



Primary Tools



Water Management

Sponge City Planning

What this tool does:

This tool represents an inter-disciplinary approach to low-impact development (LID) in cities. The management of rain waters, drainage and flood control through hydraulic engineering and 'water architecture' has been labeled in China as the 'sponge city' approach. It represents the intention to maximize the use of water, and to recycle and reuse it for non-potable purposes. This tool consists of a series engineering and architectural elements which are used at surface levels or as underground installation. Sponge City planning – as a "water sensitive urban design" – is a concept that aims to integrate urban water management, particularly storm water, into modern urban design and landscape planning.

Genesis of the Sponge City Concept¹

Surface water flooding is currently viewed as the most serious water-related issue in many of the China's large cities due to rapid urbanization, land-use change and the process of rapid socio-economic development. In 2014, the People's Republic of China established the concept of the 'Sponge City', which will be used to tackle urban surface-water flooding and related urban water management issues, such as purification of urban runoff, attenuation of peak run-off and water conservation. The concept is being developed to make use of 'blue' and 'green' spaces in the urban environment for stormwater management and control. It is envisaged that related practices will enhance natural ecosystems and provide more aesthetically pleasing space for the people that live and work in urban environments, in addition enabling nature-based solutions to improve urban habitats for birds and other organisms.

Until recently, grey infrastructure and hard engineering-based management approaches have been adopted in the rapidly developing Chinese urban environment as urban flood and drainage issues are predominantly managed by municipal water engineers. The Sponge City concept and related guidelines and practices will provide multiple opportunities to integrate ideas from eco-hydrology, climate change impact assessment and planning, and consideration of long-term social and environmental well-being, within the urban land-use planning process.

This paper aims to explicate the Sponge city concept and its development, and consider the implications of the transformation of urban land-use planning and urban-water management practice in China. To achieve the dual goals of sustainable water-use and better flood control (as targeted by the Sponge City concept), more effective development and implementation of land-use guidance and assessment tools (with explicit integration of urban flood-risk assessment, land-drainage guidance, climate projection methods, and assessment of long-term sustainability) are recommended.



Sponge City – a *proposed Green Infrastructure Master Plan combining natural and built infrastructure systems for the Udon Thani area in Thailand (Credit: estudioOCA)²*

Reasons for promoting Sponge City principles in China:

China is a country with severe water problems, both in terms of water scarcity, flooding and water quality. Due to the rapid process of industrialization and urbanization and high frequencies of global extreme weather, the urban water problems have become very prominent in the last decade. This is reflected in the following 4 aspects:

- Clotting of urban flooded rainfall and low utilization of rainwater resources;
- Over-exploitation of groundwater. There is a severe shortage of urban water resources;
- Serious pollution of urban water bodies;
- Shrinking of river and lakes and wetlands. Increased water and soil erosion

PILOT SPONGE CITIES In April 2015, China's central authorities announced the first 16 pilot sponge cities:

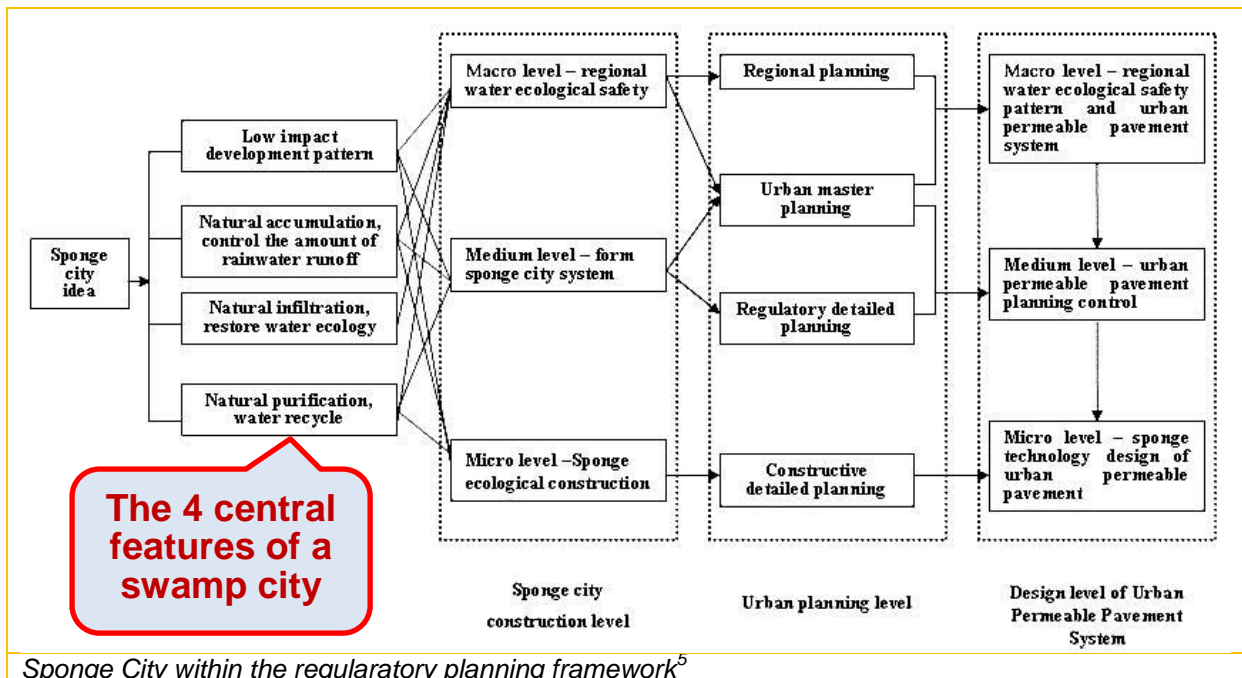
- | | |
|---------------------------------|---|
| 1. Qianan (Hebei Province) | 11. Changde (Hunan Province) |
| 2. Baicheng (Jilin Province) | 10. Wuhan (Hubei Province) |
| 3. Zhenjiang (Jiangsu Province) | 12. Nanning (Guangxi Province) |
| 4. Jiaxing (Zhejiang Province) | 13. Chongqing |
| 5. Chizhou (Anhui Province) | 14. Suining (Sichuan Province) |
| 6. Xiamen (Fujian Province) | 15. Guian New District (Guiyang and Anshun City, Guizhou Province) |
| 7. Pingxiang (Jiangxi Province) | 16. Xixian New District (Xian and Xianyang City, Shaanxi Province). |
| 8. Jinan (Shandong Province) | |
| 9. Hebi (Henan Province) | |



Sponge City design solutions³



Sponge City design solutions⁴





Green Street Design⁶



Low Impact Development Opportunities⁷

Credentials;

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Copy edited by Kosta Math y, July 2018

Sources:

¹ Source: "Sponge City" in China—A breakthrough of planning and flood risk management in the urban context

https://www.researchgate.net/publication/323738052_Sponge_City_in_China-A_breakthrough_of_planning_and_flood_risk_management_in_the_urban_context

² <https://wle.cgiar.org/thrive/2018/02/07/fighting-floods-sponge-cities>

³ Source: SvR Design company, Seattle

https://www.pinterest.com/pin/519813981966838858/sent/?sender=305682030866350581&invite_code=f3e94e5a03d6c06728a171bc8b02d504

⁴ https://www.pinterest.com/pin/347340189992714218/sent/?sender=305682030866350581&invite_code=549252b8f90132c04f31041124f59e76

⁵ https://www.researchgate.net/publication/319414994_Urban_permeable_pavement_system_design_based_on_sponge_city_concept?_sg=Zt42glQyCT1tVSz5dhoC37cmELhvxwoAyIFsSNFkstXDMveS4nDSC6vmySnbxJmFYr7abVGPXQ

⁶ Source: https://phillymotu.files.wordpress.com/2014/02/pwd_green_street_design_manual.png?w=300&h=267,
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Literature / further information:

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http://www.switchtraining.eu/fileadmin/template/projects/switch_training/files/Modules/Module_reduced_size/Switch_Training_Kit_Module_4.pdf

⁷ Source: https://www.pinterest.com/pin/AadVDWqLQ9UD9MHscdCSqdy3a5GVnSVThC4u_YIce7ZQAcxNul48sY/