Analysis of Urban Design Methods Based on Eco-City Green Blocks

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Abstract. After entering the 21st century, the contradiction between urban construction development and the number, society, nature, environment and resources has become increasingly prominent. Building an ecological city has become a fundamental method for contradictions, and it is also a core issue of common concern in today's society. The current urban ecological design must combine nature and adapt to natural development. The green block city design is the inevitable outcome of this trend. Based on this theory, the paper analyzes the current problems of eco-city, explores the timeliness of future eco-city planning, and proposes green street design strategies adapted to different ecological environments from climate, land, vegetation, water resources, etc., trying to make up for the current ecology. The inadequacies in urban planning and design are expected to build a scientific and effective green block planning system.

1. Introduction
The goal of an eco-city is to achieve environmental, economic, and social sustainable development. However, as a complex system, the development of the city is inevitably affected by many factors such as economy, system, number of people, and moral level. Therefore, the eco-city goal is a long and dynamic process for any country and region, not an ultimate blueprint. China's cities in transition are undergoing large-scale eco-city construction practices. As an important part of the world's eco-city research and development, China's “ecological city” construction has become the focus of attention of all countries in the world. From the perspective of oversalty and effectiveness, the eco-city is conducive to achieving the development goals of the eco-city from planning to implementation due to its appropriate scale and specific operational mechanism.

2. Basic theory overview

2.1. Green Block Concept
The green block city design takes the green block as the research object, guided by the design principle of the green block, and aims to realize the research content of the green block. It comprehensively studies the requirements of the green block by urban planning and architecture, and combines information and energy conservation. Technical means such as environmental protection, urban design at the block level reflecting green, ecological and humanistic concepts. The core research content of green block urban design is: taking ecological principles as the core, taking green blocks as the research object, effectively
combining the relevant theories of urban morphology and urban culture, inheriting the excellent ideas and methods of traditional urban planning and architecture. And strategy, combined with modern science and technology, from the perspective of urban design to achieve the research content and development goals of green blocks, to achieve harmonious development of people, neighborhoods, cities and nature. From design to nature to design compliance with nature, this is an inevitable trend of urban development. Green block city design is adhering to this concept, seeking the right law of harmony between man and nature in the design of green block city. Design obedience to nature is a natural law of "being sincere and inward". It is the design essence that calls for academics to reflect on reality and return to nature [1].

2.2. Eco-city content and guidelines
The eco-city was originally a typical composite system, which comprehensively studied the factors involved in the city, including urban layout, infrastructure and various environments, and can use energy, resources and current big data reasonably and efficiently. It can also effectively guarantee the harmony and unification of the environment, society and finance. It is mainly reflected in the following points: First, the system itself has the characteristics of efficient operation, and realizes economic resources in the whole process of investment output. Output is greater than natural resource inputs, while ensuring that waste emissions are effectively reduced, and the industrial system is an inverted pyramid system. Secondly, this system has the characteristics of high-quality operation. It can regard modern infrastructure as support, and rely on people, goods, information, and value and energy flow to reduce economic losses and effectively protect the environment. Finally, with significant holistic and systematic, it not only protects the environment, but also promotes the development of the urban economy. Although the green block cannot be regarded as the core goal of the construction of the eco-city, the focus is on the economy and the environment. Coordinated, the level of concern is the improvement of our quality of life, and will not affect sustainable development because of the immediate development. The construction of an ecological city must be based on the fundamentals of natural ecology, and then the creation of science, the maintenance and development of common development, and thus the ecological benefits will be significantly improved.

3. Eco-city green block urban design
3.1. Correlation between eco-environmental elements of green blocks and urban design systems
The design of green block urban design strategy based on different ecological environment elements should be based on the continuation of the traditional urban design excellent method, effectively
combine the current technical means to carry out the dynamic analysis of the block to optimize and adjust the urban design plan, and propose universality. Urban design method. Through the analysis of the ecological environment elements of the neighborhood, it is possible to establish an organic relationship between the urban design system of the green block and the ecological environment elements such as climate, land, green space vegetation and water body conditions, and clearly express the relationship between the urban design system and the ecological environment elements of the green block. Sexual strength provides a basis for the formulation of green block urban design strategies.

3.2. Green block city design strategy combined with climatic conditions

3.2.1. Design of wind environment and eco-city. The wind environment has a great influence on the initial land use selection and layout structure of the block construction, and the two show an intensity correlation. For example, the block in the cold region of China belongs to the monsoon climate, and the winter is mainly dominated by the northwest wind. The cold air has a greater impact on the environmental comfort of the block. Therefore, in the cold area, the block needs to avoid the main ventilation corridor of the city during the site selection stage, and choose the land that can receive the maximum sunshine, wind and snow, and the layout structure of the block should also be considered in combination with the wind environment. The layout of the block, the spatial pattern of the block is characterized by high northwest and low southeast, so as to be able to withstand the invasion of the outside cold air.

3.2.2. Association of thermal environment with eco-city design system. Solar radiation is the root cause of the thermal environment. Traditional urban and architectural design methods have long considered the combination of sunshine conditions and provided many excellent design experiences for today's urban construction. For example, in the hot area, the design of the block is generally considered to avoid or block solar radiation as far as possible to meet the basic lighting requirements, and to use natural wind, terrain, green vegetation, sunshade structures and the design of the building to achieve this purpose; The design of the block should not only consider lighting, but also meet the indoor thermal environment comfort requirements, and try to get enough sunshine in the location of the block, avoid the cold wind, combine the terrain and the design of the building itself.

3.2.3. Association of acoustic environment with eco-city design system. The acoustic environment and the cluster size, road width, and public space vitality of the neighborhood should be considered in two aspects: the benign acoustic environment and the non-benign acoustic environment. The benign acoustic environment is a sound that is beneficial to the neighborhood environment, such as natural wind, sweet birds and insects, which can awaken people's resonance to the natural environment and enhance the natural charm of the neighborhood. For the neighborhoods in the center of the old city, the screams of the vendors and the conversations between the neighborhoods are also a manifestation of human charm and heritage culture; the non-benign acoustic environment generally includes roaring from noisy factories. The noise of the dance hall, traffic noise of various motor vehicles, and humming [2-3].

3.3. Association of land elements with eco-city design systems

3.3.1. Correlation between topographical elements and urban design systems. Terrain is the general term for surface undulations (landforms) and features (various tangible objects on the ground, such as mountains, forests, etc.). The terrain can be divided into five types: mountains, basins, hills, plateaus, and plains. The two most important factors in the topographical features are elevation and slope. The former determines the overall environment of the block in a specific climatic condition, and plays a decisive role in the internal environment of the block; the latter mainly refers to the slope and aspect. Directly related to specific urban design strategies.
3.3.2. Association of soil elements with urban design systems. Soil is the foundation of terrestrial ecosystems and an important link between biological and abiotic environments. The relationship between surface soil and construction land is very close. Therefore, construction activities should be carried out on the basis of soil survey. The most important information provided by soil surveys includes soil composition, texture and drainage.

3.3.3. Analysis of land carrying capacity in blocks. Ecological footprint from the ecological point of view, transforming the various resources consumed by human production and living into the values provided or absorbed by the ecosystem through the land area is a way to quantitatively study the relationship between human activities and ecosystems. Through the comparison between the demand and supply of ecological footprints, it can be determined whether a certain development mode meets the requirements of sustainable development, so as to provide scientific suggestions for the improvement of human activities. Exploring the ecological footprint at the block level is mainly based on the fact that the block is regarded as the basic unit in the urban system, and through the sustainable development of the basic unit of the block, it forms a harmonious and orderly urban overall system at the macro level.

The ecological footprint analysis at the block level includes two parts. On the one hand, the ecological footprint demand is the demand for various ecological resources needed to maintain the development of the block. The calculation formula can be expressed as:

$$ EF = N \left[ ef = \sum (aat) = \sum (Ci / Pi) \right] $$  \hspace{1cm} (1)

In the formula, $EF$ is the total ecological footprint; $N$ is the number of people; $ef$ is the per capita ecological footprint; $aat$ is the product of the per capita $i$ transformed commodity-converted bio-production land; $i$ is the type of consumer goods and inputs; $Pi$ is the type of consumption The global average production capacity of commodities; $Ci$ is the per capita consumption of $i$ commodities.

On the other hand, the supply of ecological footprint is the corresponding amount of resources that the neighborhood ecosystem can provide.

$$ EC = N \left[ ec = N \sum a_j r_j y_j \right] \quad (j = 1, 2, 3,\ldots,6) $$  \hspace{1cm} (2)

In the formula, $EC$ is the total ecological carrying capacity of the region; $N$ is the population; $ec$ is the per capita ecological carrying capacity (ha/person); $a_j$ is the per capita biological production; $r_j$ is the equilibrium factor; $y_j$ is the yield factor.

When the ecological footprint demand is lower than the ecological footprint supply, an ecological surplus is generated; otherwise, an ecological deficit occurs. According to the value of the ecological surplus or ecological deficit of the block, the development status can be classified into sustainable or unsustainable grades, and the recommendations for determining the construction intensity are given accordingly [4].

3.4. Green block urban design strategy combined with green space vegetation

The green space system is the core ecological source of the green block. With the deepening of landscape ecology research, urban environmental protection pays more and more attention to the connection of the city's own natural ecosystem, and establishes the urban green space system and the urban peripheral ecology through the green corridor and greenway. The organic connection of the system. Greenways can become an important carrier for building urban ecological networks. In summary, the green block urban design strategy based on green space vegetation mainly includes the following contents:

1) Guided by the principle of landscape ecology, firstly, the protection scope of green space vegetation in the neighborhood should be clarified, so that the road network with certain flexibility will
be demarcated, and the green space vegetation with ecological value will be preserved to form block units of different scales. As far as possible, the newly planned block green space system and the original block green space system form a closed ecological network, and the greenway is connected with the urban external ecosystem to form a hierarchical urban-scale ecological green space network.

(2) Study and determine the structure type and scale of the block green space system, and determine the minimum block green area unit and green space rate. Plan and integrate the location and shape of the Block Park and green space to form a direct connection with the greenway system, and determine the width and path of the greenway according to the size of the green space reserved, and clarify its ecological function.

(3) Pay attention to the integrity of the natural vegetation in the block, delineate the relatively independent range of human activities, and reduce the interference of human activities on the natural areas to protect the diversity of species. In terms of vegetation selection, the types of vegetation that meet the local soil conditions should be selected as much as possible to reflect the combination of regional species and ecological culture.

(4) Through the combination of natural vegetation and architectural layout, reduce the hardening rate of the ground, increase the green rate and greening range as much as possible, form a good microclimate of the block, and provide a basic natural base for the ecological security of the block.

**Table 1. Levels and types of greenways**

| Level        | Types of                                | The main function                                                                 |
|--------------|-----------------------------------------|----------------------------------------------------------------------------------|
| Regional     | Ecotype, natural resource type           | Build a regional-wide ecological network to maintain the balance of regional ecosystems |
| Municipal    | Ecotype, recreation, historical culture  | Ecology blends with history and culture to form a multi-functional greenway network and actively integrate into the regional greenway network. |
| Block level  | Ecology, education and entertainment     | Form an intuitive experiential ecological greenway with a strong sense of place and connect with the municipal greenway |

3.5. **Green Street Urban Design Strategy Combined with Water Environment**

For the newly planned water body, the necessity of its planning should be clarified, and the ecological impact of the newly planned water body on the block and even the hinterland should be studied, including whether the soil, geological and hydrological conditions, groundwater, rivers, etc. will be polluted and destroyed, and under construction [5]. The impact of the planned water body on the original drainage system in the land should be minimized. When urban blocks are adjacent to different water types, the principles of water design in the blocks are also inconsistent. For example, oceans, rivers, lakes, streams, and wetlands all have their own unique spatial and cultural characteristics, and the requirements for the construction of blocks are also different. Therefore, the design of the block combined with water should be analyzed according to the specific situation. Under normal circumstances, the newly planned water body should have a fixed water source and flow direction, and it is better to form living water. Taking the block of the river as an example, according to the relationship between the block and the planned water body, it can be divided into a series type, a ring type, and an inner lake type. In the specific planning and design, no matter which form is adopted, the connection between the planned water body and the natural river can be ensured. Form living water. At the physical space level, water bodies are often closely interdependent with green spaces. With the differences in green space scales, water bodies also exhibit a proportional relationship. In addition, the water body planning on the block scale should pay attention to the combination of water bodies and waterfront buildings, and form a coordination and unity in the relationship of form, scale and proportion.
4. Conclusion
With the advent of the urban transformation period, the construction of China's eco-city urgently requires innovation and complete theoretical knowledge and practice forms of eco-city planning as a support, especially the medium-level green block planning form with strong practicability. Therefore, the research corresponding to the design planning of eco-city green blocks is not only limited to the above, but according to the ecological standards of resource conservation and eco-friendliness, the subsequent research work will gradually develop towards these levels, and the research content will gradually go deep into the actual construction process and reflects the cross-domain characteristics of urban planning.

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