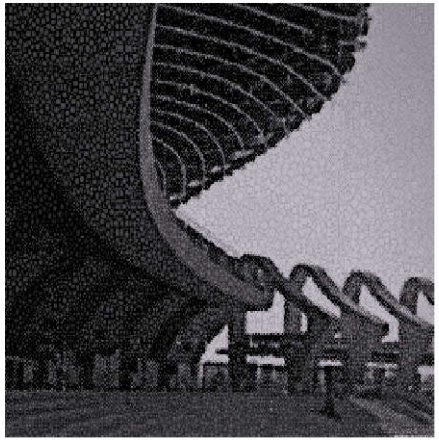
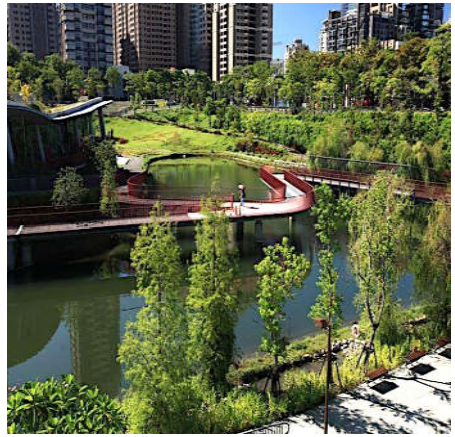
A Brief Introduction on Urban Flood Mitigation researches in ABRI





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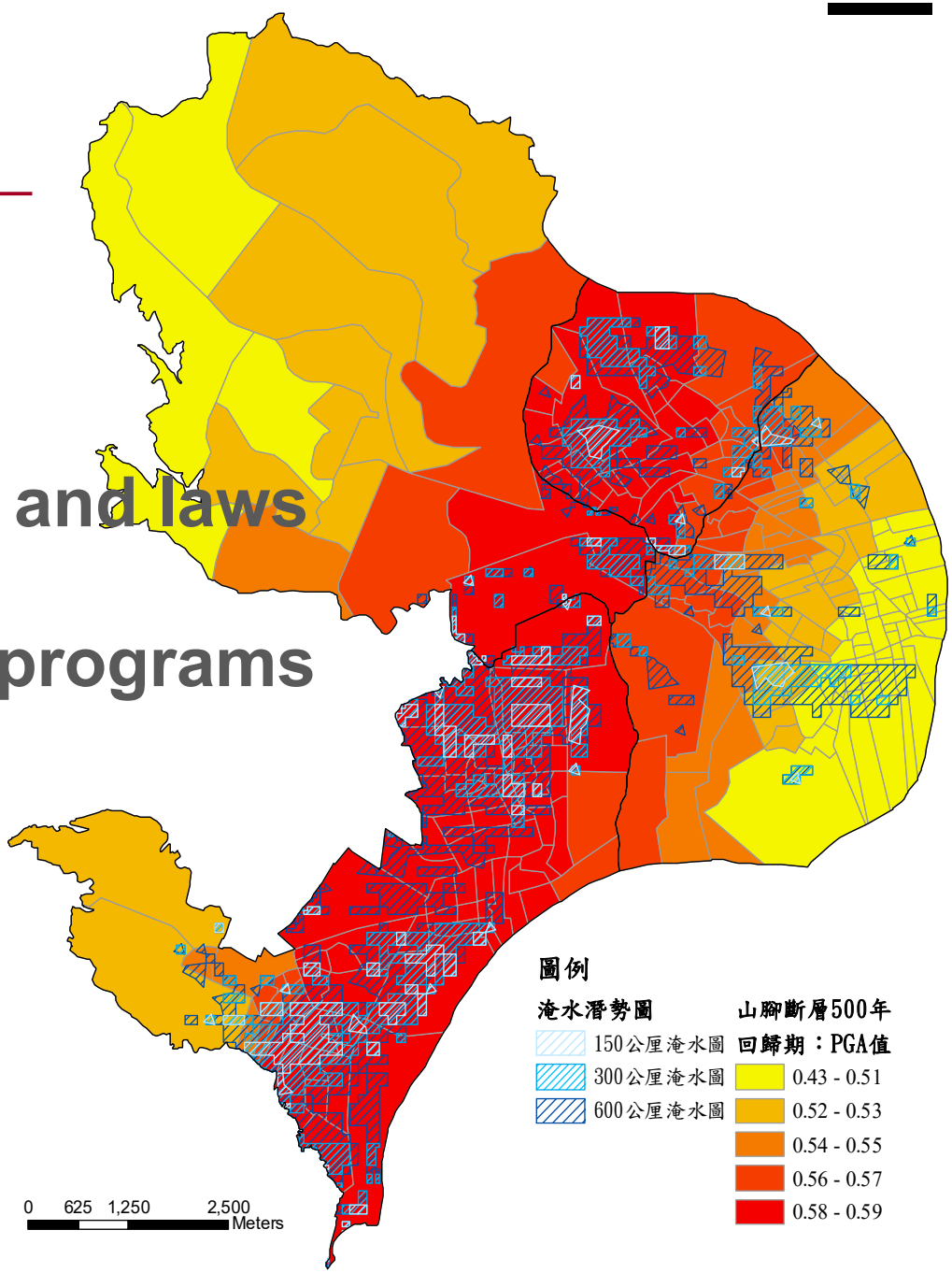
Outline

1.Background

2.Current strategies and laws

3. Related research programs

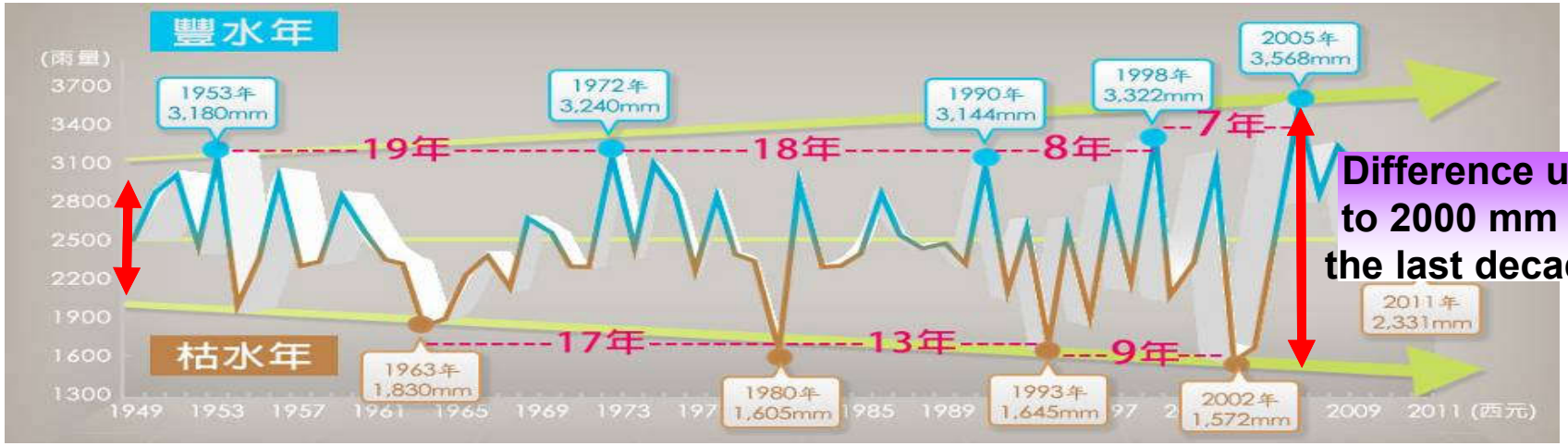
4. Next steps in the near future



Background

1. **Natural Vulnerabilities** — 2/3 mountain areas, steep rivers
2. **Excessive urban development** — 70% of population living in the urban areas occupying 17% of Taiwan territory
3. **Climate change** — extreme rainfall

Annual rainfall statistics (1949 ~ 2011)



The maximum difference about 1100 mm 50 years ago

Source：王瑞德 2013,現階段治水對策與新思維,經濟部水利署

Current strategies and laws

- **Comprehensive Flood Mitigation strategy (綜合治水策略, 2014)**

In addition to hydraulic engineering means, measures of urban planning, land use control, urban design, low impact development technology and management and maintenance system shall be applied to reduce flood disaster.

Comprehensive Flood Mitigation Framework

Engineering measures	River & Drainage System	• Waterway maintenance • Detention and retention facilities • Flood diversion channel and flood road closure • Water gate and Pumping system
	Sewer system	·Sewer system construction and maintenance ·Setting retention basin ·Water gate and pumping system
Non - engineering measures	Urban Planning & Land Use	• Define development areas • Land use Adjustment • Outflow control • Having Building site above the BFE • Building review (excavation rate, open space location) • Urban design guidelines (permeable pavement, succession planting)
	Archi-tectural Measures	·Flood prevention flaps ·Rainwater storage ·Rainwater retention and infiltration facilities
	Disaster Prevention activities	• Potential flooding map & flood warning system • Education on disaster prevention • Evacuation training & community-based disaster prevention activities

Current strategies and laws

■ Urban Planning

-Implementation regulation for periodical overall review of urban planning (都市計畫通盤檢討)

During the overall review of urban planng, flood reduction facilities system (e.g. detention basin, LID) shall be planned by means of zoning or land use control. (Article 5~8)

■ Building Code and Regulations(建築技術規則)

If the building site is over 300 square meters, rainwater storage or detention facilities shall be set up. (Volume >0.045 m^3/m^2)

Objectives of our research programs

- Assist urban planners and architects to cross the different discipline barriers of hydraulic engineering.
- Enhance flood mitigation capacities in the built-up areas.
- Apply new technologies to develop tools making flood mitigation plan and design easily performed and widely promoted.

Flood Mitigation Planning Handbook for the Periodical Overall Review of Urban Planning

Flood mitigation planning processes

Step 1 Confirm planning basemap

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Step 2 Analyze potential impacts of flood disaster

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Step 3 Designate countermeasure zones

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Step 4 Develop adaptation strategies

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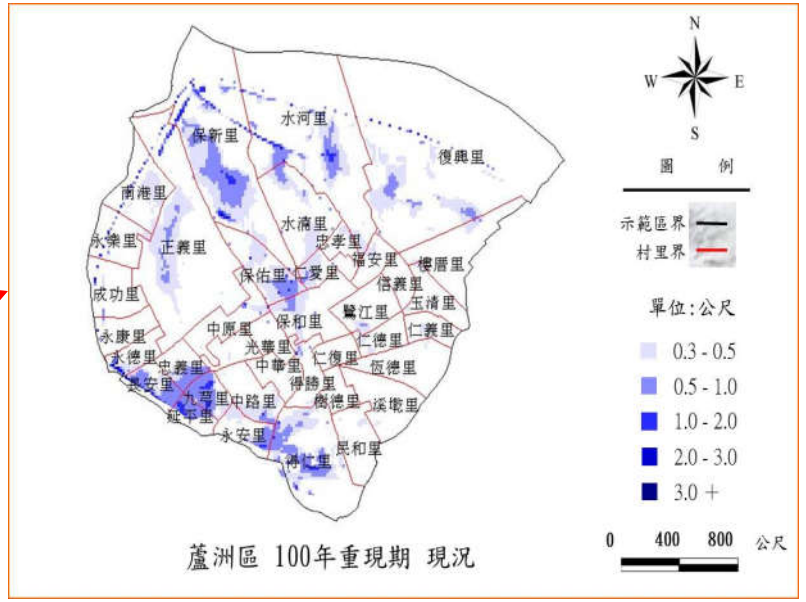
Step 5 Explore urban planning approaches

Main Planning | Detail Planning



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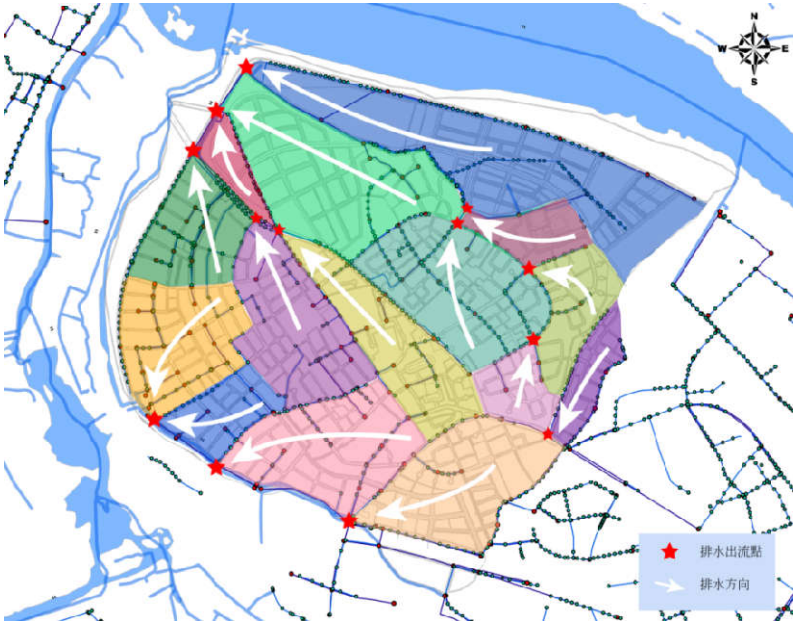

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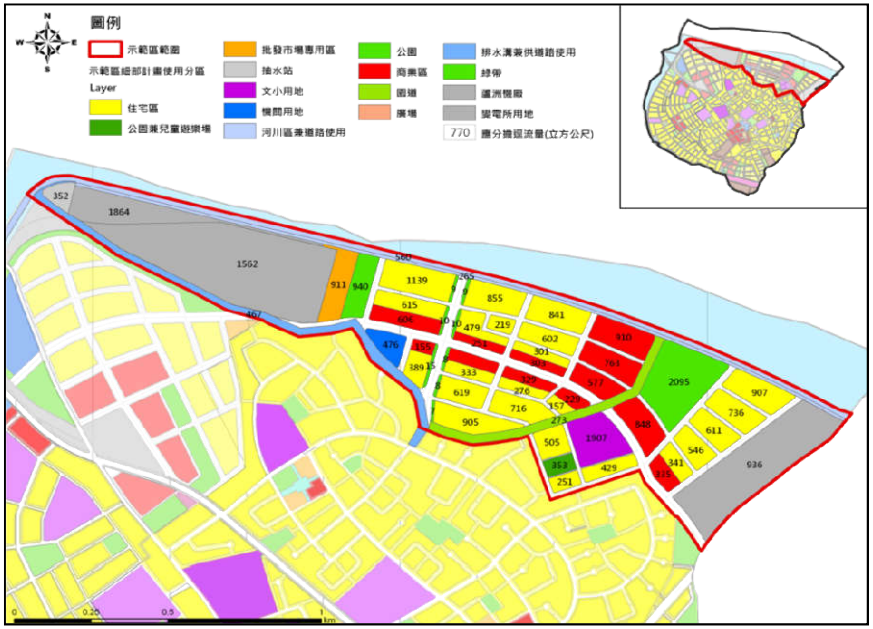
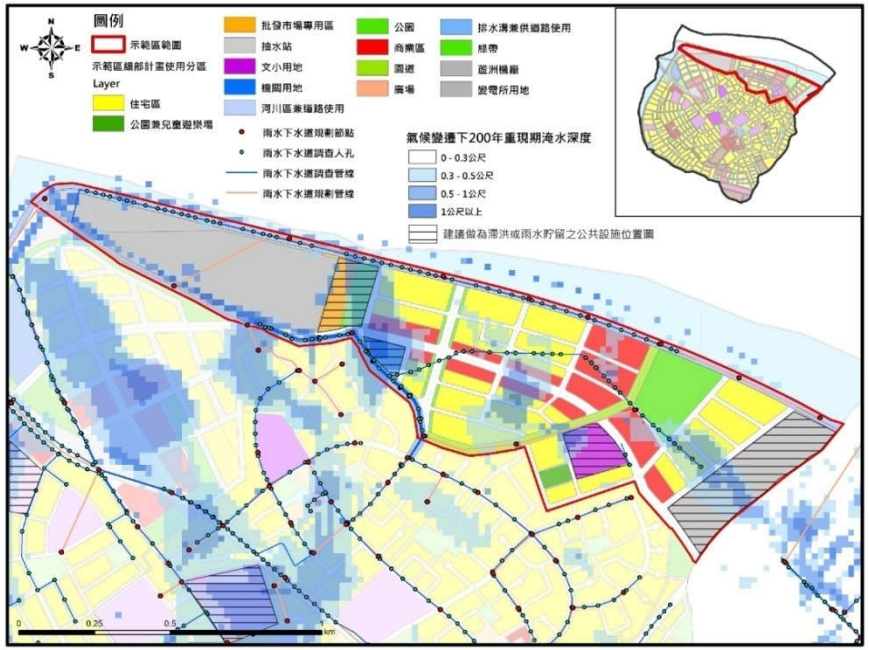
5-1 Land use zoning

- Specify shared runoff volume of each **land use zoning and public facility site** and apply them as the assessment criteria of a design project.



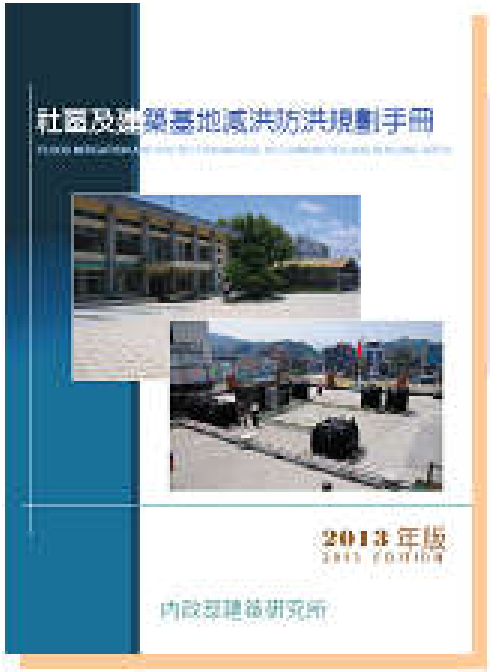
5-2 Retention facilities lots

- designate schools' sites, parks and green land as **retention or detention facilities lots** to increase the rainwater storage spaces.



Demonstration Program on Setting Up Flood Mitigation Facilities in the School

- It is expected the flood peak will be delayed for 10 minutes, the peak discharge will be reduced by 52%, and the total runoff volume will be decreased by 47%.



Compilation of "Flood Reduction Facility Design Manual for Communities and Buildings "

Introduction 1

- 緒論
- 減洪防洪設施執行及管理需求
- 都市型洪災防治理念及內涵

Planning process 2

- 環境分析及規劃目標
- 整體規劃的概念
- 配置方案
- 維護及長期監測

3 Facility design

- 減洪設施概要說明
- 結構性減洪設施
  - 雨水入滲型減洪設施
  - 雨水貯集型減洪設施
  - 雨水貯集入滲型減洪設施
- 非結構性的減洪措施

Effectiveness evaluation 4

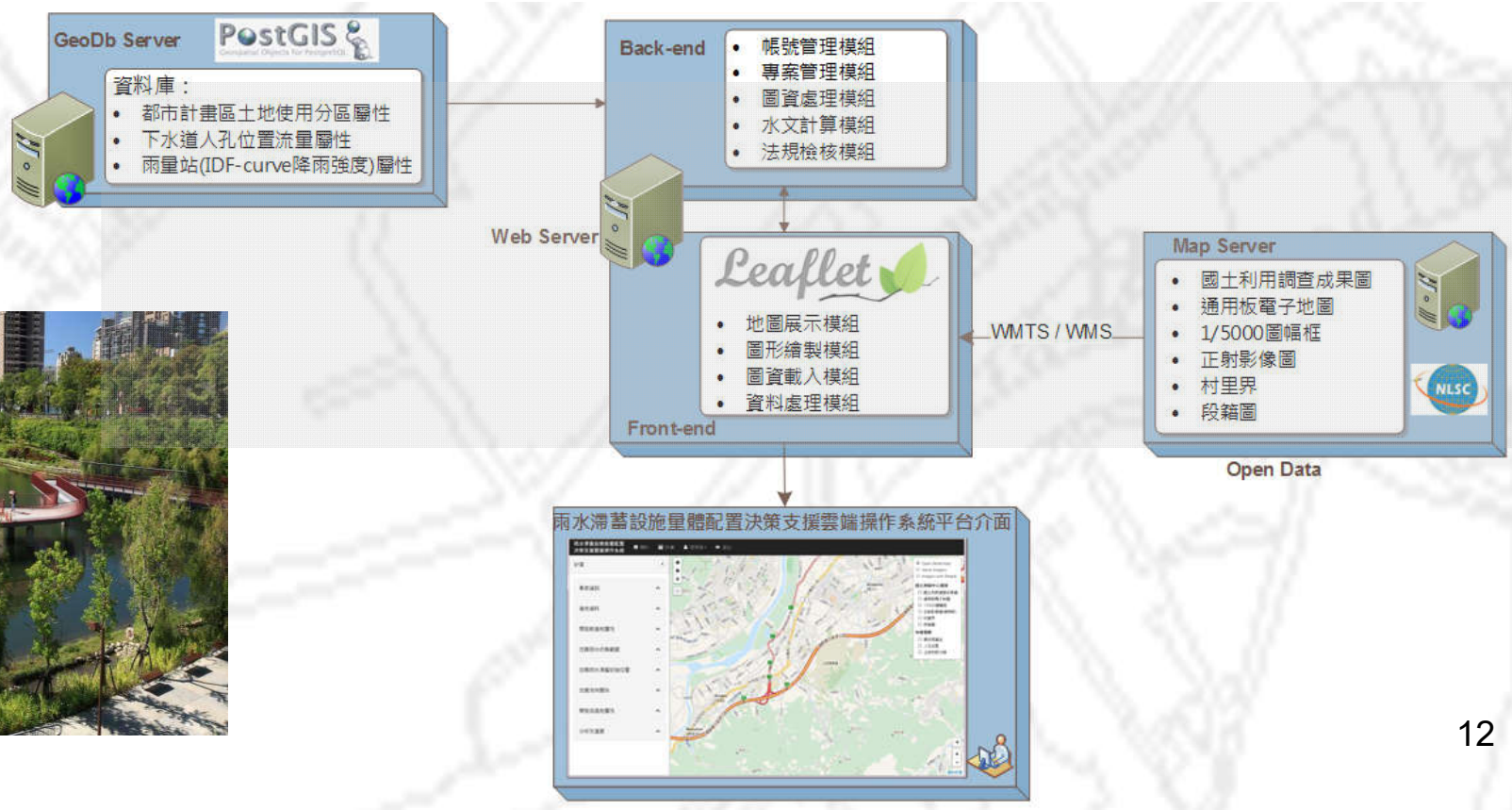
- 評估的考量因素
- 評估流程建立
- 簡易的評估成效
- 水文水理模式評估成效
- 國內實際案例評估

Next Steps in the near future

Application of Advanced Technologies --Support for Detention Facilities design with Cloud System

1

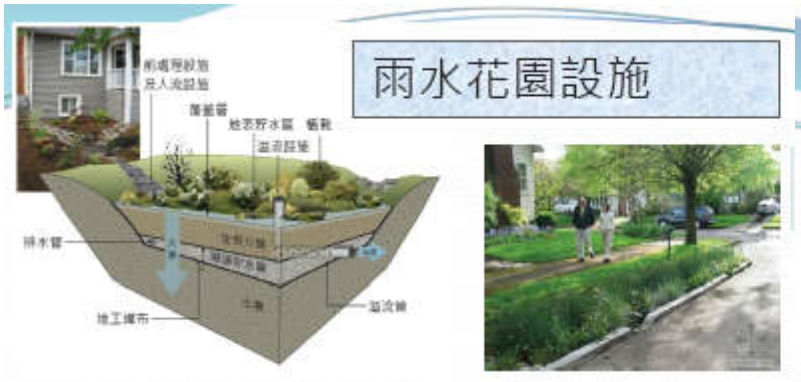
- Apply **Web-GIS to integrate government open data and hydrological analysis tools** to build the operating system for assisting architectural design and government administrative review on line.

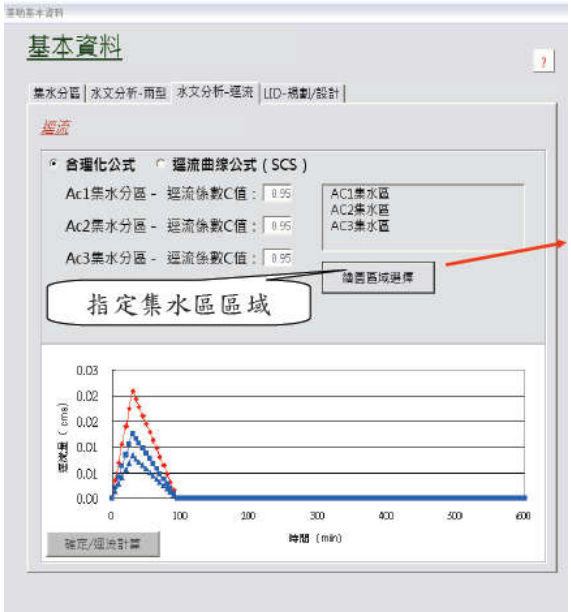


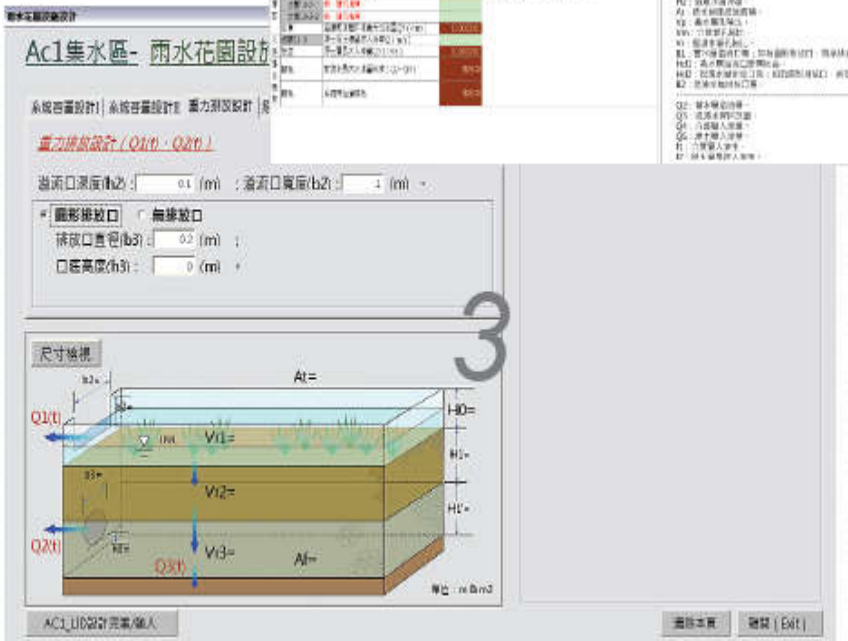
Next Steps in the near future

2

- Apply excel calculation function to **build the detail design tool** for assisting architectural design.







THANKS FOR YOUR ATTENTION