

# Sponge Cities

## Can they help us survive more intense rainfall?

**KALI MERCIER**

DEPUTY DIRECTOR OF THE HELEN CLARK FOUNDATION, AND WSP FELLOW

**BRIGITTE HICKS**

SENIOR SUSTAINABILITY CONSULTANT



# Why do we need a new approach?

- 1 Increasing - and more Intense - rainfall
- 2 Ageing pipes and infrastructure
- 3 Cities are becoming less green, and we are losing trees

- 4 Cities will have to house more people
- 5 Conventional city design favours impermeable surfaces
- 6 We are not tracking risk comprehensively or consistently



# What are Sponge Cities?

- Sponge Cities work with water rather than against it, absorbing, storing, and slowly releasing stormwater into the environment.
- Approaches include 'daylighting' streams, reducing impervious surfaces, enhancing green spaces to be more absorbent, and using green infrastructure (trees, swales, rain gardens, green roofs etc).
- Making space for water is a key element - Sponge Cities exclude vulnerable flood-prone areas from development.
- Sits alongside mātauranga Māori and other indigenous approaches world-wide that work with the environment, rather than trying to dominate it.
- Holistic and nature-based – Sponge Cities benefit biodiversity and human wellbeing by creating new habitats and amenities in urban areas.
- Lower embodied carbon, and more carbon sequestered.





## Haikou City, Hainan Island, China





# Singapore



# Greenslade Reserve, Northcote Auckland

Friday 27<sup>th</sup> January 2023

Photo: Kate Johnson



..... and the next morning





## Dudley Creek, Christchurch



## Te Auaunga Awa / Oakley Creek, Auckland

# Show me the \$\$

- **Early adaptation saves money.** The Global Commission on Adaptation found returns on investment of early investment in adaptation of as much as 10:1 within ten years.
- **Nature-based solutions cost less.** According to research by Arup and the World Economic Forum, nature-based solutions are 50% more economical than human-made solutions, and 28% more effective.
- **It will be cheaper than more, and bigger, pipes.** Wuhan's transformation into a sponge city saved US \$600 million compared with the cost of equivalent 'grey' infrastructure.
- **NZ research shows savings of 14-35%** for the use of water sensitive urban design in new developments.







## Kirimoko Park Wanaka

Photo courtesy of AR & Associates



## KEY RECOMMENDATIONS

- 1** **Retrofit cities and towns to become sponge cities** to help us survive increasing rainfall associated with climate change. Take a holistic, nature-based approach to capture benefits for biodiversity and human health and wellbeing.
- 2** **Act urgently and decisively, and plan strategically** for the long-term at the national, regional, and local levels. Name and prioritise nature-based sponge city approaches as a key climate adaptation approach for Aotearoa.
- 3** **Identify cities and towns at the greatest risk and prioritise support.** Develop and agree a national funding approach to help cities build resilience.





## KEY RECOMMENDATIONS

### At the city and catchment level:

1

**Plan for flood resilience solutions that include a network of blue and green spaces** across whole catchments, not just in some neighbourhoods.

2

**Long term plans at council level should include strategies to make more space for water** along flood plains and flow paths, including by moving people and infrastructure, if needed.

3

**Plan for and provide public green and blue spaces** in the same ways as other essential infrastructure.



## KEY RECOMMENDATIONS

### At the neighbourhood and development level:

- 1 Retrofit existing neighbourhoods, roads and private land to become more absorbent.** Use urban and suburban road corridors and other public and private land for green infrastructure; require new buildings in the inner city to include green infrastructure; and unseal hard surfaces.
- 2 Encourage ‘upwards’ development** in preference to ‘outwards’ sprawl and ‘infilling’ back yards. Develop clear guidance on how to address conflict between housing needs, and the need to provide green spaces.
- 3 Require all new developments to follow water sensitive urban design principles.** Raise the national minimum standards for proportion of the total area of new developments that must be left unsealed and require more parkland to be zoned as part of new developments.





## KEY RECOMMENDATIONS

### At the local level:

1

**Incentivise and educate homeowners to make land around private residences more absorbent**, for example, by providing free advice such as home audits. Consider rates rebates (including ‘treebates’) or discounts on materials.

Encourage homeowners to:

- Minimise the use of sealed surfaces.
- Make sure flow paths are not blocked.
- Replace lawns with plants and trees, install rainwater tanks and small-scale rain gardens to collect water and remove pollutants, and recycle rainwater.



## KEY RECOMMENDATIONS

### For businesses:

1

**Understand risk for your properties.** Consider flow paths, nearby rivers, etc.

2

**Make your properties spongier by retrofitting sponge city approaches** such as underground detention tanks, raingardens, and permeable paving. Plant trees.

3

**Change property development approaches** to follow water sensitive urban design principles. Minimise soil disturbance, retain natural features and trees, favour green infrastructure over grey.

4

**Work with local councils and community groups** to make your neighbourhoods more flood resilient.

5

**Lobby for nature-based flood resilience solutions** at the national and regional level.





**Thank you**

**All references are available in the full report:  
<https://helenclark.foundation/publications-and-medias/sponge-cities/>**

