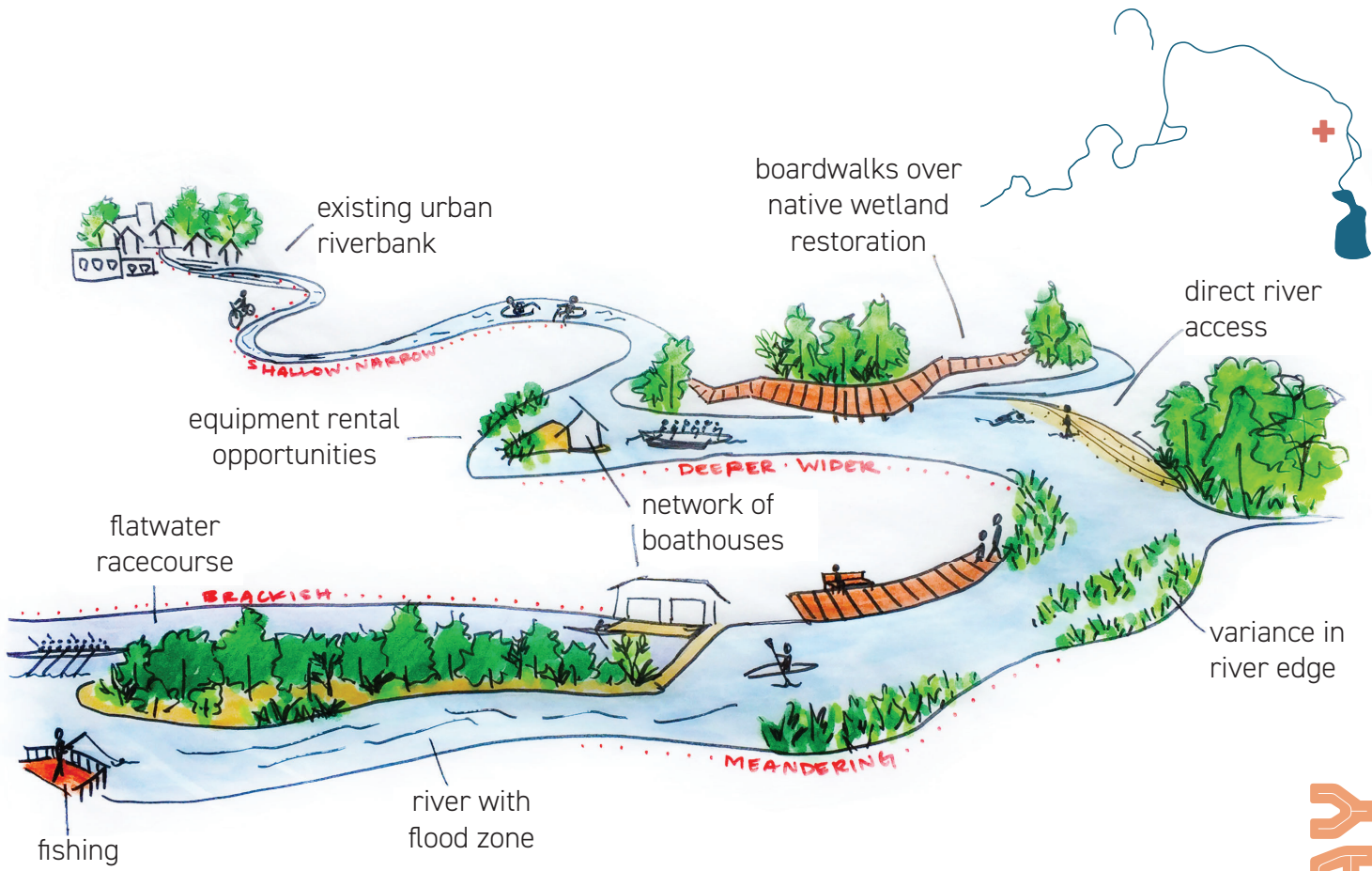


EARTH, SKY + WATER

KITE FLYING AND URBAN STAR GAZING CONNECT HUMANS AND SKY

Two aspects of open space are fundamental to the history of New Zealand. Understanding the night sky and Pacific winds is necessary to navigation; this was especially true for Polynesians that spread throughout the Pacific Ocean's islands over the course of history. An ability to navigate using stars and wind is how Māori people were able to settle in Aotearoa a millennium ago. Advancements in technology for

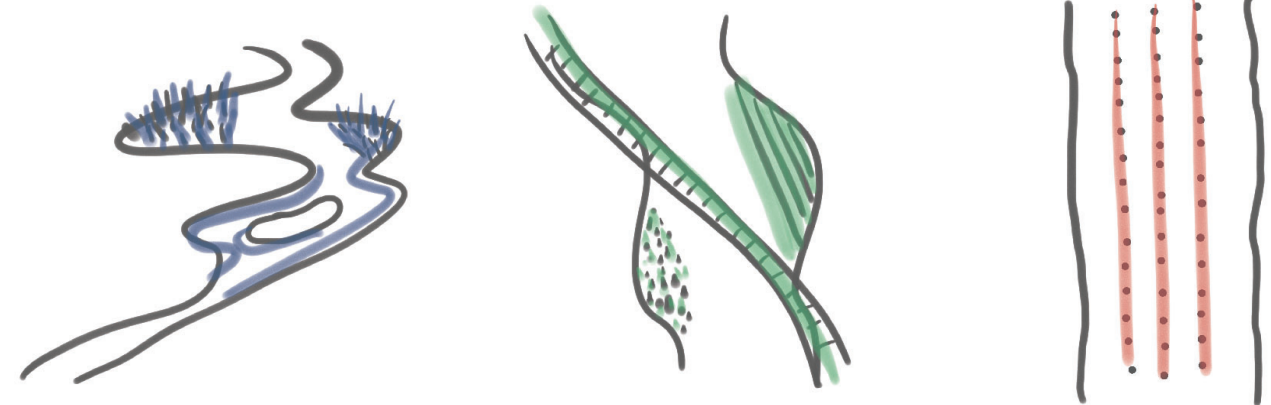
navigation and transportation have largely rendered wind and sky related activities the stuff of play—but weren't they always a form of play? Kite flying and star gazing provide opportunities for interpreting histories, exploring sciences, and connective play along the Ōtākaro Avon Corridor. Three culturally significant constellations are Matariki, Orion, and the Southern Cross.



A SERIES OF RIVER ACCESS POINTS FOR ALL LEVELS OF RECREATION

Building off of the existing urban riverwalk through city center, there is great potential for having the river itself be a trail. As areas are redesigned and the existing stop banks are reconfigured, casual river recreation should also be planned for. A network of

public boathouses for boat rentals as well as more diverse shore trails would invite people of all fitness levels to re-engage with the river.



**DISCOVER + IMAGINE**  
The entire local ecosystem depends on a healthy river. Therefore, the primary focus should be on restoration and supporting ecosystem services through varied edges and side channels.

**REFLECT + OBSERVE**  
The trail should include options for multiple speeds of travel. Boardwalks or seating along the water's edge would encourage people to slow down and to engage with the river.

**STRENGTHEN: MENTAL + PHYSICAL**  
In already manipulated regions, programmed sports areas, like a flatwater racecourse, would benefit the local community.



# INTERPRETATION

## PHYSICAL MARKERS AND DIGITAL TRAILS

Digital trails can be used to engage a wide range of visitors and communicate the rich history of the river corridor without heaps of physical signage. Audio content allows for a deeper dive into science and culture, allowing visitors of all ages to explore topics of interest. An augmented reality application

incorporates physical engagement and transforms discovery of significant landmarks into a game experience. These are only a couple of many options that might be explored to harness technology and create connections along the river.



### PODCASTING: AUDITORY ENGAGEMENT + PHYSICAL IMMERSION

EXPERIENCE IS ENHANCED BY DEEPER UNDERSTANDING.

#### SERIES 1: AVON-OLOGY

Exploring topics in:

- **Geology**
- **Ecology**
- **Sociology**

Example episodes might include features on climate change and the environment, migratory birds found along the corridor, or stories from Red Zone residents.

#### SERIES 2: DESIGNING ŌTĀKARO

Stories from those involved in redesigning this corridor.

- **Researchers**
- **Designers**
- **Planners**

Series would seek to improve transparency and connect listeners to the stories behind the designs throughout the corridor.

## THE APP: AUGMENTED REALITY AND BEYOND

An augmented reality (AR) app would allow GPS based information to be explored at one's own pace. This creates opportunities to tailor interpretation for specific audiences.

- **games with badges or points**
- **lesson plans for parents and educators**
- **citizen science projects**
- **exercise plans**
- **include existing storytelling projects**

As an example, the river could be viewed in AR with points of interest along the Discover + Imagine trail activated (below). Using the user's location information, the app could display more detailed information as one gets closer to certain areas.



TĀHAKARO: RIVER OF PLAY




RESTORATION BIKE PARK

PRE-COLONIAL FLORA + PRE-INDUSTRIAL TRANSPORT


**1869**  
First bike arrives in Canterbury

**1892**  
Christchurch's Atalanta Cycling Club is New Zealand's first all women's cycling club

**1910**  
*Looking down High St., cyclists cross intersection of Colombo + Hereford (Christchurch City Libraries)*




**1918**  
*A nurse leaving a sub-depot on her daily round of visits, influenza endemic (Christchurch City Libraries)*



**1924**  
Bikes are primary transport for 40,000 of Christchurch's 80,000 inhabitants

**1936**  
Traffic census records 11,335 cyclists passing through a corner of Cathedral Square between 8 am and 5:30 pm: 19 per minute

**1946**  
*Addington workers on their way home (Christchurch City Libraries)*



**1970S**  
Global oil price booms lead to temporary golden age of cycling in Christchurch


**1980S**  
Return to affordability puts people back into motor vehicles

**2000S**  
The city and other organizations invest in improvements in cycling infrastructure

**2009 - 2015**  
12 cyclists killed on the road in Christchurch

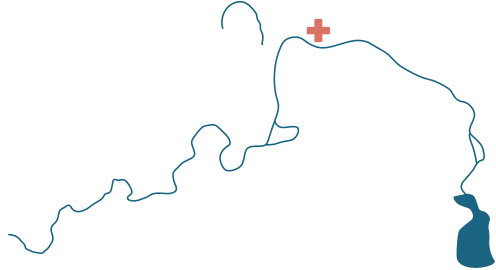
**2018**  
Christchurch residents site safety concerns as the number one reason they don't bike more often

**FUTURE**  
Generations to come share cycling culture + histories



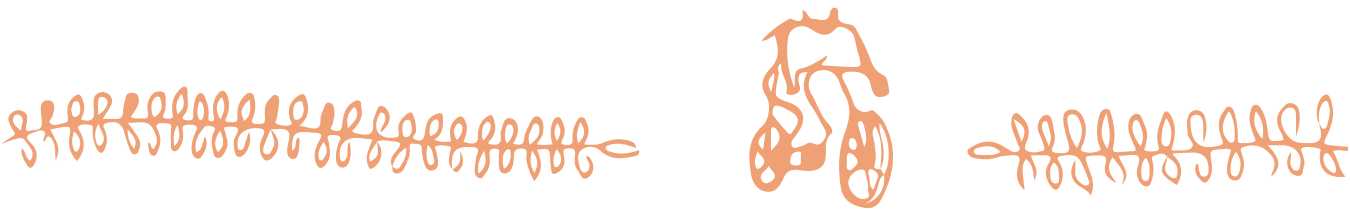
WHAT IF THERE WERE A PLACE THAT PEOPLE COULD GO NOT ONLY TO LEARN THE MUSCLE MEMORY OF RIDING A BIKE, BUT ALSO TO LEARN ABOUT SAFETY, REPAIR, AND CULTURAL HISTORY?

What if this place were a launching pad for more advanced cyclists seeking paved paths devoid of cars? What if the site also served deeper functions, hosting native restoration that soaks up and filters stormwater while rebuilding habitat for New Zealand fauna?



PROTECTED BIKE PATHS CAN BE A PERFECT BUFFER FOR ECOLOGICAL RESTORATION.

Building on ideas to build up the land north of this stretch of the Ōtākaro Avon River with dredged riverbed substrate, this spread explores the possibility of activating the corridor by connecting modern Christchurch to interwoven histories through cycling.



TĀKARO: RIVER OF PLAY





# FLATWATER RACECOURSE

## DIFFERENT STROKES FOR DIFFERENT FOLKS

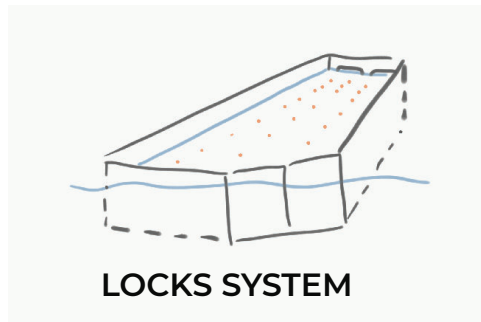
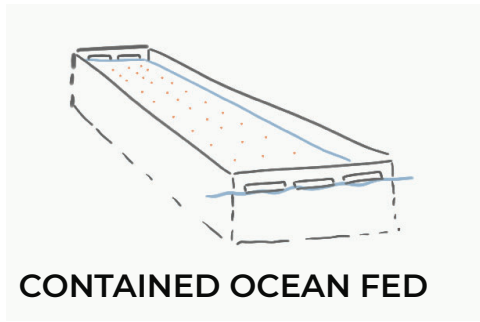
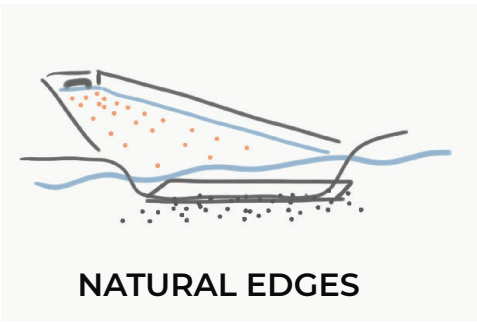
The Ōtākaro Avon River is already a popular place for water sports, including waka ama, kayaking, rowing, and dragon boating. So much so, that there are areas such as Kerrs Reach that are often constricted with boat traffic. Through restoring the river and creating an off river racecourse, recreational activity can be spread along the corridor to better protect the environment and suit human uses, a win-win.

The idea of a flatwater course was proposed by the boating community and options in the Horseshoe Lake and in river at Kerrs Reach have been explored. Siting a smaller course in the Bexley area has the potential to avoid some of the challenges faced up river:

- allowing the river to flow naturally creates healthier habitat and reduces necessary maintenance
- the water source would be the estuary so brackish water would prevent aquatic weed growth
- a narrow course is better in high wind areas and for local needs
- adequate space for full 2 kilometer course with direct connection to estuary for longer events
- new boathouses would have river and racecourse launching points

## HYDROLOGIC CHALLENGES

Creating the course in an actively tidal estuary is not without challenges, like low tides and sedimentation. Any solution should include a river overflow spillway for flood control. The lowest impact solution would be planted riverbanks. To maintain a certain level of water even at low tide, sides could also be constructed like ocean fed pools or with a locks system. Further hydrology studies would be required, but feasible precedents exist.

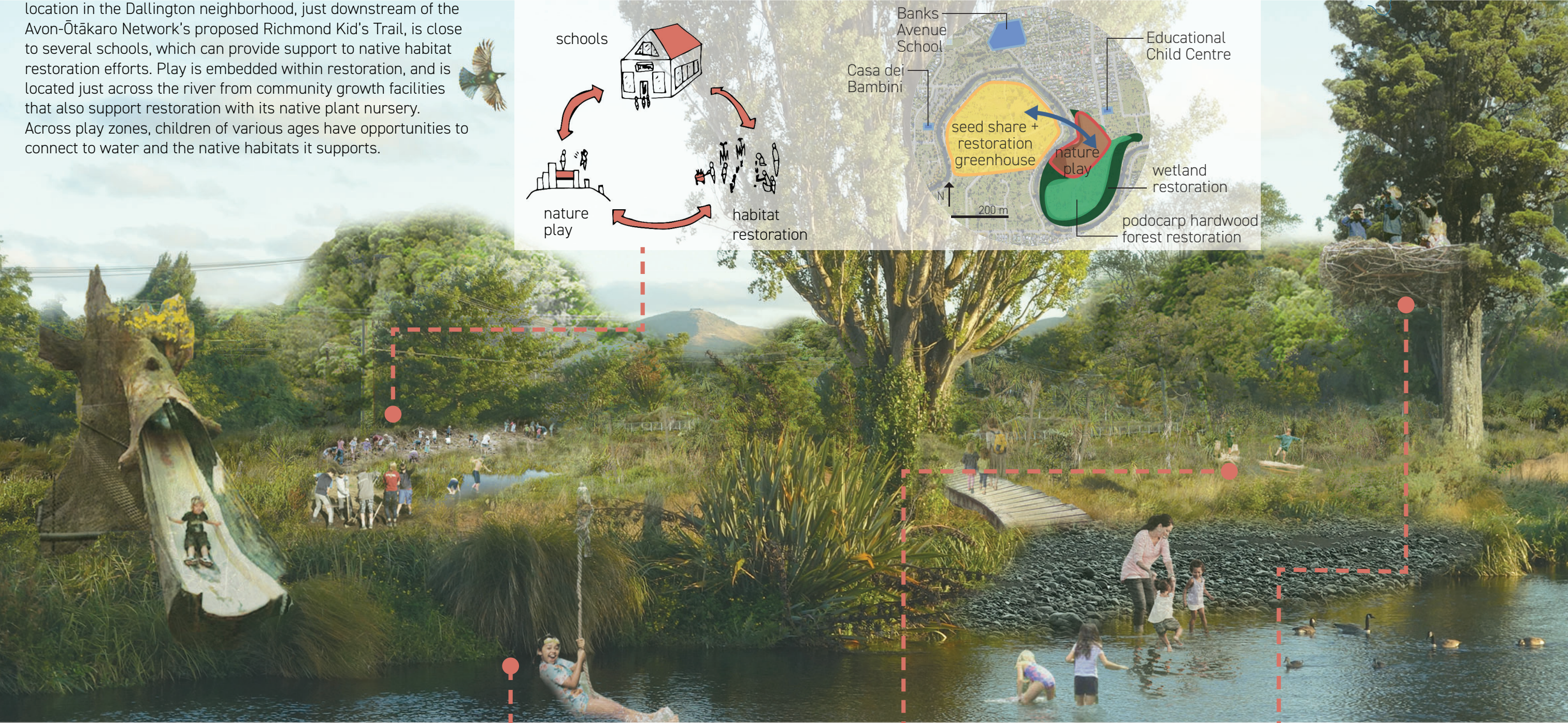
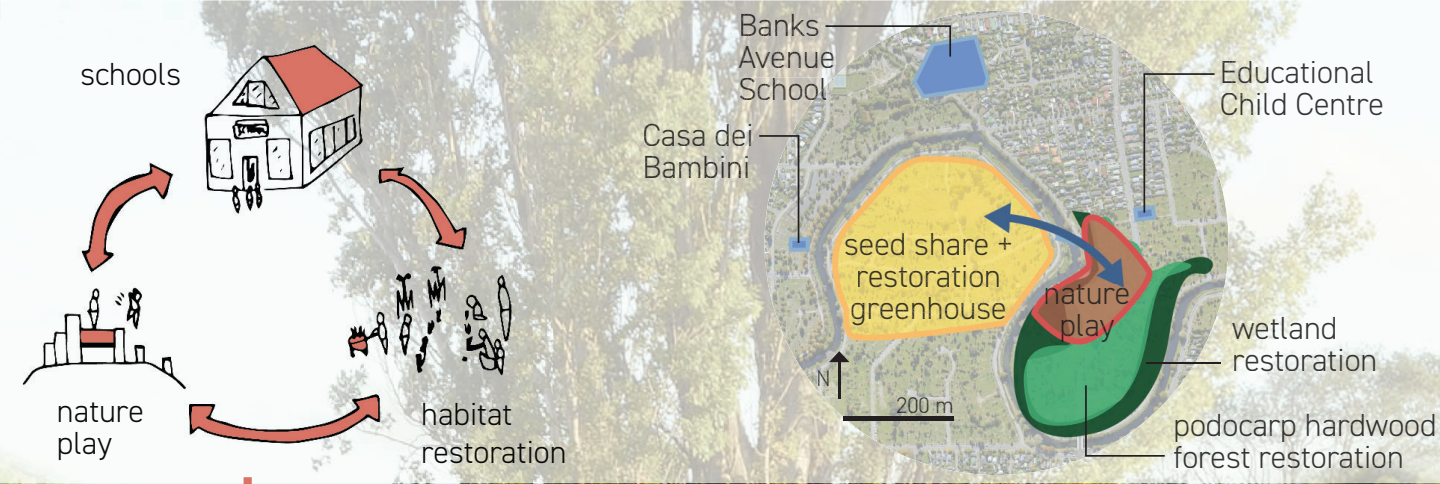




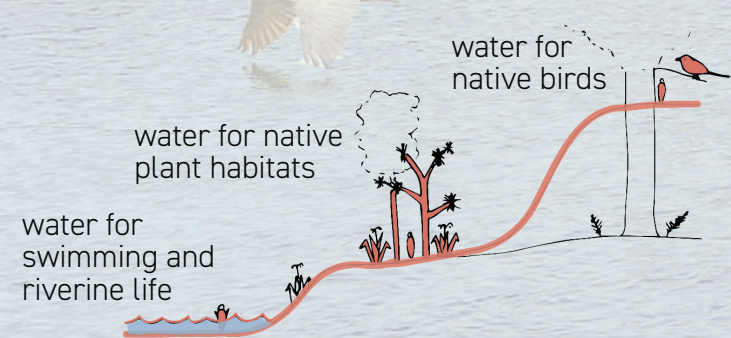
NATURE PLAY: RIVER AS LIFE

EDUCATIONAL PLAY EMBEDDED IN RESTORATION

Nature play at the river provides an opportunity for children to learn through connection with dynamic, changing landscape. This location in the Dallington neighborhood, just downstream of the Avon-Ōtākaro Network's proposed Richmond Kid's Trail, is close to several schools, which can provide support to native habitat restoration efforts. Play is embedded within restoration, and is located just across the river from community growth facilities that also support restoration with its native plant nursery. Across play zones, children of various ages have opportunities to connect to water and the native habitats it supports.



Structured and unstructured play in distinct zones can encourage children to understand the importance of water as life. Children are asked to consider Māori and European histories and understandings of river as a precious resource.

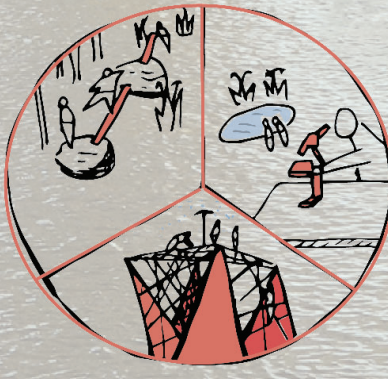


WATER ZONE  
(ALL AGES)



- slides and Māori (rope swing)
- block and mud free play
- shallow swim area

PLANT ZONE  
(AGES 5-10)



- balance free play
- young citizen science
- harakeke climbing structure

BIRD ZONE  
(AGES 7-12)



- exploration: treehouse and trail network
- building workshop (e.g., bird boxes)
- music play

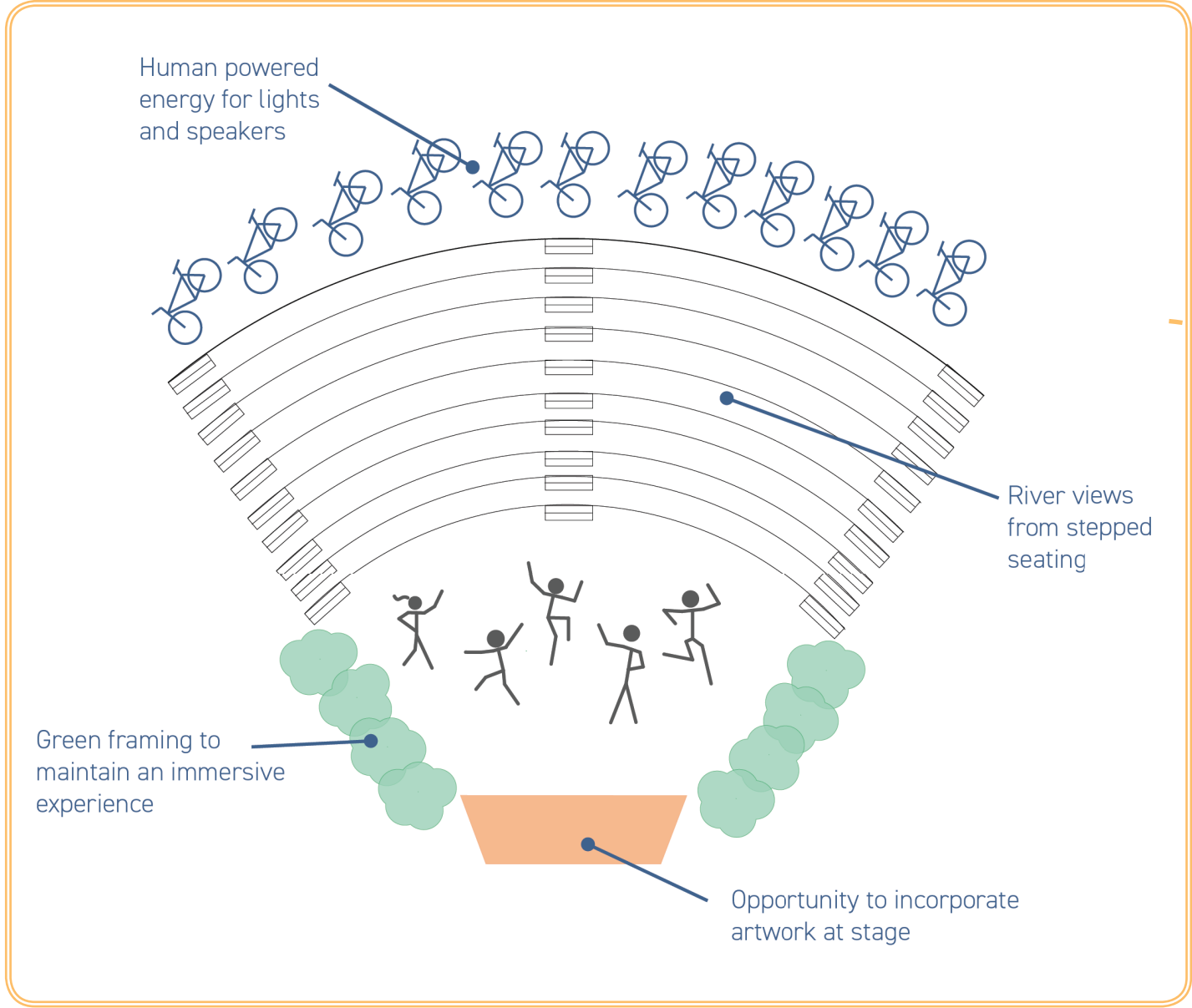


WHARE TAPERE / AMPHITHEATRE

A COMMUNITY STAGE SURROUNDED BY FLEXIBLE SPACE FOR CREATIVE ENDEAVORS

Storytelling allows for expression, cultural exchange, and the exploration of new ideas.

“YOU CAN’T USE UP CREATIVITY. THE MORE YOU USE, THE MORE YOU HAVE”  
- MAYA ANGELOU

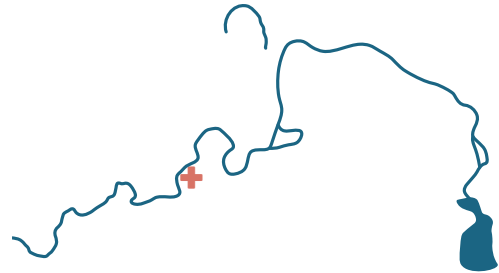


FLEXIBLE PROGRAMMING

LECTURES, SEMINARS, FESTIVALS, COMMUNITY THEATRE, KAPA HAKA, STORYTELLING, COMEDY, SCHOOL PERFORMANCES, DANCE, MOVIE NIGHTS, LIVE MUSIC

Success of flexible space projects completed through the Gap Filler program in Christchurch highlights community creativity and the desire for opportunities to explore new ideas about how open space can be used to best benefit residents. The stage creates opportunity for evening activation, with potential for local theatre, musical performances, or cinema nights.

The inclusion of flexible space surrounding the theatre opens the opportunity for small festivals, reminiscent of the historic pleasure gardens of Professor Bickerton from the late 19th and early 20th centuries. Today's art forms can thrive in a setting that celebrates native plants and wildlife.



Gap filler projects, Photo Credit: [www.gapfiller.org](http://www.gapfiller.org)



Left: 1906, Pleasure Garden festivals  
Photo Credit: [www.lostchristchurch.wordpress.com](http://www.lostchristchurch.wordpress.com)

Below: Modern practice of kapa haka, Maori performance  
Photo Credit: [www.newzealand.com](http://www.newzealand.com)





# ŌTĀKARO CRAFT CENTER

## CONNECTING COMMUNITY TO TRADITIONAL AND MODERN ARTS AND CRAFTS

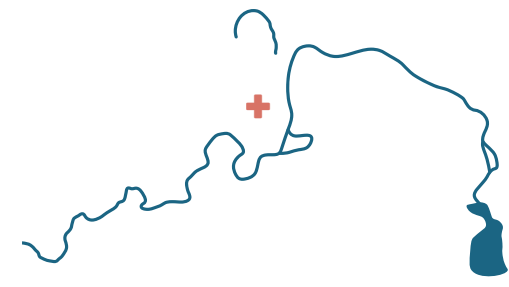
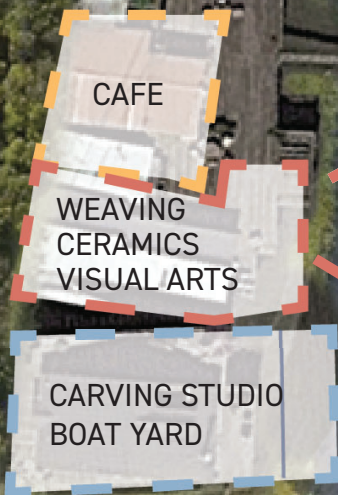
The Waikākāriki Horeshoe Lake area has a rich history of mahinga kai. Tucked within restored wetlands, the Ōtākaro Craft Center is a creative place for living art that provides education about the intersection between art and Māori traditions. Traditional craft studios and contemporary arts activities invite the public to engage and discover.

### MOKIHI BOATING

### HARVESTING AND WEAVING CLASSES

### BOATHOUSE CAFE

### WAKA CARVING



### VISUAL ARTS

Students inscribe storytelling through painting, sculpture, and printmaking classes, and showcase their work in gallery spaces.



### WEAVING

Traditional knowledge about native plants is taught through weaving and textiles classes, connecting people with the wetlands around them.



### BOAT CARVING

Outdoor workshops connect people with the water through canoe carving, recreating traditional waka, and timber sculpting.





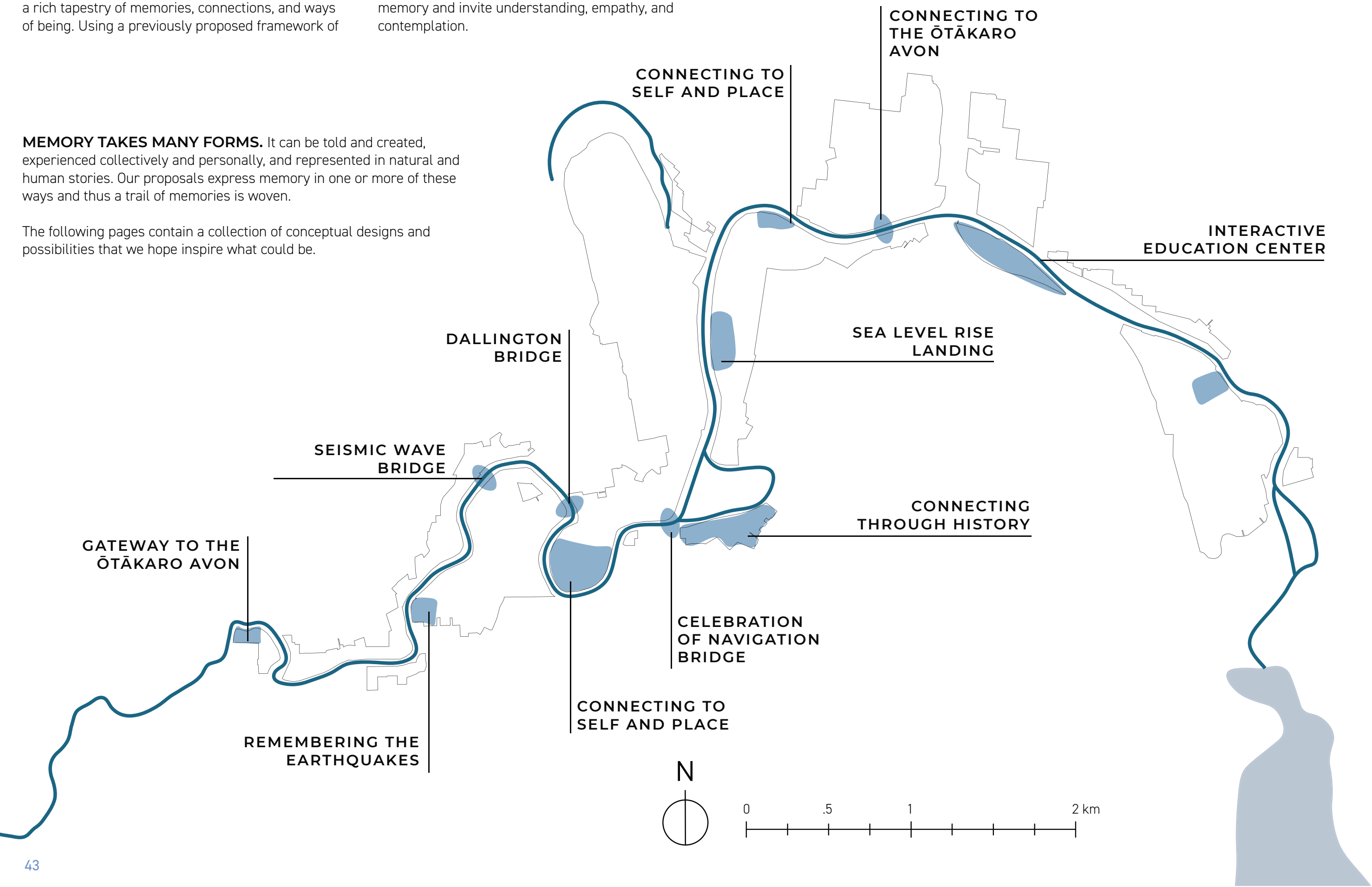
MEMORY IS WHO WE ARE.

Memory connects humans to place and each other, forming the identities of individuals, collectives, and landscapes. The Ōtākaro Avon River corridor contains a rich tapestry of memories, connections, and ways of being. Using a previously proposed framework of

landings and pedestrian bridges along the river, we begin to think about these areas as thresholds. Each landing and bridge becomes an opportunity to invoke memory and invite understanding, empathy, and contemplation.

**MEMORY TAKES MANY FORMS.** It can be told and created, experienced collectively and personally, and represented in natural and human stories. Our proposals express memory in one or more of these ways and thus a trail of memories is woven.

The following pages contain a collection of conceptual designs and possibilities that we hope inspire what could be.





SITE + CONCEPT INTRODUCTION

This cultural trail speaks to a variety of messages: connection to the natural world strengthens environmental ethics; the landscape has changed; culture has changed; communities have changed over time; and, there are many ways of being in the world. Multiple devices are used across the proposals to tell these stories, including framing devices, gardens, pavilions, land art, and pathways. We hope this will encourage people to interact with nature and the community, educate themselves and others, play in and enjoy nature, and reflect on the Ōtākaro Avon River corridor.

The design proposals that follow tell many different stories and encourage people to interact with the

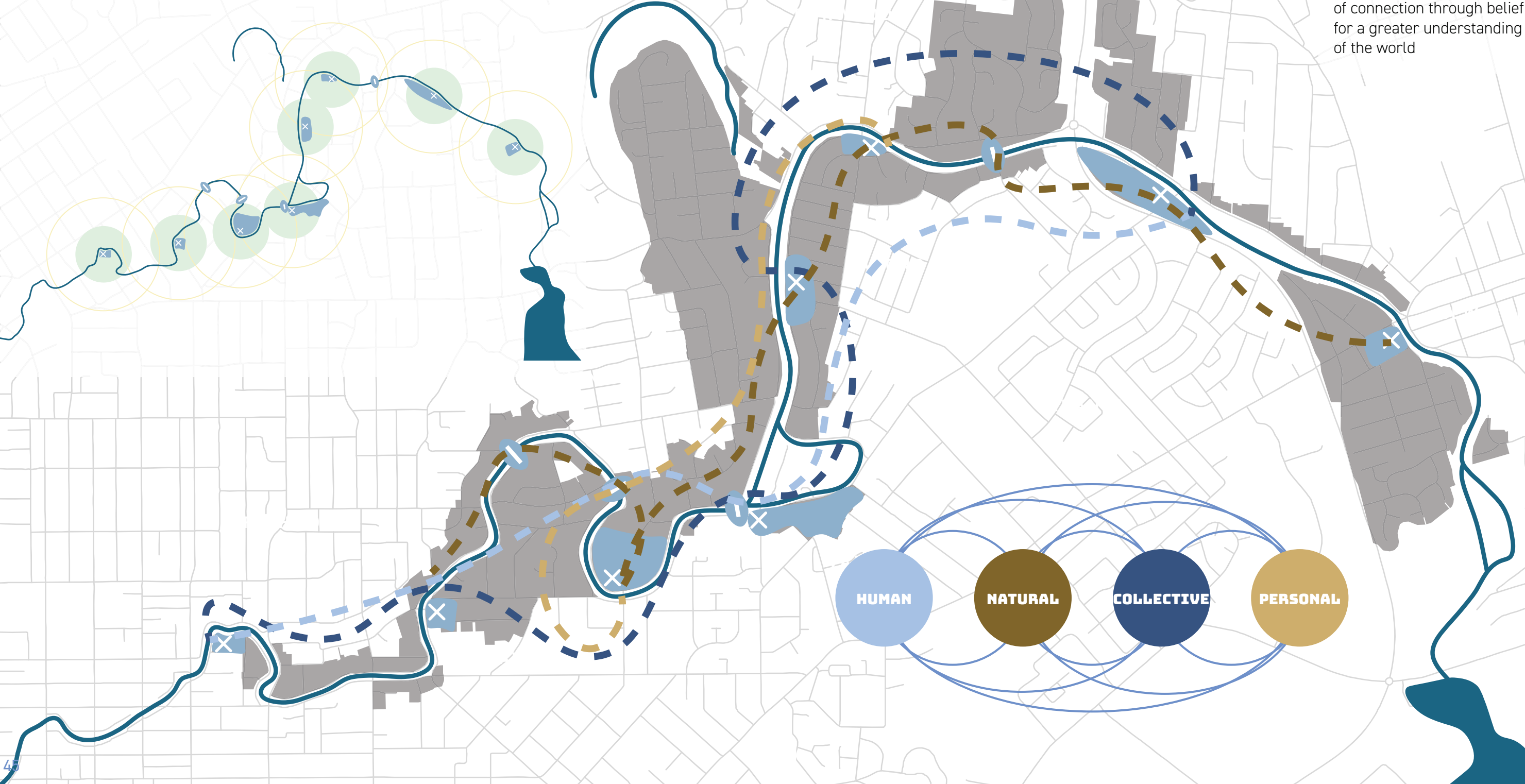
Ōtākaro Avon River corridor in different ways. The varying elements connect through multiple thematic trails: one focuses on human history and experience; one on natural history and interaction with the environment; one allows the user to access or form collective memories; and one takes the user to places where personal memories can be reflected upon or created.

By weaving together multiple elements with these four different trails, we hope to offer the community opportunities to access old memories, form new ones, and deepen connections with the Ōtākaro Avon River corridor and each other.

DESIGN GOALS

DEEPEN CONNECTION, PROVOKE RESPONSE

- Increase usage and access
- Empathy
- Connection to place
- Community engagement
- Kaitiakitanga: stewardship + guardianship
- Mātauranga: ecological understanding + learning
- Ture Wairua: create a sense of connection through belief for a greater understanding of the world



MEMORY, CONNECTION + BEING



# GATEWAY TO THE ŌTĀKARO AVON



## AVON LOOP

The landing at Avon Loop lies close to the Central Business District, and should create a strong connection to downtown Christchurch. It can serve as a gateway to the Ōtākaro Avon corridor, an important landmark for navigating, and a memorial to the Maori and European history that took place at this spot. This landing is at an important Māori site where Whata once stood, and is also the place European settlers considered the highest navigable point. Māori poles stand on the north side of the river, marking one

history, while bricks on the south side mark that of Europeans. While these should be kept, another element could celebrate both together. A tower in this place could act as a landmark, guiding people to this place, as well as offering an overlook for stunning views. The imagery of masts invokes both European and Māori sailing vessels, and that of European crow's nests and Māori Whata create opportunity for platforms. Together these elements build not only a gateway, but also a memorial to the history of a place.

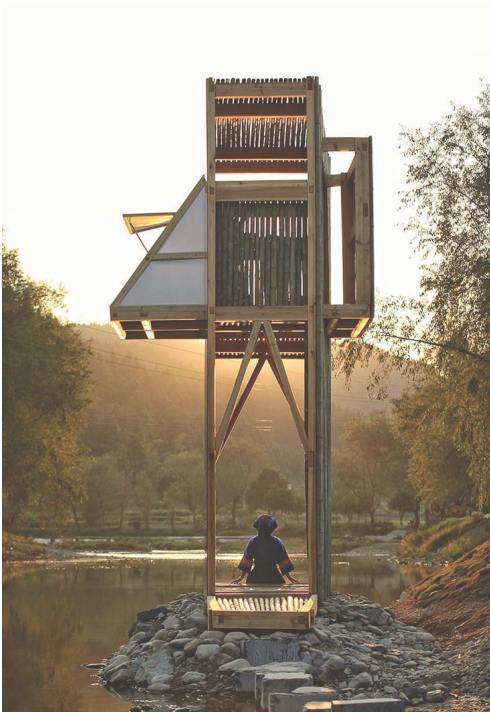
### WHAT IF A LANDING COULD BE A GATEWAY, A LANDMARK, AND A MEMORIAL?



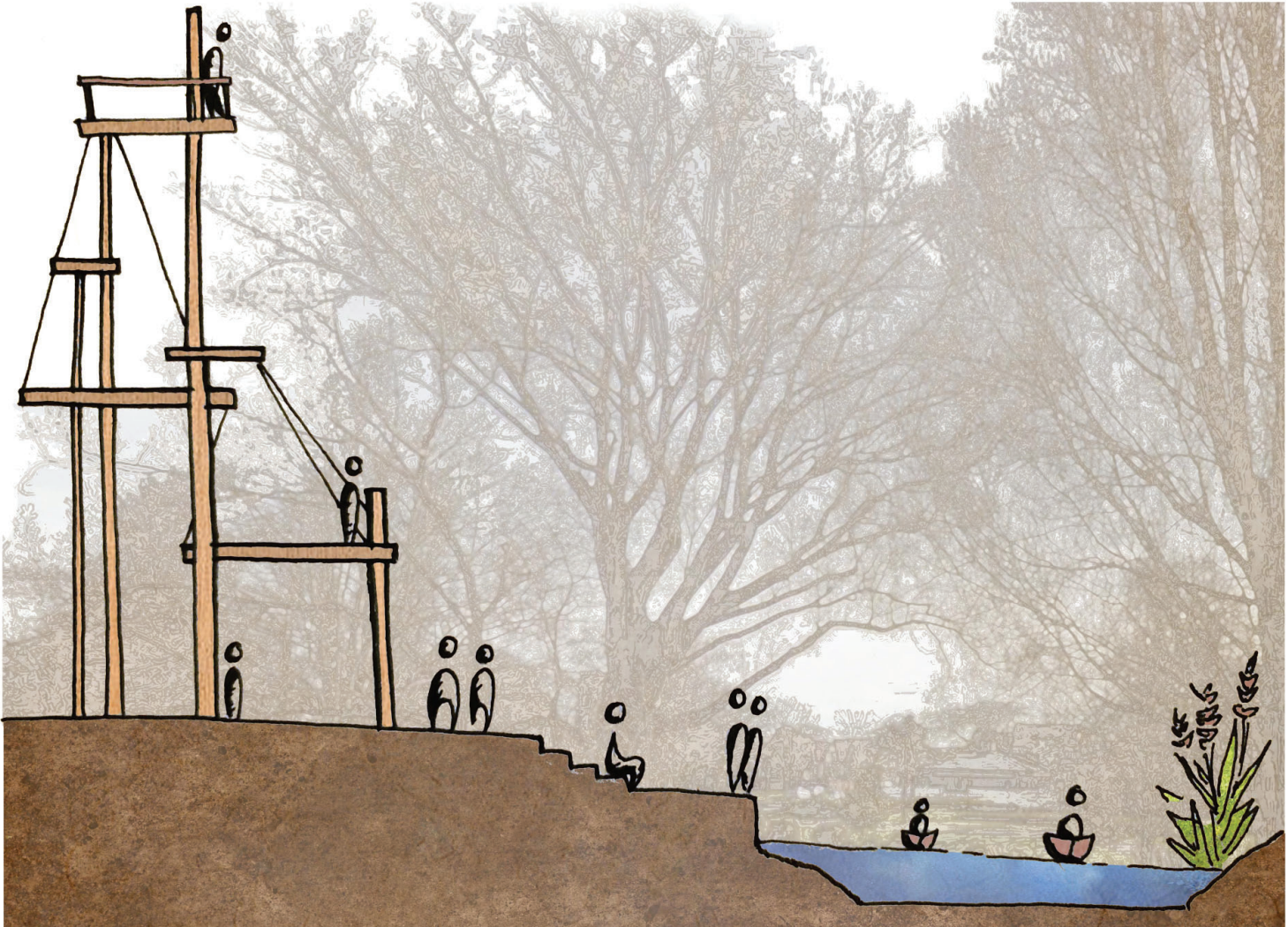
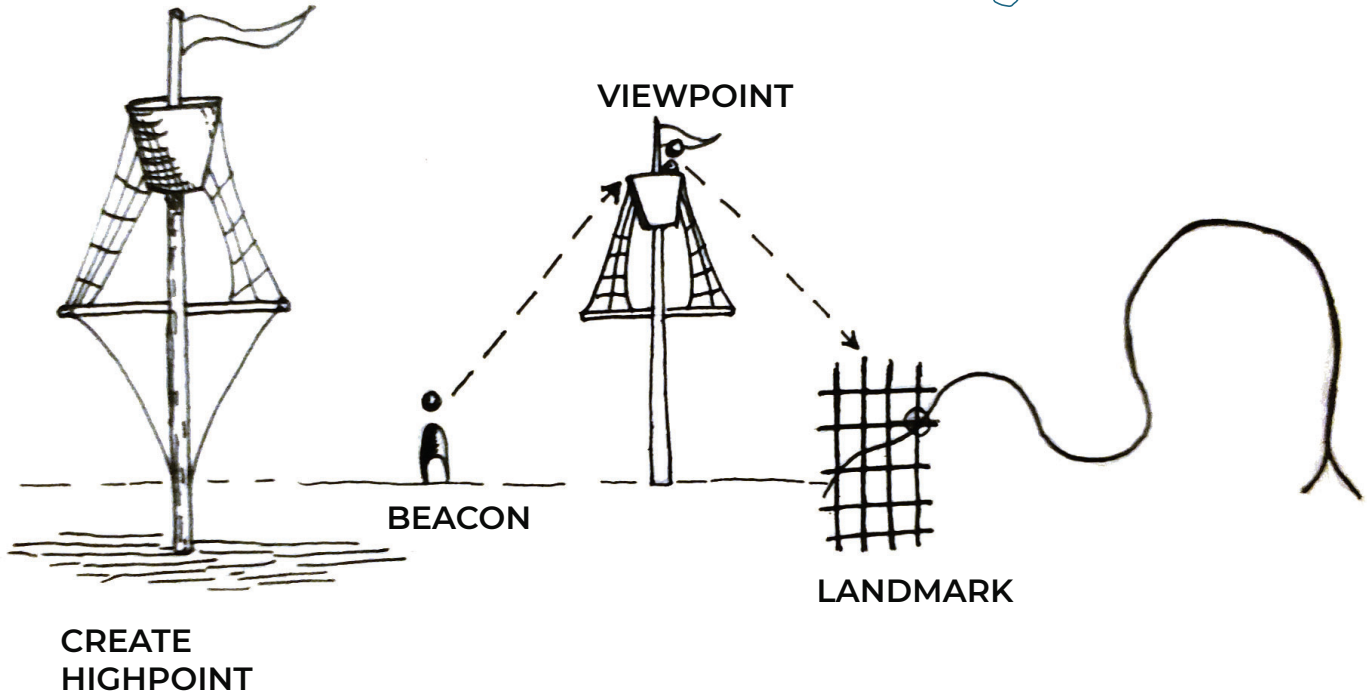
Māori and European sailing vessels used masts, a motif which could be incorporated into design. Ship's Mast, image from onboatsandsailing.com



Māori Whata were historically found in this area, and could be utilized as another vertical element. Feast at Matatā, mid-19th century, image from Te Ara - The Encyclopedia of New Zealand



A tower like this one could serve as both a beacon and overlook. Shelter: The Mirrored Sight, by Architect Li Hao, in Longli Village, China



MEMORY, CONNECTION + BEING



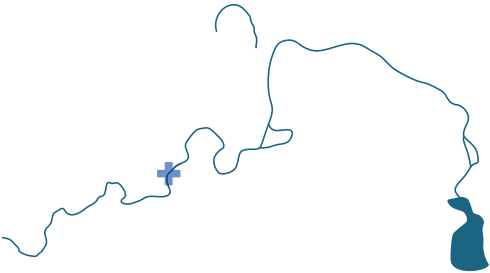
# REMEMBERING THE EARTHQUAKES



## THE SCIENCE OF EARTHQUAKES + WHAT HAPPENED AT RICHMOND LANDING

In an area that was once residential and now lies vacant and empty, how can the story be told about what happened? How can the story be told about this once-bustling area comprised of several neighborhoods that now cannot be used for homes and people? Telling the story is important not only to remember, but also to learn. Why do earthquakes happen? What happens to the earth when it shakes? Why do earthquakes sometimes leave cracks and other times cause liquefaction?

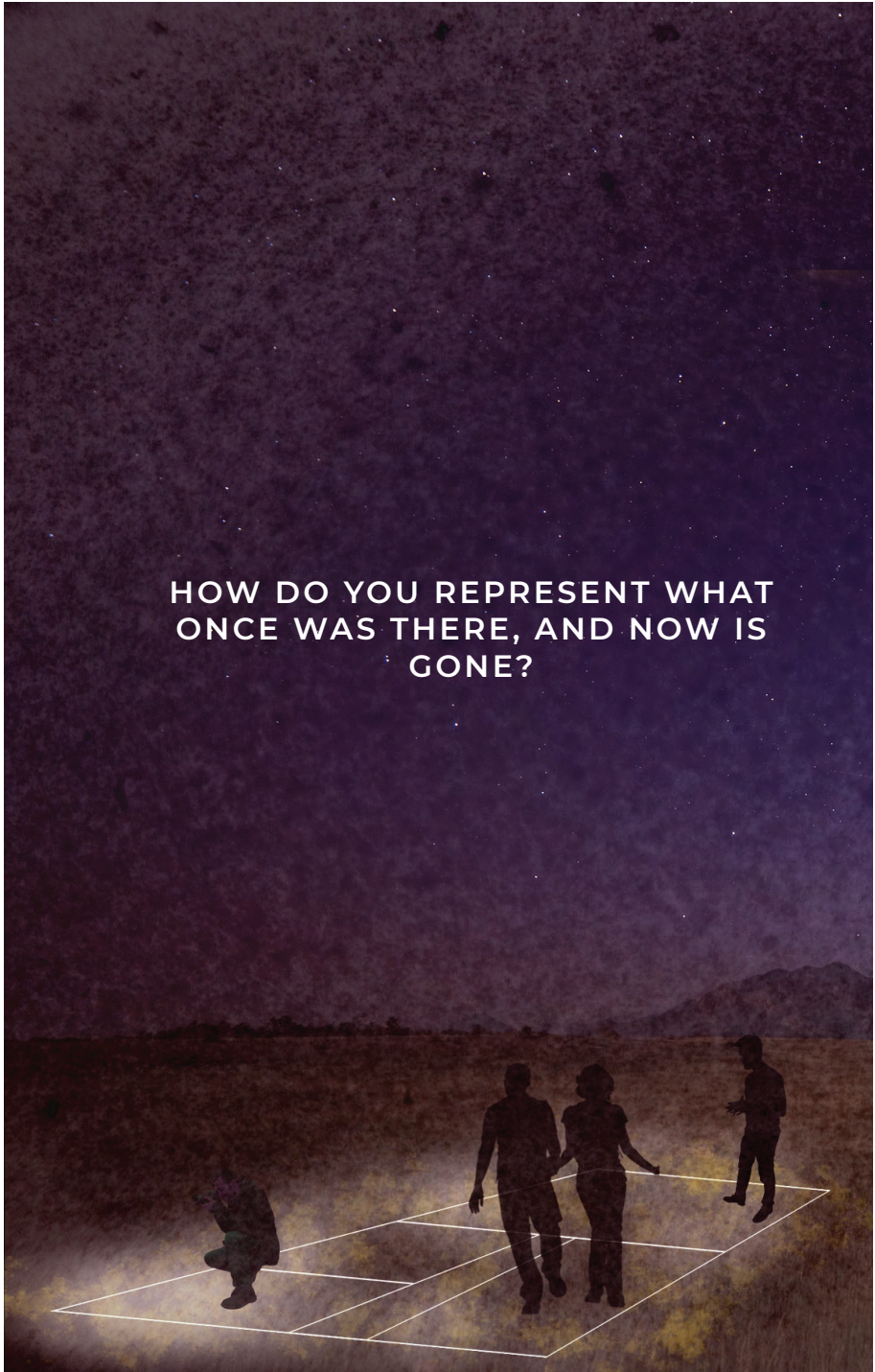
The landing in Richmond can become a hub of knowledge to express the information that people can be left wondering about. Located close to the city, this hub can be an easy walk upon entering the green spine and a great place to stop and understand what the corridor once was. Activities and landmarks focusing around the earthquakes can include paths along built up landform cracks in the landscape as well as laid out foundations of houses that were once nearby. Lighting up foundations, even for occasional festivals and events, could also draw people to the green spine, creating night time programing and excitement in the area.



Interpretive signage opportunities include: the science of earthquake, the residential red zone, and, if appropriate, rūamoko, the Māori god of earthquakes



CAN LEAVING SCARS ON THE LANDSCAPE BE A WAY TO HEAL?



HOW DO YOU REPRESENT WHAT ONCE WAS THERE, AND NOW IS GONE?

MEMORY, CONNECTION + BEING



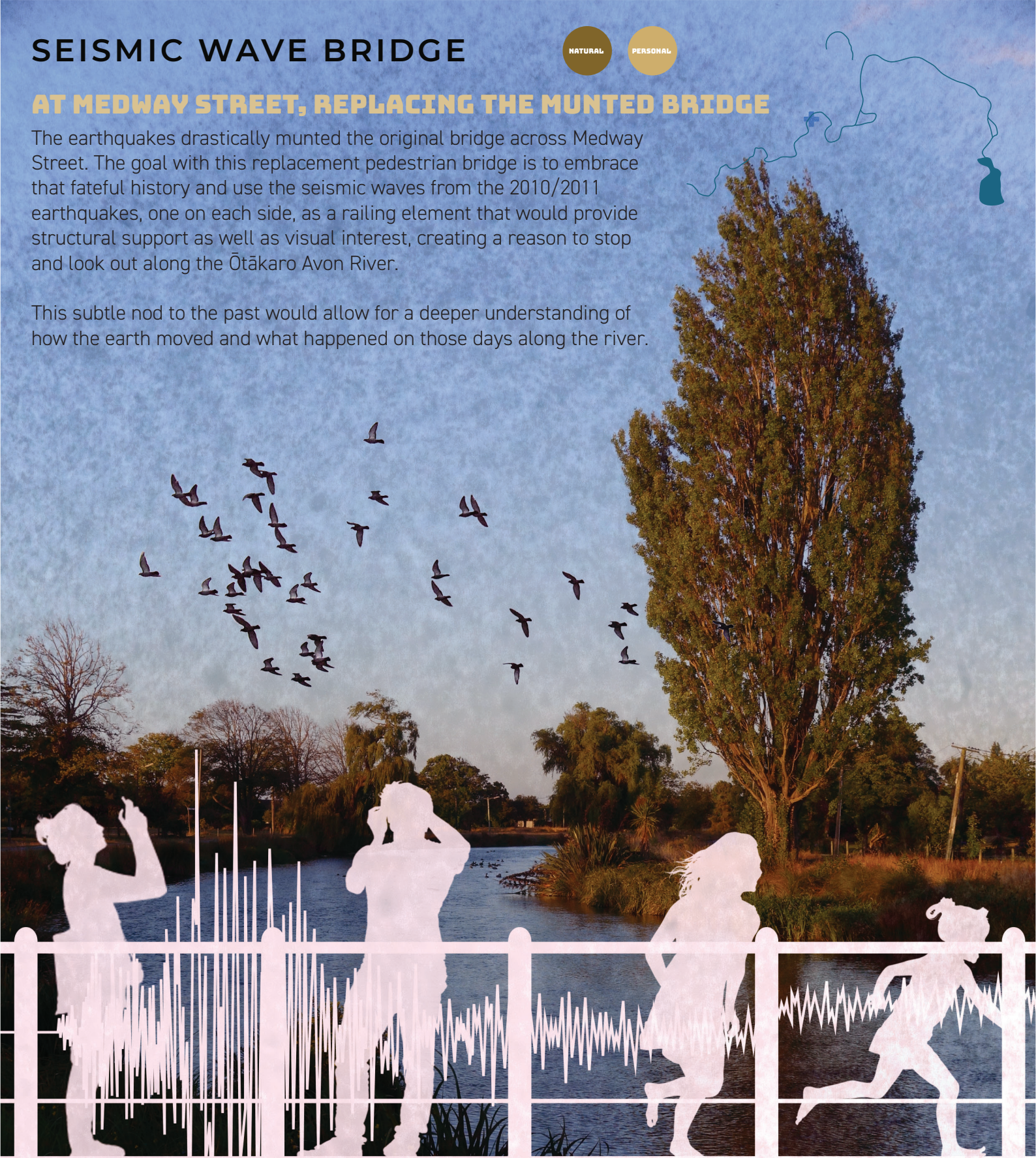
SEISMIC WAVE BRIDGE

NATURAL PERSONAL

AT MEDWAY STREET, REPLACING THE MUNTED BRIDGE

The earthquakes drastically munted the original bridge across Medway Street. The goal with this replacement pedestrian bridge is to embrace that fateful history and use the seismic waves from the 2010/2011 earthquakes, one on each side, as a railing element that would provide structural support as well as visual interest, creating a reason to stop and look out along the Ōtākaro Avon River.

This subtle nod to the past would allow for a deeper understanding of how the earth moved and what happened on those days along the river.



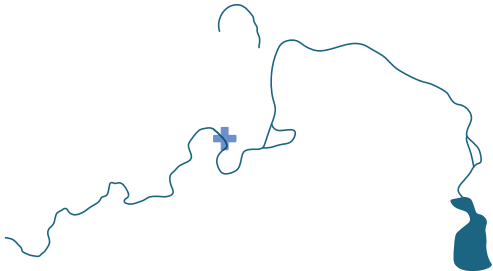
HOW TO DO WE START A CONVERSATION ABOUT THE EARTHQUAKES WITH THOSE WHO WANT TO TALK ABOUT IT AND YET ALLOW THE QUESTION TO BE UNANSWERED WITH THOSE WHO DO NOT?

DALLINGTON BRIDGE

HUMAN PERSONAL

A BRIDGE INTO RESTORED LANDSCAPE

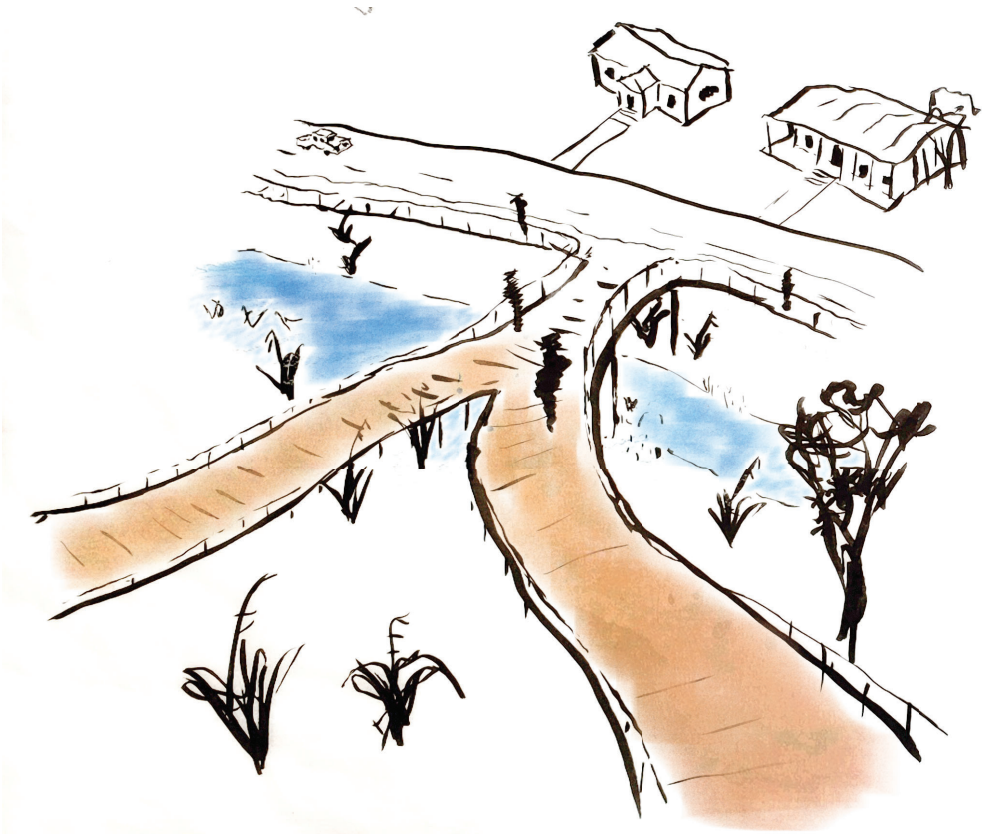
Dallington bridge offers a direct connection to New Zealand's native wetland habitat in Christchurch's suburbs. The bridge divides into elevated walkways upon entering the Avonside Restoration Area.



Esterwegen Memorial (WES Landscape Architecture)



The Metro-Forest Project (LAB Landscape Architects of Bangkok)



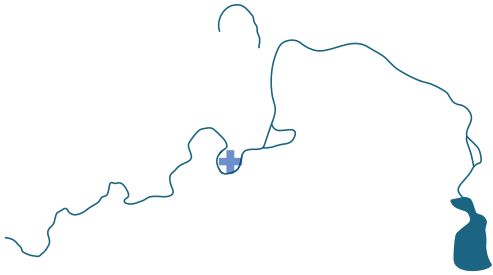


CONNECTING TO SELF AND PLACE

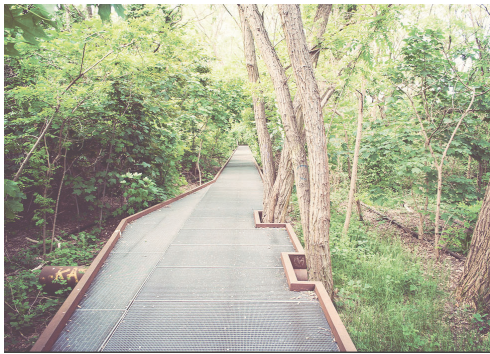
AVONSIDE AND TRAVIS RESTORATION AREAS

People create memories and connection to landscape by spending time in place. At Avonside and Travis Restoration Areas, architectural follies provide contrasting experiences of the restored landscape. An observation tower overlooking the pocket of restored freshwater wetland connects one to the urban fabric of Christchurch. A reflection garden affords a focused view of both landscape and oneself. Gaps between vertical wooden boards allow wind to pass through. A filtered enclosure creates a space for contemplation and meditation.

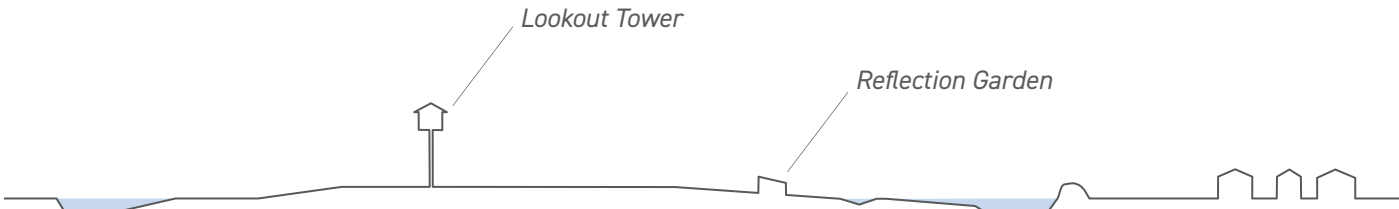
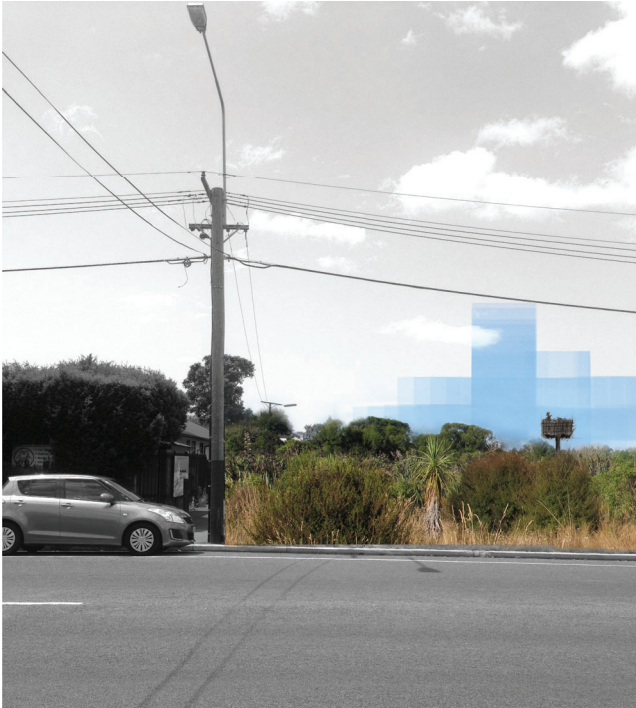
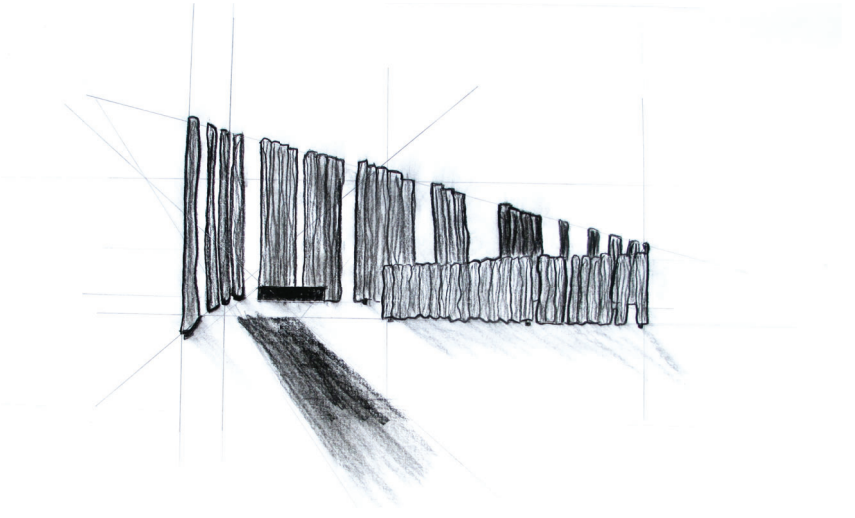
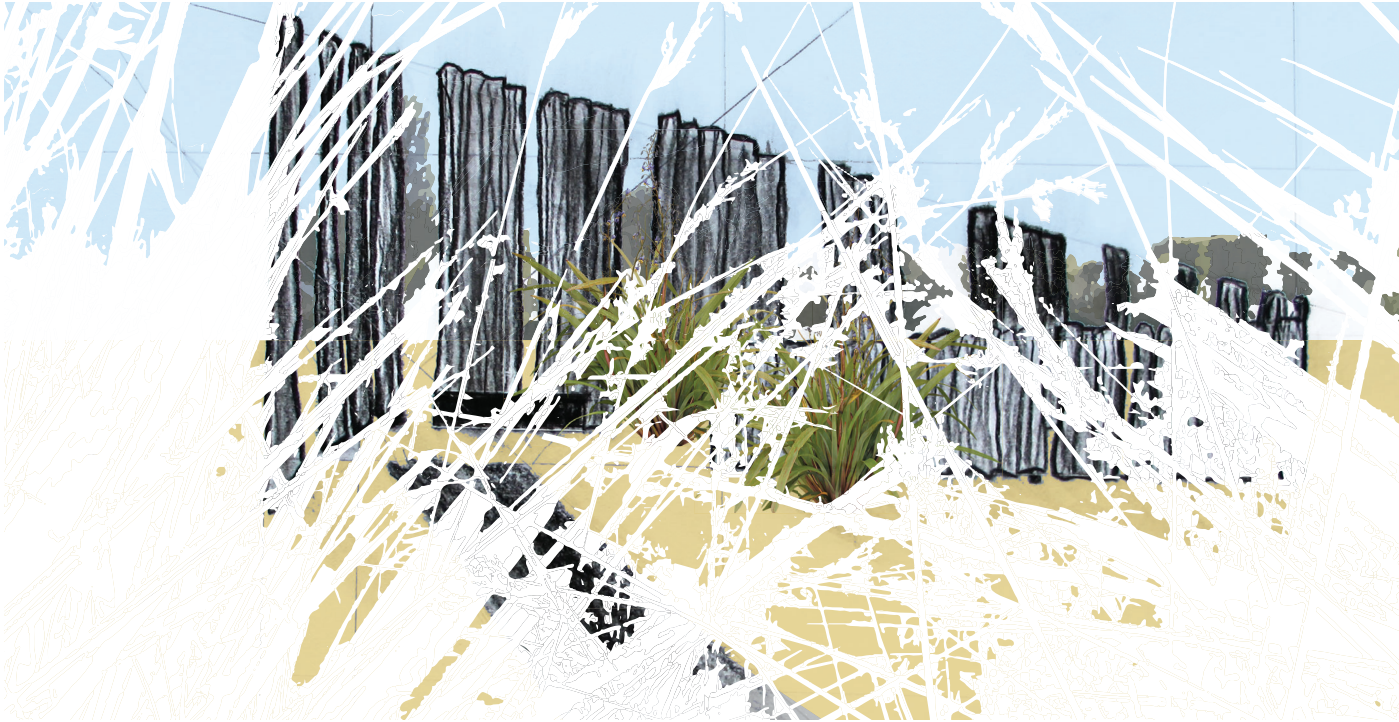
These two restored ecosystems will also contain elements as reminders of it's time as a suburban neighborhood. Street signs, garden benches, and sidewalk remnants serve as reminders of people's homes before the earthquake.



Schöneberger Südgelände Park  
(Group Odious)



Schöneberger Südgelände Park  
(Group Odious)

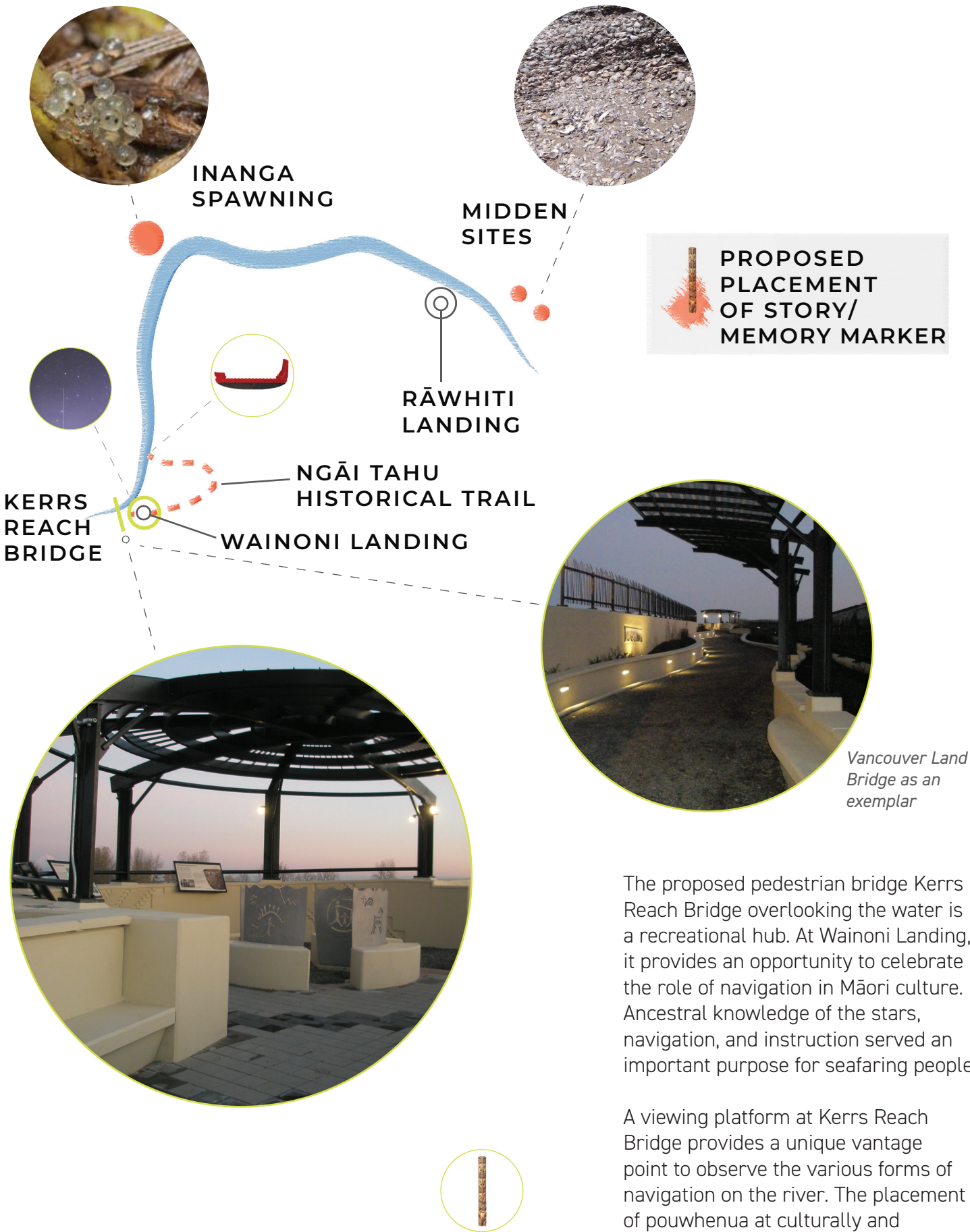


MEMORY, CONNECTION + BEING



A CELEBRATION OF NAVIGATION

AT KERRS REACH BRIDGE



The proposed pedestrian bridge Kerrs Reach Bridge overlooking the water is a recreational hub. At Wainoni Landing, it provides an opportunity to celebrate the role of navigation in Māori culture. Ancestral knowledge of the stars, navigation, and instruction served an important purpose for seafaring people.

A viewing platform at Kerrs Reach Bridge provides a unique vantage point to observe the various forms of navigation on the river. The placement of pouwhenua at culturally and ecologically significant sites along the river illuminates a guided journey of stories that can facilitate historical and environmental literacy.



WHAT IF KERRS REACH BRIDGE BECOMES A **PHYSICAL/SPRITUAL PLATFORM** FOR VIEWING WATER RECREATION, TEACHING STORIES OF THE PAST, AND STAR GAZING?





CONNECTING THROUGH HISTORY

WAINONI LANDING

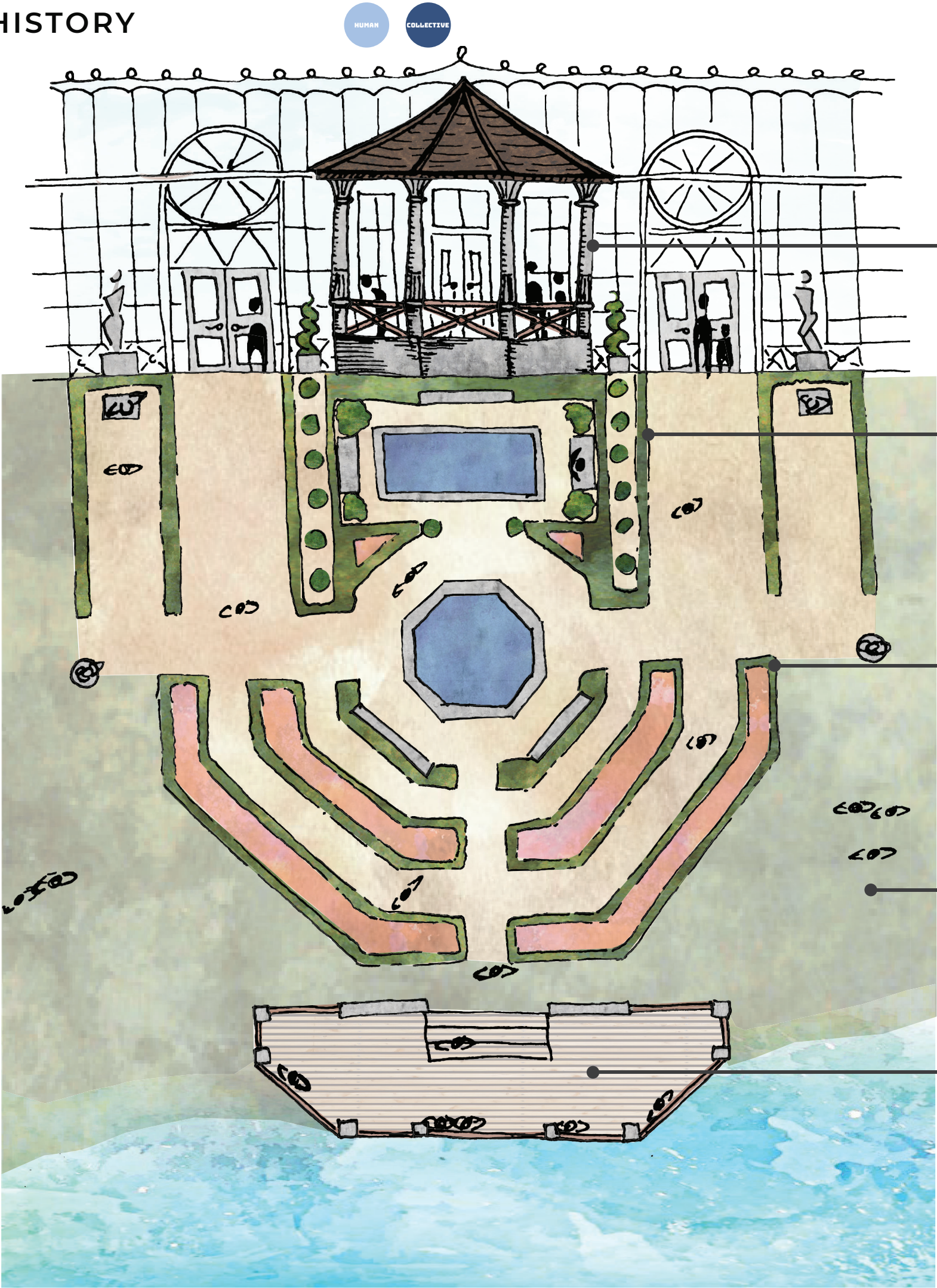
Christchurch contains many layers of history which often overlap in complicated ways. Māori stories abound in the Ōtākaro Avon corridor. Since the first European settlers arrived in the 1850's, they too have been inextricably linked to the Ōtākaro Avon. Can we connect to this historically important river corridor through the telling of certain European settler stories?

Near Wainoni landing, there is a place rich in European settler history: Wainoni Park, better known as Professor Bickerton's pleasure garden. This garden existed for many years and was once popular with the residents of Christchurch. By taking this former garden as a starting point, a center can be created that draws people together with central pavilions, elaborate gardens and opportunities for recreation and enjoyment. What was once a place of pleasure can today serve as an approachable way to access European history in Christchurch.

CAN WE CONNECT TO THE  
ŌTĀKARO AVON CORRIDOR  
THROUGH THE TELLING  
OF EUROPEAN SETTLER  
STORIES?



Wainoni Park, opened to the public by Professor Bickerton as pleasure gardedns, Christchurch, N.Z., from early 1900s (Entry in the 2014 Christchurch City Libraries Photo Hunt)



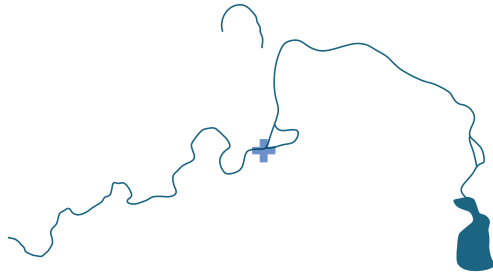
A central pavilion can act as a magnet, drawing people together

Elaborate gardens and Victorian motifs echo history and give a sense of place

More intimate gardens offer spaces for reflection

Expansive lawns offer opportunities for recreation and lounging

An overlook onto the river connects people to the Ōtākaro Avon





# SEA LEVEL RISE ARTISTIC LANDING



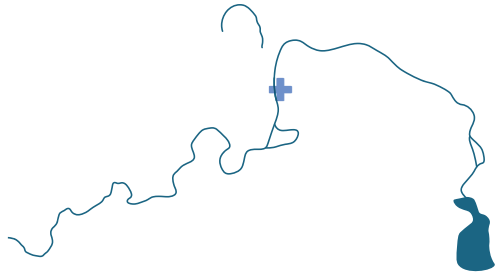
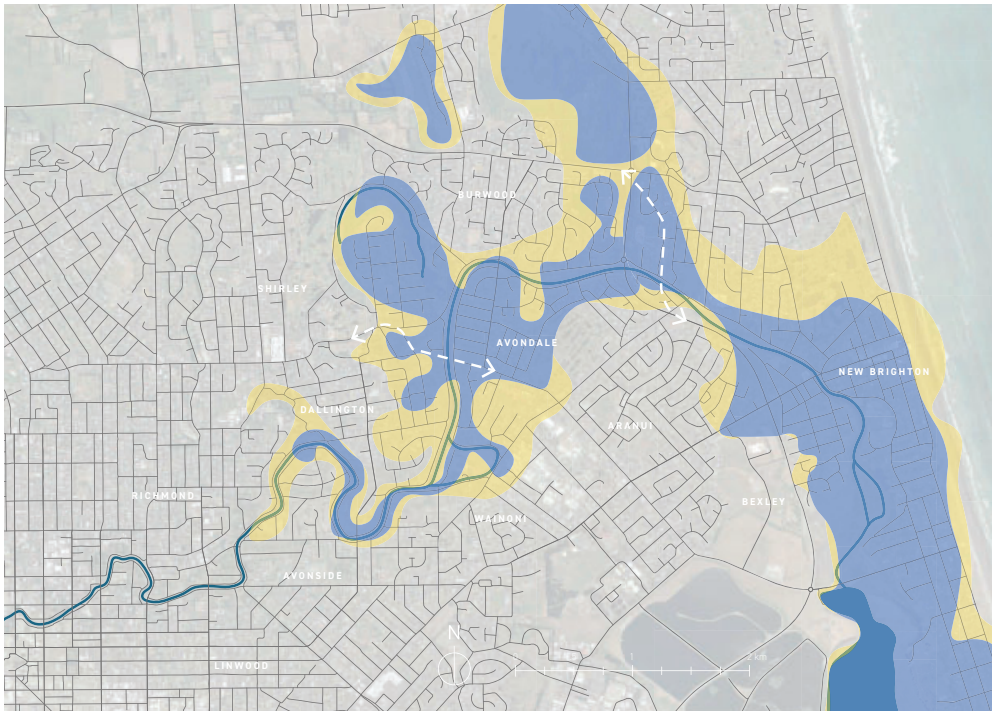
## VISUALIZATION, EXPLORATION, INTERVENTION AT AVONSIDE

In the coming decades, sea level rise is predicted to impact Christchurch pretty drastically. Even the lowest predictions show New Brighton to be primarily under water by the year 2065, according to Regenerate Christchurch as of 2018. Sea level is a tough topic to breach, especially with a population that will be displaced from their homes in a considerably slow progressing, yet natural way. How can understanding be encouraged without creating fear and stirring up havoc?

How do we talk about sea level rise in a way that will begin to explain what will happen, what is happening, and what has already happened? This landing aims to

be the hub of sea level rise information, with pillars of where the water reaches at a monthly high tide beginning in New Brighton and continuing to Avonside. These posts will ideally create a trail in the water that will be accessible even after the paths along the river are covered by water. This design could be implemented no matter where the stopbanks are placed to hold back the water from inundating the green spine and surrounding neighborhoods.

Additional elements that can be included are markers that show where the salt water wedge was and when.



PREDICTED SEA LEVEL RISE BY 2065 FOR RCP 2.6 + RCP 8.5+ (WITHOUT ADDITIONAL STOPBANK INTERVENTIONS)



MEMORY, CONNECTION + BEING



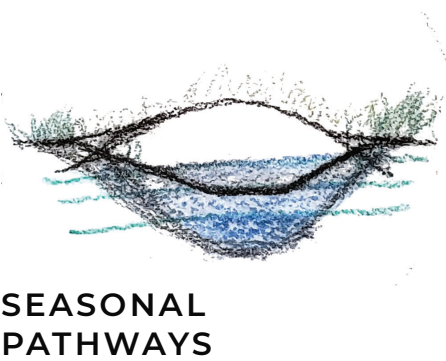
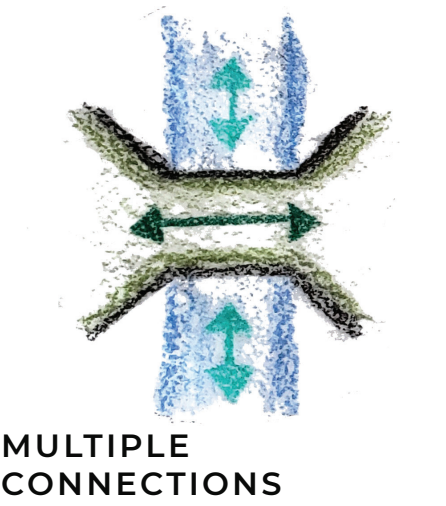
# CONNECTING TO THE ŌTĀKARO AVON

## ARANUI LANDING

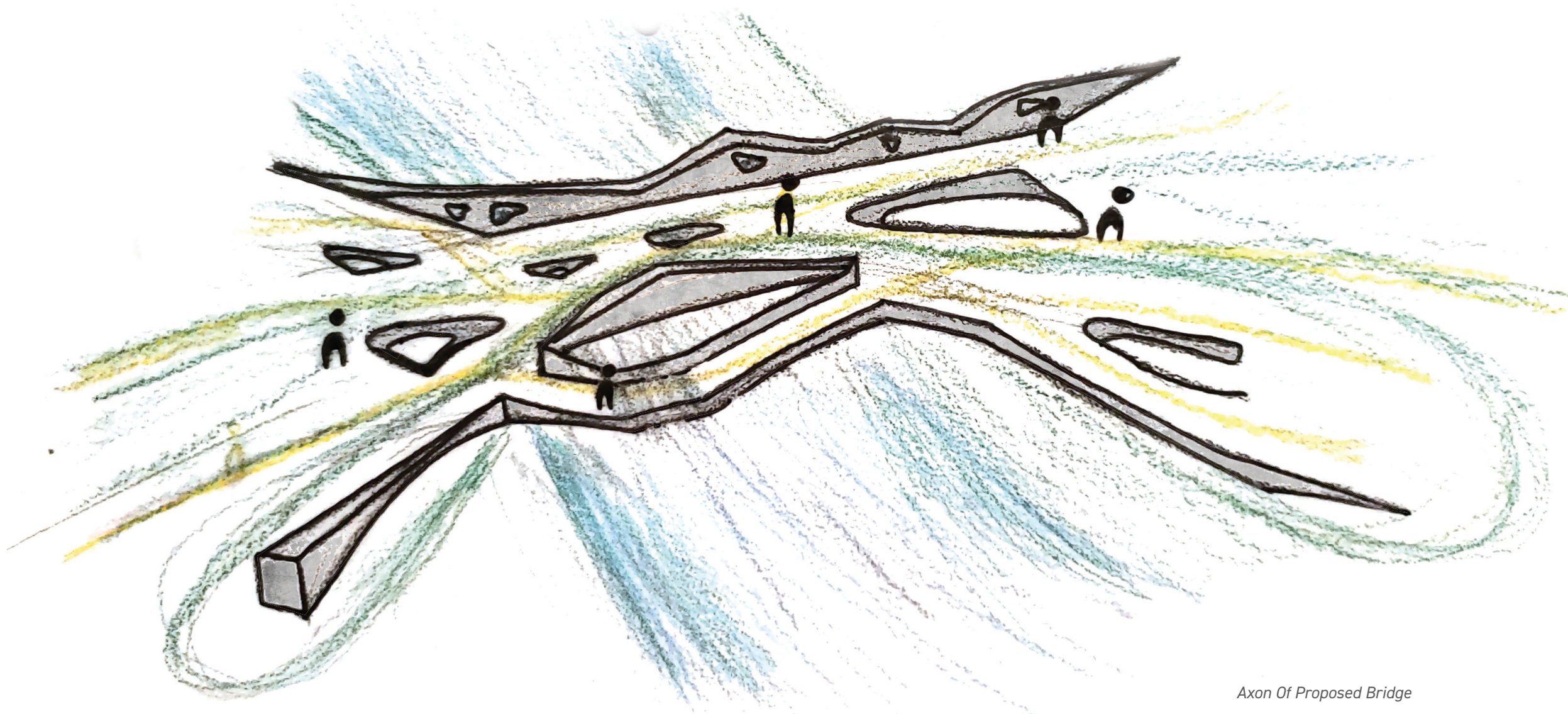
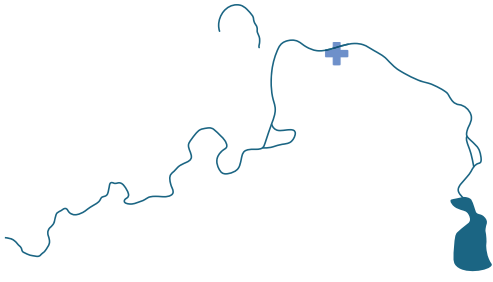
This project began with a question: what if a bridge could connect not only across, but through and with the Ōtākaro Avon River, developing respect and understanding of the river's processes? This new footbridge at Aranui can be more than a route across the river, instead encouraging people to contemplate the water in new ways. A series of openings in the bridge deck provides direct views down to the water, offering a new angle on the river; high walls block

views except in certain places, increasing awareness of what is visible; additional pathways dip down to the water, becoming inundated during high tide and flooding events, and bringing people closer to the water. These designs shift people's perspective on the river, encouraging them to ask questions about the Ōtākaro Avon River while offering them information along the way; a new interpretation of a bridge can create a new interpretation of the river.

WHAT IF A BRIDGE COULD CONNECT ACROSS, THROUGH + WITH THE ŌTĀKARO AVON RIVER?



Crossing The Bridge



Axon Of Proposed Bridge



INTERACTIVE EDUCATIONAL CENTER

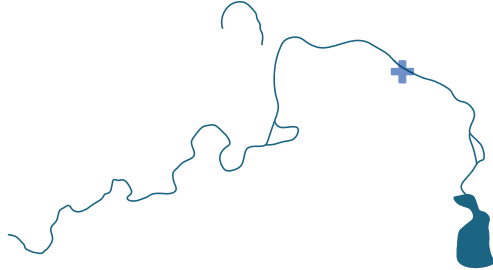
RAWHITI LANDING

Rāwhiti Landing's proximity to a major vehicle  
thoroughway (State Highway 74/Anzac Drive), several  
primary schools (Rāwhiti School and St. James  
School), and inanga (white bait) spawning offers  
an opportunity to create an interactive/educational

visitor center in homage to the Ōtākaro Avon River.  
A communal gathering place at Rāwhiti Landing  
facilitates framed views of the river, teaching and play,  
and access to the guided journey of stories.



WHAT IF RĀWHITI LANDING BECOMES A  
COMMUNAL GATHERING PLACE FOR LEARNING  
ABOUT THE PAST, PRESENT, AND FUTURE OF THE  
RIVER?



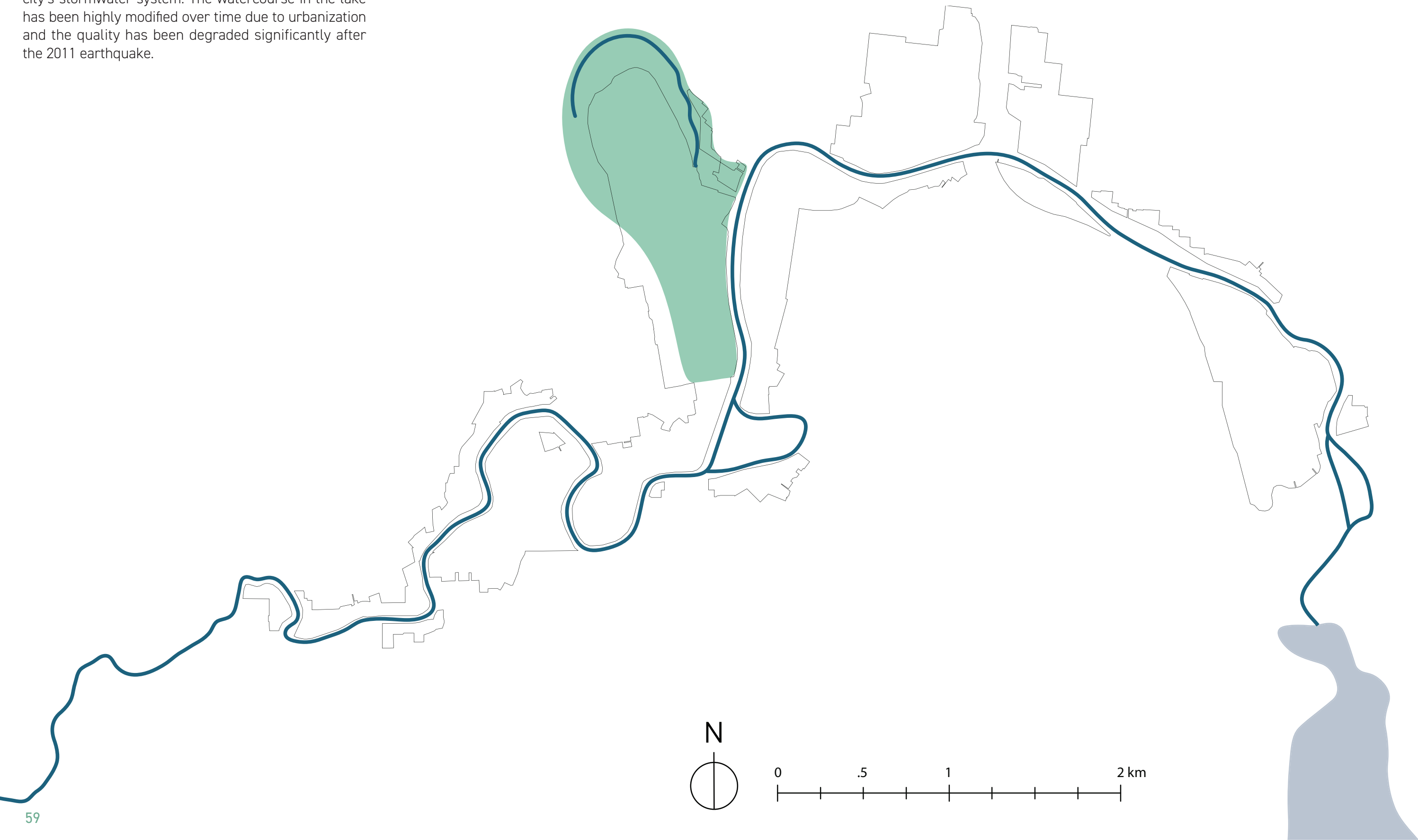
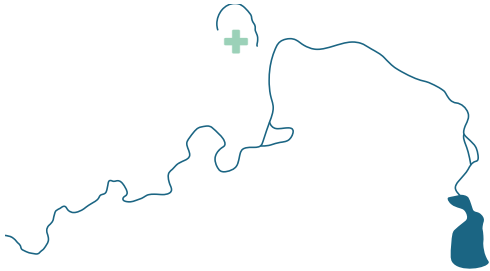
MEMORY, CONNECTION + BEING



HORSESHOE LAKE RESERVE

The University of Washington master's capstone group is focusing on the Horseshoe Lake Reserve, located north of the Ōtākaro Avon Corridor. Because of the rich Mahinga Kai history, and a range of remnant native vegetation and wetland habitat, it is now an Ecological Heritage site. The reserve is also a critical part of the city's stormwater system. The watercourse in the lake has been highly modified over time due to urbanization and the quality has been degraded significantly after the 2011 earthquake.

This project aims to restore the quality and quantity of waterways, retrofitting stormwater remediation, regenerating native ecosystem to address concurrent and future challenges like climate change, sea level rise and natural hazards.





SITE ANALYSIS & VISUAL NOTES

WATER SYSTEM



- open water area
- potential stormwater storage
- upstream B connected to Clare Park to the north
- flow through residential areas
- discharge point to the Ōtākaro Avon River
  - concrete tunnel under the road
  - facilities monitoring water level
- no. 1 drain in the Shirley Links Golf Course
- repairation through naturalisation
- new drainage construction along Kingsford Street
- run-off conveyance to Ōtākaro Avon River

VEGETATION



- typical plantings along Horseshoe Lake
- lush and native
- different layers of vegetation
- upland / lowland / floating / emerged / submerged plants
- manicured plantings in the "back yard"
- ornamental / gardening species
- ornamental / gardening species
- roses!
- spontaneous planting / weeds thriving in cracks
- ponding water after flood

HABITAT



- lush vegetation provides habitat for birds and other wildlife
- flowers attract bufferflies
- no.1 drain provides new habitat for ducks
- habitat corridor
- lots of ducks and birds
- seagulls!
- black swans and some other elegant black birds

ARTIFACTS

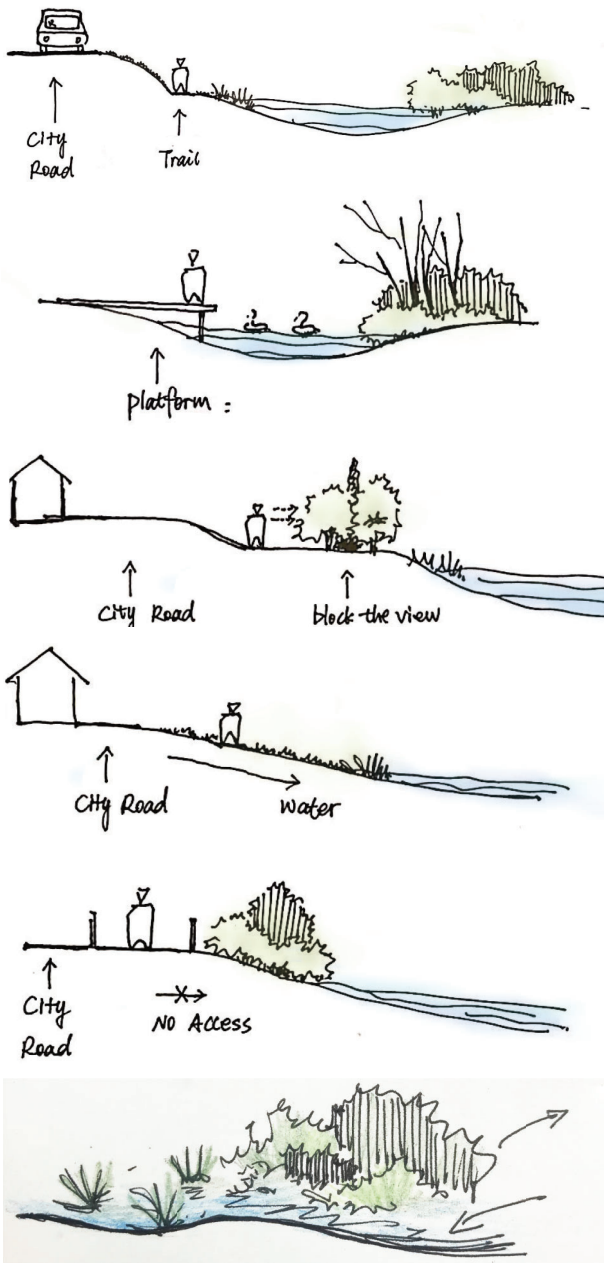


- remaining road signage - still private?
- remaining signage - neighborhood watch / support area?
- design for safety concerns
- structures destroyed by the earthquake - a reminder?
- combined with arts / education / memorial
- "I used to step down these stairs and kayak on the river"
- where do they come from?
- where should they go?

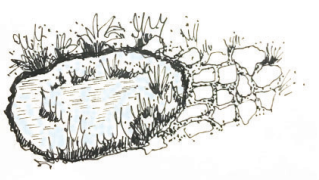
HUMAN ACTIVITY / AMENITIES



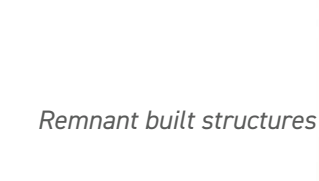
- boys biking on the lawn
- biking lane / park? or other sports ground / playground
- an abandoned boat hiding behind the vegetation
- biking traces on trail though it's abandoned in the reserve
- a need for biking lane
- the first trash can along the trail - there should be more!
- pump station - engineering the water in a more natural way?



Diagrams exploring various edge conditions



Spontaneous vegetation



Remnant built structures



A new vegetation pattern



Implied pathways



Remnant street signs

OPPORTUNITIES IDENTIFIED:

- Spontaneous ecology
- Remnant built structure and existing street signage as an opportunity for interpretive art and wayfinding
- Diverse users identified - dog walkers, strollers, bikers, kids with family
- New vegetation pattern with a combination of ornamental and native indigenous plants and trees
- Implied pathways
- Different edge conditions offer opportunities for creative programing.
- At present there are not many recreational amenities are available in the adjacent neighborhoods but the lake can provide opportunities to address the need



DESIGN FRAMEWORK

PROPOSED FRAMEWORK

The question driving the design thinking process:

“How to adapt to the challenges and opportunities of a changing landscape that is ecological and culturally significance to the city and its people?”

The proposed design framework is a reflection of the rich cultural history of the site and also highly inspired by the Māori values and principles to protect and manage environment.

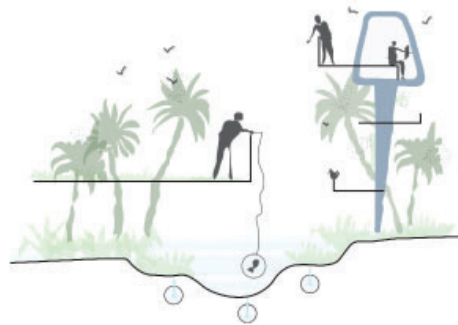
“TE MANA O TE WAI” – Integrated and Holistic Wellbeing of Water: a comprehensive approach toward managing land, water and hazard

GUIDING PRINCIPLES

- Water quality and Mahinga Kai
- Clusters/ networks of hubs – water, habitat and social
- Kaitiakitanga (stewardship and respect for the natural environment)
- Matauranga (Growing and sharing of knowledge)
- Manakitanga (Inclusive and productive landscape)



01. Horseshoe lake in past



02. Horseshoe lake in future

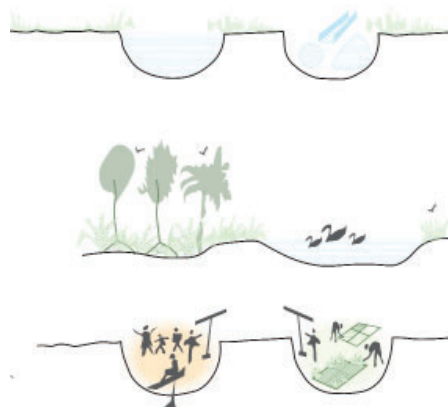
CLUSTER / NETWORK OF HUBS

Fig 01.  
The lake is also known as “WAIKAKARIKI,” Wai means water and Kakariki means green lizard/parrot

Fig 02.  
Expanding this value in future by adding more networks of wetlands, hubs for social gathering and cultural practices



01. Past - Water and habitat



02. Future -Natural, social and cultural hubs

MAHINGA KAI + WATER QUALITY

Fig 01.  
Seasonal migration to the lake to gather resources in the in order to better prepare for longer harsh months. It was a significant Mahinga Kai site for the “TeOranga” tribe.

Fig 02.  
Bringing back the Mahinga Kai tradition better prepare for future changes -SLR and Climate Change through improving water quality and managing quantity.

MANAAKITANGA

Fig 01.  
Sharing, reciprocal hospitality and respect between different people, groups and culture.

Fig 02.  
Expanding this idea in future by creating a network of inclusive , safe and welcoming public spaces that are active, productive and re-programmable to respond future changes.

PROPOSED DESIGN GOALS AND OBJECTIVES

- Improving water quality while managing the quantity (Focusing on stormwater treatment and management and sea level rise mitigation)
- Regenerating native ecosystem (reconnecting people with the land and nature)
- Dealing with future changes such as sea level rise, climate change impacts through “Climate Adaptive Design Strategies.”
- Integrating education and art into the design –Educate, Engage and connect communities to better prepare for the future. Promote ecological education and Māori cultural values and practices of environmental stewardship.
- Creating networks of hubs such as “Ecological Hub” – wetlands and habitat, Recreational Hub - activities and non-motorized corridors, Social and cultural Hub - Public spaces focusing on productive and re-programmable spaces.



01. Past - Environmental stewardship and management principles



02. Future - Environmental Stewardship and management principles

KAITIAKITANGA + MATAURANGA

Fig 01.  
Stewardship, shared responsibility and respect for natural environment.

Fig 02.  
Expanding the past value by adding layers of education, food and crafts to develop a culture of growing and sharing of knowledge in future.



01. Past - Sharing and respect between different people, groups and culture



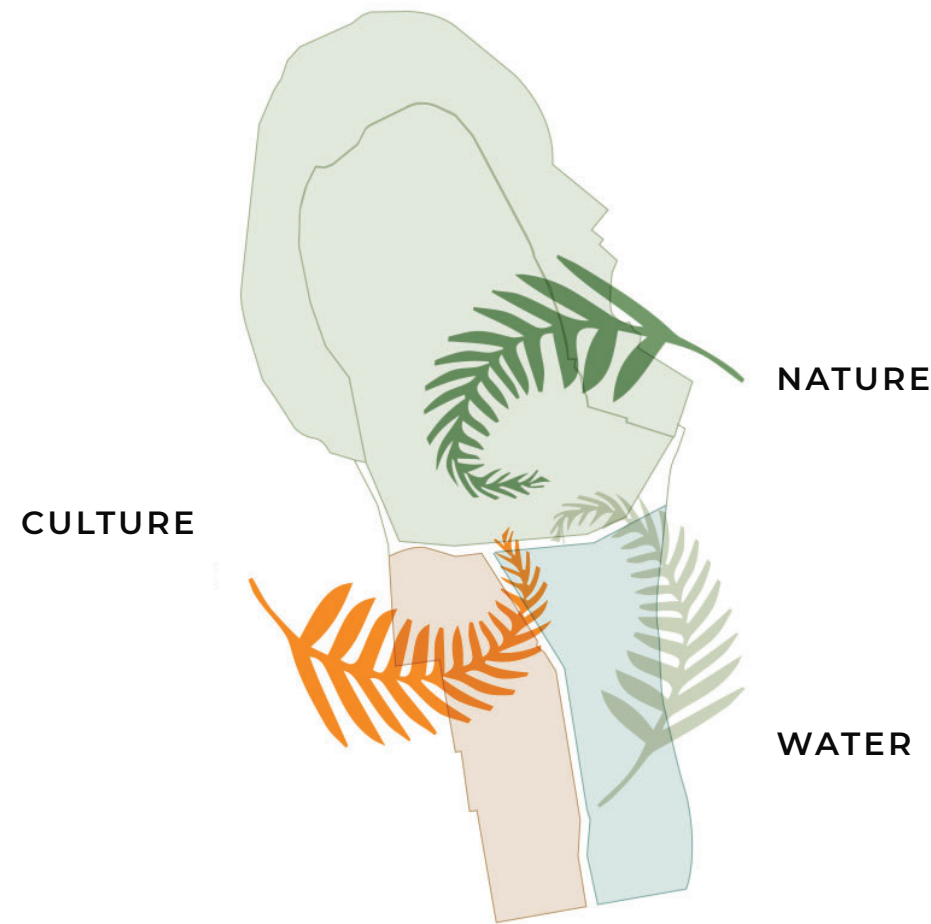
02. Future - Active, productive and re-programmable public space for all



CONCEPT

DESIGN CONCEPT

We use New Zealand's national icon, the **KIWIANA** leaf, to represent three significant elements in our site design: **NATURE**, **WATER**, and **CULTURE**. Three leaves combine to create a spiral that represents "ever changing life and also staying the same" according to Māori content.



PROGRAMS

STITCHING / WEAVING THE SITE

We propose three evolving phases for site development. In the first phase, **DISCONNECTED**, nature, water, and culture are programmed to develop in their own site based on site conditions and neighboring needs. The three areas begin to weave together, building connections and stitching a central site. The central part ultimately continues to spread to the whole site which means nature, water, and culture are merging with each other and bringing identity to the site.





PRESERVE

STORAGE + MITIGATION

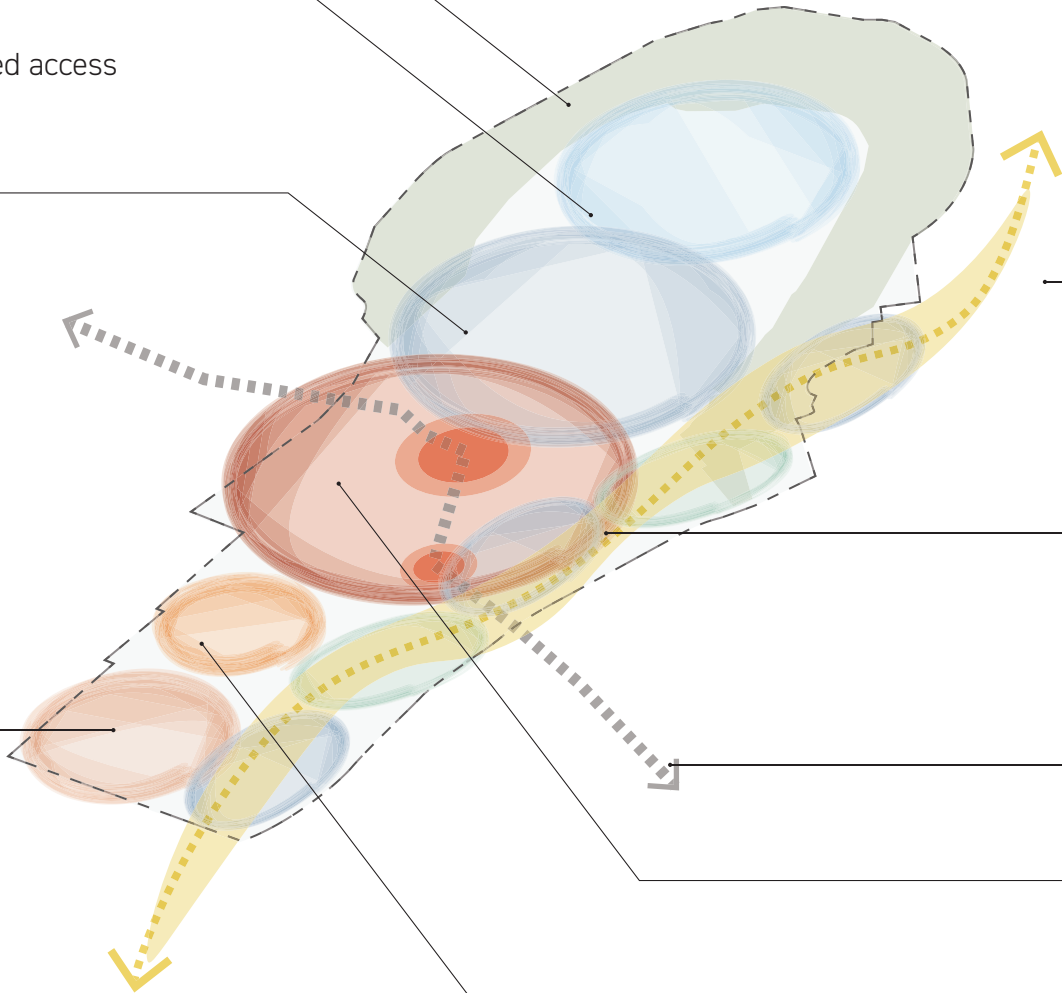
- Reservoir
- Open water / daylighting wetlands
- Elevated boardwalks
- Trails
- Forest walk + tree house
- Connection to the preserved area but with limited access

TREATMENT + MANAGEMENT

- Wetlands
  - aeration pool
  - aeration water fall
  - ponds + streams
  - floating wetlands
  - floating farms
  - constructed wetlands
  - board walks / trails
  - bird watching towers / blinds

PRODUCTIVE LANDSCAPE

- Cultural harvesting
- Community gardens
- Events space (festivals+farmers market)
- Food (vendors)



MULTI FUNCTIONAL STOP BANK / CONNECTION TO CULTURAL TRAIL

- Shared path for bike + pedestrian
- Soft natural edges
- Flood protection
- Look outs
- Bio retention + Rain garden

SEA LEVEL ADAPTATION AREA

- Salt water marsh (seperated from fresh water)
- Bio-retention cells
- Rain gardens
- Habitat + pollinator corridor

PROPOSED LANDING CONNECTION

- Bridge will connect the east-west neighborhoods

CELEBRATE + EDUCATE + ENGAGE

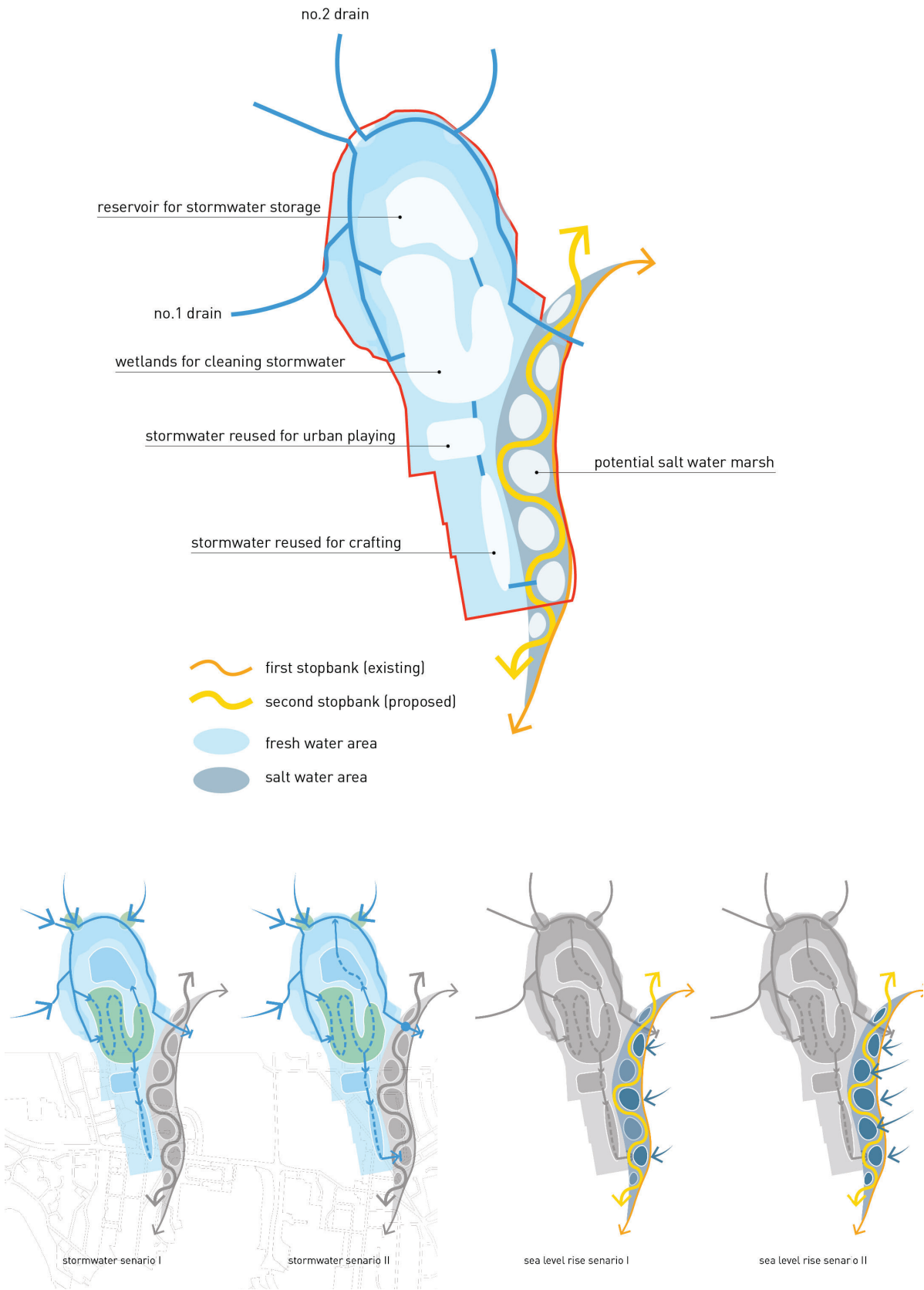
- Information center / cultural & ecological education center
- community center
- library
- music
- Urban plaza (re-programmable spaces)
- Urban forest (native + ornamental)
- Water play+ Look outs + cafe + restaurants

ART + CRAFT

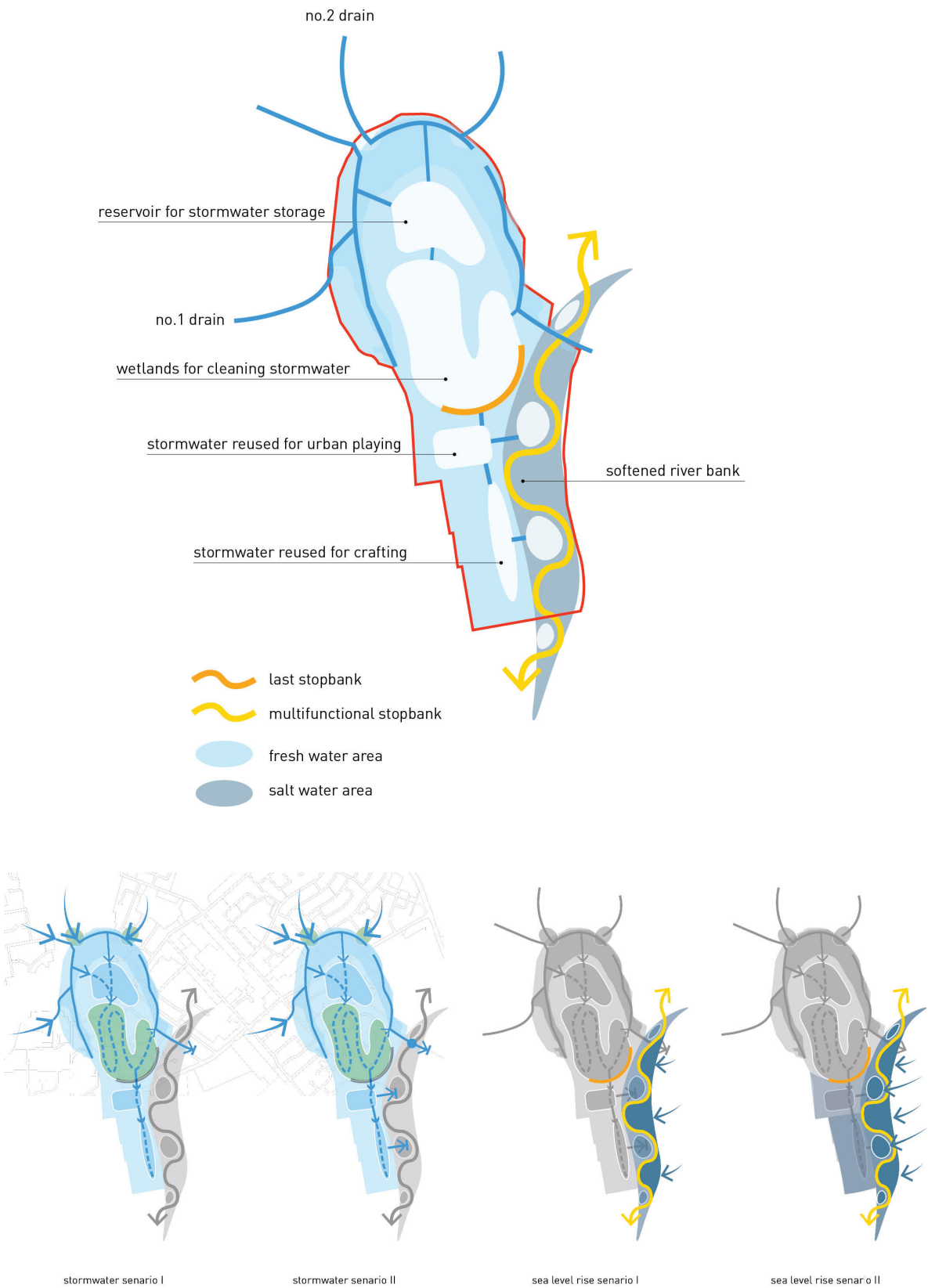
- Craft village
- Exhibition and Performance space
- Bazar (shops)
- Food + Cafe



WATERWAYS DIAGRAMS 1



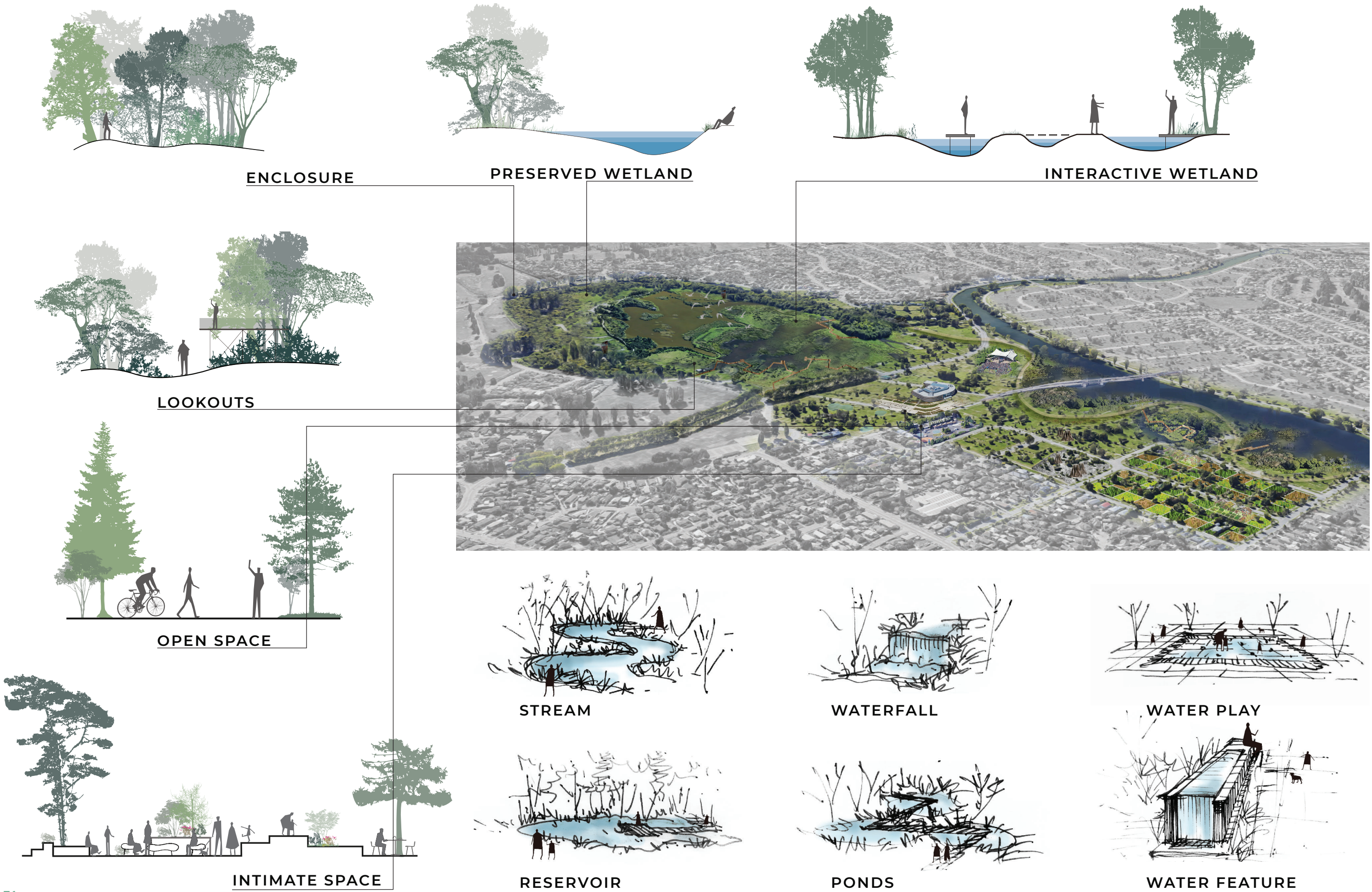
WATERWAYS DIAGRAMS 2



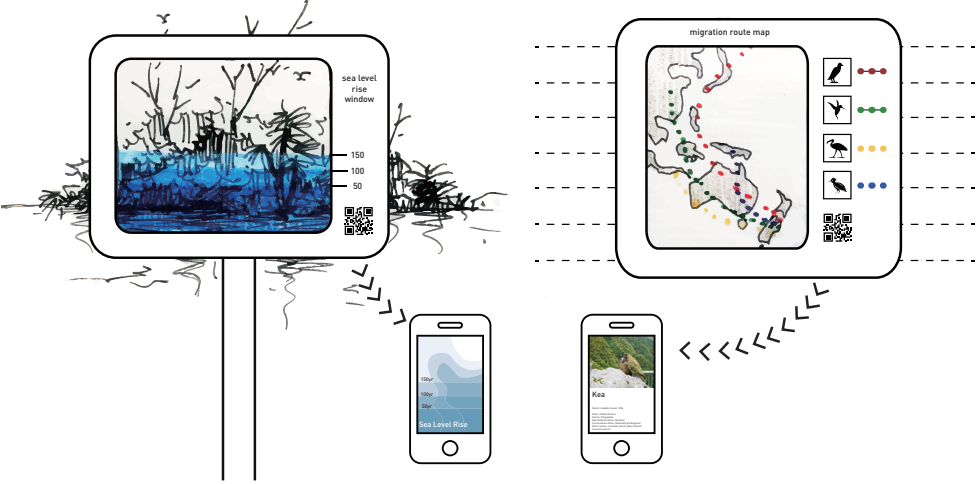


SPACE & WATER EXPERIENCES

BASED ON THE EXISTING CONDITIONS OF OUR SITE, VARIOUS SPACE AND WATER EXPERIENCES ARE PROVIDED TO MEET USERS DEMANDS.

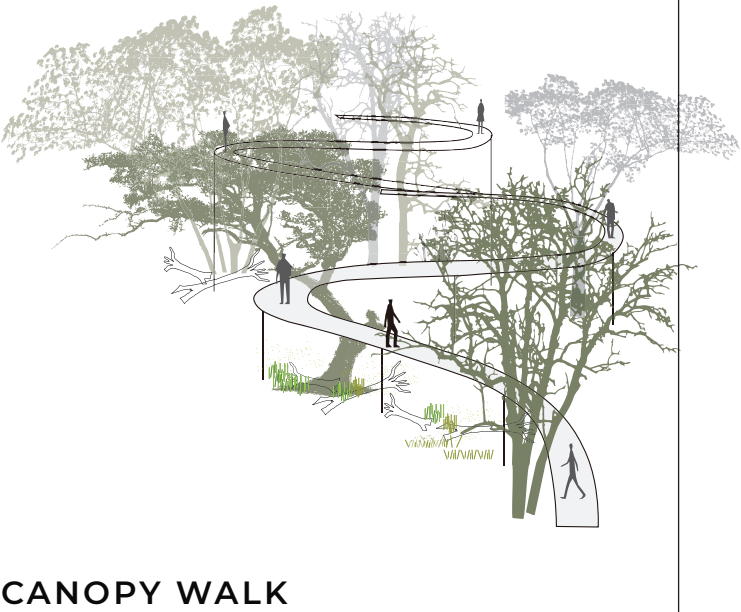






INFORMATION BOARD

Applying interactive design for education purpose. Users could learn about sea level rise and migration routes from a smart board on site. It can also connect to the smart-phone by scanning the QR code on the board for further exploration.

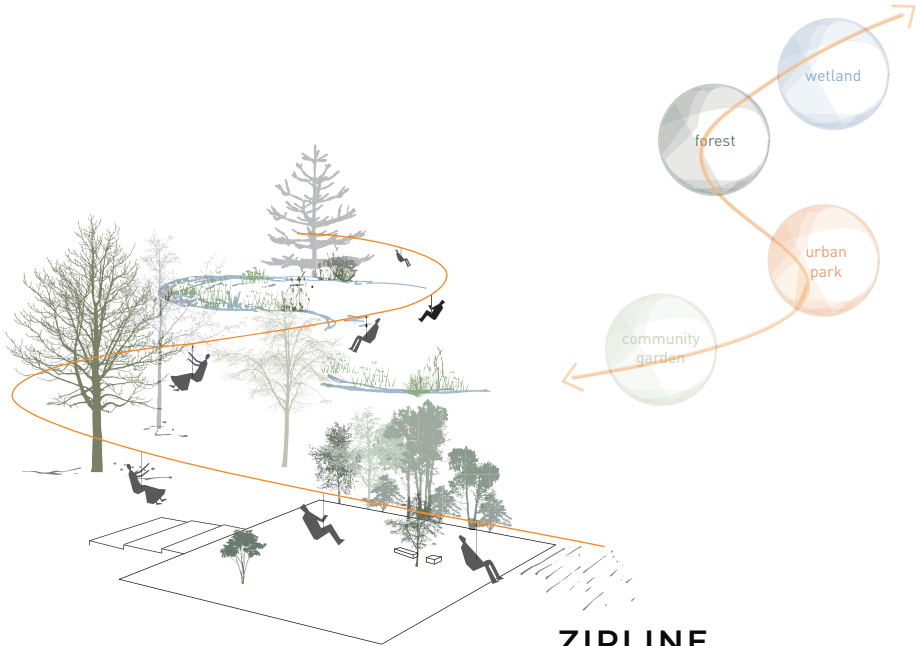


CANOPY WALK

Provides chance for users to connect with and enjoy the natural environment.

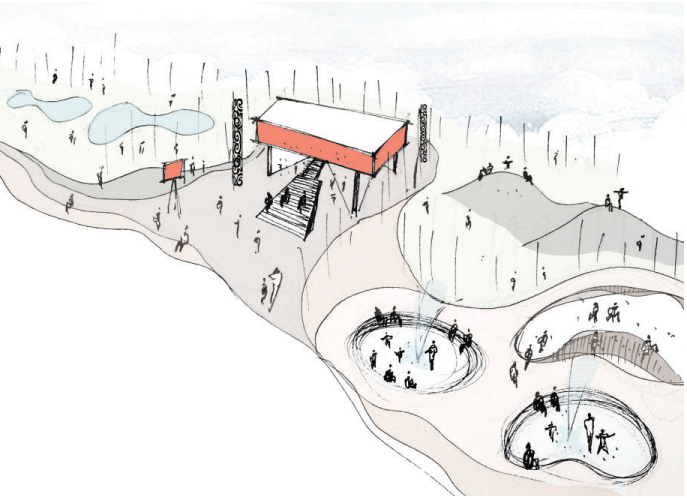


ART & CRAFT



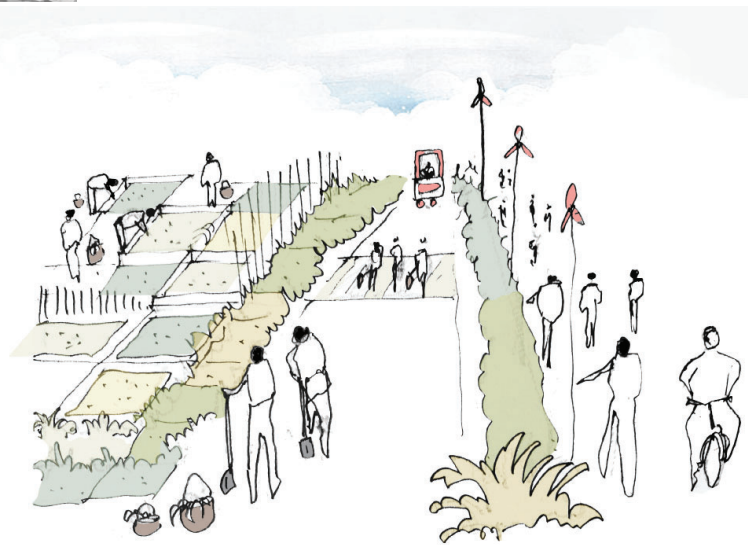
ZIPLINE

The site will also provide possibilities for recreation. A zipline is a good example as it can connect wetland, forest, urban park, and community garden in the site.



URBAN AREA

- The proposed urban area with
- A ecological cultural education center,
  - community center + library
  - Clusters of water plaza to interact with water in various form
  - Urban park with playful landforms and forest



COMMUNITY GARDEN & URBAN AGRICULTURAL



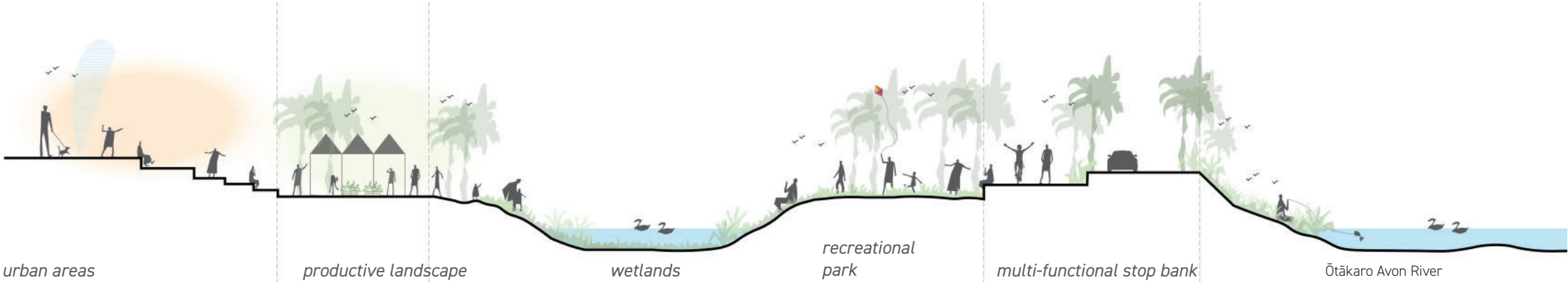
EXPLORING STOP BANK STRATEGIES

MULTI-FUNCTIONAL FLOODABLE LANDSCAPE

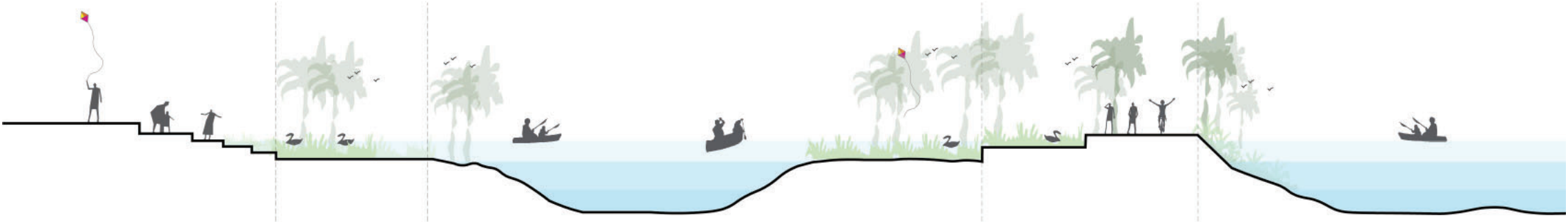
Alternatives are explored to understand how multi-functional stop banks can benefit the site and complement the programs that are proposed for Horseshoe lake.

OPTION A

REGULAR EVENT

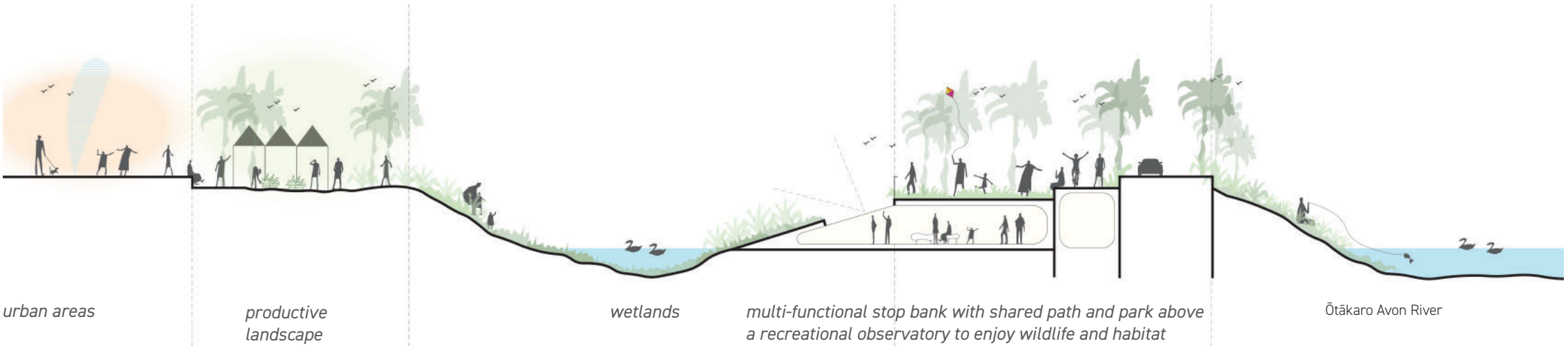


FUTURE SEA LEVEL  
RISE SCENARIO

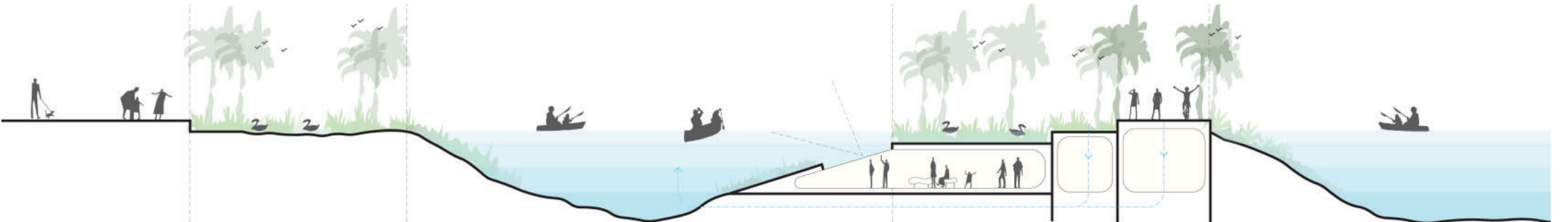


OPTION B

REGULAR EVENT



FUTURE SEA LEVEL  
RISE SCENARIO



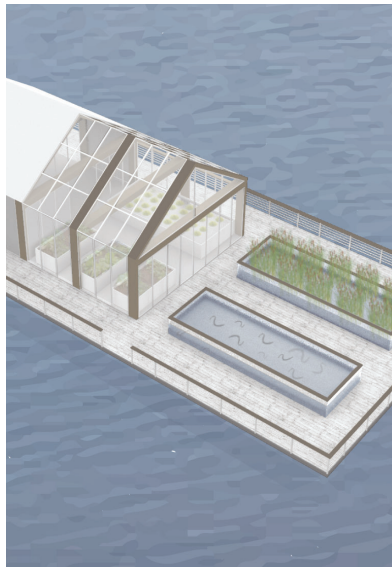
The space under the stop bank can be used for water treatment while an observatory provides opportunities for witnessing water level changes



This capstone project will be carried back to Seattle and continuing until June 2019. More detailed designs and waterway strategies will be developed in the next phases.



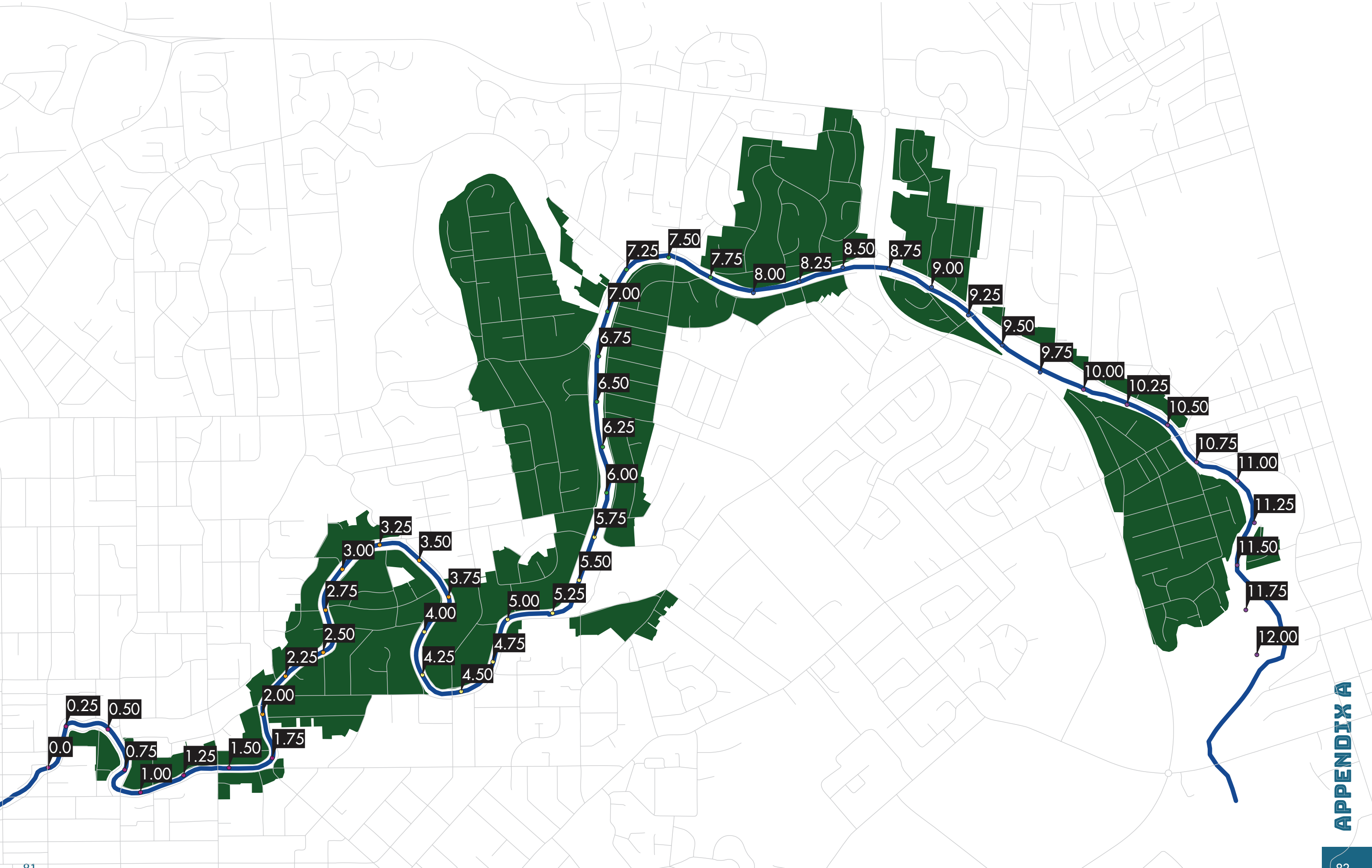




MŌ TĀTOU, Ā, MŌ KĀ URI Ā MURI AKE NEI.  
FOR US AND OUR CHILDREN AFTER US.



APPENDIX A: RIVER PANORAMAS





CHRISTCHURCH  
CITY CENTRE



0.00  
LEFT RIGHT



0.25



0.50



0.75



1.00



1.25



1.50



1.75



2.00



2.25



2.50



2.75



AVONSIDE

LINWOOD



3.00



3.25



3.50



3.75



4.00



4.25



4.50



4.75



5.00



5.25



5.50



5.75



DALLINGTON



AVONDALE



6.00



6.25



6.50



6.75



7.00



7.25



7.50



7.75



8.00



8.25



8.50



8.75



NEW BRIGHTON

BEXLEY



9.00



9.25



9.50



9.75



10.00



10.25



10.50



10.75



11.00



11.25



11.50



11.75



12.00

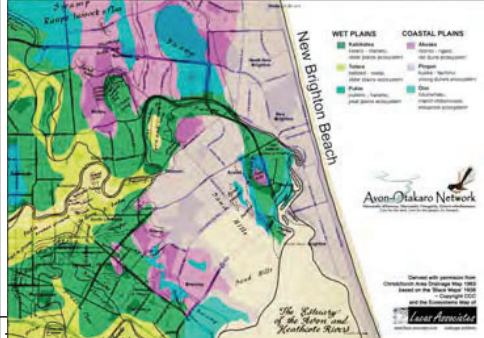




APPENDIX B: CULTURAL NARRATIVE STUDIES

MAHINGA KAI	PAST	PRESENT	FUTURE	RESOURCES
Plants				
pre-colonial/native	<div>- Podocarpaceae (podocarps) dominate among large trees</div> <div>- no Myrtaceae (eucalyptus)</div> <div>- no Pinaceae (pine)</div> <div>- no Araucariaceae (monkey puzzle, etc.)</div> <div>- plants have evolved without defences to mammals</div> <div>- something like 90% more forest than we see today</div> <div>- Collections of species remaining in yards tell a story about how food systems have changed over time</div> <div>&amp; other plant relationships: landscape plants, medicinal plants...</div>	<div><b>Stories</b></div> <div>- Collections of specimens remaining tell a story about how food systems have changed over time + other plant relationships: landscape plants, medicinal plants. However, much has been lost through demolition processes including changes in overall coverage, many tree ferns were lost and there were changes in the water table</div> <div>- 32,602 trees have been retained in the red zone; 58 percent supposedly natives</div> <div>- 1763 trees produce edible fruit or nuts</div> <div>- many podocarps exist but they are usually aggressively defended by the humans that want them there</div> <div>- lacking big native specimens, however some native forest remnants do exist</div> <div>- massive european species specimens that we see today were planted during colonial times</div> <div><b>Native species</b></div> <div><i>Leptospermum scoparium</i> (tea tree), <i>Sophora</i> (kowhai), <i>Coprosma</i> (coprosma), <i>Phormium tenax</i> (flax/harakeke), <i>Phormium colensoi</i> (flax/wharariki), <i>Pittosporum</i> (tarata, lemonwood), <i>Dacrycarpus dacrydioides</i> (kahikatea/white pine), <i>Cordyline australis</i> (cabbage tree/ti kōuka), <i>Cordyline indivisa</i> (broad-leaved cabbage tree/tōi), <i>Podocarpus totara</i> (tōtara), <i>Dodonaea viscosa</i> (akeake), <i>Pseudopanax crassifolius</i>, <i>chathamicus</i>, <i>ferox</i>, <i>linearis</i> (lancewoods)</div> <div><b>Exotic tree species</b></div> <div><i>Acer</i> (maples, sycamore), <i>Betula</i> (birch), <i>Magnoliaceae</i> (magnolias, including rhododendrons), <i>Salix</i> (willows), <i>Platanus</i> (London plane), Myrtaceae (eucalyptus), Pinaceae (pines), Araucariaceae (araucarias)</div> <div>- Salix babylonica (weeping willow) along bank are massive and iconic</div> <div><b>Noxious weeds:</b> <i>Lupinus</i> (lupine), <i>Buddleja</i> (butterfly bush)</div>	<div>- Earthquake created gaps for change from what had been a very English city</div> <div><b>Ideas for engineering strategies in the corridor</b></div> <div>- burms; wider, farther back or closer to the water? multiples?</div> <div>how much time does each burm or each square foot of burm buy against sea level rise?</div> <div>- repurpose dredged sediment from Avon to build up high ground</div> <div>- populate high ground with native forest species</div> <div>- wetland remediation; propogate <i>Cyperaceae</i> (sedges), <i>Juncaceae</i> (rushes), <i>typha</i> (cattail)</div> <div>- plan for / adapt to salinity changes by moving more salt-tolerant species up stream</div> <div><b>Ideas for land use in the corridor</b></div> <div>- orchards, other food production, gardening</div> <div>- preservation of gardens as a sort of memorial system</div> <div>- excavate roads to remember structure in high storm event</div> <div>- cultural values: indigenous doesn't exclude european and vise versa; look back, learn more, move forward</div> <div>- restoration? bringing back native trees and biodiversity</div> <div>- must consider sea level rise and salinity increase furthur upstream when considering species to plant</div> <div>- ironically, the massive estates of colonial past are now protected from development, rendering them perfect sites for greening, and sometimes, as at the Riccarton Bush, restoring and displaying old growth forest</div> <div>-orchards, edible plants, gardening</div> <div>-cultural values: indigenous doesn't exlude european cultures</div> <div>-look back and learn move forward</div>	<div>- Motukarara Conservation Nursery Plant List: Canterbury Native Plants. <a href="https://www.doc.govt.nz/globalassets/documents/conservation/native-plants/motukarara-nursery/motukarara-plant-list.pdf">https://www.doc.govt.nz/globalassets/documents/conservation/native-plants/motukarara-nursery/motukarara-plant-list.pdf</a></div> <div>- trees: <a href="https://fusiontables.googleusercontent.com/embedviz?q=select+col13+from+18tThe5yQvfNO7E4LdeGKK9berHW716HGni87F_1j&amp;viz=MAP&amp;h=fa1se&amp;lat=-43.51054591746616&amp;lng=172.6911064203989&amp;t=1&amp;z=14&amp;l=col13&amp;y=2&amp;tmplt=2&amp;hml=TWO_COL_LAT_LNG">https://fusiontables.googleusercontent.com/embedviz?q=select+col13+from+18tThe5yQvfNO7E4LdeGKK9berHW716HGni87F_1j&amp;viz=MAP&amp;h=fa1se&amp;lat=-43.51054591746616&amp;lng=172.6911064203989&amp;t=1&amp;z=14&amp;l=col13&amp;y=2&amp;tmplt=2&amp;hml=TWO_COL_LAT_LNG</a></div> <div>- fruit trees: <a href="https://fusiontables.googleusercontent.com/embedviz?q=select+col14+from+1ljOEsYoND06MJ5rm-tWHPF_zovBolojnTf5nhBtY&amp;viz=MAP&amp;h=false&amp;lat=-43.51203571037226&amp;lng=172.69052770785004&amp;t=1&amp;z=14&amp;l=col14&amp;y=2&amp;tmplt=2&amp;hml=TWO_COL_LAT_LNG">https://fusiontables.googleusercontent.com/embedviz?q=select+col14+from+1ljOEsYoND06MJ5rm-tWHPF_zovBolojnTf5nhBtY&amp;viz=MAP&amp;h=false&amp;lat=-43.51203571037226&amp;lng=172.69052770785004&amp;t=1&amp;z=14&amp;l=col14&amp;y=2&amp;tmplt=2&amp;hml=TWO_COL_LAT_LNG</a></div> <div>- about edible fruit and red zoning: <a href="https://www.stuff.co.nz/life-style/food-wine/food-news/67690529/null">https://www.stuff.co.nz/life-style/food-wine/food-news/67690529/null</a></div>
colonial/exotic	<div>- the 1% of colonial settlers claim massive estates</div> <div>- Europeans clear "inexhaustable forest" for lumber and to set up grazing space</div> <div>- Europeans plant their favorite european trees</div> <div>- Salix babylonica planting was slowed because it was thought they were too plentiful</div> <div>- Introduction of european crops also changed plant communities</div> <div>- Grass pastures for grazing replace native forest</div> <div>- Introduction of mammals causes immeasurable distruction for plants with no defenses</div> <div>-Draining the 'swamps'</div> <div>-Dune systems were planted in the east with exotic plants, changing natural processes</div>	<div>- the massive oak, sycamore, maple, birch, + willows we see today were planted during colonial times</div> <div>- willows (<i>Salix babylonica</i>) is popular along banks, despite efforts to slow their propogation back in the day</div> <div>- brassica volunteers along left bank</div> <div>- dill field along right bank (various Apiaceae/umbellifer weeds)</div> <div>- many fruit trees retained and urban foragers collect the fruit</div> <div>- Pinus radiata (Monterrey pine) most important forestry species; decking, fencing, etc.; mature in 30 years</div> <div>- Remnant forests (context): Riccarton Bush, Ahuriri wetlands, Taitapu forest, Lords Bush, Bankside Sciientific Reserve, Eyrewell Scientific Reserve, Rakaia Island, McLeans Island, the estuaries of the Heathcote and Avon Rlvers/lhutai, Brooklands spit.</div>		
Fauna				
birds	<div>- several extinct species would have been found in this area like Moa</div> <div>- endangered species like the kiwi, kakapo, and tekahe used to be in the area but are no longer</div> <div>- titi (muttonbird) was traded from south of the peninsula</div>	<div>- 61 species of birds recorded on iNaturalist along the Ōtākaro/Avon river (there are many more, but a good metric for public interaction)</div> <div>- nesting sites for many birds including swans, ducks, and shags</div> <div>- pest animal survey found canada geese grazing but not reproducing on site</div> <div>- Rockwing is very endangered bird that represents its clade</div> <div>- highest number of migratory bird species (100) stop in this estuary in NZ, such as bar-tailed gotwits; 32,000 birds at a time (South New Brighton Park)</div>	<div>- more wetland species due to subsidence of land/ potential sea level rise</div> <div>- restoration to attract species that used to be here</div> <div>- birds are important to the community in terms of bird watching + education in the estuary</div> <div>- Native NZ birds evolved to survive predators in the skies (eagles) and prefer lots of ground cover in riparian systems - carex, flax, shrubs; while introduced exotic species like Canada Geese and Mallards evolved with main predators terrestrial mammals, so prefer open grassed areas with clear lines of site. Best way to manage pest bird spp is to provide appropriate habitat to encourage native and discourage exotics.- E Smith</div>	<div>- <a href="https://www.inaturalist.org/observations?nelat=-43.49508577601088&amp;nelng=172.76597938149166&amp;place_id=any&amp;swlat=-43.52932151247603&amp;swlng=172.6424690207739&amp;taxon_id=40151">https://www.inaturalist.org/observations?nelat=-43.49508577601088&amp;nelng=172.76597938149166&amp;place_id=any&amp;swlat=-43.52932151247603&amp;swlng=172.6424690207739&amp;taxon_id=40151</a></div> <div>- <a href="http://nzbirdsonline.org.nz/?q=location-search&amp;field_location_term_id=150&amp;field_location_term_value=Canterbury&amp;search_filter=formerly_present&amp;search_sort=field_data_field_species_weighting_field_species_weighting_v">http://nzbirdsonline.org.nz/?q=location-search&amp;field_location_term_id=150&amp;field_location_term_value=Canterbury&amp;search_filter=formerly_present&amp;search_sort=field_data_field_species_weighting_field_species_weighting_v</a></div> <div>- the museum has lots of good taxidermy to study traits</div>
mammals	<div>- Elizabeth the Southern elephant seal often swam up the river during the 1970s and 80s</div> <div>- native bats (long tail?) used to live under bridges in Chch</div> <div>- European whaling ships, often with Maori crew</div>	<div>- pest animal survey in the red zone showed presence of rabbits, hedgehogs, possums, mice</div> <div>- cats are big problem for birds, Wellington example of trying to control</div> <div>- potential for marine mammals in the estuary</div>	<div>- removal of invasives through trapping and poison</div> <div>- plan for more crepuscular/nocturnal species like the native long-tailed bats</div> <div>-Any new residential developments - relocatable, experimental etc to be cat-free- E. Smith</div>	<div><a href="http://www.stuff.co.nz/the-press/news/7464952/Memories-of-Avon-Rivers-sea-elephant">http://www.stuff.co.nz/the-press/news/7464952/Memories-of-Avon-Rivers-sea-elephant</a></div> <div><a href="https://www.linz.govt.nz/crown-property/types-crown-property/christchurch-residential-red-zone/pest-animal-survey-results">https://www.linz.govt.nz/crown-property/types-crown-property/christchurch-residential-red-zone/pest-animal-survey-results</a></div>
fish	<div>- long history of recreational and subsistance fishing/exploitation</div> <div>- sharks used to have a way to Ōrua Paeroa</div>	<div>- freshwater eel (called tuna) and flounder (Pātiki) habitat</div> <div>- whitebait, mainly inanga, although it is debatable if eating ones caught here are safe to eat</div> <div>- eels and other fish started to return to the Avon within 4 months of restoration projects</div> <div>- trout for recreational fishing are introduced and eat native fish and inverts</div> <div>- salmon are more common in braided rivers, not Avon</div>	<div>- cleaner water for healthier aquatic populations</div>	<div><a href="https://www.tvnz.co.nz/one-news/new-zealand/new-species-of-fish-in-avon-river-6094240">https://www.tvnz.co.nz/one-news/new-zealand/new-species-of-fish-in-avon-river-6094240</a></div>
invertebrates	<div>- endemic freshwater crayfish</div>	<div>- crabs in estuary</div> <div>- pipi (mollusk)</div>		



<b>Restoration/Preservation</b>	<p><b>Past Restoration Projects Include:</b></p> <ul style="list-style-type: none"> <li>-reno mattress was added to banks in the 80's, a method used to soften the river banks and allow vegetation to grow in along the bank</li> <li>-1996 student lead initiative to replant river/restore native wildlife: 9 riparian planting areas added, mayflies, crayfish, mudfish reintroduced, recieved sustainable design award</li> <li>-Bexley developement had to be pushed through by developers in the first place</li> </ul>	<p><b>Existing reserves/Recent restoration projects include:</b></p> <ul style="list-style-type: none"> <li>-Anzac Drive Reserve: A small tributary that runs from travis wetland to the Avon 690 meters planted.</li> <li>-Horseshoe Lake: Preserved wetland habitat containing typical wetland plants such as raupo, rushes, flax, and sedges. Once a food harvesting place for Maori (fish, eels, birds)</li> <li>-Travis Wetland Nature Park</li> <li>-small Restoration Near Community Garden &amp; Community Garden</li> <li>-cockayne reserve - largest remaining riparian wetland fragment along the Avon</li> </ul> <p><b>Additional Projects</b></p> <ul style="list-style-type: none"> <li>-living labratory project- regenerate chch: connect area with university to share teaching and education, area as library. education adn stewardship</li> </ul>	<p><b>Ideas/Plans:</b></p> <ul style="list-style-type: none"> <li>-The 'Green Spine' &amp; the 3 Reaches</li> <li>-Avon Ōtākaro Forest Park</li> <li>-Waitakari Sanctuary: wildlife sanctuary connecting Travis Wetland with the Avon</li> <li>-Dark Sky Park: reduction of light pollution</li> <li>-Eden Project</li> <li>-need to keep and build upon stop bank systems</li> <li>-the river will require a lot of dredging: the fill could be used to build up land to be planted as native forest rather than converted into salt marsh</li> <li>-think about play experiences within cultural trail-learning while playing</li> </ul>	<p><a href="https://traviswetland.org.nz/2017/05/18/greening-the-red-zone-the-movie/">https://traviswetland.org.nz/2017/05/18/greening-the-red-zone-the-movie/</a></p> <p><a href="http://ketechristchurch.peoplesnetworknz.info/site/topics/show/1885-horseshoe-lake-reserve#.XDv_XFxKhPY">http://ketechristchurch.peoplesnetworknz.info/site/topics/show/1885-horseshoe-lake-reserve#.XDv_XFxKhPY</a></p> <p><a href="https://www.doc.govt.nz/globalassets/documents/science-and-technical/aqua9.pdf">https://www.doc.govt.nz/globalassets/documents/science-and-technical/aqua9.pdf</a></p> <p><a href="https://millionmetres.org.nz/open-project/Ōtākaro-avon-restoration-project/">https://millionmetres.org.nz/open-project/Ōtākaro-avon-restoration-project/</a></p> <p><a href="http://www.urbanwaterways.info/History/history.html">http://www.urbanwaterways.info/History/history.html</a></p>
<b>Ecosystems /transitions</b>	<p><b>Various ecosystems existed along the Avon River including:</b></p> <p>Dry plains</p> <ul style="list-style-type: none"> <li>- Houhere: piwakawaka-kohuhu, mid-age plains ecosystem</li> </ul> <p>Wet plains</p> <ul style="list-style-type: none"> <li>- Kahikatea: kereru</li> <li>- manatu, older plains ecosystem</li> <li>- Totara: bellbird - matai, older plains ecosystem</li> <li>- Pukio: pukeko - karamu, peat plains ecosystem</li> </ul> <p>Coastal plains</p> <ul style="list-style-type: none"> <li>- Akeake: riroriro - ngaio, old dune ecosystem</li> <li>- Pingao: kuaka - tauhinu, young dunes ecosystem</li> <li>- Oioi: tuturiwhatu, marsh ribbonwood, estuarine ecosystem</li> </ul> <p><b>Native plant communities include:</b></p> <ul style="list-style-type: none"> <li>- swamp/wetland</li> <li>- kahikatea/matai podocarp forest</li> <li>- beech and podocarp forest</li> <li>- dry woodland</li> <li>- grassland/shrubland</li> <li>- coastal salt marsh</li> <li>- coastal sand dune</li> </ul>	<ul style="list-style-type: none"> <li>- Avon Heathcote Estuary is a safe haven for birds</li> <li>- anecdotally, rowers say the river is gross</li> <li>- the land settled .5 - 1 meters post-earthquake</li> <li>- sedimentation + chemicals from farming + deforestation effects is one of the major ecosystem issues</li> <li>- economic benefit of the ecosystem</li> <li>- ecosystem stories are crucial</li> <li>- info + knowledge of stories</li> <li>- "we destroy wetlands faster than ever before in history" -Alan</li> <li>- estuaries are more productive than any other ecosystem</li> </ul>	<p><b>Restoration ecosystem goals:</b></p> <ul style="list-style-type: none"> <li>- wetland city within wetlands</li> <li>- riparian wetland</li> <li>- lowland forest</li> <li>- dune forest</li> <li>- dry forest</li> </ul> 	<p><a href="https://ccc.govt.nz/assets/Documents/The-Council/Plans-Strategies-Policies-Bylaws/Strategies/BiodiversityStrategy-5Part2Chapter11.pdf">https://ccc.govt.nz/assets/Documents/The-Council/Plans-Strategies-Policies-Bylaws/Strategies/BiodiversityStrategy-5Part2Chapter11.pdf</a></p> <p><a href="https://issuu.com/amandaanthony/docs/ecosystem_map/1?ff&amp;e=2872837/7204330">https://issuu.com/amandaanthony/docs/ecosystem_map/1?ff&amp;e=2872837/7204330</a></p>
<b>Mahinga Kai</b>	<ul style="list-style-type: none"> <li>- all of ChCh and the Ōtākaro/Avon river delta was a mahinga kai</li> </ul> <p><b>Mahinga Kai systems:</b></p> <ul style="list-style-type: none"> <li>- flaxland</li> <li>- grassland</li> <li>- herbfield</li> <li>- reedland</li> <li>- rushland</li> <li>- shrubland</li> <li>- sparsely vegetated</li> <li>- treeland</li> <li>- tussockland</li> </ul> <p><b>Ōtākaro means</b></p> <ul style="list-style-type: none"> <li>- concept of play</li> <li>- kids playing and learning through play while parents harvest</li> <li>- euro whaling ships traded for flax + birds</li> <li>- historically many temporary settlements, especially in oxbow</li> <li>- could only cultivate crops as low as the peninsula</li> <li>- tradable goods from region include pounamu (greenstone) from the west coast, eel, harakeke (flax)</li> <li>- post-European settlement, William "Cabbage" Wilson made his name growing cabbages (and other food plants) in the Avon Loop, new settlers depended on his seedlings to establish vegetable gardens and orchards; he later became Mayor</li> </ul>	<ul style="list-style-type: none"> <li>- Community garden exists near Shirley</li> <li>- Many existing fruit trees get harvested by visitors to the red zone</li> <li>- catching whitebait (fish) is a common recreational activity but there are a lot of concerns about water quality due to fecal coliforms</li> <li>- red zone area was rich in diversity and natural resources, yet was inaccessible prior to the earthquake, the earthquake changed this and could now allow for being able to engage with the mahinga kai again</li> <li>-There are several community gardens in and near the red zone - Richmond, Wainoni, New Brighton and at the Mahinga Kai Exemplar</li> <li>-Learning resources are almost finished as plug and play teaching resources for primary schools. Investigate: Inanga was developed last year and is now being incorporated into a Mahinga Kai resource by mana whenua. The fieldwork is done in the Mahinga Kai Exemplar.- E Smith</li> </ul>	<p>Debbie) as opposed to any specific/individual locations</p> <ul style="list-style-type: none"> <li>- proposals for future community gardens in the red zone and to keep existing fruiting trees</li> </ul> <p><b>Goals accroding to the Regenerate Christchurch Plan:</b></p> <ul style="list-style-type: none"> <li>- wairuatanga (connection to place and natural environment)</li> <li>- kaitiakitanga (custodianship, shared responsibility, respect for natural environment</li> <li>- manaakitanga (save, inclusive, and welcoming environs, productive landscapes)</li> <li>- whanaungatanga (social and whanau connections, community togetherness)</li> <li>- hauora (physical, spiritual, and mental health and wellbeing)</li> <li>- matauranga (education, cultural practices, growing and sharing of knowledge)</li> <li>- Aspiration to return ecosystem to healthy mahinga kai</li> <li>- "opportunity to expand upon massive wildlife corridor, but that still [won't be] enough" - Debbie</li> </ul> <p><b>Mahinga Kai specific place of learning could teach about:</b></p> <ul style="list-style-type: none"> <li>- forests, birds</li> <li>- medicinal traditions</li> <li>- tools + creative arts</li> <li>- what the natural environment can provide for life</li> <li>- teaching foundations/fundamentals/traditions through stories</li> <li>- how to tell stories</li> </ul>	<p><a href="https://www.stuff.co.nz/the-press/news/72961190/null">https://www.stuff.co.nz/the-press/news/72961190/null</a></p> <p><a href="http://www.avonotakaronetwork.co.nz/projects/community-food-growing-network.html">http://www.avonotakaronetwork.co.nz/projects/community-food-growing-network.html</a></p> <p><a href="https://drive.google.com/drive/u/1/folders/10IG2P8wbvp4Mvmt0XAi2-yXCyBUtmMHD">https://drive.google.com/drive/u/1/folders/10IG2P8wbvp4Mvmt0XAi2-yXCyBUtmMHD</a></p>
<b>Climate</b>	<ul style="list-style-type: none"> <li>- influenced by Southern Alps and westernly airflows</li> <li>- hot summers, cold winters, and lots of wind encouraged seasonal gathering + movement around the Ōtākaro mahinga kai</li> </ul>	<ul style="list-style-type: none"> <li>- mild, marine climate</li> <li>- sea level rise has increased 1.9 mm/year since 1925</li> </ul>	<ul style="list-style-type: none"> <li>- Sea-level predicted to rise between .65 and 1.9 m by 2115</li> <li>- increased flooding even prior to that</li> <li>- salinity increase further inland causing spawning ground of whitebait (inanga) to move upriver</li> <li>- Warmer climate with decreased rainfall + snowfall by 12%</li> </ul>	<p><a href="https://www.niwa.co.nz/our-science/climate/publications/regional-climatologies/canterbury;">https://www.niwa.co.nz/our-science/climate/publications/regional-climatologies/canterbury;</a></p> <p><a href="http://www.mfe.govt.nz/climate-change/how-climate-change-affects-nz/how-might-climate-change-affect-my-region/canterbury">http://www.mfe.govt.nz/climate-change/how-climate-change-affects-nz/how-might-climate-change-affect-my-region/canterbury</a></p>



WATER, WETLANDS & UPLANDS	PAST	PRESENT	FUTURE	RESOURCES
<b>Christchurch Waterways and Wetlands:</b>	<p><b>Maori Values and Principles:</b> Maori have strong cultural, traditional and historic links with wetlands and inland waterways, including lakes, rivers, streams, and springs. These Taonga (treasures) are spiritually significant and closely linked to the identities of the Tangata Whenua (people of the land). Water is the life giver, and it represents the blood of Papatuanuku, the Earth Mother, and the tears of Ranginui, the Sky Father.</p>	<p>Something else bubbled up with the liquefaction during the earthquakes - more than just "the memory of the land" as Di Lucas said. It was a cultural memory - quite subtle and for many still only slightly within their consciousness. It became expressed formally in recognition of Ngāi Tahu as a statutory partner in the recovery and we see the cultural narratives now expressed in the rebuild thanks to Debbie and her team. But it is also deeply embedded in the experience of those red zoned and living adjacent: its to do with a dawning of an appreciation of the concept of Tūrangawaewae - that emotional attachment to the land and the place you call home, that is more than just a piece of real estate. Its part of our identity. We get a sense of deep loss when we are dispossessed of this attachment and can maybe get a sense of what it was like for local Māori to be dispossessed of their mahinga kai. Red zoning also made us question our concepts of land ownership - we can never own the land we can only be its guardian and thus the concept of kaitiakitanga emerges into the consciousness. I do believe there has been a perceptible collective change in the consciousness of Christchurch residents - especially in the east - that now makes them more open to the cultural narratives of tangata whenua in Chch - in direct response to Rūaumoko's intervention. - E Smith</p>	<p><b>Opportunities:</b> · Practicing MAHINGA KAI In Avon River to create a restored native habitat with good quality water so there is an abundant source of mahinga kai, birdlife and native species. · Avon Corridor can be a cultural living laboratory: a destination for locals and visitors, where people can learn, experiment and explore new ideas and ways of living.</p>	<p><a href="https://www.waikatoregion.govt.nz/community/your-community/iwi/a-maori-perspective-te-ao-maori/maori-and-the-land/">https://www.waikatoregion.govt.nz/community/your-community/iwi/a-maori-perspective-te-ao-maori/maori-and-the-land/</a>  <a href="https://cccgovtnz.cwp.govt.nz/assets/Documents/Environment/Water/waterways-guide/Water-An-important-natural-resource.pdf">https://cccgovtnz.cwp.govt.nz/assets/Documents/Environment/Water/waterways-guide/Water-An-important-natural-resource.pdf</a>  <a href="http://www.aijcrnet.com/journals/Vol_2_No_10_October_2012/16.pdf">http://www.aijcrnet.com/journals/Vol_2_No_10_October_2012/16.pdf</a>  <a href="https://www.canterburyrowingclub.org.nz/about/">https://www.canterburyrowingclub.org.nz/about/</a>  <a href="https://www.regeneratechristchurch.nz/oarc/">https://www.regeneratechristchurch.nz/oarc/</a>  <a href="http://www.learnz.org.nz/water172/bg-standard-f/people-and-water">http://www.learnz.org.nz/water172/bg-standard-f/people-and-water</a>  <a href="https://my.christchurchcitylibraries.com/ti-kouka-whenua/otakaro/">https://my.christchurchcitylibraries.com/ti-kouka-whenua/otakaro/</a> <a href="https://ngaitahu.iwi.nz/ngai-tahu/the-settlement/settlement-offer/cultural-redress/ownership-and-control/mahinga-kai/">https://ngaitahu.iwi.nz/ngai-tahu/the-settlement/settlement-offer/cultural-redress/ownership-and-control/mahinga-kai/</a>  <a href="https://hakatours.com/maori-core-values">https://hakatours.com/maori-core-values</a>  <a href="https://cccgovtnz.cwp.govt.nz/assets/Documents/Environment/Water/waterways-guide/Water-An-important-natural-resource.pdf">https://cccgovtnz.cwp.govt.nz/assets/Documents/Environment/Water/waterways-guide/Water-An-important-natural-resource.pdf</a>  <a href="https://www.canterbury.ac.nz/media/documents/oexp-science/geography/community-engagement/geog402/2013/A-Future-for-the-Avon-River.pdf">https://www.canterbury.ac.nz/media/documents/oexp-science/geography/community-engagement/geog402/2013/A-Future-for-the-Avon-River.pdf</a>  <a href="https://www.ccc.govt.nz/environment/water">https://www.ccc.govt.nz/environment/water</a>  <a href="https://www.ccc.govt.nz/services/water-and-drainage/stormwater-and-drainage/policy-and-strategy/protocol-for-surface-water-management/">https://www.ccc.govt.nz/services/water-and-drainage/stormwater-and-drainage/policy-and-strategy/protocol-for-surface-water-management/</a>  <a href="https://www.regeneratechristchurch.nz/oarc/">https://www.regeneratechristchurch.nz/oarc/</a>  <a href="http://www.mfe.govt.nz/publications/environmental-reporting/environment-new-zealand-2007-chapter-2-our-environment-and-1">http://www.mfe.govt.nz/publications/environmental-reporting/environment-new-zealand-2007-chapter-2-our-environment-and-1</a>  <a href="https://www.ccc.govt.nz/environment/water/water-policy-and-strategy/waterways-wetlands-and-drainage-guide/">https://www.ccc.govt.nz/environment/water/water-policy-and-strategy/waterways-wetlands-and-drainage-guide/</a>  <a href="https://www.regeneratechristchurch.nz/oarc/">https://www.regeneratechristchurch.nz/oarc/</a>  <a href="https://www.canterbury.ac.nz/media/documents/oexp-science/geography/community-engagement/geog402/2013/A-Future-for-the-Avon-River.pdf">https://www.canterbury.ac.nz/media/documents/oexp-science/geography/community-engagement/geog402/2013/A-Future-for-the-Avon-River.pdf</a>  <a href="https://www.ccc.govt.nz/services/water-and-drainage/stormwater-and-drainage/policy-and-strategy/protocol-for-surface-water-management/">https://www.ccc.govt.nz/services/water-and-drainage/stormwater-and-drainage/policy-and-strategy/protocol-for-surface-water-management/</a></p>
	<p><b>Geology and The Avon River:</b> · Movement of the braided Waimakariri River has been the dominant force to shape the Christchurch area and the surrounding Canterbury Plains. The river's interaction with the coastline and the volcanic rock of the Port Hills formed a landscape of large freshwater and saltwater wetlands, small meandering waterways, river plains, sand, dunes, and old gravel beds. · The Otakaro/Avon River is one of the major rivers cut through Christchurch, considered a source of mahinga kai and transportation for early Ngai Tuahuriri and colonial pioneers.</p>	<p><b>Waterways Today</b> The Avon River is one of two major rivers that flow into the Avon-Heathcote Estuary. The water quality in the Upper Avon and its tributaries are pristine, reflecting the quality of the water in the aquifers that feed the springs. However, as the river flows through the city, its quality deteriorates due to urbanization and human activities. Other issues include: Significant water level changes caused by coastal tides in the lower reaches and inland wetlands, higher groundwater levels higher the risk of flooding and water quality issues caused by contaminants. Recently, number of wetlands has been constructed in Christchurch and many are under the planning process realizing their importance in resorting habitat and improving water quality.</p>	<p><b>Opportunities:</b> · Improving water quality and ecological health in the river environment through innovative wetland design and storm-water management solutions. · Regenerate Christchurch Project : draft Regeneration Plan presents a bold vision for the future of the Otakaro Avon River Corridor, emphasizing a strengthened connection between people, the river and the land through public engagement, towards creating restored natural environment and creating experiences that link our city to the sea. · Strategies needed to adapt to the challenges and opportunities presented by natural hazards, climate change, and flooding. · Integrating ecological planning principles to the design and development of built environment.</p>	
	<p><b>2010/2011 Earthquake Impacts:</b> The initial 7.4 September quake of 2010 was the one that first inflicted the real damage in the red zone, the Feb 2011 quake just compounded it and extended it. Most housing and land in the east was critically damaged in 2010. In 2011, an earthquake measuring 6.3, struck Christchurch. The service infrastructure of the city was severely damaged including lacking power and water. The majority of homes were flooded by a combination of broken sewage/water pipes and liquefaction and the drinking water supplies contaminated. The waterways and wetlands got contaminated, and existing aquatic ecosystems was greatly disturbed causing significant loss of native habitat and species.</p>	<p><b>2010/2011 Earthquake Impacts:</b> Urban waterways are highly polluted, particularly with the remnant contaminants from the deadly earthquake as well as heavy metals from roof and road storm-water runoff.</p>		
	<p><b>The Recreational Corridor:</b> · The Otakaro/Avon River was also highly regarded by Waitaha, Ngati Mamoe, and Ngai Tahu as a site for Mahinga Kai. Instead of settling along the Otakaro/Avon River, people, generally visited seasonally to gather and preserve food that could be eaten during the colder months. · For Maori communities the Avon corridor has always been a source for habitat and spawning grounds for native plants, birds, and fish, building and weaving materials such as Raupo and Harakeke (flax), medicines and dyes used for seasoning timber and restoring precious artifacts and a source of food and a movement. · A rich history of Rowing for the city - Christchurch Boating Club in 1907-1908, Canterbury Rowing Club on the Avon River, Christchurch (1909) and Women rowing on the Avon River in 1901. -It was also the local swimming hole for kids in summer - E. Smith -Also includes a fixation within land drainage practice by local authorities on reducing flood flow friction by cutting down or thinning riparian native plants like harakeke - eg in upper reaches of red zone. There are conflicting priorities here that need resolution!! - E. Smith rituals, travel, food "and resources" fibre, wood, dyes, etc... -E. Smith</p>	<p><b>Urbanization Impacts on Water and Wetlands:</b> Urbanization impacts on waterways and wetlands overtime include: Loss of wetland &amp; riparian buffers, changes in water quality, loss of habitat diversity, increased pollution levels, increased hard surfaces, a shift in energy source, reduction in biological diversity</p>		



	<b>The Recreational Corridor:</b> <ul style="list-style-type: none"> <li>· The Otakaro/Avon River was also highly regarded by Waitaha, Ngati Mamoe, and Ngai Tahu as a site for Mahinga Kai. Instead of settling along the Otakaro/Avon River, people, generally visited seasonally to gather and preserve food that could be eaten during the colder months.</li> <li>· For Maori communities the Avon corridor has always been a source for habitat and spawning grounds for native plants, birds, and fish, building and weaving materials such as Raupo and Harakeke (flax), medicines and dyes used for seasoning timber and restoring precious artifacts and a source of food and a movement.</li> <li>· A rich history of Rowing for the city - Christchurch Boating Club in 1907-1908, Canterbury Rowing Club on the Avon River, Christchurch (1909) and Women rowing on the Avon River in 1901.</li> </ul>	<b>The Recreational Corridor:</b> <p>Avon River Corridor currently offers:</p> <ul style="list-style-type: none"> <li>· Walking and biking trails</li> <li>· Canoeing and boating</li> </ul>		
<b>Management Practice: Conservation and Restoration</b>	<b>Maori Values and Principles:</b> <ul style="list-style-type: none"> <li>· Kaitiakitanga: is about guardianship and the connection between people and the natural world. A fundamental concept of the guardianship of a resource for future generations.</li> <li>· Mahinga kai: traditional food and other natural resources and the places where those resources are obtained.</li> </ul>	<b>Six Values of Water Management</b> <p>Emphasizing on these six values in current water management practice - ecology, landscape, recreation, heritage and culture, drainage</p>	<b>Maori Values and Principles:</b> <p>Mahinga Kai Framework into water management and stewardship. A great example could be Christchurch regeneration plan</p>	<a href="http://www.learnz.org.nz/water172/bg-standard-fi/people-and-water">http://www.learnz.org.nz/water172/bg-standard-fi/people-and-water</a> <a href="https://my.christchurchcitylibraries.com/ti-kouka-whenua-otakaro/">https://my.christchurchcitylibraries.com/ti-kouka-whenua-otakaro/</a> <a href="https://ngaitahu.iwi.nz/ngai-tahu/the-settlement/settlement-offer/cultural-redress/ownership-and-control/mahinga-kai/">https://ngaitahu.iwi.nz/ngai-tahu/the-settlement/settlement-offer/cultural-redress/ownership-and-control/mahinga-kai/</a> <a href="https://hakatours.com/maori-core-values">https://hakatours.com/maori-core-values</a>
	<b>Christchurch Drainage Board:</b> <ul style="list-style-type: none"> <li>· The Christchurch District Drainage Act 1875: drainage of the City of Christchurch and surrounding districts. Storm-water sewers, natural creeks, drains and side-channels, being discharged into the Avon, Heathcote, and Styx rivers.</li> <li>· A system of sewers for the removal of sewage proper was designed. The revenue of the board is derived from rates made by special orders on the various local bodies within its jurisdiction, under the Rating Act of 1894.</li> <li>· 1989 local government reforms, Christchurch City Council took over the functions of the Christchurch Drainage Board.</li> </ul>	<b>Current Wetlands and Storm Water Management Projects:</b> <p>Travis Wetland; Bexley Wetland; Horseshoe Lake; The Bricks; South New Brighton; Avon Heathcote Estuary; Avon River</p>	<b>Stormwater Management Planning:</b> <p>Intergrading mahinga kai concept in stormwater management, flooding mitigation and planting design</p>	
<b>Ecological Literacy &amp; Community Engagement</b>	<b>Maori Values and Principles:</b> <ul style="list-style-type: none"> <li>· “Ko te wai te ora nga mea katoa - Water is the life giver of all things.”</li> <li>· water has its own mauri (life force) and spirit, is linked to identity, spiritual qualities (mauri and wairua) can be badly affected by the misuse of water.</li> <li>· it gives tangata whenua (people of the land) life and food, Maori found fish, birds and edible roots in wetlands. They made cakes from the pollen of raupo. They used flax for weaving, and dried moss for bedding.</li> </ul>	<b>Maori Values and Principles:</b> <p>Over years the major environmental concerns have shifted over the past few years from air quality, waste disposal, industrial pollution, and introduced pests, weeds, and diseases to water pollution, flooding control, sea level rise, and climate change</p>	<b>Maori Values and Principles:</b> <ul style="list-style-type: none"> <li>· Opportunities of restoring riverbank area in/along Avon River for spiritual connections, native species, or even traditional Maori farming for food and weaving materials.</li> <li>· Maori culture exhibition/art installations along the river.</li> </ul>	
	<b>Promoting Environmental Knowledge:</b> <p>community efforts include restoration, planting, monitoring, education, and reporting damage and pollution incidents.</p>	<b>Promoting Environmental Knowledge:</b> <ul style="list-style-type: none"> <li>· Research, visioning and feedback of Regenerative Chch plan.</li> <li>· Self-organized education, monitoring and restoration projects.</li> <li>· Policies regarding surface water management including Community Education Plan, Awareness Education Plan, Schools education plan, ICMP Education Plan</li> </ul>	<b>Promoting Environmental Knowledge:</b> <ul style="list-style-type: none"> <li>· Implementation of the policies and strategies.</li> <li>· Closer connections and cooperations between public sectors and local communities.</li> <li>· Continue to review and participate in the Regenerative Chch Plan.</li> <li>· Self-initiated restoration/education programs, with the help of social media or AI.</li> </ul>	
	<b>Initiatives and Projects:</b> <p>policies e.g. Waterways, wetlands and drainage guide 2003 by CCC, Protocol for surface water management 2006 by CCC and ECan, Integrated Catchment Management Plan 2008 by CCC</p>	<b>Initiatives and Projects:</b> <ul style="list-style-type: none"> <li>· Learning Through Action (Education for Sustainability LEOTC Programmes) for schools by CCC</li> <li>· City water, waterways and wetlands.</li> <li>· Policies e.g. Surface Water Strategy 2009 – 2039 by CCC</li> <li>· Organization e.g. Travis Wetland Trust, National Wetland Trust of New Zealand</li> <li>· Education centers on site e.g. Travis Wetland Six Values of Water Management</li> </ul>	<b>Initiatives and Projects:</b> <ul style="list-style-type: none"> <li>· Project should focus more on adaptive designs in face of climate change, rising flooding risk, sea level rise, and other natural disturbances.</li> <li>· Great opportunities in/along Red Zone regarding stormwater management and treatment facilities before the water is discharged to Avon River.</li> </ul>	
<b>Feedback from the Workshop:</b>	Changing shape of the Avon River corridor over time - (urbanization, natural process, recreational amenity, and earthquake event)	<b>Tidal changes</b> and stormwater events	Exploring various scenarios of Sea Level Rise and the impacts both short and long term in waterways and wetlands	
	The geological formation of waterways referring to <b>Sea Level Rise</b> (past as an implication of the future)	Current stormwater management and wetland design techniques in response to mitigate flooding and climate change	<b>Educate</b> communities about Sea Level Rise and <b>Climate Change Impacts</b> in a creative way and without scaring them away	
	Including the “Black Map” as a visual narrative to represent the changes in waterways, wetlands, and vegetation	Existing stopbanks issues related to flooding mitigation in some part of the corridor.	Exploring multiple values of green spaces, waterways and wetlands.	
	Avon river edges (before and after) - Hard and soft edge and their impacts on habitat and overall ecosystem		Stopbanks issue: Careful design of stopbanks in terms of placement and stormwater management.	
			The earthquake has created an opportunity for the city to establish new relationships between people, the land and the river. Exploring new possibilities to engage with the river will establish the significance of the Avon river as an iconic landmark for the city of Christchurch. Interesting comment on how the Avon River become an iconic landmark for the city - after earthquake.	



CULTURAL LANDMARKING TURANGAWAEWAE	PAST	PRESENT	FUTURE	RESOURCES
<p><i>NARRATIVE: Māori life along the river corridor was not just a source of collecting food but a framework for a way of life. Places shifted with the seasons. Daily life was along large areas. Systems influencing this way of life were at varied scales extending beyond stewardship boundaries. Today the river serves as recreational and play corridor inclusive of multiple cultures.</i></p>			<p>Excellent resource map on page 15 of Draft Ōtākaro Avon River Corridor Regeneration Plan:  <a href="https://engage.regeneratechristchurch.nz/Draft-OARC-Regeneration-Plan">https://engage.regeneratechristchurch.nz/Draft-OARC-Regeneration-Plan</a></p>	
Land as Food Gathering				Ngāi Tahu Atlas
Puāri	<p>Puāri is a kāinga nohoanga (settlement) and kāinga mahinga kai (food-gathering place) on the banks of Ōtākaro (the Avon River) in Christchurch. Puāri refers to a large area within the extensive wetlands that later became the central city, and is centred on the riverbanks encompassing the sites around what is now Durham St, which became occupied by the Provincial Chambers, Law Courts, the Christchurch Town Hall, and Victoria Square. Puāri remained one of the principal kāinga mahinga kai in Christchurch, right up to the Ngāi Tahu signing of the Canterbury Purchase in 1848. Twenty years later Pita Te Hori, the first Upoko Rūnanga of Ngāi Tūāhuriri, claimed Puāri as a mahinga kai. However, his claim was dismissed, as the Crown had already alienated the land. A further unsuccessful claim to Puāri was brought as part of the wider Ngai Tahu Claim (Wai 27) in 1986.</p>			Ngāi Tahu Atlas
Waikākāriki & Te Oranga	<p>Waikākāriki (Horseshoe Lake) was part of the extensive network of kāinga mahinga kai (food-gathering places) located throughout the extensive wetlands of Ōtākaro (the Avon River) and Ōpāwaho (the Heathcote River). Whakaomaraki is the branch of the Ōtākaro at Waikākāriki. In 1868 Aperehama Te Aika from Tuahiwi claimed a fishing reserve at Waikākāriki in the Native Land Court, which the Court dismissed on the basis that it had already been sold. Waikākāriki/Horseshoe Lake was the site of a significant settlement called Te Oranga. A tributary to the Ōtākaro, Waikākāriki was rich in wildlife and natural resources and was a significant site for mahinga kai.</p>			Ngāi Tahu Atlas
Te Kai-a-Te-Karoro	<p>Te Kai-a-Te-Karoro is a pā located on Te Karoro Karoro (South Brighton Spit) near South New Brighton Park. Archaeological remains of the pā were visible until the early 1900s. Karoro is both the Māori name for seagulls in general, and specifically the southern black-backed gull (<i>Larus dominicanus</i>) prevalent throughout the area. Te Kai-a-Te-Karoro was one of several Ngāi Tahu settlements located near Te Ihutai (the Avon-Heathcote Estuary) that took advantage of the estuary's rich mahinga kai resources. In c.1920 eeling weirs, made from mānuka stakes and located half a mile upstream, were reportedly removed by yachting enthusiasts.</p>			Ngāi Tahu Atlas
Tamahika	Tamahika are the mud-flats at Te Ihutai (the Avon-Heathcote estuary).	Tamahika are the mud-flats at Te Ihutai (the Avon-Heathcote estuary).		Ngāi Tahu Atlas
Ngai Tuahuriri		Ngai Tuahuriri are the mana whenua (tribe with authority over the land) for Christchurch. They are responsible for determining the appropriate protocols and customs for this area.		Ngāi Tahu Atlas
Ōtākaro	<p>Ōtākaro (Avon River)was an important part of the interconnected network of traditional travel routes, particularly as an access route through the swampy marshlands of Christchurch. The mouth of the Ōtākaro was a permanent mahinga kai, and the river supported numerous kāinga mahinga kai (food-gathering places). Foods gathered included tuna (eel), inaka (whitebait), kōkopu (native trout), kanakana (lamprey), waikōura (freshwater crayfish), waikākahi (freshwater mussel), tuere (blind eel), and pātiki (flounders). A variety of birds were also harvested on the river, including pūtakitaki (paradise ducks), pārerā (grey duck), raipo (New Zealand scaup), tataa (brown duck), and pāteke (teal). On the banks of the rivers, plant-based foods such as aruhe (bracken fernroot) and kāuru (root of the tī kouka) were also gathered.</p>			Ngāi Tahu Atlas
Ōtautahi	<p>Although Ōtautahi is the general Māori name used nowadays for Christchurch, it is specifically a kāinga nohoanga (settlement) and kāinga mahinga kai (food-gathering place) on the banks of the Ōtākaro (Avon River). In 1868 Hakopa Te Ata-o-Tū from Ngāi Tūāhuriri claimed Ōtautahi as a mahinga kai in the Native Land Court, which the Court dismissed on the basis that the land had already been sold. During the 1879 Smith-Nairn Royal Commission of Inquiry into the Ngāi Tahu land claims, Ngāi Tūāhuriri kaumatua recorded Ōtautahi as a kāinga nohoanga, kāinga tūturu, and kāinga mahinga kai. The foods gathered here included tuna (eels), inaka (whitebait), mata (juvenile whitebait), kōkopu (native trout), koukoupāra (giant kōkopu), pārerā (grey duck), pūtakitaki (paradise duck), raipo (New Zealand scaup), tataa (brown duck), pāteke (brown teal), pora ('Māori turnip') and aruhe (bracken fernroot).</p>			Ngāi Tahu Atlas
Ihutai Native Reserve 900	<p>One of 15 fishing easements set aside by the Native Land Court in 1868 to allow Ngāi Tahu to continue the practice of mahinga kai. In 1887 the Native Land Court investigated the title under the provisions of the Native Equitable Owners Act 1886, to determine all those who held a beneficial right to the reserve. The court found that those entitled were the owners who had appeared on the 1868 Kaiapoi list and the successors to those on the list who were deceased. In 1956, the reserve was compulsorily acquired by the Crown under the Public Works Act 1928 for a sewage treatment works and vested in the Christchurch Drainage Board.</p>			Ngāi Tahu Atlas
Te Waihora/Lake Ellesmere	<p>Te Waihora/Lake Ellesmere has been a historic guarentee site for Mahinga Kai food gathering. Presently Environment Canturbury Regional Council is addressing upland farming practices to enhance the Lake water quality, as the lake is a polluted low habitat lake. Restoring the ecology and biodiversity of the Lake restores cultural pride and Kaitiakitanga - guardianship over natural resource by Canterbury farmers.</p>			<a href="https://www.stuff.co.nz/the-press/business/68674419/null">https://www.stuff.co.nz/the-press/business/68674419/null</a>
Kaiopi	A fishing market on current day Kilmore Street from harvest along the river.			Canterbury Museum



Ōruapaeroa	Ōruapaeroa is the traditional name generally applied to the extensive network of wetlands that once existed throughout the Christchurch suburb of New Brighton, of which only Travis Swamp now remains. Ōruapaeroa was one of the numerous kāinga mahinga kai (food-gathering places) located throughout the wetlands surrounding the Ōtākaro (Avon River) and Ōpāwaho (Heathcote River). It is reported that whare (houses) were still standing at Ōruapaeroa in the mid-19th century, until they were burnt down in 1862. Ōruapaeroa supported an abundance of native fish and birdlife, and was an important kāinga mahinga kai for local Ngāi Tahu hapū and whānau.			Ngāi Tahu Atlas
Te Ihutai	Te Ihutai (the Avon-Heathcote Estuary) was part of a larger fishery used by Ngāi Tahu. Traditionally, a number of hapū and whānau used Te Ihutai, which was renowned for its abundance and variety of fish and shellfish, including tuna (eels), kanakana (lamprey), inaka (whitebait), pātiki (flounder), and pipi. Several nearby kāinga nohoanga (settlements) took advantage of the estuary's rich food resources, with caves along the base of the nearby foothills providing necessary shelter. The estuary itself was the gateway to the vast comprehensive network of wetlands that once extended throughout the Canterbury region, with the Ōtākaro (the Avon River) and Ōpāwaho (the Heathcote River) being the primary access routes.			Ngāi Tahu Atlas
Land as Orientation to Place and Ancestry				
Rapanui	Rapanui is the Māori name for Shag Rock, a sea stack that once stood at the entrance of Te Ihutai (the Avon-Heathcote Estuary). Rapanui was a guiding stone for those entering the estuary, which in pre-Pākehā times was rich in birdlife, shellfish, harakeke (flax), flatfish, and tuna (eels).	Rapanui was halved in size by the February 2011 Christchurch earthquake. It remain a landmark at Telhutaī's entrance.		
Tautahi	Name of a pa (village) along the Avon/Otakaro that			
Mokiki	Reed boats crafted from Bullrush used to float resouces downstream			Canterbury Museum
Pou	Carved poles that represent messages, symbols, and stories. The vertical element bridges the spiritual world and connects Ranginui (Sky Father) with Papatuanuku (Earth Mother)			Canterbury Museum
Nor'wester	The great wind of the Northwest that was an orientator. Te Hau Kai Tangata 'the wind that devours humankind' Locating oneself requires a genealogy of relationships. The wind is linked to the western mountains but also the winds effects on lands.			Canterbury Museum
Mount Grey/Maukatere Conservation Area	The Nor'wester blows from Mtn Maungatere/Grey.			Canterbury Museum
Te Waka o Aoraki	Formation of the South Island : the four brothers Aoraki, Rakirua, Rakiroa, and Rarakiro crashed their canoe back down to earth with their step-mother Papatuanuku. The canoe of Aoraki became their permanent home. Brothers turned to stone and represent Aoraki (Mount Cook), Mount Teichelmann, Mount Dampier, Mount Tasman.			
Rākaihautū	Creation of waterways in the South Island : Rākaihautū was an explorer who navigated to the South Island and carved out lakes and rivers with his digging stick,ko. Te Waihora (Lake Ellesmere) - the fish basket of Rākaihautū and Wairewa (Lake Forsyth). Te Pataka o Rākaihautū (Banks Peninsula) served as his storefront.			
Story telling	Oral history past down intergenerationally through songs that records life, lessons, locations, and heritage.			Workshop Conversation
Whakapapa		Genealogical table, lineage, descent. Importance of genealogies in Māori society in terms of leadership, land and fishing rights, kinship and status.		Maori Dictionary
Mana whenua		Power from the land, authority over land or territory, jurisdiction over land or territory - power associated with possession and occupation of tribal land		Maori Dictionary
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Otakaro River	"The feathers that lead you to the black bird" Describing the role of the river as a connection to the estuary			Workshop Conversation





CULTURAL LANDMARKING TURANGAWAEWAE	PAST	PRESENT	FUTURE	RESOURCES
<p><i>NARRATIVE: Māori life along the river corridor was not just a source of collecting food but a framework for a way of life. Places shifted with the seasons. Daily life was along large areas. Systems influencing this way of life were at varied scales extending beyond stewardship boundaries. Today the river serves as recreational and play corridor inclusive of multiple cultures.</i></p>			<p><i>Excellent resource map on page 15 of Draft Ōtākaro Avon River Corridor Regeneration Plan: https://engage.regeneratechristchurch.nz/Draft-OARC-Regeneration-Plan</i></p>	
Land as Food Gathering				Ngāi Tahu Atlas
Puāri	<p>Puāri is a kāinga nohoanga (settlement) and kāinga mahinga kai (food-gathering place) on the banks of Ōtākaro (the Avon River) in Christchurch. Puāri refers to a large area within the extensive wetlands that later became the central city, and is centred on the riverbanks encompassing the sites around what is now Durham St, which became occupied by the Provincial Chambers, Law Courts, the Christchurch Town Hall, and Victoria Square. Puāri remained one of the principal kāinga mahinga kai in Christchurch, right up to the Ngāi Tahu signing of the Canterbury Purchase in 1848. Twenty years later Pita Te Hori, the first Upoko Rūnanga of Ngāi Tūāhuriri, claimed Puāri as a mahinga kai. However, his claim was dismissed, as the Crown had already alienated the land. A further unsuccessful claim to Puāri was brought as part of the wider Ngai Tahu Claim (Wai 27) in 1986.</p>			Ngāi Tahu Atlas
Waikākāriki & Te Oranga	<p>Waikākāriki (Horseshoe Lake) was part of the extensive network of kāinga mahinga kai (food-gathering places) located throughout the extensive wetlands of Ōtākaro (the Avon River) and Ōpāwaho (the Heathcote River). Whakaomaraki is the branch of the Ōtākaro at Waikākāriki. In 1868 Aperehama Te Aika from Tuahiwi claimed a fishing reserve at Waikākāriki in the Native Land Court, which the Court dismissed on the basis that it had already been sold. Waikākāriki/Horseshoe Lake was the site of a significant settlement called Te Oranga. A tributary to the Ōtākaro, Waikākāriki was rich in wildlife and natural resources and was a significant site for mahinga kai.</p>			Ngāi Tahu Atlas
Te Kai-a-Te-Karoro	<p>Te Kai-a-Te-Karoro is a pā located on Te Karoro Karoro (South Brighton Spit) near South New Brighton Park. Archaeological remains of the pā were visible until the early 1900s. Karoro is both the Māori name for seagulls in general, and specifically the southern black-backed gull (<i>Larus dominicanus</i>) prevalent throughout the area. Te Kai-a-Te-Karoro was one of several Ngāi Tahu settlements located near Te Ihutai (the Avon-Heathcote Estuary) that took advantage of the estuary's rich mahinga kai resources. In c.1920 eeling weirs, made from mānuka stakes and located half a mile upstream, were reportedly removed by yachting enthusiasts.</p>			Ngāi Tahu Atlas
Tamahika	Tamahika are the mud-flats at Te Ihutai (the Avon-Heathcote estuary).	Tamahika are the mud-flats at Te Ihutai (the Avon-Heathcote estuary).		Ngāi Tahu Atlas
Ngai Tuahuriri		Ngai Tuahuriri are the mana whenua (tribe with authority over the land) for Christchurch. They are responsible for determining the appropriate protocols and customs for this area.		Ngāi Tahu Atlas
Ōtākaro	<p>Ōtākaro (Avon River)was an important part of the interconnected network of traditional travel routes, particularly as an access route through the swampy marshlands of Christchurch. The mouth of the Ōtākaro was a permanent mahinga kai, and the river supported numerous kāinga mahinga kai (food-gathering places). Foods gathered included tuna (eel), inaka (whitebait), kōkopu (native trout), kanakana (lamprey), waikōura (freshwater crayfish), waikākahi (freshwater mussel), tuere (blind eel), and pātiki (flounders). A variety of birds were also harvested on the river, including pūtakitaki (paradise ducks), pārera (grey duck), raipo (New Zealand scaup), tataa (brown duck), and pāteke (teal). On the banks of the rivers, plant-based foods such as aruhe (bracken fernroot) and kāuru (root of the tī kouka) were also gathered.</p>			Ngāi Tahu Atlas
Ōtautahi	<p>Although Ōtautahi is the general Māori name used nowadays for Christchurch, it is specifically a kāinga nohoanga (settlement) and kāinga mahinga kai (food-gathering place) on the banks of the Ōtākaro (Avon River). In 1868 Hakopa Te Ata-o-Tū from Ngāi Tūāhuriri claimed Ōtautahi as a mahinga kai in the Native Land Court, which the Court dismissed on the basis that the land had already been sold. During the 1879 Smith-Nairn Royal Commission of Inquiry into the Ngāi Tahu land claims, Ngāi Tūāhuriri kaumātua recorded Ōtautahi as a kāinga nohoanga, kāinga tūturu, and kāinga mahinga kai. The foods gathered here included tuna (eels), inaka (whitebait), mata (juvenile whitebait), kōkopu (native trout), koukoupapa (giant kōkopu), pārera (grey duck), pūtakitaki (paradise duck), raipo (New Zealand scaup), tataa (brown duck), pāteke (brown teal), pora ('Māori turnip') and aruhe (bracken fernroot).</p>			Ngāi Tahu Atlas
Ihutai Native Reserve 900	<p>One of 15 fishing easements set aside by the Native Land Court in 1868 to allow Ngāi Tahu to continue the practice of mahinga kai. In 1887 the Native Land Court investigated the title under the provisions of the Native Equitable Owners Act 1886, to determine all those who held a beneficial right to the reserve. The court found that those entitled were the owners who had appeared on the 1868 Kaiapoi list and the successors to those on the list who were deceased. In 1956, the reserve was compulsorily acquired by the Crown under the Public Works Act 1928 for a sewage treatment works and vested in the Christchurch Drainage Board.</p>			Ngāi Tahu Atlas
Te Waihora/Lake Ellesmere	<p>Te Waihora/Lake Ellesmere has been a historic guerentee site for Mahinga Kai food gathering. Presently Environment Canturbury Regional Council is addressing upland farming practices to enhance the Lake water quality, as the lake is a polluted low habitat lake. Restoring the ecology and biodiversity of the Lake restores cultural pride and Kaitiakitanga - guardanship over natural resource by Canterbury farmers.</p>			https://www.stuff.co.nz/the-press/business/68674419/null
Kaiopi	A fishing market on current day Kilmore Street from harvest along the river.			Canterbury Museum

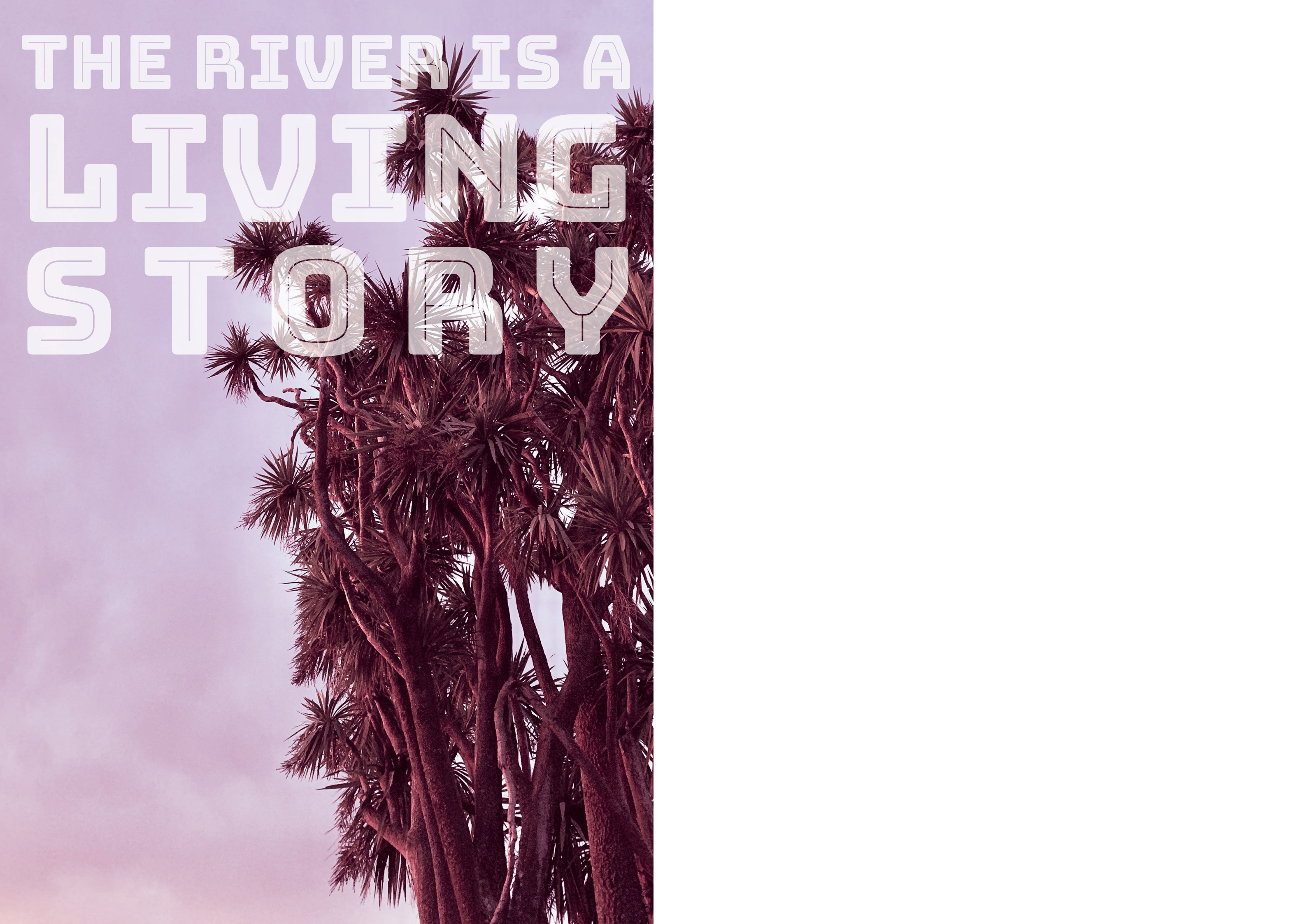


Ōruapaeroa	Ōruapaeroa is the traditional name generally applied to the extensive network of wetlands that once existed throughout the Christchurch suburb of New Brighton, of which only Travis Swamp now remains. Ōruapaeroa was one of the numerous kāinga mahinga kai (food-gathering places) located throughout the wetlands surrounding the Ōtākaro (Avon River) and Ōpāwaho (Heathcote River). It is reported that whare (houses) were still standing at Ōruapaeroa in the mid-19th century, until they were burnt down in 1862. Ōruapaeroa supported an abundance of native fish and birdlife, and was an important kāinga mahinga kai for local Ngāi Tahu hapū and whānau.			Ngāi Tahu Atlas
Te Ihutai	Te Ihutai (the Avon-Heathcote Estuary) was part of a larger fishery used by Ngāi Tahu. Traditionally, a number of hapū and whānau used Te Ihutai, which was renowned for its abundance and variety of fish and shellfish, including tuna (eels), kanakana (lamprey), inaka (whitebait), pātiki (flounder), and pipi. Several nearby kāinga nohoanga (settlements) took advantage of the estuary's rich food resources, with caves along the base of the nearby foothills providing necessary shelter. The estuary itself was the gateway to the vast comprehensive network of wetlands that once extended throughout the Canterbury region, with the Ōtākaro (the Avon River) and Ōpāwaho (the Heathcote River) being the primary access routes.			Ngāi Tahu Atlas
Land as Orientation to Place and Ancestory				
Rapanui	Rapanui is the Māori name for Shag Rock, a sea stack that once stood at the entrance of Te Ihutai (the Avon-Heathcote Estuary). Rapanui was a guiding stone for those entering the estuary, which in pre-Pākehā times was rich in birdlife, shellfish, harakeke (flax), flatfish, and tuna (eels).	Rapanui was halved in size by the February 2011 Christchurch earthquake. It remain a landmark at Telhutai's entrance.		
Tautahi	Name of a pa (village) along the Avon/Otakaro that			
Mokiki	Reed boats crafted from Bullrush used to float resouces downstream			Canterbury Museum
Pou	Carved poles that represent messages, symbols, and stories. The vertical element bridges the spiritual world and connects Ranginui (Sky Father) with Papatuanuku (Earth Mother)			Canterbury Museum
Nor'wester	The great wind of the Northwest that was an orientator. Te Hau Kai Tangata 'the wind that devours humankind' Locating oneself requires a genealogy of relationships. The wind is linked to the western mountains but also the winds effects on lands.			Canterbury Museum
Mount Grey/Maukatere Conservation Area	The Nor'wester blows from Mtn Maungatere/Grey.			Canterbury Museum
Māori World View				
Te Waka o Aoraki	Formation of the South Island : the four brothers Aoraki, Rakirua, Rakiroa, and Rarakiro crashed their canoe back down to earth with their step-mother Papatuanuku. The canoe of Aoraki became their permanent home. Brothers turned to stone and represent Aoraki (Mount Cook), Mount Teichelmann, Mount Dampier, Mount Tasman.			
Rākaihautū	Creation of waterways in the South Island : Rākaihautū was an explorer who navigated to the South Island and carved out lakes and rivers with his digging stick,ko. Te Waihora (Lake Ellesmere) - the fish basket of Rākaihautū and Wairewa (Lake Forsyth). Te Pataka o Rākaihautū (Banks Peninsula) served as his storefront.			
Story telling	Oral history past down intergenerationally through songs that records life, lessons, locations, and heritage.			Workshop Conversation
Whakapapa		Genealogical table, lineage, descent. Importance of genealogies in Māori society in terms of leadership, land and fishing rights, kinship and status.		Maori Dictionary
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ENVIRONMENT & ADAPTATION	PAST	PRESENT	FUTURE	RESOURCES
Human Experience	Story mapping - As suggested in "Mapping Memories in the Red Zone" an interactive map sharing stories from previous Red Zone residents could help preserve the legacy of the area. Many of these stories reflect community action and organizing efforts by residents.			<a href="http://www.ceismic.org.nz">http://www.ceismic.org.nz</a> , "Mapping Memories in the Red Zone" - Quaid, Laura et al., University of Canterbury, <a href="http://www.quakestories.govt.nz">http://www.quakestories.govt.nz</a> , <a href="https://quakestudies.canterbury.ac.nz/store/collection/235">https://quakestudies.canterbury.ac.nz/store/collection/235</a>
	Mailbox and housekey sculptures - Making art that represents the loss of family life in the red zone			
	Street grid - how can or should we preserve this network? Canal system?			
		Conversation around land acquisition process and the remediation / retreat decision		
		Whole House Reuse Project - Point out the location of the home that was carefully deconstructed for reuse to highlight the innovation and rebirth of the structure		<a href="https://quakestudies.canterbury.ac.nz/store/collection/578">https://quakestudies.canterbury.ac.nz/store/collection/578</a>
		Community Volunteerism - Several community based groups are formed to help with the recovery process and offer any necessary aid during the aftermath. (ie. Student Volunteer Army, Farmy Army, Rural Women New Zealand)		<a href="https://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&amp;objectid=10709207">https://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&amp;objectid=10709207</a> (Farmy Army), <a href="https://www.ruralwomen.org.nz/news-and-inspiration/aftersocks-boosts-support-for-rural-communities">https://www.ruralwomen.org.nz/news-and-inspiration/aftersocks-boosts-support-for-rural-communities</a> (Rural Women), <a href="https://sva.org.nz/our-story/">https://sva.org.nz/our-story/</a> (Student Volunteer Army)
		Transition - A mentality that currently encompasses the ChCh mindset about how to redevelop the city and its spaces for the better so that it speaks to what the residents' want it to be and how they could be involved in the process.		"A Transitional Imagery: Space, Network and Memory in Christchurch" , <a href="https://quakestudies.canterbury.ac.nz/store/collection/703">https://quakestudies.canterbury.ac.nz/store/collection/703</a>
		Community Gardens allow an engagement with the earth and helps with coping. Several such projects have been developed already.		
			Seismic culture and collective trauma - what does it mean to embody a quake mentality? How has this changed society and how are people recovering?	
			GIS mapping memories and community engagement, and public surveys: How can these processes and information be incorporated?	<a href="https://www.canterbury.ac.nz/science/schools-and-departments/geog/community-engagement/">https://www.canterbury.ac.nz/science/schools-and-departments/geog/community-engagement/</a>
Geology / Landscape	Liquefaction - Explain the concept, soil types that are vulnerable, and point out certain places in the river where the effects have been most dramatic.			<a href="https://api.ecan.govt.nz/TrimPublicAPI/documents/download/1702192">https://api.ecan.govt.nz/TrimPublicAPI/documents/download/1702192</a>
	Aftershocks - Explain the volume and intensity of aftershocks in the 2010/2011 series that deeply affected Chch			
	Earthquakes - Australian and Pacific Plates build up tension along the rocks of the Canterbury Plains that cause a sudden rupture/break.			<a href="https://www.ecan.govt.nz/data/document-library/?ids=2147172,1645906,1811999,2147181,1811995,1512242,1242237,1394179,1337380,1059852,301544,1081016,2250897,2370766,2390871">https://www.ecan.govt.nz/data/document-library/?ids=2147172,1645906,1811999,2147181,1811995,1512242,1242237,1394179,1337380,1059852,301544,1081016,2250897,2370766,2390871</a>
				<a href="https://www.linz.govt.nz/">https://www.linz.govt.nz/</a>
		This area can provide key lessons to other cities on sea level rise through community stories and know-how and technical assessments		
		Some areas are below sea level; flash flooding; inundation		
Infrastructure / Design				
	Medway St Footbridge - Destroyed in Sept Earthquake and there are hopes to rebuild using the original structure. Currently, there is a commemorative plaque at the site			
			Resilient design - showcase the new methods being used to mitigate flooding, purify water, and open a new chapter for resource management in Chch	<a href="https://www.building.govt.nz/#building-code">https://www.building.govt.nz/#building-code</a>
			Rebuilding - Ground Improvement Programme is currently researching ways in which homes can be rebuilt within a land vulnerable to liquefaction, by reducing risks through the use of international techniques and products. – Part of a \$16 million annual research programme by the EQC.	<a href="https://www.eqc.govt.nz/what-we-do/eqc-research-programme/ground-improvement-programme">https://www.eqc.govt.nz/what-we-do/eqc-research-programme/ground-improvement-programme</a>
			Infrastructure: wayfinding for streets taken away. What design solutions? Keep road signs?	





# THE RIVER IS A LIVING STORY