Basic Concept and Three-dimensional Urban Spatial Planning Analysis of the Integrated Urban Architecture Plan
– Focusing on Gwangmyeong-Siheung District 3rd New Town –

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Abstract

This study analyzed the submissions for the LH “Gwangmyeong-Siheung Public Housing District Urban Basic Concept International Competition", which were based on the integrated urban architectural planning from the initial planning stage, planning the city, buildings, and facilities in three dimensions. The research methodology employed case studies and FGI (Focus Group Interview). To select the analysis indicators, a literature review of existing overseas design guidelines, reports on the 3rd New Town, and competition manuals, as well as a review of prior research, were conducted. Lastly, the design concepts and strategies of the submissions were judged with (◎, ○, △). As a result, both submissions were found to have established a consistent master plan considering the context and current status of the site by setting up specialized zones within the district. Similarly to foreign cases, they presented a three-dimensional spatial plan that accommodates urban landscapes, streets, residential blocks, and low-rise plans suitable for human scale, a road system considering walkability, a mix of various types of housing, and architectural prototype models. In terms of importance, both submissions showed high connectivity and significance in three-dimensional urban spatial planning, traffic and movement planning, and three-dimensional land use planning for the Gwangmyeong-Siheung district. The urban basic concept and the specialized zone's three-dimensional urban spatial planning were found to be consistent. This suggests that the future realization of new cities with high connectivity from urban planning to architectural planning could be supported by the system. This study is expected to provide implications for the creation of new cities and integrated planning of urban architecture in the future and can be used as a basis for further research.

Keywords: 3rd New Town, Integrated Urban Architecture Plan, Three-dimensional urban spatial planning, Street-centered shared city

Introduction

Since the 1980s, Korea has been implementing new town policies aimed at solving urban problems in Seoul and other major cities. These policies have led to the development of new urban areas such as Sanggye and Mokdong, and the construction of the first-generation new towns within 20km of Seoul, contributing to rapid economic growth, advancements in

construction technology, and urbanization. However, these developments have also accelerated population concentration in the metropolitan area, undermining balanced national development and leading to increased commuting, real estate price surges, limitations in self-sufficiency, and the creation of bedroom communities. To address the issues of the first-generation new towns, plans for second-generation new towns were made, focusing on enhancing urban competitiveness, increasing self-sufficiency, creating low-density cities, and expanding parks and green spaces. Despite these efforts, problems such as development focused on the Gyeongbu axis, lack of planned management, delays in infrastructure provision, and the persistence of bedroom communities remained. The root of these complex issues can be traced back to problems in the domestic urban planning process and its connectivity.

According to Lee (2017), Korea's spatial planning system has been focused on urban development policies, with individual building activities managed separately under the Building Act. This approach has limitations in linking buildings with their sites and poses challenges for long-term urban spatial development. Subsequent laws such as the "Act on Planning and Use of National Land," "Urban Development Act," and "Act on the Maintenance and Improvement of Urban Areas and Dwelling Conditions for Residents" were enacted to efficiently utilize national land resources. Despite efforts to maintain a balance between urban and architectural aspects through the involvement of experts from the planning stage and the application of the MP system, there were shortcomings in the connectivity of plans before and after district designation and in implementing urban designs that reflect local characteristics. Choi et al. (2012) emphasized that the degree of architectural involvement in urban design significantly affects the urban structure and the quality of space. They argued that to plan an integrated urban structure and space, land use planning and architectural proposals must be carried out simultaneously.

In response to the problems of the first and second-generation new towns, the government announced the "Third New Town Development Plan" in 2019, aiming to construct and supply a total of 173,000 housing units in new towns such as Namyangju-Wangsuk, Hanam-Gyosan, Incheon-Gyeyang, and Gwangmyeon- Siheung. The plan focuses on enhancing residential welfare through the "Special Act on Public Housing" and aims to create sustainable and co-living cities. By applying the "Urban Architectural Integrated Plan" from the initial concept stage and involving Urban Concept Planners (UCP) composed of experts in urban planning, architecture, transportation, and environment, the government seeks to create a "shared city centered on street spaces." This study examines the new development paradigm of the third-generation new towns through the "Urban Architectural Integrated Plan," exploring the changes it will bring to future urban planning.

Method

This study analyzes the international competition entries for the Gwangmyeong-Siheung public housing district of the third-generation new towns, which were planned in three dimensions from the initial planning stage based on the urban and architectural integrated planning method that establishes a master plan and then a land use plan. The subjects of the study are the winning entry ‘New-Nex City’ by Yuhsin Consortium and the excellent entry ‘N+Ter City’ by Dohwa Engineering Consortium. The research is conducted through case studies

and FGI (Focus Group Interview). By examining overseas design guidelines established for integrated urban and architectural planning as a case study, setting analysis indicators through literature review and examination of previous studies related to domestic new towns and third-generation new towns, and adjusting and supplementing the indicators through FGI with two urban design experts and one architectural expert, the final analysis elements are derived. Based on this, the design concepts and strategies of the competition entries are analyzed with symbols (◎, ○, △), and the interpretations and applications of the designers, as well as the importance of each urban planning sector, will be identified based on the concept of a ‘co-existing and co-prospering symbiotic city’.

Literature Review

Definition and Guidelines of Urban Architectural Integrated Planning

Urban Architectural Integrated Planning establishes a 3D master plan that encompasses architecture and facilities from the urban planning phase. A similar term is three-dimensional urban spatial planning, aimed at setting specialized zones in the third new cities and planning different facilities in the upper and lower spaces of these zones to enhance the utilization value of urban spaces.

The major difference between the existing urban planning phase and the Urban Architectural Integrated Planning phase is indicated by the selection of the master plan through a design competition and the establishment of the urban architectural integrated planning district plan. Based on these improvements, urban design proceeds with an urban architectural integrated master plan competition from the planning phase. The urban planner who wins the competition consults with the engineering company responsible for establishing the district plan to complete the three-dimensional plan. The completed three-dimensional plan is then materialized into a district unit plan, presenting a consistent three-dimensional plan.

According to the "Gwangmyeong-Siheung Public Housing District Urban Basic Concept International Competition Planning Guidelines," the goal of Urban Architectural Integrated Planning is to develop a "co-existing and symbiotic city." The detailed objectives are presented in three parts (Table 1.): First, to establish a city where street spaces are central to life, implementing various block plans and planning human-scale buildings and community facilities. Second, to create a shared city of mixed-use and social integration, promoting social mixing where diverse classes and generations can live, and generating mixed-use spaces for residence, work, and leisure to enhance self-sufficiency. Third, aiming for a convenient and safe city by establishing a public transport and eco-friendly centered transportation plan, thus ensuring safety from crime and disasters, and targeting a society prepared for childcare and an aging population, showing a consistent and three-dimensional plan.

Overseas Design Guidelines

Historically, urban planning in various countries has faced challenges such as zoning systems, the formation of large blocks through single-use land utilization, disorderly urban sprawl, destruction of place identity, and automobile-centric spatial structures. To address the issues associated with single-use land utilization, guidelines for the three-dimensional form and

design of buildings were established, aiming to enhance place identity, establish identity, and create spaces that are both improved in terms of space and environment and human-friendly. While the background and characteristics of urban form determination, formation, and surrounding context vary from city to city, the fundamental principles of urban design are similar. This study examines the design guidelines and systems established for integrated urban architectural planning in the United States, the United Kingdom, and Germany.

The United States has developed an intermediary system for urban planning that involves local residents in planning according to spatial hierarchy and accommodates regional characteristics. For instance, the city of Seattle prepared an urban master plan with the objectives of improving quality of life and the natural environment, as part of implementing Washington State's Growth Management Act. This plan was established considering active participation from citizens and neighborhood plans, serving as an intermediary planning role. San Francisco developed regional plans and a Citywide Action Plan (CAP) as an intermediary role, with regional plans being more specific and direct than the urban master plan and detailing comprehensive planning content. The CAP allows for the development and management of areas under a unified plan to meet objectives such as job creation, housing supply, and quality of life improvement. Thus, the United States emphasizes the need for a clear development process, new plans for urban areas, consideration of transportation and urban infrastructure, housing supply, environmental considerations, and zoning and land development for central industrial areas.

Form-based codes were introduced to address the limitations of the traditional zoning system in the United States, which separated uses and contributed to sprawl. Unlike the traditional zoning system, which was a one-dimensional public supply method that categorized land use and parcels in two dimensions, form-based codes offer a three-dimensional approach to regulating physical form. They aim to create a human-scale urban environment favorable to pedestrians by regulating various scales of details from streets to building facades. The term "code" implies a design directive with legal basis and enforceable power, stronger than design guidelines. Form-based codes focus not on land use but on form and harmony in collaboration with the private sector, emphasizing publicness in cities and aiming for human-friendly spaces. According to Parolek et al. (2008:15-16), form-based codes consist of five basic components, including regulatory plans and public space guidelines, and five additional components, such as block guidelines and building type guidelines. While both zoning systems and form-based codes have dealt with use, density, and form as planning elements, the emphasis on each varies, with form-based codes providing flexible planning based on physical form criteria. This approach remains neutral towards specific architectural styles and focuses on basic urban design guidelines.

In the United Kingdom, traditional zoning-focused urban planning and automobile-centric city structures, coupled with limited land resources, led to inefficiencies. According to Yang (2010), the UK pursued an integrated approach to spatially efficient planning that considered not only the physical environment but also the unseen social environment. This approach aimed to achieve democratic goals through collaboration between the public and private sectors, civic organizations, local communities, and stakeholders. Furthermore, UK boroughs, as the decision-makers in urban planning, were empowered to address issues within

their capacity through Local Development Schemes, enabling flexible development planning and fostering community-centered urban and living environments. Continuous monitoring and evaluation of the urban planning process and implementation have led to the provision of specific urban planning guidelines, including local implementation plans and supplementary urban planning documents, considering the spatial hierarchy and circumstances of each borough.

DCLG (2006a) mentions the consistent relationship between the UK's Masterplan and Design Code, arguing that having the same team work on both prevents duplication and ensures consistency. At a minimum, the Code Designer must perform their coding work within the principles defined in the design vision. According to Yoon & Hwang (2014), Masterplans and their related design codes demonstrate a hierarchical structure across four parts: settlement patterns, urban form, urban spaces, and building forms.

Im (2010) categorized the German urban planning system into the F-Plan, B-Plan, and an intermediary stage known as the Rahmenplan. The Land Use Plan (F-Plan) is the initial stage of the basic construction induction plan that municipalities must undertake, created according to Article 5 of the Federal Building Code, and serves as the basis for subsequent detailed district plans. The Detailed District Plan (B-Plan) is a basic construction induction plan that municipalities must undertake, produced according to the Federal Building Code, and unlike the indicative nature of the F-Plan, the B-Plan has direct legal effect as its drawings must be realized on a 1:1 scale. The Rahmenplan, while not having a prescriptive definition and varying in use as development concept, program plan, or master plan, is introduced in English brochures as the urban framework development plan. Although the Rahmenplan is a non-statutory plan, it plays a significant role in land use planning at the community level by providing guidelines and preparation processes as an official system defined by the Federal Building Code.

In conclusion, Germany begins its spatial planning system at the parcel level, focusing on resident-centered and public-private cooperative systems in urban planning. Particularly through the use of the non-statutory Rahmenplan, the system reflects local characteristics and establishes a legal framework that allows for changes to higher-level plans, ultimately leading to urban planning that considers public design, public interest, place identity, and urban context.

This study categorized elements of urban and architectural items from abroad based on literature review and analysis of previous studies, along with the analysis guidelines for the Gwangmyeong-Siheung public housing district urban basic concept international competition announced by LH. It was found that both domestic and international urban issues arise from urban planning and design factors, and the fundamental content of the established design guidelines to solve these issues is similar or identical. The analysis indicators derived from this study are as follows in Table 2.

Derivation of Analysis Indicators Based on FGI

Overview of FGI Analysis

The scope of the research, which includes competition entries, presents some difficulties in organizing the relevance of each design element due to their varying characteristics. Therefore, it was intended to establish analysis indicators and design elements

for comparing and analyzing the awarded entries through FGI. Focus Group Interview (FGI) analysis is a qualitative research methodology where experts in relevant fields conduct interviews. This involved in-depth interviews with two urban experts who had served as planners and review committee members for new city district plans, and one architect with extensive practical experience, to derive analysis indicators.

FGI Results

The materials for the FGI were provided as set out in the analysis indicators based on literature review and previous research (Table 2.), and interviews were conducted over two sessions on November 13 and 17, 2023. To analyze the winning entry of the Gwangmyeong-Siheung public housing district competition from an 'integrated urban architectural planning perspective,' discussions on the suitability of analysis indicators, considering the ambiguity and redundancy of items, were held, and accordingly, the details of each item were categorized by sector. The final consensus on the indicators was based on the judgment by the consensus of FGI experts, and the final analysis indicators are defined as follows (Table 3.).

Furthermore, to examine the importance of each sector applied to each design proposal, after discussions with experts, the items were divided into three levels (◎, ○, △). While examining the proposals of the winning Yushin consortium (Company A) and the excellent Dohwa consortium (Company B), the focus of their plans and their differences were analyzed, and the key considerations for the future district planning of the Gwangmyeong-Siheung public housing district were preemptively identified. The most concretely written and significant items are marked with '◎', those including three-dimensional form planning or ending with descriptive guidelines are marked with '○', and those ending with descriptive guidelines or merely mentioned are marked with '△'.

Results

The final analysis was conducted in terms of the basic urban concept and the specialized area's three-dimensional urban spatial planning. The basic urban concept was divided into urban vision and development concept, and three-dimensional urban spatial planning ideas. The urban vision and development concept provided the design concept and direction, while the three-dimensional urban spatial planning proposal presented the three-dimensional design planning concept and direction, three-dimensional design guidelines, and land use planning before examining the specialized area design proposals. Moving on to the specialized area's three-dimensional urban spatial planning sector, after reviewing the concept and strategy of three-dimensional urban spatial planning, the sector-specific three-dimensional plans and the architectural three-dimensional plans are examined in detail. The sector-specific three-dimensional plans consist of three-dimensional land use planning, transportation and movement planning, and parks, green spaces, and external space planning, while the architectural three-dimensional plans consist of usage distribution planning and architectural design specialization methods (Table 4.).

Both Company A and B placed importance on the metropolitan transportation system, a key consideration for the Gwangmyeong-Siheung district, and it was shown that three-

dimensional urban spatial planning ideas, transportation and movement planning, and three-dimensional land use planning had high connectivity and significance. Furthermore, the three-dimensional design planning concept and direction of the basic urban concept maintained consistency up to the specialized area's three-dimensional urban spatial planning items, thus being distinguished with '◎'. On the other hand, Company B planned by dividing into key specialized areas and mixed-use development areas, and rather than focusing intensively on one item or area, it was conceptually planned by area. As a result, the importance was dispersed, and the three-dimensional land use planning was distinguished with '○'.

In the case of parks, green spaces, and external space planning, both Company A and B showed interesting external planning and program proposals that reflect the characteristics of each area but were distinguished with '△' due to lower significance compared to other items. Moreover, the architectural design specialization methods proposed concrete forms and plans linked to the surrounding context, enhancing the feasibility of integrated urban architectural planning. Company A focused on 'architectural form' and presented guidelines with significant weight, whereas Company B provided descriptive architectural guidelines considering the connectivity with the city and the linkage at the lower levels, thus distinguishing them with '◎' and '○' respectively. However, as Jin et al. (2012) indicated, mixed-use has a positive impact on diversifying land use and proximity between residence and workplace, and the necessity for mixed-use to increase the proportion of residential use and public transportation usage in future cities suggests that Company B's guidelines for mixed-use sites also hold significant meaning.

In conclusion, the competition entries for the Gwangmyeong-Siheung public housing district covered in this study proposed deep, sector-specific planning and ideas, which appear to satisfy the necessary elements for the future third-generation new cities.

Conclusion

This study analyzed the winning entry of the "Gwangmyeong-Siheung Public Housing District Urban Basic Concept International Competition" by LH (Korea Land and Housing Corporation), which planned the city, architecture, and facilities in three dimensions based on the integrated urban-architectural planning from the initial planning stage. In February 2023, LH conducted the international competition to unearth ideas that align with the future vision of the city, including housing, jobs, transportation, environment, and safety, and to establish a differentiated urban spatial plan. The winning entry was "New-Nex City" by the Yooshin Consortium, and the runner-up was "N+Ter City" by the Dohwa Engineering Consortium. The winning entry, which advocated a new future (Next) through connections (Nexus), was evaluated by the judges as showing the potential for a future city through well connecting the two spaces divided by administrative districts, Gwangmyeong-Siheung, and integrating the social community. Furthermore, the winner was granted the right to conduct the basic planning services for the Gwangmyeong-Siheung district, worth approximately 16.9 billion KRW, and to participate in establishing the land use plan and district unit plan, enabling consistent project execution. The project will start the district planning based on the basic concept of this

competition entry, with district planning approval in 2024, construction commencement in 2025, and the start of supplying 70,000 housing units from 2027.

Through this study, it was observed that both the winning Yooshin Consortium and the notable Dohwa Engineering Consortium's entries established consistent master plans considering the specialized zones within the district, surrounding context, and the current status of the target site. Similar to the design guideline cases from overseas literature reviewed, it was identified that the planning for Korea's third-generation new cities also aimed to solve existing urban spatial problems through three-dimensional spatial conception. Both entries completed their plans in alignment with the goals of the third-generation new cities, which are "street-centered shared cities," and the Gwangmyeong-Siheung district's goal of "a city of coexistence and mutual prosperity," by preparing measures for coexistence with existing residents and relocation plans. Unlike existing new cities, they proposed urban landscapes, residential blocks, and low-rise plans that fit human scales, road systems considering walkability, a mix of various types of housing, and architectural prototypes. Thus, in the future, Korea should continue to set urban visions and development concepts, then present three-dimensional urban spatial plans with consistent planning through appropriate land use distribution and mixed-use of land use to improve the relationality of urban spaces. Additionally, it is hoped that the winning entry of the Gwangmyeong-Siheung Public Housing District international competition will be realized with the support of future regulations and look forward to establishing new urban plans that implement communication, UCP (Urban-Community Planning), and integrated urban-architectural planning to expect high-quality urban spaces.

Discussion

This study aimed to complement expertise through FGI (Focus Group Interview) to analyze the basic urban concept and three-dimensional urban spatial planning of the winning entries of the Gwangmyeong-Siheung district international competition, where an integrated urban architectural plan is to be realized. Through selected indicators, the importance of design aspects for each winning entry was identified. Thus, it holds significance in that it can be used as basic data for future three-dimensional urban spatial planning and the creation of new cities. However, as this study is a comparative analysis of the winning entries of the "3rd Generation New City Basic Concept and Three-Dimensional Urban Spatial Planning" competition, generalization may be limited. Additionally, being a qualitative analysis, it has its limitations in objective evaluation.

As implication, future urban planning should center around the people living in those areas, accompanied by long-term planning. Moreover, even though buildings are owned by many individuals, planning with consideration of public interest and the value of urban space, such as connectivity with streets, facade planning, and the formation of public spaces within the site, is likely to result in the creation of good urban and architectural spaces. For the winning entries' plans to proceed to district planning and realization stages, concrete discussions on the method of commercialization and the project entities will be necessary. There will also need to be a balance between current regulations' technical feasibility and

safety and the realities and future prospects. Future studies should compare the competition designs with the approved district plans, identifying ideas that were not adopted during the development process of the district plans and examining the reasons, to understand the considerations needed when establishing future new city master plans.

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Table 1. International Public Offering Planning Guidelines for Gwangmyeong-Siheung Public Housing District Planning Directions for Urban Architecture Integration Planning (LH)

Goal	Content
to establish a city where street spaces are central to life	1. Create a more diverse block plan than a uniform block-oriented plan 2. Formation of Human-Scale Urban Street Space with Harmonized Buildings 3. Establishment of a community facility plan to support street-oriented living
a shared city of mixed-use and social integration	1. A social-mix pattern that combines various classes and generations 2. Create a complex space for residential, business, and leisure use 3. Linkage of Urban Spatial Structure of Self-sufficient Land and Residential Land
a convenient and safe city	1. Establishment of a Transportation Plan Using Public Transportation-Eco-Motorized Transportation 2. Creating a City Safe from Crimes, Disasters, and Traffic Accidents 3. Childcare and Aging-Friendly City Implementation

Table 2. Establishment of analysis indicators based on literature review and prior research

Category	Overseas Design Guidelines Indicators (US, UK, Germany)	Analysis Guidelines for the LH Urban Architecture Integration Plan
Reference	Parolek et al. (2008: 15-16), DCLG (2006), Im (2010)	LH. Guidelines for International Public Offering of the Basic Urban Initiative of Gwangmyeong-Siheung Public Housing District. Volume 2: Planning Guidelines. 2023.
Urban Guidelines (Basic Urban Initiative)	Vision, Regulatory Planning, Residential Patterns	Urban Vision and Development Concept (Design Concept, Design Direction)
	Building Form Guidelines	Three-dimensional Urban Space Planning (Concept of 3D Design Planning, Planning Direction, Guidelines, Land Use Planning)
	Public Space Guidelines	Urban Space Plan (Land Use Plan, Population/Housing Construction and Living Area Plan)
	Street network, Block pattern, Building line, Parcel form, Building location, Density, Landscape, Implementation	Planning by sector (traffic pedestrian traffic lines, park green rivers, landscape, energy, eco-friendly, smart cities)
Architectural Guidelines (3D Urban space planning)	Regional Planning, Block Guidelines	A Plan for the Linkage of the Surrounding Areas
	Framework conception, Building type instruction, Building form, Architectural instruction, Block instruction	Three-dimensional Design Guidelines
		Three-dimensional Urban Space Planning (Concepts and Strategies, Urban Space Environment Planning)
	Building Form, Type, Front, Complex Use, Townscape, Landscape Guidelines, Technical Considerations, Street Trees, Landscape, Boundary Planning	Divisional planning (three-dimensional land use plan, traffic and movement lines, park green areas and external spaces)
	Building and Block Guidelines	Architectural Planning (Plan of Allocation of Use, Design Specialization of Buildings)

Table 3. Final Analysis Indicators

Category	Analysis Guidelines Section of the LH Urban Architecture Integration Plan	Elements of LH Urban Architecture Integration Planning Division
Urban Basic Initiative	Urban Vision and Development Concept	• Design concept • Design directionality
	Study on the 3D Urban Space Planning	• Three-dimensional design planning concept • Three-dimensional design planning direction • Three-dimensional design guidelines • Land use plan
3D Urban Space Planning for Specialized Areas (Draft)	Concept and Strategy for 3D Urban Space Planning	• Concepts and strategies
	Three-dimensional plan by sector	• Three-dimensional land use plan • Transportation and movement plan • Parks green and outer space planning
	Three-dimensional architectural plan	• Usage allocation plan • Design Specialization Plan for Buildings

Table 4. Aggregating the importance of each sector

Category	Division	Elements of the LH Urban Architecture Integration Plan	Company A	Company B
Urban Basic Initiative	Urban Vision and Development Concept	Design concept	◎	◎
		Design directionality	◎	◎
	Study on the 3D Urban Space Planning	Three-dimensional design planning concept	◎	◎
		Three-dimensional design planning direction	◎	◎
		Three-dimensional design guidelines	◎	◎
		Land use plan	○	○
3D Urban Space Planning for Specialized Areas (Draft)	Concept and Strategy for 3D Urban Space Planning	Concepts and strategies	◎	◎
	Three-dimensional plan by sector	Three-dimensional land use plan	◎	○
		Transportation and movement plan	◎	◎
		Parks green and outer space planning	△	△
	Three-dimensional architectural plan	Usage allocation plan	◎	○
		Design Specialization Plan for Buildings	◎	○