

lets RDC!
(Renew Our City)



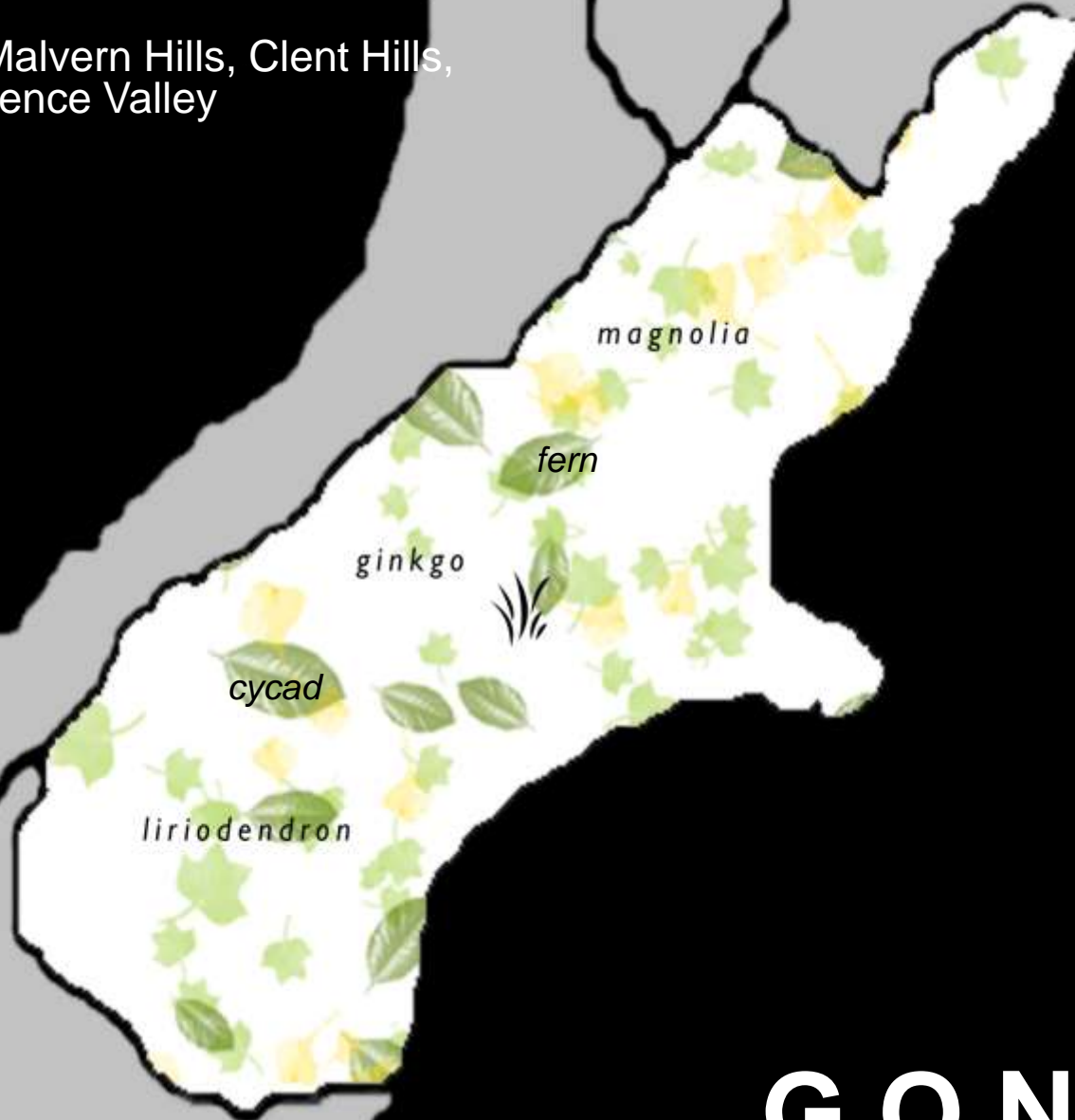
Lucas Associates

www.lucas-associates.co.nz



Canterbury Triassic Fossils

eg Malvern Hills, Clent Hills,
Clarence Valley



Ginkgo fossil



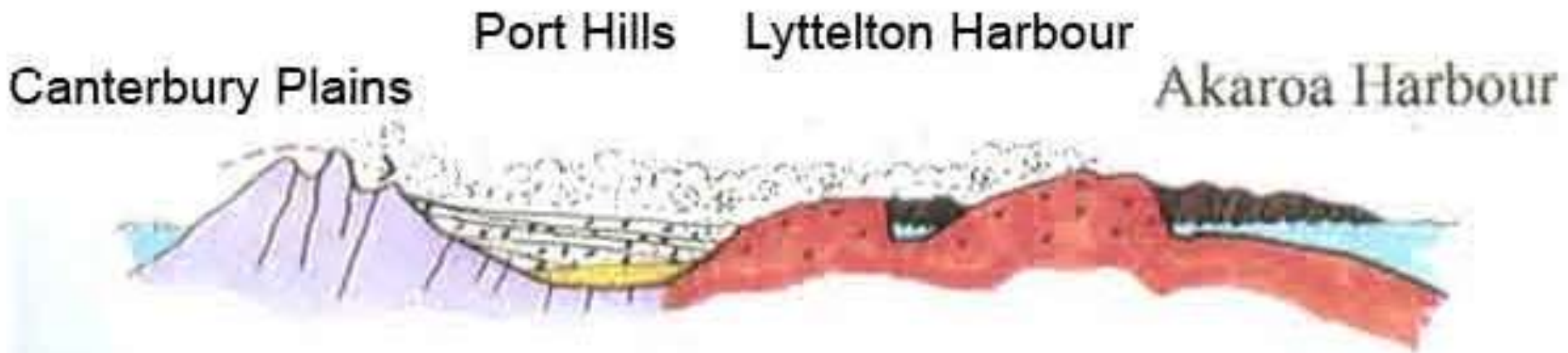
Liriodendron ancestor



Source: Ian L. Daniel

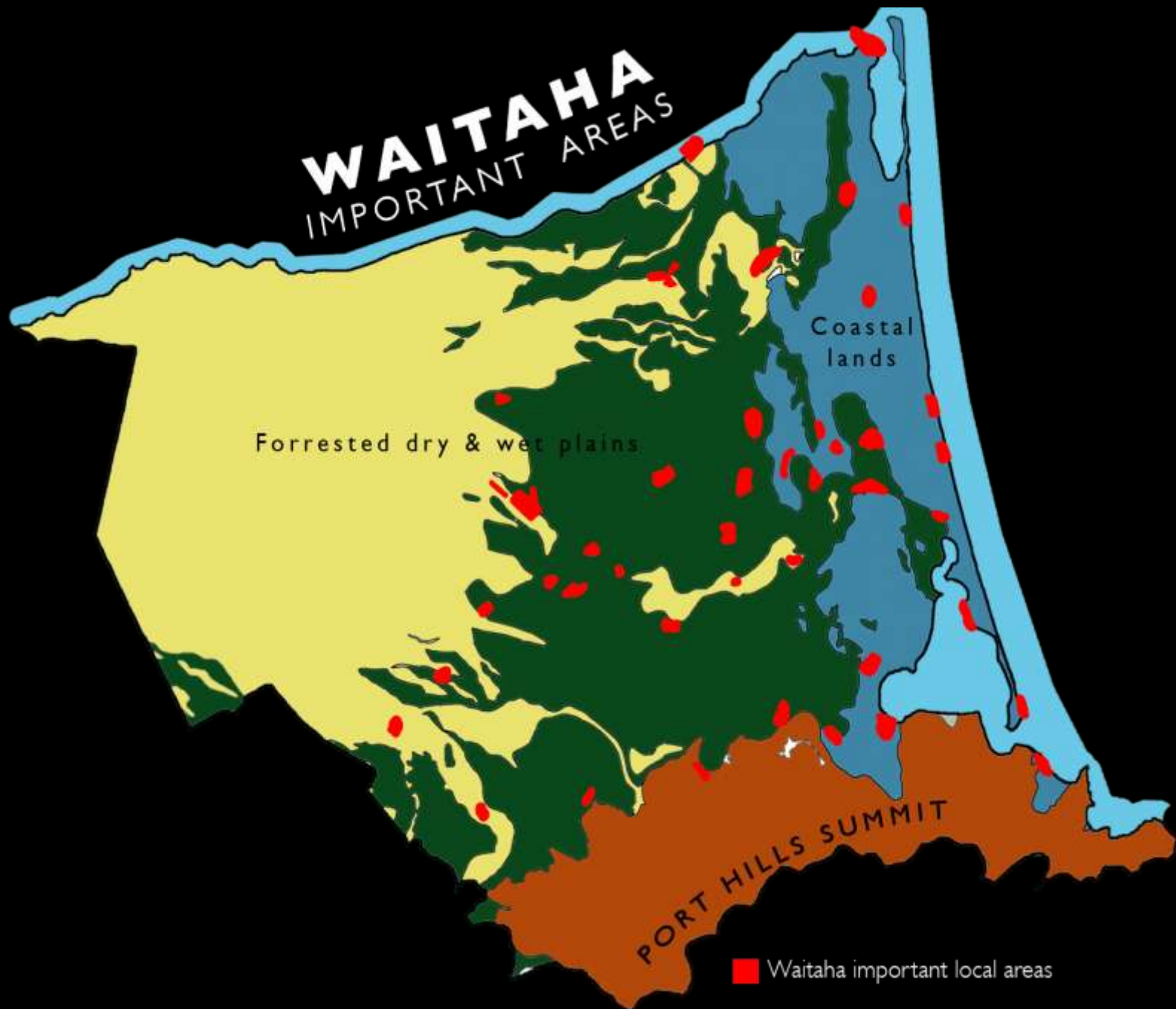
GONDWANA

Layers of Christchurch



WAITAHA

IMPORTANT AREAS



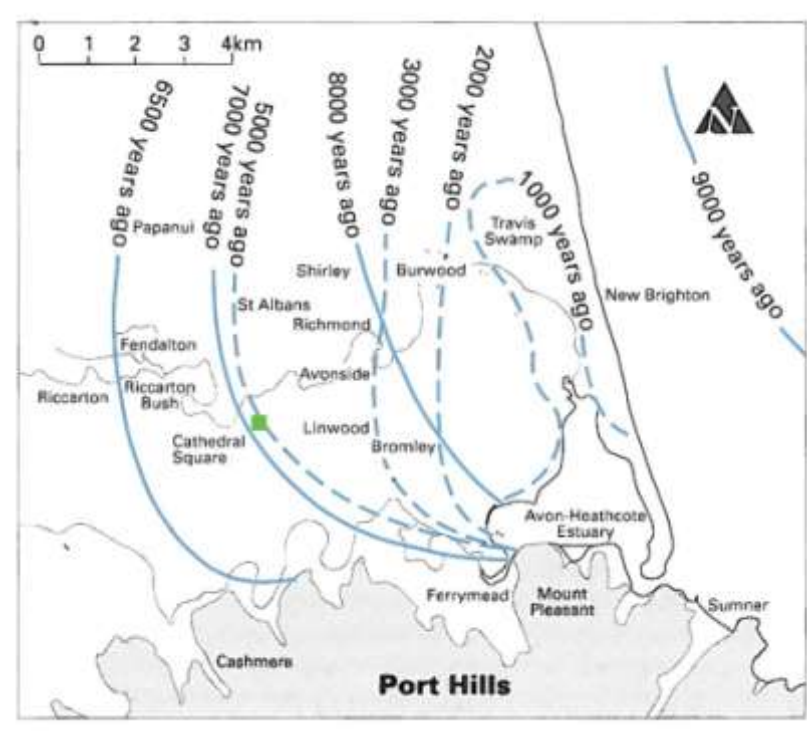
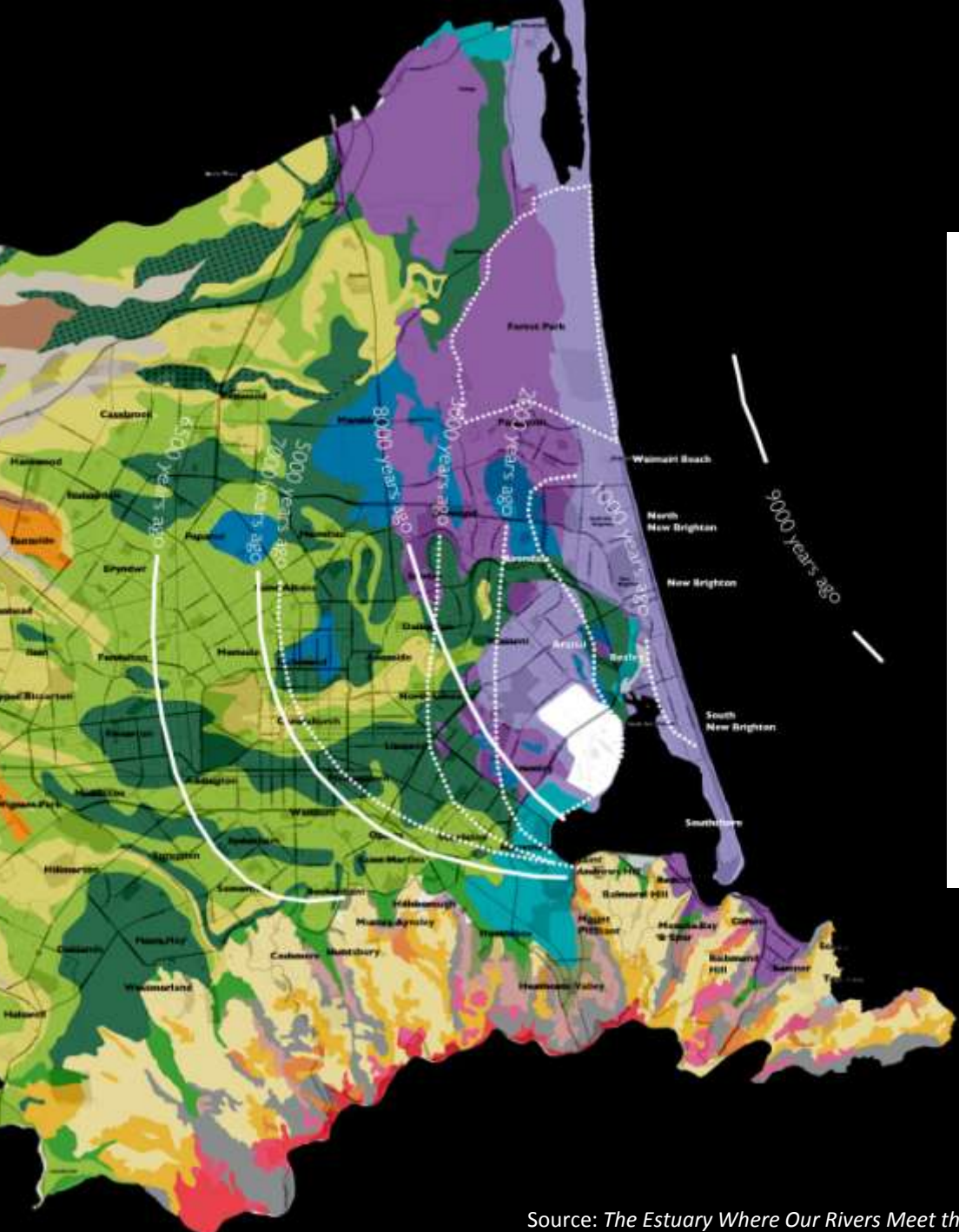
Coastal lands

Forrested dry & wet plains

PORT HILLS SUMMIT

■ Waitaha important local areas

Shorelines in the last 9,000 years



Source: *The Estuary Where Our Rivers Meet the Sea Christchurch's Avon-Heathcote Estuary & Brooklands Lagoon*, p. 4

Ecosystems of Christchurch



WET PLAINS

- Kahikatea**
kereru - manatu,
older plains ecosystem
- Totara**
bellbird - matai,
older plains ecosystem
- Te Kakahi complex**
dry or stony
- Pukio**
pukeko - karamu,
peat plains ecosystem

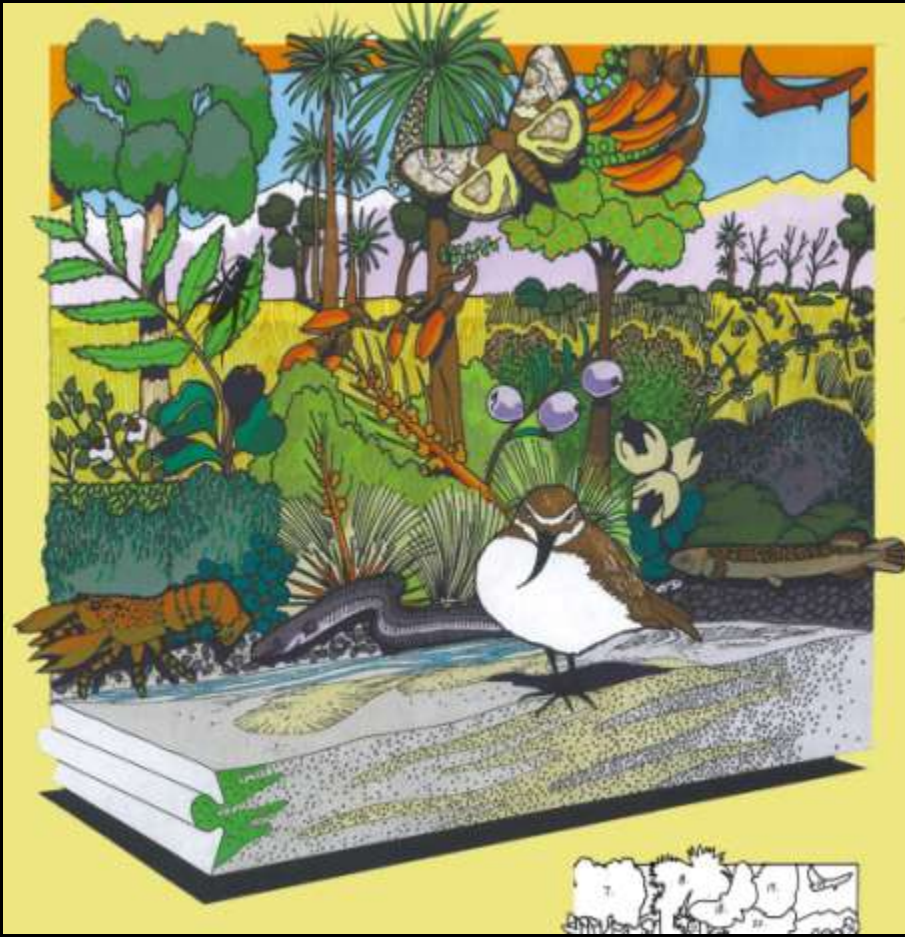
DRY PLAINS

- Tussock**
green skink - ti kouka,
young plains ecosystem
- Ti Kouka**
kotare - kanuka,
mid-age plains ecosystem
- Kowhai**
pipit - mikimiki,
young plains ecosystem
- Houhere**
piwakawaka - kohuhu,
mid-age plains ecosystem

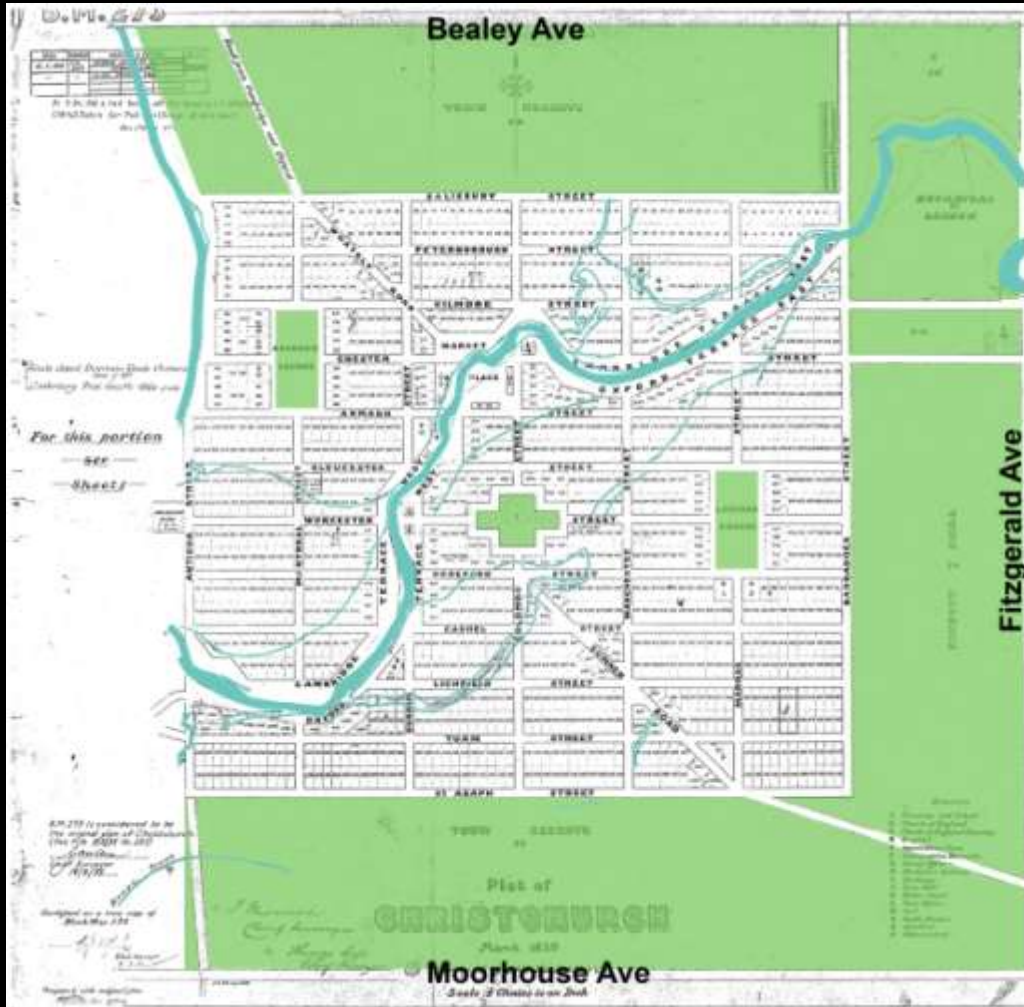
Wet Plains Ecosystems



Dry Plains Ecosystems



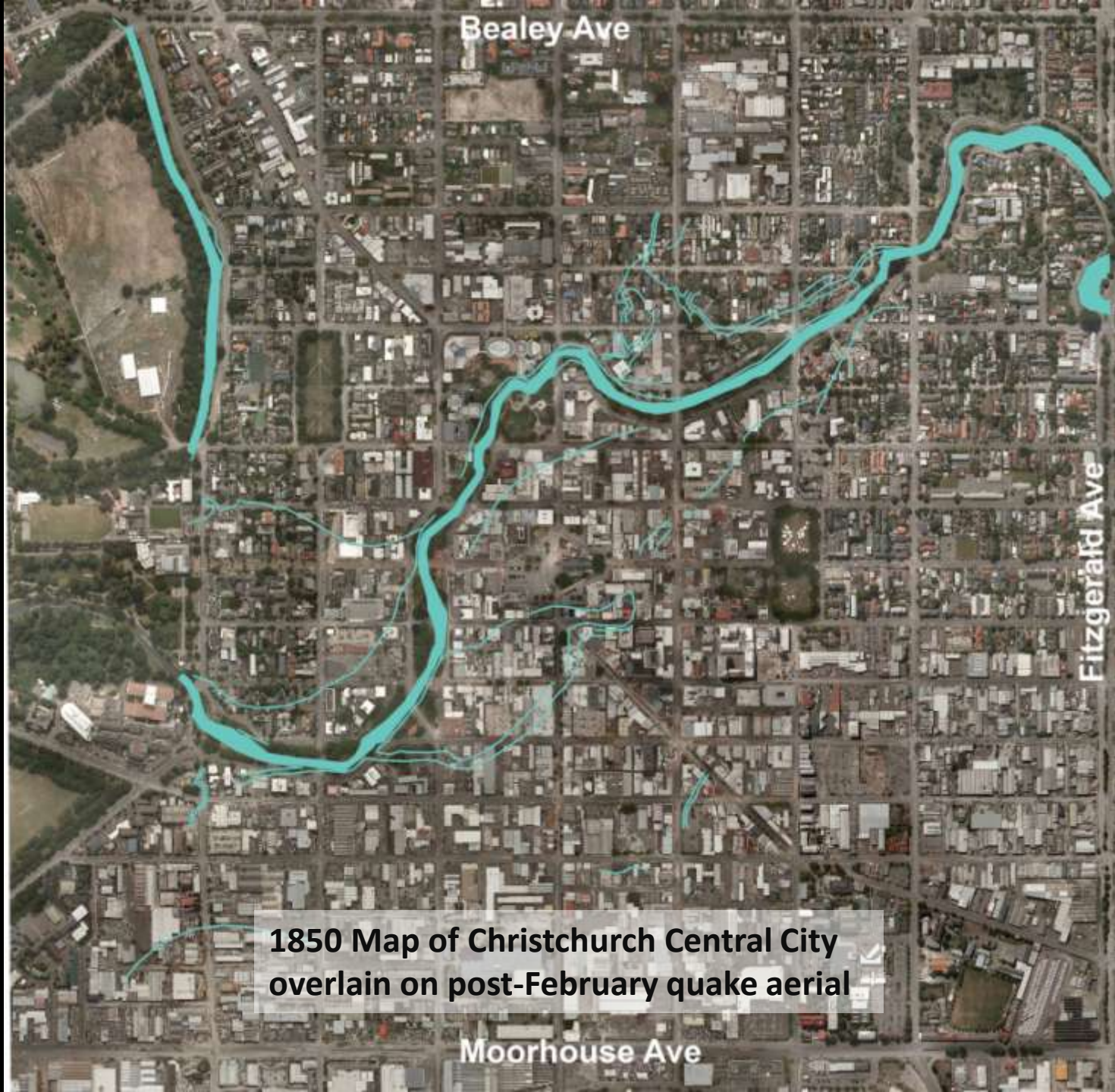
Greatest Health for the Greatest Number



1850 Map

A park greenbelt was to:

- Improve the environment for the working class
- Separate urban and rural
- Control city expansion
- Guard against & protect the natives
- Transplant the British landscape

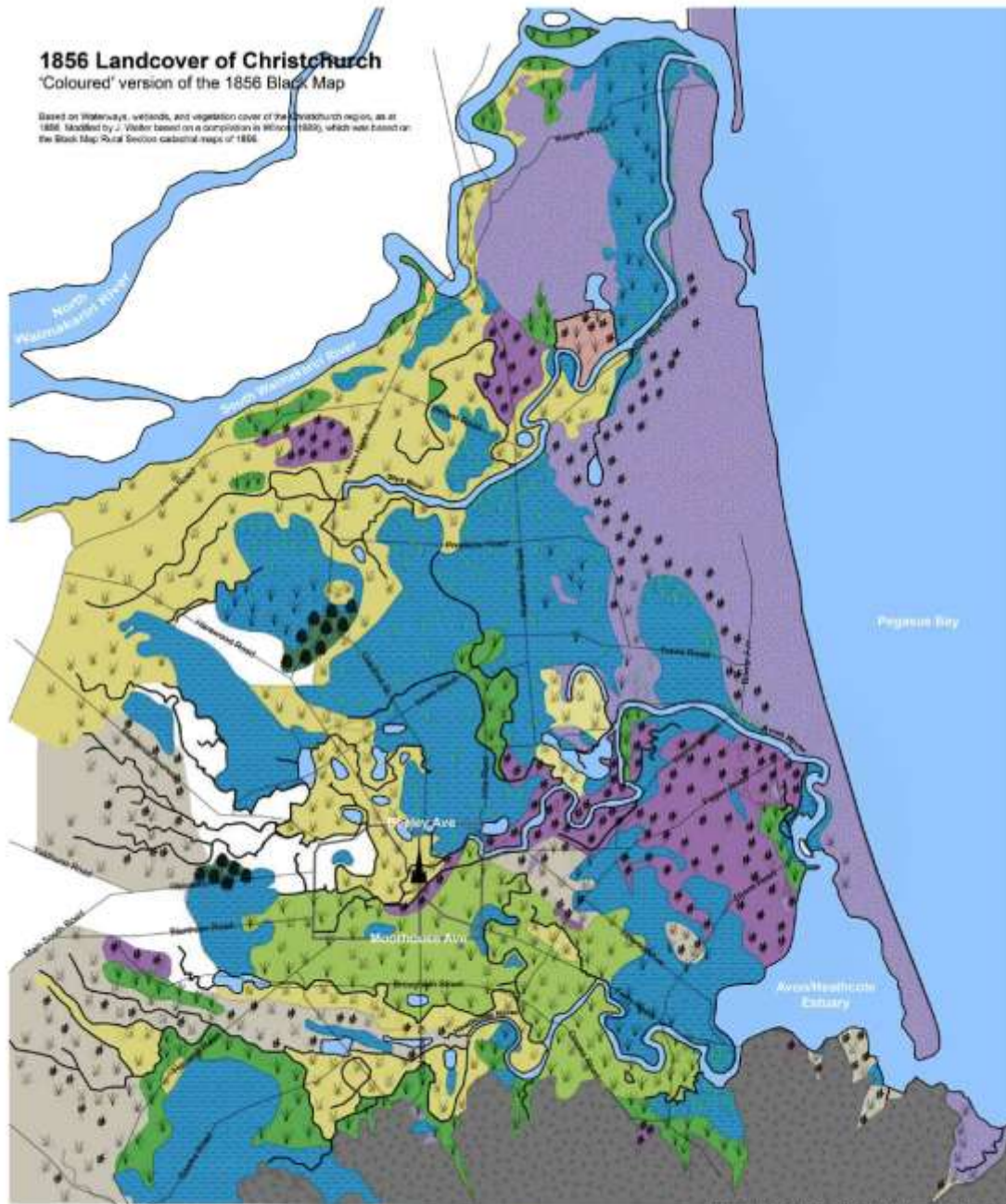


**1850 Map of Christchurch Central City
overlain on post-February quake aerial**

1856 Landcover of Christchurch

'Coloured' version of the 1856 Black Map

Based on Waterways, wetlands, and vegetation cover of the Christchurch region, as at 1856. Modified by J. Walker based on a description by Wilson (1980), which was based on the Black Map Rural Section cadastral maps of 1856.



(From: Network, Wetlands Database, Part 8 & 1, Christchurch City Council 2010)

- | | | | | | | |
|----------------|-------|-------|------|--------------|--------------|-------|
| Surface Water | Sand | Rock | Fern | Flax & Grass | Grass & Fern | Raupo |
| Streams/Rivers | Swamp | Trees | Flax | Grass | Fern & Flax | |

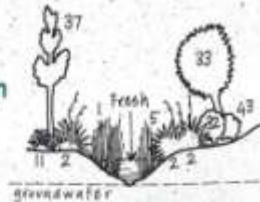
WATERWAY ENHANCEMENT

RIVER AND STREAM PROFILES

These profiles show the sequence of native plants best suited to each zone. Scale is exaggerated.

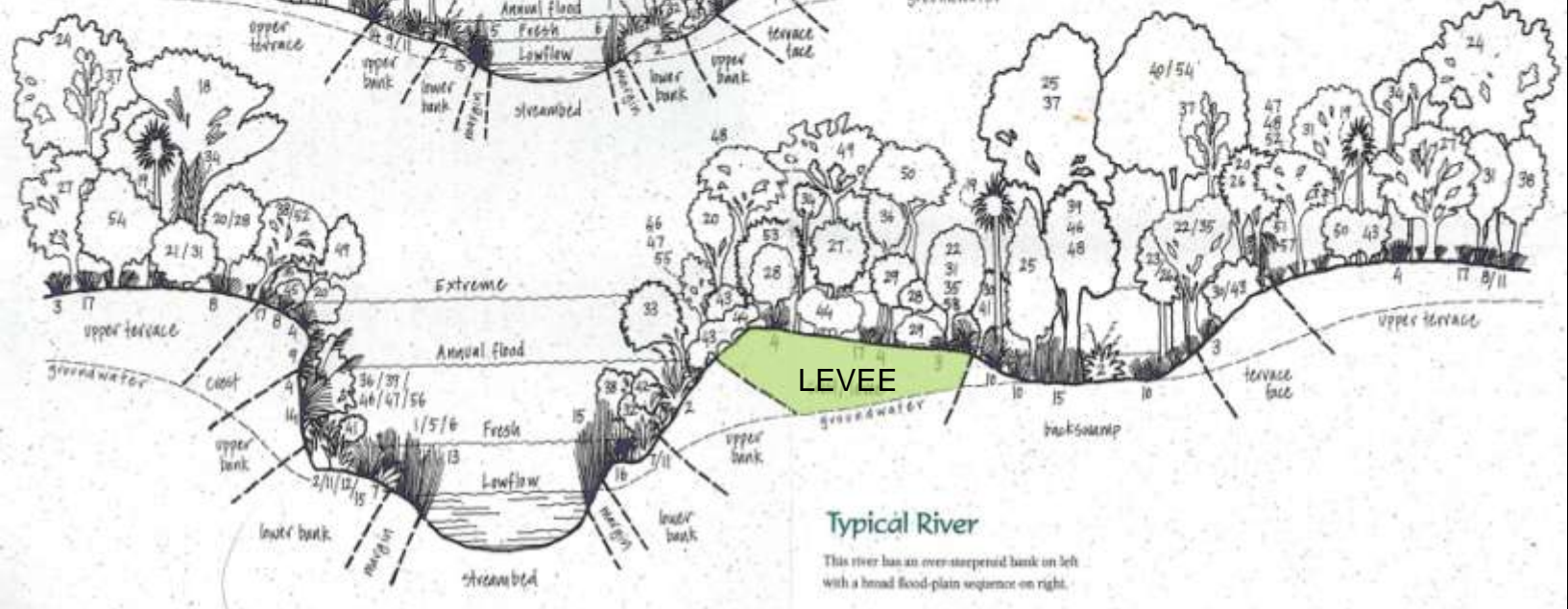
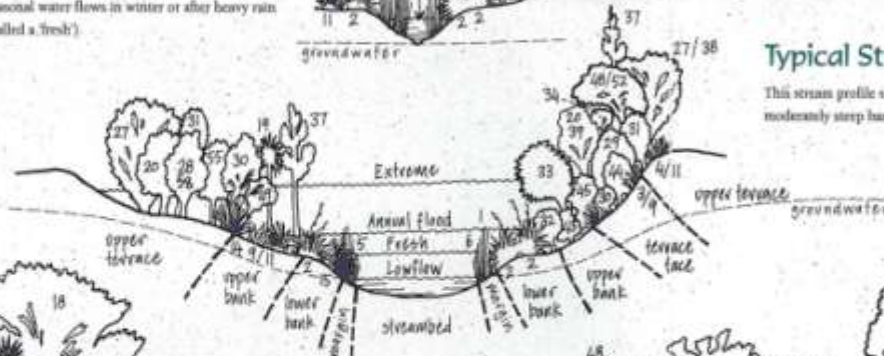
Typical Seasonal Stream

This profile shows upper stream reaches with seasonal water flows in winter or after heavy rain (called a 'fresh').



Typical Stream

This stream profile shows a gentle bank on left and moderately steep bank on right, with spring-fed low flows.



LEVEE

Typical River

This river has an over-steepened bank on left with a broad flood-plain sequence on right.



Fitzgerald Avenue-Avon River





Halswell River
levees ripped
after the
February
earthquake

Courthouse Riverbank Dune 1852



Christchurch New Zealand

from the Bank of the Head of the River
June 1852

By A.C.H.

Poplar trees along the Avon
River from Manchester Street

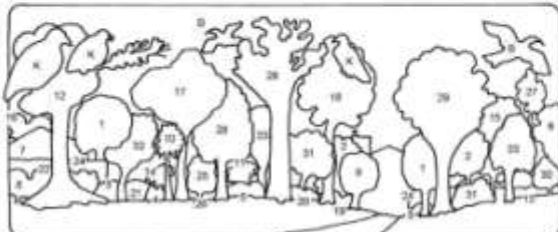




No	Botanical Name	Common Name
1	<i>Alsechyon excelsus</i>	titoki
2	<i>Asplenium platyneuron</i>	whiteweed
3	<i>Asplenium adnigrum</i>	black fern
4	<i>Berlinium minus</i>	swamp flax
5	<i>Carex lasiocarpa</i> , <i>C. obovata</i>	sedges
6	<i>Cardinalis maritima</i>	tuatua
7	<i>Carex lasiocarpa</i>	swamp flax
8	<i>Carex lasiocarpa</i>	swamp flax
9	<i>Carex lasiocarpa</i>	swamp flax
10	<i>Cochlearia australis</i>	sea purslane
11	<i>Cyathochaeta diandra</i>	sea purslane
12	<i>Dryopteris filix-mas</i>	fern
13	<i>Dryopteris filix-mas</i>	fern
14	<i>Dryopteris filix-mas</i>	fern
15	<i>Dryopteris filix-mas</i>	fern
16	<i>Dryopteris filix-mas</i>	fern
17	<i>Dryopteris filix-mas</i>	fern
18	<i>Dryopteris filix-mas</i>	fern
19	<i>Dryopteris filix-mas</i>	fern
20	<i>Dryopteris filix-mas</i>	fern
21	<i>Dryopteris filix-mas</i>	fern
22	<i>Dryopteris filix-mas</i>	fern
23	<i>Dryopteris filix-mas</i>	fern
24	<i>Dryopteris filix-mas</i>	fern
25	<i>Dryopteris filix-mas</i>	fern
26	<i>Dryopteris filix-mas</i>	fern
27	<i>Dryopteris filix-mas</i>	fern
28	<i>Dryopteris filix-mas</i>	fern
29	<i>Dryopteris filix-mas</i>	fern
30	<i>Dryopteris filix-mas</i>	fern
31	<i>Dryopteris filix-mas</i>	fern
32	<i>Dryopteris filix-mas</i>	fern
33	<i>Dryopteris filix-mas</i>	fern

AGENDA 21

OTAUTAHI CHRISTCHURCH PLANTS of the...

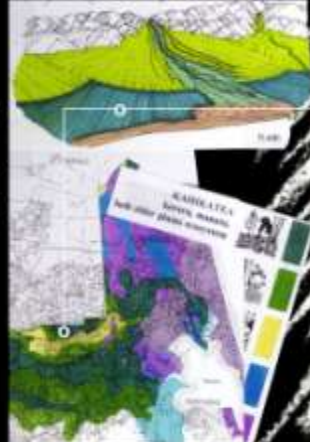


KAHIKATEA kereru, manatu, lush, older plains ecosystem & TOTARA bellbird, matai, older plains ecosystem



*inner city courtyard
design based on
**UNDERLYING
NATURE...***

lush older plains (alluvial fan) ecosystem



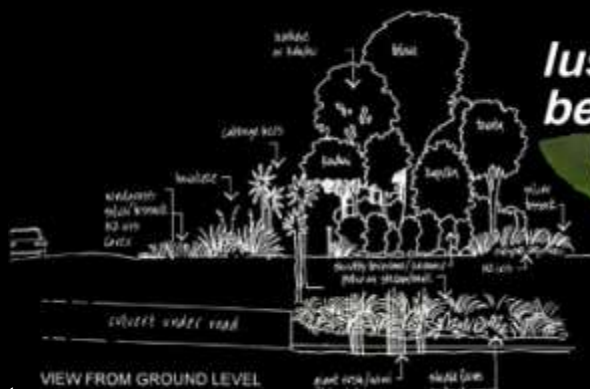
*gorgeously gawky
juveniles of*

****Pseudopanax crassifolius***
(horoeaka / lancewood)*



*lush, bold,
beautiful...*

****Pseudopanax arboreus***
(whauwhaupaku / five-finger)*



COMMUNITY based restoration

by Lucas Associates for
Avoca Valley Streamcare Group
& Christchurch City Council



a celebration of
INDIGENOUSNESS
in planting design...



impossibly twiggy
DIVARICATING
branch form kept moa away,
gave the lizards a fortress
and the designer a hedge...

Coprosma propinqua
(mikimiki / mingimingi)



Tim Galloway

Source: Lucas Associates

**a RARE plant,
well worth sculptural
interpretation**

(gate to tiny urban domestic courtyard)

Muehlenbeckia astonii
(shrubby tororaro / pohuehue shrub)

Tim Galloway



**tapping the underlayers, letting
the ancient flora vent forth...**

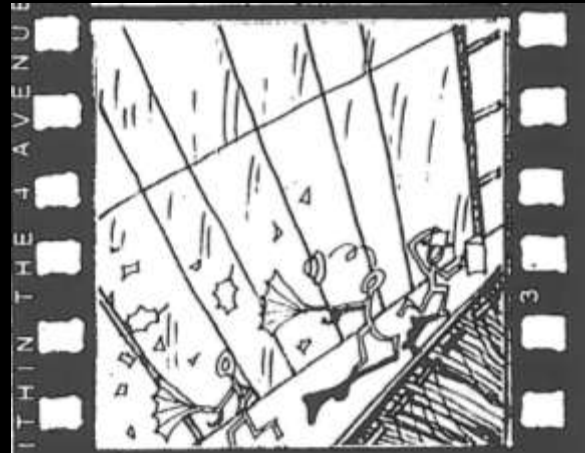
'Chalice'
by sculptor Neil Dawson
(Cathedral Square Christchurch)



Summary



Living



Outstanding Landscapes



Avon River



Avon River

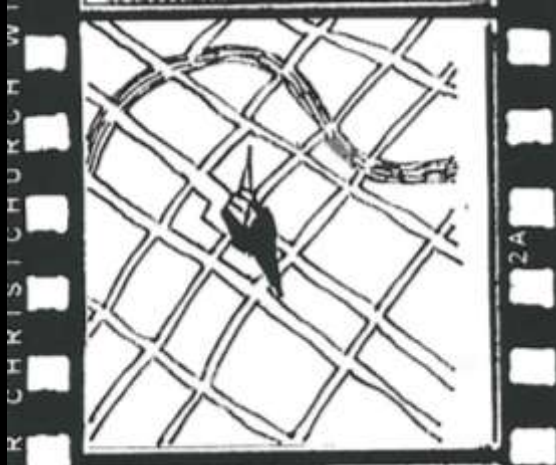


Public Open Space



The Shape of Christchurch

Streetscape



Built

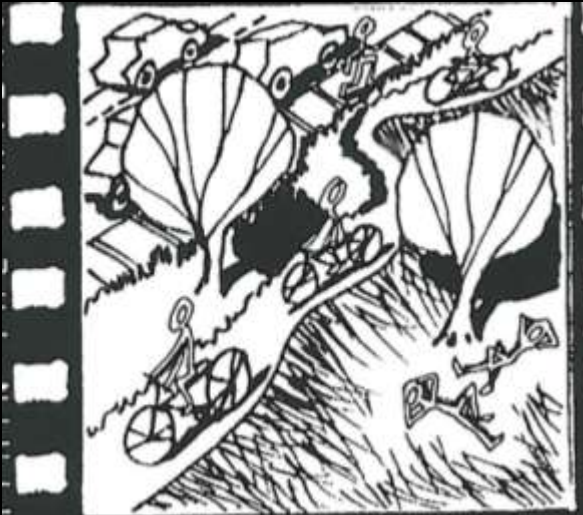


Garden loss, where is the Garden City?

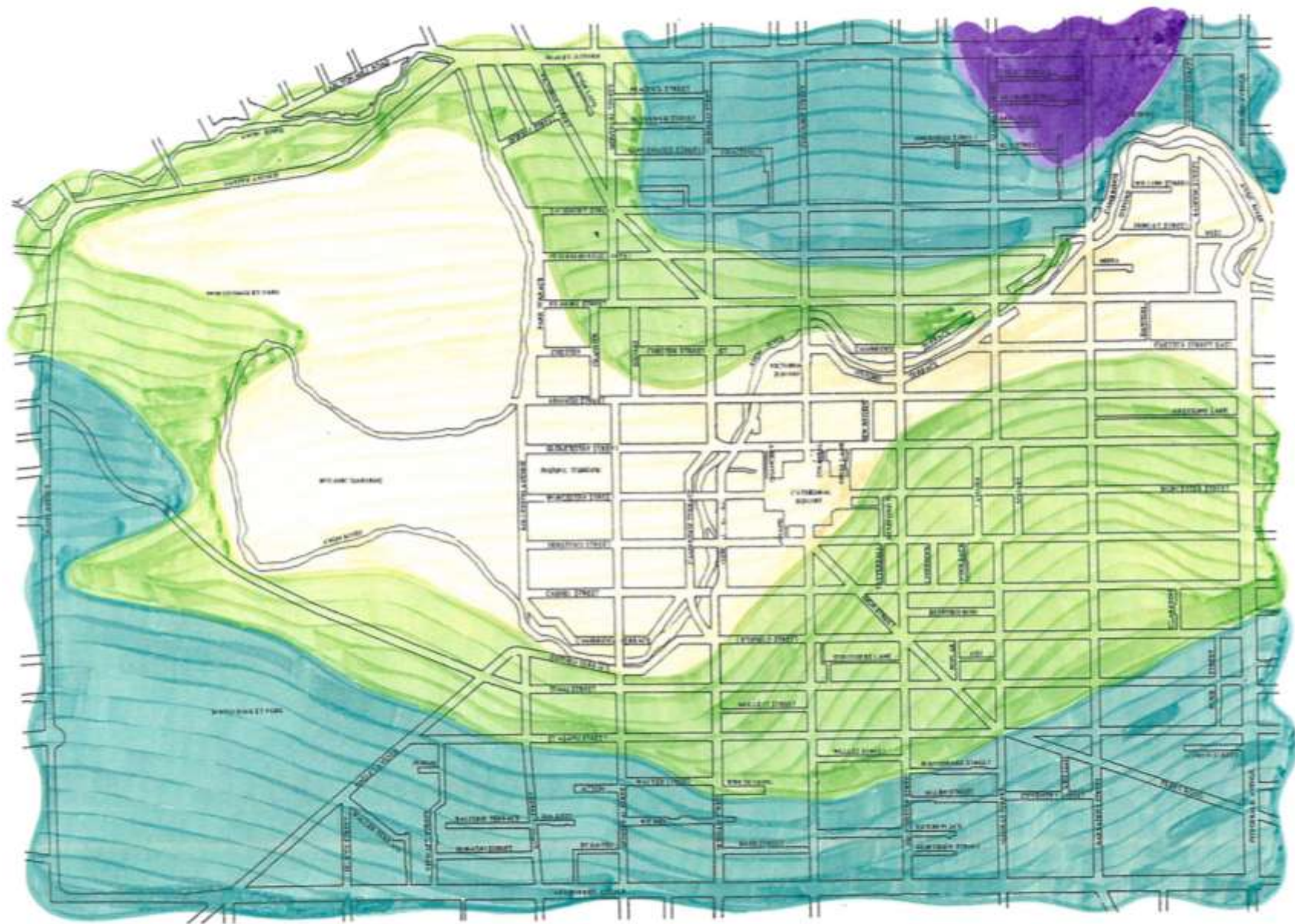


Threat of dispersal of 'city centre' to suburbs

Spatial Change



Increased social stress, perceived increased in crime, security and safety issues, especially in presently neglected Cathedral Square and eastern streets



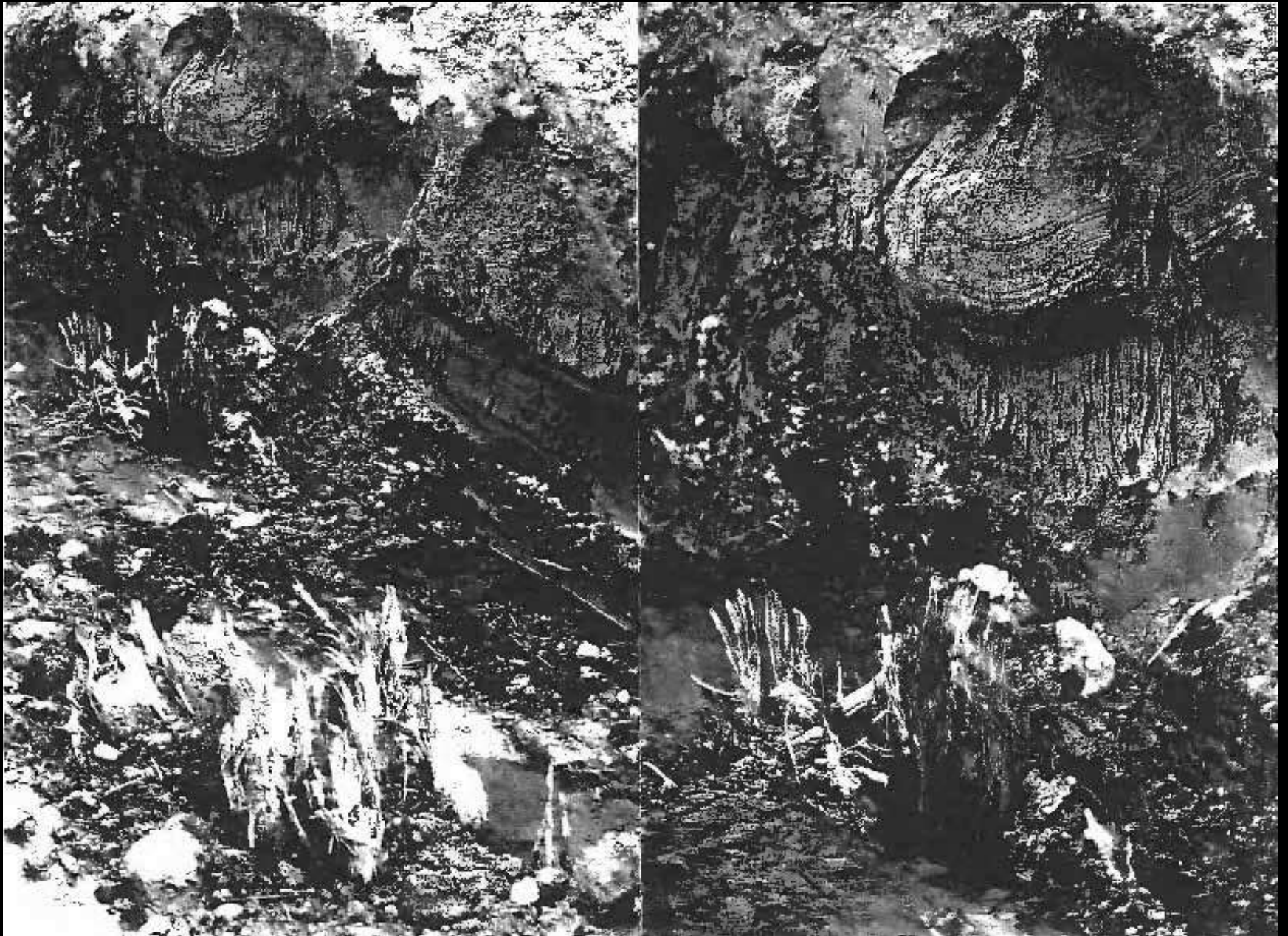
Kahikatea, koraru, manatu, lush older plains ecosystem.
 Totara, bellbird, matai, broadleaf, older plains ecosystem.



Houhere, pimakamata, kokuku, mid-age plains ecosystem.
 Pukio, puketo, karamu, peatland plains ecosystem.

INDIGENOUS PLAINS ECOSYSTEMS within the 4 AVENUES

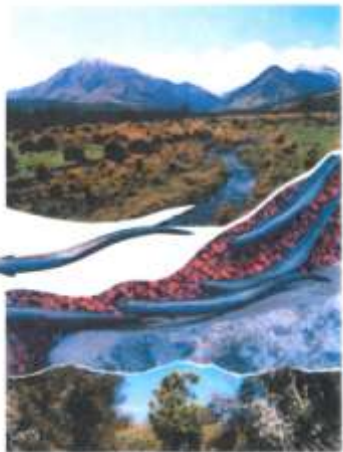
From: 'Indigenous Ecosystems of Otautaki Christchurch
 Set2. Lucas Associates 1995 (currently in draft)



Totara stumps 1m metre below ground

Marokapara, 349 Manchester Street

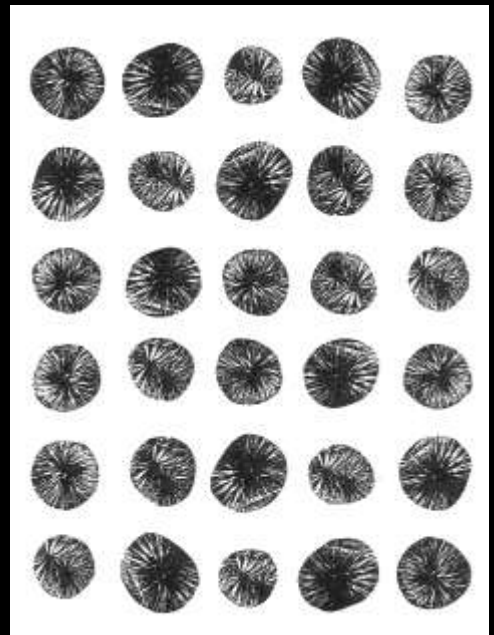


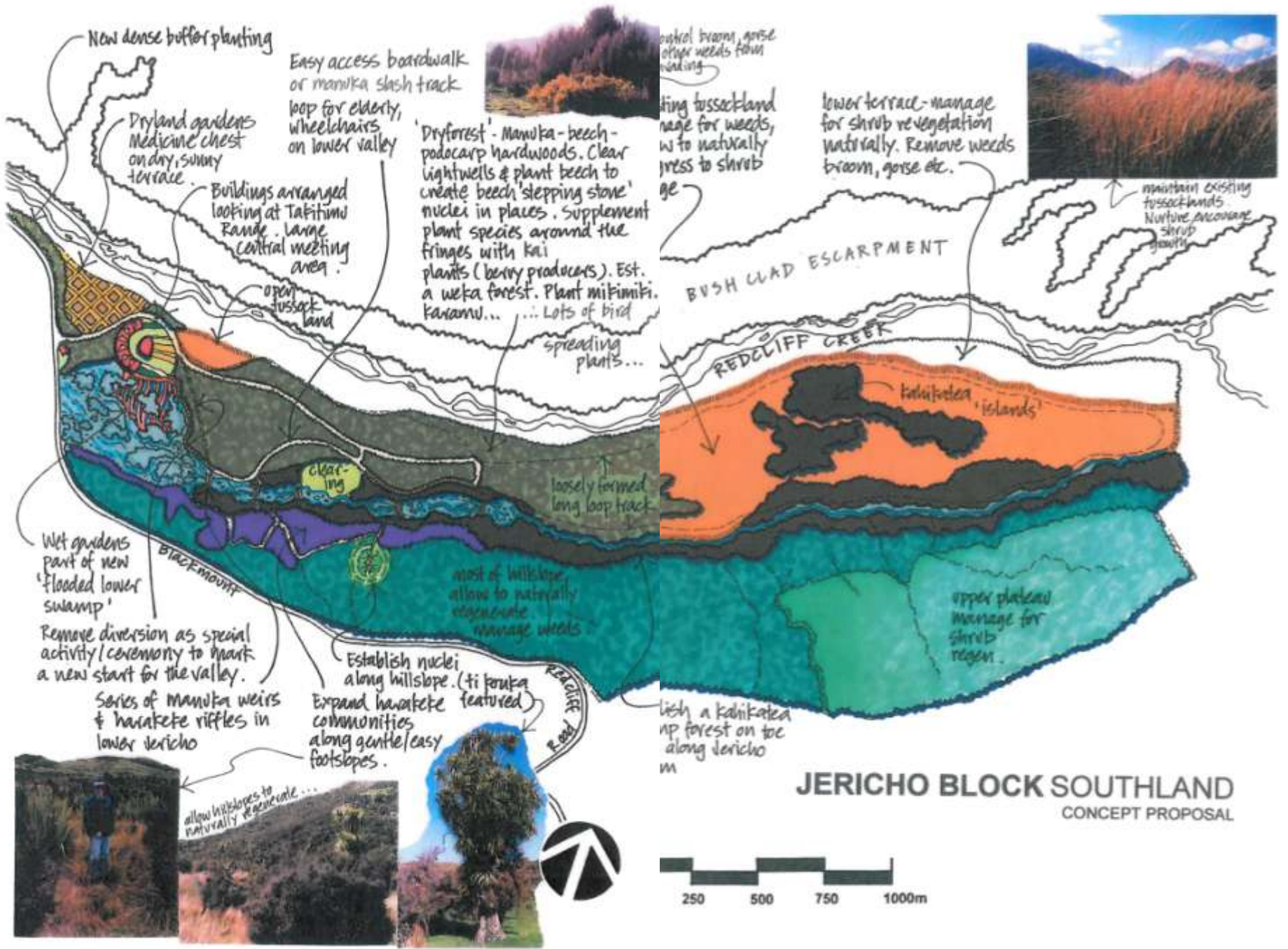


Jericho Restoration Plan

A plan to restore the
marshes and wetlands of the
Te Kōwhiri Tāroa O Takitimu area
of the Takitimu Mountains and
Waiou Valley of Murihiku, SouthWest

by Te Whānau Māhika Kai Trust March 2001





New dense buffer planting

Easy access boardwalk or manuka slash track loop for elderly, wheelchairs on lower valley

Dryland gardens Medicine chest on dry, sunny terrace

Buildings arranged looking at Takitimu Range. Large central meeting area.

open tussock land

'Dryforest' - Manuka - beech - podocarp hardwoods. Clear lightwells & plant beech to create beech 'stepping stone' nuclei in places. Supplement plant species around the fringes with kai plants (berry producers). Est. a weka forest. Plant mitimiki, karamu... Lots of bird spreading plants...

control brown, gorse other weeds from walking

dry tussockland range for weeds, w to naturally press to shrub

lower terrace - manage for shrub revegetation naturally. Remove weeds brown, gorse etc.

maintain existing tussocklands. Nurture encourage shrub growth

BUSH CLAD ESCARPMENT

REDCLIFF CREEK

kabikatea 'islands'

loosely formed long loop track

most of hillslope allow to naturally regenerate manage weeds

upper plateau manage for shrub regen.

Wet gardens part of new 'flooded lower swamp'

Remove diversion as special activity/ceremony to mark a new start for the valley.

Series of manuka weirs & harakete riffles in lower tericho

Establish nuclei along hillslope. (ti foruka) Expand harakete featured communities along gentle/easy footslopes.

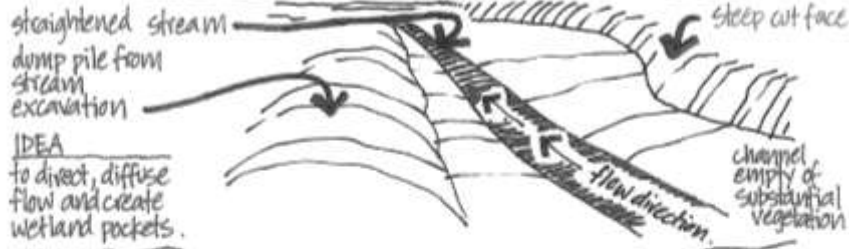
Establish a kabikatea up forest on toe along tericho

allow hillslopes to naturally regenerate...

JERICHO BLOCK SOUTHLAND
CONCEPT PROPOSAL



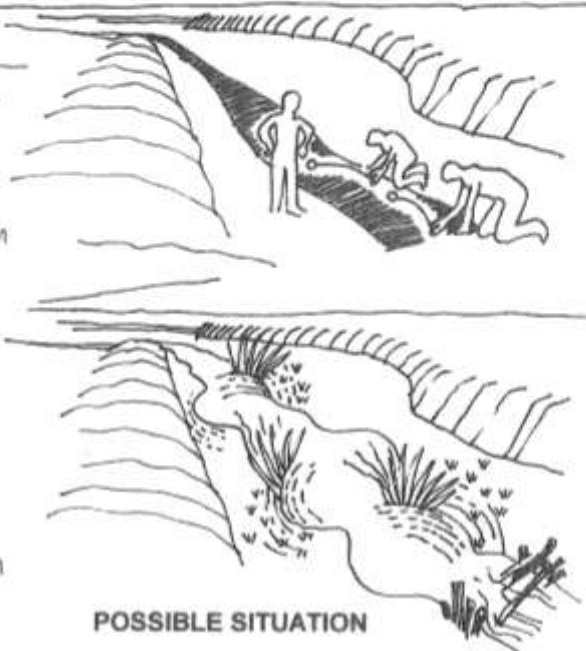
PRESENT SITUATION



IDEA
to direct, diffuse flow and create wetland pockets.

HOW TO

1. make raupo balls and tether with 2-3 metres of string
2. watch how they flow...
3. note where they touch the bank...
- this is where the harakeke will be planted.
4. but first, dam upstream with manuka logs, then plant.
- when the logs have rotted, the harakeke will be strong enough to take the flow.

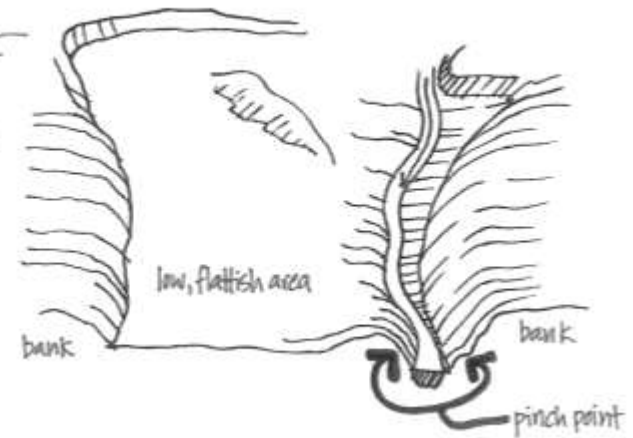


POSSIBLE SITUATION

PRESENT SITUATION

LOOK FOR

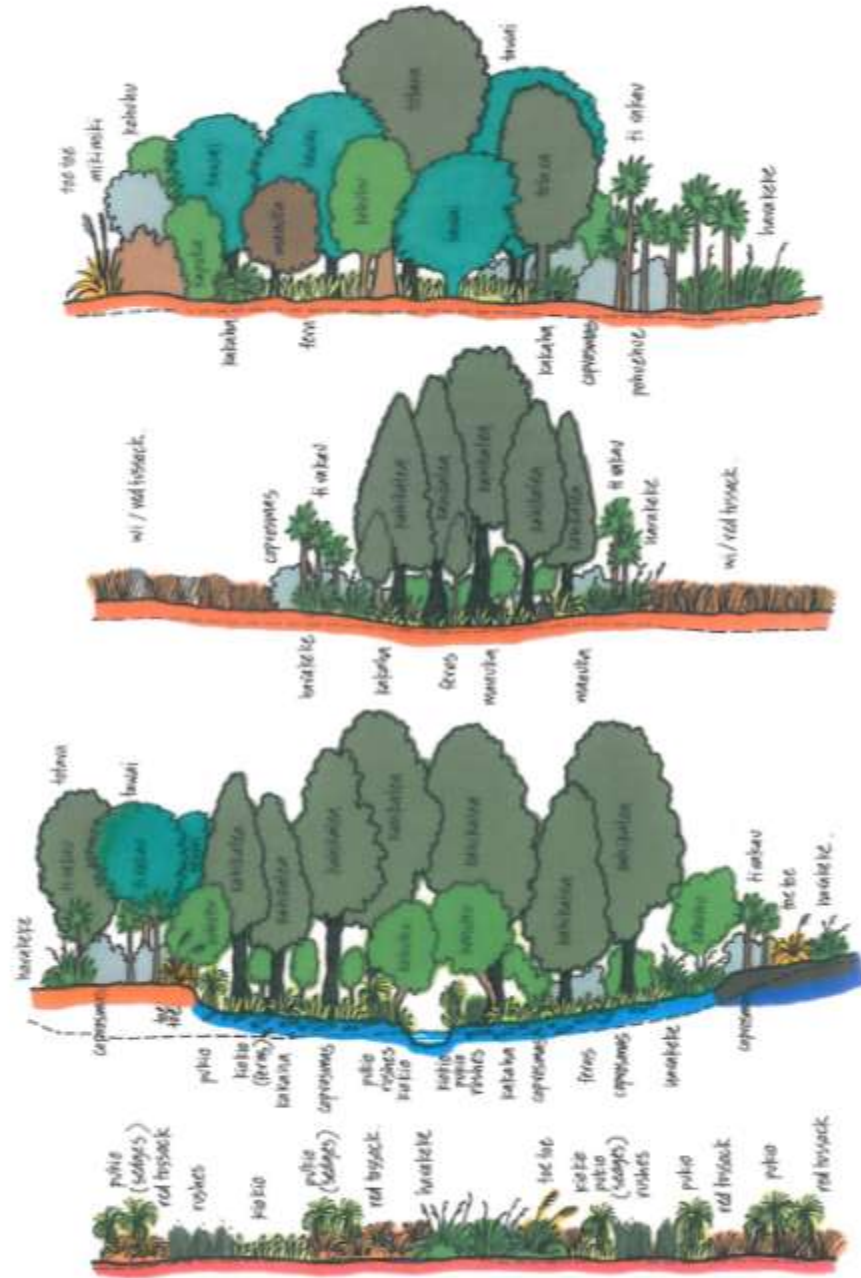
1. a natural or artificial pinch point between two higher banks...
2. an area behind with a bit of width to allow for wet areas to form...



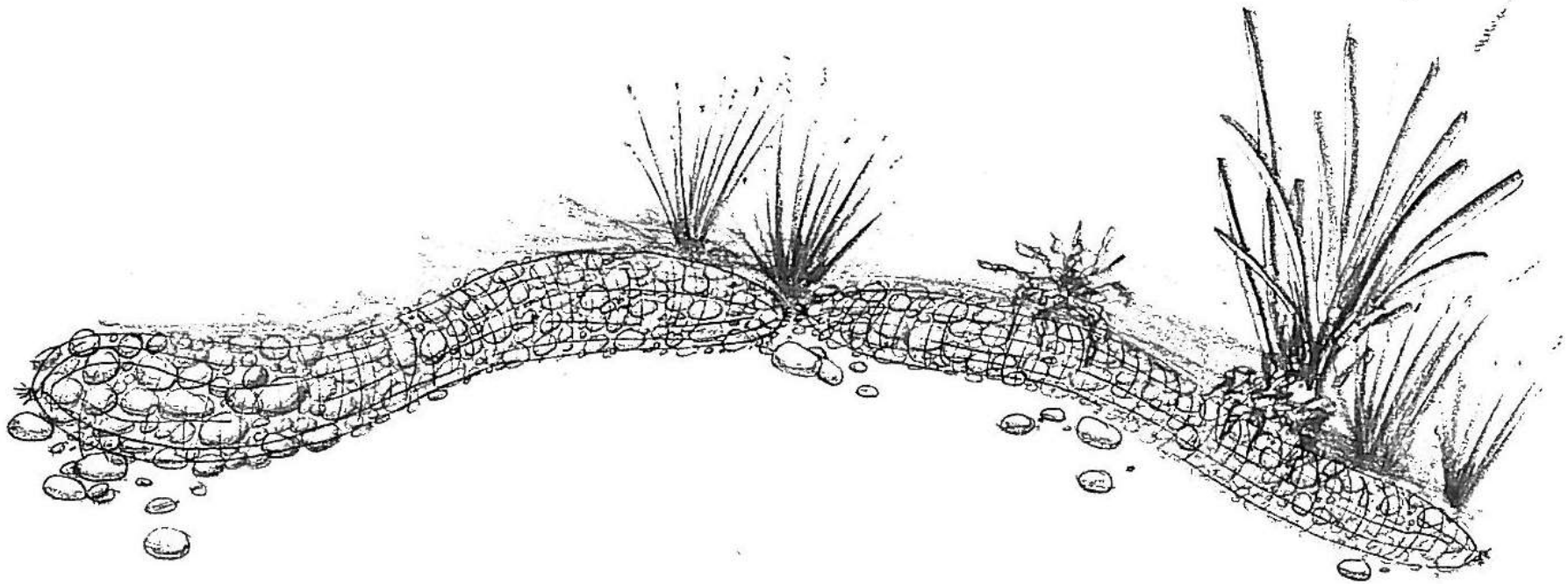
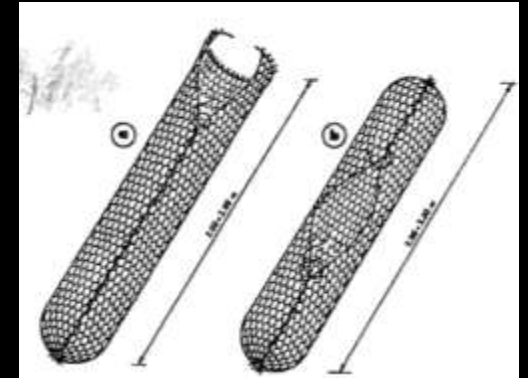
POSSIBLE SITUATION



HOW TO IMPLEMENT



The "sausage gabion", together with variable backfilling and planting, can form a pleasant stabilised greywacke bank. The gabion can sag into areas of scour at its base and not compromise structural integrity.



The "Stony Hedgehog"

- **Precast Units**

Greywacke-faced pre-cast units provide a flexible option.

Stony hedgehog blocks are being developed as a useful bank stabilising tool. (see Firths first attempt)

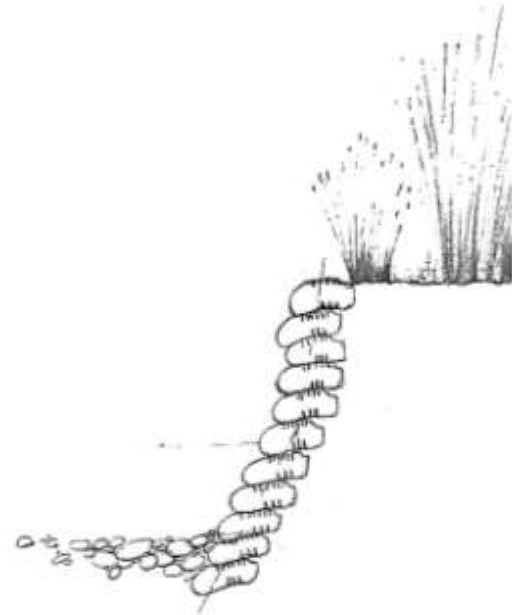
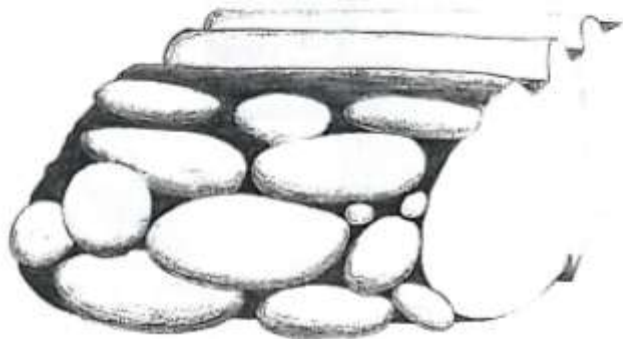
The blocks each weigh 25 kg, can be stacked up vertically, or sloped, to replicate stony cut banks.

No footing is necessary.

Small voids can be left between blocks for occasional vegetation.

A gentle curved alignment is possible.

The face of intact greywacke stones can replicate horizontal river sorting patterns.





AVONSIDE ~~DRIVE~~ PARK

from Fitzgerald Avenue to Linwood Avenue



Lucas Associates



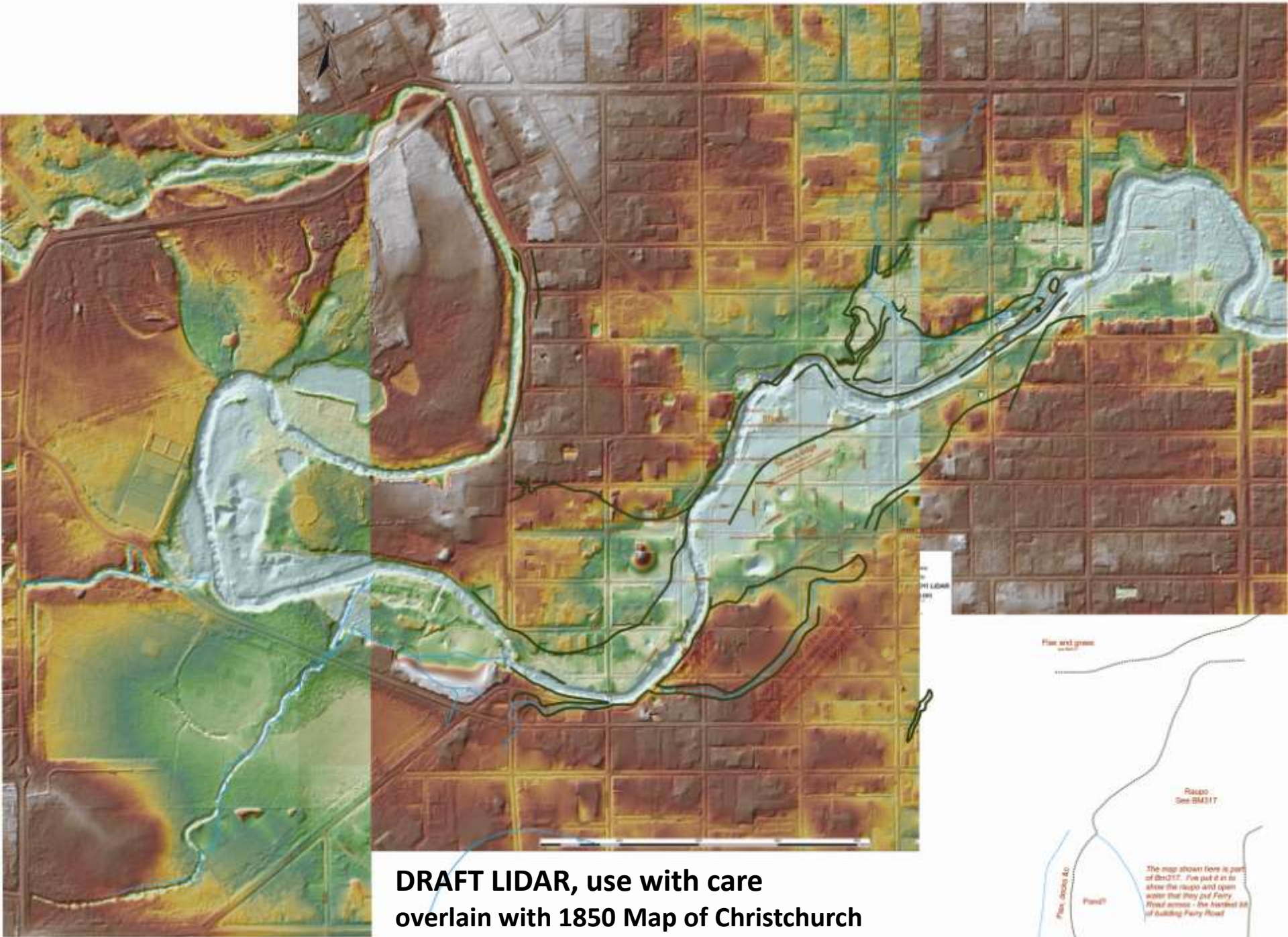
EXISTING SITUATION:
 Two lanes, two-way traffic, no pedestrian and cycle opportunities at riverbank.
 2012/13
 An illustration of the existing situation, showing the road, trees and riverbank access.
 © Lucas Associates
 25 Macquarie Street, Sydney NSW 2000

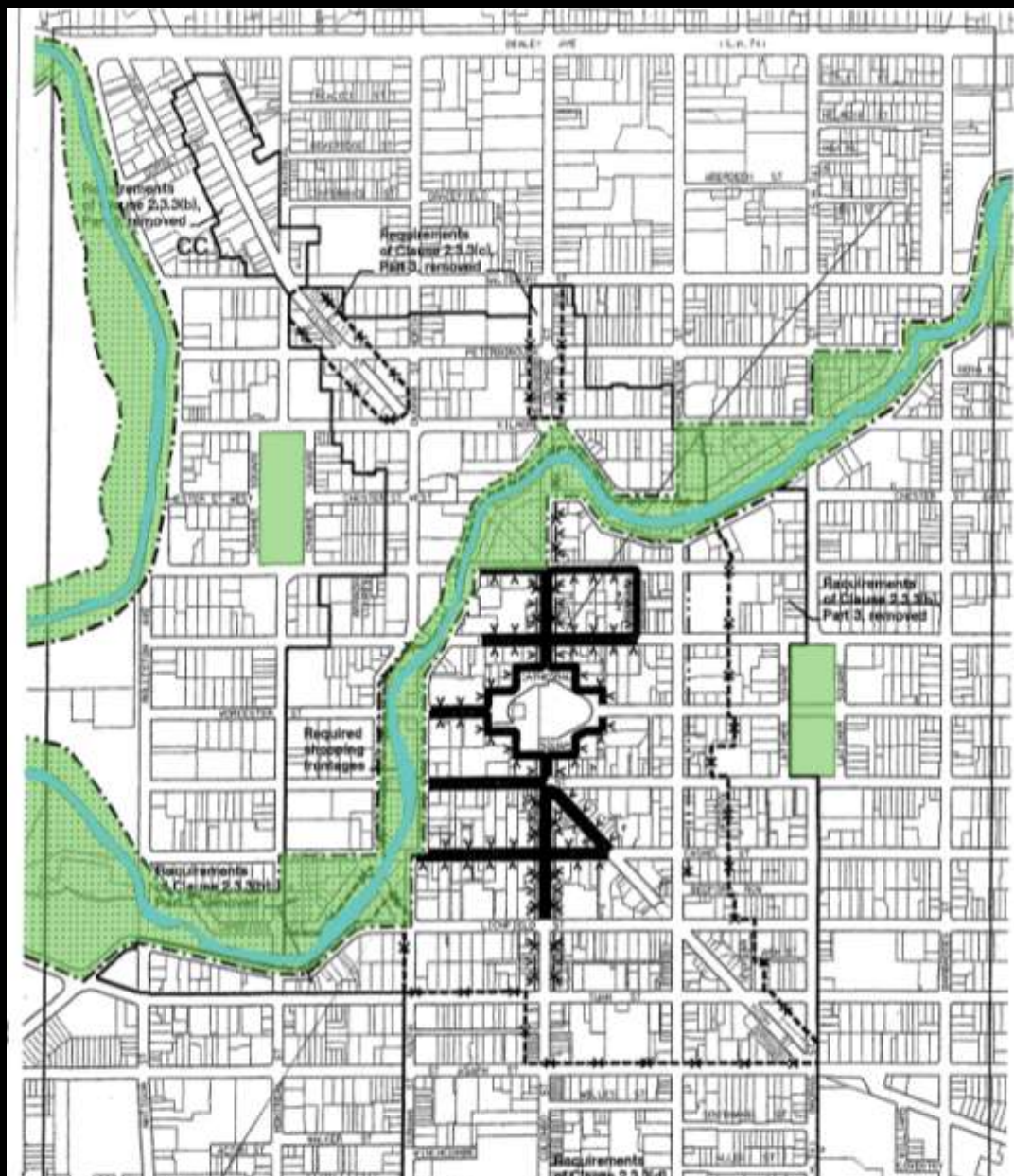
RIVERSIDE PARK

With road removed, pedestrian and cycle routes, slopes regraded and naturalised plus riverbank access with possible landing stages etc.



With one lane, one way slow street, pedestrian and cycle routes, slopes re-graded and naturalised.

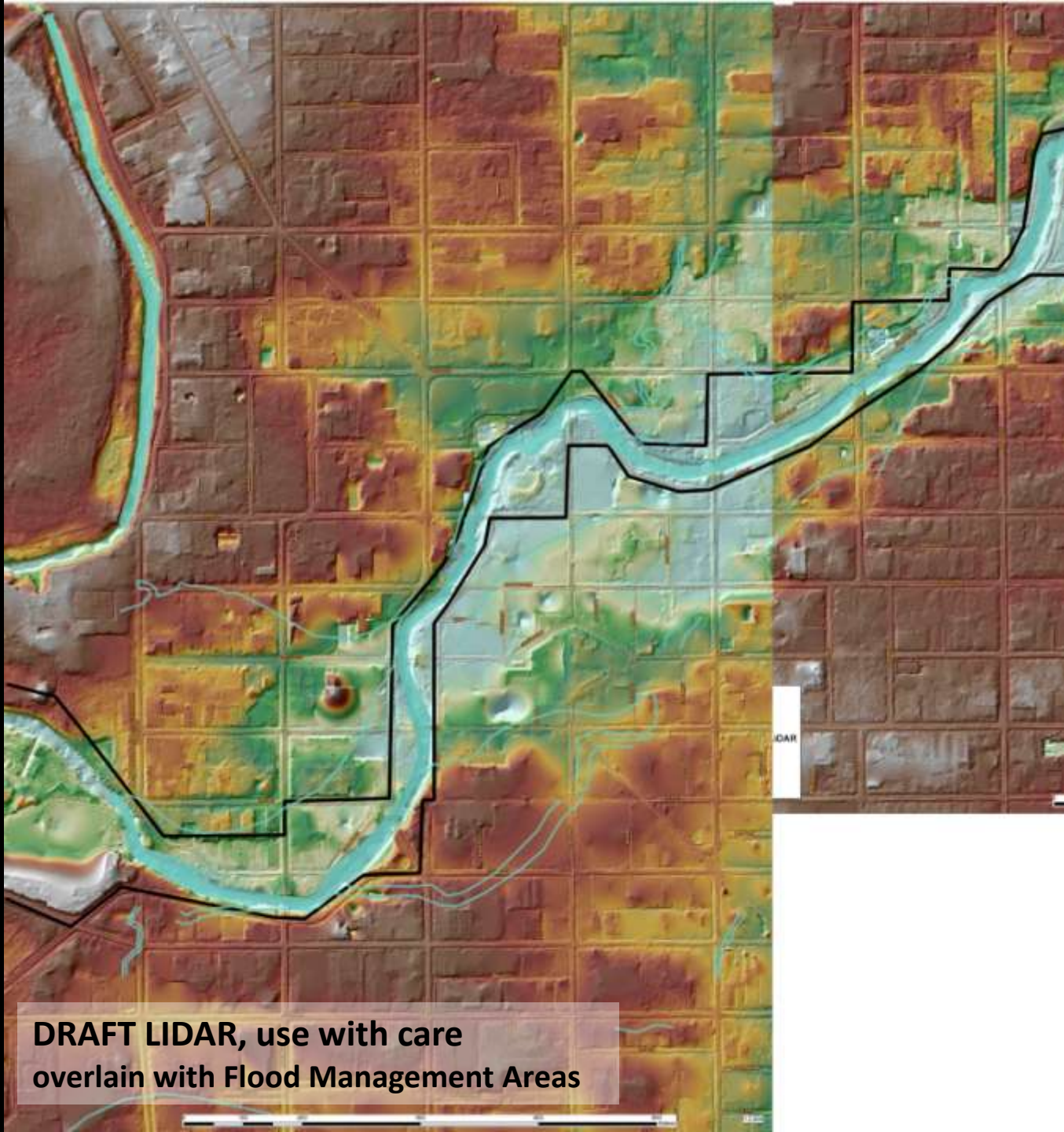




Flood Management Area in City Plan

January 30, 2011

Avon River Blue-Greenway Pedestrian Corridor & Cycleway Potential



**DRAFT LIDAR, use with care
overlay with Flood Management Areas**

WATERWAYS AND WETLANDS ASSET MANAGEMENT STRATEGY

CENTRAL CITY NEIGHBOURHOODS

VISION:

To create delightful and interesting neighbourhood green space in high density living areas through the imaginative design of stormwater management systems in an integrated way with streets and parks.

STRATEGIES:

- ① Provide mitigation for the adverse effects of increased urban runoff from high density development in an environmentally sensitive way.
- ② Compensate for the loss of private green space that occurs in high density living areas by contributing to urban renewal projects.
- ③ Improve community understanding and involvement with the waterway network by the use of icons, artworks and interpretation.
- ④ Acknowledge the strategies as a means of implementing Community Board objectives.
- ⑤ Work in an integrated way with Parks Unit, City Streets and the Urban Design Team.
- ⑥ Establish recreational opportunities, access and linkages along waterway corridors and to streets and parks.

⑦ Enhance and add meaning to urban neighbourhoods by opening views to waterways and incorporating heritage values in design.

⑧ To create imaginative concepts for high density neighbourhood that form the basis for collaborative effort by the Council Units and developers.

⑨ Reflect and reinforce unique neighbourhood character through restoration, protection and 'daylighting' of drainage utilities.

⑩ Restore natural values to urban waterways and promote ecological linkage.

⑪ Integrate waterways and swales into streetscapes and gardens.

⑫ Establish attractive ponds to mitigate potential flooding.

⑬ Protect and where possible restore baseflows.

CITY PLAN OBJECTIVES

The Draft Strategy is to be regarded as one of the methods of achieving the City Plan Objectives and Policies relevant to the Project Area. Key sections include:

1. Natural Environment - Water; - Natural features and habitats; - Environmental awareness.
2. City Identity - Form; - Amenity; - Heritage protection.
3. Tangata Whenua - Maori and their resources.
4. Utilities - Adverse environmental effects.
5. Subdivision and Development - Protection of natural features; - Amenities values; - Anticipated land uses.
6. Recreation and Open Space - Provision and diversity; - Efficient and effective use; - Design Appearance.

THE AVON TRIBUTARIES

Waterways and Wetlands Asset Management Strategy 1999

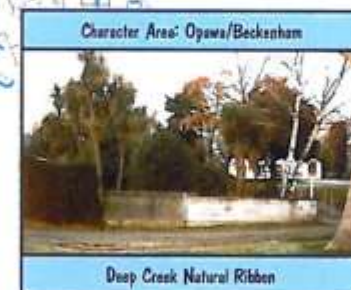
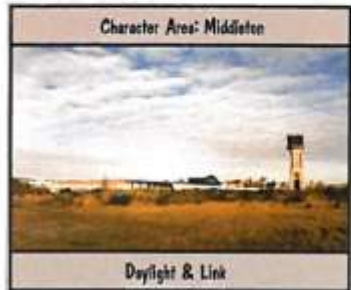
Vision

Living in Harmony with natural waterways

•Recognize that levees erupt in earthquakes and lateral spread occurs

Strategies

- Recognise that the numerous spring-fed tributaries of the Avon River are an essential part of the character of Christchurch
- Recognise that significant lengths of waterway are degraded and that restoration is necessary for the benefit of present and future generations
- Sustain spring flows through restoration, groundwater management and monitoring
- Maintain aquatic habitats by protection from sedimentation and over-widening of low flow channels and restoration of water's edge plant species
- Promote the multiple benefits of canopy trees alongside waterways (including shade for aquatic habitats and birds)
- Promote the protection and restoration of riparian planting to satisfy ecological and human wellbeing values
- Demonstrate all the potential values of waterways and wetlands by enhancing stream flows, aquatic habitats and riparian environments within public areas, eg parks, streets, schools, university and shopping areas
- Promote understanding of ecological and wildlife values for amateur naturalists and residents by on-site talks and demonstrations
- Support the establishment of neighbourhood stream care groups and school ecological monitoring groups

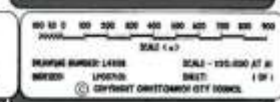


Commendable works

Source: Christchurch City Council 1999

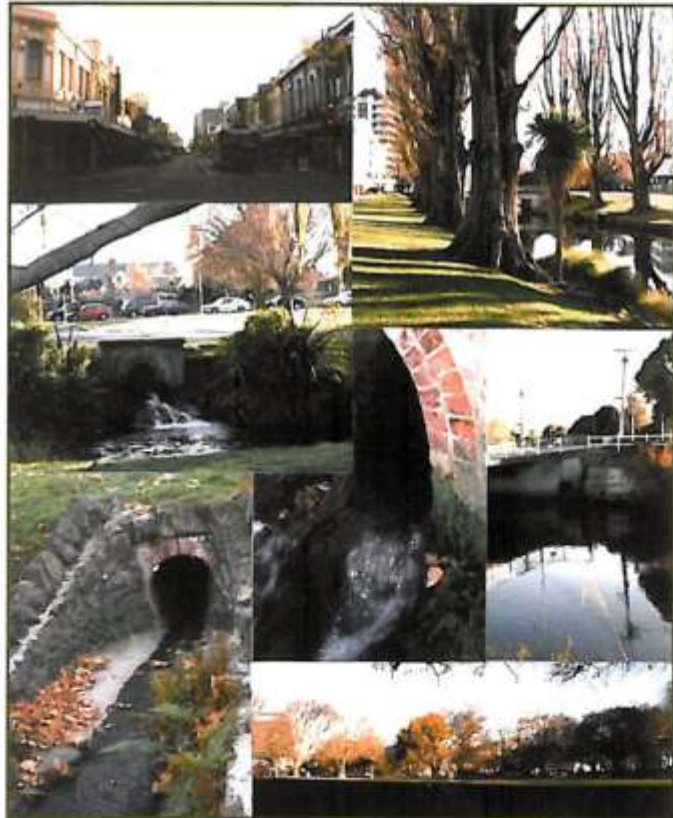
LEGEND

- Major Roads
- Railway
- Open Waterways
- Piped Waterways
- Reserves/Conservation Areas/Significant Grass or Open Space



CENTRAL CITY NEIGHBOURHOODS
PROJECT AREA 7

CENTRAL CITY



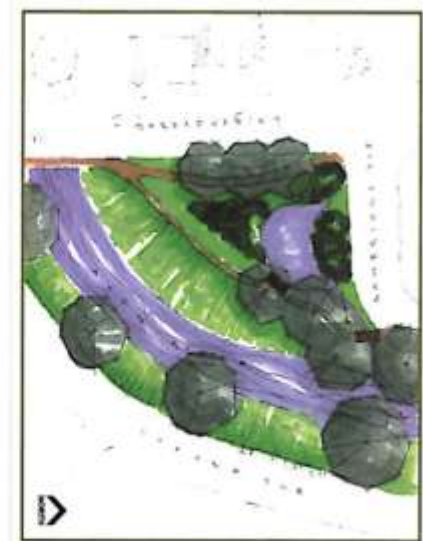
CHARACTER

NEIGHBOURHOOD



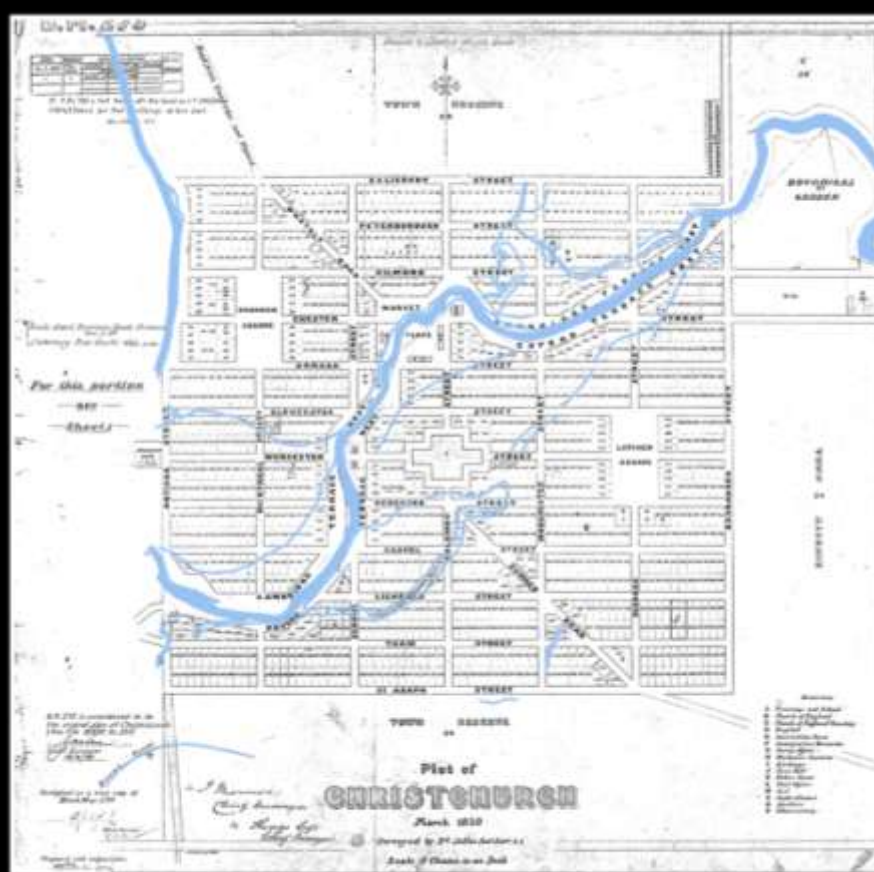
100 50 0 100 200 300 400 500 600 700 800 900 1000
SCALE (m)

- Existing and Potential Values:
- Ecological values confined to river corridor.
 - Highlight drainage system through visual cues, eg durable & artistic works beside sumps - fish symbol.
 - Highlight brick barrels & interpret as historic part of drainage system.
 - Enhance stormwater outfalls.
 - Investigate options for 'daylighting' piped systems with regard to life of structures.



VISION: ICONS & OUTFALLS

Central City Waterways as at 1850 & in 2000





Day-lighted stream corner of Barbados & Salisbury Streets

Day-lighted waterway through central Seoul



AFTER



BEFORE



Re-instate lushness



Re-instate lushness

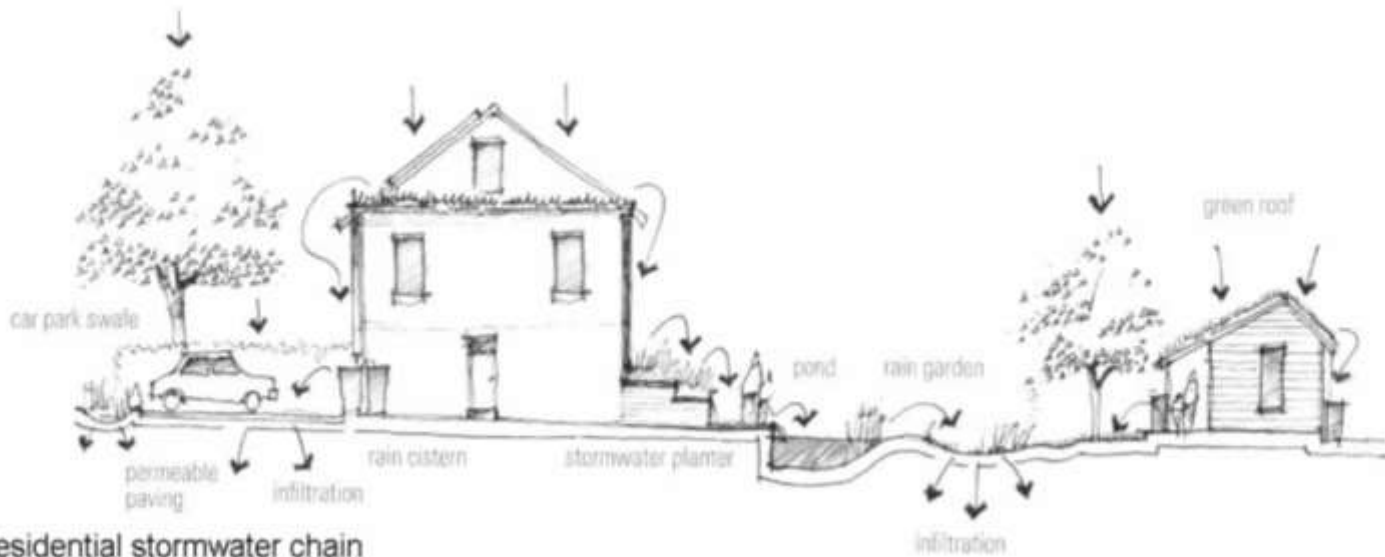


'Marokapara' Green Roof (built 1998)

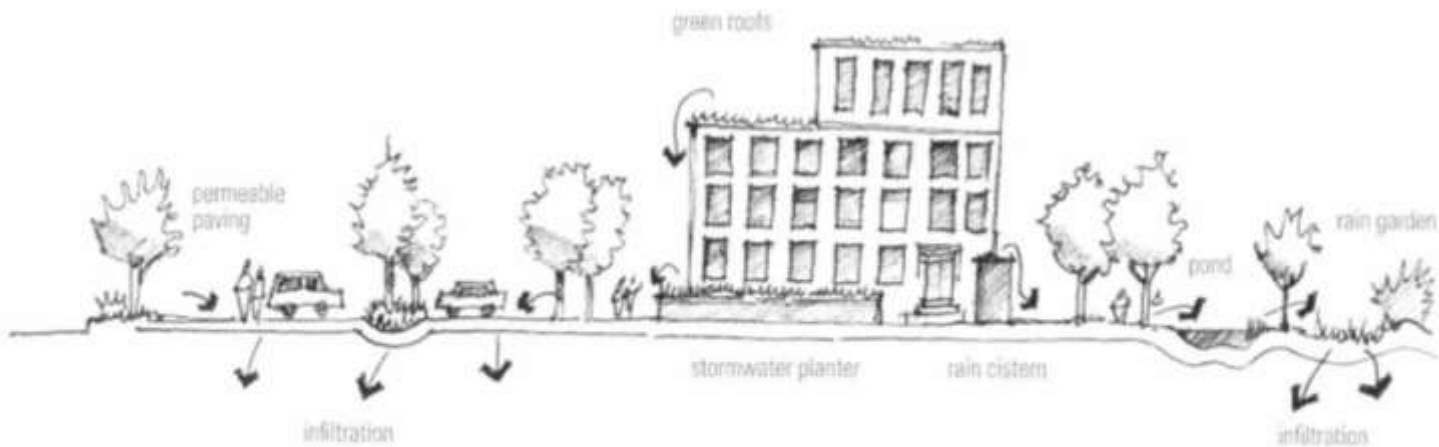
example of a 'green roof' in the city increasing local biodiversity while reducing water runoff



Wall greened with
native climber



Residential stormwater chain



Commercial stormwater chain

Linked sequences of features can capture rainfall and release it back into the landscape.

Adapted from Nigel Dunnett and Andy Clayden. 2007: Rain Gardens

Rain Gardens



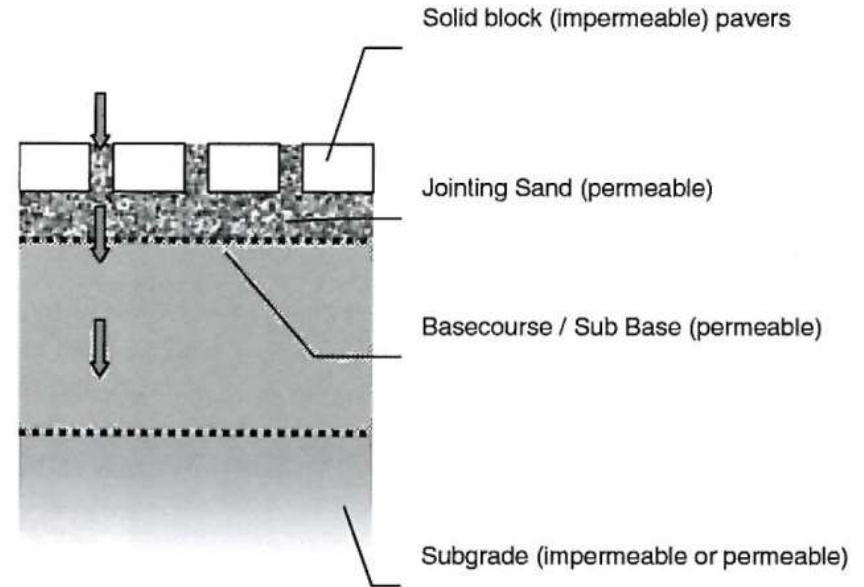
Infiltration planter intercepts water from the roof before being gradually released into the groundwater. Excess water overflows the planter into the next stage in the link of stormwater features.

Adapted from Nigel Dunnett and Andy Clayden 2007. Rain Gardens



The flow-through planter creates a sealed container that gradually releases the water through evapotranspiration or into the next stage of the stormwater features.

Adapted from Nigel Dunnett and Andy Clayden 2007. Rain Gardens



† Permeable paving allows rainwater to filter through directly into a gravel basecourse and then either into the underlying soils or collected by a drain coil to a discharge point.

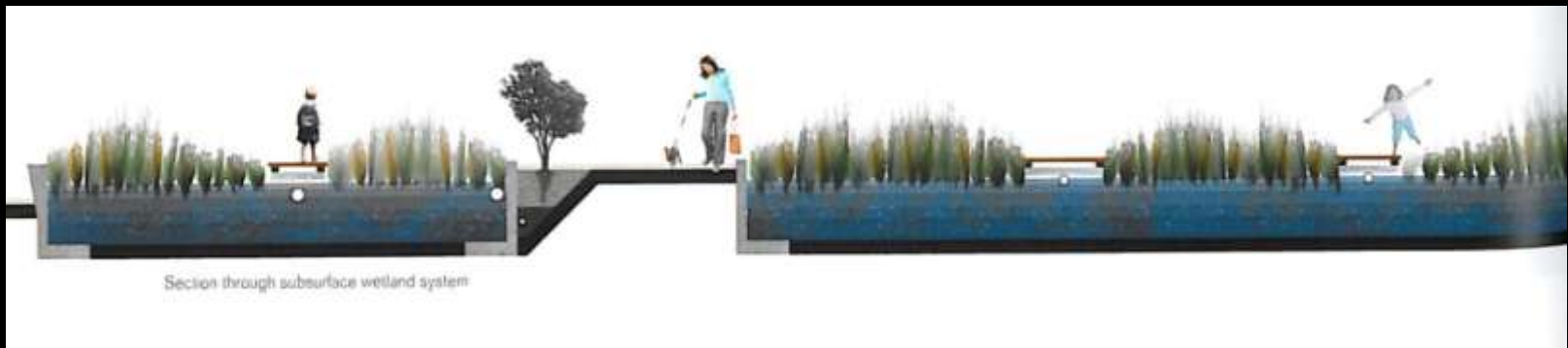
← Shallow ditches with grass and/or plants, called swales, use plants to purify stormwater.

Sources: North Shore City Council, Stormwater Management Practice Note NSC 23, Permeable Pavement Design Guidelines

www.civusmultirum.com/products_basic.shtml

Source: *A Deeper Shade of Green*, p99

Waitangi Park, Wellington



Source: *A Deeper Shade of Green*, p184



Source: Waitangi Park, Wraight Associates



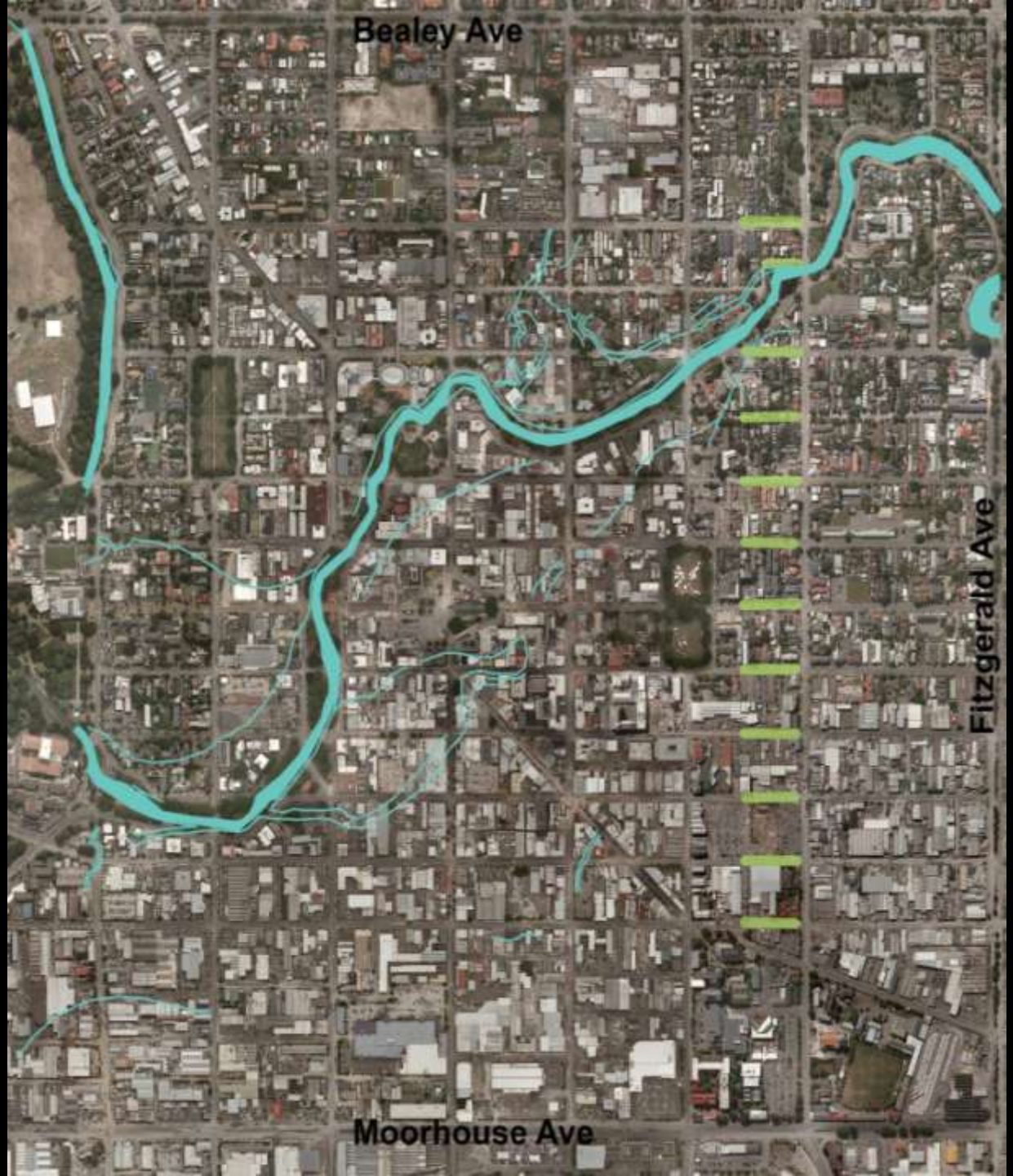
IMAGE: WRIGHT AND ASSOCIATES



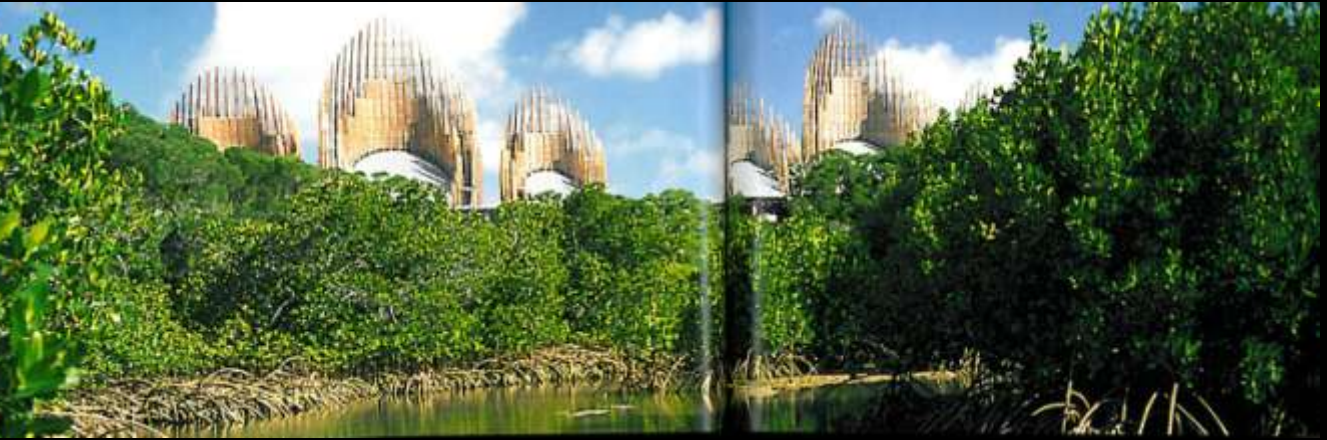
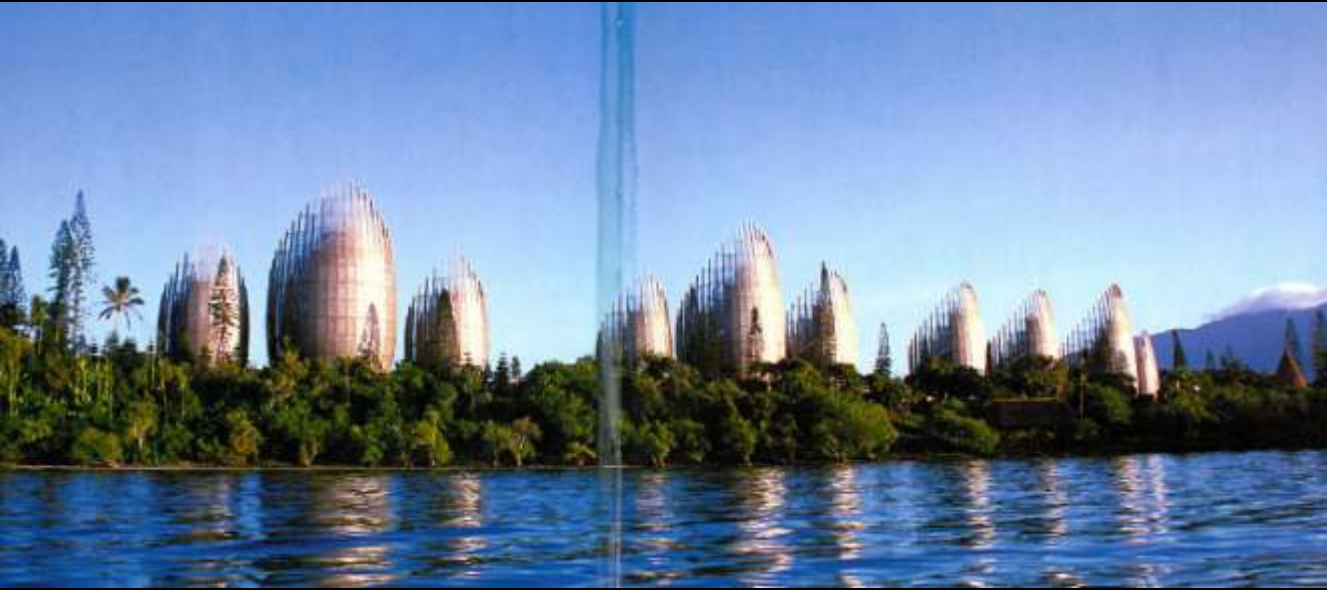
STUFF THE GRID!

The draughty east-west channels, that is, plant them up.

Bisect & intersect the grid to create friendly, green lane spaces.



Tjibaou Cultural Centre, New Caledonia



City of 1000 lakes vs City of many thousands of wells & springs

Sister City : Wuhan, China

Like Wuhan, Christchurch has a high water table, resulting in many springs and waterways.

Wuhan has many freshwater lakes.

Christchurch has the sea coast.

Waterways - the springs, rivers, streams, wetlands, estuary and coast - form a natural landscape matrix and structure for this city.

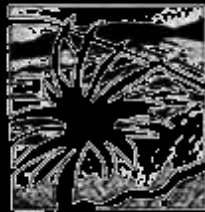


Sister City : Wuhan, China



Reveal our wetlands for amenity, biodiversity & research as at Wuhan

lets ROC!
(Renew Our City)
June 21, 2011



Lucas Associates

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