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The qualification work contains the results of one's own research
The use of ideas, results and texts of other authors must be referenced to the appropriate source.



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INTRODUCTION

Urban design shapes the environment in which people will be living, socializing, and interacting. While cities keep on developing, designing functional, accessible, and inclusive public spaces has become absolutely important. This becomes particularly true in residential development where universal design principles must be integrated to ensure that public space is accessible for all members of the community irrespective of age, ability, or background. Public spaces are not merely a physical area; They are an important component of community life, promoting social interaction, sports activities, and a sense of happiness.

This paper discusses the application of universal design principles in designing public spaces, especially in residential development, in response to the challenges posed by an aging population, increasing demand for child-friendly spaces, and sustainable and ecologically conscious urban development. The research draws on the theories of environmental design and spatial narrative theory to present guidance on how these spaces should be designed to enhance user experience, accessibility, and social inclusivity.

Therefore, the first chapter of this thesis reviewed the history of the formation of public space from the standpoint of international and domestic research into trends. This section discusses how different countries design their public spaces, with particular emphases on integrating universal design features. Chapter 2 then focuses on the requirement for the formation of public space in the process of residential development in detail and discusses the importance of universal design for the accessibility of different user groups. The key features of the functional areas and methods for the design of these areas from the perspective of meeting varied community needs are discussed.

Chapter 3 focuses on a practical design project - a pocket park within a waterfront residential community. This project utilizes spatial narrative theory to construct

designs aimed at creating a continuous and immersive experience of flow from one functional area to another. This design integrates elements such as children's play areas, elderly leisure spaces, and scenic walkways, ensuring that all users can enjoy the space in a meaningful and engaging way. By combining innovative design techniques and sustainable material selection, this park aims to become a model for creating inclusive, adaptive, and environmentally responsible public spaces in residential areas.

This study aims to provide a comprehensive framework for designing public spaces that are not only fully functional and accessible, but also vibrant and conducive to fostering community life. By applying universal design principles, this research contributes to a continuous dialogue on how to design urban spaces to better meet the needs of all users, ensuring their relevance, inclusivity, and sustainability in the coming years.

SECTION I. HISTORIOGRAPHY OF THE ISSUE.STATUS OF RESEARCH ON THE TOPIC

1.1The Status of Research on Old Communities Abroad

Under conditions of accelerated urbanization and urban central functional aging, European countries, as well as the United States, Japan, South Korea, and other countries, in fact, have to tackle the realistic issue of old community renovation, having formed a relatively mature research system. Old community research overseas is primarily concentrated in renovating spatial areas, restoring social functions, building multi-level governance systems, and sustainable development, presenting a systematic characteristic, which revolves around the essential route of "regeneration-activation-integration."

In Europe, for example, countries such as Germany, as well as the Netherlands, led in formulating ideas for "urban regeneration" or "urban renewal" as approaches to revitalizing already established community resources as a function of renovation rather than destruction. Germany’s "Social City" (Soziale Stadt) initiative, to give a concrete example, seeks to promote increased social cohesion for residents in troubled zones of cities by focusing upon infrastructure enhancement, implementing concepts of social services, as well as providing avenues for resident-community involvement for old communities. The Netherlands, for example, via "Living Labs" initiatives, seeks to promote community renewal at the micro-community level by identifying avenues for community involvement at this level to simultaneously revitalize geospatially, functionally, as well as maintain community culture in terms of revitalizing traditions at this level.

Studies in the United States tend to examine old community projects more in relation to issues of racial integration, property equity, and resource equity in providing governmental services to residents. For instance, there is the "HOPE VI" project, which is headed by the Department of Housing and Urban Development (HUD). This project is primarily focused on implementing measures for mixed-income group integration by upgrading old housing stock, improving environmental conditions, and building capacity for good governance to benefit residents in those old communities. American researchers tend to discuss more about the aspect of community involvement, as they include residents in renewal processes by pushing for what is termed as "bottom up renewal."

Being an urbanized state, old community issues in Japan also attract much attention. The main topic of research as well as practice is aging-friendly renovation, as well as cultivating capabilities for community self-organization. For example, Tokyo’s concept of a “compact city,” which involves small expansion projects, green renovation, and community development, is beneficial to old communities in terms of convenience for living as well as disaster prevention systems. Japan makes full use of resident self-governance bodies such as “chōnaikai,” focusing on creating conditions for community self-management and self-renovation, including convenience for senior residents in old communities.

In addition, South Korea has also adopted "resident-led urban regeneration" in old community renewal, which attaches great importance to residents' involvement in the entire process of project initiation, planning, to realization of projects. The "Sharing City" strategy of Seoul, for instance, seeks to activate old community spaces by using information technologies to create a shared urban renewal process, establishing a smart urban renewal roadmap focusing on residents' needs. Old community renewal projects include, for example, young people’s return, cultural resource integration, as well as encouraging young people to create jobs, in order

to promote old communities' development from multiple perspectives of industry, culture, as well as space.

1.2 The Status of Research on Old Communities in China

In China, although research began relatively late for old community renovation, it only began to appear in the 1990s. At this time, urbanization acceleration caused problems for some cities, including old residential environments and poor infrastructure conditions. The state began to attach importance to urban renewal; however, this phase did not provide systematic support for old community renovation, primarily focusing on building new residential zones. Renovation at this time only took place in fragmented urban renewal projects, as renovation of old communities only began in three cities in China at this time.

In the 2000s, as the pace of housing system reforms progressed, the government began to tackle, to some extent, the issue of renovating old communities. During this period, attention mainly focused on upgrading housing conditions in old communities, resolving problems relating to basic life facilities such as water supply, electricity, and roads in old communities. In addition, old urban areas in certain cities began to see the construction of low-cost housing in response to housing needs, but renovation wasn’ t planned from a macro perspective.

Since 2008, documents like "Several Opinions on Promoting the Construction of Affordable Housing" have been drafted by the central government, in which emphasis is laid upon old community renovation, as well as upgrading living conditions and improving the quality of people's lives. During this period, old community renovation began to be integrated into the national housing security system as a whole, as pilots began to be implemented in large cities across the nation, which became more systematic in nature. Substantial financial investments by the government took place in old community renovation projects, which primarily dealt with infrastructure upgrading, including waterproofing, heating, as well as corridor maintenance in residential buildings.

As the issue of an aging population has grown in recent years, renovating old communities in terms of aging-friendly design has emerged as an important area of research study to date. In this phase, besides revamping basic facilities, renovating old communities has also encompassed concepts of aging-friendly design, which include installing elevators, having recreation areas, as well as barrier-free routes, among others. The "Livable City Construction Project," commenced in 2014, encouraged standardizing facilities for an aging-friendly community, which aimed at functional renovation in old communities to create more convenience for senior residents in those areas.

The strategic proposal of the report of the 19th National Congress of the Communist Party of China is to "implement rural revitalization and urban renewal," in which old community renovation is included in the national development program of modernization. Already in 2017, old community renovation progressed from focusing only upon hardware facilities to exploring community governance systems as well as social services brought into the community to promote convenience and happiness in residents' lives. The current phase already encompasses upgrading community culture, senior care services, educational facilities, as well as other facilities pertaining to community services, in which resident self-governance is also incorporated in community committees in designated areas.

In 2020, the State Council began to issue the "Three-Year Action Plan for the Comprehensive Promotion of Urban Old Residential Area Renovation" to promote comprehensive renovation of old residential areas in urban cities by the end of 2022. This led to the widespread renovation of old community areas in relation to infrastructure, community services, management, as well as other aspects, including resident involvement in renovation projects via surveys, community meetings, as well as other means, which increased the applicability as well as scientificity of renovation projects.

Under the guidance of the concepts of ecological protection and environmental protection, as well as the "Dual-Carbon" strategy, in recent years, old community renovation projects have increasingly integrated green construction technologies, including solar photovoltaic systems, rain gardens, and porous pavers, into renovation projects. At the same time, the stakeholder model, which involves multiple actors such as the government, enterprises, foundations, and residents, has also gradually been used in old community renovation projects to leverage resources to make projects more economically sustainable.

1.3 Research on Community Public Space Design

Recently, with the acceleration of urbanization in China, studies on community public space design have increased in depth and coverage. The study of community public space design is no longer only focused on functional design, but also demands integration of different facets, such as social, cultural, and natural elements, primarily in catering to the needs of senior communities, child-friendly communities, green ecological design, and smart communities. The design approaches for community public spaces have also been enriched.

In relation to the design of public spaces for aging communities, experts highlight aging-friendly design approaches, prioritizing the safety, recognizability, comfort, and social interaction of public spaces. Some of these approaches include creating barrier-free facilities like ramps and handrails to facilitate easy movement of senior citizens; optimally designing resting areas by providing senior citizens with comfortable seating facilities as well as shade facilities to create a better outdoor leisure experience for them; creating more recognizable landmarks and signs to promote better navigation skills; and designing semi-private communication environments to stimulate social interactions between senior citizens.

Regarding child-friendly communities, fun and interactivity in design processes get priority. Increasing play facilities for children, as researchers suggest, is an important step in creating safe and educative zones for them. The set of activities

involves child play areas, creating safe ground surfaces, child interactive installations, more exposure to nature for children, parent-child interaction, and making areas more visually appealing in terms of colors, pictures, and other visual design concepts.

Green ecological design, for instance, is focused on improving the ecological sustainability of community public spaces by incorporating natural features into those environments. Some of the common techniques for green ecological design include increasing ground cover, creating rain gardens, as well as using porous materials to make community public spaces more environmentally friendly. Incorporation of ecological corridors, community gardens, and green roofs is also important in bringing people together with nature to create livable ecological communities.

The use of smart community concepts and technological innovations has slowly been incorporated into design methodologies as an essential aspect as well. Design experts enhance management efficiency and usability of public spaces by implementing smart facilities such as smart lighting, smart monitoring systems, as well as smart fitness facilities. Furthermore, dynamic changes in spatial organization of the community can be implemented using big data analysis of residents' usage rates and behavioral patterns to optimize usage efficiency of public spaces. For instance, smart seating, environmental sensing, amongst other facilities, offer more personalized services to residents.

Multi-dimensional development in community public space research also attracts consideration in relation to concepts including, but not limited to, social interaction, environmental sustainability, and technological advancements in community public spaces. Contrariwise, international research is more advanced than domestic research, including but not limited to, social function, ecological design, and smart technologies in community public spaces. Likewise, international research challenges include an aging population, which leads to aging-friendly designs as an important trend of international research. Age-friendly

design in countries such as Germany, for example, primarily concentrates on barrier-free route facilities, comfortable seating, and easy-to-recognize sign systems to promote safety and convenience for older people in community public spaces. For the United States and United Kingdom, age-friendly designs also include concepts of community rehabilitation and health-related community designs, providing more fitness facilities and health-related areas for older people to maintain a healthy lifestyle.

The design of child-friendly community spaces is led by countries in the Nordics. Researchers and designers work to involve children in community spaces by creating safe, innovative, and interactive play environments for them in those spaces. Lessons for children have also been incorporated in community design, including eco-lessons in eco-themed parks, so that community spaces for children not only provide fun but also provide critical environments for children to learn to be responsible members of society.

Green design is incorporated in Europe and North America in urban public spaces as part of planning and construction processes. Green designers incorporate local flora, rain gardens, porous materials, and other green technologies to provide more benefits of ecological interaction in these environments between humans and nature. In Denmark and the Netherlands, green approaches to ecological design include green roofs, urban gardens, as well as community farms.

One of the major streams of research in the design of foreign public spaces is the concept of Smart City, which is increasingly being incorporated in highly advanced nations such as the United States, Japan, and Singapore, to name a few. Smart technologies are increasingly being incorporated into the design of public spaces, including intelligent lighting systems, smart waste management systems, as well as digital kiosks, which allow for increased efficiency in management as well as better usability. Data analysis capabilities, including big data analytics, of residents' behavior allow for optimization of spatial layouts, increasing convenience in public spaces.

In Spain and France, public art is extensively used in community squares and streets, which beautifies the community environment, increasing the residents' sense of belonging to it. Public space design also encompasses historical/cultural aspects of the community, creating space environments with distinct features to raise residents' awareness of cultures in those areas.

1.4 The Concept of Community

(1) From a Sociological Perspective: A Carrier of Social Networks and Community Identity

From a sociological perspective, community is more than just a unit of residence; it is also a social collective that is grounded in fixed social relationships and cultural identity. Tönnies described community as a "living community established on the basis of kinship, geographical, and emotional ties." Today, communities remain significant as society views them as essential arenas for individual socialization, cultural transmissions, as well as social control as a critical component of society ’ s structure and function for individuals in society. In contemporary urban society, communities maintain certain traditional community features, which preserve this social function in formalized organizations such as community committees, community organizations, and other community-based volunteer organizations as they interact, participate, and co-produce in society ’ s community, producing this sense of belonging to society’ s community, which is stable, autonomous, and integrated into a social network.

(2) From an Urban Planning Perspective: A Basic Functional Unit of the City and a Governance Platform

From an urban planning point of view, a community is regarded as the most basic unit of the functionally spatial level of a city, which serves as a link between macro urban development schemes and micro urban operations in an urban area in general. According to "Urban Residential Area Planning & Design Standards", a

community is "a regional unit with a certain amount of population, complete support infrastructure, and full management & service functions." A community encompasses various urban functions including residence, education, healthcare, transportation, as well as recreation, which makes it an important platform for implementing the idea of "15-minute living circle". In terms of urban planning, a community is positioned between "residence area-neighborhood-community", which is primarily regarded as a central carrier of urban management and service resource decentralization. Scientific community planning provides significant support for reasonable allocation of urban functions, optimized population density, as well as equalized provision of urban services, which is primarily regarded as an important force for implementing high-quality urban development in an urban area in general.

(3) From a Spatial Layout Perspective: A Complex System Integrating Physical Form and Social Functions From a spatial perspective, a community is a complex spatial system in which the spatial configuration not only influences, to a certain extent, the efficiency of residents' daily living, but also impacts, in a more direct manner, the vitality of public spaces and social interactions. A community’s spatial structure is generally characterized by residential clusters, routes, open spaces, service facilities, as well as green landscapes, reflecting an obvious "accessibility-convenience-intimacy" principle. An optimally designed spatial structure for a community needs to serve plural groups of people, including achieving zone partitioning for active and passive functions, mixed use, clear routes, as well as spatial flexibility. Especially in old community renewal, renovating the spatial structure of a community needs to go beyond merely repairing infrastructure, and attach even greater importance to spatial diversity, social interfaces in an open manner, as well as functional complexity, in order to achieve finally a "human-centered" living space in essence.

1.5 The Concept of Old Communities

(1) From a Sociological Perspective: Weakening Neighborhood Relations and Aging Social Structures

Old communities refer to social spatial units that emerged from the rapid development of cities, often having strong "historicities" and "liveliness." Old communities originally embodied strong "neighborhood relationships" and "community cultures." However, as a result of changing urban population structures, old communities' original social ties began to dissolve because of population mobility issues, for example, "alienated relationships between neighbors,""dissipated social capital," and "difficulties in intergenerational integration." Old communities generally possess large populations of low-income, senior, or migrant workers, which bring complex social structures, a lack of governmental organizations, as well as low involvement. Under this understanding, old communities demonstrate neither only outdated infrastructure nor merely updated social structures but also depict an updated transformation in social structures, as well as deteriorated public relations.

(2) From an Urban Planning Perspective: Degraded Functions and Lagging Infrastructure as Targets for Renewal

From an urban planning point of view, old communities generally relate to residential units constructed during past eras, which, in terms of functional support, date back to outdated systems that have long been in need of proper renovation. Such old communities tend to be ineffective in meeting the differentiated needs of residents in a modern urban area, including problems in transport organization, provision of community services, high building density, and insufficient green space. As for the development of urban spatial structure, old communities tend to increasingly function as "spatial fault zones" as well as "service gaps" during this process, which obstruct the enhancement of urban functionality as well as optimization of environmental quality as a whole. From an urban planning point of view, attention to old communities is needed not only because of renovation

urgency but also because of the difficult challenge of guiding them to function as efficient, integrated, and sustainable organic parts of a city via urban planning.

(3) From a Spatial Layout Perspective: Monolithic Spatial Structure and Physically Closed Interfaces

Typically, old community environments present problems of distorted spatial organization, mono-functional layouts, and a lack of opportunities for social interactions. The internal environment is organized around "residential functions" but does not include, in an organic manner, other community services like those of education, healthcare, and entertainment, resulting in strong "residential island" zones. Furthermore, community internal roads remain narrow in width, high in building density, accompanied by irregular architectural patterns without an organized spatial order, failing to provide visual permeability in an organized manner. Finally, community public open-space dimensions remain unreasonable, inadequately used, limiting opportunities for social interactions as well as increasing negative impacts for this senior-friendly, child-friendly environment of low quality. In this manner, in community renovation, basic repairs would definitely remain insufficient to deal with such problems, but there is an imperative to reshape the logic of organization, increasing complexity, and mending usage flexibility, having as a result an upgraded community environment which reintegrates community members.

1.6 Research methods

For this analysis, the object of study is Beizhijie Community in Changzhou City, China. This community is located in the central region of Changzhou City, which makes it an old community because of historical reasons. As urbanization continues to evolve, this community, like many aging ones, encounters common problems, which include outdated infrastructure, low usage of community facilities, as well as upgrading residents' quality of life.

To identify a comprehensive understanding of this community condition, study methods for this proposal include a combination of several approaches, as follows:

(1) Investigative Approach

During field trips in community Beizhijie, the researcher observed in-depth the general environment, distribution, as well as residents' lifestyle in this community. The researcher observed, during field research, community residents' usage of shared facilities, ease of street connectivity, condition of green belts, as well as community residents' general living conditions. Engaging with community residents enabled the researcher to learn from them personally regarding community problems, in addition to understanding residents' renovation needs.

(2) Survey

In order to assess residents' needs and views, this study formulated a questionnaire for residents, which encompassed several areas including community environment, public

services, transport infrastructure, community safety, and green areas. The questionnaire was also conducted both online and offline to get a wider pool of samples. From this questionnaire, data could be gathered concerning residents' views about current infrastructure, what they anticipate in relation to future infrastructure renovation, as well as ideas for community development. The data from this questionnaire is processed using stats analysis to identify issues that require priority attention in renovating this community.

(3) Interview Method

Interviews were conducted to further get insights from community managers, resident representatives, as well as experts in relation to this study. From interviews conducted with community managers, this study gained insights into how community management is presently done, in addition to plans for renovating this community. From interviews conducted with resident representatives, this

study gained insights into residents' needs, as well as perspectives in relation to community renovation.

(4) Case Study Method

In order to further enrich the theoretical basis for this study, cases of old community renewal that have achieved success in both China and internationally have been chosen for analysis. From this, comparisons have been drawn tothe current state of Beizhijie community, so as to enable the researcher to learn from past experience in other communities, offering recommendations for renovation based upon the needs of Beizhijie community.

Conclusions to the first chapter

1.Conducts a systematic review of the current state of research on the renewal of old communities both domestically and internationally, summarizing the core issues and progress in the revitalization of aging communities.

2.Identifies that international studies have initially focused on urban renewal and regeneration practices, emphasizing the reuse of community resources and the restoration of social functions through various approaches such as “Social City” programs and resident-led renewal.

3.Reveals that Western countries prioritize enhancing social cohesion and governance capacity in established communities, while Japan and South Korea integrate age-friendly projects with resident self-governance, proposing strategies for small-scale and flexible renewal.

4.Finds that in China, although research started later, with the acceleration of urbanization, the government has attached increasing importance to old community renewal, focusing on infrastructure improvement, living condition enhancement, and addressing the challenges of an aging population.

5.Confirms that recent government policies have promoted a more systematic approach to old community renovation, with remarkable progress in aging-friendly designs and community governance models.

6.Notes that both domestic and international studies have deepened research on public space design, particularly in relation to aging-friendly environments, child-friendly spaces, green ecological design, and smart community development.

7.Highlights that research methods have diversified, including the introduction of barrier-free facilities, interactive spaces, and green landscapes to improve livability and inclusiveness.

SECTION II. REQUIREMENTS FOR THE FORMATION OF PUBLIC SPACES

2.1 Requirements of Universal Design in the Formation of Public Space

Universal design as a philosophy strives to create environments for everyone, regardless of age, skills, and backgrounds. When creating public space in residential areas, using universal design principles ensures that this is achieved, which is quite important for equity, accessibility, as well as usability.

(1)Accessibility for All Users

Public environments should also be designed in such a way as to be easily accessible to all individuals, including those who have physical disabilities, senior citizens, children, as well as people who have other special needs. This implies that routes, entrances, as well as transition areas between environments, should be barrier-free. Ramps, wide entrances, smooth floors, as well as well-constructed curb links, should also be incorporated to facilitate easy movement for those who use wheelchairs, strollers, as well as those who have mobility problems. Lifts should also be installed where necessary, together with level routes to avoid trips.

(2)Equitable Use

Universal design focuses on creating environments that all people can use, independent of whether they require any adjustments to design to suit them. This is inclusive of providing seating, lighting, as well as resting areas, for everyone’s use. Even seating should be designed to accommodate comfortable accessibility for people of different capabilities, including those using mobility support devices. Public environments should be designed to accommodate usage by both the elderly, children, as well as people from different backgrounds, for everyone’s equal use of the environment.

(3)Clear and Intuitive Navigation

The provision of clear signs is of paramount importance in universal design to aid in easy navigation for all people using this design concept in those environments. For those who may be visually impaired, tactile paving, Braille signs, as well as strong contrast signs, would aid in ensuring they navigate those environments easily. For those who may be intellectually challenged, using universal symbols as well as clear signs would aid in ensuring they navigate those environments more easily by avoiding confusion.

(4) Inclusive Social Interaction Spaces

Public spaces should promote social inclusion to facilitate interactions between people of different backgrounds and capabilities. The design of such spaces should entail common areas that should be shared by everyone, including community centers, parks, playgrounds, and event grounds. These areas should be designed in a manner that suits different social, recreation, and cultural interactions, which should give an equal chance to everyone, including people of all ages and capabilities, to participate in such interactions. For example, accessible seating, eating, and shade facilities should be incorporated in a manner that makes socialization possible without leaving out anyone.

(5) Safety and Comfort for All

Safety and comfort lie at the heart of universal design principles. Public environments must be safe for people of different abilities, and this is possible by creating conditions such as lighting, safe seating areas, and well-structured pathways for people to use. For comfort, factors such as temperature regulation, shade, and protection from environmental conditions apply, mainly in an outdoor environment that is accessed by most people, including those in public open spaces. Noise regulation measures also promote a comfortable environment for those who have sensory disabilities..

(6) Environmental Integration

Public spaces also ought to blend into their surroundings, taking into consideration the natural environment as well as adapting to the needs of the people in that location in respect to accessibility. Universal design principles also involve consideration of how the environment affects accessibility, for example, provision of shaded areas in hot environments, as well as provision of protected areas in environments that experience high winds. Finally, green areas in environments, including green roofs, provide an enhanced aesthetic in addition to an increased environmental quality of the location, being inclusive of both accessibility as well as sustainability aspects as well.

2.2 Features of the formation of functional zones of space

Functional zones in a public environment play an important role in creating an environment that caters to different activities to suit the needs of local residents. Functional zones also help in creating environments that support social interactions, health, as well as well-being, in addition to being efficient and accessible.

(1) Diverse and Multi-functional Areas

A properly designed public space should have different functional zones to cater to multiple needs of people for different types of activities. These functional zones in a properly designed public space may incorporate zones for recreation, socializing, rest, sport, cultural, and leisure activities. For example, in a public park, different functional zones would include children’s playing zones, garden zones for resting, sport zones for different sport activities, as well as zones for different gatherings, meetings, or events. Functional zones in a public place, which accommodate different needs, make it more inclusive to suit multiple needs at different times.

(2) Clear Delineation of Spaces

Even as diversity in function is to be encouraged, it is also important for these zones to be obviously marked in order to prevent conflicts between different types of functions. Functional zones in a park should be designed such that noisy and active zones, like sport grounds, do not impinge upon quieter zones, such as resting grounds and gardens, where people value solitude as much as they value recreation. Finally, children’s play grounds should be segregated from grounds designated for older people, as well as for those who may be differently-abled, to promote safety as well as comfort for all park-goers.

(3) Integration of Natural Elements

Functional zones should not only focus on human actions but also incorporate natural features, which would further increase environmental quality within that area. For example, green zones like parklands help in improving air quality, provide shade, as well as aid in biodiversity conservation. Nature, in this case, has multiple purposes, for instance, as relaxation sites, picnic zones, as well as environmental learning areas. Incorporation of nature in functional zones leads to a harmonious environment where individuals get to experience nature irrespective of what activity they participate in at that time.

(4) Accessibility and Connectivity Between Zones

Functional zones have to be designed in such a manner that facilitates accessibility between zones. Factors such as pathways, ramps, as well as connectivity features, have to be taken into consideration in such a manner that facilitates easy movement between zones. This is even more important in an urban setting where accessibility between zones could entail crossing roads, which may be quite busy, as well as zones having irregular surfaces. Accessibility features such as seating, resting stations, as well as signposts, further aid in accessibility between zones, which makes it easy for people to access this space. Accessibility also makes it possible for people of different capabilities to enjoy this shared space.

(5) Flexible and Adaptable Zones

Functional zone design needs to account for adaptability in the future usage of such zones by residents. This is because residents' needs may shift in the future, but an efficient design for such zones will accommodate this by adapting to suit different needs in relation to spatial usage. For instance, an open grassed area may be used for events during festivals, but for regular residents, this area may functions as a recreation ground in addition to an events ground during festival time. Seating systems in different zones of public spaces, which may also be movable, allow for efficient usage of such publicly designed zones either for socializing, resting, or community events, depending on residents' priorities at different times.

(6) Community and Social Interaction Focus

For this An important aspect of functional zone development is also creating conditions for socialization and community involvement. Designed zones for socialization, for example, community seating, community gardens, or zones for community markets/cultural events, provide opportunities for residents to interact. Social zones should be located in such a manner as to make them available to all members of the community, from children to seniors, to facilitate bonding and creation of community. Public spaces, therefore, by focusing on functional zones

for positive social interactions, provide an essential area for community identity development.

(7) Safety and Security Considerations

This Every functional zone has to incorporate issues of safety and security to ensure that everyone is comfortable in that zone. Such issues as lighting, visibility, and surveillance systems have to be incorporated into the functional zones to ensure greater safety, most importantly in areas that require usage in the evening. The playing grounds for children also require safety to be taken into consideration during architectural design to ensure that children play in an enclosed area away from busy roads or any other hazard. Safety needs to be incorporated into every functional zone to provide a safe haven for everyone in society.

2.3 Basic Methods of Forming Public Space Design

An efficient design of public spaces necessitates careful plans to ensure that such spaces are functional, accessible, and accommodate the needs of all residents. Through a combination of design approaches, public spaces can be transformed into inclusive, vibrant, and sustainable environments to promote interactions, physical activity, as well as a collective sense of community.

(1) Contextual Analysis & Site Evaluation

The initial step in creating a design for a public space is carrying out a context analysis of the site. This analysis typically involves examining the site from an environmental perspective, including factors such as location, topography, climate, and infrastructure of the surroundings of the site. Of equal importance is understanding the historical, cultural, and demographic context of the community in which the site is established. This analysis is undertaken to recognize what the needs of the community are, to create a design for the establishment of a public space in accordance with those needs, including what is needed in relation to that

community’s needs, for example, more seating in an urban area versus more greenery in a residential area.

(2) Inclusive and Participatory Design

One of the most useful tools in designing public spaces is community engagement using inclusive approaches. Engaging community members in designing ensures that this designed space serves the community members who will utilize this space in the future. A perspective to ensure community engagement involves using methods such as surveys, interviews, workshops, and community meetings to incorporate community views into the design process of this space to ensure that this space speaks to the character of those who shall utilize it in the future, for instance, if they feel they require a place to socialize, they design such a place accordingly.

(3) Principles of Human-Centered

A human-centered design is all about creating environments, including those of public spaces, around people who use this environment. This is because, apart from being functional, comfortable, accessible, as well as enjoyable, environments also have to be functional, which is achieved by human-centered design. The concept of human-centered design discusses the significance of scale, proportion, as well as sensory experiences in environments like those of public spaces. The design of such environments has to incorporate human movement, which ensures it is easy to navigate, facilitating interactions in an indirect manner. Finally, sensory details, including lighting, sound, texture, as well as smells, also ought to be incorporated in such environments to make them enjoyable to people’s senses.

(4) Integration of Nature and Green Infrastructure

The integration of nature in the design of public spaces is a critical approach for designing sustainable as well as health-promoting environments. The integration of green infrastructure, including green walls, gardens, tree-lined routes, and parks,

into public spaces has a significant influence on making public spaces more beautiful as well as sustainable from an environmental perspective. Green spaces help in improving air quality, mitigating urban heat-island effects, as well as providing opportunities for people to exercise in an open environment. In addition to that, natural elements have been known to have stress-reducing as well as mental health-promoting effects.

(5) Flexible and Adaptive Use of Space

Public spaces should also be designed in a flexible manner to accommodate different needs at different times, as they require adaptability in order to accommodate different types of functions at different times. For example, an open plaza may be used as an event location for concerts at night, as well as being an open market during daytime for farmers to display their products, for people to sell fresh fruits and vegetables, for example. A well-adapted public space is able to enable different community needs to be satisfied at different times of the year.

(6) Connectivity and Accessibility

One of the important approaches in designing public spaces is focusing on connectivity and accessibility. This involves creating pathways to connect different functional areas in a manner that facilitates movement from one place to another. Connectivity is also understood to include facets that relate to social and cultural connectivity. Public spaces ought to be inclusive in that they ought to allow everyone to access them, irrespective of their capabilities and mobility. This involves implementing universal design principles like installing ramps, providing wide walkways, signs, as well as seating arranged in a manner that is accessible to people who are differently able, seniors, as well as parents with children in strollers. Connectivity to other locations, including transport systems, ensures that everyone is able to access this space easily.

(7) Sustainable Design Practices

Sustainability is an important consideration in the design of a public space. Sustainable design techniques ensure that the designed space does not harm the environment in any manner but is also able to withstand the tests of time. Sustainability in this respect encompasses using eco-friendly material, efficient lighting, harvesting water, as well as increasing biodiversity by using native plant species, to name a few examples. A public space, in addition to sustainability, also needs to be designed in a manner that is resistant to climate change, including natural disasters such as floods, to name but a few examples. For instance, using permeable surfaces to allow water to flow through can minimize flooding, which is an important component of stormwater management in cities.

(8) Safety and Security

Measures Safety and security as a principle of design should also be embodied in any public open space. For an open space to be well designed, it ought to feel safe to everyone using it, which is possible by providing adequate lighting, visibility, and optimized location of facilities in a manner that does not create hiding spots for potential assailants, besides which open spaces ought to be designed in such a manner as to promote surveillance by people moving in those spaces. Safety and security measures, for example, emergency call boxes, presence of security personnel, as well as closed-circuit televisions, ought to be incorporated in this respect if needed.

Conclusions to the second chapter

1.Analyzes the essential requirements for forming public spaces within residential communities, emphasizing functional, inclusive, and sustainable design principles.

2.Establishes universal design as a foundational principle for public space formation, ensuring accessibility and usability for individuals of all ages, abilities, and backgrounds.

3.Identifies key components of universal design in public spaces, such as barrier-free access, clear signage, and zones that encourage social interaction, with a particular focus on the needs of the elderly, children, and people with disabilities.

4.Highlights the importance of functional zoning in public spaces, advocating for the separation of active and quiet areas to support diverse activities such as relaxation, recreation, social gatherings, and cultural events.

5.Outlines core methods for public space design, including contextual analysis, participatory design, and human-centered approaches, ensuring alignment with community needs and environmental context.

6.Emphasizes the role of participatory processes in engaging residents and stakeholders, enabling their preferences to shape the public space environment.

7.Applies human-centered design principles to create public spaces that are not only functional but also enjoyable, inclusive, and conducive to social connection.

8.Stresses the integration of natural elements and sustainable practices, particularly green infrastructure, to enhance environmental quality, public health, and community well-being.

9.Advocates for flexibility and adaptability in design, recognizing the need for public spaces to evolve with the changing needs of the community over time.

10.Presents a comprehensive framework that combines universal design, functional zoning, sustainability, and adaptability as a basis for creating high-quality, inclusive public spaces that foster community engagement and long-term livability.

CHAPTER III. DEVELOPMENT OF AN EXIBITION SPACE PROJECT BASED ON THE PRINCIPLES OF SPATIAL NAEEATIVE THEORY

3.1 Concept Design

The idea for the water-front park seeks to create a public space in a small green area by the river, at the center of an old residential area. The target population for this park consists of senior citizens, as well as children and adolescents from a nearby kindergarten and a primary school respectively. For this reason, apart from improving the aesthetics of the riverfront, this project also serves to provide recreation for senior citizens.

For this, functional areas including zones for children’s play, seniors' leisure areas, as well as walkways, have been integrated in this design, which suits different groups of people. These functional areas in the park stimulate interactions between people of different ages, which is an important component of improving social cohesion in this community. The design also focuses on the aesthetics of this park by using waterfront areas, natural environments, as well as fun facilities to ensure that this park is a safe, comfortable, as well as a beautiful place for people to carry out different functions.

3.2 Application of Spatial Narrative Theory

Spatial Narrative Theory serves as the guiding framework for the park’s design. The design follows a sequential narrative approach, where the park is divided into distinct spatial episodes, each providing a unique experience. The journey begins with active zones and transitions into more tranquil areas, creating a narrative flow that encourages exploration, relaxation, and social interaction.

(1)Entry and Discovery

As soon as people step into the park, they encounter a transition plaza that gives them instant access to two major regions of the park, namely the senior’s leisure area, as well as the children’s play zone. This is basically where park-goers get to enjoy themselves as they have a link to the river in sight.

(2)Activity and Interaction

As visitors proceed in this park, they get to participate in dynamic zones of interaction, such as the children’s play zone. The children’s play zone, which is also central, has sculpted topography that stimulates children’s imagination as they interact.

(3)Transition and Reflection

The seniors' leisure zone provides an area for rest, socialization, and reflection. This zone provides seating, shade, and plant features, creating a peaceful relief from other active areas of the park.

(4)Riverside Contemplation

The final destination is at the riverside viewing platform, which provides an opportunity for viewers to enjoy a calm environment surrounded by views of the water, completing the story of this park complex.

3.3 Design Innovations

The design is crafted in a manner to incorporate multiple innovations to create value in terms of functionality as well as aesthetics for meeting community needs. Some of those innovations include the concept of fold line design, interactivity, as well as sustainable landscapes.

(1)Fold-Line Design

The park employs fold line design to achieve ease of transition from one zone to another. Curves in pathways, as well as folding geometry, help in moving from one place to another in the park.

(2)Interactive Features

For increased interactions, participatory features in the park include movable seating, sensory gardens, as well as modular equipment. The sensory garden, which consists of different plant species providing varied texture, stimulates both

children and seniors to engage with their surroundings. The movable seating in the park enables people to create their own environment according to social needs or event programming.

(3)Sustainable Materials

The project takes into consideration sustainable material usage, including permeable pavement, indigenous plant species, as well as sustainable construction principles. Such materials make sure that this park is eco-friendly, as well as blending in perfectly with nature. Finally, using materials resistant to environmental conditions makes sure that this project is long-lasting.

(4)Multi-Functional Zones

The park design also consists of multifunctional spaces, which in this case include shaded plazas as well as multifunctional playing areas that can be used for different functions and, as such, create a dynamic park able to suit different needs at different times, which in turn promotes community involvement.

3.4 Material Selection and Application

Materials selection is an important consideration in ensuring that the park is durable, safe, and easy to maintain. The following is a discussion of material selection in different parts of the park, taking into consideration issues of corrosion, slip-resistance, as well as usability of materials in the long run.

(1)Children’s Play Area

Corrosion-resistant wood: The structure of play equipment shall be made of corrosion-resistant wood to ensure that it is durable as well as eco-friendly. Corrosion-resistant wood is resistant to all kinds of weathering, including sunlight, water, humidity, as well as corrosion.

Rubber Flooring: The playground would also incorporate slip-resistant rubber flooring, which has shock-absorbing capabilities that prevent injuries in cases of

falls. The material is also easy to maintain, which makes it durable enough for heavy usage at the playground.

Stainless steel and high-strength plastic: For slides and climbing frames, stainless steel and high-strength plastic materials shall be used, combining both corrosion-resistance and durability. Reliability against wear and tear is also accounted for, as this ensures safety for the children at all times.

(2)Elderly Leisure Area

Slip-Resistant Stone: The ground surfaces in this senior recreation area shall incorporate slip-resistant stone, such as granite stone, to ensure senior clients' safety by providing slip-resistance, in addition to having high durability to withstand outdoor conditions.

Weather-Resistant Metal:Weather-resistant metals (like aluminum or galvanized steel) shall be used for benches and armrests. The materials shall be corrosion-resistant, lightweight, as well as easily transportable, which makes them preferred for outdoors.

Wooden Landscape Features: For the construction of landscape features such as benches, corrosion-resistant wood shall be used. This material provides a warm, welcoming ambiance without losing the natural look.

(3)Riverside Viewing Area

Natural Stone Paving: The riverside platform would be designed using natural stone paving, such as limestone or marble, which would not only blend in perfectly in the natural surroundings but also offer durability as well as slip-resistance property.

Artificial turf: For creating a green look, artificial turf as well as natural grass shall be incorporated in the riverside area. Artificial turf is known to provide good

drainage in addition to a natural look, which is beneficial for accentuating the riverside area.

(4)Paths and Walkways

Permeable paving: Permeable paving, for example, is going to be used in walkways to allow water to pass through, thus minimizing water runoff in parks. Permeable paving is more sustainable; in addition to this, it provides a natural look to walkways at parks.

Slip-resistant tiles: For regions of high moisture, such as around water features, slip-resistant tiles shall be utilized for increased safety to prevent accidents resulting from slipping, even when wet.

(5)Maintenance and Environmental Considerations

All materials chosen in designing this park require minimal maintenance and consideration for environmental sustainability. Corrosion-resistant wood, resistant metals, as well as natural stone, provide durable material for minimal maintenance in this park, in addition to using permeable materials to ensure environmental sustainability in this park.

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APPENDIX A. Visual material for the text

Case Study – White Tangram: Micro-Renewal of the Entrance to East China Normal University No.1 Residential Compound, Shanghai / ZSD Studio (Zhongsen Zhijing Design Studio, Shanghai)

Located just a hundred meters from the Suzhou Creek, the East China Normal University No.1 Residential Compound is surrounded by a dense cluster of housing. The outdated community entrance is narrow, chaotic with mixed pedestrian and vehicle flows, and cluttered with disorganized infrastructure. Particularly problematic is its direct exposure to the elevated Inner Ring Road, leaving almost no space for people to pause or gather.

"Spatial Extension": The design meets usage demands by expanding spatially, breaking the conventional notion of the entrance as a flat, two-dimensional interface. The entrance area is extended inward into the community to accommodate multiple needs: separating pedestrian and vehicle flows, providing seating, installing bulletin boards, blocking the view and odor from the adjacent primary school kitchen exhaust pipes, and screening off garbage bins—resolving a variety of messy yet authentic aspects of daily life.



Case Study – The Warm Pavilion: A Community Home by the Huangpu River / VIA Landscape

The "Warm Pavilion" is a renamed version of the Xiangdong Community Home, located in Xiangdong New Village in Pudong New Area, along the banks of the Huangpu River in Shanghai. A critical design context is the fact that, even along this prime riverside public landscape axis of Shanghai, more than 480 households still live in old-style residential blocks with an average indoor living space of just over 10 square meters per unit.

Small-scale Semi-Enclosed Public Space: A small portion of the original community corridor was repurposed to create a cultural public space—something previously lacking in the neighborhood. This space enhances the community's overall cultural atmosphere and enriches daily social life.



Case Study – Hudong Experimental Project: Weaving Community Public Spaces through Incremental and Phased Renewal, Shanghai / VIA Landscape

The starting point of Hudong's series of incremental updates was the "Warm Pavilion to the East", created by VIA in May 2020. Within a limited footprint of just 70 square meters, the innovative structural design created a larger and more complete spatial experience for users, fostering a warm sense of public life at a human scale.

Redistribution of Urban Grey Space: The design organically integrates the pedestrian greenbelt with a viewing platform, enhancing the vertical spatial layering of the urban roadway. At the same time, it makes pedestrian routes more engaging, encourages longer stays, and effectively utilizes previously neglected grey spaces within the urban road system.。



Case Study – The White Cloud Courtyard, Shanghai / Wutopia Lab

Wutopia Lab, in its practice, explores the use of symbolic expressions beyond abstraction to create legible and interpretable designs. The White Cloud Courtyard is a courtyard that is not only usable but also readable.
A courtyard should not degrade into a large decorative bonsai. Therefore, the design incorporates pavilions, winding paths, and low-maintenance yet visually appealing plants. Everyday elements like seemingly unrelated clotheslines and fences are also integrated as part of the landscape. The courtyard becomes a space where people can gather, chat, and rest, and where children can play. It is envisioned as an outdoor public living room, not merely the fading core of a declining community.
Usable Landscape: The courtyard landscape is seamlessly integrated with the daily life of residents. Through a multi-functional design approach, it creates a distinctive spatial experience unique to the community—rich in everyday warmth and liveliness.



APPENDIX B. Tables, diagrams

Table for chapter 1

Time Period	Domestic Research Status	International Research Status	Key Conclusions
1990s	Research started late, focusing on infrastructure	Europe: Urban regeneration concept, emphasizing urban	Domestic research started late, focusing mainly on

	improvement and housing conditions.	space renewal and resource reuse. US: HOPE VI project focusing on community function recovery and resident participation.	infrastructure and housing improvement. International research focused on urban regeneration and resource reuse.
2000s	Government gradually promoted urban renewal, focusing on infrastructure and housing improvement.	Japan, South Korea: Integration of aging-friendly design with self-management, promoting small-scale flexible updates. US: Focused on mixed-income housing and community participation.	Domestic urban renewal began in the 2000s, and international research expanded into small-scale community updates and aging-friendly design.
2010s	Focus on incorporating aging-friendly design and community governance mechanisms.	US and Europe: Community participation and coordination of social capital. Japan: Emphasis on aging-friendly design and social function integration.	Government-driven large-scale renovation and policy systems in China are enhancing infrastructure and social functions.
2020s	Large-scale community renovation is promoted by the government, especially for infrastructure and service functions.	Continued emphasis on ecological sustainability and low-carbon renewal. Green buildings and smart communities become key directions in development.	The international focus is on ecological design, smart communities, and low-carbon urban renewal.

Table for chapter 2

Demand Type	**Core Content**	**Design Points**	**Key Conclusions**

Universal Design Needs	Ensure accessibility for all groups, particularly the elderly, disabled, and children.	Provide accessible paths, ramps, wide doorways, and seating.	Universal design ensures accessibility for all groups, especially vulnerable populations like the elderly and children.
Comfort Needs	Provide spaces suitable for long stays, ensuring comfort through materials and design.	Comfortable seating, shaded areas, and soft materials.	Design should prioritize comfort and long-term use.
Social Interaction Needs	Encourage social interaction between different groups through shared spaces.	Open social spaces, such as communal seating and gathering areas.	Social interaction spaces are vital for fostering community connections.
Functional Needs	Ensure functionality of the space, meeting the diverse needs of users.	Functional zoning with areas like play zones, leisure zones, and activity areas.	Space should have a clear functional layout, with different areas serving distinct purposes.
Ecological Needs	Ensure ecological functionality and sustainability in design, using natural elements and green infrastructure.	Integrate natural elements, use permeable pavings, and include green spaces.	Ecological design is key to enhancing environmental quality and promoting sustainability.

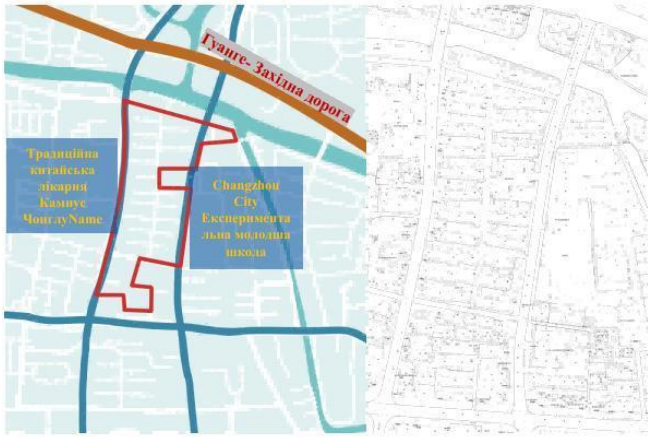
Table for chapter 3

Design	**Core Content**	**Design Methods**	**Key Conclusions**

Goal			
Functional Goals	Ensure the functionality of each space by meeting user needs.	Zoning design, path and space layout for different functional areas.	Functional spaces must be designed to meet diverse user needs with a clear spatial organization.
Comfort Goals	Create a comfortable environment for users to stay for extended periods.	Use human-centered design with comfortable materials, lighting, and seating.	Comfortable spaces encourage longer use, making the space more attractive and user-friendly.
Social Interaction Goals	Promote social interaction through open spaces and shared areas.	Open space design, ensuring easy access for different social groups.	Social interaction is key to community cohesion, and design should foster this.
Ecological Sustainability Goals	Integrate ecological elements into the design, ensuring environmental sustainability.	Use green design, natural elements, permeable materials, and energy-efficient solutions.	Ecological and sustainable design elements ensure environmental quality and user well-being.
Flexibility Goals	Design flexible spaces that can adapt to future changes and needs.	Modular design, movable furniture, and adaptable layouts.	Design flexibility ensures spaces can evolve with future needs, enhancing long-term use.

APPENDIX C. Project proposal.....

Аналіз адреси



Адреса
Громада вулиці Беджі розширюється від мосту Боаї на сході, вулиці Беджі на заході, дороги Боаї на південі і дороги Гуане на північ, що покриває площу 203000 квадратних метрів. Є 1942 будинки з населенням 4902 та 520 квадратних метрів офісного простору.

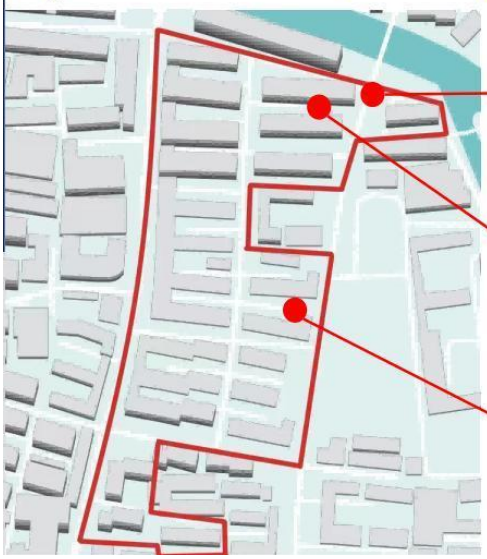
Округлене середовище
На північ - Гуанхе Західна дорога, на південь - Донхе вулиця, відокремлена від Хуонґ Лейн лише одною вулицею, на захід - Кампус Чонглу Традиційної Китайської лікарні Чанжжу, на схід - Експериментальна юніорська школа Чанжу, а всередині - поліцейська станція Кіанцю.

Аналіз населення



Перевірка часу діяльності населення
Громада Бедждкі має високий рівень старіння, а кількість реєстрованого населення життя більше 60 років дорівнює 24% загального реєстрованого населення життя. Більшість з них є місцевими жителями з Чангзу і не живуть з дітьми, що призводить до поганої якості життя.
Старіші люди можуть рухатися незалежно, але їхній час діяльності переважно від 9:00 до 11:00 і від 2:00 до 5:00 протягом дня.
Більшість нічних дій домінують молоді люди, і через те, що спільнота знаходиться в старому центрі Чангзу, потік людей відносно великий.

Аналіз поточної ситуації — спорт на відпустку





1. Спортське поле закрите і в основному складається з дорог, які не мають доступності та обмеженої видимості.

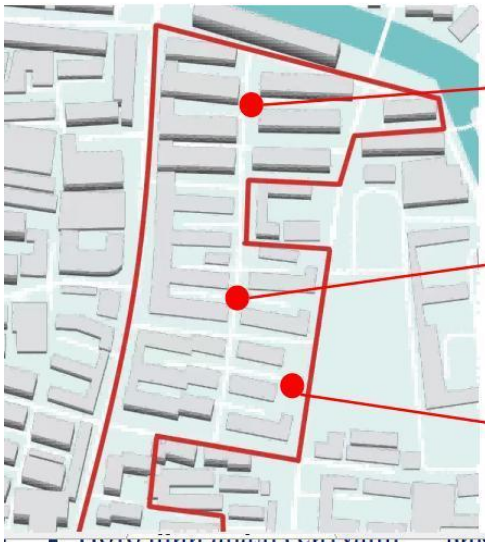


2. Функціональний тип є одним і повторним, з подібними областями повторно мають те саме функціональне місце.



3. У місці немає перешкод і влітку вона виявляється прямим сонячним світлом, що призводить до низького використання.

Поточнийаналізситуації–функціональнийсайт





1. Паркування призведе до зменшення доступності дороги.

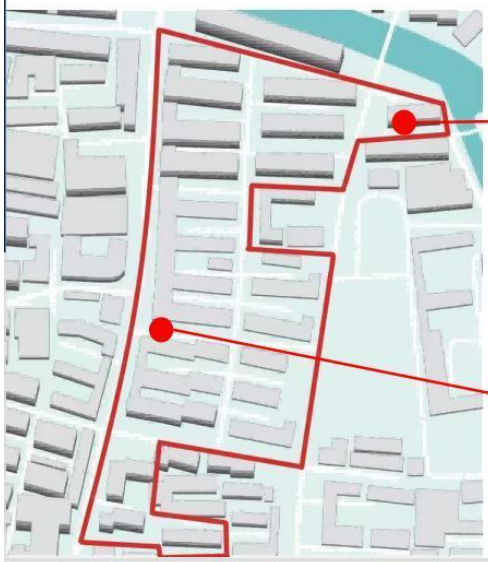


2. У сусідньому комітеті існує декілька культурних засобів поширення, що робить важко вчасно поширити відповідну інформацію.



3. Є занадто багато квадратів відпустного збирання оточених, з низькою стапкою використання і застарілими об'єктами.

Поточний аналіз ситуації — використання сірого простору



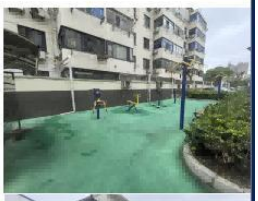


1. Доступність до дороги не висока, і багато місць потребує повернення назад, а занадто багато сходів не є дружними для старших людей.



2. Спортське поле закрите і в основному має бездороги, без доступності.

Summary of Current Issues





Проблема 1: недостаток загального планування. В різних часах спільнота пройшла декілька реновацій, і в загальному середовищі існують різні потреби, але існує багато проблем, таких як повторення функцій і нерозумне планування.

Проблема 2: Нещасний ефект перегляду пейзажу. Пейзажська побудова спільноти оточена великою кількістю рослин, які не можуть бути добре показані, і немає особистої людини, яка займається рослинами, що спричиняє непорядкову вегетацію.

Проблема 3: Просторова функція одна, а людська участь не сильна. Велика кількість композитних просторових областей розташування є створеними як окремі простори функцій, які не можуть досягти функцій збирання, відпуску та діяльності.

Проблема 4: Не існує віку відповідного дизайну, що не є приємним для старших людей. Пропорція старших людей у спільноті дорівнює 24%, але у спільнотному просторі немає віку відповідного дизайну, і недостатньо доступних засобів.

Проблема 5: Процес не достатньо гладкий, з великою кількістю мертвих кінців. Існує велика кількість нерівноманітних дорог і нерівноманітних дорог, що розташовані на діяльному шляху спільноти, що може легко призвести до неправильної і непотрібної відстані ходу.

Позначення дизайну — інтерактивність між людьми і космосом

Необхідні дії: проход, залишення, паркування тощо. Налаштувати дорожню мережу і збільшити доступний парковий простір.



Спонтанні діяльності: ходити, сидіти, сонячні ванні, ходити собаки, робити фотографії, дивитися тощо. Налаштувати налаштування зелених рослин, оптимізувати простірну форму, створити гарне пейзажське середовище, покращити інфраструктуру і зберігати проходжених жителів.



Соціальна діяльність: соціалізація, дитячі розваги, шахи та картові ігри, групові діяльності, клуби тощо. Підкреслити функціональну складність і збільшити маленькі квадрати, які відповідають потребам збірок.



Позначення дизайну — створення пейзажу

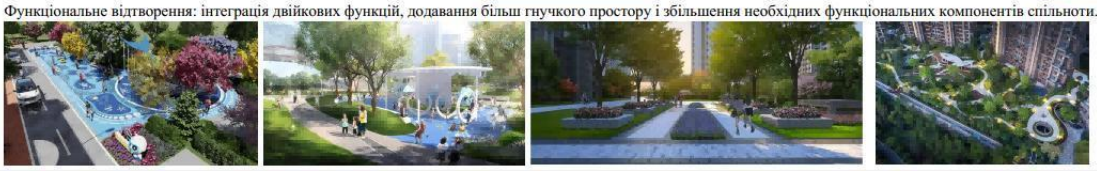
Розширення космосу: Очистити початково складне спільнотне середовище і створити відкритіше спільнотне середовище.

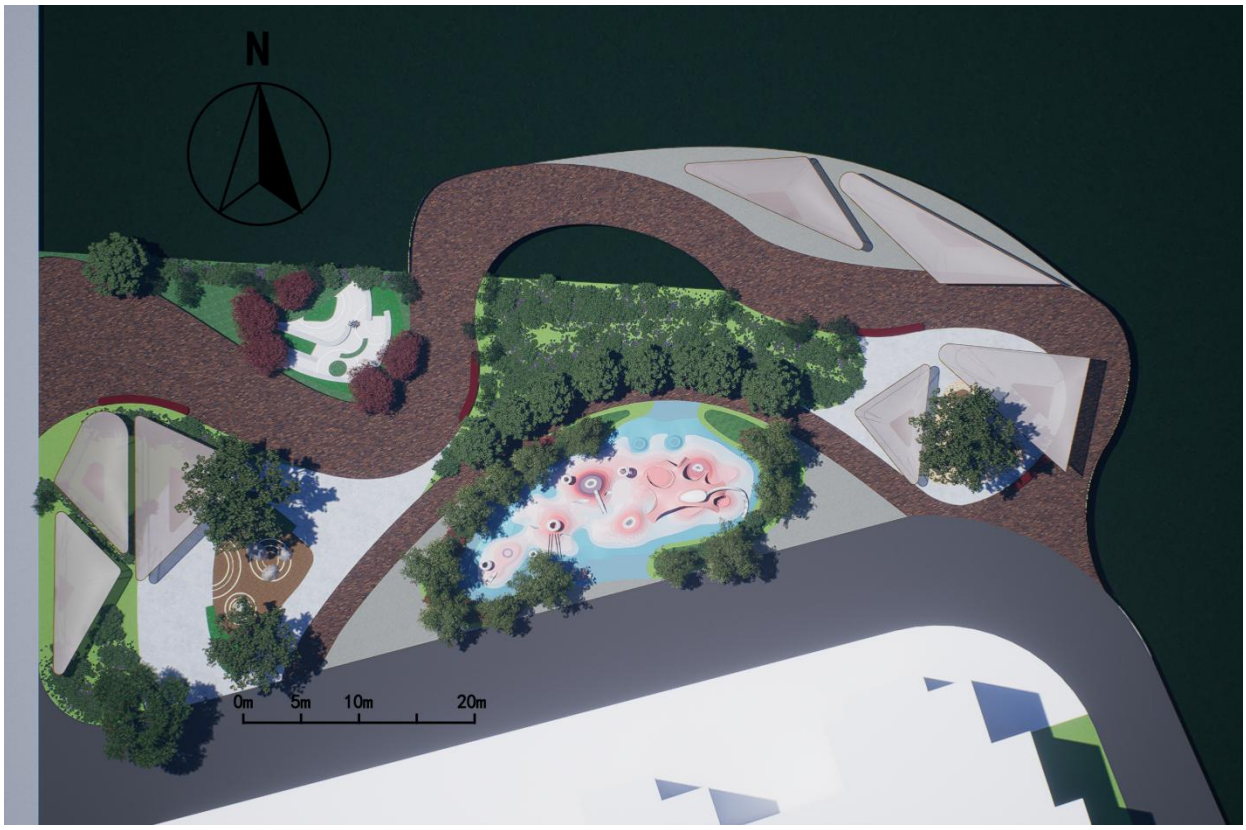


З' єднання лінії потоку: Інтеграція складених і повторених ліній потоку, щоб покращити гладкість лінії потоку і зменшити непотрібну відстань ходу.



Функціональне відтворення: інтеграція двійкових функцій, додавання більш гнучкого простору і збільшення необхідних функціональних компонентів спільноти.




N
0m
5m
10m
20m













