

Analysis of Land Engineering Strategies for Urban Land Ecological Renovation

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Abstract: With the acceleration of urban ecological civilization construction, the demand for ecological land in urban construction is increasing day by day. Currently, land improvement projects often aim to minimize project costs and maximize land use, neglecting the ecological carrying capacity of the site. In the construction of urban ecological space land improvement projects in China, there are phenomena such as excessive emphasis on aesthetics and visual effects, blind introduction of foreign species, unreasonable plant configuration, and large-scale use of lawns, which have also caused many problems in the construction of urban ecological civilization. Land is the foundation of urban construction and sustainable development, and making land clean, healthy, and safe is a prerequisite for the construction of ecological cities. Government departments need to use ecological concepts as work guidance to continuously improve the effectiveness of land resource remediation and maximize the efficiency of land use. Land engineering technology plays an important role in the ecological remediation of urban land. We need to keep up with the pace of development of the times, apply various advanced technologies, and effectively address various problems, in order to achieve better results. This article conducts research on land ecological remediation and proposes optimization strategies for land ecological remediation.

Keywords: Urban Land; Ecological Improvement; Land Engineering.

1. Introduction

With the acceleration of industrialization, people's living standards have significantly improved. However, with the intensification of resource consumption, the pollution caused by land use has become increasingly prominent [1]. In the process of urbanization, as more and more people flock to cities, the scale of urban buildings is expanding year by year, which brings a great burden to land resources. The concept of ecology and land remediation should be developed in a coordinated manner, and ecological land remediation is of great significance for maintaining the sustainable development of urban land remediation projects [2].

Ecological management and protection of land remediation is an important content and inherent requirement of land remediation. It not only relates to the sustainable development of land remediation, but also affects the sustainable use of land resources [3]. In the new era of advocating and practicing ecological civilization construction, ecological land remediation is an inevitable trend and requirement of land remediation development. Land remediation and ecological management should cover the entire process of land remediation, involving planning stages (regional planning, project area planning), project engineering design, construction, and post maintenance [4]. The breakthrough in promoting urban ecological renovation lies in the innovation of land engineering technology, and it is imperative to implement the protection of the quantity, quality, and ecology of cultivated land in a trinity. Land engineering is a new discipline that can fundamentally improve the quality of urban land, solve urban land problems, ensure urban land safety, and coordinate human land relations [5]. Ecological remediation and landscape design are inseparable, requiring

workers to combine various situations, optimize resources, propose reasonable measures to improve their level, provide assistance for the effective use of land resources in China, and protect our living environment to the greatest extent while developing. The core content of land engineering is to use the theory of organic soil reconstruction to reconstruct the soil structure, quality, and environment according to the requirements of different land uses in cities, so as to meet the land safety standards and construction standards. Some landscape designers do not have a deep understanding of the meaning of ecology, simply believing that "green is ecology" and "flowers, grass, and trees are ecology". They cannot effectively plan and design limited ecological spaces as a complete ecosystem, which has also led to many unexpected problems in urban ecological space land remediation, such as the disappearance of local species, homogenization, and ecological imbalance [6].

Strengthening the ecological remediation of urban land can improve the agricultural ecological environment, improve the production and living conditions of towns, and promote the development of urbanization [7]. When implementing land planning projects, local government departments need to pay more attention to the quality of arable land, ensure that land development methods do not have negative impacts on the ecology, maximize the utilization value of land resources, promote the coordinated development of urban and rural construction, and form a comprehensive ecological system, in order to form a more local characteristic ecological system.

2. The Importance of Ecological Renovation of Urban Land

2.1. The Basic Logic of Ecological Management and Protection in Land Remediation

The essence of land remediation and ecological management is the management and protection of land ecosystems, following the theories and methods of ecosystem management, and improving the resilience of land ecosystems by regulating the types, processes, and patterns of land landscapes [8]. According to the operational standards of land governance, forming a scientific design plan can have a direct

impact on the implementation effect of the project. The basic logic of land remediation and ecological management starts from its connotation, and is a logical system composed of generative logic, theoretical logic, and practical logic. Theoretical logic focuses on theoretical guidance, while practical logic focuses on guiding practice. Together, the two constitute the theoretical and practical logic of land remediation and ecological management (as shown in Figure 1). From the perspective of ecological civilization, the implementation of urban and rural planning and development needs to focus on innovative planning methods and technologies, improve the efficiency of using various resources, and promote the coordinated development of urban development and ecological environment.

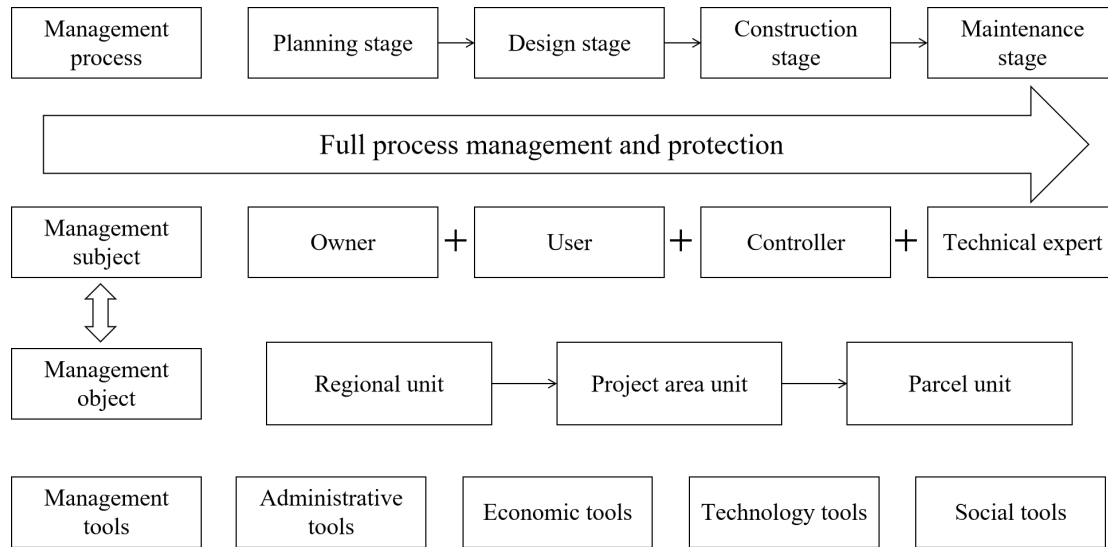


Figure 1. Basic logic of land improvement and ecological management and protection

The theoretical logic of land consolidation and ecological management is to maintain and enhance the elasticity of the land ecosystem as the goal, coordinate the relationship between humans and land as the main line, and construct a multi-scale collaborative land consolidation and ecological management system driven by the interactive development of multiple subjects such as land owners, users, and managers. In order to achieve a higher level of land governance work, it is necessary to scientifically plan and construct residential and road areas, always guided by the concept of ecological protection, promote people-oriented thinking, and promote coordinated development between humans and the natural environment. The practical logic of ecological management and protection in land remediation is the process of clarifying the goals and contents of ecological management and protection for different management objects, and implementing them using different management tools. In land remediation, engineering should design and develop corresponding engineering content and measures based on the actual conditions of soil and water resources, plant resources, animal resources, etc. in the land remediation project area [9].

2.2. The Impact of Land Ecological Remediation on Green Development

Climate change can have multiple impacts on the natural environment, and addressing it is an important challenge facing the world. Currently, the world is committed to significantly reducing greenhouse gas emissions. If the damaged ecological environment cannot be repaired in a timely manner, once it exceeds the environmental carrying

capacity of the region, it will seriously affect the construction of urbanization. Research has shown that land remediation work can not only improve agricultural production and living conditions, but also better form positive ecological impacts, with a prominent impact on issues such as reducing low-carbon emissions and global climate change. China is rich in land resources, but with a large population, in order to achieve the goal of ecological land use, the first priority is to consider protecting local land plants as an important component of the design plan [10].

At present, some countries attach great importance to land ecological remediation, and they also attach great importance to landscape construction and biodiversity protection. They have relatively high requirements for adaptability to the natural ecological environment, economic and social conditions of the remediation area and important areas. Beyond land use, it does not cause harm to the environment and does not affect the survival of related species. By using strategies such as constructing natural reserves, diversity protection of species and the continuation of genetic resources can be better achieved, which has significant value for land ecological remediation work. Therefore, it is necessary to vigorously carry out the rectification of urban ecological environment problems, fully utilize land engineering technology to create a good living environment, achieve harmonious coexistence between humans and nature, and promote the healthy development of urban land ecosystem.

3. The Application of Land Engineering Technology in Urban Land Remediation

3.1. The Goal of Land Improvement and Ecological Management and Protection

One of the main purposes of land remediation and ecological management is to maintain the resilience of the land ecosystem and leverage its ecological service functions. It is very important to carry out land ecological remediation work in a reasonable manner. In specific work, it is necessary to pay attention to the collaborative construction of soil and water conservation and protective forest work, and strengthen the effectiveness of ecological environment protection construction work. Management and protection are aimed at achieving goals, and clarifying the orientation of land remediation ecological management and protection goals is the key to establishing a land remediation ecological management and protection system. The goal of land improvement and ecological management is a structured system of goals, including overall goals, specific goals, and stage goals (as shown in Table 1).

Table 1. Structured target system for ecological management and protection of land remediation

Target type		Main content
Overall objectives		Maintaining and enhancing the resilience of land ecosystems
Specific objectives		Maintaining the structure and function of the land ecosystem Integrity, reducing land ecosystem Fragility of the system
Stage objectives	Regional planning stage	Building a regional ecological security pattern
	Project area planning stage	Building a fully functional landscape ecosystem
	Engineering design stage	Creating high-quality biological habitats
	Project construction phase	Reduce interference and damage to organisms and habitats
	Post project management phase	Maintaining and improving ecological service functions

Guided by the concept of ecological construction, China needs to scientifically carry out land planning and design related work, improve the efficiency of land resource utilization, and ensure that land planning does not have a destructive impact on ecosystems and functions. In land remediation, it is not only necessary to consider the unreasonable and inefficient use of land, but also to protect and maintain the diversity of land ecosystems, strengthen the construction of system resilience, and form healthy ecosystems and good biological habitats.

3.2. Ecological Remediation Technology for Land Engineering

The technologies involved in land remediation mainly

include information technology, ecological engineering technology, planning technology, reconstruction technology, environmental impact assessment technology, etc. The ecological construction of river channels is of great significance in the process of land remediation. As the main body of urban natural vitality in the process of land engineering construction, river channels are an important natural geographical element and should become the supporting core of urban ecosystems. In land engineering construction, the application of their ecological functions should be emphasized. The physical methods mainly include mechanical algae removal, dredging of sediment, water diversion and sedimentation, and water regulation. The organic matter in river sediment is prone to aerobic and anaerobic decomposition, making the water body black and odorous. Dredging the sediment can remove the black enrichment layer and completely eliminate its impact, which is a commonly used method for river regulation. The chemical method mainly involves adding chemical reagents for treatment, such as adding coagulation precipitation, adding chemical agents to kill algae, adding iron salts to promote phosphorus precipitation, and adding lime for denitrification. Biotechnology is a new type of technology that has developed rapidly both domestically and internationally in recent years, including biofilm technology, bioremediation technology, aquatic plant evolution method, land treatment method, etc.

Soil issues are also an important aspect, and soil governance technology is very important for our development. Based on the actual situation, we need to adopt various new technologies and content to handle various tasks in a targeted manner, grasp the key to development, and make reasonable arrangements for different situations. In the process of land leveling, it is not only simple earthwork excavation and filling, but also necessary to accurately calculate the quantity of land leveling engineering and determine the method of land leveling engineering based on the natural conditions such as the terrain and topography of the project area. Due to significant differences in terrain, resources, and other aspects among different cities, it is necessary to fully consider the characteristics of different cities and make reasonable construction plans when carrying out urban planning and construction.

4. Conclusion

Land remediation ecological management and protection is a systematic project that requires a clear management and protection subject and responsibility, conducting theoretical research on ecological management and protection, establishing a technical method system that supports the entire process of land remediation, and also ensuring the connection and integration with current technical specifications. In the process of urban land remediation, ecological concepts should be integrated throughout the entire construction process, and a series of land engineering techniques should be used to carry out ecological remediation, in order to reduce the adverse impact on the ecological environment. In the future, during the implementation of land ecological remediation, it is necessary to pay attention to the comprehensive performance of landscape design, and based on the close cooperation of relevant departments and different design and construction teams, promote landscape design to better adapt to land ecological remediation work, thereby improving the suitability of the ecological environment in the region. Nature provides people with a variety of available

land resources. It is necessary to take the overall planning of land remediation and the protection of the ecological environment as the premise, adhere to the concept of green development, strengthen the protection and restoration of the ecological environment, and ensure the sustainable use of land.

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