COLLINS WOERMAN

Climate Change and Cities of the Future

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INTERNATIONAL WATER ASSOCIATION

CITIES MUST ADAPT

- The world has changed
  - Climate change
  - Urbanization and growth
  - Competition for Energy
  - Infrastructure costs
- Our systems are not resilient
  - Past weather is no longer a guide
  - Existing systems need repair
  - New approaches can handle extremes and bounce back

Outline

- How to build capacity
  - Build connections between silos of expertise
    - Better able to handle a more extreme events
    - Adaptable in times of uncertainty from climate change
  - Build prototypes
  - Create special circumstances to allow for innovation
- Examples
- Why now?

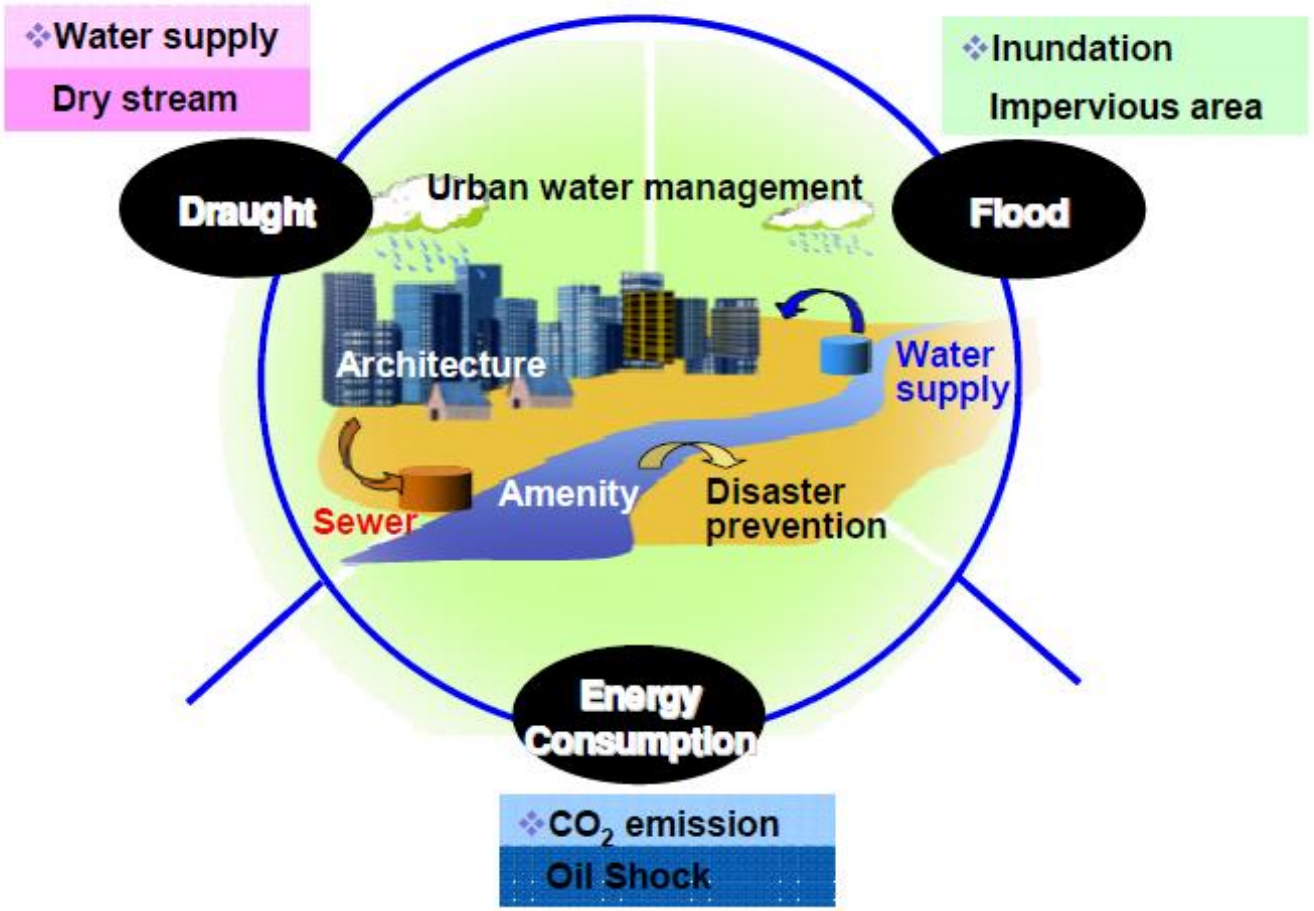
HOW TO BUILD CAPACITY TO RESPOND?

A. Build connections between silos of expertise
   A. Better able to handle a more extreme events
   B. Adaptable in times of uncertainty from climate change
B. Build prototypes
C. Create special circumstances to allow for innovation
D. Why?

A. BUILD CONNECTIONS BETWEEN SILOS

A. BUILD CONNECTIONS BETWEEN SILOS

REINTRODUCE WATER AND NATURAL PROCESSES INTO THE HEART OF THE CITY



Graphic: Mooyoung Han, Seoul National University

B. BUILD PROTOTYPES

In areas that are:

- Changing from one use to another
- Attracting Growth/investment
- Require expensive capital investment
- High profile that can serve as teaching tools

C. CREATE SPECIAL CIRCUMSTANCES TO ALLOW FOR INNOVATION

1. Broaden the goals
2. Assemble a special integrated team
3. Create special exceptions to the rules
4. Make it a measureable experiment (business cases)
5. Make it a teaching tool with feedback loops

1. BROADEN THE GOALS

- Resilience
- Adaptability
- Community/user involvement
- Education
- Beautiful/delightful

2. ASSEMBLE A SPECIAL INTEGRATED TEAM

- Convene an expert team of multiple backgrounds
  - Land use, transportation, energy, water, economics and more
  - Team members deep in at least one “silo” but a broad thinker
  - Respected by the experts within the government
- Give them broad authority
- Collaborate two years early
  - Don’t try and change a project that is already underway – too much momentum! Too hard to change!

3. CREATE SPECIAL EXCEPTIONS TO THE RULES

- Place project in a special category for land use, energy code, etc.
  - May require special legislation
- Create “barrier buster” advisors to the project
  - They become internal advocates

4. MAKE IT A MEASUREABLE EXPERIMENT

- Create a business case
  - Develop and compare robust alternatives to business as usual
  - Compare life cycle costs
  - Quantify risk cost
  - Set performance goals
    - Similar or less cost
    - Same or higher levels of service

5. MAKE IT A TEACHING TOOL WITH FEEDBACK LOOPS

- Report lessons learned
- Create recommendations
- Evaluate post completion performance

CREATE SPECIAL CIRCUMSTANCES TO ALLOW FOR INNOVATION

1. Goals
2. Special team
3. Exceptions to the rules
4. Measurable experiment
5. Teaching tool

CREATE SPECIAL CIRCUMSTANCES TO ALLOW FOR INNOVATION

1. Goals

Resilience/Adaptability

2. Special team

Integration/Governance

3. Exceptions to the rules

Regulations/Incentives

4. Measurable experiment

Dense monitoring

5. Teaching tool

Smart Systems

EXAMPLES

- Seoul
- Stockholm
- Qingdao
- Langfang, China
- Singapore
- Zhangjiawo, China
- Star City, Seoul
- Seattle


Chonggyechon Seoul, Korea


Chonggyechon Seoul, Korea

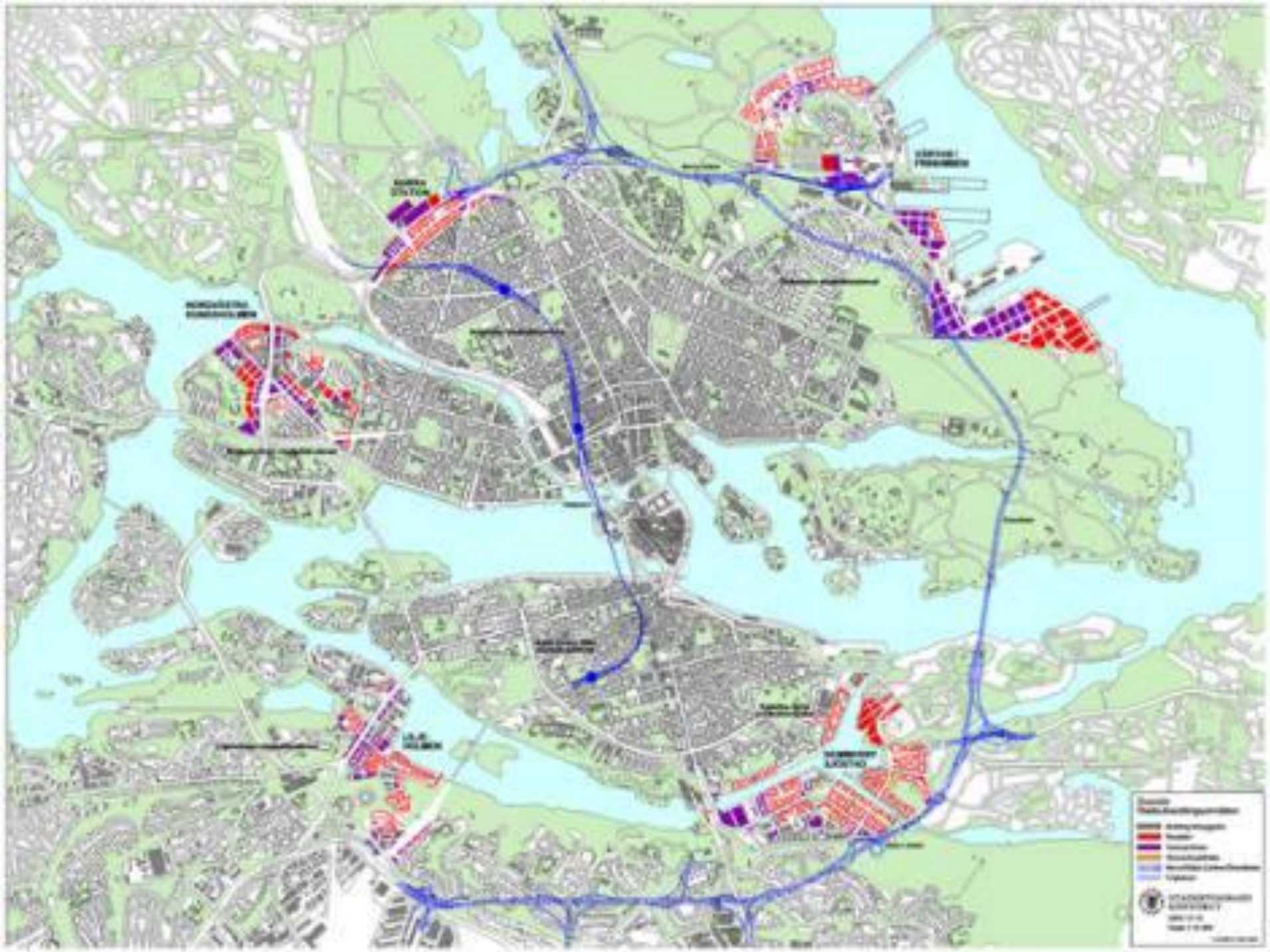

Chonggyechon Seoul, Korea

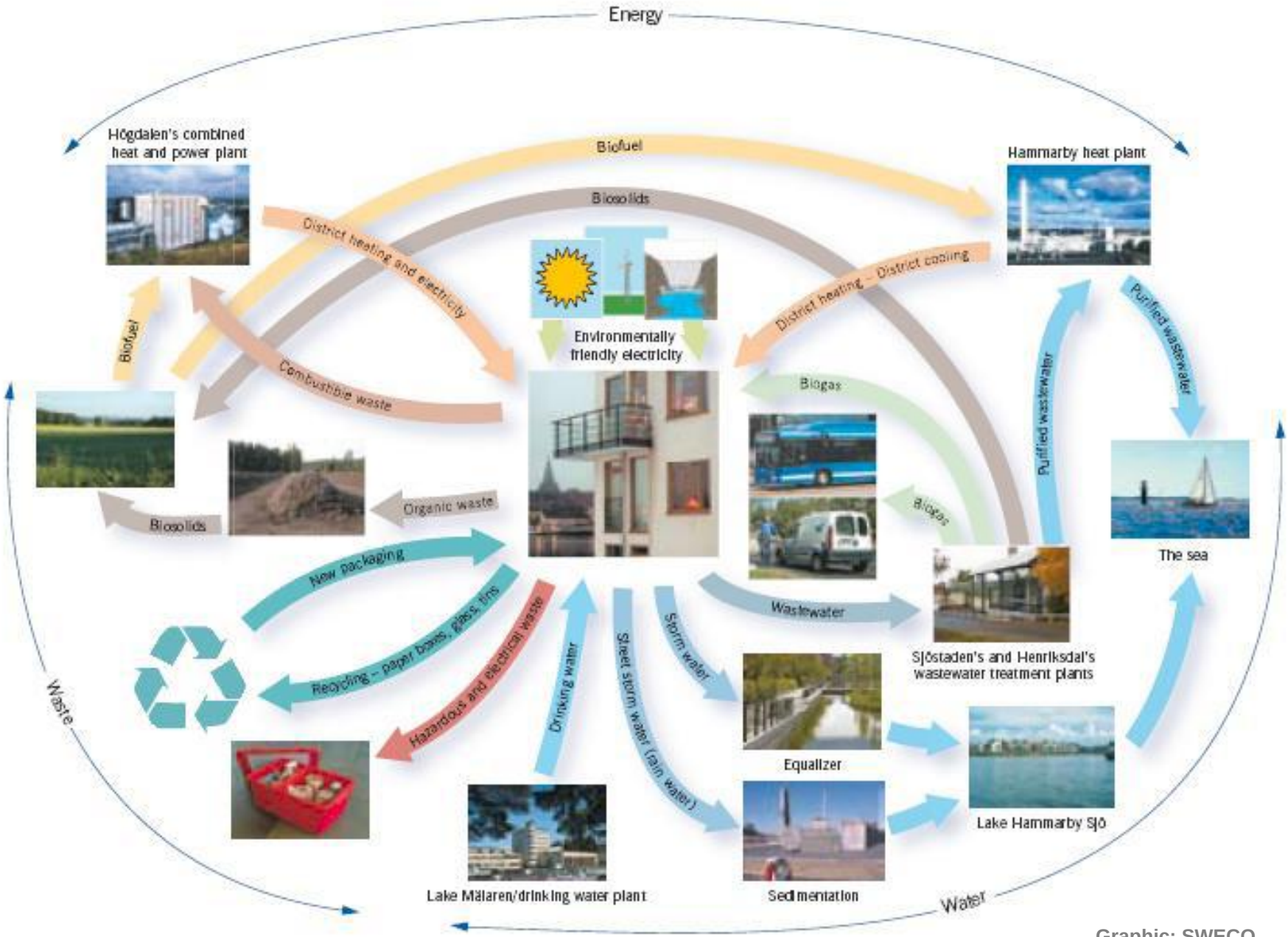

길스비그

Chonggyechon Seoul, Korea


외환플래티넘

Hammerby Sjostad





Graphic: SWECO

Singapore Marina Barrage

ATILIER DREISEITL, GERMANY

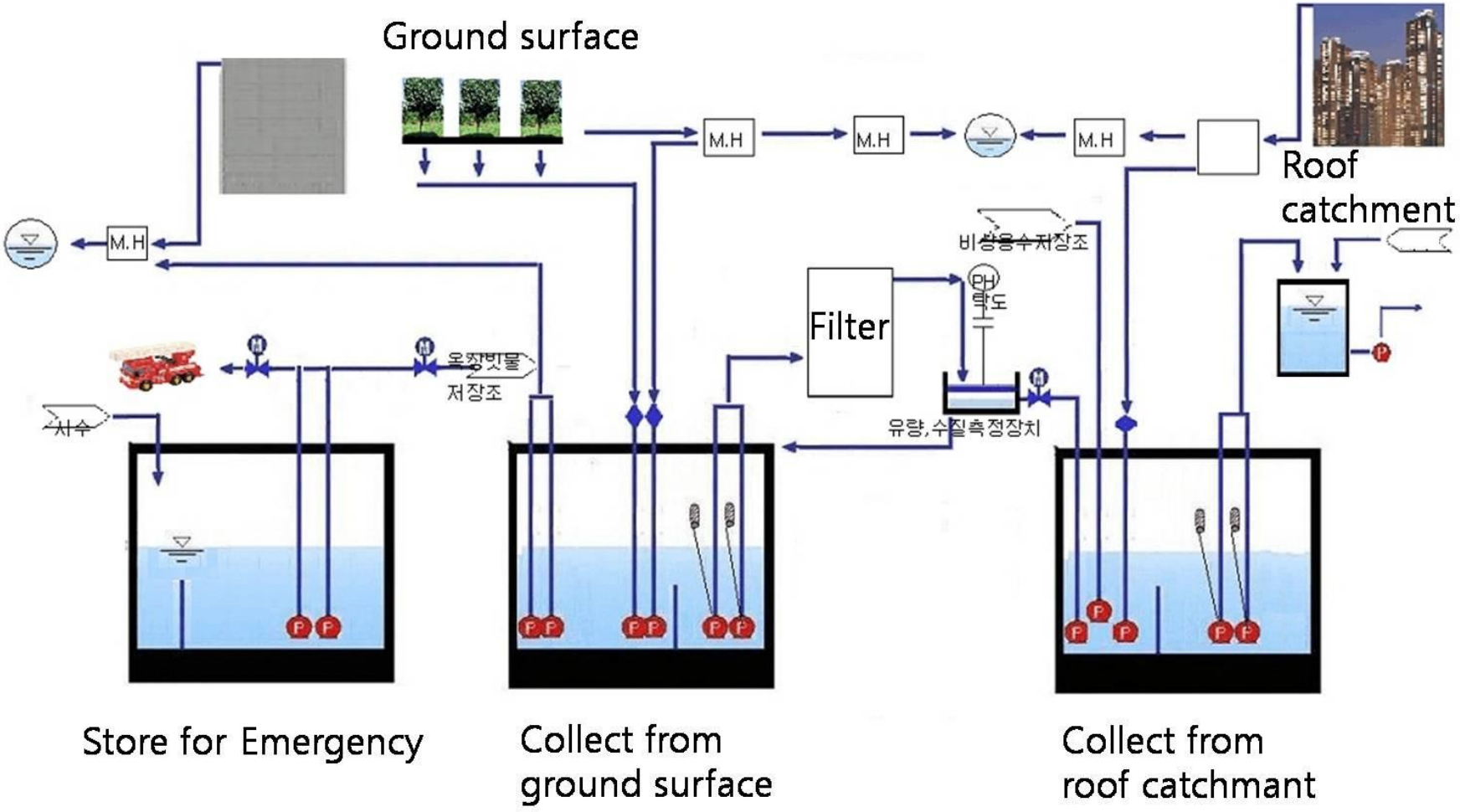

Marina Barrage, Singapore,
From Bing maps: Microsoft, GeoEye, Digital Globe 2010

Marina Barrage, Singapore,

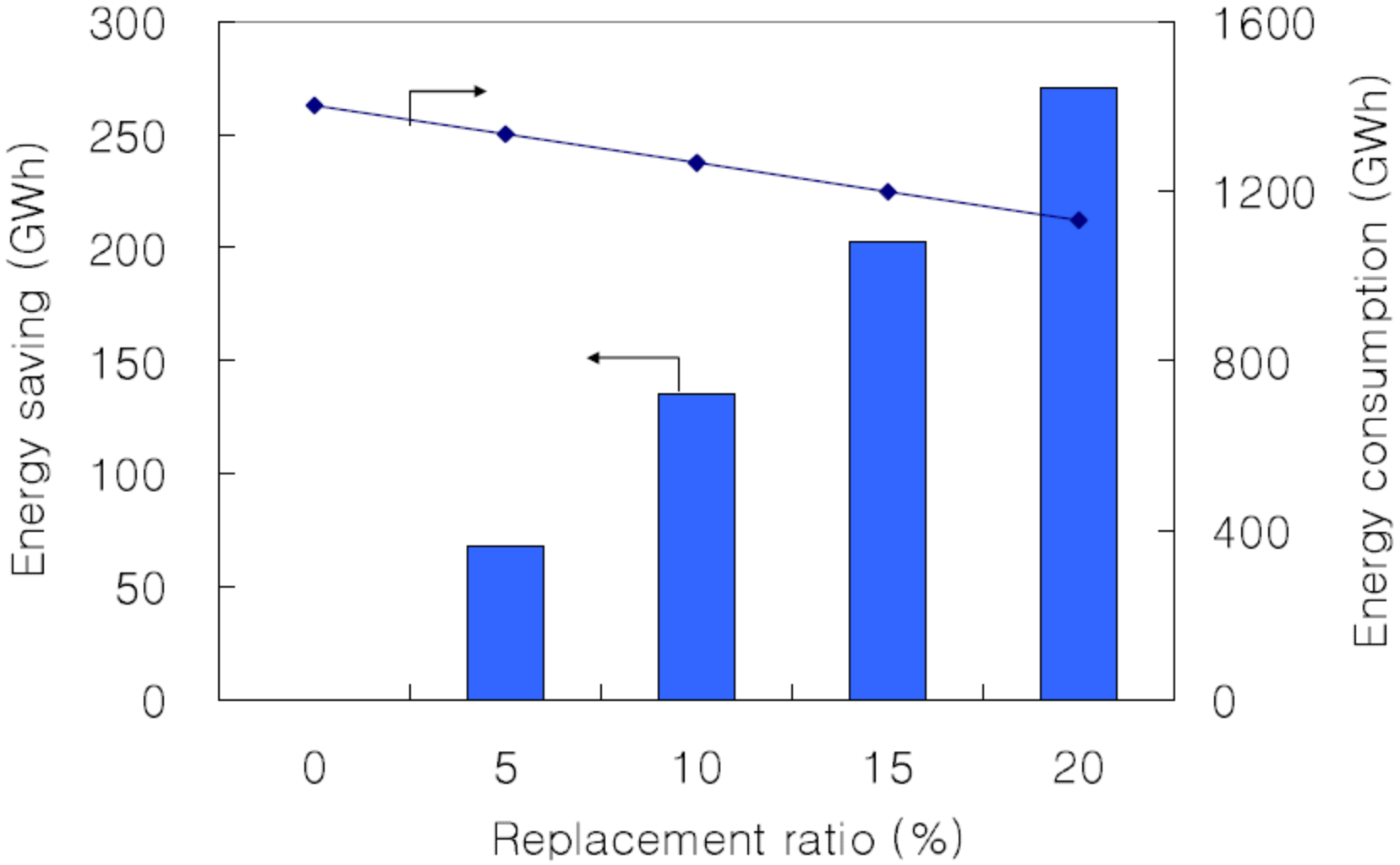
http://www.mycarforum.com/lofiversion/index.php/t2588893.html


Star City, Gwangjin-gu, Seoul, Korea
Imagery ©2010 DigitalGlobe, GeoEye, NSPO 2010 / Spot Image

Star City, Gwangjin-gu, Seoul, Korea

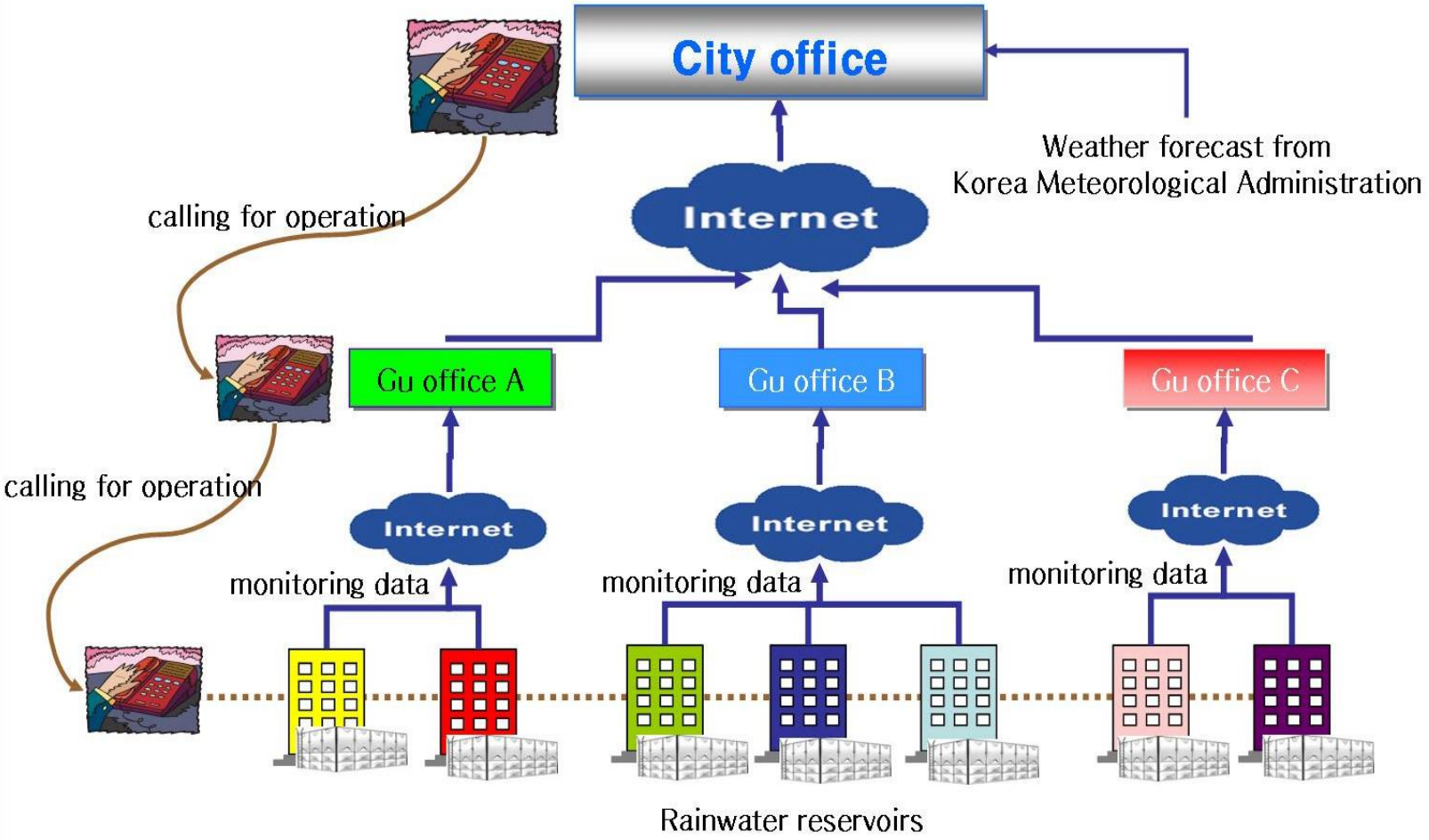


Star City, Energy Savings



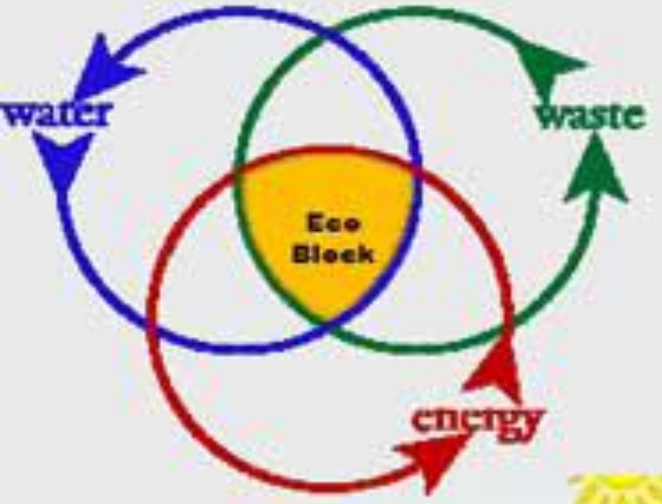
Graphic: Mooyoung Han, Seoul National University

Star City, Centralized Management of Rainwater Tanks

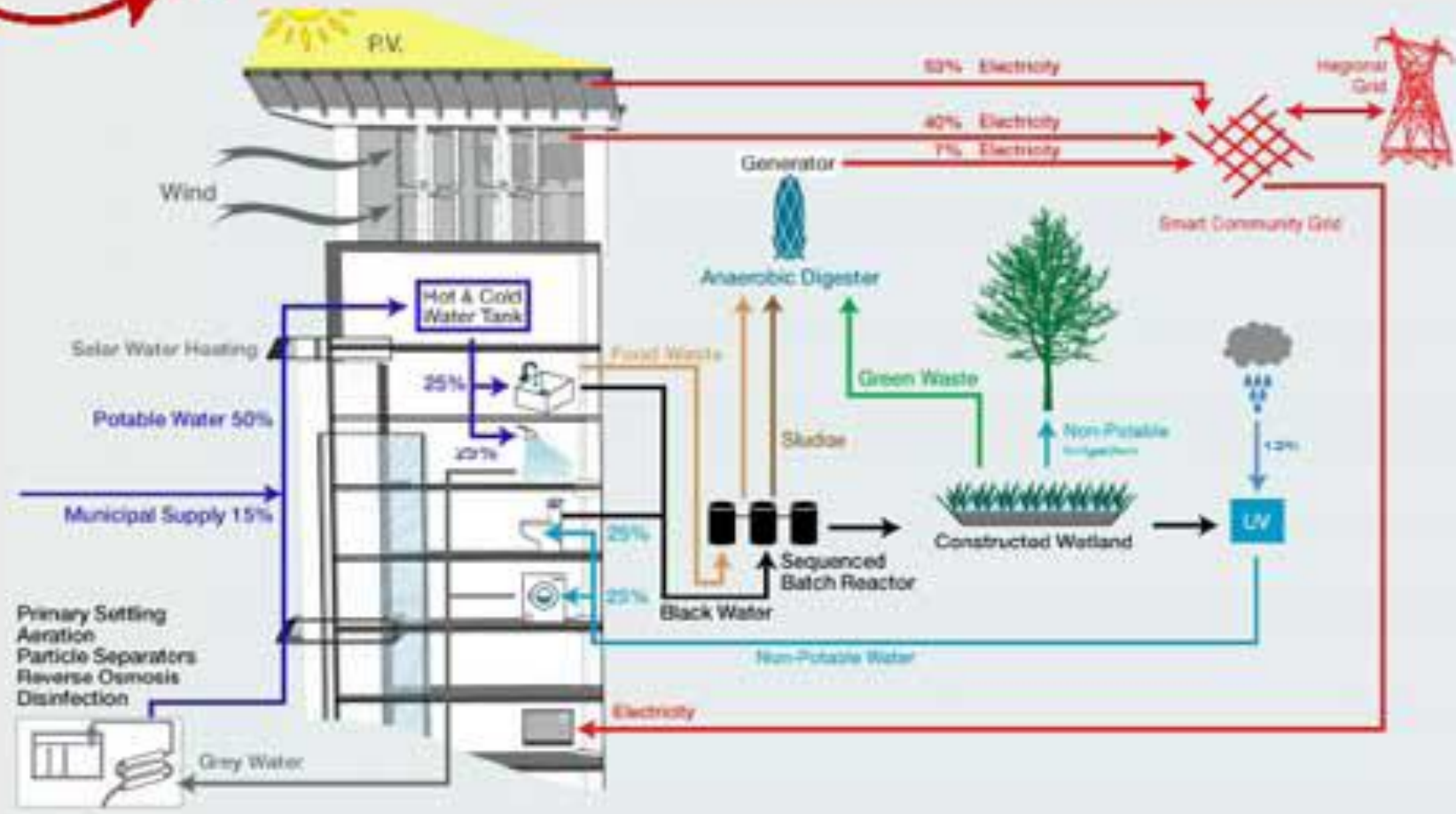


Graphic: Mooyoung Han, Seoul National University

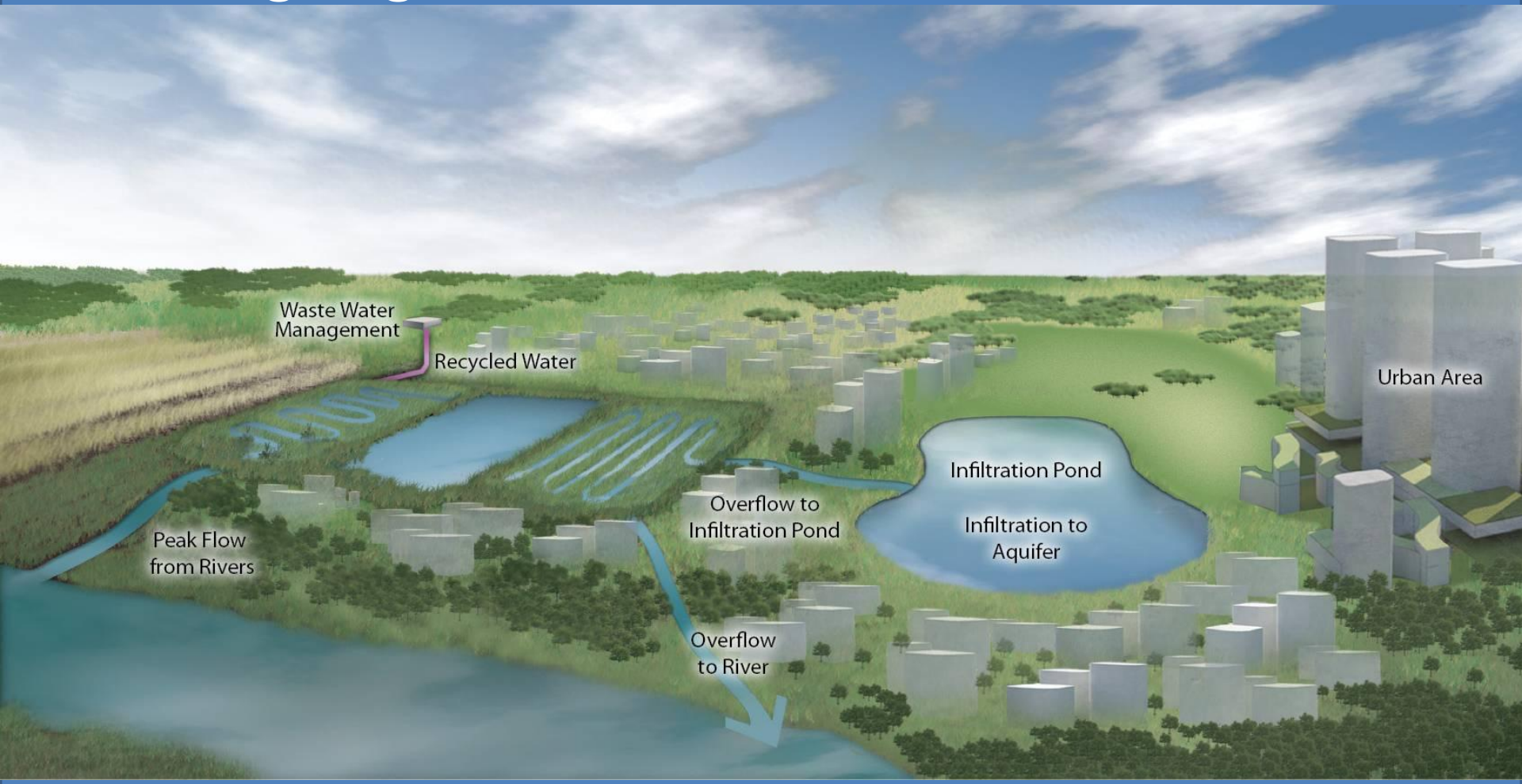

Qingdao, China (eco-blocks)



Whole Systems Design: integrated systems that are mutually beneficial



Langfang, China



Langfang has settlement problems due to shrinking aquifers and poor soils. Strategy is to recharge the aquifers and soils with water features around and throughout the city.

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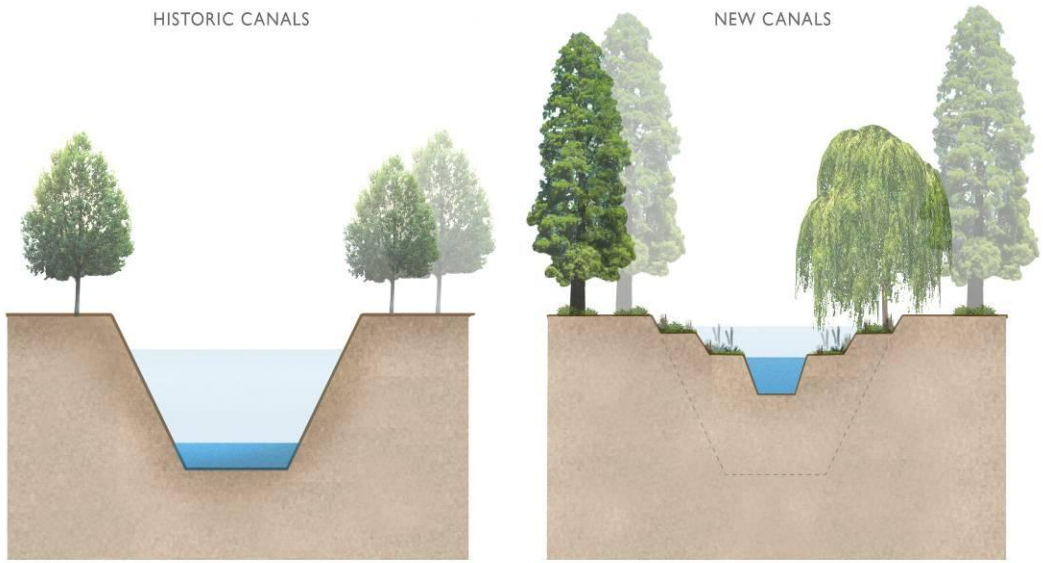
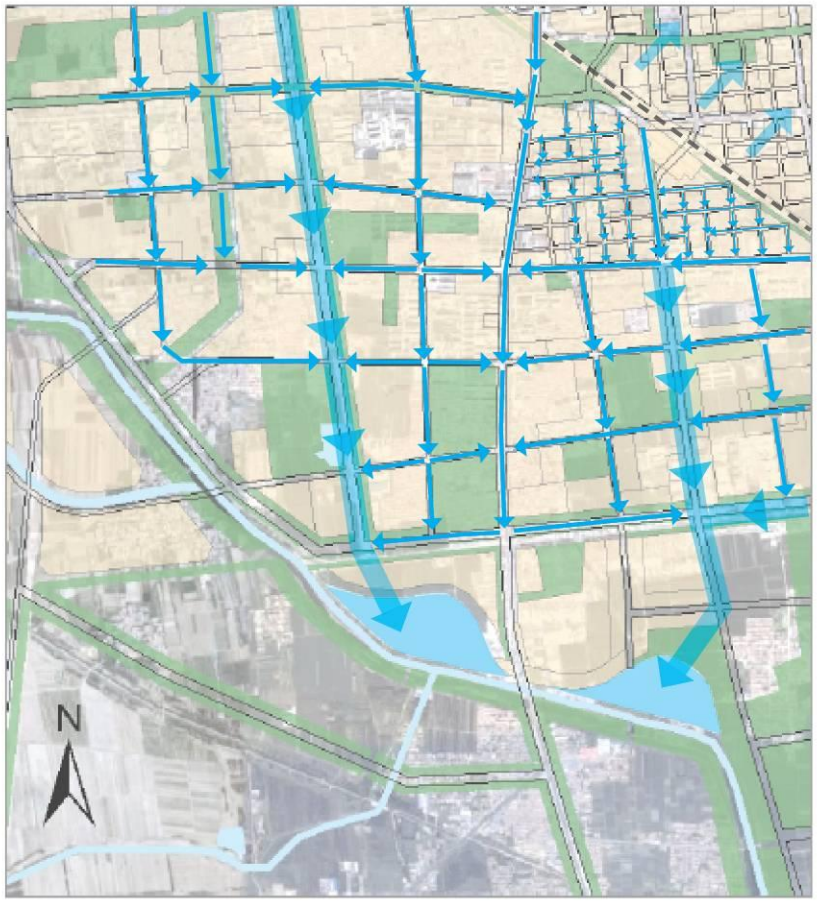
Langfang, China canal network





Langfang, City Center Transit Hub

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Langfang, Northern Gateway Cultural Corridor

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Design Engineers

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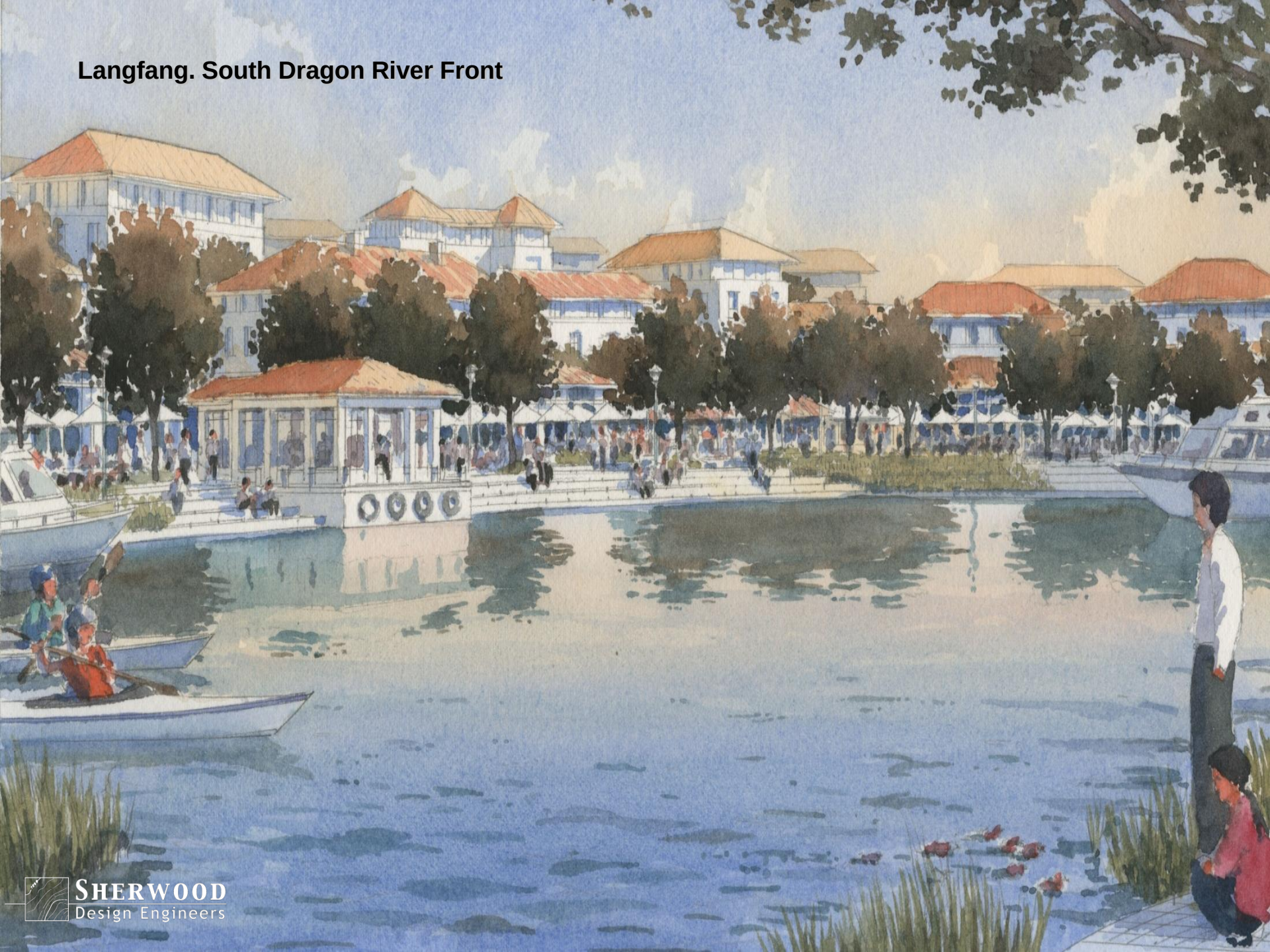
Langfang. South Dragon River Front



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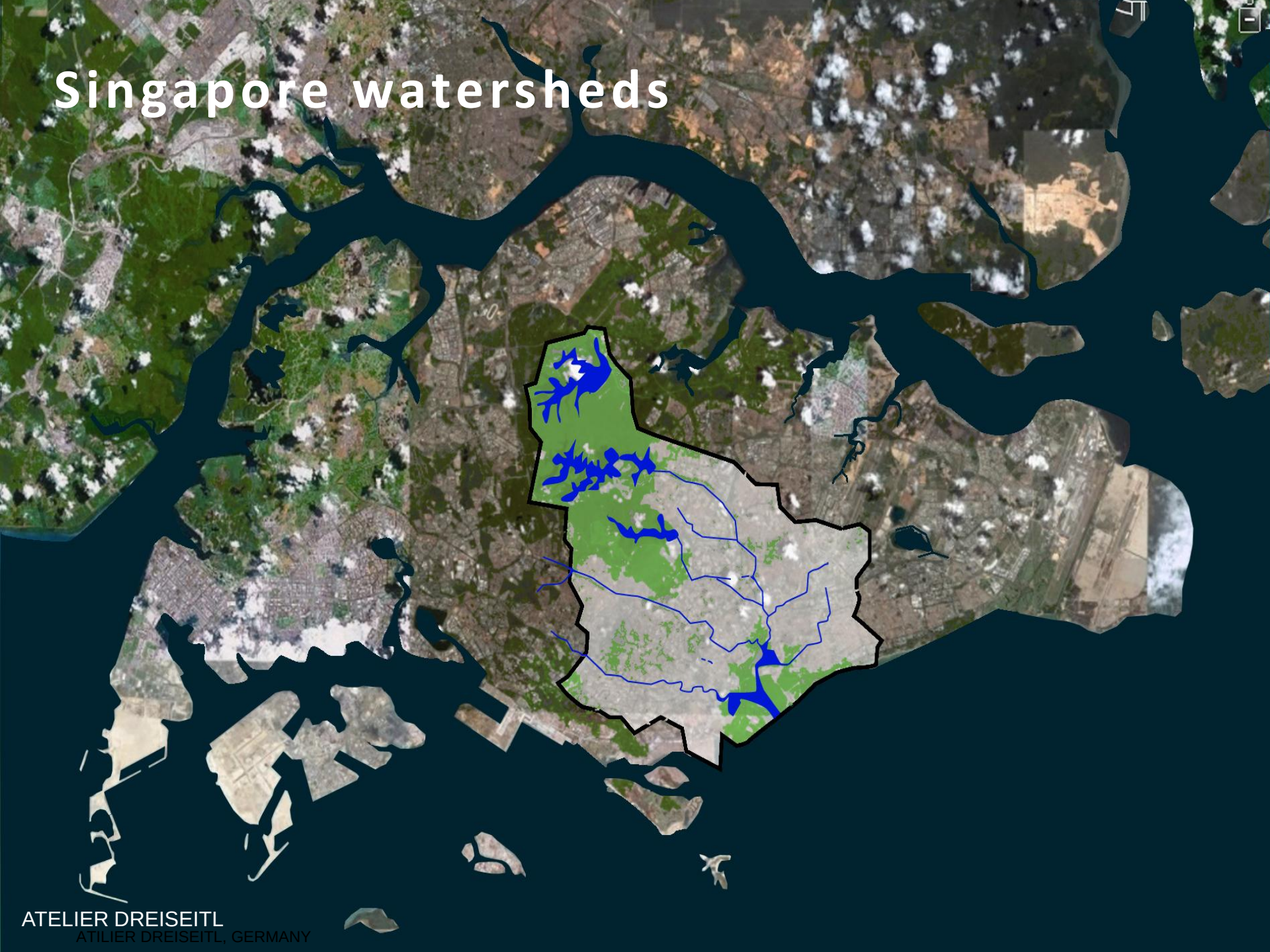
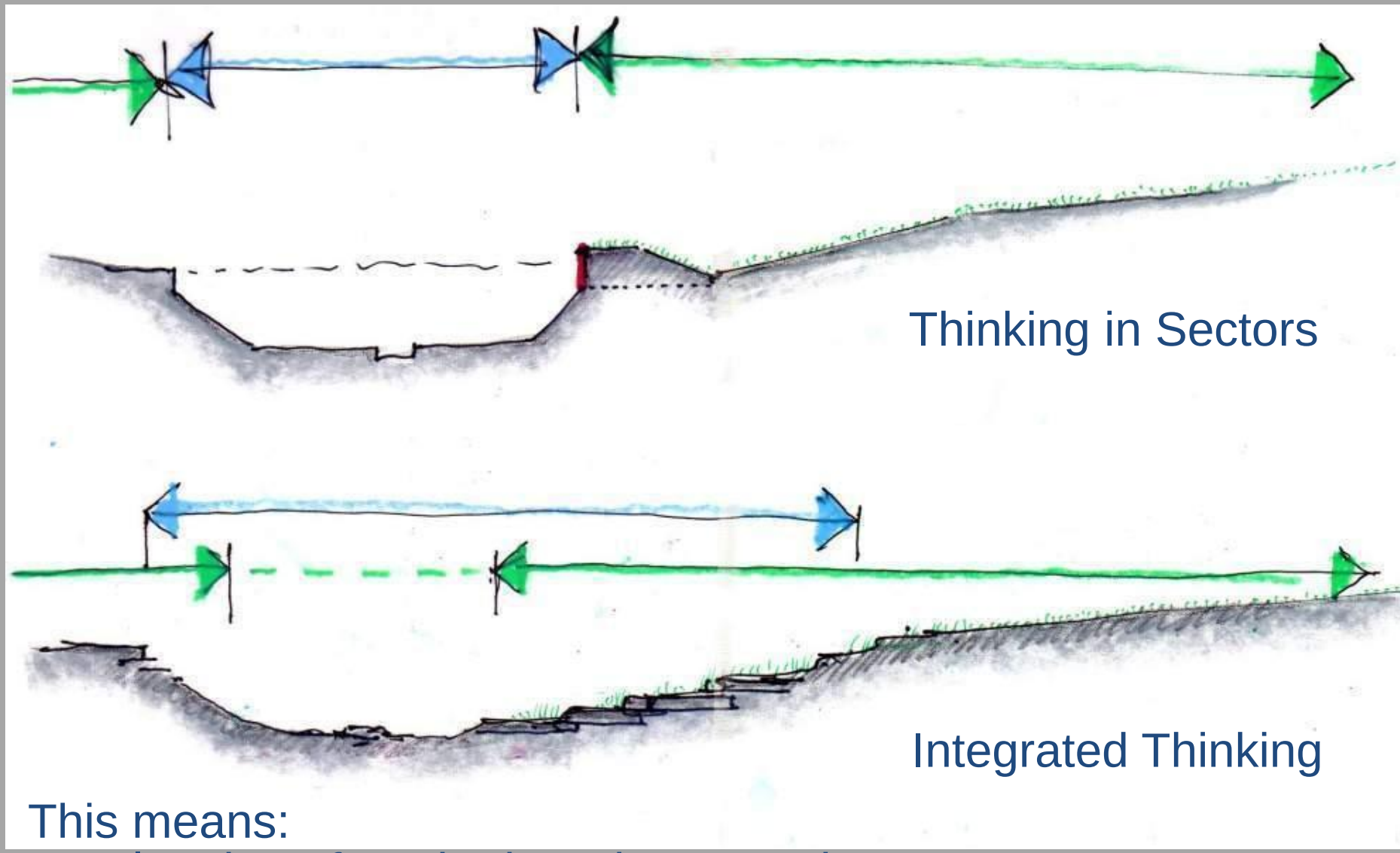
Singapore watersheds



Potential Projects – Bishan Park

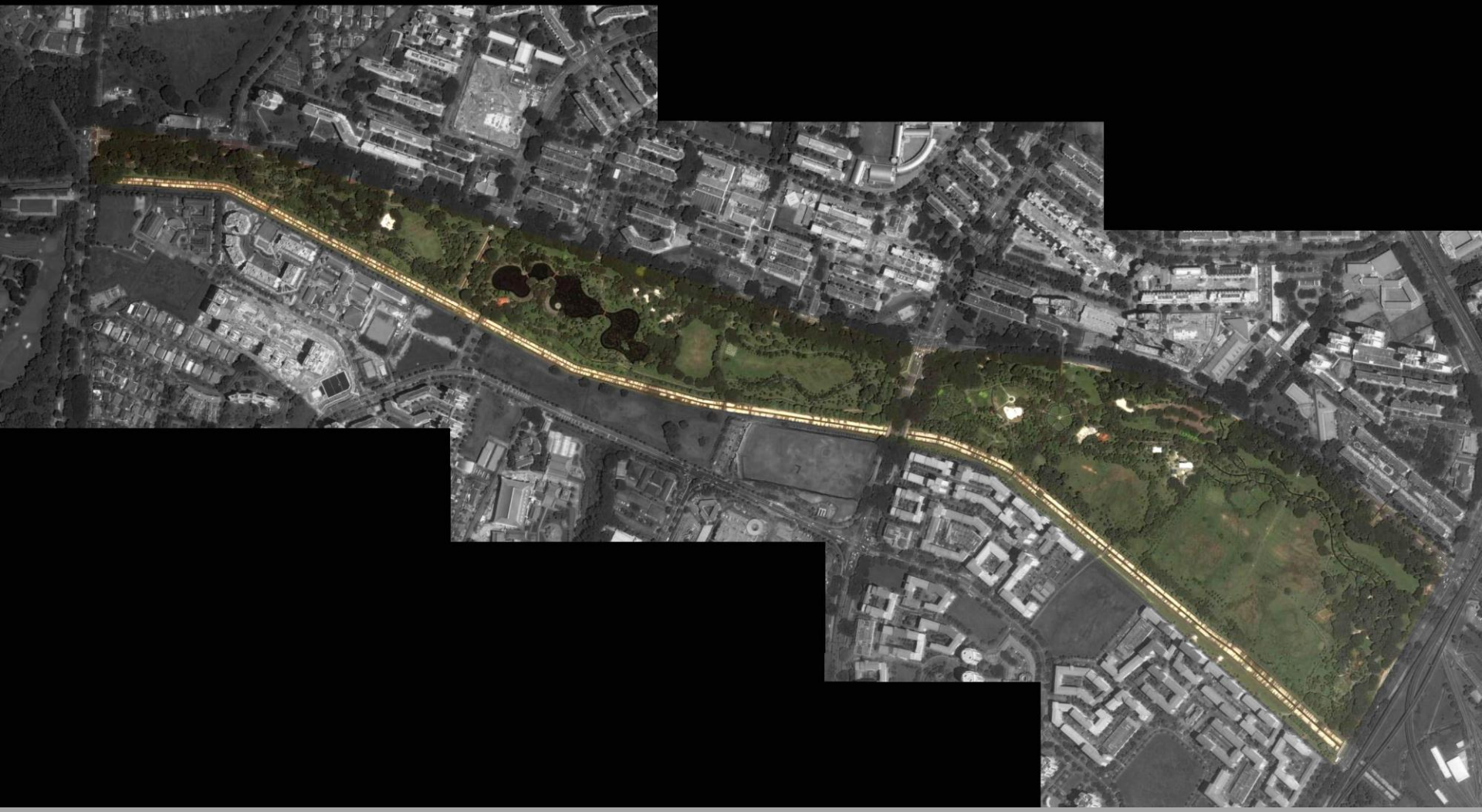


This means:

Overlapping of Territories River – Park

Overlapping of Responsibilities PUB - NP

Overlapping of Maintenance and Service PUB - NP



20 Reairsceptéon Today Bishan Park 2009

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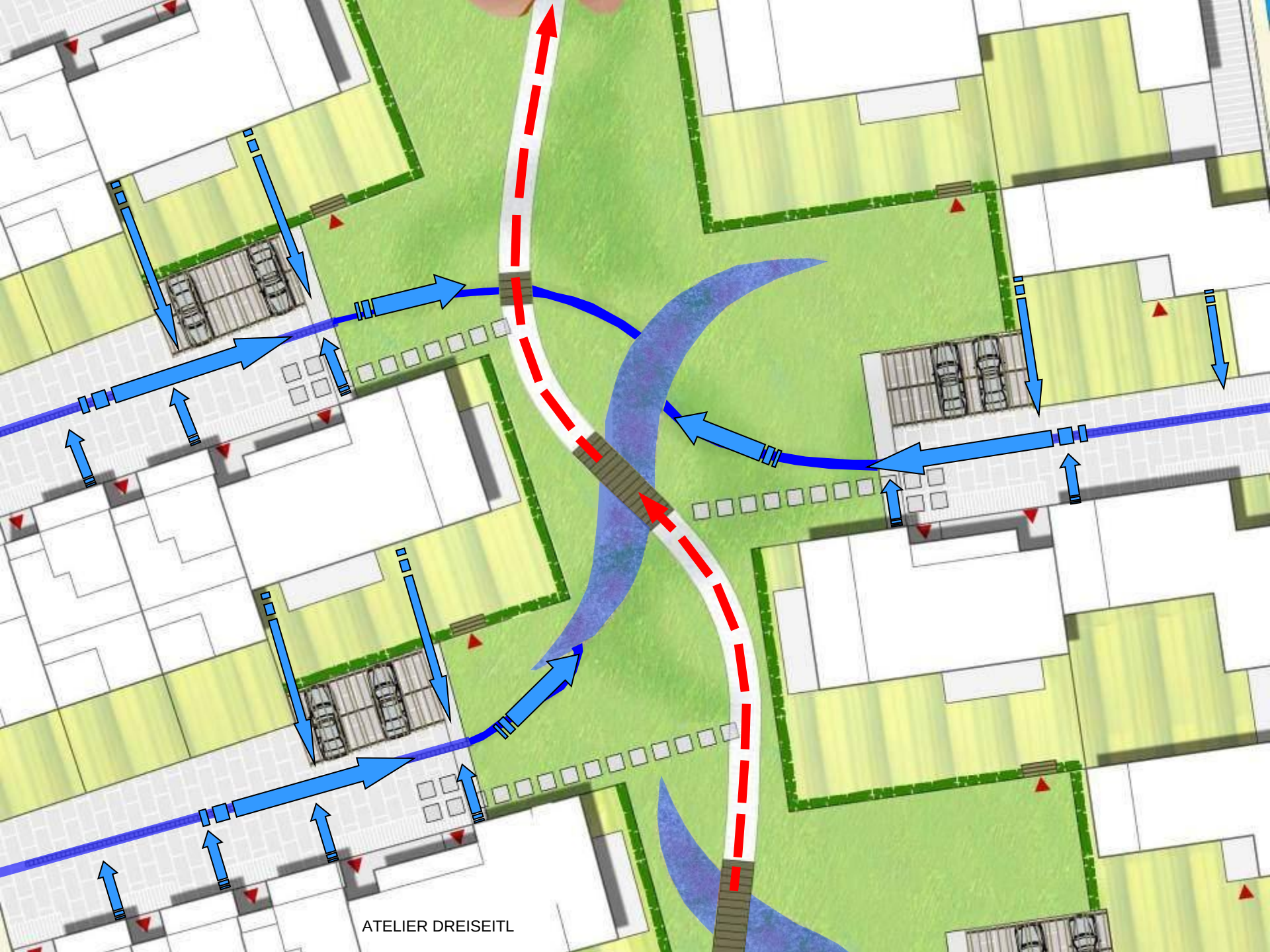
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Tianjin, China Zhangjiawo New Town

Tianjin, China Zhangjiawo New Town

restored canal Jul 2009

Tianjin, China Zhangjiawo New Town

restored canal Jul 2009


Seattle, USA Yesler Terrace
Seattle, WA
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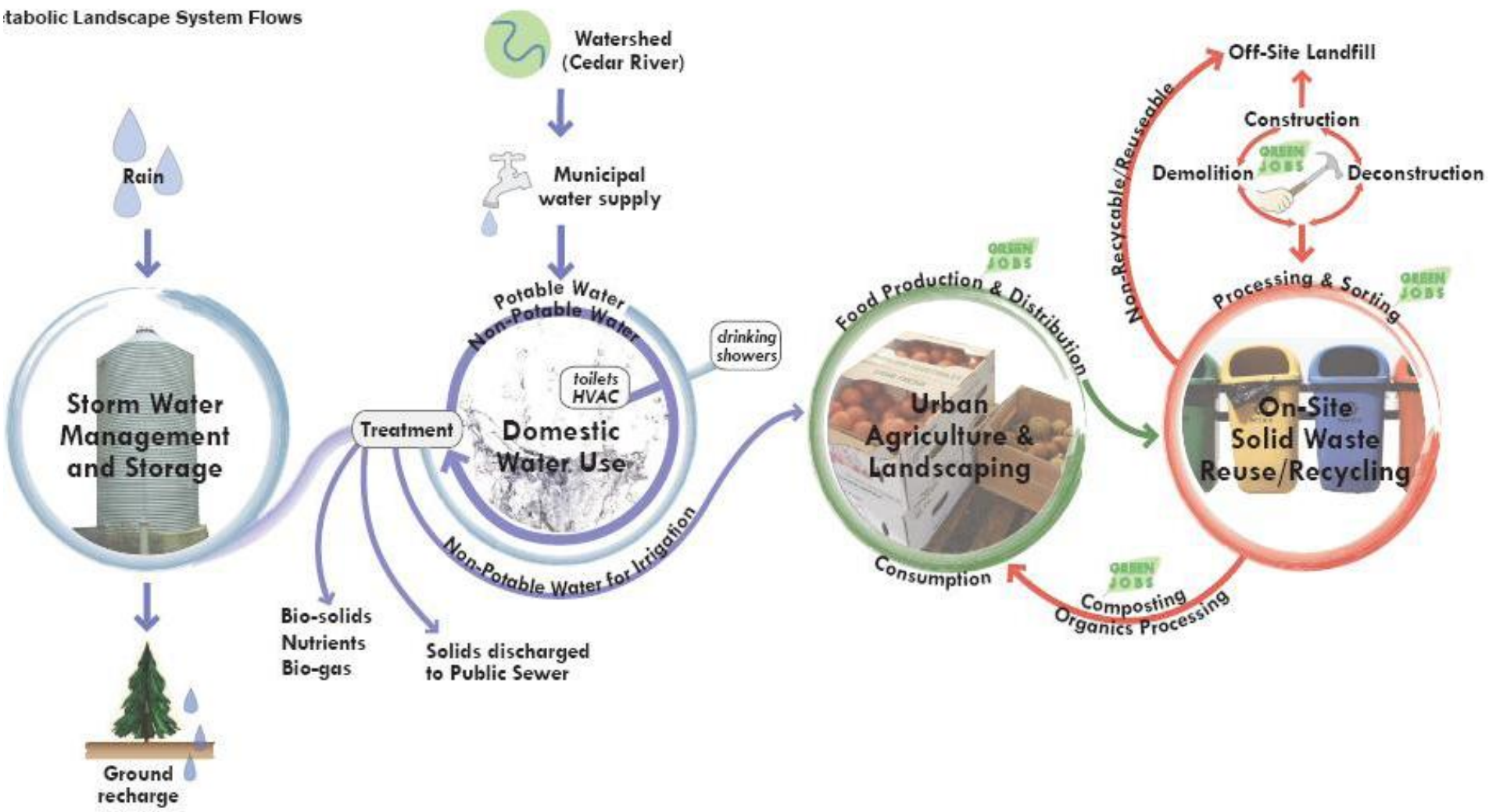
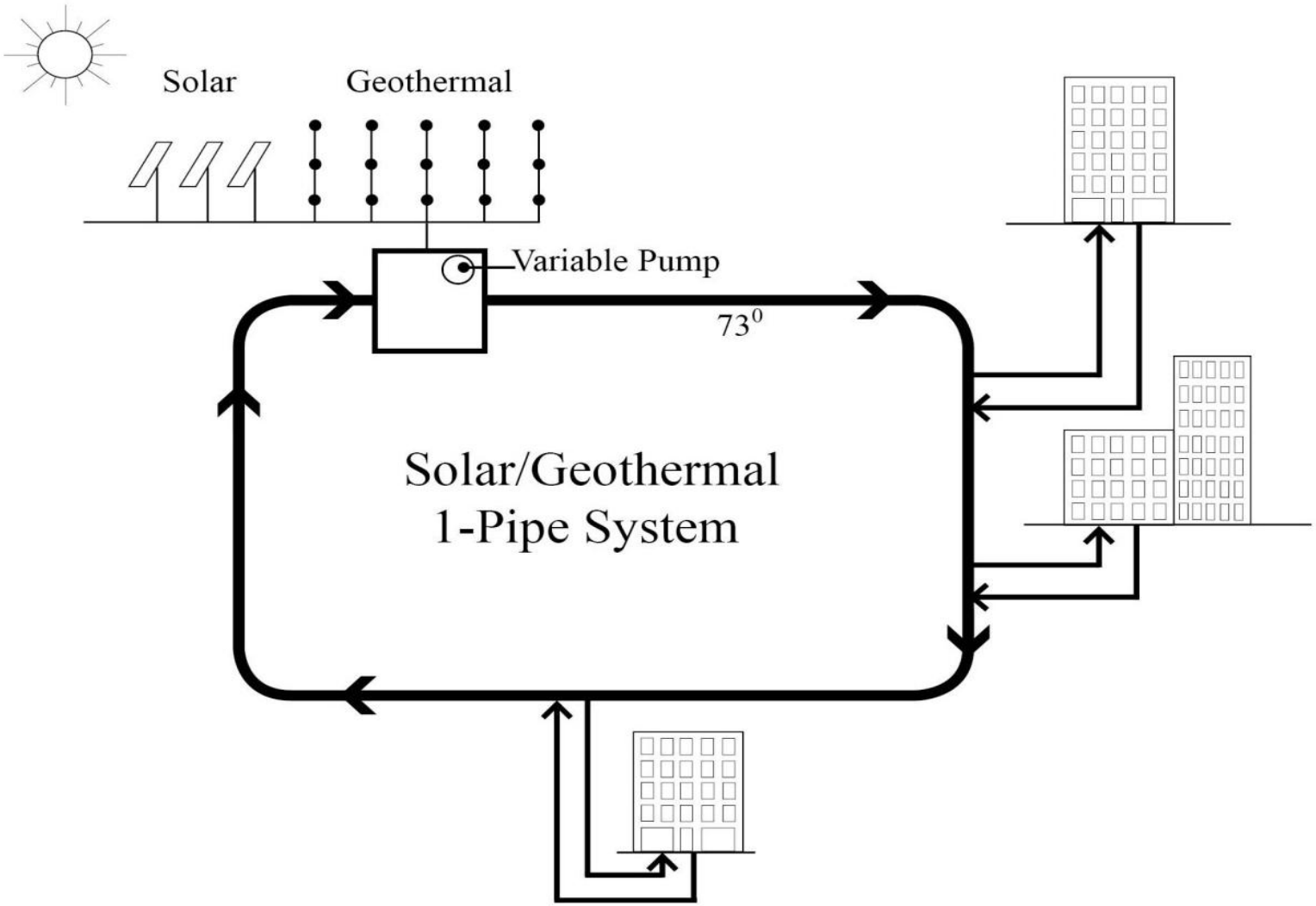
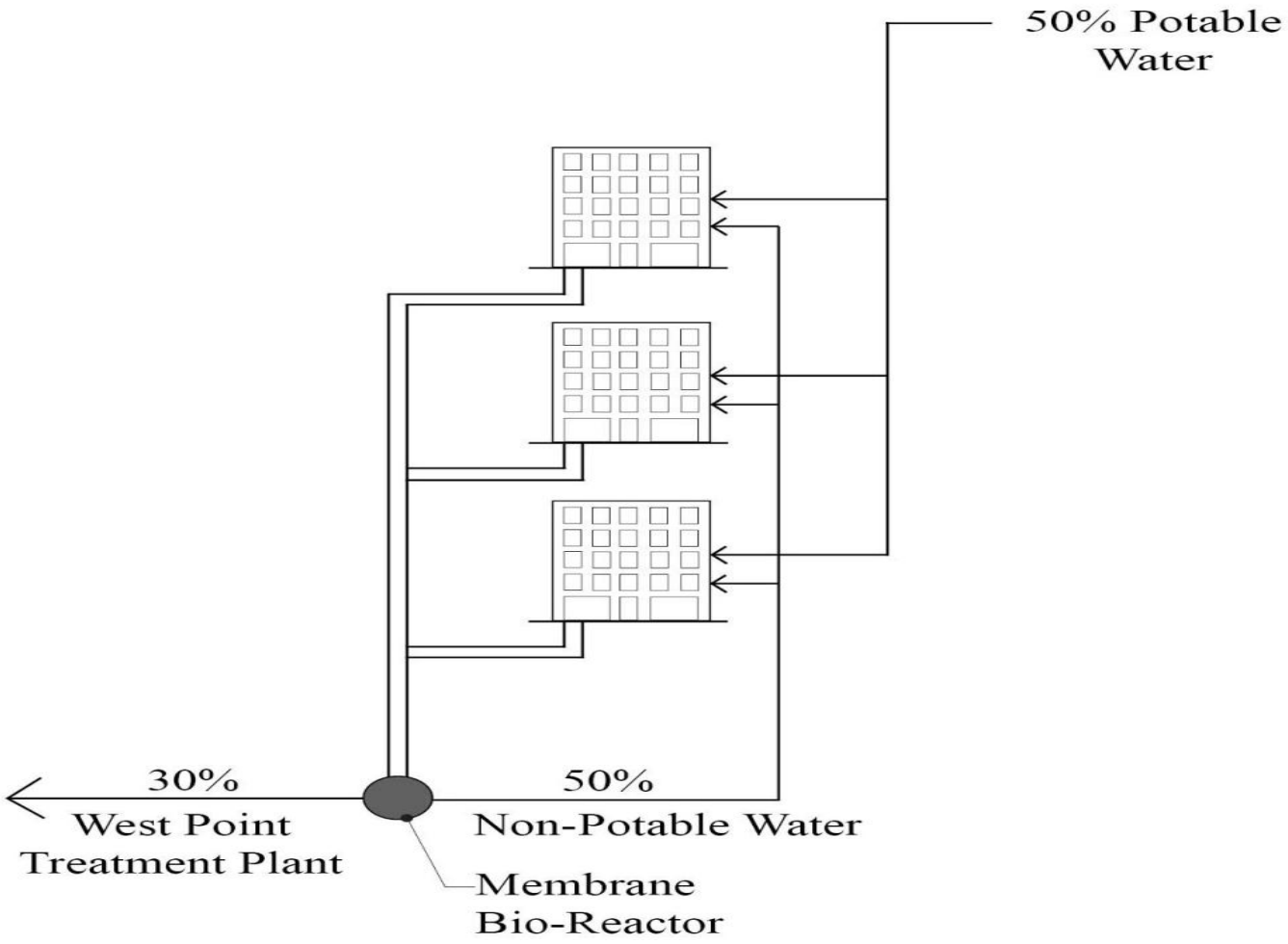

tabolic Landscape System Flows
Watershed
(Cedar River)
Rain
Municipal
water supply
Storm Water
Management
and Storage
Potable Water
Non-Potable Water
toilets
HVAC
drinking
showers
Domestic
Water Use
Treatment
Bio-solids
Nutrients
Bio-gas
Solids discharged
to Public Sewer
Non-Potable Water for Irrigation
Ground
recharge
Food Production & Distribution
Urban
Agriculture &
Landscaping
Consumption
Off-Site Landfill
Construction
Demolition
Deconstruction
Non-Recycable/Reuseable
Processing & Sorting
On-Site
Solid Waste
Reuse/Recycling
Composting
Organics Processing
GREEN JOBS

Seattle, Yesler Terrace

Solar hot water, geo-exchange, sewer heat recovery at same or lower cost to gas or electric



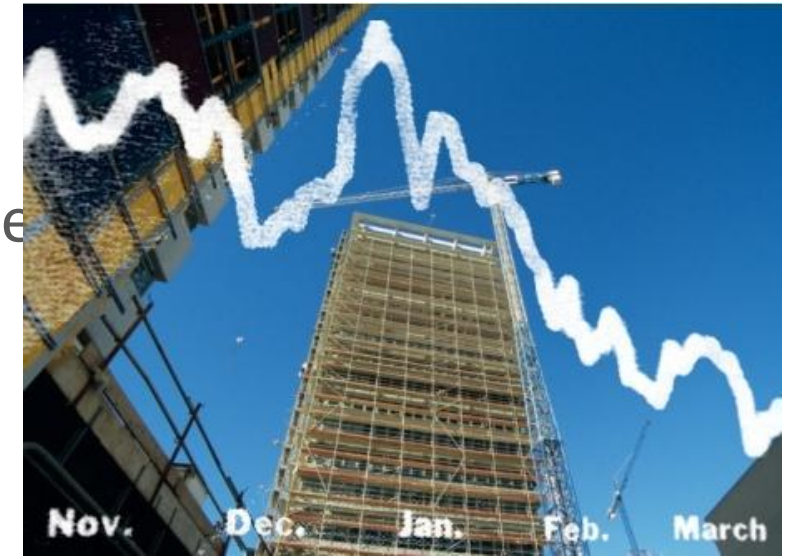
Membrane bioreactors on site costs less than normal sewer and water rate



E. WHY NOW?

CAPITAL SPENDING CAN HURT YOU

- Build the wrong things
- Build the right things the wrong way
- Sink operations and maintenance money into infrastructure that will drain resources year after year



CAPITAL SPENDING CAN HELP YOU

- Get more value for every dollar spent
- Provide higher levels of service in multiple lines of business
- Lower environmental impact with solutions that nest into centralized “legacy” systems
- Lower life cycle costs and increase urban systems’ resilience

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Thank you.

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