Taihu Lake New Town: an comprehensive ecological plan towards implementation

Taihu New Town Construction Headquarters
Shenzhen Urban Planning & Design Institute

2013.11

Taihu New City

Content

New City, the strategic platform of local economic growth and urban extension

- **12** provincial capital cities

  4.6 new cities and towns on average for each

- **144** cities at the prefectural level

  1.5 new cities and towns on average for each

Source: data from the survey on 12 provinces conducted by China Center for Urban Development under National Development and Reform Commission

Eco-city, a new hot topic in new city development

- Constructing eco-cities has become a trend in new town construction too. However, most of the eco-city planning is deficient and lacking a holistic perspective. The plans lack of a method to combine goals and content into the existing planning system to achieve efficiency, economic growth, and reduced pollution.

Collage town

Port city

administration city

high-speed rail city

Eco-city

……

Source: data published by cities in 2013 and collected and mapped by the author

Taihu Lake New Town, an exploration of "overall ecological plan"

Nowadays, most cities' traditional new town construction has provided a relatively complete planning system. How to implement an ecological civilization at all levels of construction is a meaningful issue for urbanization in our country. What follows are some aspects we can learn from Taihu New Town.

01 Overview

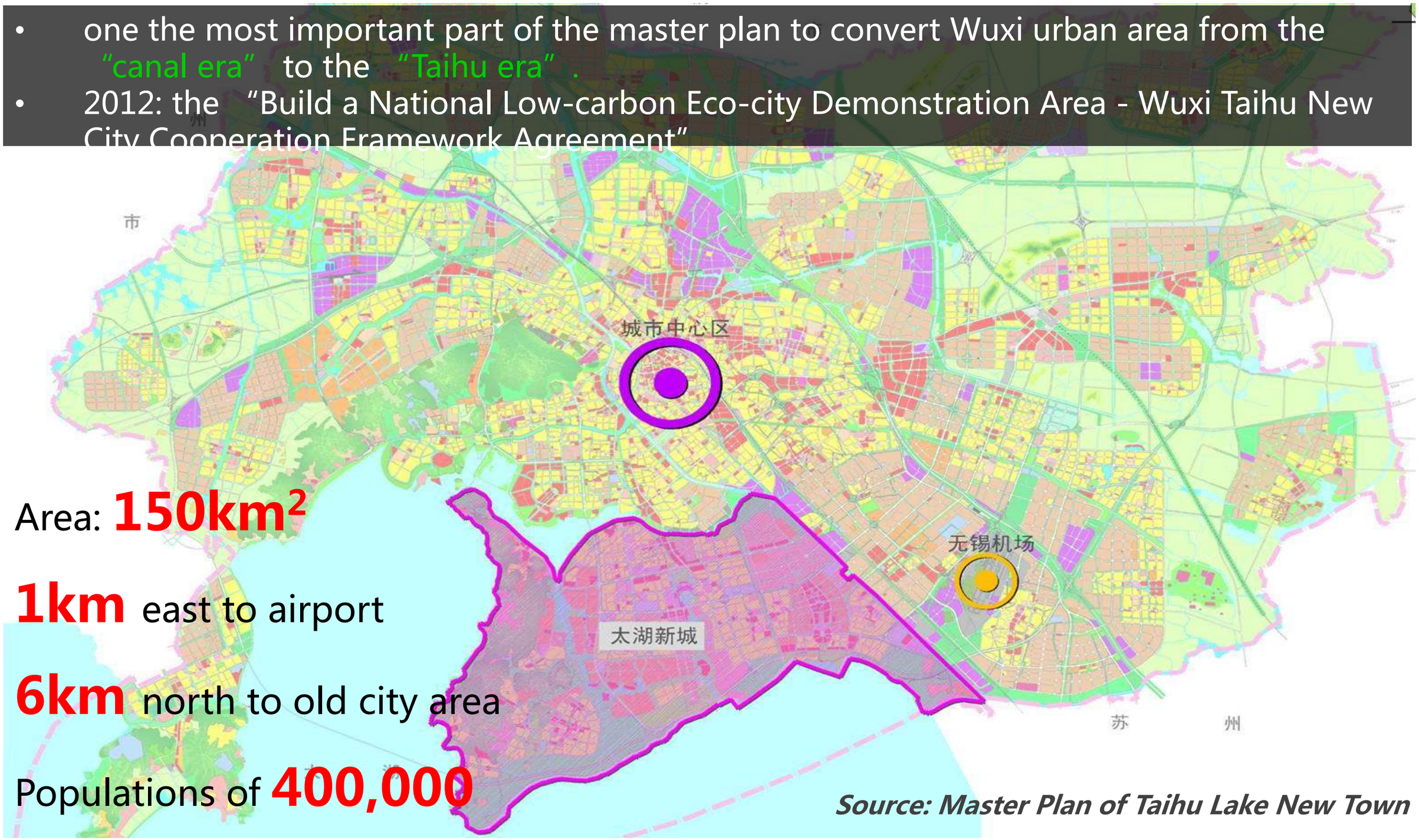
Wuxi: the “Pearl of Taihu Lake” with Long Culture History and Proposals Economy

- One of the central cities of the Yangtze River Delta, its environs have the best natural environment, the most abundant human resources, and the most developed and active economic environment.

In 2012 within the Yangtze River Delta, the city’s GDP, GDP per capita, gross industrial output value, and municipal revenue ranked fourth, first, third, and sixth respectively.

Taihu New Town: A mission to build a new town for a "National Low-carbon Ecological Demonstration Area"

- one the most important part of the master plan to convert Wuxi urban area from the "canal era" to the "Taihu era".
- 2012: the "Build a National Low-carbon Eco-city Demonstration Area - Wuxi Taihu New City Cooperation Framework Agreement"



Area: **150km²**

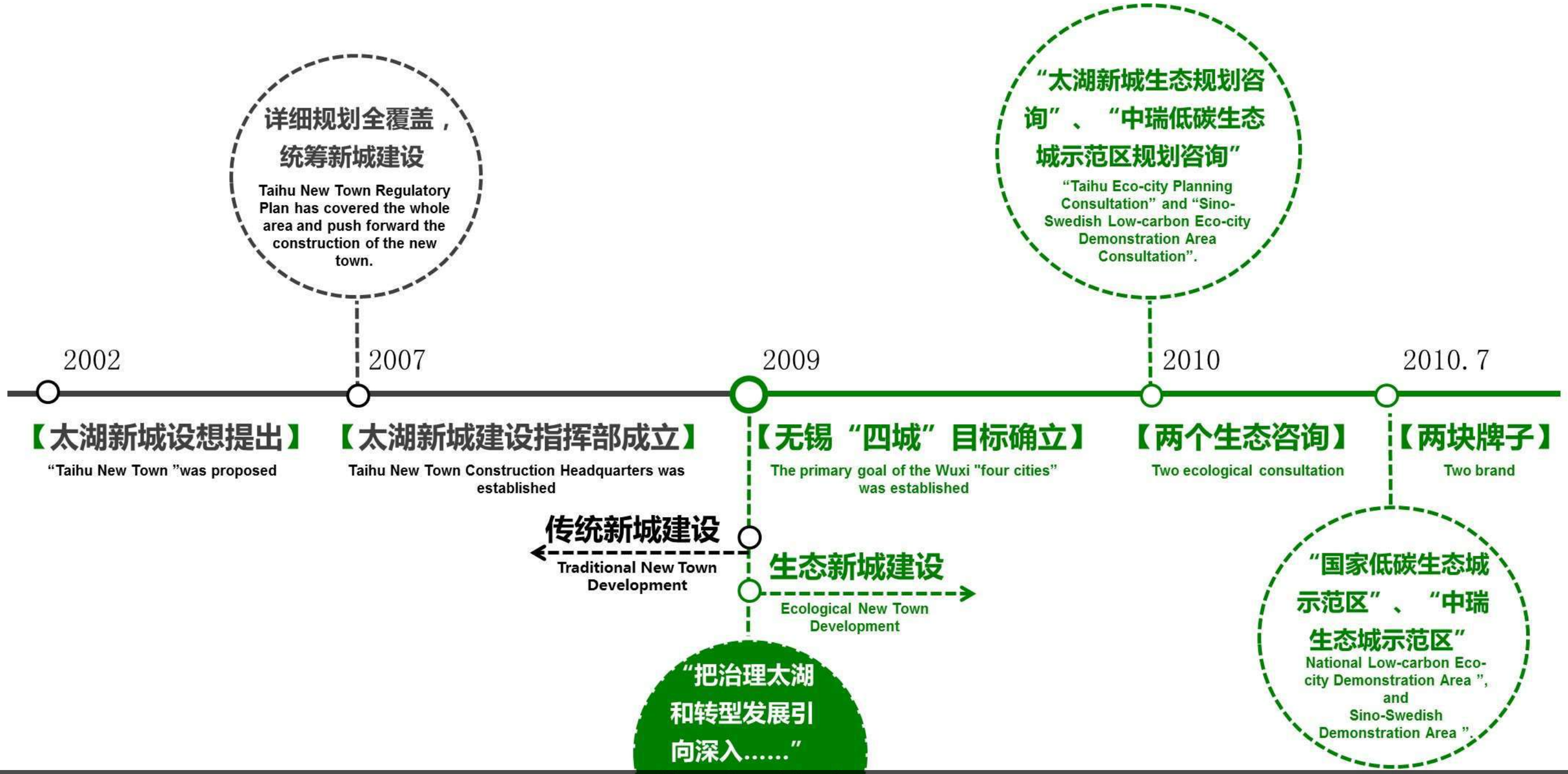
1km east to airport

6km north to old city area

Populations of **400,000**

Source: Master Plan of Taihu Lake New Town

The Plan-led Development and Transformation of Taihu New Town

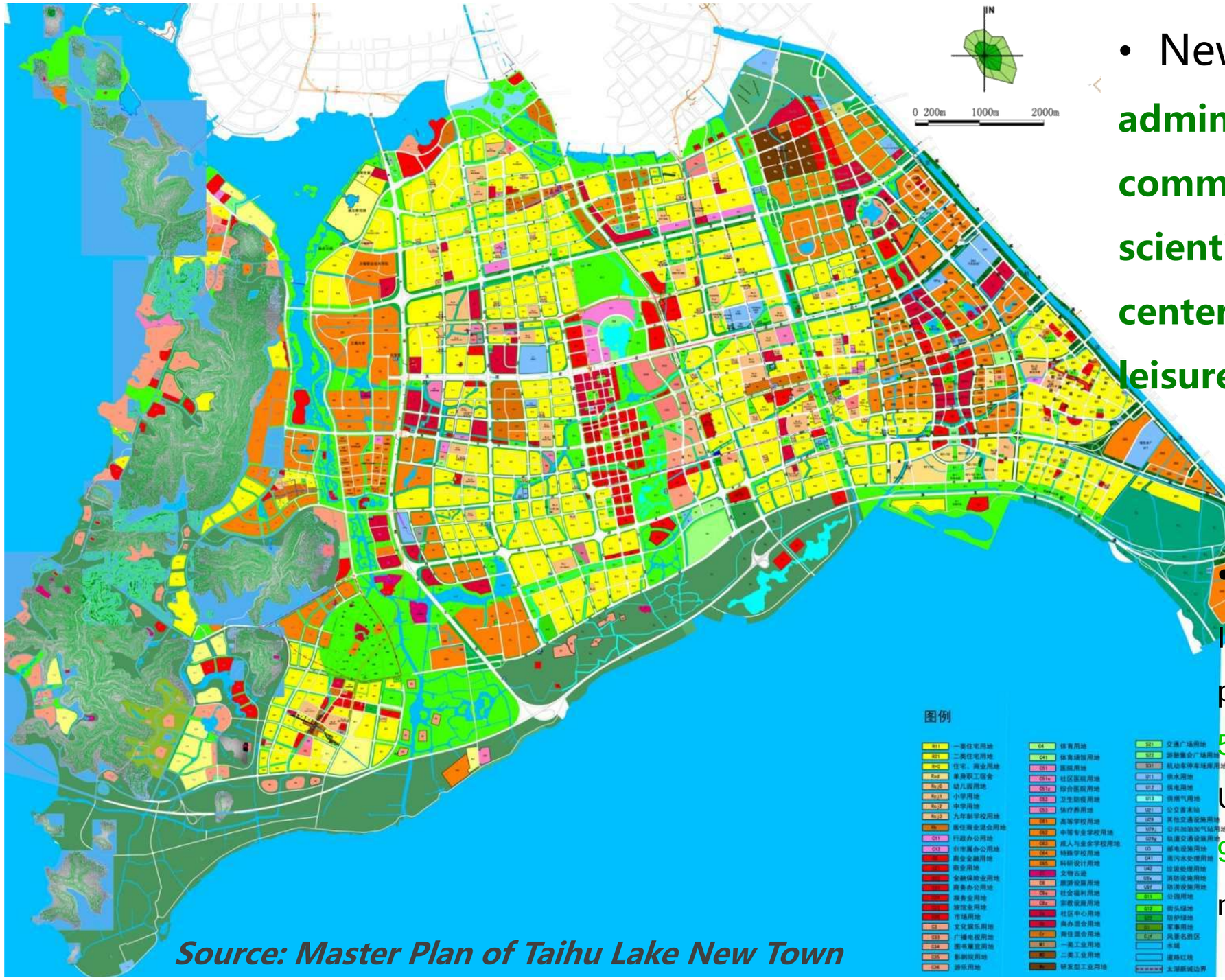


Since its inception Taihu New Town’s development, has undergone a change in concepts, from traditional new town construction to a transformative eco-city. This low carbon, ecological approach has laid a foundation for new town as transformation upgrade.

来源：笔者整理自绘

02 Spatial Planning

Goal: the New City Center



Source: Master Plan of Taihu Lake New Town

- New positioning :

administrative and commercial center

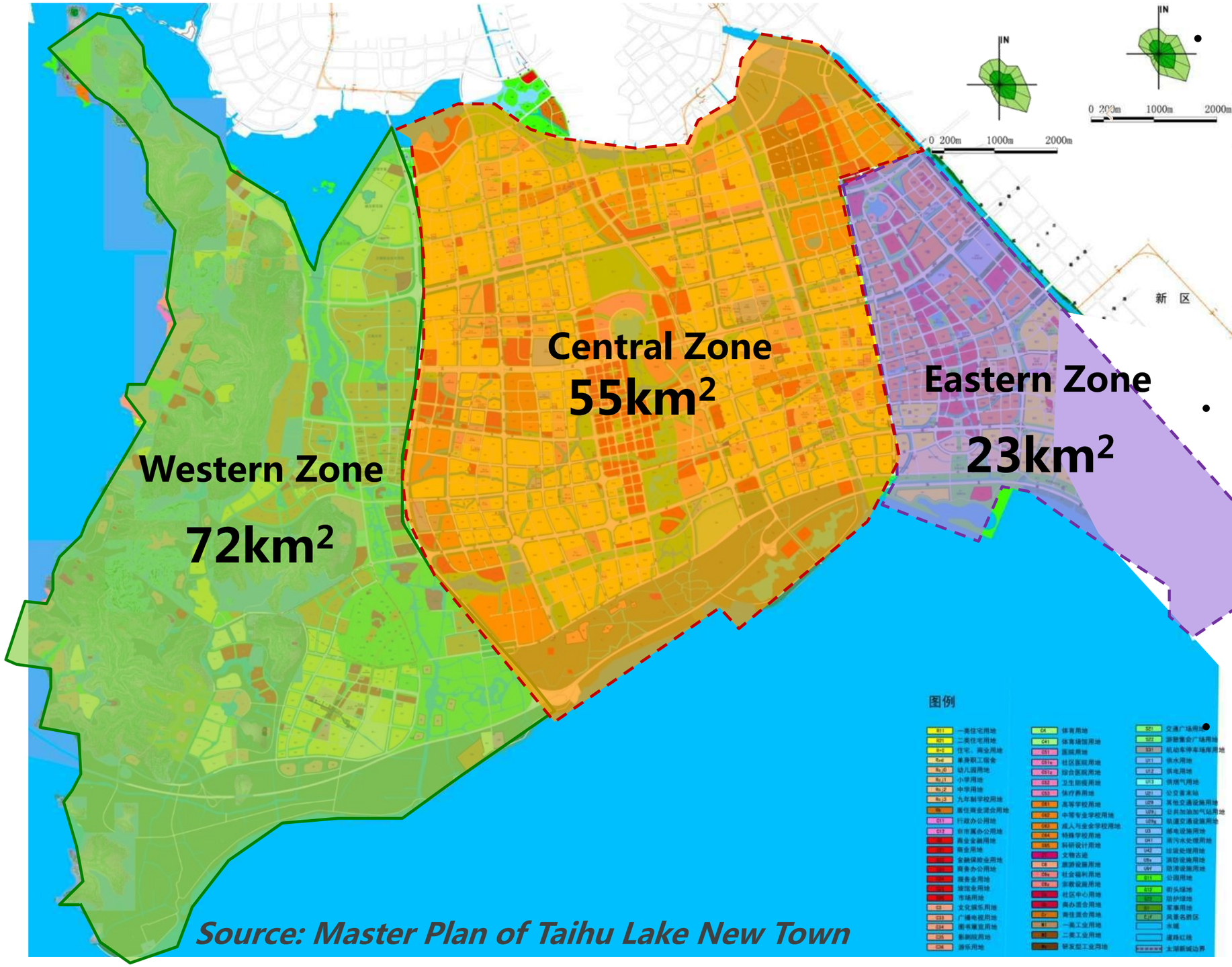
scientific and creative center

leisure and livable center

- By 2020

In 2020, there will be one million people living in the new town and 500,000 will be employed there. Urban construction land will be 9,980 ha, and 5,020 ha will be non-construction land

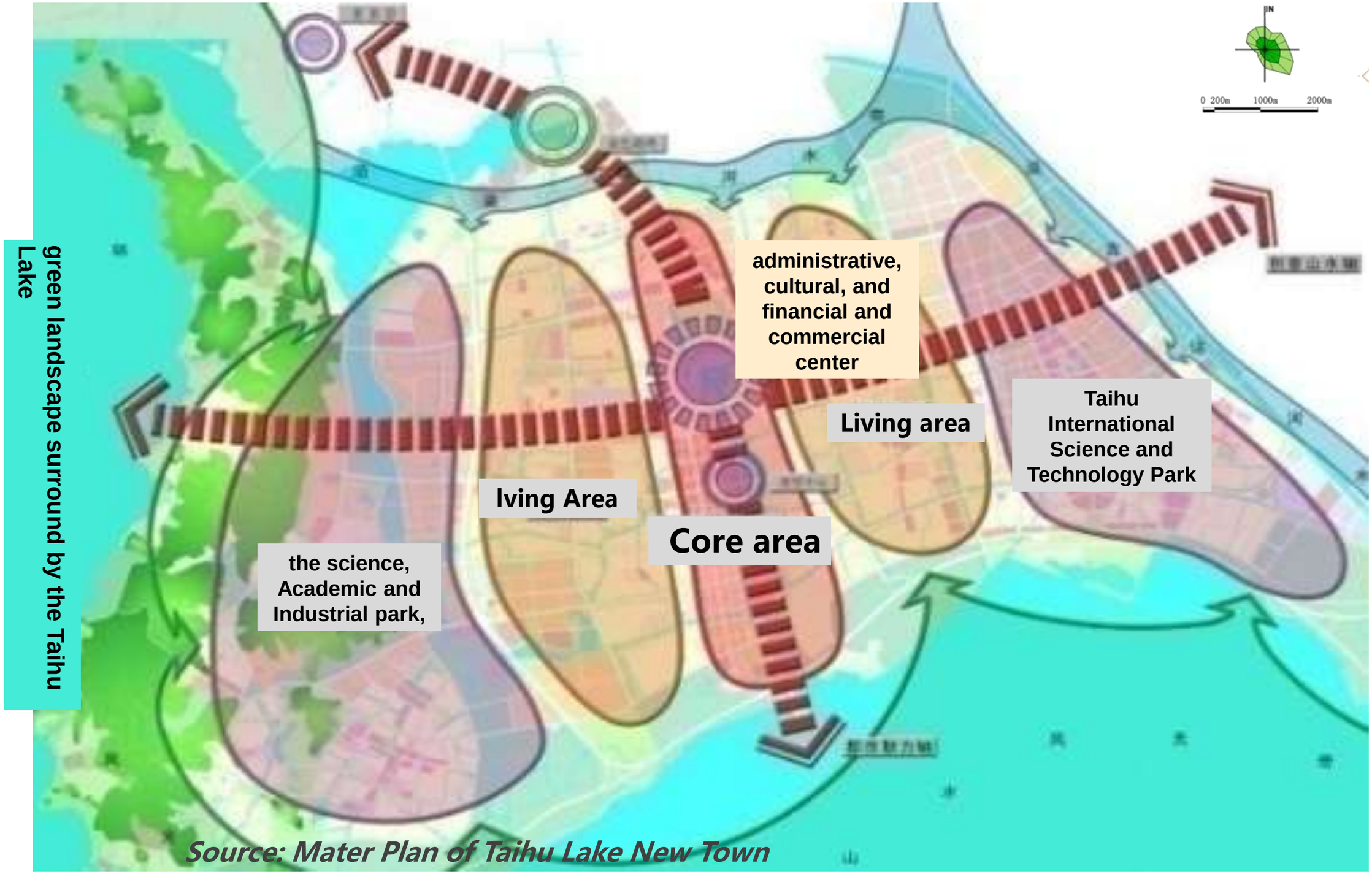
Clusters: Clarify the Three Major Functional Cluster



Source: Master Plan of Taihu Lake New Town

- creative industries and ecological tourism by constructing the nation's leading university city and technology park, a tourism and leisure base, and a movie and television studio base
- home to the financial, commercial, cultural and administrative centers and the livable communities of Taihu New Town
- national sensing and information center, high-tech research parks, university science and technology park

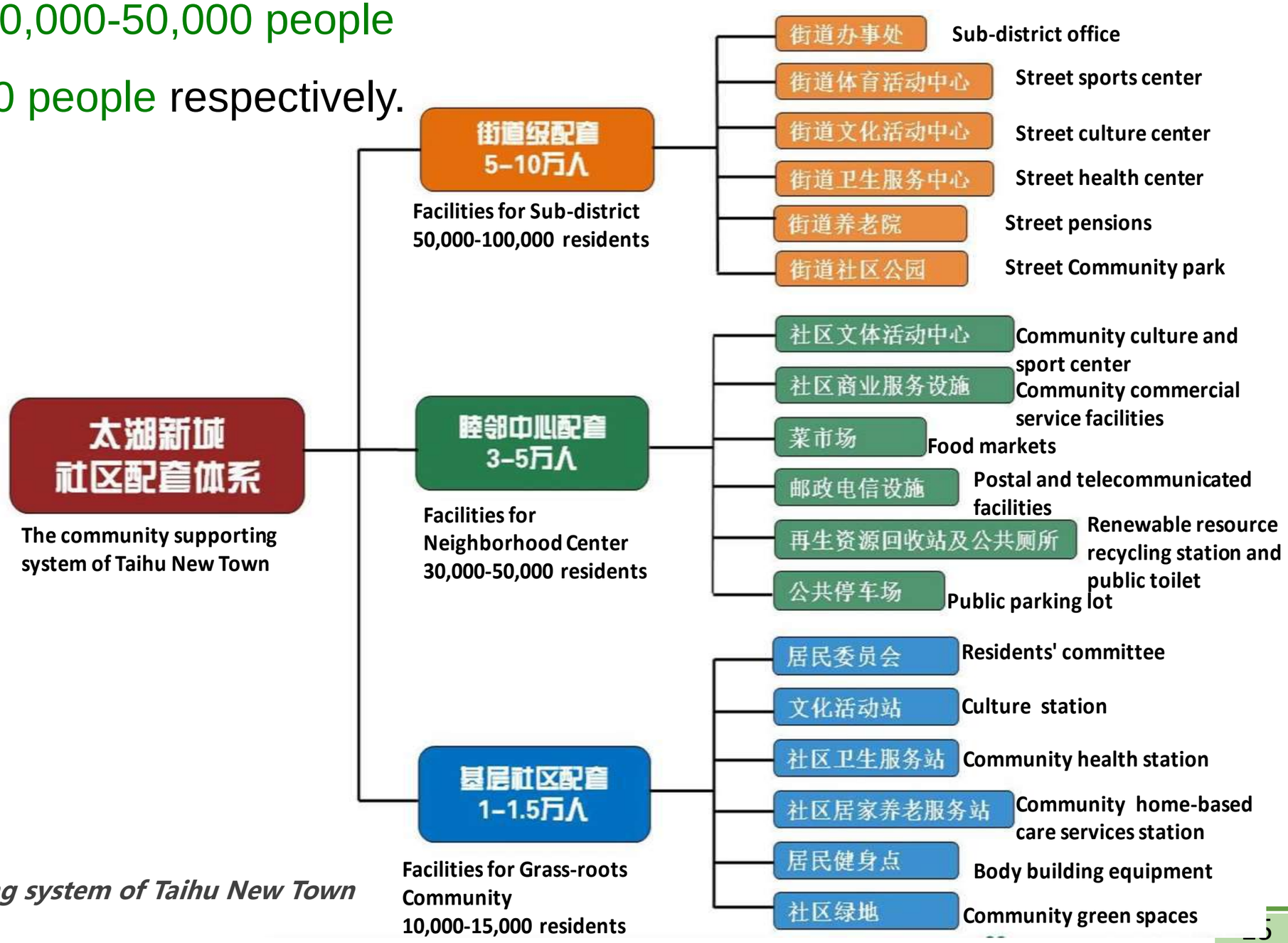
Spatial Structure: One Core, One Belt, Two Parks and Two Zones



Source: Mater Plan of Taihu Lake New Town

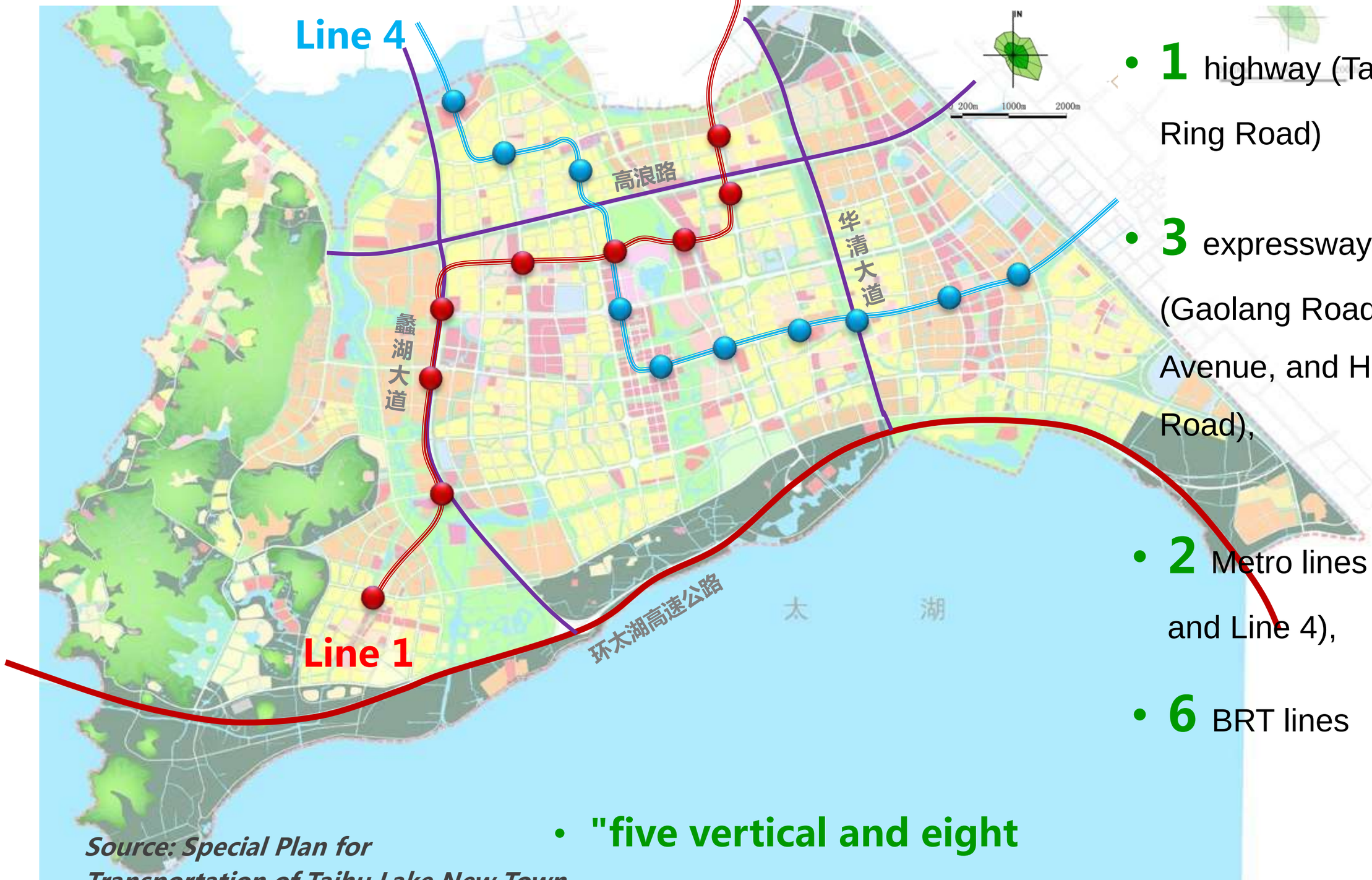
Public Facilities: Three Levels of Allocation "Sub-district - Neighbourhood Centre – Grass-roots Community"

- The three levels planned to serve 50,000-100,000 people, 30,000-50,000 people and 10,000-15,000 people respectively.



Source: Plan for community supporting system of Taihu New Town

Transportation: A Backbone of Rail, BRT and Conventional Bus Transit

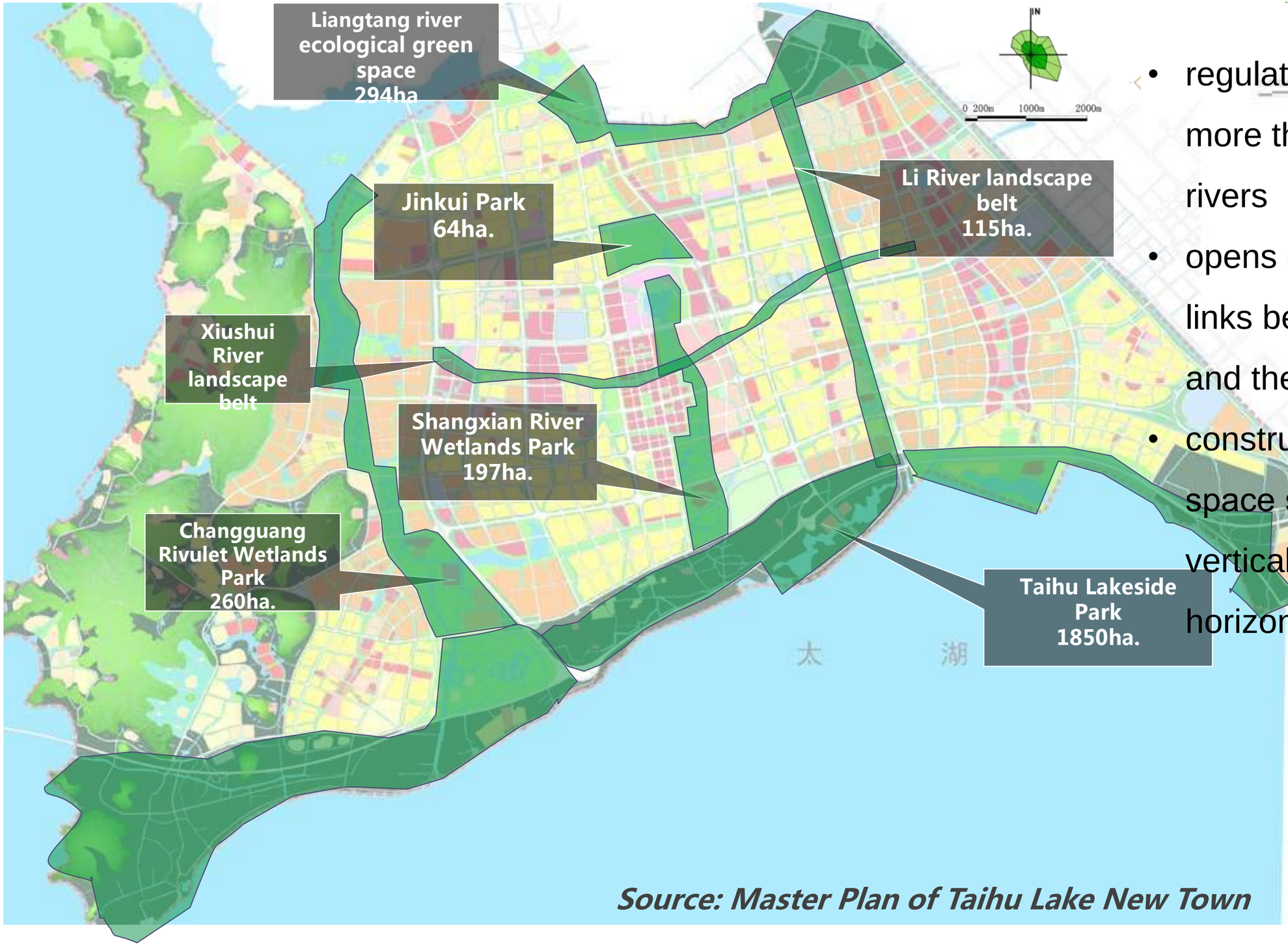


- **1** highway (Taihu Lake Ring Road)
- **3** expressways (Gaolang Road, Lihu Avenue, and Huaqing Road),
- **2** Metro lines (Line 1 and Line 4),
- **6** BRT lines

Source: Special Plan for Transportation of Taihu Lake New Town

- **"five vertical and eight horizontal"**

Ecological Infrastructure: forming the Ecological Context with the Green Corridors and the Water System



Source: Master Plan of Taihu Lake New Town

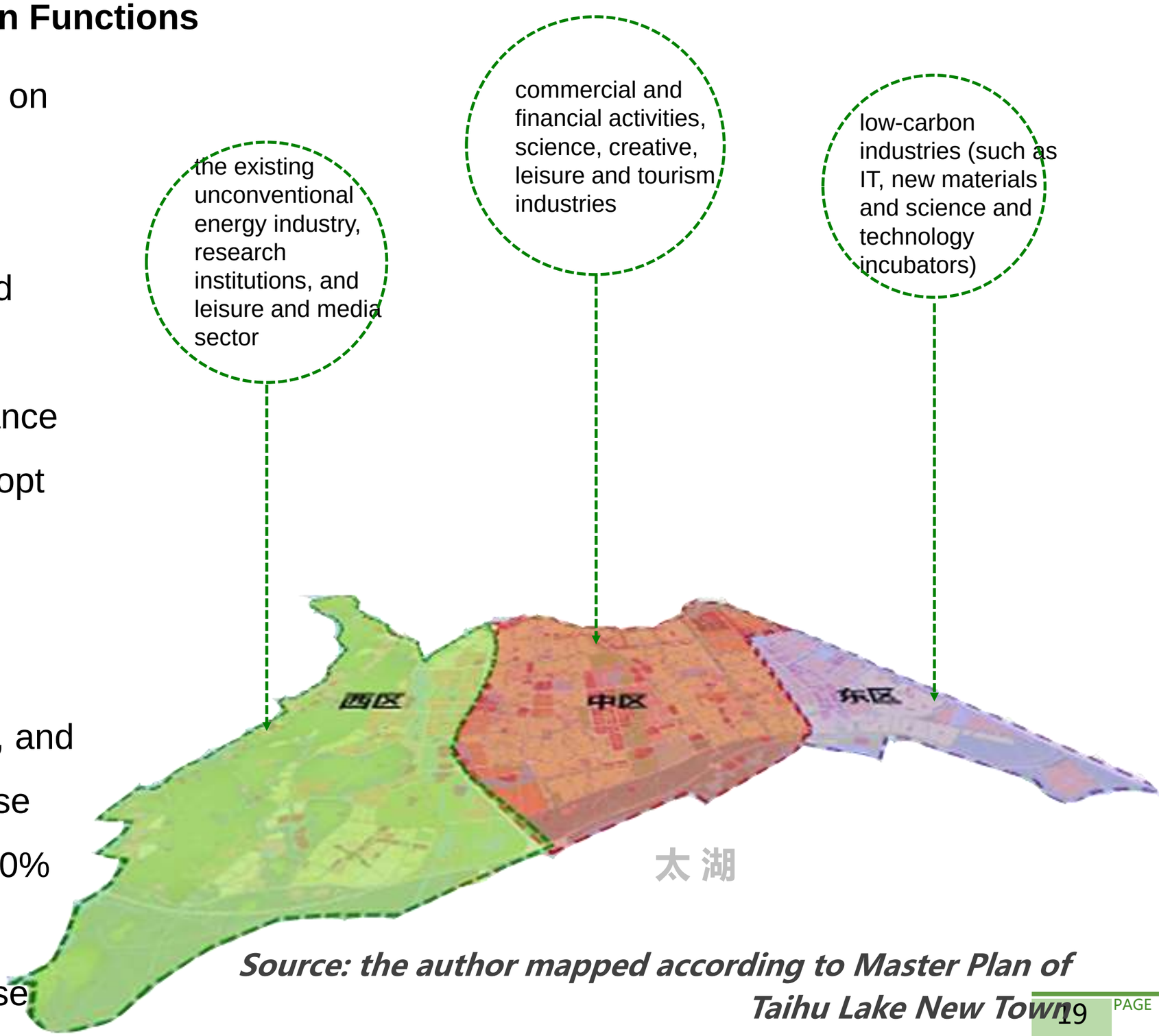
- regulating and retaining more than 300 original rivers
- opens up the symbiotic links between the lake and the city
- constructs a green space system of “three verticals and three horizontals"

03 Ecological Construction Strategy

3.1 Energy Saving Oriented Spatial Allocation of Urban Functions

1 Encourage Composite Urban Functions

- at the urban cluster level: rely on the practical strategies of the existing industries
  - Encourage low-carbon and service industries
  - Improve the live/work balance
- at the neighborhood level: Adopt mixed-use land development
- - encourage mixed-use development
  - live-work, live-commercial, and commercial-work mixed-use
  - suggests that more than 50% of the newly developed neighborhood be mixed-use



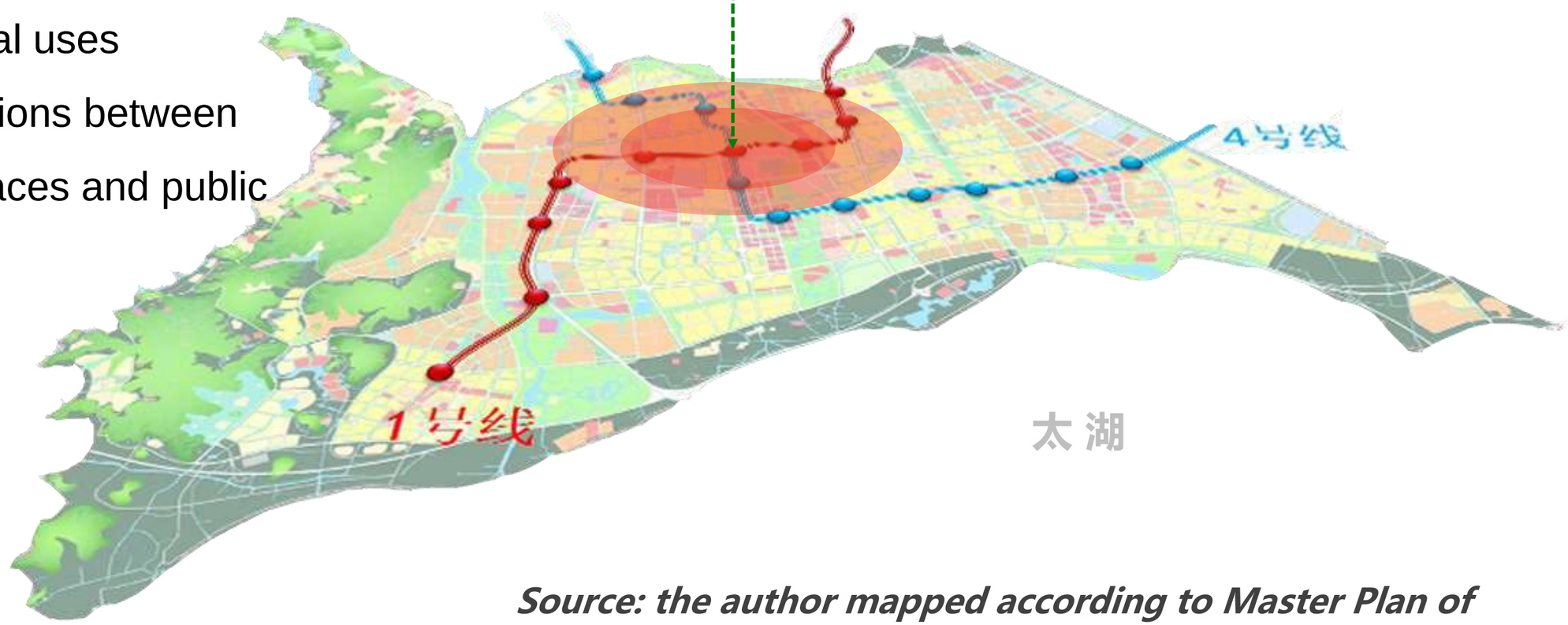
Source: the author mapped according to Master Plan of Taihu Lake New Town

3.1 Energy Saving Oriented Spatial Allocation of Urban Functions

2 Improve Land Use Intensity

- Enhance development of areas surrounding public transportation hubs and along rail lines.
  - plot ratios for office uses should be between 2.5-6.0 and between 3.5-6.5for commercial uses
- improve connections between underground spaces and public activity centers

Encourage building urban complexes and public activity centers--with a greater than 80% overlap between the public activity center and public transport hubs

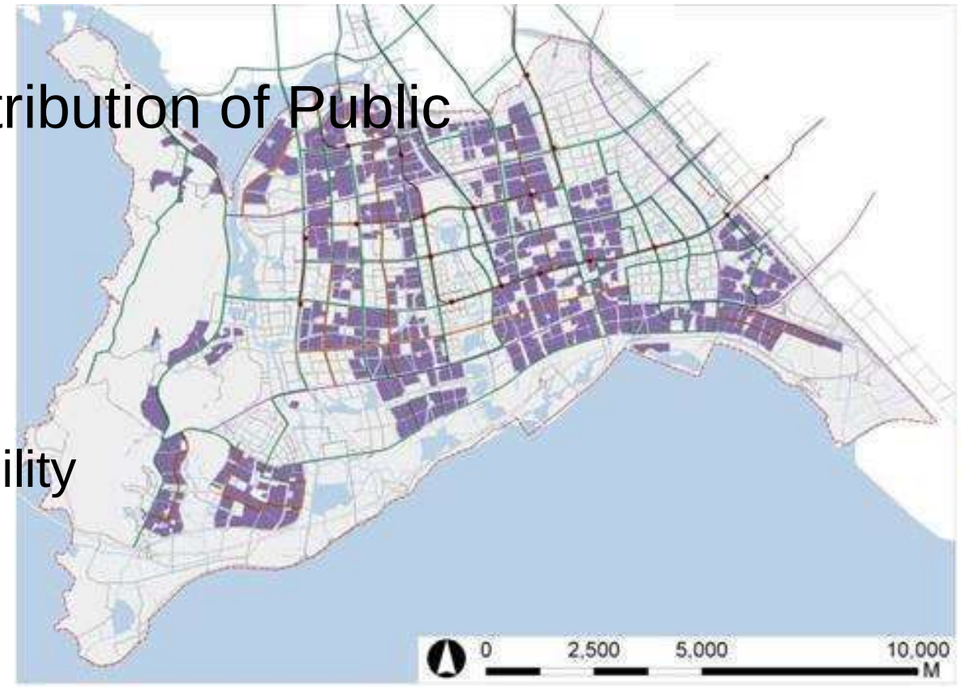


Source: the author mapped according to Master Plan of Taihu Lake New Town

3.1 Energy Saving Oriented Spatial Allocation of Urban Functions

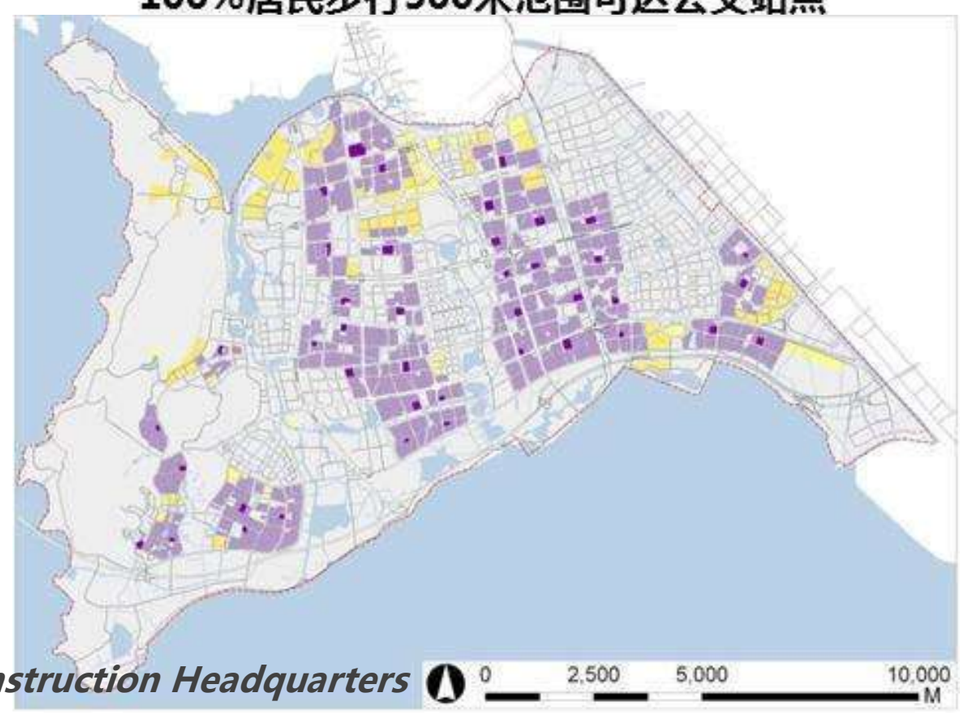
3 Enhance Distribution of Public Facilities

- enhance accessibility



100%居民步行500米范围可达公交站点

100%居民步行500米可达公共绿地



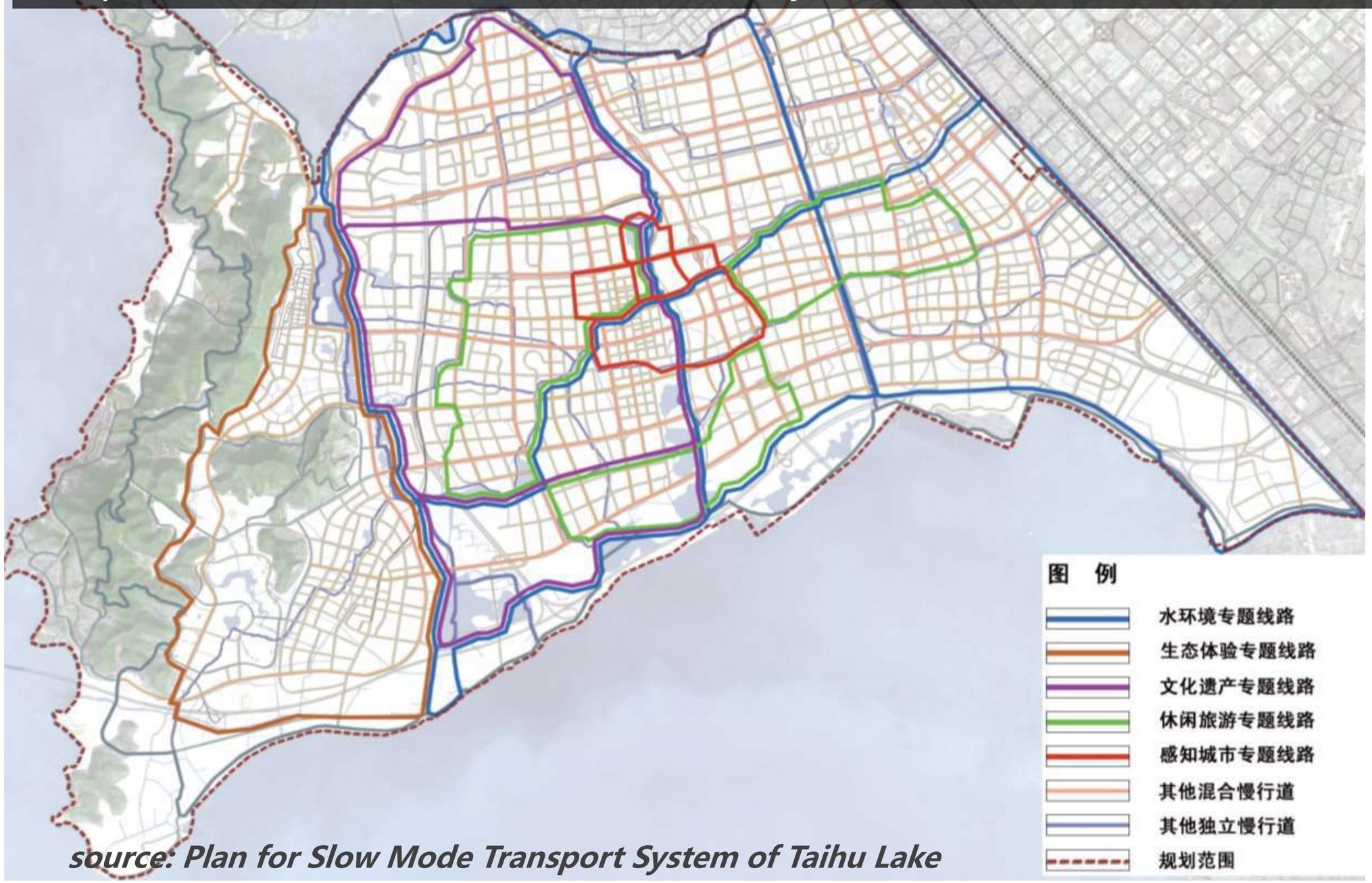
80%入学学生步行500米可达小学

97%幼童步行500米可达幼托

Source:
data from Taihu New Town Construction Headquarters

3.2 Multi-layer Green Transportation: green public transportation + slow mode system

a “public transit city” by constructing a coordinated multi-modal transport system with a complete rail, BRT and conventional bus system

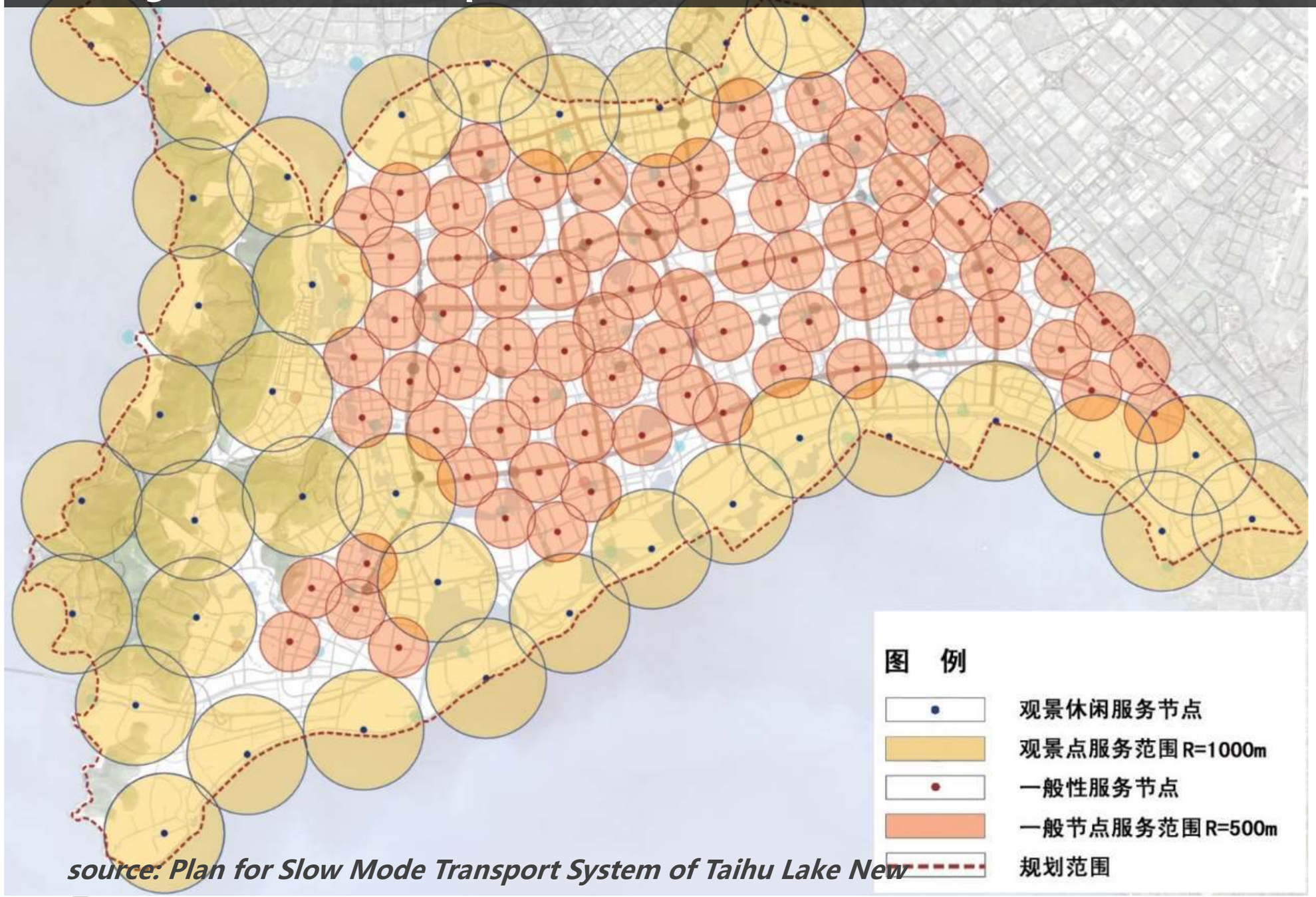


source: Plan for Slow Mode Transport System of Taihu Lake New Town

- Slow Mode Transport System **with a density of 3.7km/km2**

3.2 Multi-layer Green Transportation: green public transportation + slow mode system

ensuring that each development unit has a 2 km service radius and1-2 transit nodes



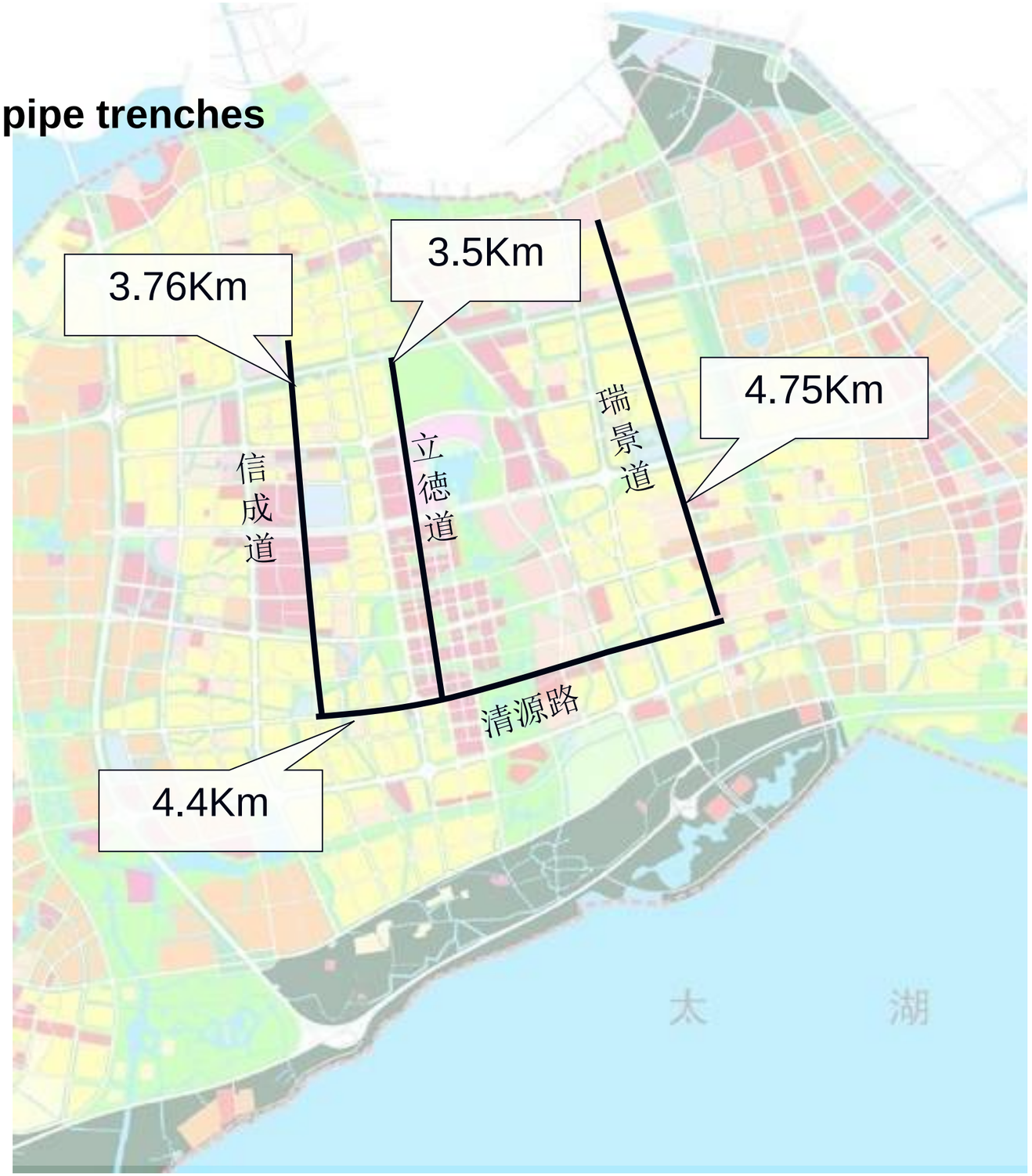
source: Plan for Slow Mode Transport System of Taihu Lake New Town

- integrate it into local neighborhoods, transit nodes and major public buildings. A complete bike share system will also help increase the use of green transport modes.

3.3 Promote Energy Saving and Low Emission Model for Energy and Resources Uses

1 Encourage the construction of common pipe trenches

- Encourage the construction of common pipe trenches (holding electric cables, telecommunications, and water mains). Total length of common pipe trenches is about 16.4 kilometers.



Source: data from Taihu New Town Construction Headquarters

3.3 Promote Energy Saving and Low Emission Model for Energy and Resources Uses

2 Water Resources/ Water Circulation and Regeneration

improve the utilization of unconventional water resources

•the water loss rate in the new pipe system should be no more than 5%.

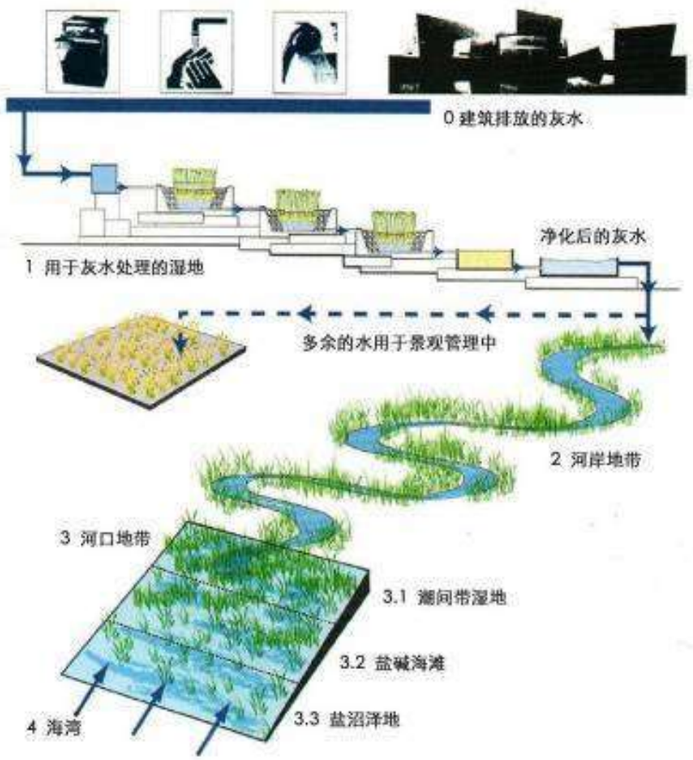
•Use of unconventional water resource should be above 40% for new projects.

•Achieve 100% use of water saving appliances.

Improve sewage treatment

•adopts a grey water reuse system

•aims top expand grey water use to 30%



Achieve ground permeability and zero impact.

•New roads and buildings of the New Town will comprehensively utilize a rainwater reuse system and increase rainwater infiltration through permeable surfaces to guarantee that rain infiltration remains the same as before development--achieving zero impact in

Source: data from Taihu New Town Construction Headquarters

3.3 Promote Energy Saving and Low Emission Model for Energy and Resources Uses

3 Waste Disposal Technology

Reduction of solid waste

•Per capita garbage disposal should be no more than 0.8 kg/person/day

•Reduced construction waste will come about through efficient construction techniques and utilizing construction debris for land reclamation

Utilization of solid waste as a resource

•The plan states that the New Town's garbage recycling rate should be no less than 95%.

•The recycling rate of construction waste should be no lower than 75%.

Zero impact on solid waste disposal

•The plan targets Taihu New Town to have hazard-free treatment rate and waste collection up to 100%.

•Implement an ecological vacuum waste collection system.

Source: data from Taihu New Town Construction Headquarters

3.3 Promote Energy Saving and Low Emission Model for Energy and Resources Uses

4 Energy Saving and Regeneration Technology

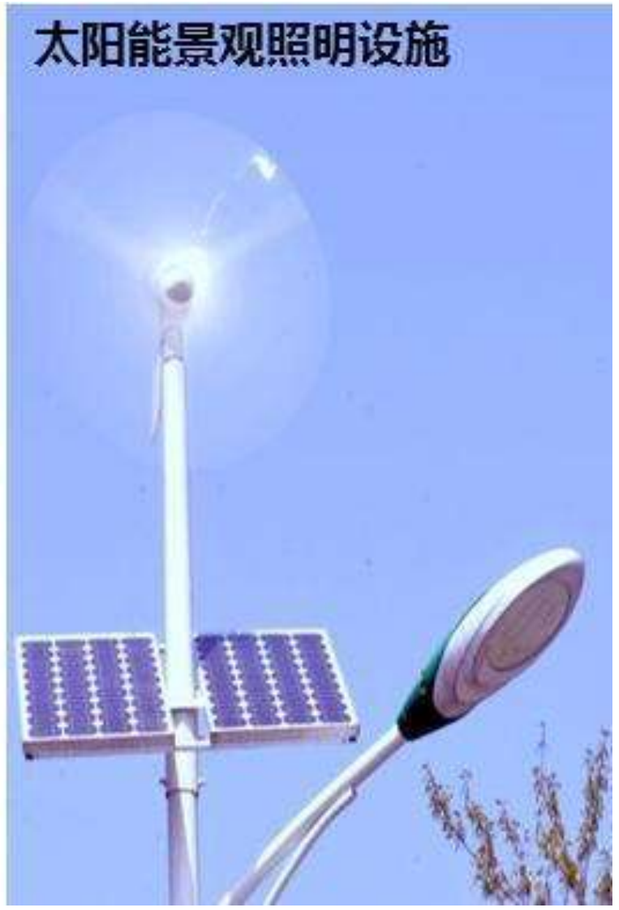
Strategy for new building energy savings

•The proper use of shading devices, thermal insulation, sound insulation, and environmental friendly technology will reduce each building's energy consumption. The plan targets the energy efficiency rate of new residential and public building's to be greater than 65%.

Strategy for utilization of renewable energy

•the utilization rate of renewable energy should be above 8%, new buildings renewable energy utilization rate of 15% or more, in the low carbon eco-city will be more than 20%.

• the technology of distributed energy form



Source: Special Plan for Energy of Taihu Lake New Town

3.4 Protect and Improve the Ecological Environment

Development goals	Air: Monitored air quality levels should be better than or equal national Standard 2 at least 350 days per year. Water: Strengthen control of Taihu Lake's water environment s that the lake's surface water environment quality is not lower t Class III. Noise: Environmental impact assessments should be done before each construction project.
Greening projects	improve the landscape's photosynthesis rate to at least 45%. Plant tall trees and create protective green space 80%, road green space 70%, and park green space 60%.
Livable city	Actively promote the building of the vertical greening and increase the number of green roofs to increase the carbon sink capability of the eco-city.

3.5 Promote Green Architecture

Eco-city new buildings are constructed in accordance with the "Green Building Evaluation Standards" and "Green Building Evaluation Standards of Jiangsu Province". 100% of the buildings will pass the one-star certification, with 20% qualifying for two-star certification and 10% for three-star certification.

Source: data from Taihu New Town Construction Headquarters

04 Character Analysis

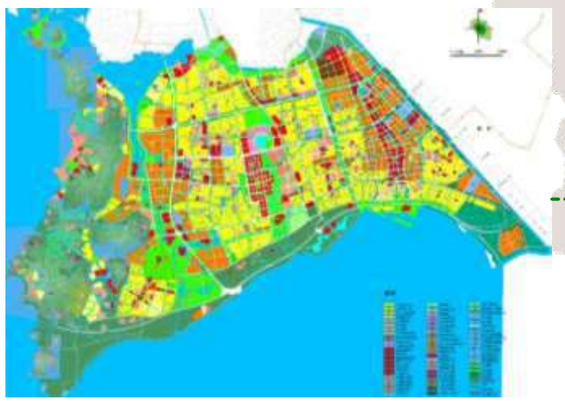
Characters of Ecological Construction

Intermediate-level Technical Exploration of Comprehensive Ecological Planning

Ecological planning oriented by goals

Development Goal :
Innovation town leading the development of environmental industry

Tianjin : 34.2km²
Zhongxin Eco-city



Ecological promotion based on traditional planning system

Development Goal :
new administrative, scientific and educational creative, living and recreational centers

Wuxi : 150km²
Taihu Lake Eco-city

Ecological planning oriented by goals

Development Goal :
showcase of livable low-carbon district and new towns in the future

Shenzhen : 57km²
Sino-Europe International Eco-city

Source: drawn by the author

Intermediate-level Technical Exploration of Comprehensive Ecological Planning

传统规划 Traditional Planning	2个生态咨询 2 Ecological Consultation	2套指标体系 2 Indicators System	规划更新 Update Plan

150km²

总体规划层面 Comprehensive Planning

- 太湖新城总体规划 Taihu New Town Comprehensive Planning
- 市政、道路、水系、公共设施等专项规划 Special planning of municipal, transformation, drainage, and public facilities

太湖新城生态规划 "Taihu Eco-city Planning

- 循环资料战略 Circulated information strategy
- 生态建设战略 Ecological development strategy
- 低碳经济战略 Low-carbon economy strategy
- 绿色交通战略 Green transformation strategy

建设指标体系 Indicators System

- 《无锡太湖新城-国家低碳生态城示范区规划指标体系及实施导则（2010-2020）》 "Wuxi Taihu New Town • Low-carbon Eco-city Indicator System and Implementation Guidelines of Demonstration Area"

更新控规单元 Update the regulatory unit

- 《太湖新城控制性详细规划生态指标更新》 Ecological Indicators Update of the Taihu New Town Detailed Plan

深化专项规划 Deepen the subject planning

- 能源、慢行、市政管线等专项的生态审视 Ecological examination of Energy, slow transportation , and municipal pipelines

2.4km²

地块规划层面 Land Planning

- 既有控制性详细规划 Existing control detailed planning

中瑞生态城规划 Sino-Swedish Eco-city Planning

- 7个可持续发展目标 7 targets of sustainable development
- 生态城的启动建议和城市设计框架 The suggestions of startup and urban design framework of eco-city

建设指标体系 Indicators System

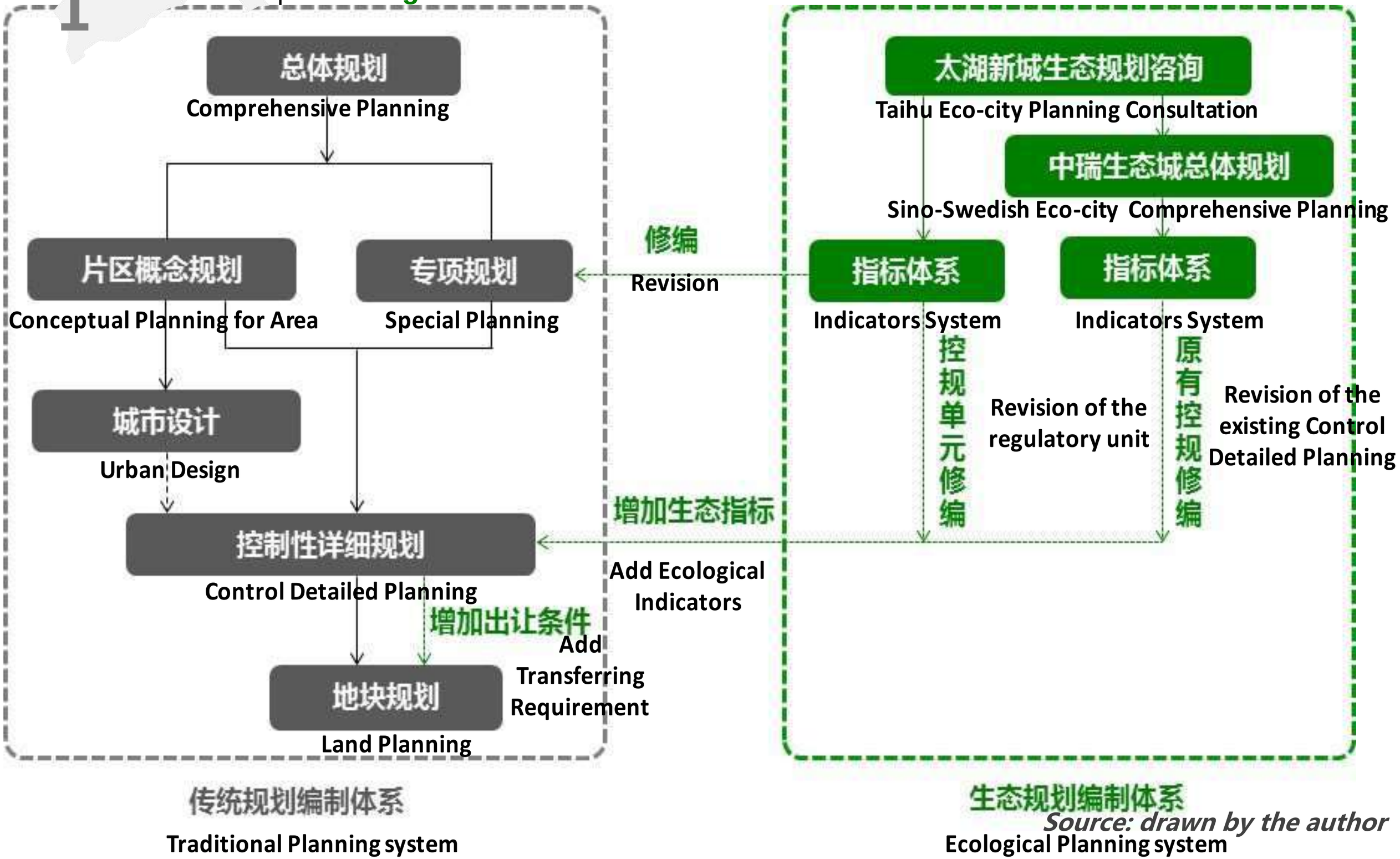
- 《无锡中瑞低碳生态城建设指标体系及实施导则（2010-2020）》 "Wuxi Sino-Swedish Low-carbon Eco-city Indicator System and Implementation Guidelines for Construction"

推动控规修编 promote the plan revision

- 《中瑞低碳生态城控制性详细规划修编》 "Sino-Swedish Eco-city Detailed Plan Revision"

Source: drawn by the author

Intermediate-level Technical Exploration of Comprehensive Ecological Planning



Source: drawn by the author

Both macro-level planning of space and micro-level guidance on land development

Operational Indicators System Establishes Both Technical and Management Measures

- **Not a "One Size Fits All" – the Guidelines Provide Sufficient Flexibility**
- **it combines the practicability of implementation in the guidelines with targeted decomposition**
- **Local character**

Source: Operational Indicators System

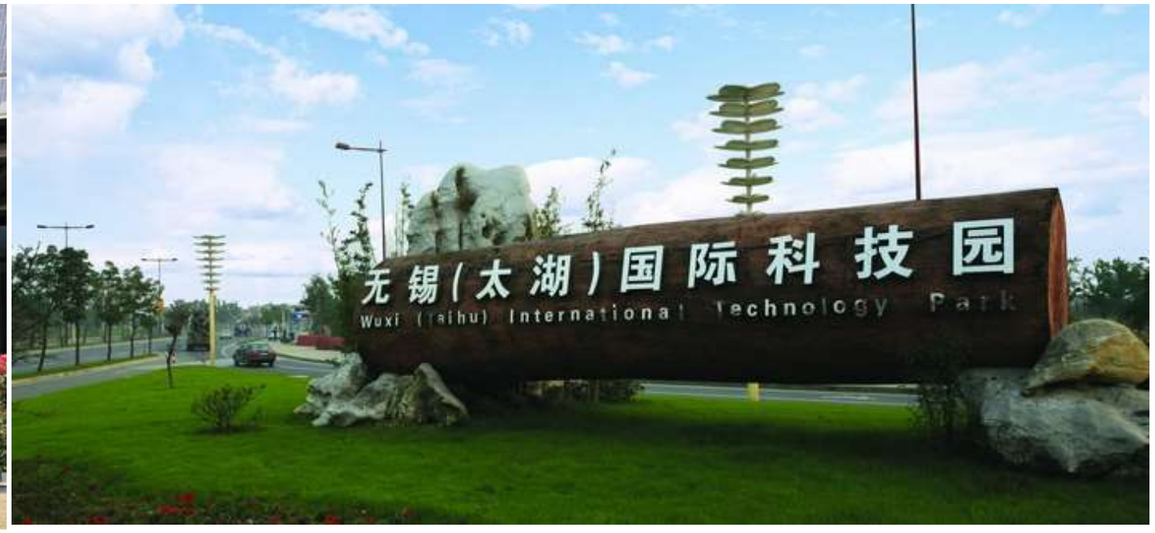
Support of Local Industry and Ecological Environment

Other Eco-cities

- focused mainly on residential and living facilities—mono-functional projects
- lacked cohesion and planning with the surrounding city economically and socially.

Taihu New City

- Taihu New Town has functionally diverse planning to create integrated development that is ecological and livable and has high-technology industries, tourism, and modern services.
- The strong foundation of new energy technologies and industry has contributed to the development of a low-carbon eco-city, and formed networked foundation for business, research, government, and market.



Directly Guiding Detailed Urban Design for the New Town's Place-making

- In 2005, urban design for the Taihu New Town started in the core area to optimize the functional layout of the Central Zone and explore possible city skylines, focus points, and interfaces. In stages, designs were completed for focal functional areas, spaces along main roads, and the waterfront. All main urban design was completed in 2007

focal functional areas

- CBD、sensing center、golden bay park…

- to coordinate the generation of a district skyline

spaces along main roads

- Gaolang Road, Guanshan Road, Lixin Avenue…

- to design the urban space along the main roads, to focus on the building scale and setbacks,
- focus points, facilities

the waterfront

- Shangxian River, Gonghu Bay, Liangtang River …

4 Directly Guiding Detailed Urban Design for the New Town's Place-making

Source: Urban Design for No.2 and 3 Blocks in CBD of Taihu Lake New Town

Thirty-year urbanization of China has witnessed an unprecedented construction wave of new cities in world`s history. There are both success and lessons.

With emphasis on ecological construction and based on traditional concepts of planning, the construction of Taihu Lake New Town is a practical and sustainable example in this area.

We Welcome Your Comments and Suggestions!