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Exploration of Detailed Planning Practice of Chemical Industrial Parks under the Background of Territorial Space Planning

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Abstract With the gradual completion of the overall planning of city and county land space, the detailed planning will be prepared according to the requirements of transmitting and refining the upper planning. Industrial parks are one of the "main forces" of local economic development, and the preparation of their detailed planning will escort their development. The key points of the *Control Indicators of Construction Land in Industrial Projects* issued in 2008 and 2023 were compared, and the new requirements for detailed planning under the background of territorial space and the contradictions between the detailed planning of industrial parks and the overall planning of the upper territorial space were sorted out based on the summary of the existing problems in the development of chemical parks. It provides some ideas for the practice of detailed planning of chemical industrial parks under the background of territorial space.

Keywords Detailed planning, Chemical industrial parks, Practice, Territorial spatial planning

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In the *Several Opinions of the Central Committee of the Communist Party of China and The State Council on the Establishment of a Territorial Spatial Planning System and Supervision of its Implementation* issued in May 2019, a territorial spatial planning system with "five levels and three categories" is established. Territorial spatial planning is a key measure for the modernization of national governance capacity and an important starting point for the country to achieve all-factor management[1]. With the gradual completion of the preparation of overall territorial spatial planning, the detailed planning under the background of territorial space planning is also advancing steadily.

As we all know, the development of industrial parks plays an important role in local economic development. As one kind of industrial parks, chemical parks need to be further improved in terms of development quality and operation guarantee. In this study, aiming at the problems existing in the development of chemical industrial parks, some thoughts on the detailed planning practice of chemical industrial parks under the background of territorial spatial planning were put forward, and possible measures for the preparation of detailed planning of chemical industrial parks were proposed.

1 Development of detailed planning of industrial parks and problems faced by the development of chemical industrial parks in China

1.1 Gradual improvement of relevant documents for detailed planning of industrial parks

For a long time, detailed planning, especially controlled detailed planning, has been an important tool for urban and rural planning management and maintenance of development and construction order[2]. Since the founding of New China, especially since the reform and opening up, China's urban construction has continued to develop, and the relevant requirements for detailed planning of industrial parks have also been continuously improved from the establishment of *Control Indicator for the Construction Land of Industrial Projects* released in 2008 and 2023.

1.2 Problems faced by the development of chemical industrial parks

1.2.1 Extensive land use. Presently, industrial parks are mainly industrial land, but some enterprises in chemical parks have insufficient vitality of industrial land use due to poor efficiency, which leads to obvious extensive land use in industrial parks. How to revitalize "deactivated" land needs to be considered and solved[3].

1.2.2 Uneven matching of public facilities. The supply of public infrastructure also mainly relies on enterprises to provide supplements. If enterprises stop supplying water, electricity and other facilities or services in the middle of the course due to market reasons, or the chemical enterprises they rely on will reduce the external supply due to the expansion of production scale, certain risks will be brought to the production of enterprises in chemical parks.

1.2.3 Further improving the coordinated development of transportation. Some chemical parks have low traffic accessibility, poor quality of traffic facilities, low road density and low road grade. In the chemical industry park, its leading industry is chemical industry, and needs many kinds of raw materials. With the gradual upward trend of the construction and development of chemical industrial parks, the traffic volume is bound to increase, and most of them are freight traffic, which has higher requirements for road surface and foundation. Industrial parks should have special transportation channels of chemical products. Hence, the roads in chemical industrial parks cannot provide perfect traffic development support for the development of chemical industry parks. In order to meet the needs of future traffic development, the current traffic network needs to be greatly improved.

1.2.4 Establishing and improving emergency management mechanisms. At present, the emergency management mechanism of chemical parks should be further improved, and relevant rescue plans should be further developed and enhanced in terms of emergency handling. Besides, it is needed to adhere to the basic principle of "putting people first", safe development, the policy of "putting safety and prevention first, and comprehensive management", and the synchronization of emergency measures and prevention work. "Prevention, prediction, early warning and forecasting" should be conducted. Fire fighting force should be strengthened to meet the future needs of "safety development" in chemical industry. On the basis of strengthening the current medical cooperation, the equipment of medical rescue stations in chemical

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parks should be increased.

2 New requirements for the detailed planning in the context of territorial space

2.1 Adapting to the coordinated management with "multi-planning integration"

From the *Urban Planning Law of the People's Republic of China* promulgated in 1989 to the *Urban and Rural Planning Law of the People's Republic of China* promulgated in 2007, the preparation and management of the planning has been continuously improved. In 1989, the country established the planning preparation system with "general planning" and "detailed planning" as the main body by national law. In 2007, the statutory status of controlled detailed planning has been clarified in the *Urban and Rural Planning Law of the People's Republic of China*, thus giving legal binding force to controlled detailed planning[4]. However, under the condition of coexistence of "multiple planning", the efficiency of planning administrative permission is not high, and to some extent, the efficiency and fair value of the Urban and Rural Planning Law have not been highlighted[5]. In the Several *Opinions of the Central Committee of the Communist Party of China and The State Council on the Establishment of a Territorial Spatial Planning System and Supervision of its Implementation* issued in 2019, it is clearly proposed that it is necessary to set up a planning approval system, implementation supervision system, regulations and policies system and technical standards system with "multi-planning integration". With the continuous improvement of the "multi-planning integration" system, detailed planning, as one of the three categories in the "five levels, three categories and four systems", should have corresponding adaptive measures in its planning[6].

2.2 Fine development of land use under the background of stock

With the continuous improvement of China's urbanization level, under the background of strict protection of cultivated land, strengthening of bottom line control and realizing sustainable development, the development of cities and towns is bound to move from rough to fine development. Planning is also gradually from "incremental planning" to "inventory planning". The existing definition generally believes that "stock" refers to the current status of construction land, and "increment" refers to the current status of non-construction land. However, as we all know, in areas that rely on stock land for development (often referred to as old urban areas), the property rights of the land are very complicated, and the stock resources need to be fully explored[7]. With the rapid expansion of development in the early years, many industrial parks depend on many stock land with low utilization efficiency and idle and abandoned for a long time. Revitalizing these stock land and giving these land a "second life" is the key to the sustainable development of a park.

3 Contradiction between the detailed planning of industrial parks and the overall planning of upper territorial space

3.1 The planning unit does not match the land ownership

In the *Guidelines for the Preparation of Municipal Territorial Spatial Planning* promulgated by the Ministry of Natural Resources, it is clearly pointed out that in the preparation of the overall territorial spatial planning, the detailed planning unit should be delimited, and the relevant requirements for the decomposition of the overall territorial spatial planning and the supporting of public service facilities and infrastructure should be implemented through the detailed planning unit, which is conducive to the specific implementation of the detailed planning[8]. Through the interpretation of an actual case, it is found that there are 7 different detailed planning units within the scope of less than 1 000 hm^2, and only a small part of some units are within the planning scope, which is not conducive to the coding of the plots in the later detailed planning. There will be a conflict with the coding of the plots in the detailed planning scope. The master plan of the upper territorial space takes roads as the boundary factor when implementing detailed planning units. At the same time, it can take into account the problem of land ownership, and then effectively avoid the subsequent land coding contradictions, which is

Table 1 Comparison of key points between the 2008 and 2023 versions of the *Control Indicator for the Construction Land of Industrial Projects*

Item	2008	2023
Indicator system	Including investment intensity, plot ratio, the proportion of land used for administrative office and living service facilities, construction coefficient and green space rate	Land output rate and land tax are added on the basis of the old version
Classification standard	/	The classification standards for strategic emerging industries and advanced manufacturing industries are added based on the 08 edition
Construction requirement	Green space: generally, no green space shall be arranged inside an industrial enterprise. However, due to production and other special process requirements, a certain proportion of green space needs to be arranged, and the ratio of green space shall not exceed 20%	Green space: green space indicator is deleted, and green space that is not necessary for safe production should not be arranged inside the land of industrial projects, and it is strictly forbidden to build garden-like factories that are divorced from the needs of industrial production
Indicator value	Building coefficient: the building coefficient of industrial projects should not be less than 30%. The control value of the proportion of land used for administrative office and living service facilities: the area of land used for administrative office and living service facilities required for industrial projects shall not exceed 7% of the total area of industrial projects	Floor area ratio: the floor area ratio of most industries is increased by 0.1. Building coefficient: except that the construction coefficient of petroleum, coal and other fuel processing industry, chemical raw materials and chemical product manufacturing industry, ferrous metal smelting and rolling processing industry, non-ferrous metal smelting and rolling processing industry shall not be less than 30%, that of the other 27 industries is not less than 40%. The control value of the proportion of land used for administrative office and living service facilities: firstly, except that the area of land used for administrative office and living service facilities required for industrial projects shall not exceed 7% of the total area of industrial projects, the construction area shall not exceed 15% of the total construction area of industrial projects; secondly, research and development, design, testing, pilot test facilities necessary for industrial production can be calculated outside of administrative office and living facilities; the construction area is less than or equal to 15% of the total construction area of industrial projects, and must meet the requirements of relevant industrial building design codes

also more conducive to land management.

3.2 Part of the land at the edge of the urban development boundary cannot be reasonably available to an industrial park

The land with a small area at the edge of the urban development boundary cannot be used as the utilizable land of a chemical industry park (referring to small pieces of construction land at the edge of the urban development boundary, namely the gray filling part in Fig.1). Firstly, chemical enterprises, especially those that may lead to pollution, have a certain distance from residential areas. The land at the edge is mainly rural residential land, so it cannot be used as industrial land. Secondly, industrial enterprises often involve the layout of plants, and the area of land at the edge can not reach the area of industrial enterprises, so it can not be used for industrial enterprises. Moreover, because it is located at the edge of the park, it is highly unlikely that it can be used as public service facilities or infrastructure land considering the radiation capacity. To sum up, it is difficult to produce benefits in the planned land use for the finely fragmented land located around an industrial park and at the edge of the urban development boundary.

3.3 Lack of conductance in guiding and managing non–construction land

The territorial space planning includes construction space and non-construction space. Under the background of the concept of ecological civilization and strict farmland protection, the management of non-construction space is also very important. The management object of detailed planning under the background of the overall planning of territorial space is mainly the construction land within the urban development boundary, and it is endowed with relevant index control. However, for the non-construction land located in the planning scope but outside the urban development boundary, there are no specific guidance and management measures, and the use control system of non-construction space is still to be established.

4 Some thoughts on the detailed planning practice of chemical industry parks under the background of territorial space

The preparation of the controlled detailed planning of chemical parks under the background of territorial space planning should first strengthen the planning coordination and transmit the functional layout, spatial structure, bottom line control and facility layout of the upper territorial space master plan into the detailed planning for implementation. Secondly, it is needed to promote intensive and economical green development, save the incremental space of parks, make reasonable use of its stock space, and create a "green park" with healthy development. Moreover, the relationship between rigidity and elasticity in the development of the park should be handled well, and reasonable control indicators should be given to adapt to the transformation requirements of "digitalization" and constantly improve the efficiency of spatial governance.

4.1 Effectively conducting and implementing relevant contents of upper territorial space

4.1.1 Strictly implementing the "three control lines". The detailed planning scope shall not occupy the scope of the ecological protection red line and permanent basic farmland issued by the Ministry of Natural Resources, as well as areas that coincide with the urban development boundary, and according to the relevant requirements of the detailed planning, the relationship between elasticity and rigidity shall be handled[9]. For the non-construction land located within the planning scope but outside the urban development boundary, the style guidance of the relevant non-construction land shall be carried out.

4.1.2 Actively conducting spatial layout and strengthening facility support. First of all, the spatial development strategy determined in the upper plan should be implemented, and the development demands put forward in the development strategy should be implemented in detail[10]. Secondly, the infrastructure of industrial parks is the basis to ensure the healthy development of industrial parks, mainly protecting traffic facilities and public facilities.

4.2 Clarifying the development intensity and control requirements of industrial land

First of all, according to the *Control Indicators of Construction Land in Industrial Projects* (2023 version) issued by the Ministry of Natural Resources in May 2023, the specific content can be seen in Table 1. It is stipulated that the plot ratio of industrial land in the chemical concentration area is greater than 0.6, but the plot ratio of industrial land outside the chemical industry concentration area within the planning scope is greater than 1.0.

4.3 Establishing a database of stock resources

According to the basic conditions and development demands of the current situation of a park, a stock land index evaluation system can be established for the park. The stock resources of the park can be found out according to construction intensity, enterprise operation, enterprise construction quality, transportation location and other conditions, and data collection and information digitization can be carried out by using big data platforms. A stock resource database is established with the help of a professional data platform[11].

4.4 Establishing a multi–layer security system and defining the scope of security control

The development of industrial parks is often an important part of local industrial development. Industrial development in industrial parks should be regulated to improve background safety, reduce safety risks, establish the safety development guarantee mechanism of chemical industry, so as to promote the safe, healthy and stable development of chemical industry, and achieve the harmonious development of local economy and society.

4.4.1 Strictly implementing the safety control

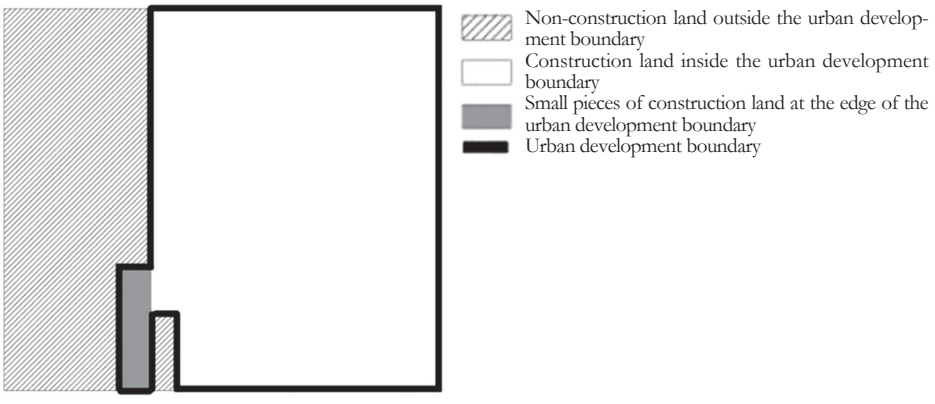

Fig.1 Part of the land at the edge of the urban development boundary cannot be reasonably available to an industrial park

line of land use around the concentration area of chemical industry. According to the *Determination Method of External Safety Distance for Hazardous Chemicals Production Units and Storage Installations* (GB/T37243−2019) and the *Risk Criteria for Hazardous Chemicals Production Unit and Storage Installations* (GB36894−2018), the scope of chemical concentration area in an industrial park should be clarified firstly; secondly, the safety control line around the chemical concentration area should be delimited. The protection objectives in different safety control scopes are different, and the protection objectives in different scopes can be specified according to the *Risk Criteria for Hazardous Chemicals Production Unit and Storage Installations* (GB 36894−2018).

4.4.2 Constructing the emergency handling platform. In the construction of the emergency handling platform, the safety production monitoring and early warning system should be set up firstly, and it can monitor the real-time operation status of key devices in the park in real time, compare the safe operation status monitoring, dangerous chemical system, etc., which can prevent accidents to a large extent and is one of the guarantees for safe production. Secondly, a joint prevention and linkage three-level rapid response program system should be established, and it can prevent and immediately deal with related accidents in time. Thirdly, the emergency response platform should be set up, and it requires the linkage of professional departments in the region; comprehensive organization and integration can be carried out in a timely manner, so as to share emergency rescue resources in the park and further improve the level of collaborative rescue in the park.

5 Conclusion

With the continuous advancement of the modernization of national governance capacity, China has put forward higher requirements for detailed planning. It is necessary to face up to the problems in traditional detailed planning and establish the implementation path of detailed planning under the background of territorial spatial planning.

Based on the summary of the current development problems of chemical parks, the requirements and possible contradictions of detailed planning under the background of territorial spatial planning were analyzed, and then some thoughts on the preparation of detailed planning under the background of territorial spatial planning were obtained, such as effectively conducting and implementing relevant contents of upper territorial space, clarifying the development intensity and control requirements of industrial land, establishing the database of stock resources, establishing a multi-layer security system and clarifying the scope of security control. In general, the detailed planning of chemical parks under the background of territorial spatial planning needs to put forward more refined and sustainable development requirements for industrial space, constantly optimize the industrial space of industrial parks, and inject impetus into the sustainable development of local industries.

References

[1] Wang, X. X., Zhong, H. M., Li, L. F. (2022). Exploration on the efficient implementation of detailed planning in the context of territorial space planning. *Planners*, *38*(9): 88-95.

[2] Zhao, GY, Li, C. (2019). Reform of detailed planning technology under the territorial land spatial planning system. *Urban Planning Forum*, (4), 37-46.

[3] Dong, H. T. (2019). Exploration on the innovation and coordinated development of industrial parks in the new era: A case of Louxing Industrial Cluster Zone. *Urbanism and Architecture*, *16*(18), 43-46, 54.

[4] Xu, J. M., Lei, C. & Geng, H. et al. (2019). The new requirement and response of detailed planning compilation in territory spatial planning system. *Planners*, *37*(17), 5-11.

[5] Ye, Q., Li, M. Y. (2017). Law as it ought to be and law as it is: Integration of Urban Rural Planning Law. *Planners*, *33*(3), 43-48.

[6] Chen, C., Xu, N. & Wang, C. Y. et al. (2021). Transmission between national territory spatial plan and regulatory plan at city and county level. *Planners*, *37*(15), 75-81.

[7] Tang, Y., Liu, C. & Liu, H. X. (2023). The path transition and institutional innovation of urban design integration with detailed planning in the era of urban redevelopment. *Planners*, *39*(6), 11-19.

[8] Shen, Y., Shen, Q. & Shao, Q. F. (2023). The division of detailed planning units in rural areas and the exploration of planning technology paths in the context of territorial spatial planning: A case study of Wuxi. *Urban Insight*, (5), 75-88, 161-162.

[9] Gui, Z. L., Li, L. & Xiong, Y. P. et al. (2012). Mountainous industrial park planning strategies within three lines integration: Xilin County. *Planner*, *38*(S1), 99-103.

[10] Hu, H. B., Cao, H. J. & Cao, Y. (2021). Rethinking and reform orientation of detailed planning in territory spatial planning system. *Planners*, *37*(17), 12-16.

[11] Luo, J. Y., Wu J. H. & Dou, F. Y. et al. (2023). Accurate diagnosis of stock resource and urban renewal planning based on CIM smart platform: Baiyun District, Guangzhou. *Planners*, *39*(11), 147-153.