

Spatial Deconstruction and Optimized Strategies of Historical and Cultural Villages and Towns

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Abstract. Under the background of constructing urban and rural historical and cultural protection system, the inheritance of historical features of historical and cultural villages and towns is an important part of their protection. Taking Longmen Town as an example, based on the field research, we analyse the spatial evolution of Longmen Town and the problems of the old and new built-up areas, deconstruct the spatial vocabulary of the ancient town through the pattern language, and summarize the intrinsic mechanism and law of its architecture and the overall layout of the settlement. Combined with the current situation, it proposes the optimized strategies of spatial transfer, integration, revitalization, landscape transformation and remediation and spatial intertwining, with a view to promoting the protection and development of the landscape of the historical villages and towns.

1. Introduction

In 2021, the General Office of the Central Committee of the Communist Party of China (CPC) and the General Office of the State Council issued the Opinions on Strengthening the Protection and Inheritance of Historical and Cultural Heritage in Urban and Rural Construction, which put forward new requirements for historical and cultural preservation: on the one hand, it is necessary to protect not only the monolithic buildings, but also the overall pattern; on the other hand, it is necessary to protect not only the ancient heritage, but also the important construction achievements of the modern and contemporary times. Under the development trend of protection and renewal of historical and cultural villages and towns, Longmen Town in Hangzhou has a long historical lineage and a large number of buildings from the Ming Dynasty, Qing Dynasty, Republic of China, etc., which centrally display the traditional settlement style of the south of the Yangtze River. At the same time, the current development of Longmen Town also faces many common problems encountered by traditional villages and towns: 1) the integrity of the ancient town's architectural groups and traditional spatial patterns have been weakened by the damage of single buildings and new construction; 2) the loss of historical features in the new built-up areas and the trend of modularization is difficult to avoid. In the face of the bottleneck of the protection and development of the ancient township, the split of the new built-up area and the ancient township, and the difficulty of continuing the historical style and other realities, there is an urgent need to strengthen the control and guidance of the construction of the township.

As a design theory and method centered on spatial mechanism, pattern language plays an important role in the excavation of local spatial vocabulary and logic [1]. Domestic research on pattern language has been extended to a variety of fields, in the deconstruction of village space, some scholars analyze the spatial vocabulary of traditional villages in different regions by comparing and contrasting them, and distill the commonality and individuality [2]. Some scholars also pay attention to the spatial layout characteristics of traditional villages of ethnic minorities and provide planning ideas for their spatial restoration and renewal [3]. Besides, there are also some studies focusing on the public open space of traditional villages [4], the public space of ancient towns [5], the space of traditional settlements [6], and land morphology [7]. Through the literature combing, it is found that most of the related research articles focus on traditional villages, and there is less research on the spatial vocabulary of historical and cultural towns, which is a special type of "countryside" [8], and the research of pattern language in the related aspects needs to be expanded.

Based on this, we try to take Longmen Town, a traditional Chinese famous historical and cultural town, as the research object, to elaborate and analyze its spatial texture, evolution vein and new and old building areas, and deconstruct the spatial elements of the ancient town with pattern language, and then finally combine the pattern vocabulary with the development direction of the region to put forward the optimized strategy of the new and old building areas, so as to provide reference ideas for the conservation and development of the landscape of the historical and cultural villages and towns.

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2. Overview of the study area

2.1. General overview

Longmen Town is located on the south bank of the Fuchun River in Fuyang District, Hangzhou City, Zhejiang Province, and is connected to National Highway 320. The area of the town is 18 square kilometers, and the area of the ancient town area is about 2 square kilometers. Longmen inherits the long history of Dongwu culture, and was included in the fourth batch of the list of Chinese famous historical and cultural towns, which is the only national famous town in Hangzhou. The ancient township is located in the center of the current Longmen Township, which was founded in the Northern Song Dynasty and basically took shape in the Yuan and Ming Dynasties, with a history of more than 1,000 years of establishment. The ancient town retains a large number of traditional Hangzhou-style houses, including more than 300 ancient houses and 65 historical buildings such as ancient halls in different historical periods such as the Qing Dynasty and the Republic of China, with a large scale and compact layout, making it one of the best-preserved landscape and idyllic towns of Ming and Qing dynasties in the south of the Yangtze River.

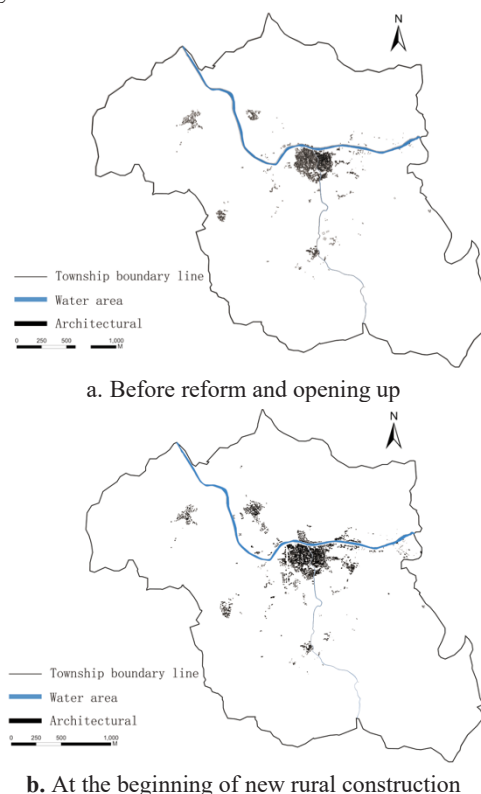
2.2. Evolution of spatial pattern

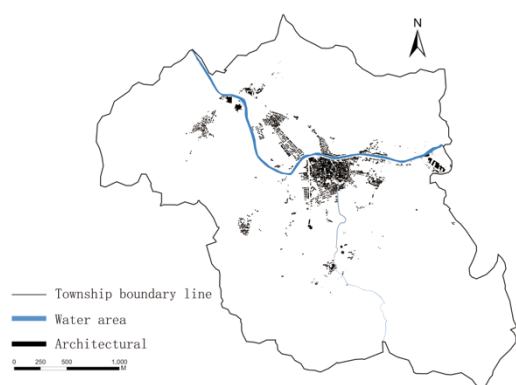
The rural settlement space is formed in the long process of historical development, and its evolution in practical terms also means the evolution of the pattern of human-land relationship [9]. Generally speaking, Longmen Town is flat and surrounded by mountains, with good sunshine and ventilation. Hepei River and Longmen River constitute the main water system of Longmen Town. Hepei River originates from Shengzhou, Shaoxing, and flows from Chengtan River and Changle River, and extends east-west in a natural curve shape in the territory of Longmen. Since ancient times, there have been many poets who have used the river as an inspiration for their poems and songs, making it a very poetic culture. The Longmen River is a slender meandering north-south extension of the river, and the river is connected to the river, along the residential and farmland cultivation, linking the living, production and ecological space.

According to the integration of historical images (Fig. 1) and related data, the evolution of settlement space in Longmen Town follows the landscape layout, and the characterisation of the evolution of the spatial pattern of Longmen Township are shown in Table 1. The pre-reform and opening-up township settlement structure around the intersection of the water system was in the form of one center and multiple points, the center of the settlement in the north of the river, the southeast and west of the buildings adjacent to the farmland and cultivated land, and followed the view of unity of man and nature close to the nature. Natural villages followed the water system, ponds, topography and other elements of the layout, the distribution of spacing and size was relatively equal, scattered around the farmland fragmented patches of residential points. After the reform and opening up of the

old town and the scattered layout of the village to the periphery of the expansion of architectural space to expand around. At the beginning of this century, after the policy orientation of building a new socialist countryside was put forward, Longmen Township developed rapidly, and the town land and industrial land continued to expand, and the spatial layout showed the development trend of one zigzag pattern with multiple points. The street texture of the ancient town area was well preserved, and the architectural texture expanded along the water system, topography and roads. The new built-up area extended to the urban area along the water system and transportation roads, the connection between the natural village dock and the ancient town area was strengthened, and the villages extend and spread in the direction of the ancient town area to form scattered settlements.

In recent years, with the in-depth development of rural revitalization and the continuous growth of population, the living space of the ancient township and other villages spread outward, expanding mainly in the central area of the township, forming a core of agglomeration, and the morphology of the southern villages is more stable due to the distance from the center. Generally speaking, the structural form of each part of the township is getting richer and richer, with the distribution form of "points", "lines" and "surfaces", and the spatial evolution of each settlement develops from scattering points to reticulation. The spatial evolution of the settlements has changed from scattered dots to a reticulated process, and the spatial layout of "mountain-water-forest-field" has been maintained, while the development trend has gradually changed from disorder to order. The new built-up area and the ancient town area have become more and more closely connected, and their internal space is threatened by the synergistic effect of various factors.





c. During the period of rural revitalisation

Fig. 1. Spatial evolution trajectory of settlements in Longmen Township

Table 1. Characterisation of the evolution of the spatial pattern of Longmen Township

Time period	Development trend	Spatial characteristics
Before the reform and opening up	One center with multiple points	The ancient township was close to nature, and the distribution of villages was relatively equally spaced
At the beginning of new rural construction	One zigzag pattern with multiple points	The land use space was expanded, and the connection between the ancient township and villages was strengthened
In the period of rural revitalization	Cluster-nucleated reticulation	The villages spreading outward, and the overall development trend was like an orderly network

2.3. Problems in the new era

2.3.1 Lack of protection of historical and cultural veins

Cultural heritage brings a unique charm to a region, as well as economic and use value [10]. In the development process of historical villages and towns, the lack of scientific planning and the blind development and construction under the neglect of the protection of cultural lineage can easily lead to the lack of protection of historical and cultural lineage, such as the lack of protection of various historical elements such as hall buildings, residential buildings, pagodas and gates, ancient temples, wells, stone bridges, etc. In recent years, with the extension of time and space and the development of urbanization, there is also the problem of the lack of

protection of historical elements in ancient towns. In recent years, with the extension of time and space and the development of urbanization, the ancient town area also has the problem of the lack of protection of historical elements. In terms of individual elements, the traditional form and materials of the Wan'an Bridge over the Hedian River in the north have been rebuilt and its traditional form and materials no longer exist, and ancient wells such as the Loujia Well and the Paper Trough Well have been filled in. As for the overall elements, due to long-term vacancy and lack of maintenance, some of the buildings have collapsed and become dilapidated, resulting in spatial dislocation and mutilation. At the same time, part of the restored and residents spontaneously new buildings not only have the problem of misalignment, alignment is not clear, in the material, facade is often not coordinated with the surrounding buildings, which leads to the weakening of the integrity of the architectural complex, the traditional axis symmetrical spatial pattern has been destroyed. Secondly, the connection between ancient buildings and cultivated land is separated by the new buildings, and the new buildings on the periphery surround the old buildings in the ancient town, and it is difficult to continue the pattern of unity of heaven and man in which the original ancient buildings and nature are close to each other.

2.3.2 Difficulty of historical style inheritance

The new built-up area, which is only separated from the ancient architectural complex by a river in the river, adopts the template of new rural construction for the arrangement of buildings, which is very different from the style of the ancient town. The residential buildings are mainly 3-story houses, and the roads are hardened cement pavements. The overall architectural arrangement is in the form of rows and columns, with the road as the main axis, and the styles of the building facades on both sides are mixed, while the architectural layout of the blocks a little farther away is more disorderly. The generation of space includes both natural and artificial effects. On the one hand, the new built-up area is laid out along the river, which is in line with the law of natural evolution. On the other hand, the modularity of the new rural design and construction mode is different from that of the ancient towns, which is one of the reasons for the difference in the style of the new and old districts. The modularization tendency of the construction causes the new built-up area to form a courtyard-type combination of residential forms that are different from the ancient towns that are full of changes, and at the same time, there is a lack of outdoor open space and street and alley space full of life interest, and there is a lack of open places of communication such as ancient streams, bridges, pavilions, courtyards, and so on, which ignores the spiritual needs of the middle-aged and old-aged residents, who are the main body of the townships, in the construction. Due to the homogenization of the spatial layout, informal behaviors such as residents' self-built courtyards and occupation of farmland and stream bank spaces are derived, and the overall development pattern is disorderly, which is not conducive to the

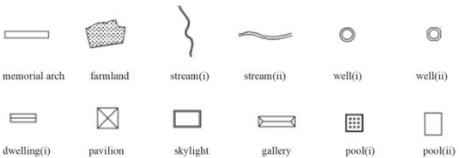
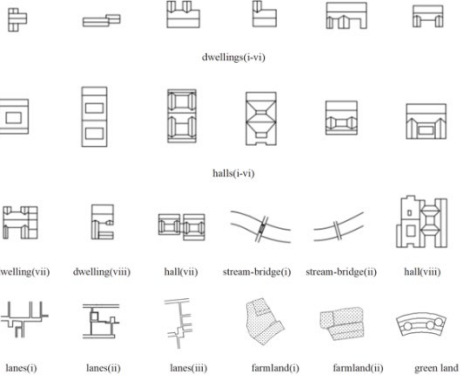
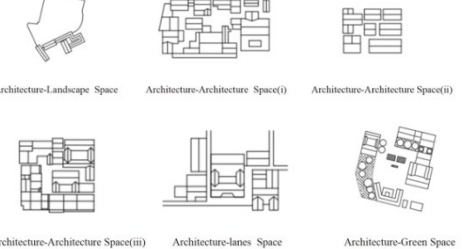
inheritance of historical features and the sustainable development of the human habitat.

3.The pattern language system of Longmen Town's spatial layout

3.1.Deconstruction of the basic pattern language of the ancient town

The formation of pattern language involves three parts, including the construction of a framework on the basis of cognitive objects, translation and symbolic expression [11]. On the basis of organizing and analyzing the historical images, remote sensing images, human history, CAD and other materials of the ancient town and field research, the basic pattern vocabulary of the ancient town is refined into "word" (basic spatial unit), "phrase" (compound spatial units) and "word group" (complex spatial unit), which are shown in Table 2. Drawing on the experience of related research [6], the types of pattern are categorized into block spatial pattern, free spatial pattern and line spatial pattern. The "word group" layout type is divided into: Architecture-Landscape space, Architecture-Architecture space, Architecture-lanes space and Architecture-Green space, in order to deconstruct the spatial layout of the splicing, combining process and mechanism.

Table 2. Deconstruction of pattern vocabulary of Longmen Town

Type	Deconstruction of pattern vocabulary
Word	
phrase	
word group	

The constituent elements of the pattern vocabulary of the ancient town area mainly include four parts: stream, farmland, building and lane, corresponding to line type, free type, block type and line type. From the point of view of the number of pattern types, as the single building of the ancient town is the basic unit of the spatial pattern, the block spatial pattern is predominant, and the combination form is rich, through a series of superposition, nesting, juxtaposition, intertwining and so on, deriving a complex architectural clusters. Line spatial pattern is mainly for the stream and lanes, both of which are woven into the building complex as skeletons, guiding the direction of traffic flow and assuming the function of public space, where people walk and talk along the streets and streams, which not only serves the local residents, but also provides space for tourists to visit, shop, and get in touch with the local residents. The free type spatial pattern is mainly for farmland, ponds and other ecological landscape elements, the layout is scattered and mostly adjacent to the residential area, there are also some small square nodes, ancient trees, ancient wells, etc., which together constitute the ecological network of the ancient town area and the block logo, but also as part of the public space, to support the local residents of the local sentiment.

The three pattern types are further divided into residential space, landscape space and public space by functional attributes. Among them, the living space is mainly composed of residential halls in the form of triple courtyard, quadruple courtyard, multiple courtyard as the basic unit, the courtyard combination pattern plane is usually presented in the shape of "□", "回"and "井".

Landscape space includes inkstone pond, green space, square, stone bridge, etc. As public space, it undertakes the same functions of daily communication, gathering and recreation as the old form of life, which is an important historical element of the ancient town. The street space connects the living space and landscape space, mainly in the east-west and north-south directions, including the old street, Chaojiu lane, ancestral hall lane, Xiaozi lane, Louyuan lane, etc., which are in the shape of "T", "Y", and "□". The number and shape of these streets are richly varied. Among the many streets and alleys, the Old Street as the main street connects the residential houses on the east and west sides of Longmen Creek, with a total length of about 400 meters, and the branch alleys are intertwined with each other, showing the traditional old town stores and residential houses along the street in the south of the Yangtze River.

3.2.Pattern formation and structure interpretation

Under the logical framework of linguistic thinking, pattern language uses formation, structure and other language architecture methods to organize the elements into a whole landscape [12]. The compound formation of the Lonmen town includes spatial inner relationships such as spatial nesting, intersection, and spatial continuity and spatial interruption. The architectural arrangement is dominated by group-type spatial sequences, with "halls and houses combined with courtyards" as the main residential space

pattern, the architectural form of Hangzhou-style houses, and garden elements such as rockeries decorating the interiors of the main buildings. Secondly, the intersection of buildings and buildings, buildings and streets and lanes creates visual dislocation, and often extends paths in different directions at the corners, and small green spaces are derived from the public spaces at the corners. The production space such as farmland is distributed in a small number of block patterns around the buildings in the inner part of the ancient township, while the main farmland and sunbathing yards are distributed in the outer part of the ancient township in a free pattern.

The structure of pattern language is the basic criterion and relationship between the basic unit and composite unit inside the space transformed into the overall space, including dimension, order, correction, time and localization [3]. The architectural vocabulary of the town is diverse, and the expression of its structure emphasizes dimension, time, order and localization. (i) Regarding dimension: The dimension of the single building has a similar rhythm, and there is a nested relationship between the dimension of the single building and the dimension of the group to the overall spatial dimension, spatial relationship layer by layer, and the order of the construction follows the twists and turns of the streets and lanes and the ups and downs of the terrain, so that the architectural form and the dimension of the subtle changes that occur accordingly. (ii) Regarding time: In the long-term construction process of the ancient town, the layout of the ancient town will be built according to the changes of the times, can be clearly observed in the Ming and Qing Dynasties, Republic of China buildings and new buildings of the difference between the language of its pattern contains a different era characteristics. (iii) Regarding order, the single building is subordinate to the group of buildings, and the same group follows a unified axis arrangement, such as the Hundred Lions Hall and its surrounding halls and the arrangement of the single building, together constituting a coordinated overall "axis symmetry" structure. (iv) Regarding localization: It is reflected in the use of building materials for the local materials, common brick and wood structure and hardwood carving, different building components such as horse head wall, cow leg decoration, etc., details of the carving rich, carving skills worth speculation. The halls and dwellings are constructed with the common patio in the south, and the walls of some buildings and the street pavement are made of pebbles, which are skillfully arranged.

3.3. Analysis of context and endogenous mechanism

Compared with ordinary villages and towns, historical and cultural villages and towns are not only rich in historical and cultural heritage, but also contain traditional culture, folklore and simple environmental concepts and other internal logics, which can be spatially characterized as pattern discourse with regional characteristics. In addition to deconstructing and analyzing its vocabulary, formation and structure, a complete and accurate understanding of

the connotations of pattern language also requires interpretation and elaboration of the contexts in which it is used and the implicit messages it conveys, and the connotations of words, phrases and word groups interpreted in different contexts are also influenced by the internal mechanism of generating the vocabulary in a different way. Longmen's rich architectural vocabulary and architectural groups, highlighting the long and prosperous history of Longmen Sun clan, the overall formation of Jiangnan charm, traditional culture and historical atmosphere is inseparable from the natural environment, cultural practices, rituals and systems, etc., according to the analysis of the spatial layout of the town of Longmen and the interpretation of ancient township pattern, which can be summarized into the following three aspects:

(1) Natural and feng shui principles. The layout of Longmen Town fits the landscape structure, the formation of nature and the integration of idyllic poetic habitat environment, reflecting the concept of "maximize the benefits of nature, to avoid the harms of nature, to create their own happy place to live" [13]. Secondly, the site of the settlement is located in the inner side of the bend of the river, presenting a "negative yin and embrace the yang" situation, and the natural environment of the spatial composition of the landscape is coordinated. The Tongxing Pagoda on the northwest side of the town is a typical feng shui pagoda, which is mainly used to make up for the terrain, promote Buddhism, and pray for blessings. Ancient town of building combinations, landscape construction also reflects its inward-looking and defensive. Some of the landscape construction in front of the residential buildings, such as pools shaped like a nine-star array, can now be done to draw water for fire fighting and other purposes. Unlike the spacious compounds of the northern villages and towns, the compounds in the ancient towns are deep with patios, mainly used for ventilation, and water tanks are placed on the open platform below the patios to store water, and the compound combinations are small and elegant, and their arrangements are closely related to the natural climatic factors.

(2) Clan culture and ritual concepts. "Bloodline is a stabilizing force. The unity of blood and geography is the original state of community" [14]. Through generations of clan camping, bloodline and geomancy are displayed in figurative physical buildings, and the symbolic cultural and spiritual status of the buildings is given to them, enabling the physical buildings to convey things that contain their own material and non-material properties. In Longmen Township, the shrine buildings are rare, while the ancestral halls are distributed in various districts. As one of the core public spaces in the ancient town, the ancestral halls and clan temples play the role of connecting blood relations and geographic relations, and are the main space for public spiritual cohesion and productive life in the ancient town. The area of the ancestral halls and clan temples is about 150~300m², and all kinds of architectural groups are formed around the ancestral halls, and the seemingly disordered combinations actually follow the orderly traditional rituals. From the local point of view,

each building group has its own invisible axis around the center building, and from the overall spatial unit point of view, the main axis of Longmenxi East-West group is mainly in the south-east and south-west direction, which is in accordance with the concept of "left is more important than the right, and south is more important than the north", which constitutes a counterpoint to the elements of the mountains and rivers. Ancient town space construction system follows the concept of strict system, reflecting the typical Jiangnan ancient clan settlement form, and the atmosphere of clan culture is far better than the temple. In addition, it can be found that the layout of newly reconstructed buildings is often dispersed and has no obvious axes, weakening the spatial interconnection.

(3) Confucianism and traditional ideas. In the Jiangnan region, elements of loyalty and filial piety, Confucianism, benevolence and righteousness are often passed down in the cultural value system of historical villages and towns. The Clan in Longmen Township is familiar with Confucianism and the traditional ideas, which can be reflected in the details of the buildings and constructions, such as "The wise man enjoys the water, the benevolent man enjoys the mountain" in Shanle Hall and "There is a surplus of happiness in a family that accumulates good deeds" in Yuqing Hall, etc., which are homophonic, metaphorical and other means to convey the idea of the Confucian value system and the family of cultivation and study. They use homophones, metaphors, associations and other techniques to aspire to the Confucian value system and the ideal character and picture of life presented in the family motto. Secondly, brick and stone carvings are commonly found on the exterior of the houses, while the interior is delicately carved on hardwoods, and different carving styles are presented in different historical periods, gradually ranging from the simple to the complex, highlighting the harmony and unity of regional beauty and historical features. In terms of carving subjects, the main content for the characters, drama and folklore, such as doors and windows carved "twenty-four filial piety", "fishing, woodcutting, plowing and reading" and so on, reflecting the Longmen clan affected by Confucianism and the idea of cultivation and study of family thinking and cultural values in the feudal society [15].

4.Optimized strategies

4.1.Spatial transfer, integration and revitalization

In terms of spatial transfer: pay attention to the inheritance of the remaining historical features of the ancient township, follow the principle of "historical landscape layer", protect the traditional architectural form, to avoid the artificial new "fake antiques", do a good job of protection without destroying the spatial texture on the basis of building materials, The building materials, colors, the degree of roof inclination, doors, windows, signs, etc. should be consistent with traditional buildings as much as possible, avoiding the abruptness caused by the large area of white painted walls. Combined with the requirements of the actual conservation plan, through special assessment, the new buildings that are obviously not in

harmony with the surrounding architectural style should be reconstructed and rebuilt, and follow the direction of the linear pattern vocabulary to reduce the impact on the aboriginal people and the surrounding environment, as well as reasonably adopting the green and sustainable construction materials, and adopting the modern technology to protect and reinforce the buildings. After the reconstruction, the misaligned and unidentified buildings are repaired according to the pattern architectural vocabulary, and the defective and ambiguous alignment relationships are supplemented to maintain the original axes and preserve the original form and style. In the details, repair the carved window decorations and other patterns and patterns, and adopt different repair programs for different styles, so as to completely inherit the regional characteristics and historical and cultural features.

In terms of spatial Integration: the architectural scale of the ancient town area is relatively homogeneous, and outside the groups formed around the ancestral halls and halls, the architectural spatial vocabulary has a low level of unevenness and undulation, and the overall spatial layout is not clear enough in terms of the relationship between the primary and secondary. While maintaining the original pattern of the ancient town area as a whole, the visitor center and the entrance are appropriately remodeled, and the interior is converted to landscape enhancement and architectural function to enhance spatial recognizability. Integrate the fragmented space, form the relationship between primary and secondary space, and give the primary and secondary space their respective functions. For streets and alleys open to tourists, such as the Old Street, clean up the non-ancient facilities that are mixed in the alleys and obstruct the view, and maintain a smooth passage route. For streets and alleys with good historical value, preservation status, and landscape features, the landscape space will be upgraded and the introduction of a large number of industries will be restricted, taking the human environment into consideration.

In terms of revitalization: on the basis of maintaining the appearance of ancient buildings, about 20,000 square meters of vacant public houses within the core area of the ancient town will be transformed into internal spaces according to a certain proportion, to be used for functions such as lodging, governmental management, convention and exhibition, and cultural display. Actively publicize and introduce diversified industries, and introduce high value-added and low-pollution industries, such as cultural and creative and study industries, to the remaining vacant or under-utilized buildings. In addition, considering that the main inheritance of the ancestral halls is local residents, it is necessary to balance the livability of the environment per capita with the preservation of the architectural authenticity of the buildings, such as the maintenance of facilities such as light bulbs, electrical wiring and water pipes, the repair of broken arches and other detailed components, and the preservation of the patio and the ground floor pavement.

4.2. Transformation and improvement of landscape and spatial intertwining

Renewal and reconstruction of the new built-up areas should focus on the adoption of local spatial expression forms, and flexibly use the "dialect" system of pattern language to avoid excessive use of the uniform template of village construction in Jiangsu, Zhejiang and other areas, resulting in the loss of historical features and homogenization of features.

Under the premise of maintaining the morphological recognition of new spatial and temporal features, the architectural vocabulary, street vocabulary and landscape vocabulary of the ancient town are extracted, and the lexico-syntactic and contextual mechanism of interpretation are integrated and interwoven into the newly built area, so as to enhance the public space and micro-space of the newly built area through selective transformation (Fig. 2).

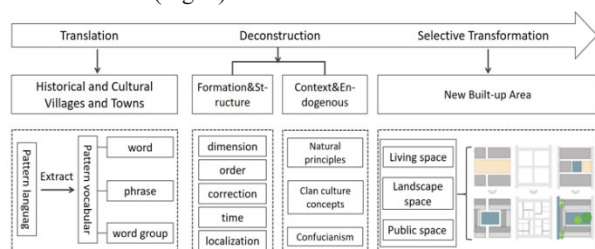


Fig. 2. Selective transformation framework of new built-up area using pattern language

The newly-built area has its own Hangzhou-style residential style in the new period, although it is difficult to recreate the small bridge and flowing water style of the core area of the ancient town, but it can be reasonably planned for the streets, squares, green spaces, pavilions and other open spaces where the residents have their daily activities and exchanges, so as to satisfy the spiritual needs of the residents. Under the premise of not demolishing the completed buildings in a large area, corresponding public buildings are constructed for the original isolated residential buildings to form interrelated residential groups, and the form of the newly built residential space is not completely in the form of the original ancient buildings, but through the corresponding pattern vocabulary and interpretation, combined with the characteristics of the traditional architecture of the old town area, the traditional vocabulary and the modern design vocabulary of the architecture and spatial layout of the old town can be selectively combined with the traditional vocabulary and modern design vocabulary of the old town. The residential clusters formed by the workshop-style courtyards are in line with the concept of axial symmetry and provide the aborigines with adjacent public space and landscape space, optimizing the human environment and promoting communication between neighbors. The public service, commercial and other spaces are composed of roughly similar contours and scales, and their settings maintain overall continuity with the residential groups, optimizing the visitor experience while satisfying the residents' lives and adding tour lines and landscape nodes.

The road facilities are arranged according to the original road direction of the newly built area, and the

roads are changed in width and narrowness, the scale of the carriageway is controlled at about 4m, and the sidewalks in the streets and alleys are formed at 0.7-2m. The street space connecting the residential groups and the main roads adopts the form of the ancient town street "starting - bearing - turning - combining". The street space connecting the residential group and the main road adopts the form of "starting - bearing - turning" of the streets in the ancient town, retaining the comfortable scale of pedestrian and making full use of the 13m control line of the building spacing. Within the range of 13m spacing, it meets the needs of traffic, parking and entry to households. In the streets and lanes of the main buildings, small regional landscape spaces are added, and the original farmland connected with the building roads is preserved, which forms a counterpoint to the farmland around the built-up area and continues the view of unity of nature and mankind that is close to nature. In addition, the unused objects occupying the farmland and stream bank space are regulated to keep the fire escapes smooth, maintain a neat and orderly human environment, and promote the coordination of the relationship between people and space, people and people, and space and space with a reasonable spatial layout.

Landscape space is the excessive bond of all kinds of space, with reference to the smaller scale landscape space formed in the ancient town area centered on the linear water system, including courtyards, streets and alleys, stone bridges, small squares in front of important buildings, etc., and constructing dispersed green space around the new residential houses and inside the courtyards. The materials of artificial landscape such as square paving and entrance signs are adjusted to incorporate stone carvings, wood carvings and other patterned carving elements. Taking the main driveway and the architectural landscape on both sides as the main axis and the alleyway as the secondary axis, combining the natural landscape with the space nodes to build an ecological and cultural landscape area. The right side of the new area retains a concentrated linear green space, blocking dust and noise pollution from the main driveway and promoting the healthy development of the human environment in the new area.

5. Conclusion and discussion

In the context of the protection and development of historical and cultural villages and towns, the inheritance of historical features is an important and complex part of their protection. Therefore, we need to pay attention to preserving the historical uniqueness of vernacular architecture and the actual way of life [16], and we need to deeply explore the connotation and hidden mechanism of the respective regional spatial layout, and its renewal and reconstruction should focus on the adoption of local spatial expression, refinement of spatial characteristics and evolution vein, and emphasise the coordinated development of the old and new built-up areas, so as to avoid the loss of historical features and homogenisation of the features. The limitation of this study is that it only attempts to provide historical village and town protection

ideas through pattern language methods, lacks a three-dimensional semantic model perspective, and lacks research on the sustainable inheritance of cultural core. Under the background of rural reconstruction and rural contraction in the new period, it is necessary to interpret the formation and evolution of the spatial texture of the countryside and its inner core, and explore the relationship between people and the land, such as the difficulty of inheriting regional characteristics, the gradual decline of heritage space, and the contradiction between the indigenous people and the spatial development, etc., which require in-depth research. At the same time, with the technological update, the protection of historical villages and towns is moving from paradigm protection to smart planning, and the use of ArcGIS, python and other software to analyse big data of villages and towns can protect all kinds of historical elements more accurately.

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