River Revitalisation for the Triple Bottom Line:
International Best Practice and Applications in Hong Kong

David Gallacher

November 25th, 2017

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Contents

- River Degradation and Revitalisation
- Hong Kong Context
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River Degradation - Pollution

Fen River, China

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River Degradation – Hydrology

Photo: https://www.npr.org/sections/pictureshow/2011/07/15/137821595/why-the-colorado-river-stopped-flowing

Colorado River, USA

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River Degradation – Flood Control and Channelization

Tokyo, Japan

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River Revitalization – The Triple Bottom Line

Revitalizing rivers to maximize direct and indirect environmental, social and economic values and benefits

South Platte River, Denver

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The Triple Bottom Line

Environment

- Ecological Value
- Flood Management
- Erosion Control
- Water Quality Improvement
- Air Quality Improvement
- Carbon Sequestration
- Reduced Urban Heat Island

Photo:
https://commons.wikimedia.org/wiki/File:Hong_Kong_Newt_(Paramesotriton_hongkongensis

Hong Kong Newt (*Paramesotriton hongkongensis*)

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The Triple Bottom Line

Social

- Public Enjoyment
- Walkability, Cycling and Recreation
- Civic Pride and Environmental Responsibility
- Public Events
- Improved Health
- Education Opportunities

Photo: https://www.trinityhs.org/student-life/blazers-in-the-know/2016-high-school-expeditions/

Chicago River, USA

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The Triple Bottom Line

Economic

- Direct Employment
- Land and Property Value
- Private Sector Investment
- Avoided Cost for Stormwater Management
- Avoided Costs for Air Pollution Control
- Avoided Costs for Health Care

Photo: http://www.travelandleisure.com/slideshows/americas-coolest-river-walks#1

San Antonio River, USA

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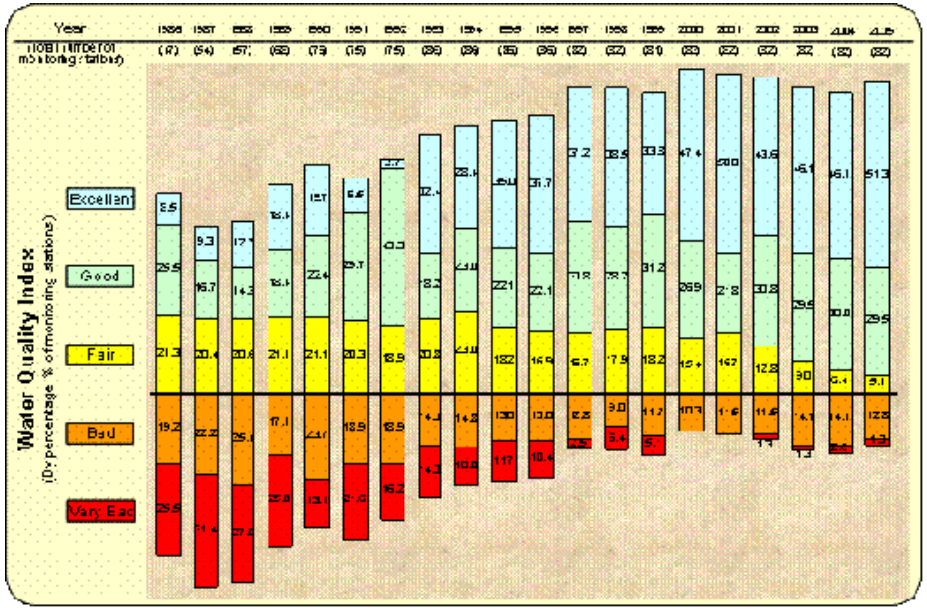
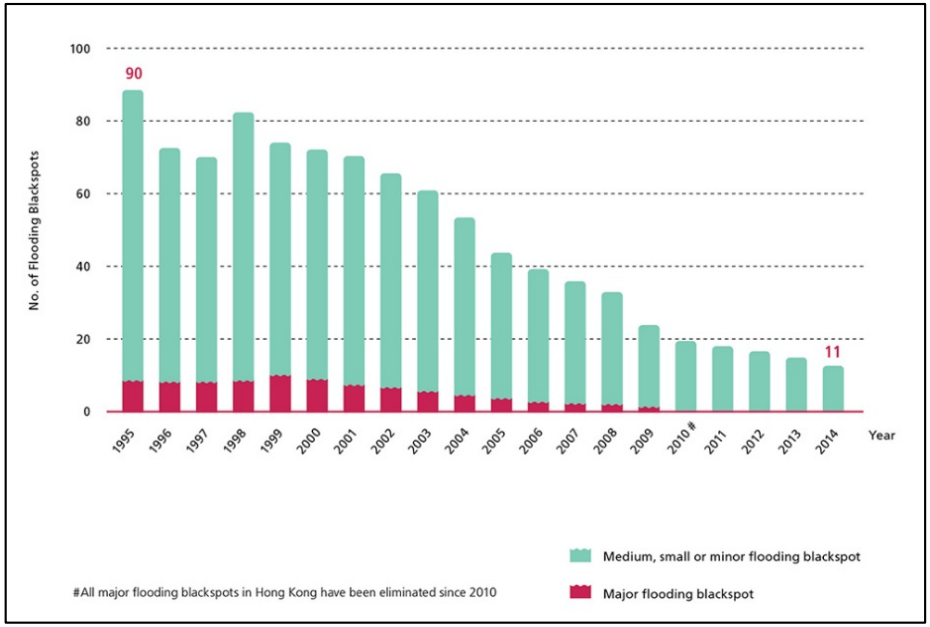
Hong Kong Context

- Upland streams well protected.
- Historically, lowland rivers and drainage channels impacted by:
  - Point and non-point source pollution.
  - Water abstraction: 17 local reservoirs with total capacity of 586.05 m^3 million.
  - Flood control and channelization





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Hong Kong Context

- 1980-1990 – trapezoidal, concrete lined channels to maximize conveyance

Hong Kong Context

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- 1990-2000 – Adoption of grasscrete/gabion and other landscape/ ecological enhancement features.

Hong Kong Context

- 1980-1990 – trapezoidal, concrete lined channels to maximize conveyance
- 1990-2000 – Adoption of grasscrete/gabion and other landscape/ ecological enhancement features.
- 2000-2010 – Improved ecological enhancement measures.

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Hong Kong Context

- 2015 CE Policy Address 2015 “We will adopt the concept of revitalising water bodies in large-scale drainage improvement works and planning drainage networks for NDAs so as to build a better environment for the public.”

- Policy Agenda 2015 “….promoting greening, biodiversity, beautification and water friendliness in addition to achieving efficient drainage, with a view to building sustainable drainage facilities and providing a better living environment.”

- 15-20 revitalisation projects under consideration.

Proposed revitalization of Kai Tak Nullah

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Case Studies: River Lea, London UK

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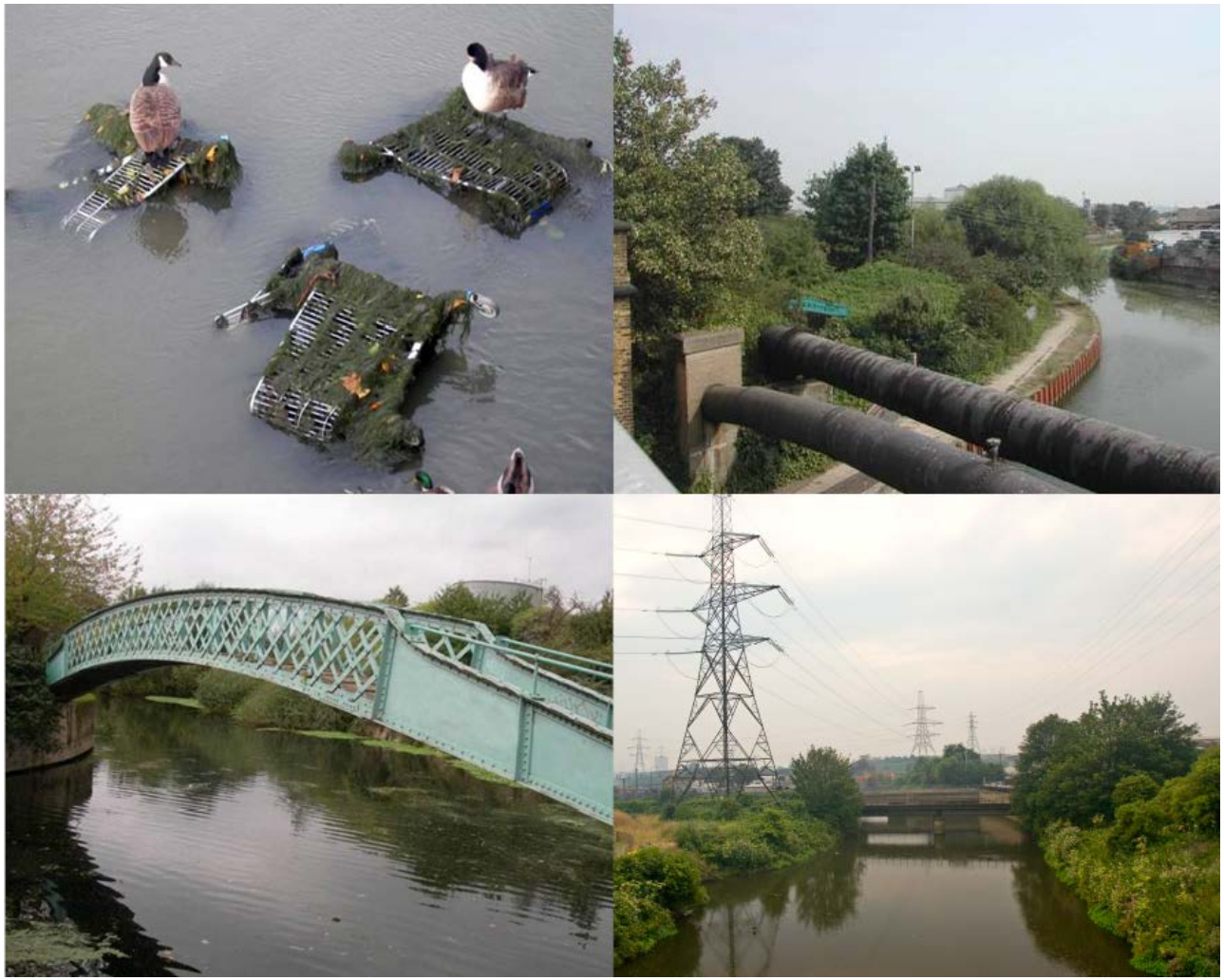

Case Studies: River Lea, London UK

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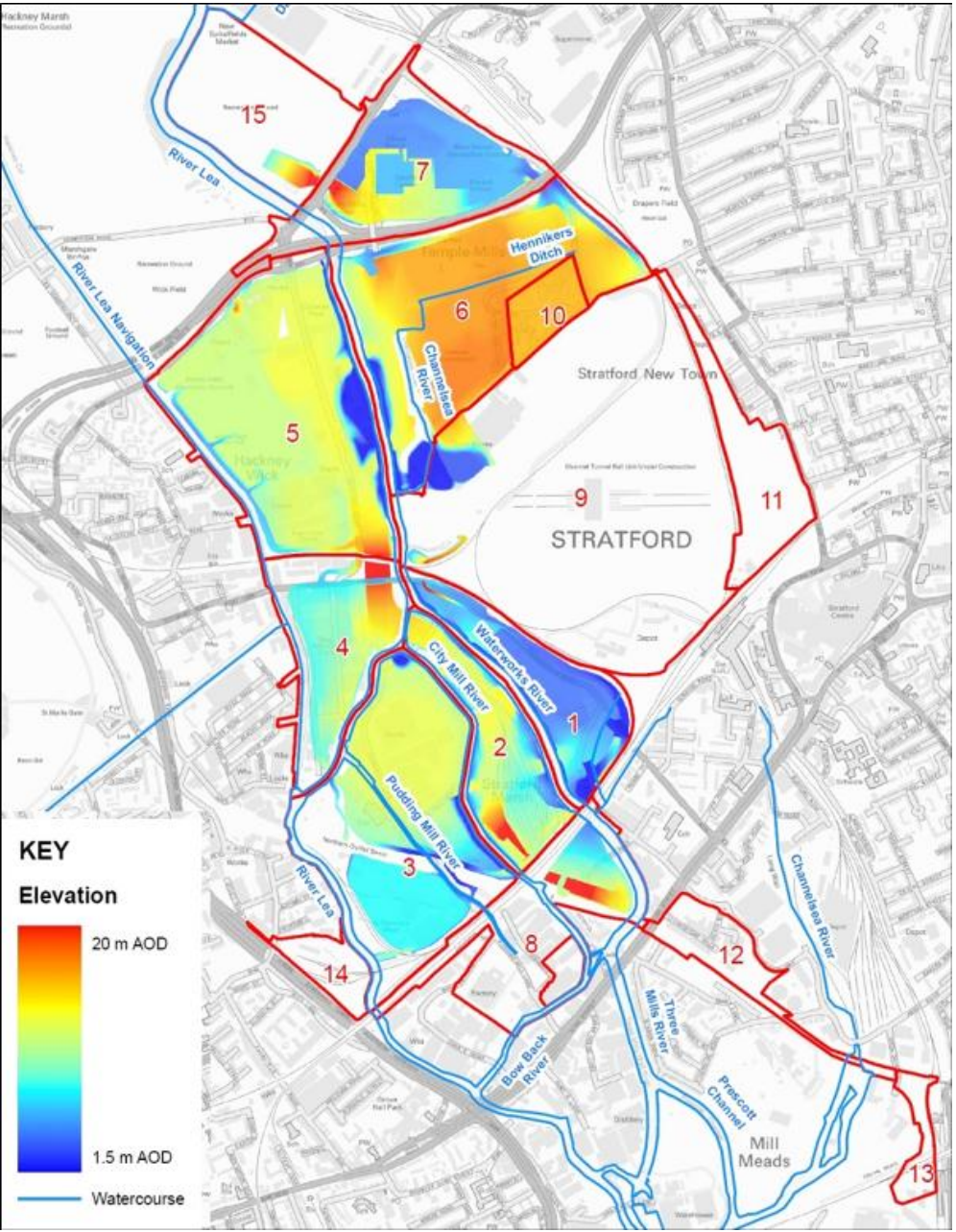

- The site topography was re-profiled as part of development:
- Some areas raised over 9m, other areas deepened and widened to form wetland bowl within the River Lea.
- The Park is protected against fluvial flooding and manages flooding generated by a 100 year return period rainfall event plus Climate Change allowance.
- Extensive Sustainable Drainage Systems (SuDS, also called Water Sensitive Urban Design, WSUD) to manage runoff generated from the project site.

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Case Studies: River Lea, London UK

Key

Existing soft bank retained - with towpath

Existing soft bank retained - no towpath

New soft bank- with towpath

New soft bank - no towpath

Existing river wall retained and repaired

New river wall - 8m set back from water edge

Existing wall retained as upstand

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Case Studies: River Lea, London UK

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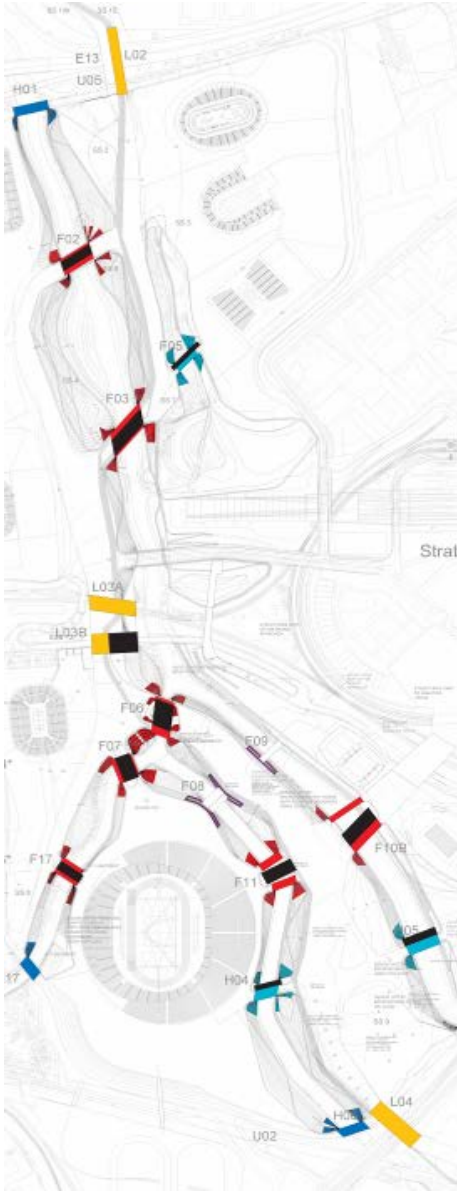

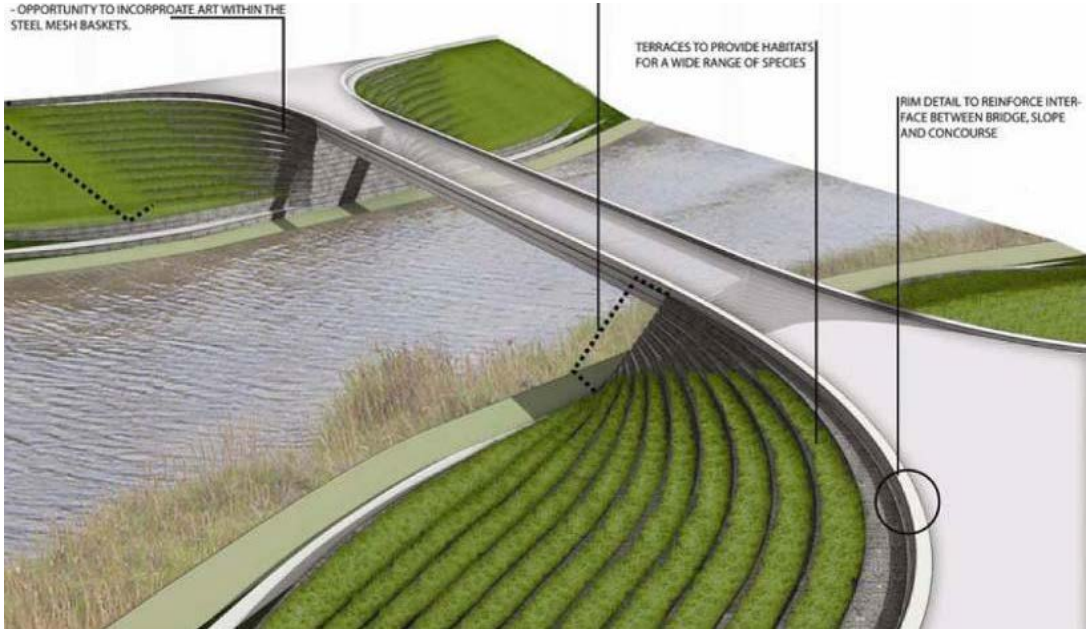

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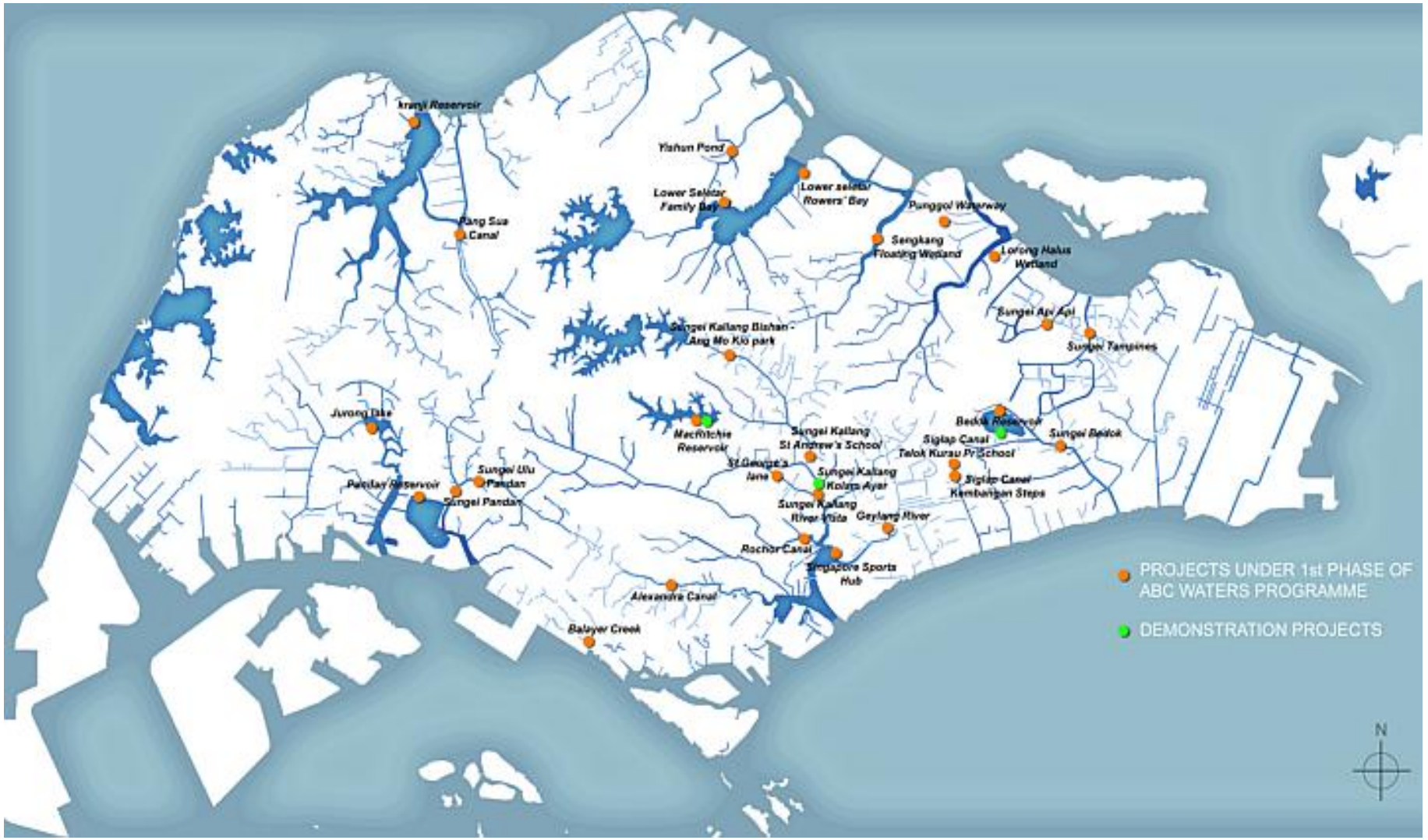
Case Studies: Urban Stormwater Management, Singapore



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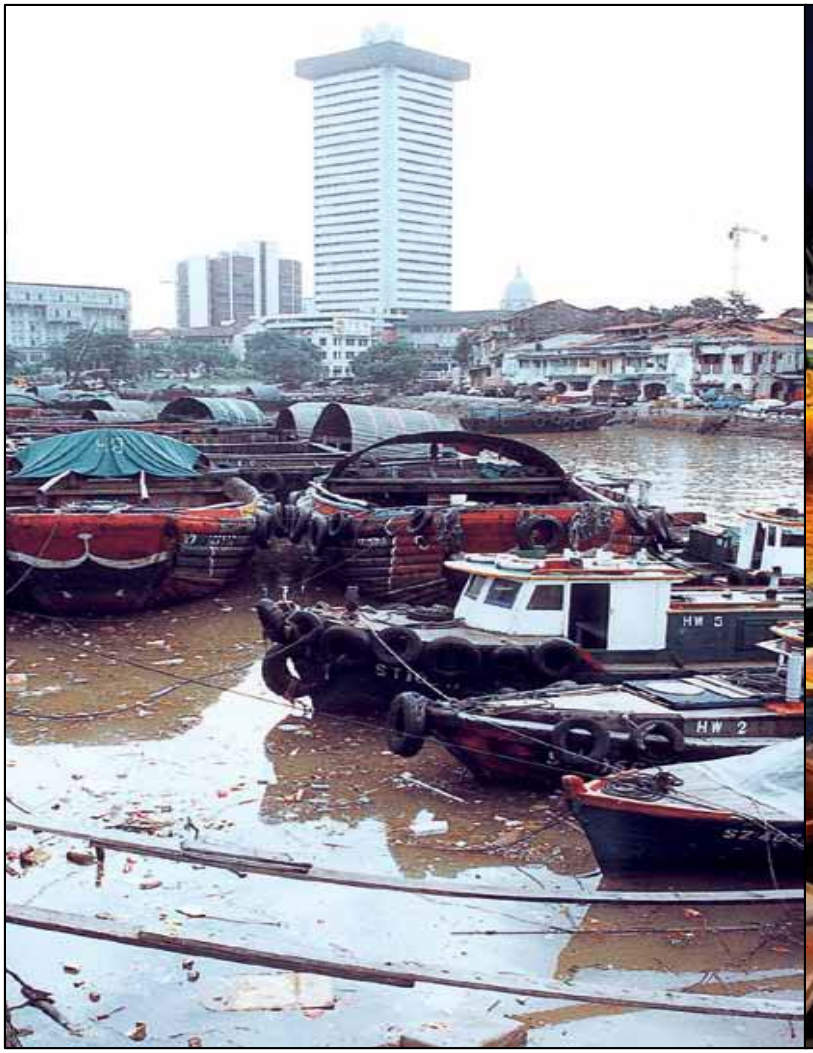
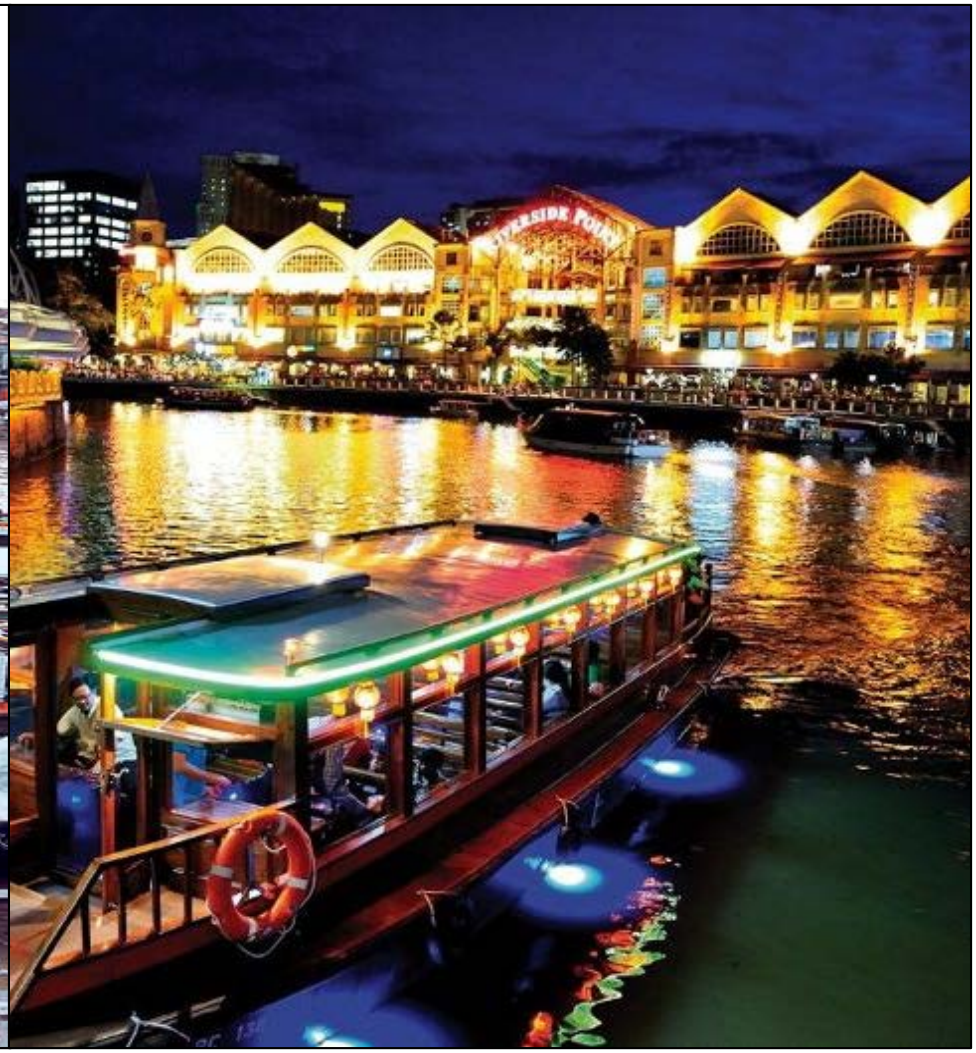
Case Studies: Urban Stormwater Management, Singapore





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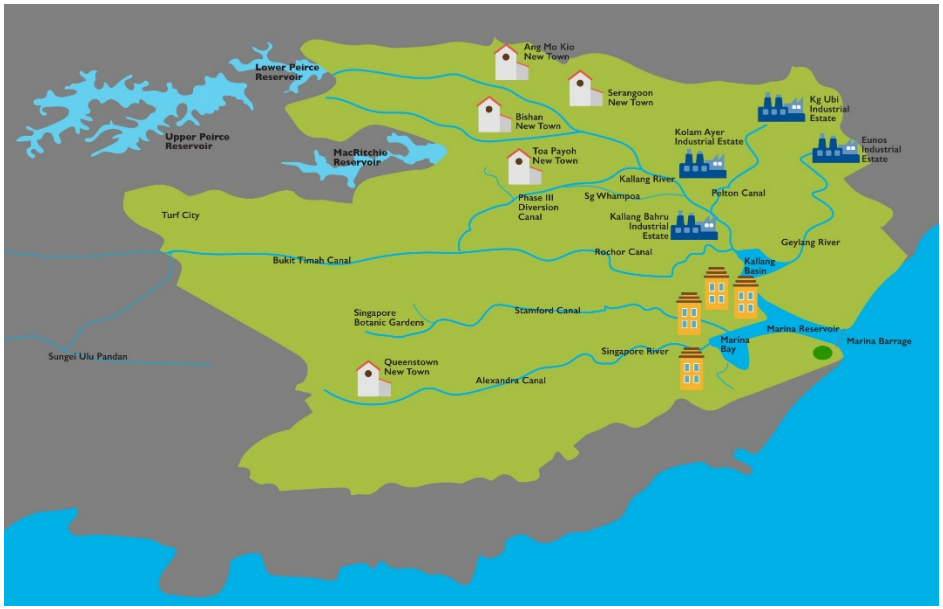
Case Studies: Urban Stormwater Management, Singapore



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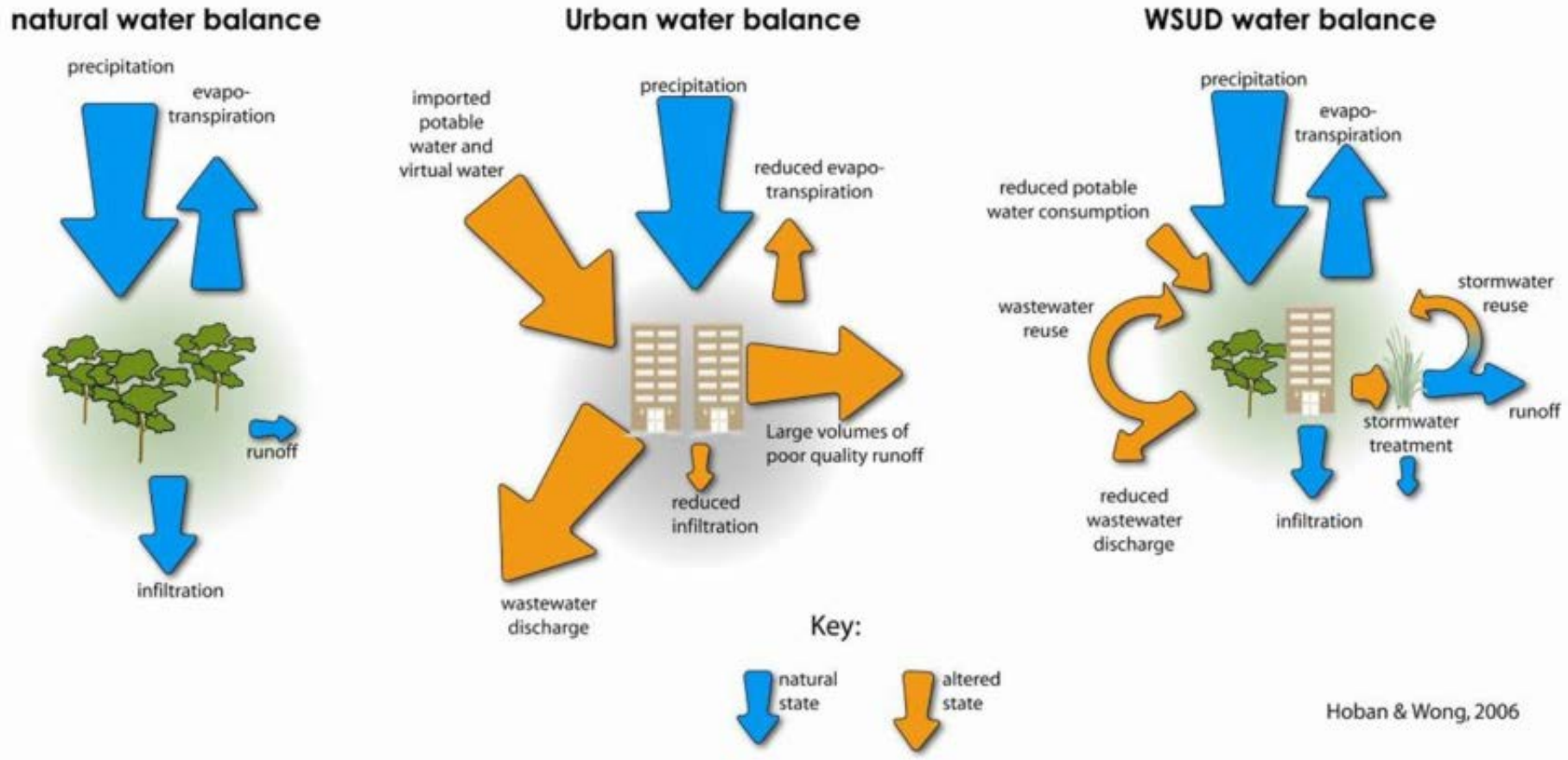

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Case Studies: Urban Stormwater Management, Singapore

Grove Drive Treatment Wetland, Singapore

- Urban stormwater management features retrofitted to existing drainage systems
- Linear Wetland collects polluted urban stormwater runoff and cleanses it before discharge into adjacent water channel
- Provides landscape enhancement alongside existing drainage channels with limited space for more extensive restoration.

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Case Studies: Urban Stormwater Management, Singapore

- **Active:**
  - Providing new community space
  - Bring people closer to waters
  - Developing a sense of ownership of waters
- **Beautiful:**
  - Integrating reservoirs and waterways with the urban landscape
  - Going beyond flood control and water storage
  - Creating aesthetically pleasing lifestyle attractions
- **Clean:**
  - Improving water quality
  - Public education

ABC
Active, Beautiful, Clean Waters for All

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Case Studies: Urban Stormwater Management, Singapore

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Case Studies: Urban Stormwater Management, Singapore

- Develop a customized sustainable development framework to measure, evaluate and monitor the sustainability performance of new CBD.
- Identify gaps and areas for improvements, and develop workable and integrated sustainable design and engineering solutions that can be implemented.

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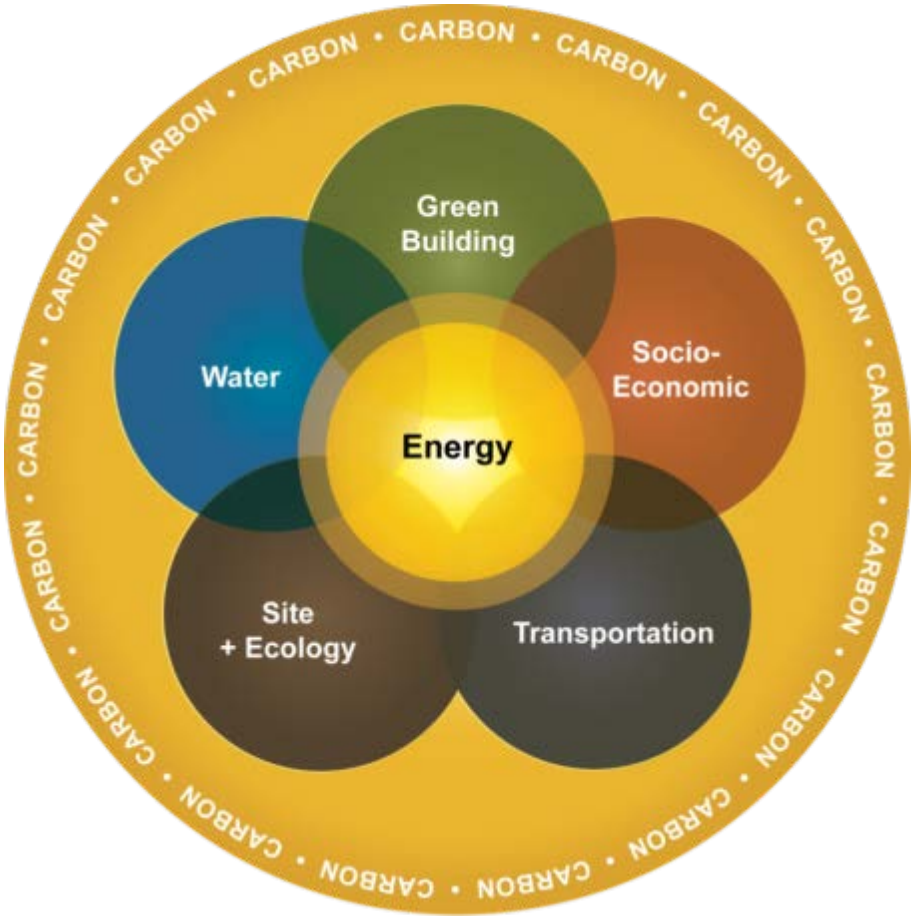
Case Studies: Urban Stormwater Management, Singapore

An Integrated Master Planning Approach – Sustainable Systems Integration Model/Method (SSIM™)

A model and methodology for quantifying, evaluating, balancing and costing a wide variety of sustainability strategies to determine the combinations best suited for environmental, social, and economic objectives.



- Addresses eco-system services, energy, transportation, buildings, water, and socio-economics as a holistic system
- Assess sustainability performance of alternative packages
- Quantifies cost and benefit for sustainable outcomes
- Tool to create low-carbon, financially viable project

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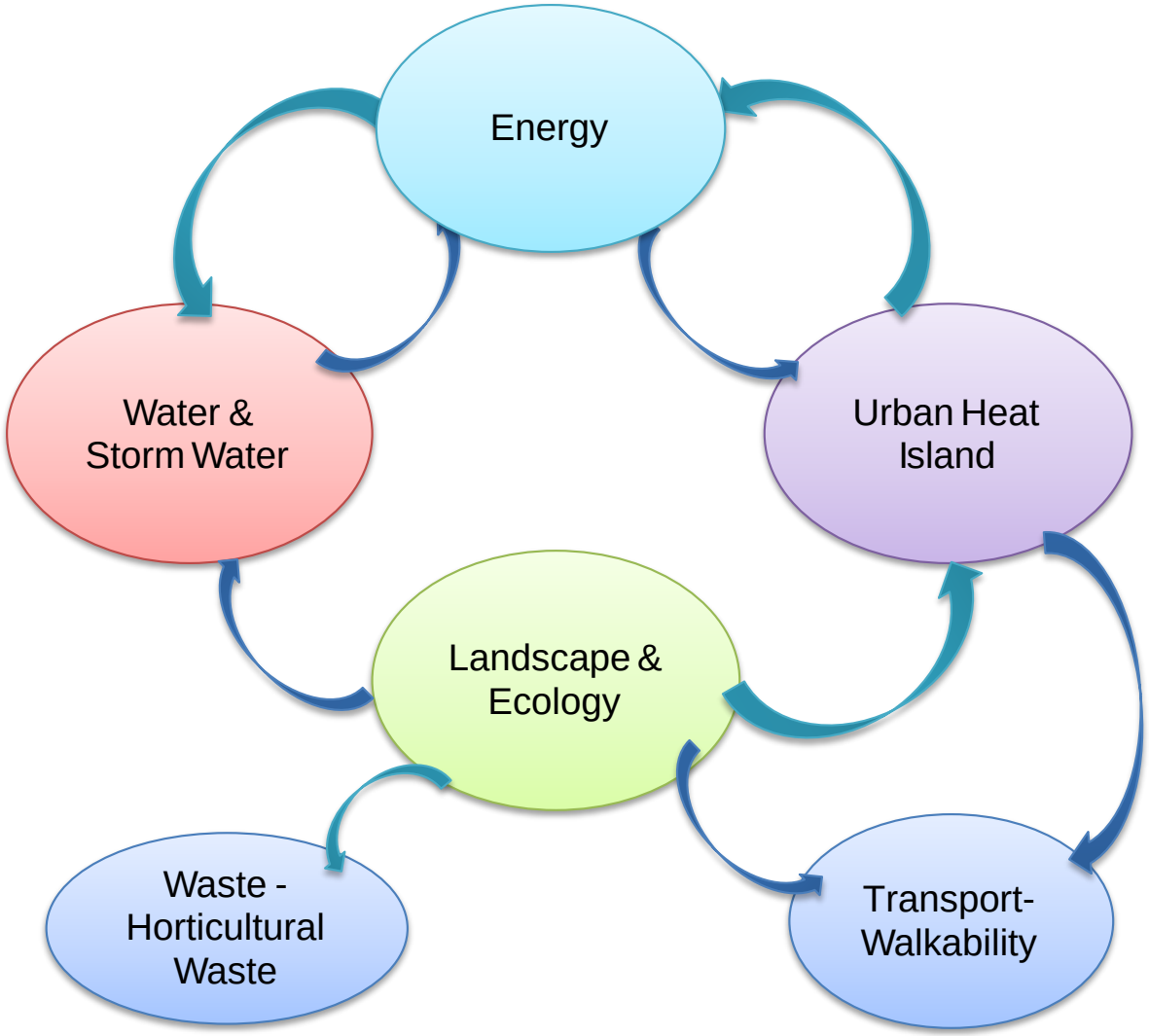
Case Studies: Urban Stormwater Management, Singapore

An Integrated Master Planning Approach
– Sustainable Systems Integration Model/Method (SSIM™)



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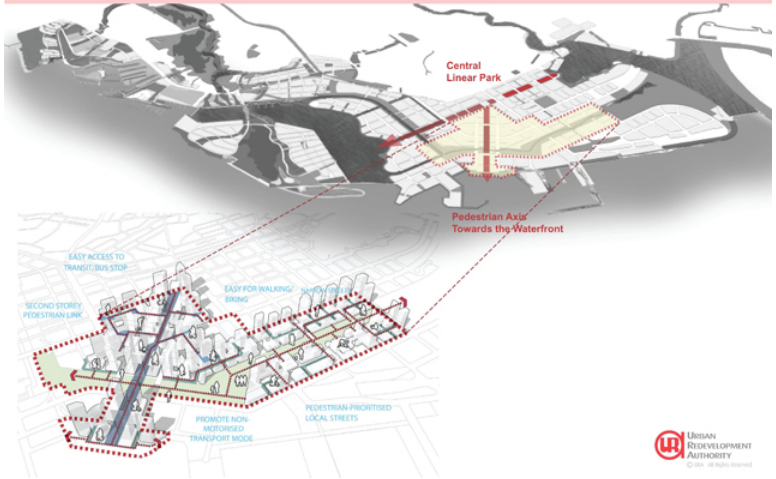
Case Studies: Urban Stormwater Management, Singapore

Idea 1: New Opportunities to Live, Work & Play

Idea 2: Extend the City to Greater Southern Waterfront

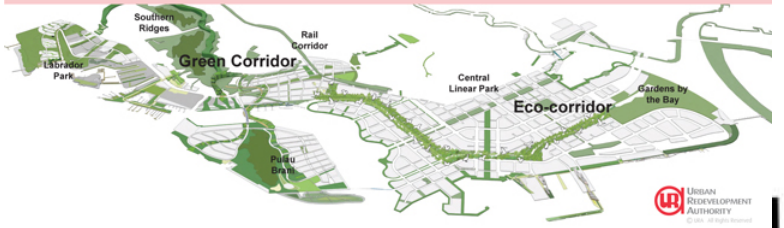
Idea 3: Expand the Network of Public Spaces



Idea 4: Capitalise on our Blue Assets

Idea 5: Create a Continuous Waterfront

Idea 6: Connect Green and Open Spaces



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Best Practice and Applications in Hong Kong

- Technical solutions available

Shui Chuen O Estate, Hong Kong

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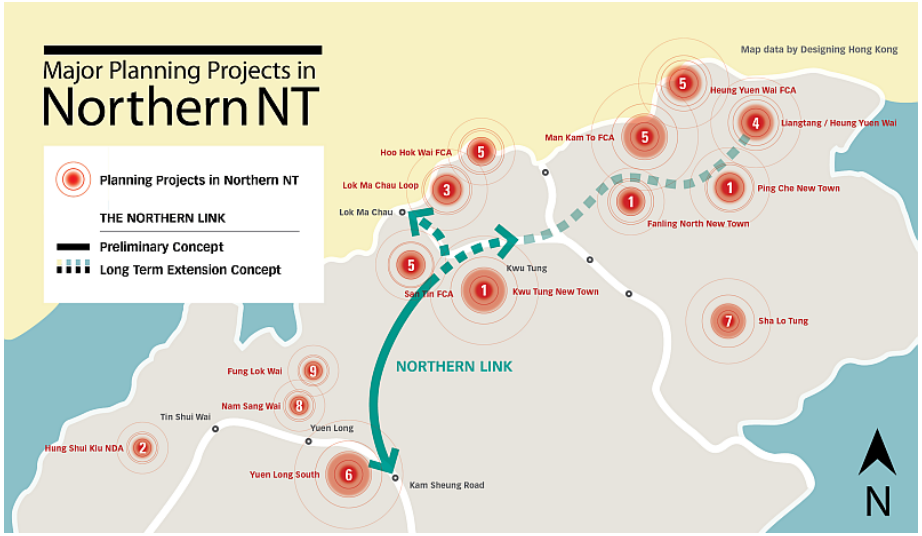
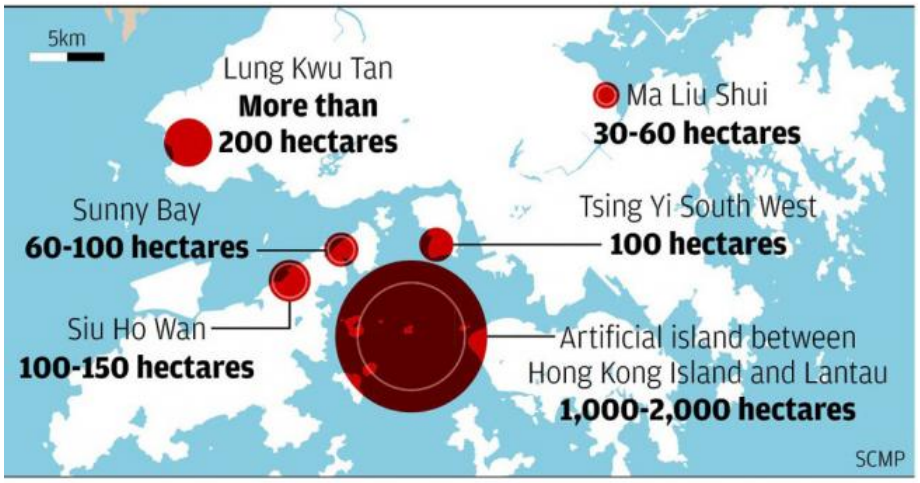
Best Practice and Applications in Hong Kong

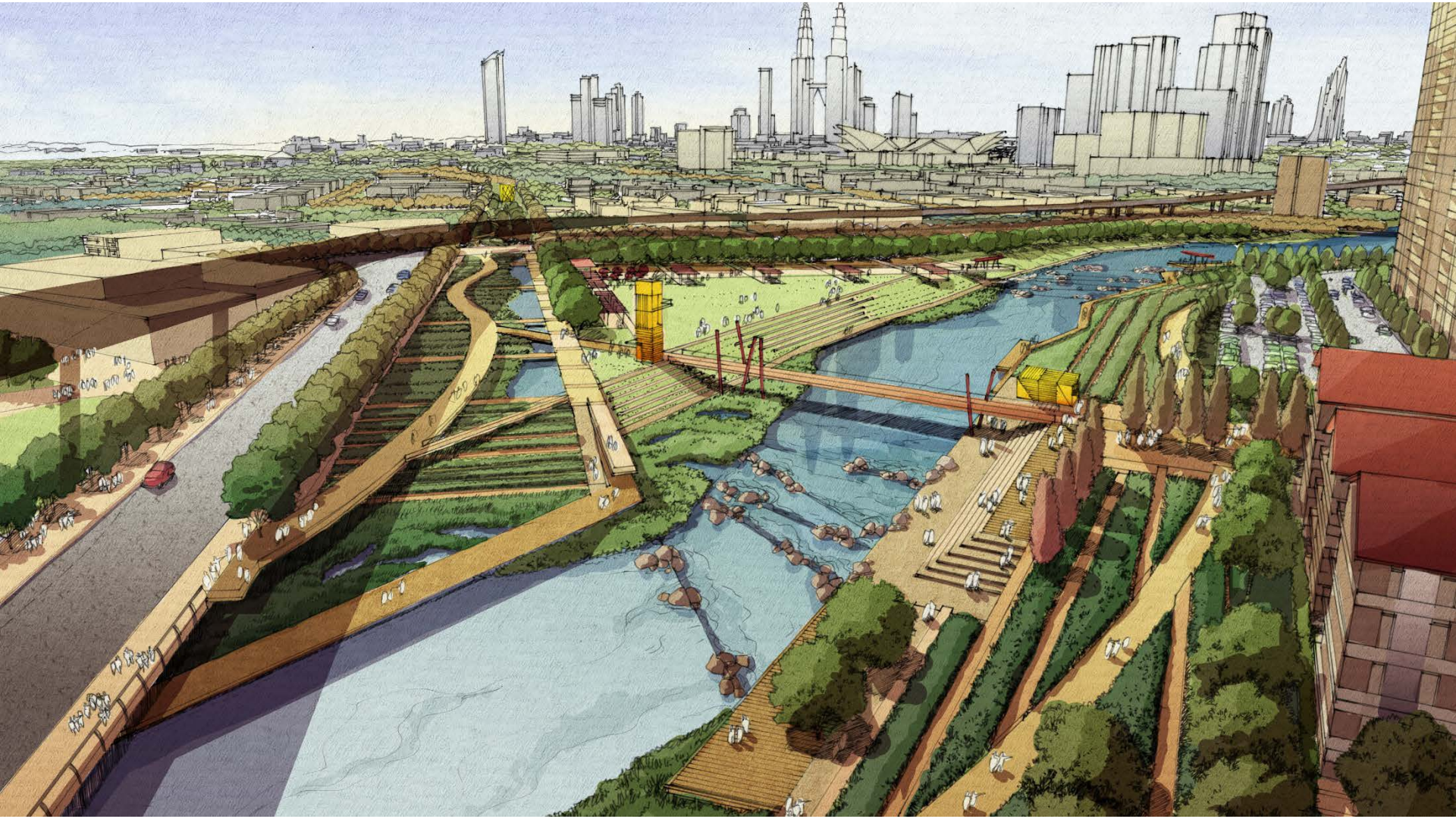
- Not just about the river channel – catchment level approach





Best Practice and Applications in Hong Kong

- Collaboration – Public Engagement and Support



River of Life, Kuala Lumpur, Malaysia

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Best Practice and Applications in Hong Kong

- Setting Objectives and Data Acquisition

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Best Practice and Applications in Hong Kong

- Monitoring, maintenance and adaptive management

Best Practice and Applications in Hong Kong

- Collaboration – Government

ABC
Active, Beautiful, Clean Waters for all

THE RIVER RESTORATION CENTRE
Working to restore & enhance our rivers

ARRC Australian River Restoration Centre

Trinity River Restoration Program
Restore • Adapt • Improve

River of Life

CHANGE The COURSE of LA

LA RIVER REVITALIZATION CORPORATION

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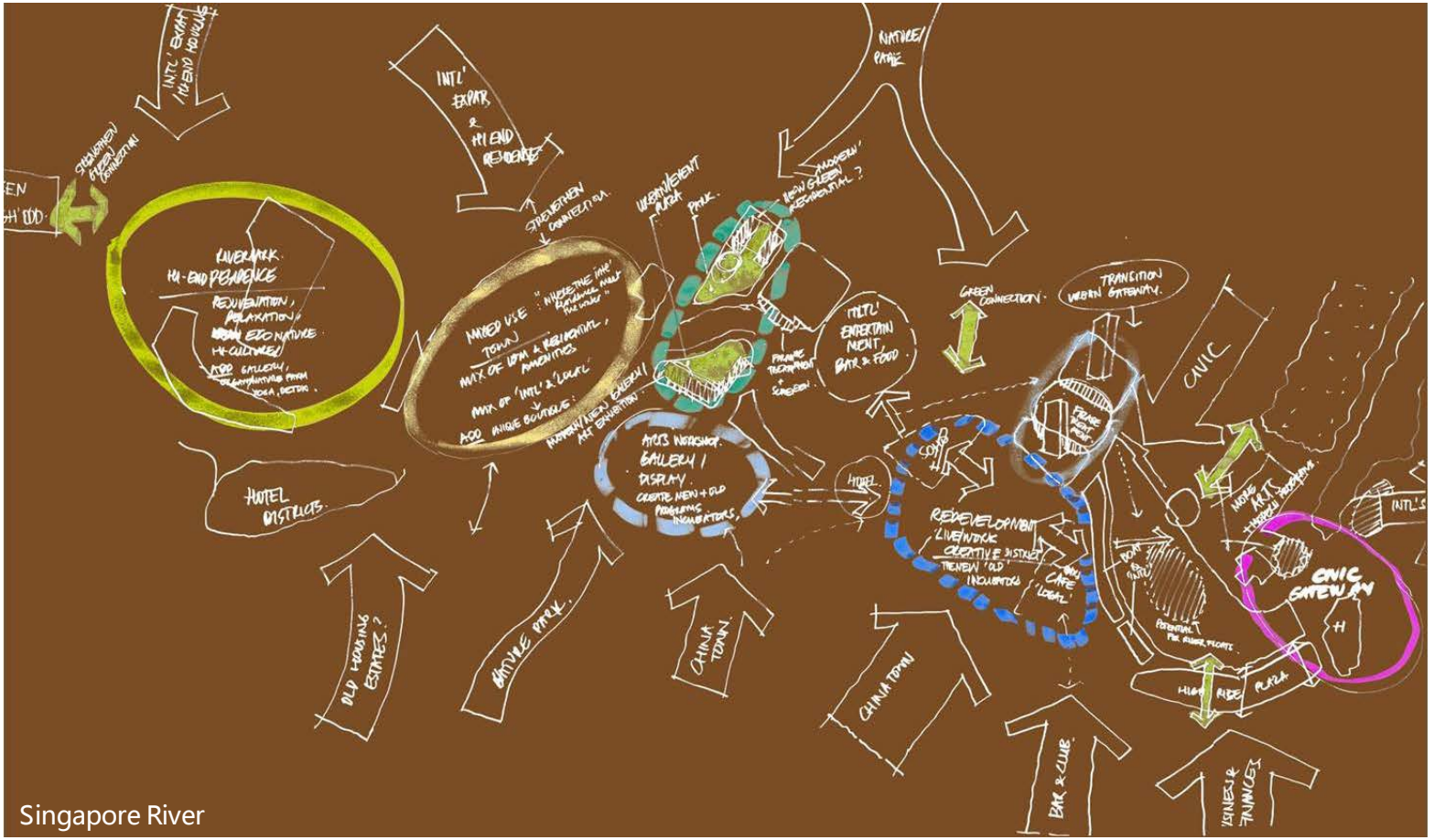
Best Practice and Applications in Hong Kong

- Collaboration – Multi-disciplinary design and construction



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