华南理工大学
South China University of Technology

专业学位硕士学位论文

广州内城廓归德门-小南门段形态演变与更新设计研究

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论文提交日期　2024 年 10 月

Abstract

The word "Cheng Kuo" refers to the outline of a city, also as the city wall area. The city wall, as an important defensive facility for ancient cities to resist foreign invasion, formed the overall outline of the city. The city moat is the river that surrounds the city wall. Excavate the moat, the excavated soil can build the city wall. The development and evolution of them not only affected the material space form of the surrounding areas, but also was closely related to people's lives. The city gate is the most important node space in the city wall area. As the entrance of the city wall connecting the inner and outer spaces of the city, the city gate plays the role of organizing traffic, military defense, city flood control and symbol and so on, and is also the main place where a large number of crowd activities occur within the range of the city wall area. Studying the city gate node is an important entry point to discuss the change of the city wall area.

The research scope of this dissertation is the eastern section of the inner city wall area of Guangzhou, located between the Inner city and the Southern City, including the former city wall from GuiDe Gate to XiaoNan Gate, the city moat YuDai Moat and the four city gate nodes, which belong to the core area of the old city of Guangzhou. The time span of the study is from the construction before Ming dynasties to the present, including the whole cycle of the inner city's establishment, development, demolition and disappearance. Guangzhou laid the basic spatial pattern in the Ming and Qing dynasties after the development of successive dynasties. During the Republican period, the city walls were demolished to build roads, and the city moats were gradually silted up and covered as streets. In the process of evolution, the inner city wall area has lost its own spatial characteristics, and it is difficult to identify the old city site space without historical relics.

In recent years, most studies on the morphological evolution of Guangzhou's old city focus on specific historical districts and blocks. From the perspective of "typo-morphology", combined with historical documents and current situation investigation, this paper studies the historical morphological evolution of Guangzhou's inner city wall area(GuiDe Gate-XiaoNan Gate section) from the aspects of overall urban spatial form, street and road network, plan units and combination, and building types. According to the morphological changes of the inner city wall area in different historical stages, it is divided into five historical periods longitudinally, to analyze the transformation of the inner city wall area from closed to open and from single function to compound function

Based on the evolution of the inner city wall area, this paper analyzes the type and form

status quo of the two historical city gates, GuiDe Gate and WenMing Gate, as well as the existing problems in the block, and uses the method of type design to propose regeneration and optimization strategies suitable for the reconstruction of historical memory and future development, so as to reshape the spatial form pattern of Guangzhou's inner city wall area. Attaching importance to the renovation of the two city gate nodes, is not only the restoration of the historical form, but also the revitalization of the city's function and cultural value.

Keywords：Guangzhou Inner City Wall Area; City Gate Node; City Gate and City Moat; Typo-Morphology

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Chapter 1 Introduction

1.1 Research Background

Guangzhou has a history of more than 2,000 years since its founding in the Qin and Han Dynasties. As one of the first historical and cultural cities in China, the city has a long and far-reaching historical memory, from street to lane, to brick and tile. With the intensification of urbanization in Guangzhou, the outline of the city continues to develop and expand, historical buildings are demolished, new buildings without regional cultural characteristics appear, and many historical memories and scenes are gradually forgotten by people. Due to the demolition and road construction plan in the Republic of China and the construction of the city moat after the founding of the People's Republic of China, the inner city wall and city gate disappeared, and the style of the traditional historical city of Guangzhou changed greatly. The area around the city wall gate has become a shopping arcade and commercial street, and the city moat has also become a back alley in the historical district. It is difficult for people to identify the old site space of the city without historical relics, and only traces of their existence can be found from some existing place names, such as DaNan Road (DaNan Gate), YuDai Moat, WenMing Road, WenMing Gate, etc.

Figure 1-1 Existing status of inner city historical space

Source: Photo by the Author

As an important urban spatial focus of ancient cities, the city gate node has a strong normative and restrictive effect on the surrounding space, and plays a role in organizing the surrounding space and regulating the urban order. However, nowadays, with the trend of homogenization among regions, ancient cities have lost their sense of order. How to find the

traditional forms of cities and establish the connection between new forms and traditional forms in the case of rapid urban development is a key issue.

The Inner City wall area refers to the section between the old City of Guangzhou and the New City built in the 44th year of Jiajing of the Ming Dynasty (1565). It is located between the East Moat and the West Moat, with a total length of about 2,500 meters. There are four gates, GuiDe Gate, DaNan Gate, WenMing Gate and XiaoNan Gate, and a Yudai Moat to the south. This section of the city wall was originally used as the physical boundary of the city to define the southern outline of the city. During the construction of the new city in Ming Dynasty, this section of the city wall and the natural boundary formed by the Pearl River and was directly used to build the new city of Guangzhou. The old city of Guangzhou and the new city were arranged side by side, so the inner city wall area was the only one inside the city of Guangzhou.

Before modern times, the traditional spatial form of the inner city wall area has been continuously consolidated and adapted to update, and the development has strong historical continuity on the whole. As the only place that can communicate between inside and outside the city, the gate node has a key position. In modern times, with the transformation of society, city walls and city moats generally began to undergo great changes, which had a profound impact on the reconstruction of modern cities, and even directly laid the urban pattern and form of most cities today[1]. Throughout history, some cities with developed industry and commerce took the lead in dismantling their city walls, while most cities with mainstream politics and culture chose to retain their city walls, among which Guangzhou belongs to the "demolition school". On the one hand, Guangzhou has been a city with flourishing commerce since ancient times, and the old city wall is regarded as an obstacle to urban economic development, and the city urgently needs to break the old spatial pattern in feudal times. On the other hand, after the Revolution of 1911, a series of modern urban planning ideas in the West also influenced the urban planning and construction of Guangzhou, and the action of dismantling the old city wall was imminent.

In 1918, Guangzhou Municipal Government Office was established to take charge of municipal construction and began a large-scale road demolition campaign. The city walls and gates from Xishuiguan to ZhengXi Gate in Xiguan area, the commercial center of Guangzhou at that time, were first demolished, and a 30-meter road was opened by using the city base to facilitate overland commercial exchanges, that is, the People's Middle Road today. With the vigorous implementation of the arcade system at that time, the arcade was built on both sides of the road.

At the same time, as another limited object of the urban boundary of water resources

facilities, City Moat, a complete urban water system has been built in Guangzhou since the Song Dynasty, which consists of four levels of water: street canal → six-vein canal → moat → sea (river)[2]. The city moat is not only the moat of Guangzhou, but also connects with the upstream and downstream water system, which undertakes the functions of water supply, drainage, fire protection and water transport harbor in Guangzhou, and develops into a commercial gathering place in Guangzhou. With the changes of The Times, the expansion of the city territory incorporated the original moat into the city, becoming the water street in the city. The connection of the waterway is convenient for commercial exchanges with the city. Ports and wharves will be set up along the water side, and streets and houses will be located on both sides of the river. With the emergence of parallel or vertical streets with several waterways, a rich long street form will be formed.

The development of the past dynasties resulted in dense population in the city moat, a large number of additional houses were occupied in the channel, and the sewage of residents, businesses and small workshops gathered in the city, and the river became narrower, silt accumulation and smelly. During the Republic of China, it was regarded as a municipal project in need of key transformation. After the founding of the People's Republic of China, the city was gradually covered into the ground and rebuilt into a reinforced concrete box culvert.

From the Republic of China to the first day of the founding of a series of "demolition of the city and cover the city moat" activities, in the original city wall, city moat on the basis of the construction of urban roads, the location of the city gate because of its connection to the city's south and north long street, the demolition of the city wall and the formation of the east and west long street, most of them were rebuilt into the intersection of roads, such as GuiDe Gate, DaNan Gate, XiaoNan gate, the material space of the city has greatly changed. On the one hand, Guangzhou has changed from the feudal urban structure to the road of modern development, improved the traffic road network, health environment, municipal facilities and urban style, and formed a clear urban form structure composed of spacious roads. On the other hand, the city walls and city moats were completely banned by roads, which also made Guangzhou lose the historical outline of the traditional water system gradually formed in the Song Dynasty, and it was difficult to distinguish the historical boundaries and important nodes. The disappearance of the city gate as a landmark makes the boundary of Guangzhou historic city lack a certain sense of domain and place, leaving a blank in the historical memory.

After the reform and opening up, Guangzhou, as an important display window to the world, has been significantly developed. A large number of urban planning and construction activities have been carried out, and the outline of the city has expanded rapidly, and high-rise buildings

have sprung up, forming a new urban face of Guangzhou. These activities not only promote the development of urban modernization, but also break the original traditional urban pattern of the old city, and bring significant spatial and social changes. For the inner city wall area, the original compact block structure dominated by bamboo tube houses and cold alleys was replaced by modern wide roads and high-rise buildings.

In the traditional old city of Guangzhou, the buildings are mostly low-rise, dense combined bamboo tube houses, arcade buildings, etc. The number of floors of the buildings is generally less than 4 floors, and the skyline of the inner city wall area is relatively gentle, retaining the style of the historic district. However, with the rapid urbanization after the reform and opening up, a large number of modern high-rise buildings have been erected, and some plots of new offices and apartments with more than 30 floors have formed a strong contrast with the traditional low-rise historical buildings around, and the skyline of the old city has undergone significant changes.

In the protection planning of Guangzhou historical and cultural city, according to the different spatial texture and functional form, the inner city wall area (GuiDe gate - XiaoNan Gate section) is divided into three historical and cultural blocks: traditional central axis, Beijing Road and Wendenan. In the development of the new era after the demolition and renovation of the city wall and city wall, the traditional historical areas around the city wall have become fragmented

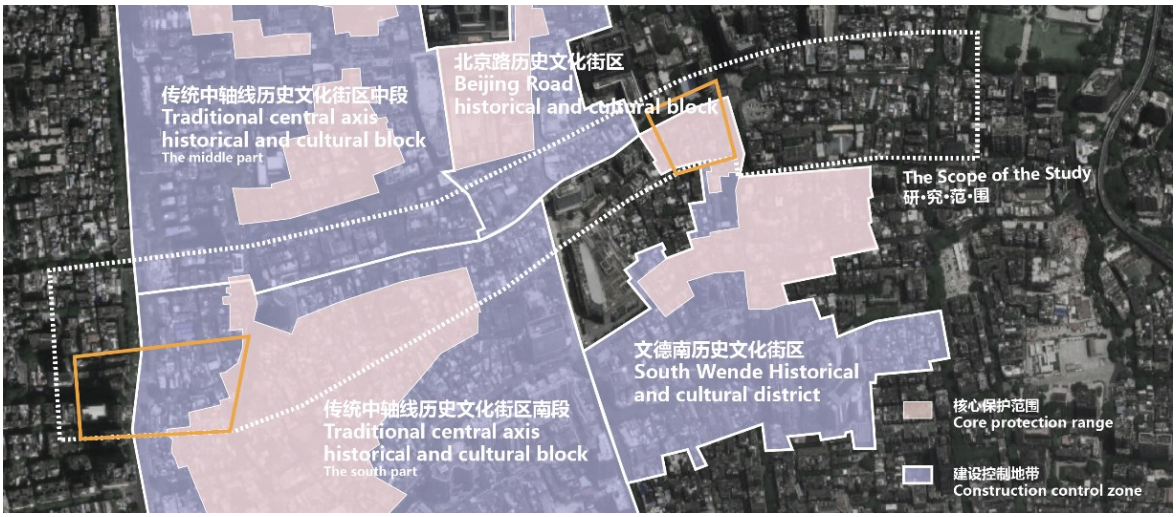


Figure 1-2 the scope of study and historical district

Source: Drawn by the Author

1.2 Research Aim and Significance

1.2.1 Research Aim

This thesis uses typo-morphology method to interpret the urban development and

evolution, and studies the urban spatial form evolution from GuiDe Gate to XiaoNan Gate of the inner city wall area of Guangzhou according to the specific phenomena in the process of urban development. With the influence of the establishment, prosperity, demolition and disappearance of the city wall and city moat on the spatial form around the city gate node, including the physical space form, street system, plot combination, architectural entity and People's Daily life behavior in non-material form, the relationship among the city wall, city gate and city moat is analyzed. On the basis of the current status of nodes, excavate the traditional spatial pattern and continue the historical context, chooses two gate nodes in the site to guide the urban design with the method of type design, and puts forward the renewal and optimization strategy that ADAPTS to the local tradition and context of historical memory reconstruction and future development.

1.2.2 Research Significance

In the process of urban development of Guangzhou, the spatial form of the city is often accompanied by slight changes and mutations, such as the increase and decrease of some local buildings and streets, and the expansion of the new city on the basis of the inner city wall area of Guangzhou in the Ming Dynasty, including the YuDai Moat zone into the city of Guangzhou, etc. Especially in the last century, the major changes occurred in the urban pattern of Guangzhou, and the spatial form of the city underwent reconstruction. The development of the city gradually broke through the restrictions of the old city walls and began to expand rapidly. This paper studies the evolution of gate space, which is an important node in the ancient city wall, along with the establishment, development and disappearance of the city wall. Through the analysis of typo-morphology, dig up the most fundamental morphological types and valuable morphological genes of the site, so as to reconstruct historical memory in the contemporary era when history has been gradually forgotten.

The study of urban spatial form type can not only describe the current space more systematically, but also help us to understand the mechanism behind the dynamic evolution of the city. The analysis, induction and summary of the type form form a database under the urban design vocabulary, which helps us to better carry out urban design in the face of the renewal and construction of the existing form. On the one hand, the study of the influence of important historical nodes on the block form is to explore how top-down policies and bottom-up residents' behaviors change the outer contour and internal structure of the city in the process of urban development. On the other hand, the thesis studies the influence of Guangzhou's urban boundary changes on urban form, and analyzes the formation and evolution process of urban

spatial form in these different historical stages. It also provides a basis for better explaining the past and present of Guangzhou's urban form, and for shaping a sustainable and orderly expansion of urban form that ADAPTS to the present and moves into the future in urban planning.

1.3 Research Object and Content

1.3.1 Research Object：Guangzhou Inner city wall area (GuiDe Gate - XiaoNan Gate section)

The research object is the southeast section of the inner city wall area of Guangzhou Old City, located near Beijing Road in the Yuexiu District, including the southeast section of the former Inner city Wall of Guangzhou (in the line of today's DaDe Road and DanNan Road), the east section of YuDai Moat and the original sites of four city gates. The north-south border is Huifu Road to Gaudi Street and Daxin Road, the east-west border is Xiaonan Gate (Dezheng Middle Road) in the east, and GuiDe Gate (today's Jiefang South Road) in the west. The east-west length is about 1600 meters, and the north-south span is about 300 meters. This section of the city wall area is located in a number of historical and cultural protection blocks, and there are many historical relics, which is the most core section of the inner city.

Two city gates are selected to further analyze the evolution of the texture, type, shape and spatial pattern of the historic blocks where they are located, and put forward the strategy of updating the design according to the problems of the blocks.

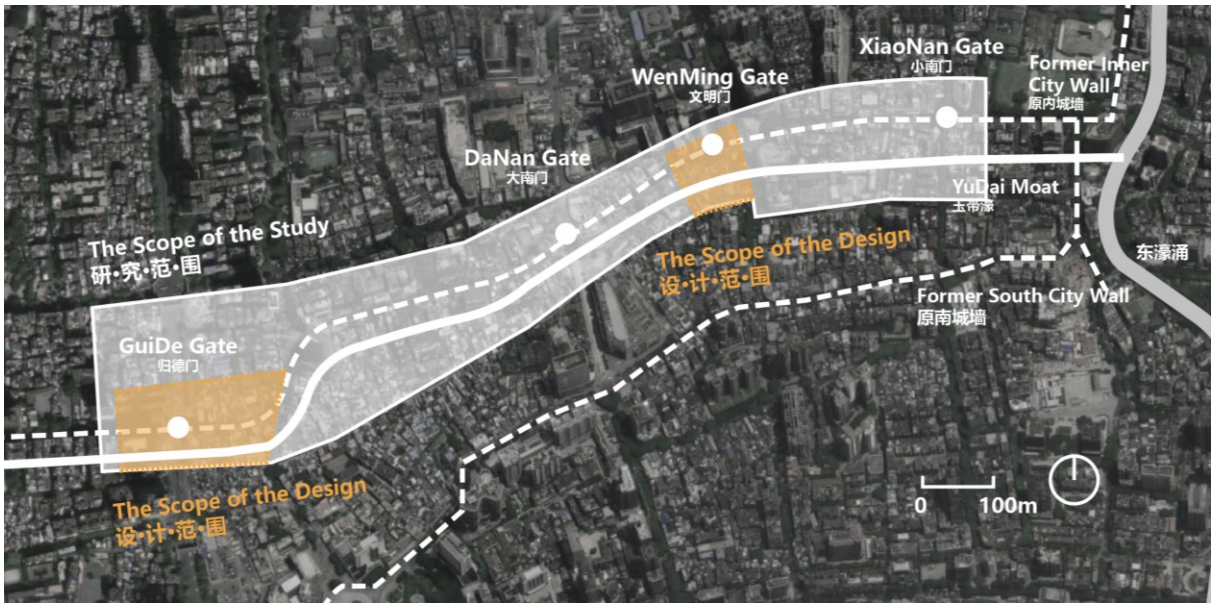


Figure 1-3 The scope of study and design

Source: Drawn by the Author

The time range of the study of the inner city wall area span from its gradual establishment

as the starting point, the construction of the city wall gate and the excavation of the city moat, to the important event of the plot -- the demolition of the inner city wall of Guangzhou and the reconstruction of the road, the construction of the arcade building (about 1920), and the cover plate of the city moat (1951) to the present day, which spans several dynasties. It involves the process of building, developing and dismantling the gate node. According to the division of historical time periods and the historical map information obtained, the evolution of spatial forms within the research scope can be summarized into the following morphological periods:

1）The formation period of traditional historical pattern

a. Before Ming Dynasties（-1368）

b. Ming and Qing Dynasties（1368-1911）

2）Morphological mutation stage

c. The Republican Period（1912-1949）

d. After the foundation of the PRC（1949-1978）

3）Continuous development and evolution period

e. Reform and opening up till now（1978-2024）

Based on the classification of its form development, this paper divides the form period of the research object into three parts. In the Ming and Qing dynasties and before, Guangzhou city wall gradually laid its pattern and the city moat was built to become a bustling commercial center. As an important node of the traditional city, the city gate was the period when the traditional landscape pattern of Guangzhou was formed. From the Republican Period to the early days of the founding of the People's Republic of China, the city wall and city moat changed dramatically. They were replaced by roads successively and became part of the Guangzhou road network. Since the reform and opening up, the morphological changes of the blocks have been concentrated in the plots and buildings, and the general changes are rarely but mainly partial micro-transformation.

1.3.2 Research Content

Based on the theory of typo-morphology, this paper studies the spatial morphological changes of the historical blocks where the gate nodes are located from different periods in view of the development and evolution of the inner city wall area of Guangzhou (GuiDe Gate-XiaoNan Gate section), and combines the investigation of the current situation of the site to sort out the block morphology and summarize the spatial morphological changes within the research

scope. Based on the research results, the paper puts forward some suggestions and strategies to optimize the spatial form of the two gate nodes within the research scope of Guangzhou inner city wall area.

This paper is divided into two parts. The first part contains two chapters, which is the exploration of the research content and theoretical basis; the second part is the sorting out of the evolution of the historical form, the field investigation and the optimization strategy of the spatial form of the research object. The main contents of this paper are as follows:

The introduction part: briefly describes the research background of the paper, the proposal of the problem, the research object, the purpose and significance of the research, the research status at home and abroad, and the main content and methods of the research;

The second chapter interprets and analyzes the relevant theories of typo-morphology at home and abroad, studies the concept, composition, development and other aspects, and summarizes the composition of morphological elements, which are divided into material form and non-material form elements and explains their characteristics；

The third chapter, based on historical documents and historical maps, sorts out the spatial form evolution of selected sections of Guangzhou inner city wall area from its establishment to the present, including historical background, basic information overview, street system, plot combination, building types, etc., and analyzes the influence of important historical events on it as well as the current development dilemma of the research scope.

The fourth chapter conducts in-depth research on the spatial form of the city gate historic blocks of GuiDe Gate and WenMing Gate, and summarizes the morphological region of the blocks according to the analysis of streets, plot combinations and buildings. Through investigation and interview, on-site observation and other methods, people's lifestyle and behavior activities in the site were sorted out and analyzed.

The fifth chapter is based on the theoretical research and analysis of the space form in the previous four chapters. First of all, the general principles of spatial pattern construction, corresponding design guidelines for different form areas and the operation objects of the two gate nodes in the selected section of the inner city wall area of Guangzhou are proposed, and the optimization research strategies suitable for GuiDe Gate and WenMing Gate are proposed. It also makes a detailed and in-depth exploration and research on its problems, graphic analysis, design operation, achievement expression, etc., and puts forward strategies for its spatial pattern, street optimization, gate node construction, etc.

Conclusion: First, summarize the value and significance of the previous exploration on urban spatial form, focusing on the significance of theoretical research, design practice and

practical architecture. Secondly, based on the reflection and prospect of the research practice of spatial morphology, the author puts forward constructive suggestions on the basis of analyzing the limitations of the application of typo-morphology, and looks forward to the development of typo-morphology.

1.4 Literature Review

1.4.1Research on the inner city wall area of Guangzhou

Table 1-1 Research on the inner city wall area of Guangzhou

Research Category	Paper Title	Author	Research Content
The overall spatial form of Guangzhou ancient city	Transformation of Guangzhou: From a Provincial Capital in the Late Qing Dynasty to the First Modern City in the Republic of China	Feng Jiang	Review the development process of Guangzhou's urban form modernization
	Research on the Protection of Guangzhou Ancient City Spatial Pattern	Xie Shaoliang	Put forward the protection ideas and methods of the whole spatial pattern of Guangzhou ancient city
	Research on the Protection and Display Strategy of Guangzhou Ancient City Pattern	Ge Peimeizi	Analyzes Guangzhou's traditional landscape patterns, including mountains, city walls, streets, and axes.
Guangzhou City Wall	Urban Planning and Construction in Guangzhou during the Republic of China	Zou Dong	Discusses the construction of old Guangzhou in the early Republic of China.
	Preliminary Research on the Protection of the Ancient City Wall (Yuexiu Mountain Section) of Guangzhou	Zou Xin	Summarizes the development and evolution of Guangzhou city walls, proposing protection measures for the existing walls.
	Research on the Protection and Utilization of	Wei Lisha	Plans the design of ancient city heritage corridors based on the Ming city wall relics

	Guangzhou Ming City Wall Ruins		and the main urban traffic lines of the ancient city.
Guangzhou City Moat	Research on the Six Channels of Guangzhou City	Guan Feifan	In-depth research on the historical development and function of the Six Channels.
	Research on Flood Control in Ancient Chinese Cities	Wu Qingzhou	Examines flood control experience in the Pearl River Basin in ancient China.
	The Evolution of the Water Landscape of the Old City of Guangzhou	Xu Zili	Explores the overall evolution trends and patterns of Guangzhou's water systems.
	Exploration of the Historical Landscape Evolution along the Yudai Moat in Guangzhou	Jiang Fanying et al.	Investigates the historical landscape imagery of the Yudai Moat during various periods.
	Research on the Water Environment and Urban Development of Guangzhou in the Ming and Qing Dynasties	Liu Wenwen	Discusses the interaction between Guangzhou's water environment and urban development during the Ming and Qing dynasties from macro to micro levels.
	Research on the Relationship between Water Systems and Urban Development in Guangzhou	Liu Wei	Studies the impact of the evolution of Guangzhou's water systems from the Qin and Han dynasties to the Ming and Qing dynasties on urban development, mentioning the Yudai Moat.

Source: Drawn by the Author

1）The overall spatial form of Guangzhou ancient city

There have been a lot of studies on the overall spatial form of Guangzhou's ancient city. A large number of ancient books and local Chronicles have recorded the city's construction and development and historical map information. For example, Qiu Juchuan's "*Ancient Banknote of Yangcheng*"[3] in Qing Dynasty, Qu Dajun's "*Guangdong Xinyu*"[4], Guo fei's "*General Annals of Guangdong*" in Ming Dynasty[5], Huang Foyi's "*Guangzhou City Annals*"[6], etc., collected

Guangzhou's history and geographical materials, landscape, and city construction. Two books, "*Essence of Guangzhou Historical Map*" [7] published by Guangzhou Municipal Archives and "*Illustrated Urban Context - Ancient and Modern Maps of Guangzhou*"[8] published by Guangzhou Municipal Urban Construction Archives, contain more than 100 ancient maps, recording the outline of Guangzhou City from different angles and different periods.

Some foreign works recorded the scene of Guangzhou in the eyes of foreigners from the perspective of Westerners during the Ming and Qing dynasties. French scholar Douhede compiled *the Jesuit Chinese Books: Memoirs of China*[9], which collected the letters from China of Western Jesuits who entered China in the Ming and Qing Dynasties, describing the urban appearance, street forms and architectural types of Guangzhou.

The domestic academic works are more comprehensive and record a lot of information about the construction and development of Guangzhou in detail and comprehensively. Zeng Zhaoxuan's *Historical Geography of Guangzhou*[10] is the first monograph to study the historical physical geography and human geography of Guangzhou. It deeply analyzes the evolution of the historical form of Guangzhou City and lays the foundation for the historical geography of Lingnan. Feng Jiang's *Transformation of Guangzhou: From a Provincial Capital in the Late Qing Dynasty to the First Modern City in the Republic of China* [11] combs the development course of the modernization of Guangzhou's urban form; Based on the spatial pattern of Guangzhou Ancient City in the Ming and Qing Dynasties, Xie Shaoliang's doctoral thesis "*Research on the Protection of Spatial Pattern of Guangzhou Ancient City*"[12] reviewed the historical development and evolution of Guangzhou's founding, and proposed conservation ideas and methods for the overall spatial pattern of Guangzhou Ancient City. Meizi Ge's master's thesis "*Research on the Protection and Display Strategy of Guangzhou Ancient Urban Pattern*"[13] analyzes the traditional landscape, city, street and axis pattern of Guangzhou;

2）Guangzhou City Wall research

As for the research on the construction and repair of Guangzhou City, Huang Wenkuan, former deputy director of Guangdong Provincial Institute of Literature and History, recorded the rubbings of Guangzhou ancient city bricks and the textual documents of the repair in the form of manuscripts in his book "*Guangzhou Ancient City Brick rubbings and Repair Survey*"[14]. As for the research on the demolition and reconstruction of the city wall, Dr. Zou Dong's thesis *Guangzhou Urban Planning and Construction in the Republic of China*[15] studied the construction of the old city of Guangzhou in the early Republic of China, removing the city wall to expand the urban area and carrying out large-scale reconstruction of the road system.

Study on the protection and utilization of Guangzhou City Wall, integrating historical and cultural heritage with natural landscape into the city: Zou Xin, *A Preliminary Study on the Protection of Guangzhou Ancient City Wall (Yuexiu Mountain Section)*[16]; Wei Lisha's *Study on the Protection and Utilization of the Ruins of Guangzhou Ming City Wall*[17], based on the ruins of Guangzhou City Wall, connects the heritage resources near the city wall and forms a heritage corridor of the city wall.

3）Guangzhou City Moat

As for the research on the city moat, Guan Feifan's master's thesis "*Research on the Six Veins of Guangzhou City*[2]"deeply explored the historical development and multiple functions of the six veins of Guangzhou City, providing guidance for the research on the city's veins system and the urban construction of Guangzhou today. Xu Zili's *The City Moat -- The Historical Evolution of the Water System Landscape in Guangzhou Old City*[18] analyzed the general trend and pattern of the evolution of Guangzhou water system. Jiang Fan-ying et al. summarized the historical landscape intention of the city in different periods in the *Exploration of the Historical landscape Evolution of the coastal city of Guangzhou YuDai Moat*[19].

As for the study of the interaction between the historical development of Guangzhou city and the city water system, Wu Qingzhou mentioned the flood control experience of the Pearl River Basin in ancient China in his *Study on Flood Control of Ancient Chinese Cities*[20]. Xu Min, *A Study on Guangzhou Urban Landscape in Song Dynasty*[21]; Liu Wenwen, *A Study on Water Environment and Urban Development in Guangzhou during Ming and Qing Dynasties*[22]. Liu Wei's doctoral thesis "*A Study on the Relationship between Water System and Urban Development of Ancient City of Guangzhou*"[23] studied the influence of the evolution of urban water system on urban development in Guangzhou from the Qin and Han Dynasties to the Ming and Qing Dynasties. He mentioned the various functions of Yudai moat as a city moat, and built the main framework of urban business zone based on Yudai moat.

For the study on the protection and utilization of the city water system, Meng Haoliang, *Study on the Historical Evolution and Landscape Ecological Reconstruction of the Four Rivers in the Main City of Guangzhou*[24]; Han Feng, *Research on the protection and utilization Strategy of the surrounding Area of Haochong Water System in Guangzhou Old City from the perspective of symbiosis*[25].

1.4.2 Research on city gate node space

As for the collection of historical data and image figures of the city gate, Swedish art historian Xi Renlong's *The City Wall and the City Gate of Beijing*[26] recorded the details of the

city gate in detail in the form of text and photos through field visits, and mapped the horizontal and vertical profile of the city gate in detail. Japanese scholar Ehan Nakano restored the scene of Beijing City in the early period of the Republic of China in his book " *The Chronicle of Beijing's prosperity*"[27], recording the digital details of the city wall gate in the way of "digital city wall". Chang Qing et al. made a recording analysis of city gates and a restoration study of city gates in "*Collage" City Wall Heritage: A Study on the Shape and Construction of Danzhou City Gates* "[28].

The research on the protection and space renewal and utilization of the city gate site is mainly about transforming the city Gate site into parks, green Spaces, squares and museums in the city, and integrating its original space into the contemporary urban outline. The corresponding documents are as follows: Sha Mingna et al. [29]put forward the methods of using the cultural elements of the City Wall Site Park, such as restoration, transformation, borrowing scenes, metaphor, etc. Wu Zeying's master thesis "*Research on the green Space System of Chengmen Square in Ming and Qing Dynasties in Beijing*"[30] analyzed and summarized the green space of Chengmen Guangzhou, continued the historical context and reproduced the urban style; Guo Qian et al., "*Museum-style Protection of Historical Sites"-- Research on the Restoration of the Ancient City Tower of Zhaoqing*[31], proposed to build a museum of the tower remains for the purpose of displaying the ruins of the ancient city gate; Wang Yue's master's thesis "*Research on the Design of Gate Square in Historic Areas of Cities - Taking Yongan Gate in Lishui as an example*" [32] sorted out the composition elements and evolution process of gate, summarized the forms of protection and utilization of contemporary gate, and proposed the design method of gate square in historic areas for Yongan Gate.

1.4.3 Research on the evolution of spatial form in Guangzhou

As for the study of the overall urban form evolution of Guangzhou, Zhou Xia's *Guangzhou Urban Form Evolution*[33] focuses on the evolution of urban material form and studies the overall urban spatial form structure of Guangzhou. *Modernity and Locality: The Modern Transformation of Lingnan City and Architecture*[34] by Peng Changxin summarizes the evolution process of urban and architectural modernization in Lingnan region. Zeng Xin's *Guangzhou City and Local History of Ming and Qing Dynasties*[35] studied the evolution process of the ancient city's natural environment, pattern, shape, roadway and meltback through the summary of ancient books and historical materials. Huang Huiming's *Study on the Morphological Evolution Characteristics and Mechanism of Guangzhou Old City since 1949*[36] built a systematic analysis framework of "morphological unit" based on the typo-morphology

theory to study the dynamic mechanism of urban morphological evolution.

For the study on the evolution of the form of a certain urban element, such as streets, public space, street houses, etc., Qiu Li's doctoral thesis "*A Study on the Evolution and Form of the Guangzhou Urban Street System in Ming and Qing Dynasties*"[37] analyzed the categories of Guangzhou urban streets in Ming and Qing Dynasties, and studied their formation and development as well as the mechanism affecting the evolution of streets. Dr. Zhou Xiang's thesis "*A Study on the Form and Evolution of Urban Public Space in Guangzhou 1759-1949*"[38] took the public space in the city as the research object and summarized its historical form characteristics and evolution law; Chen Jintang's thesis "*Characteristics and Evolution of Residential Areas in Guangzhou since the Early 20th Century from the Perspective of Morphological Types*"[39] mainly studied the evolution of building types and ground plane types of residential areas built in Guangzhou after the early 20th century by using the typo-morphology method. Tian Yinsheng et al. analyzed the evolution of six basic forms of Guangfu residential buildings from the perspective of dynamic process in their *Analysis on the Evolution and Influencing Factors of Guangfu Residential Buildings* [40]. Zhou Binghong's *Research on Modern Urban Street House Architecture in Guangzhou*[41] defined the building types of street house as the research object, and studied the basic morphological characteristics and evolution process of street house based on a large number of surveying and mapping drawings.

There are few monographs on the study of the morphological evolution of a specific neighborhood, mainly dissertations. Bai Gayyu, "*A Study on the Urban Morphology of Beijing Road Area, Guangzhou*"[42]; Zhang Jian's doctoral thesis "*A Study on the Morphology of traditional Urban Blocks in Guangzhou from the Perspective of Conzen School*"[43] studied the morphology of traditional urban blocks in Guangzhou under the guidance of Conzen School's Urban Morphology; Zhao Yiwoong, *Morphological Evolution of Gaodi Street in Nancheng, Guangzhou in the Late Qing Dynasty*[44]; Chen Jintang, Tian Yinsheng, "*The Morphological Evolution of New Village Construction in Guangzhou from the Perspective of Morphological Types*"[45]; Lu Meng, *Basic Research on Urban Form of Zhuangyuanfang District in Guangzhou*[46].

1.5 Research Methods and Framework

1.5.1 Research Methods

1）Literature collection method

Through consulting papers, books and historical maps related to the evolution of Guangzhou city's historical form, the development of city walls, city gates and city moats,

collecting various relevant urban design theories and urban design practice cases, digesting, sorting out, classifying and analyzing the data, this paper aims to understand the background, development status and characteristics of city walls and city moats. Then the city gate node space to carry out in-depth research work.

The main reference historical maps are: the late Qing Dynasty maps, the Republic of China historical maps, *the Map of Guangzhou plot*[47], which was mapped between 1926 and 1933, the Guangzhou Aerial Image Atlas in 1955, and the Guangzhou Historical Image Atlas in 1978.

2）Typo - morphology analysis

The core of Conzen's urban form school lies in the " plan unit", which mainly focuses on the composition logic of urban form and its evolution and generation process. The core of Muratori-Caniggia's school of architectural types lies in the "architectural type process", which focuses on the unchanging spatial morphological characteristics of architectural space. They are complementary to form typo-morphology to identify the spatial structure characteristics of urban form elements and the development and evolution of gate node space in selected sections of Guangzhou inner city wall area in different periods.

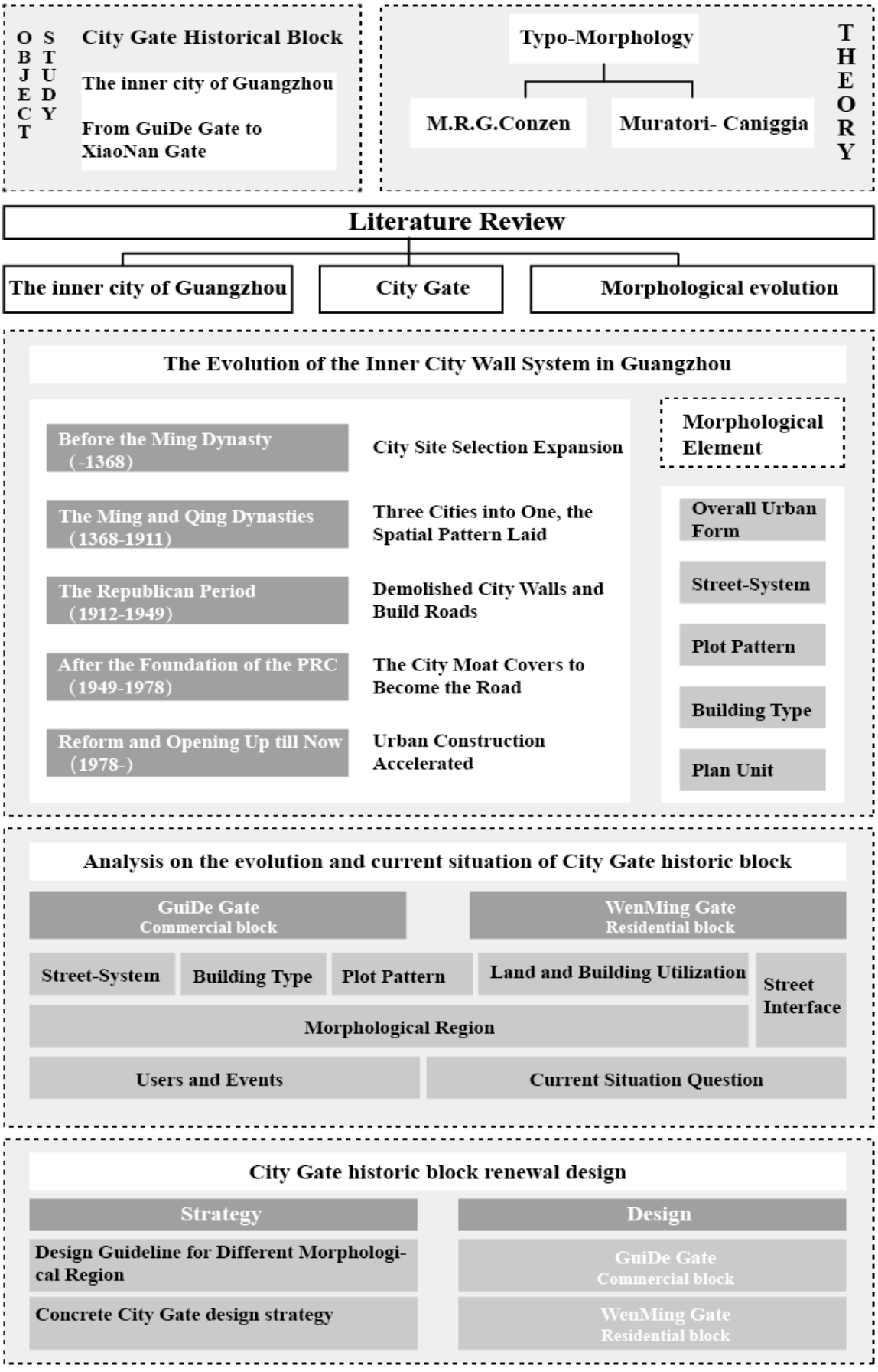
3）Graphic analysis

In the research process, the key urban Spaces were analyzed graphically, the data of the changes of Guangzhou's inner city wall area morphology in various historical periods were found, node maps were drawn, and the evolution and design generation process of urban morphology were clearly demonstrated in graphical language. Compared with the method of text expression, graphic analysis is more conducive to the study of architectural spatial form.

4）Field Survey Research Method

During the period of project practice, field research was conducted on the inner city wall area of Yuexiu District, Guangzhou (GuiDe Gate - XiaoNan Gate section), which focused on the original site of GuiDe Gate and WenMing gate, collected photos of the current situation of the site and other information, and focused on the layout, building facades and historical buildings within the design scope.

1.5.2 Research Framework



Chapter 2 Theoretical basis and practice

2.1 Typo-Morphological theory

The word morphology comes from the Greek words morphe (form) and logos (logic), representing the logic of form formation[48]. In the study of the city, the "logical" connotation and "representation" of the city together constitute the urban form. Urban form can be summarized into two levels: In a broad sense, urban form refers to the physical space environment and the internal laws of various history, culture and activities that constitute a city in a certain period of time under the influence of natural environment, politics, economy, society and other factors, including material form and non-material form; In a narrow sense, urban form refers to the concrete morphological characteristics of the city's material environment.

Type refers to the category formed according to the common attributes and characteristics of things. Typology is a very broad discipline, originally from the field of biology to describe the morphological structure of living things, in the 19th century was extended to a wider field. Rossi's Urban Architecture (1966) laid the theoretical foundation for contemporary typology, arguing that "type is associated with a certain form and way of life," related to collective memory, and is the formal constant that classifies and describes all buildings. He believes that the city is a building with a structure, which is presented by an organizing principle, and this eternal principle is type[49].

A lot of discussion revolves around two schools of urban morphology research that have been active in the western academic field in recent years: one is the urban morphology theory, which originated in Germany and developed in Britain in the discipline of urban historical geography -- M.R.G.Conzen school; The other is the Muratori-Caniggia school of Italian architecture, which combines typology with the study of urban form and focuses on architecture and urban texture.

In the 1950s, the Italian scholar Muratori and his assistant Caniggia established the Italian Type School by studying the development and evolution of medieval towns in Italy[50], The Italian type school emphasizes scale and hierarchy and constructs the whole research system. They target the built and urban environment, Its historical evolution and development put forward a series of important concepts, such as urban organism, typological process, urban tissue, synchronic variantions, etc[51]. Caniggia divided the buildings in the city into two types: Basic Type housing and Special Type public buildings.

Type is a combination of spontaneous and critical awareness of rich experience, representing adaptation and adjustment. Muratori believed that the study of types was not the

classification of a single thing, and different form types might have similar processes in their subsequent evolution. He proposed the concept of "typological process"[52], which emphasized the evolution of different historical periods, architectural types and urban forms along with urban development. In view of the two dimensions of time and space, Caniggia used comprehensive comparison method to compare the characteristics of different time periods or the characteristics of multiple regions in the same time period, and proposed synchronic variantions and Diachronic Variations.

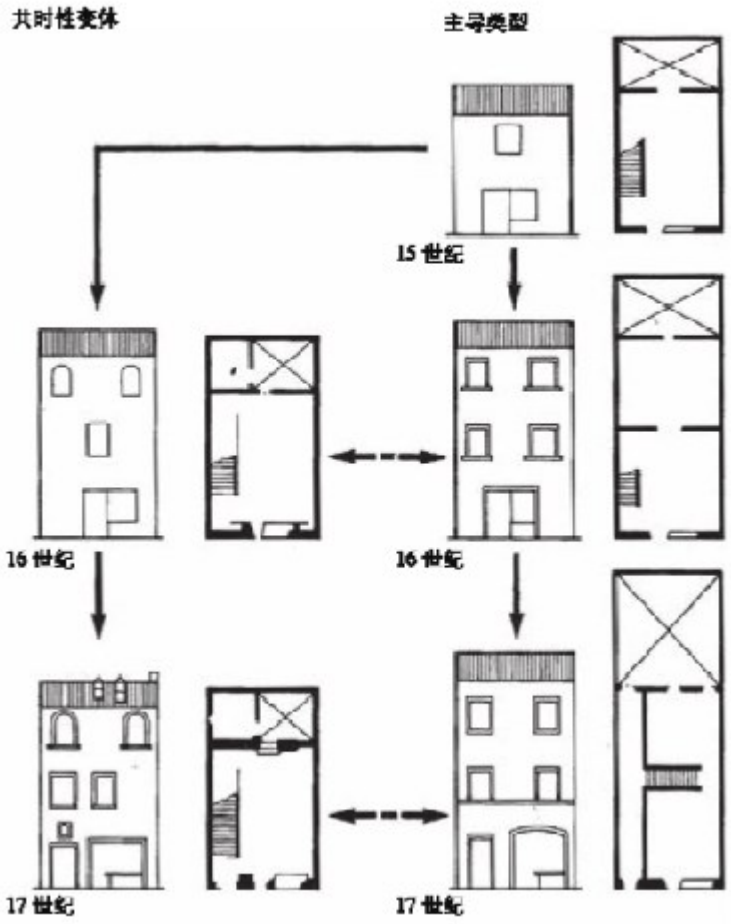


Figure 2-1 Diachronic Variations of Houses in Florence, Rome and Genoa

Source: Reference[53]

In the 1960s, influenced by German geography, Conzen studied three towns in northern Britain, selected "urban landscape" as the research object, analyzed a lot of historical map information, and proposed a plan unit and morphological region, in which the morphological region contains the following morphological elements: In terms of plan unit, building form and land and building utilization, researchers need to grasp the relationship and evolution rules among different form elements in the city. He also put forward many concepts about morphological phenomena: morphological frameworks, urban fringe zones, etc. It is very

important to put forward the mesomorphic region, which is considered to be the core concept of the Conzen School. Morphological region refers to a region with unified morphological characteristics, including plane, building, land use type, etc. Due to the influence of similar social factors, some areas form the same land use, street system and architectural form, etc., which can be divided into different form units and form different form areas.

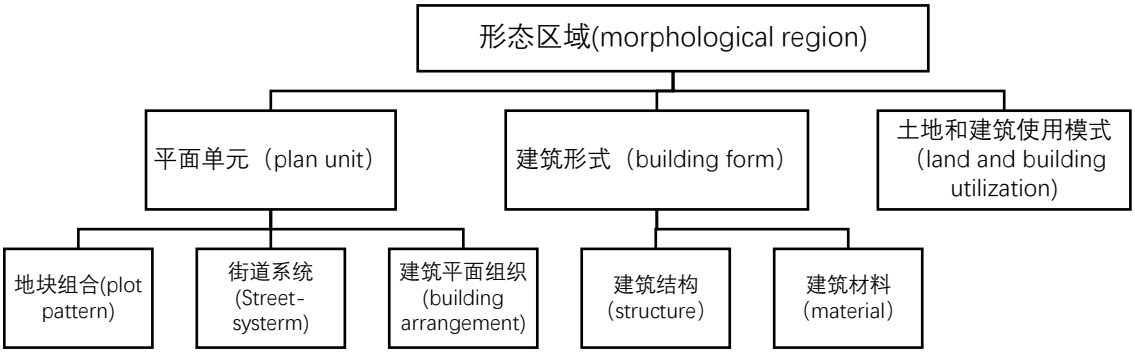


Figure 2-2 Morphological region components

Source: Drawn by the Author, Reference [54]

Figure 2-3 Morphological area map of Ludlow Town, UK

Source: Reference[53]

Table 2-1 The core theory of Conzen School and Muratori– Caniggia school

School name	Research Background	Theoretical basic	research elements	research methods	Research objectives
Conzen School	human geography	plan unit morphological region	①plan unit ②building form ③land and building utilization	Historical map research	Cognitive urban form
Muratori-Caniggia school	architecture	typological process urban tissue synchronic variantions Diachronic Variations	①street ②plot ③Building (basic type, special type)	Comprehensive comparative method	An operational design method

Source: Drawn by the Author

Due to the similarities and complementarity between the two schools in research methods, research elements and theoretical basis, the term "Typo-morphology"[55] was first proposed by Italian planning designer Calro Amonino in the 1960s. In 1980, the American scholar A. V. Moudon integrated Conzen's urban morphology school with Muratori-Caniggia's architectural typology school to deeply study the research framework system of typo-morphology. Since the 1990s, K.S. Kropf and I.Semuels have tried to apply morphological typology to urban planning and management practices in France. In Mennecy, France, Form-based Zoning is attempted to complete POS (Plan d 'occupation des Sols) division and unit management rules, which constitutes a practical application method of typo-morphology research[53]. (Figure 2-6)

In 1994, the International Urban Morphology Forum (ISUF), initiated by the three schools of English, Italian and French, organized its conferences and published Urban Morphology, which further promoted the development of the study of type - morphology and marked that the study of urban morphology entered a new stage of integration.

The theories of morphology and typology were introduced into China in the late 1980s, but the discussion of typo-morphology was not recognized by domestic scholars until the early 21st century. Fei Chen (2009), A New Research Framework: The Application of Urban Typo-morphology in China[56], proposed a research framework and analysis procedure suitable for Chinese cities based on western research theories. In recent decades, Gu Kai, Chen Fei, Tian Yinsheng[57] and other scholars began to explore the organic integration of urban morphology and architectural typology, and explore the way of localization application. At present, the

domestic research on typo-morphology mainly focuses on the theoretical explanation and the analysis of corresponding cases.

The analysis of urban forms and types uses the analytical and conceptual cognitive framework of urban morphology to understand the structure and characteristics of forms (physical properties), and examines the logical relationship between the formation and change of these forms (humanistic properties) with the view of evolution in typology[53]. typo-morphology combines the advantages of both urban morphology and typology. For scholars with different research elements, there are different classification methods from different angles. Mu Dong believes that the research elements mainly include basic form units of various spatial levels, including building layout, street system, plot combination, block and town. In combination with the overall form of traditional Chinese cities, Chen Fei classifies urban elements into seven major elements: general plan, skyline, street network, street, block, public space, public building and residence[56]. Chen Jintang summarized the research elements of the two men into two categories: the architectural part, mainly in the form of plane and elevation; The ground plan part includes the building volume, the plot, the combination form of the plot and the street[53].

Typo-morphology has periodicity and stages, and the analysis of each element requires a complete analysis of its periodic changes. From the beginning of formation, the time background, what kind of changes have taken place in the process to produce new forms or to be replaced by other forms. The research results of typo-morphology include historical analysis and understanding of the evolution process of morphological types, not only the evolution analysis of a particular morphological element but also the combination analysis of morphological units.

Typo-morphology can not only describe the current space more systematically, but also help us to understand the mechanism behind the dynamic evolution of the city. The analysis, induction and summary of type and form form a database under the urban design vocabulary, which helps us to better carry out urban design in the face of the renewal and construction of existing forms.

2.2 Theoretical framework

The establishment of typo-morphology is based on the mutual complement of the two schools, and the consensus that the city can be interpreted and analyzed through the study of the material form of the city. It synthesizes the work of the Conzen School and the Muratori-Caniggia school and argues that:

1) Type-form is composed of different material form elements. Urban spatial form (such as street layout, building density, open space, etc.) is the result of historical development process and the product of multiple forces. Material form elements can be divided into plots, streets, buildings, etc.;
2) The integrity and logic of the research system, emphasizing the research from different levels and scales of the city, such as regional level, street and block level, building and land level;
3) Urban form is a kind of dynamic structure, which develops with the evolution of building types, and also plays a role in limiting and guiding the development of building types;
4) The two core concepts of the Konzern School and the Muratori-Canigia school are respectively "morphological unit" and "architectural type process", emphasizing the study of type-form from the spatial and temporal dimensions.

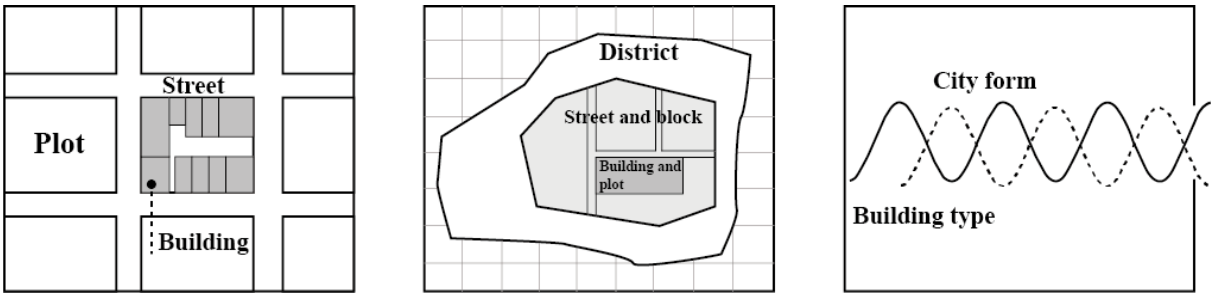


Figure 2-4 Type - Morphological consensus

Source: Drawn by the Author

2.2.1 Basic conception

In the framework of typo-morphology, building type and urban form are interdependent. Urban spatial form is not only affected by building types, but also restricts the evolution of building types. This two-way interaction is the core of typo-morphology research.

1) Building type: Building type refers to the specific spatial organization form and functional mode of buildings in a certain historical period and social background. Each type takes on different forms under different historical conditions, but the basic spatial patterns and functional relationships remain relatively stable.

2) Urban form: Urban form refers to the material form of urban space, including the arrangement of buildings, the combination of plots, the organization of street networks, the design of public Spaces, etc. It reflects the functional layout, social structure and economic activities of the city in a specific historical context.

3) The connection between type and form: Building types gradually accumulate specific urban forms through repeated occurrence in urban space, and urban forms affect the

development of building types by shaping the physical environment of buildings. For example, in traditional cities, the compact arrangement and inward layout of buildings formed the spatial form of narrow streets, while the wide streets and tall buildings of modern cities allow for more diverse building types and functional layouts.

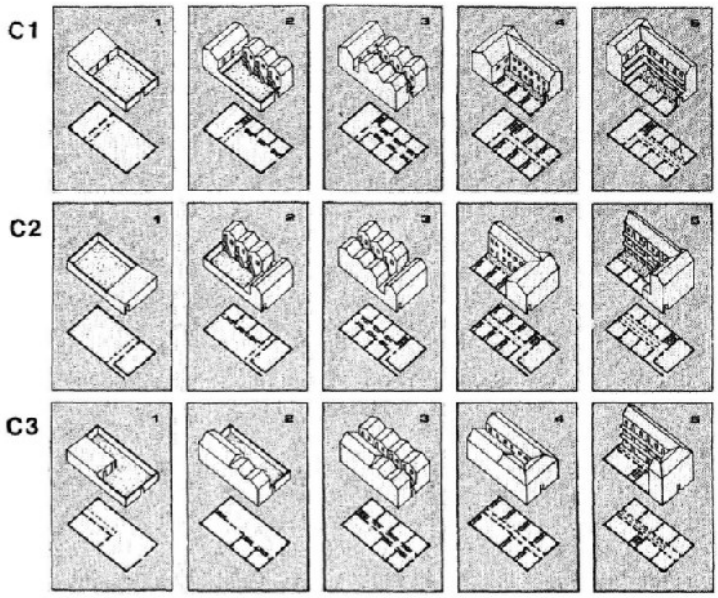


Figure 2-5 The relationship between the various courtyard housing types in the Isulea Process

Source: Reference [58]

2.2.2 The application of typo - morphology to urban research

1) Preservation and renewal of historic districts

In the reconstruction of historic blocks and old cities, typo-morphology pays attention to the morphological evolution process of architecture and urban space, which provides a theoretical basis for the protection of traditional urban spatial structure and architectural style. The old city of Guangzhou has a history of thousands of years, and its spatial form has experienced the ancient city pattern in the Ming and Qing dynasties, the arcade blocks under the influence of modern colonialism, and the modernization after the reform and opening up. typo-morphology can help analyze the formation and evolution of urban spatial form in these different historical stages. By studying the forms and types of streets, blocks and building layouts, we can reveal how the old city of Guangzhou responds to the changes of social, economic and cultural needs in different historical stages.

For example, in the renovation of old cities, it is possible to analyze traditional building types and block forms to determine which elements are stable and need to be retained and reused to maintain the historical continuity and cultural memory of the city. Specifically, it can be used in the design methods such as repairing the old as the old and micro-updating.

2) Planning of new urban areas

Typo-morphology can also be applied to the planning of new districts. Through the analysis of traditional building types and urban forms, we can design a spatial structure that is in harmony with the overall pattern of the city. For example, when planning new districts, referring to the characteristics of traditional building types and block layouts, learning from history can create urban Spaces that meet modern needs and have cultural continuity.

2.2.3 Design steps and instructions

The first step is to determine the scope and time span of the research, and divide the research area within the research scope. Select different research areas according to different levels. The time span should encompass the entire evolution cycle.

The second step is to select the morphological elements, analyze the evolution process of different types in the study area and extract and summarize. Whether the evolution of the type is continuous, and what changes are made to adapt to the current environment after undergoing mutations and micro-changes. The analysis of each form element from the beginning of the form to the process of change, continuation, replacement, disappearance should be the whole process of analysis. The form elements are not only material form elements, but also non-material form elements.

The third step is to summarize different morphological elements in the research area, divide morphological units and morphological regions on the basis of morphology and type, and propose design guidelines for protecting or updating such forms according to the analysis.

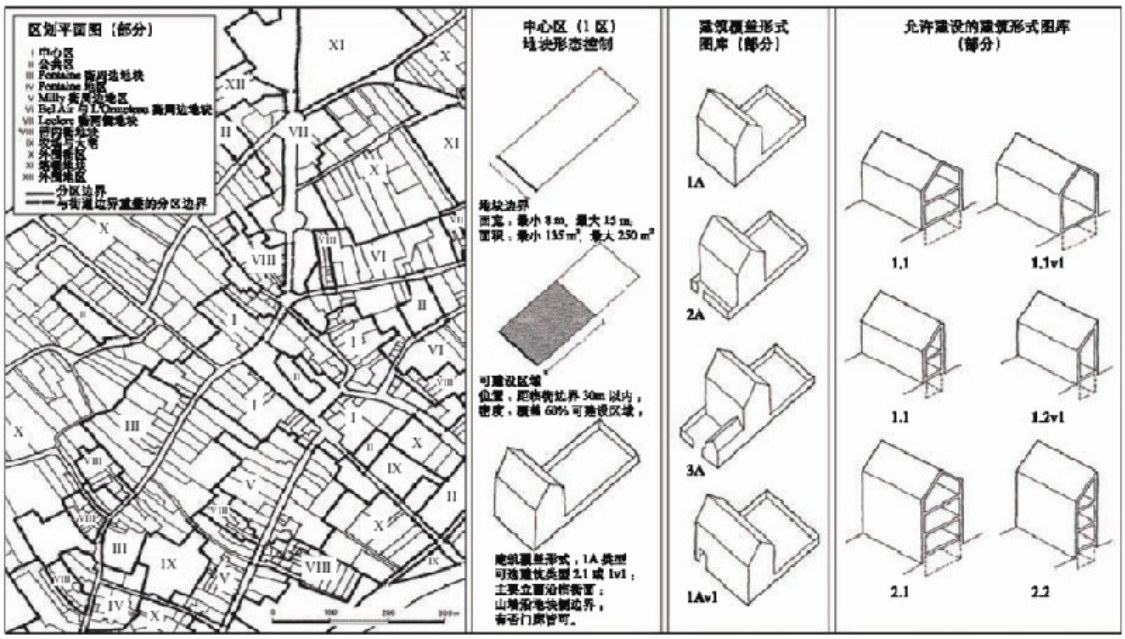


Figure 2-6 POS zoning in Menassy, France with some graphical control management details

Source: Reference [59]

The fourth step, according to the design guidelines, applies the type that has undergone the evolution of the type process in the new design. With the help of the continuity of urban form and architectural type, the new form can be more harmonious and unified with the old form. The new design not only has the modern function and form requirements, but also respects the historical context and enhances its cultural identity.

2.3 Morphological component

The inductive methods adopted by the form elements from different levels and different angles will also produce different results. The scale of urban research in this paper mainly focuses on the medium and micro blocks and node scales of the city wall and gate. Based on the above analysis, it can be divided into two levels, namely material form elements and non-material form elements, and the components of each level can be further subdivided into several categories. For example, the material form elements can be divided into plot layout, road network system, interface and skyline, and building entity according to the hierarchical system from large to small. Rather than material form elements about the history of the area, culture and residents' lifestyle, behavior and activities.

2.2.1 Material form element

Material form elements are tangible elements that can be intuitively perceived in urban form, and are material attributes of urban block form, such as ground layout, street and road system, building entity, land use, street interface, etc.

The ground plan layout includes the use function of land, public space, green space and other layout, which constitutes the internal rules and logic of the land form.

The street and road network system is an important part of the urban form, which defines the boundary of the land and connects all elements of the city into a whole as the skeleton of the city. The street involves the shape and scale of the land form and the fabric of the overall form. The street width to height ratio (D/H), that is, the ratio between the street width and the building height along the street, is an important index to weigh the spatial balance and enclosure of the street based on the approachable scale perception.

The interface and skyline represent the visual focus of the plot, which is jointly determined by the building, the street, the sky and the space between them, and can be divided into horizontal interfaces (bottom and top interfaces) and vertical interfaces (side interfaces, sections). The skyline shows the overall form of the city, and is the spatial form relationship between the external outline of the physical space building and the virtual space sky.

Building entity is the main factor of material form elements, is the smallest element of

form scale, mainly studies the building type and style, building texture, building layout and group organization form.

2.2.2 Non-material form elements

The non-material form elements mainly include the abstract non-material elements about the city's history, culture, residents' lifestyle, behavior activities, social relations, etc., which reflects the inner law of the urban form system.

The history and cultural background of urban blocks express the life activities and spatial forms of different historical periods, carry local traditional lifestyles and social relations, such as folk culture, regional culture, etc., and also express the humanistic spirit of different historical periods to a certain extent, reflecting the changing process of social features, which has important historical value and social significance.

Residents' rich behavior activities are the active components of the form elements, constituting the diversity of urban block forms, and the behavior activities in urban block form together with the population structure form a complex social relationship network, which overlaps with the physical space environment.

The direct or indirect social connection between people and the relationship between people and the specific built environment together constitute a stable neighborhood atmosphere, that is, the place spirit, through the symbols and metaphors of spatial forms to form a sense of identity, belonging, emotional experience and other consciousness.

2.4 Practice research

1) Suzhou Old Town

Dr. Chen Fei took the old city in the moat of Suzhou as the research object, and analyzed the three major elements of the plot, block and architectural texture of the ancient city of Suzhou with the help of typo-morphology analysis, aiming to propose the western concept of typo-morphology to the urban design of China. According to the evolution process of Suzhou's urban form, the research time range is divided into three stages: the first stage 960-1850s, the second stage 1850s-1948, and the third stage 1949- present.

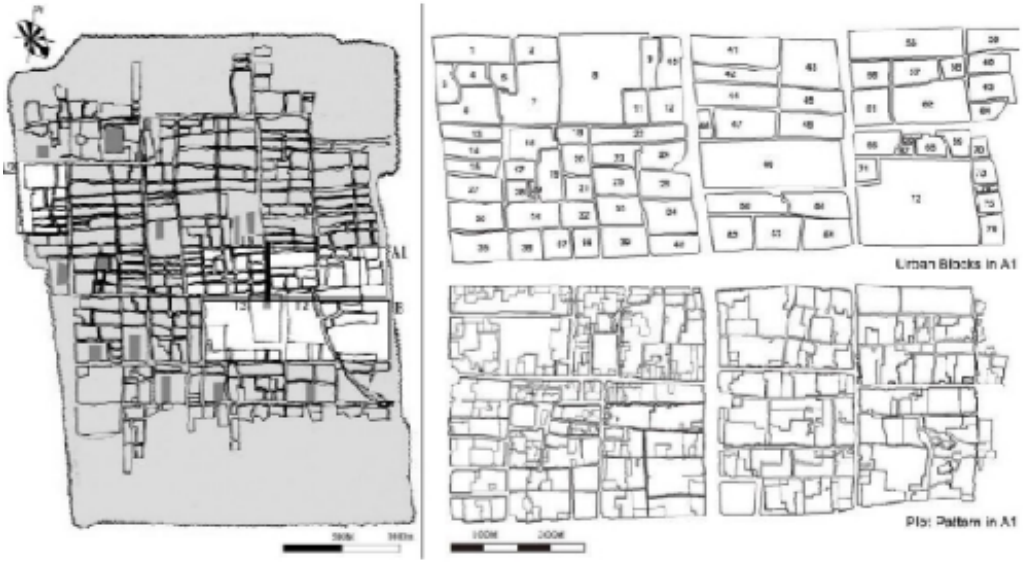


Figure 2-4 Analysis of Suzhou block and A1 Area Block in Eighteenth Century

Source: Reference[60]

At the block level, in the early stage of the first stage of urban development, urban blocks were influenced by the concept of zoning and the Lifang system. During this period, Suzhou had three types of city blocks: T1 was a special block, usually containing a large building complex; T2 is the block in Hou-Lifang, which is usually residential; T3 is a common block, usually a mixed-use block. The author studied the area, aspect ratio and functional format of different block types.

At the plot level, the factors such as the size, proportion, area and surrounding environment of each plot in the block are studied, and the close relationship between the construction inside the block and these factors is also studied and analyzed. Through the above research, the similarities and differences between the same street area and different street area plots are determined, so as to deeply understand the characteristics and laws of the plots.

Finally, the paper can clearly identify the type process through the similarities and changes of synchronic variants (Figure 2-5). The type process shows that a series of building types is a dynamic system that can maintain continuity over time. The type change of block type is very slow, while the change of land type is relatively fast in Suzhou.

The author proposes that Suzhou's urban blocks, plots and architectural forms do not fully reflect all the traditional characteristics of the city, which are also reflected in other urban elements. Therefore, the study of typo-morphology should further carry out detailed studies on street systems, streets, urban public Spaces, public buildings and private houses to obtain design references for all traditional Chinese types.

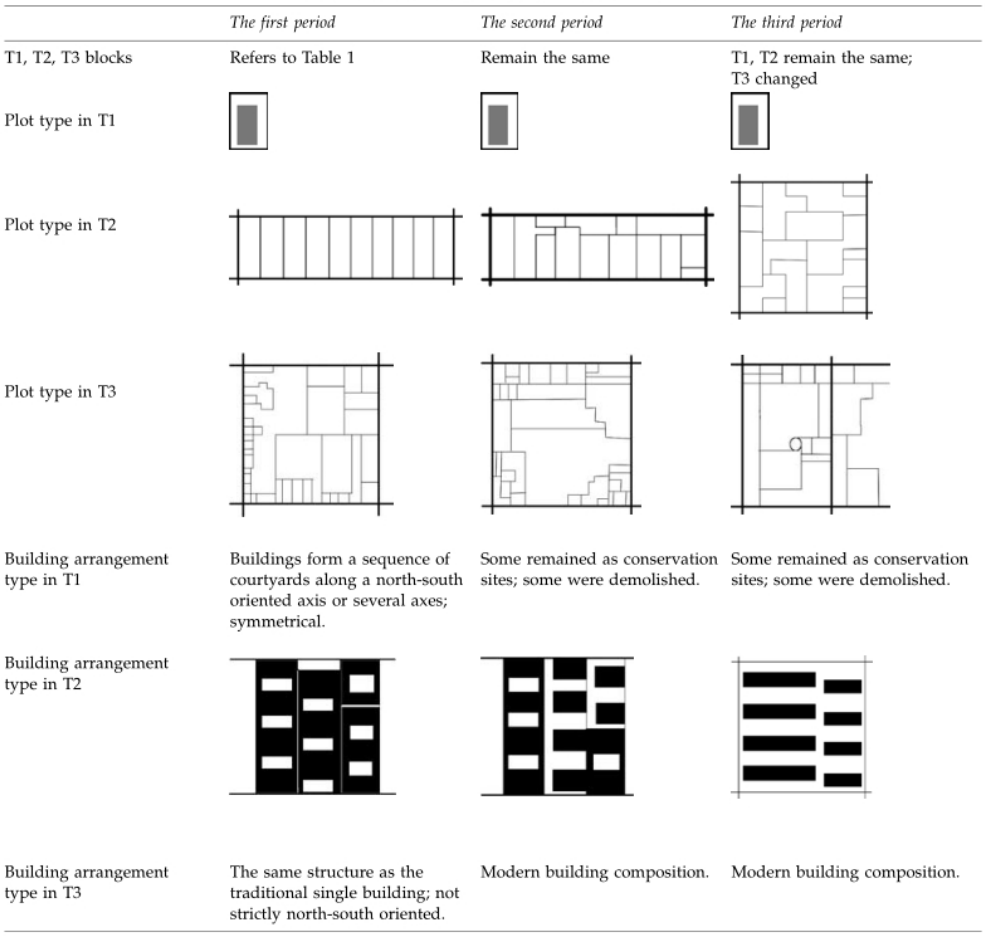


Figure 2-5 Type Process of Building Blocks, Texture and Blocks

Source: Reference[60]

2.5 Summary

This chapter analyzes the research elements, research methods and purposes of the two main theoretical schools of constitutive typo-morphology, namely the Conzen School of urban morphology and the Muratori-Caniggia School of architectural typology, and compares the similarities and differences between them. The second part puts forward the theoretical framework of typo-morphology, including the analysis of Conzen school and Muratori-Caniggia school, the analysis of the basic concept of typo-morphology, the application of typo-morphology in urban research and the guidance of urban design.

Based on the above analysis, the third part summarizes the form elements into material form elements and non-material form elements, the former including the plot layout, street and road network system, interface and skyline, building entity, etc. The latter mainly refers to the abstract elements of the block's history, culture and residents' lifestyle, behavior activities and social relations. The fourth part analyzes the application of typo-morphology in the study of Suzhou Ancient City.

Chapter 3 Morphological evolution of the inner city wall area of Guangzhou (GuiDe Gate - XiaoNan Gate section)

3.1 Overview of the inner city wall area

In this paper, the research scope of Guangzhou inner city wall area is based on the base of the original city wall in the southeast section of Guangzhou Inner city (GuiDe Gate to XiaoNan Gate), including the historical districts south and north of the city wall (Figure 3-1). This area was roughly formed in the Song Dynasty, to the Ming and Qing dynasties gradually finalized, there are four gates of GuiDe Gate, DaNan Gate, WenMing Gate, XiaoNan gate and adjacent moat YuDai Moat.

Nowadays, the inner city wall area of Guangzhou has lost the limitation of the city wall, and it is difficult to recognize its traditional historical spatial pattern. In this chapter, the evolution of the historical spatial form in the inner city wall area is sorted out according to the time period of the development of the form,

Figure 3-1 Location of the inner city wall area of Guangzhou (GuiDe Gate - XiaoNan Gate section)

Source: The base map is from *the Annals of Guangzhou Prefecture*

3.2 Before Ming Dynasties morphological evolution of inner city wall area in Guangzhou

3.2.1 City siting, expansion and development

Guangzhou is located in the hinterland of the Pearl River Delta, bordering the South China Sea and separated by five mountains. The establishment of Guangzhou Ancient City in Qin and Han dynasties experienced three stages: Renxiao City, Panyu City and Bustallion City. In 214 BC (33 Qin), Qin Shi Huang set up Nanhai County in the south of the Lingnan, Guangzhou (Panyu) as the county administration, Ren Xiao as a county lieutenant, in the Spring and Autumn Period on the basis of Nanwu City to expand the defensive city, known as "Renxiao City". After Zhao Tuo took over the command of Nanhai, he expanded the city for the second time, and the city was ten li, which was called "Yue City". "There are two hills in Panyu County, and they are also called" Panyu City "[61], citing the Annals of South Yue in Chuxueji." In 111 BC, the Yuecheng was burned down, and in The Three Kingdoms period, the Jiaozhou governor Bustallion moved the capital back to the former site of Panyu, called Bustallion City. The city of Bustalt was the first documented wall built in the 400 years since Renxiao's founding[62]. In 226 AD, Sun Quan divided the northern part of Hepu into Guangzhou, and the name Guangzhou came from there[33]。

Figure 3-2 The outline of Guangzhou city in Tang, Southern Han Dynasty

Source: Reference[30]

The city of Guangzhou did not expand from Jin to Tang, but because Guangzhou is

located at the confluence of the river and the sea, it benefited from the advantages of the geographical environment of mountains and rivers, and many foreign trade exchanges, the city became increasingly prosperous and populous. Domestic and foreign goods are gathered here, and Guangzhou formed a water-based mode of transportation at this time, opening up a spatial form of "inner and outer port" for shaping a haven for ships.

In the Tang Dynasty, the construction scope of Guangzhou City wall was very small (Figure 3-2). The wall only protected the government institutions, but the development of the city broke through the limitation of the wall and formed a bustling commercial district. The main roads in the city are Beijing Road and Zhongshan Road [61]。

After the five dynasties and ten kingdoms, Liu Yin, the governor of Guangzhou, gradually unified the Lingnan, and his brother Liu Yan proclaimed himself emperor in Panyu. In the Southern Han period, Guangzhou was used as the capital to imitate the construction of Chang 'an City, and the two mountains of Panyu were cut off as the palace palace. The two mountains were no longer the barrier of urban development, but became part of the city. The expansion of the capital, along with the southward movement of the bank of the Pearl River, and the expansion of the South City in order to protect the South commercial trade zone, formed the urban pattern of "northern government and southern commerce". Although the Southern Han Dynasty only had a political power of more than 50 years, the urban construction during this period laid the foundation for the simultaneous establishment of the three cities in the Song Dynasty.

Since most of the urban area of Guangzhou was originally a shallow sea, and gradually became land after a long time, such a layer of "soil mixed snails" was difficult to build a solid and durable city wall under the conditions at that time[33]. During the Northern Song Dynasty, a lot of repairs were made to the city wall. Since the east and west sides of the palace city gathered a large number of commerce, vassal houses and residential areas, the eastern and western outer cities were built on the basis of the Southern Han capital city, forming a pattern of three cities (Figure3-3). There are West Lake between the sub-city and the West City, and Wenxi between the sub-city and the East city. The three cities have a total of 17 city gates (including 5 in the sub-city, 9 in the West city and 3 in the East City), of which there are a total of five city gates on the original site of the research scope of this paper. The development of the city continued to expand to the west and the Pearl River in the south. The land on the Pearl River bank was silted, the river bank continued to move southward, and the commercial trade along the river was frequent, bringing a large number of people. In addition to inner city, eastern

city and western city, YanChi City was built in the south of the original city wall in the Song Dynasty, with the Pearl River as its natural border to the south.

Figure 3-3 The outline of Guangzhou city in Song Dynasty

Source: Reference[30]

In 1011 AD, Shao Ye of the Northern Song Dynasty was an official in Guangzhou, dredged the river, rebuilt the port, and dug six channels. At that time, the inner city moat system was not perfect, ships from the Pearl River into Guangzhou city suffered from typhoon attack, Shao Ye dug the southern city moat, later called the YuDai Moat (Song Dynasty YuDai Moat was not named, only in the Ming Dynasty, because of its winding like the YuDai Moat so named YuDai Moat) to sail on the right boat, the city moat 20 zhangs wide, 3 zhangs deep, forming a harbor for Guangzhou ships, and dug six veins connecting the city moat, It is convenient for water irrigation and ship traffic, forming a four-level water system network of Guangzhou Street Canal →six channel canal→city moat→Sea (river). "Yangcheng ancient banknotes · Capital city Map" records: "There are six ancient canals, running through the inner city, can be through the river, so that the canal through the city, the city can be no flood, the real city water conservancy.[3]。”

The Song Dynasty actively developed maritime transportation. Guangzhou was the largest trading port on the north coast of the South China Sea and an important birthplace of the

Maritime Silk Road. Foreign trade was extremely developed, and merchant ships from home and abroad gathered to sell their goods to overseas countries and regions. The moat city outside Guangzhou city moat, as the main waterway for material collection and delivery, connected the city with the six veins canals, forming a commercial transportation network. In Song Dynasty, materials were transported to all parts of the city along the city moat, relying on the six veins canals. The construction of the six veins canals combined the commercial markets with the waterways, and carried out urban trade activities with the waterways as the framework, forming an urban spatial form with Guangzhou characteristics. As a moat with wide water in the south of the city, YuDai Moat has also become a bustling commercial area in Guangzhou. Located on the west side of the city, "ten miles of Zhu Lou, merchants gather" Haopan Street was formed in the Song Dynasty. After the Song Dynasty, commercial activities gathered by docks became the dominant force in the evolution of social space in Guangzhou[63].

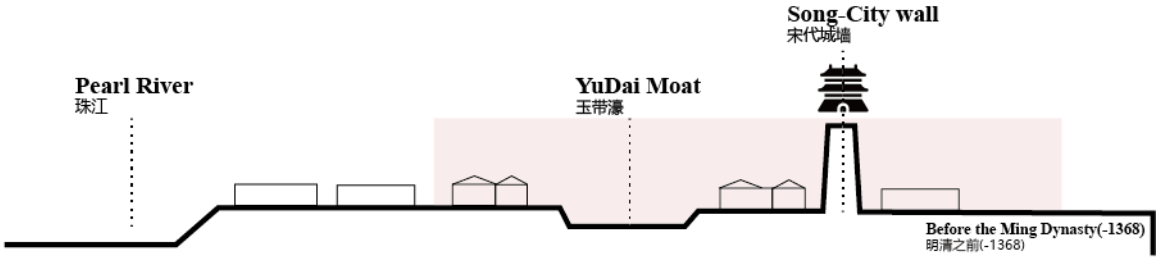


Figure 3-4 Section diagram of Guangzhou inner city wall area before Ming Dynasties

Source: Drawn by the Author

3.2.2 Long street style road along the city moat

Commercial markets based on waterways formed in successive dynasties until the Song Dynasty constituted the urban spatial form of Guangzhou at that time. Shipping commerce was one of the most important means of material circulation in Guangzhou in the Song Dynasty. Goods and commodities from all over the world first entered the relatively wide bay docking area, and then were transported to the city by small boats along their respective rivers. People's activities are carried out here, and it is easy to form shops on both sides of the river in areas with wide water surface and conditions. In order to facilitate the development of commercial activities, a continuous road in the form of long streets parallel to the waterway was formed, such as the east-west long streets parallel to the city: Gaodi Street and Haopan Street, which developed into the commercial center at that time. The north-south streets connected with it had no fixed logic to follow, and meandered arbitrarily to form street blocks of different sizes. Some north-south branches were not bidirectional connected with the east-west Long Street for the convenience of feudal management. (Figure 3-5)

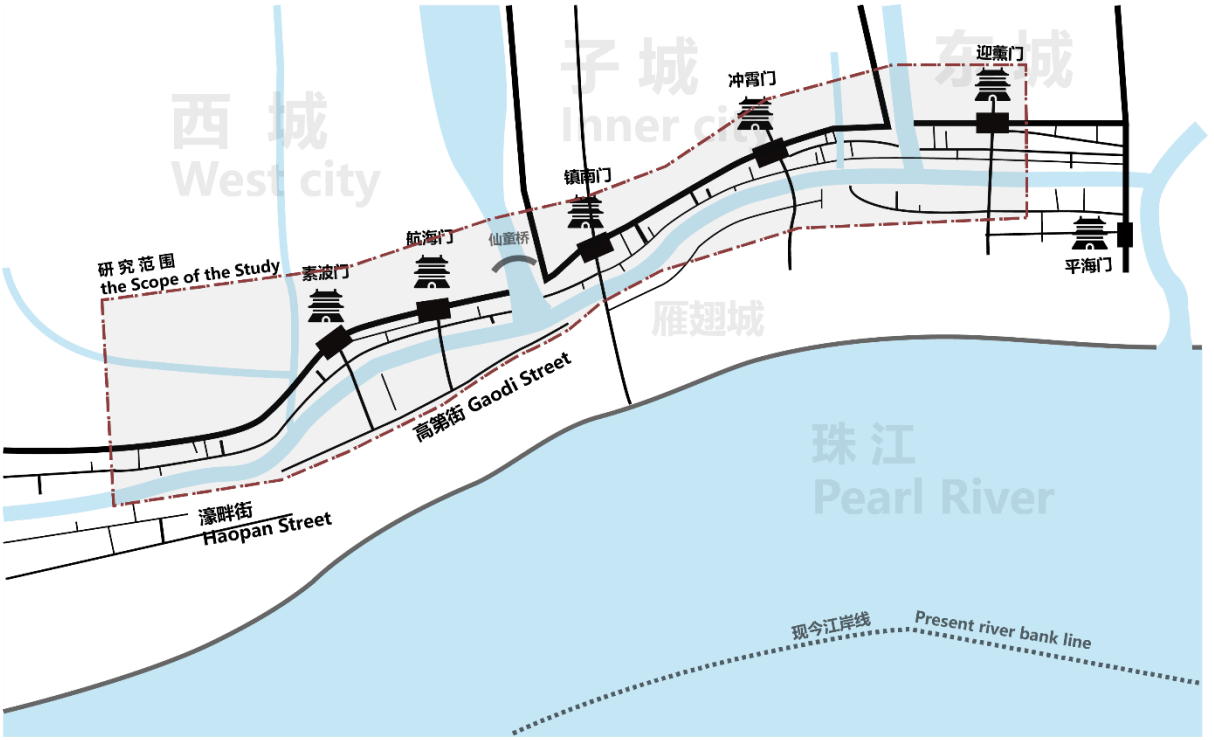


Figure 3-5 Guangzhou inner city wall area long street type street before Ming Dynasties

Source: Drawn by the Author

3.2 Ground plan and land utilization

In the Tang Dynasty, Guangzhou adopted the "Lifang system" in urban planning and organization. The city is divided into a number of districts, each of which has a number of districts, and walls are built around the districts, on which doors are opened to facilitate entry and exit. Due to the barrier of the square wall, the main roads in the city are not connected with the roads in the square, and the square where residents live and the city where commodities are traded are separated from each other. This method of subdivision of land forms a regular layout, which is convenient for rulers to manage. Nowadays, some plots in the inner city have retained the place names of "Li", such as Dingan Li and Yingen li.

In the Song Dynasty, the Lifang system was abolished to form an open street system, and the walls inside the city were gradually dismantled, and the urban form was no longer restricted by Lifang. Residential areas and commercial areas in Guangzhou are no longer distinguished, and a series of open commercial blocks have formed inside and outside the city. The main streets, secondary streets and branch roads were connected, allowing Tibetan merchants to set up shop and trade freely. In the Song Dynasty, commerce was operated according to the "Hang", and most of the shops on one street were dealing with the same kind of goods, so some place names were named after the goods sold, such as Rice Street, Cashmere Street, agate Lane, Ivory Street, embroidery Clothing square, etc.

In the Tang Dynasty, foreigners often came to Guangzhou to engage in trade, and the personnel flow was frequent, the road was far and the channel was not easy, and some vassal merchants chose to live and buy property, thus forming a community of Bo merchants gathered called "vassal Fang". In Tang Dynasty, Fanfang was located in the Poshan area on the western outskirts of Guangzhou City, which was incorporated into the West City during the construction of the three cities in Song Dynasty. Zeng Zhaoxuan described in Guangzhou Historical Geography that the location of Fanfang was south of Zhongshan Road, east of Renmin Road, north of Dade Road and west of Jiefang Road, with Guangta Street and its vicinity as the center[10]. When the merchant ships returned home, the official would give a farewell dinner in the "Haishan Tower". Haishan Tower is a famous building in the Song Dynasty, which should be located at the intersection of South Beijing Road and Dongheng Street. Under Haishan Tower is the city Pavilion, where ships can berth and rest. Haishan Tower can also be used as a high overlook, the Song Dynasty review of the water army is in the Haishan Tower, is a landmark building between land and water.

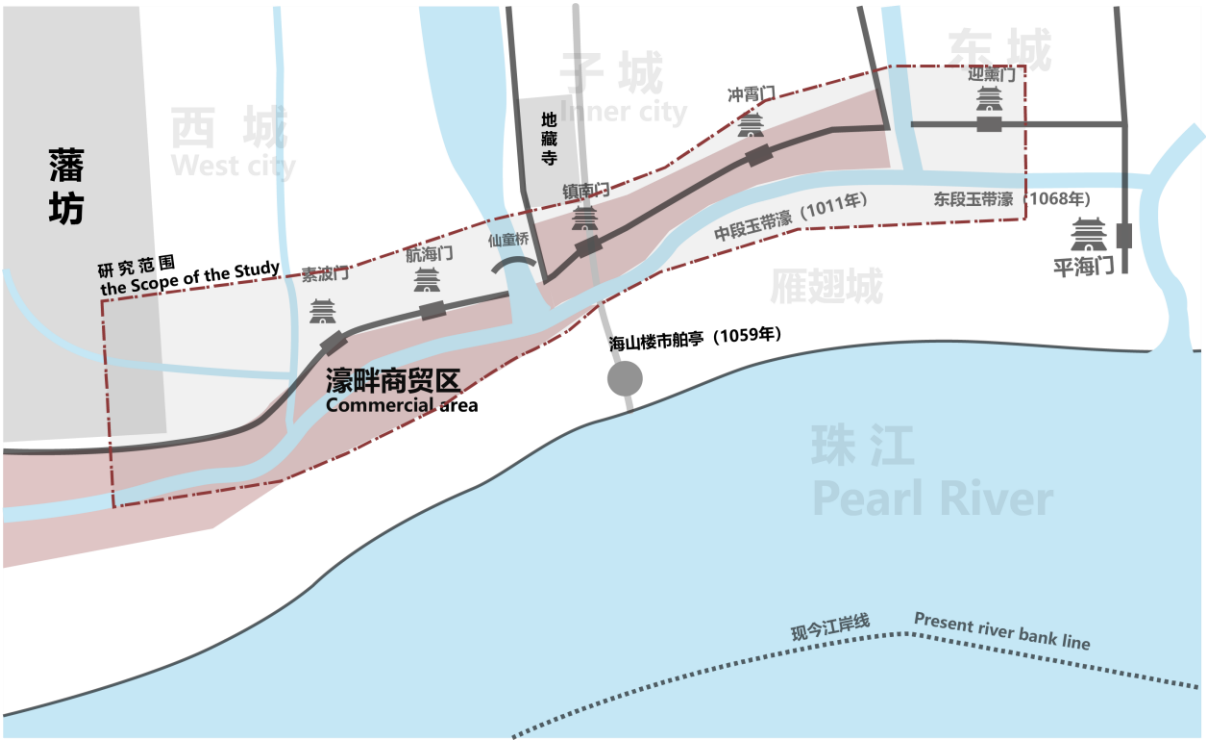


Figure 3-6 land utilization in Guangzhou before Ming Dynasties

Source: Drawn by the Author

3.3 In Ming and Qing Dynasties morphological evolution of inner city wall area（1368-1911）

3.3.1 The foundation of the urban pattern

In Ming and Qing Dynasties, the development and change of Guangzhou city accelerated.

In the Ming Dynasty, due to the development of the city, the original pattern of three separate cities was no longer able to meet the needs of commerce and economy. During this period, Guangzhou underwent three large-scale transformations, including the integration of three cities, the expansion of the northern suburbs and the construction of the southern city[10] (Figure. 3-7). In the thirteenth year of Hongwu in the Ming Dynasty (1380), Zhu Liangzu, the Marquis of Yongjia, went out to Guangdong, took the old city as a low pass, and asked the three cities as one[6], removed the city walls separating the sub-city and the two eastern and western cities, extended the city boundary to the former moat at west moat and east moat, and buried part of the water system blocking the passage in the city, solving the problem of inconvenient traffic and restricted development of the city.

The integration of three cities also laid a rough foundation for the urban spatial pattern of Guangzhou in the Ming and Qing dynasties.

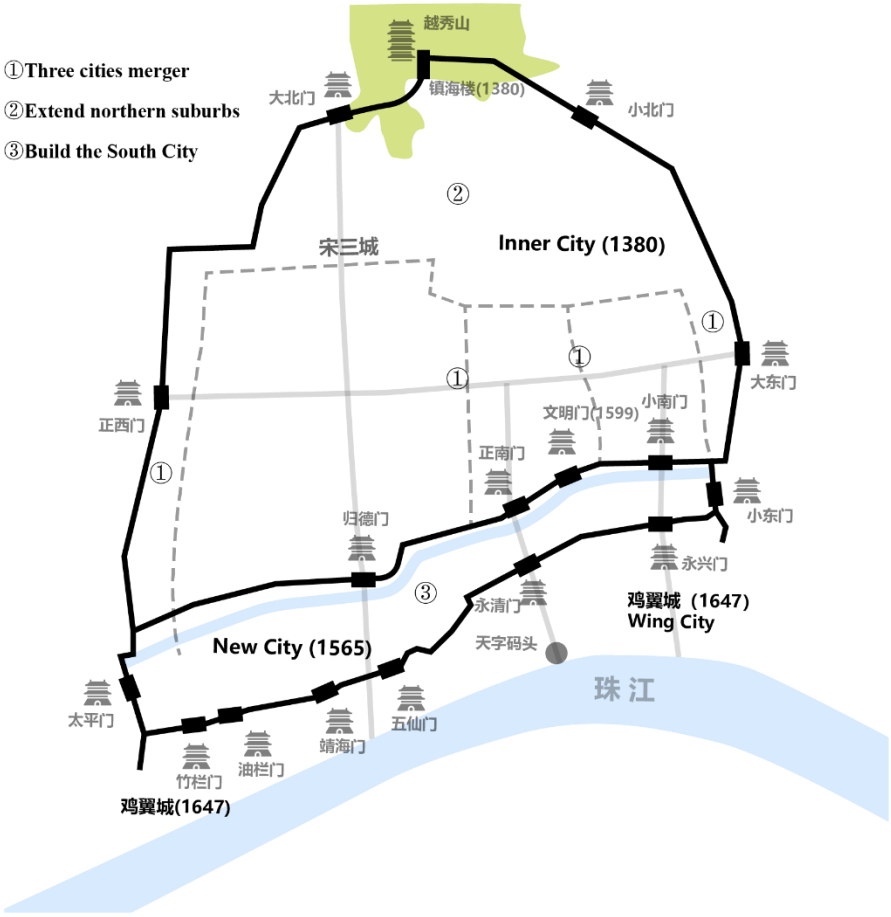


Figure 3-7 The outline expansion of Guangzhou city in Ming and Qing dynasties

Source: Drawn by the Author

The southern city wall of the inner city was built on the basis of the city wall of the Song Dynasty. Due to its proximity to the YuDai Moat, the city wall shape curves naturally according to the waterfront, not straight.

According to the Ming Dynasty Huang Zuo "*Guangdong Tongzhi · Geomatics*" : Guangzhou city "circumference of 3796 zhangs, Shang 2.8, Guang2, Guang3.5 zhangs. There are 7 gates, 7 towers and 7 enemy towers, and 97 police shops[64]." The inner city is described here, with seven gates, namely, DaBei Gate, XiaoBei Gate, ZhengXi Gate, DaDong Gate, GuiDe Gate, ZhengNan Gate (DaNan Gate), and DingHai Gate (XiaoNan Gate). In the second year of Chenghua (1466), the ZhengNan Gate and GuiDe Gate Moon City were built, each extending 38 zhang, "the upper floors were built, the lower three doors were opened, and the barriers were completely solid." In the thirteenth year of Jiajing (1534), the DingHai Gate Moon City was added. In the 27th year of Wanli (1599), a gate was opened between the DaNan Gate and the XiaoNan Gate to the east of the south wall of the inner city, which was called the WenMing Gate, and since then there have been 8 gates on all sides of the inner city of Guangzhou[5].

In the middle and late Ming Dynasty, the border of the Pearl River continued to move south, and the Yanwing City area along the river in the original Song Dynasty had become a bustling commercial area. In order to protect the commercial and resident activities outside the city, the city wall was built on its original foundation in the 44th year of Ming Jiajing (1565), and this area was also called "New City" or "South City".

The city wall between the southern city and the inner city was not demolished, but retained as the boundary between the inner city and the outer city, the southern city had 8 gates, plus the 8 gates of the inner city, the Ming Dynasty Guangzhou City had a total of 16 gates. Due to the commercial development of the South City, relying on the water transport of the YuDai Moat and a number of city gates, it has become a medium of communication between the inner city and the outside world, facilitating the passage and trade with the outside world.

In the early Ming Dynasty, the city had developed to the foot of Yuexiu Mountain. From the eleventh year to the thirteenth year of Hongwu (1378-1380), the northern city wall was built at the southern foot of Yuexiu Mountain, and the five-story Zhenhai Tower became the commanding height of Guangzhou City. In the thirteenth year of Chongzhen (1640), the north wall was built on Yuexiu Mountain, thus incorporating Yuexiu Mountain into the city limits, and becoming one of the only Ming Dynasty wall relics left in Guangzhou today.

Table 3-1 Guangzhou Ming Dynasty city wall remains

Name	Location	Function	Photo
the north city wall	Yuexiu Mountain	In the city park, it becomes a leisure and entertainment place for citizens, with a length of 1137 meters	
Barbican of West city gate	Zhongshan road seven road bottom	Small landscape parks will be built around the city wall	
The stone forehead of GuiDe Gate	Guangzhou Museum stele Corridor	The city gate stone forehead engraved with the word "Gui De" is the only Ming Dynasty city gate stone forehead in Guangzhou	

Source: Drawn by the Author

In the Ming Dynasty, Guangzhou formed a spatial pattern of "six veins all open to the sea and green mountains half enter the city". The river in the Ming Dynasty uses the name of "six veins canal" in the Song Dynasty, but according to the literature, the location is different from that in the Song Dynasty (some positions are similar), and only three veins are connected with the YuDai Moat[2]. YuDai Moat connects the east and west two city moats, to the Ming position changes little, the new city will include the YuDai Moat area after the Song Dynasty outer city city with the development of the city has become a part of the city. Between the two walls of the inner city and the new South City, the YuDai Moat crosses east and west, the sea ships do not enter, and several Bridges are set up on the sky, there are many ships, lively, businessmen and gentry compete to build houses in the YuDai Moat bank, the Ming Dynasty poet Sun Diji's "Guangzhou Song" records: Guangzhou is rich and prosperous, and the atmosphere is as long as spring..... Youth pleasure everywhere is good, the south of the city is more prosperous..... There is also a saying that "there is much food and dance, which is several times more than Qin Huai[4].

The city wall of Guangzhou in the Qing Dynasty was about 9700 meters long, 6 meters wide and 7.6 meters high, following the layout of the Ming Dynasty city as a whole, and made

great economic development in terms of foreign trade. At that time, commercial activities along the Pearl River were also very prosperous. In order to protect the commerce along the river, the original east and west city walls of the Ming Dynasty were extended to the south by more than 20 meters during the Shunzhi period of the Qing Dynasty, and Jiyi City, the third major city in Guangzhou, was built close to the Pearl River. This was the last large-scale city construction in the feudal period of Guangzhou. In the Qing Dynasty, due to the dense population and land tension around the YuDai Moat, the residents of the YuDai Moat often fought over land with the water, which led to the gradual erosion of the YuDai Moat. Guo wrote in "Guangdong General Chronicle" that "according to the broad ten Zhangs of the city of moat, most of them were invaded by the people of the city of moat today. It began with wooden fences, followed by stone. Over time, the pool gets narrower. Not half as much as at the beginning."[10]. Song dug twenty Zhang City moat, to the Ming Dynasty bridge can be used to cross, Qing Dynasty although silt but still can pass the boat.

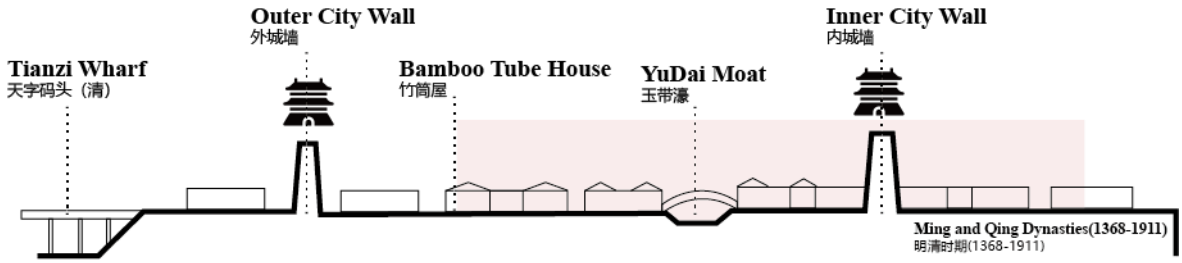


Figure 3-8 Section diagram of Guangzhou inner city wall area in Ming and Qing dynasties

Source: Drawn by the Author

3.3.2 Straight north-south street through the city gate

In the early Ming Dynasty, Guangzhou carried out large-scale renovation and expansion of the outline layout of the city, but the streets and roads were not renovated, resulting in "poor streets, brick and stone rows, and every wind and rain is a damp, difficult to walk[65]." In the sixth year of Orthodoxies (1441), local officials in Guangdong called on officials and volunteers to donate money to build roads, and the group responded by building flat and orderly roads stretching from two zhangs to five feet, extending about ten miles, making cities more attractive, provinces more successful, and residents more beautiful[66].

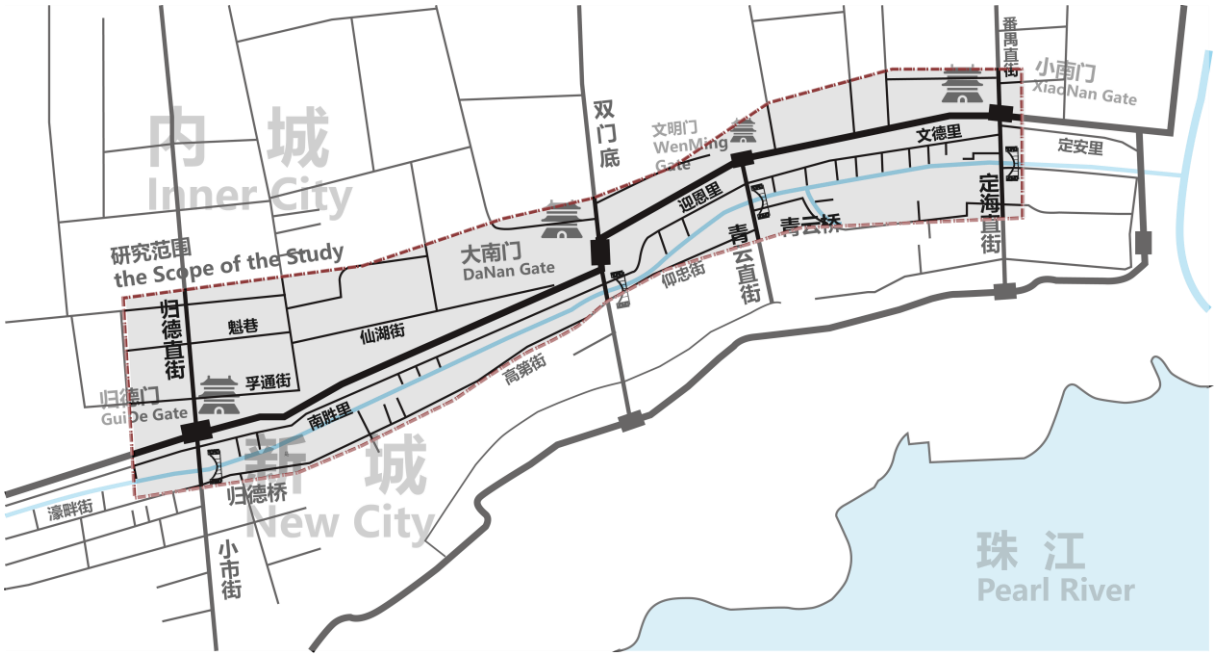


Figure 3-9 Guangzhou inner city wall area street network in Ming and Qing dynasties

Source: Drawn by the Author（Base map of Guangzhou, 1860）

The water transportation in Song Dynasty developed to the integration of three cities in Ming and Qing Dynasties, and the status of land transportation rose. From the prosperous commercial waterway of the Song Dynasty to the Ming and Qing Dynasties, the Liumai Canal gradually silted up, partly became an urban drainage canal, and partly was diverted to landfill. The commercial center of the city was transferred to the YuDai Moat, and the width of the YuDai Moat was not wider than that of the Song Dynasty, which gradually changed from "crossing the water painting" to "flying bridge across the water", and more Bridges were built across the YuDai Moat to connect. There are more east-west long streets along the main roads on both sides of the city, while north-south straight streets connect with the city gate. The streets close to the city wall area showed a zigzag and high-density morphological structure due to the disorderly development of civil houses in the early period[34].

Since the city gates determine the traffic inside and outside the city, the number and arrangement of the city gates largely determine the city's street network and canal system[67]. In Ming and Qing Dynasties, there were 4 city gates on the south side of the inner city of Guangzhou, all of which connected the inner city with the south city through roads except the WenMing Gate, and there were straight streets orthogonal to the city gate outside the city gate, among which the north-south straight streets had Xiaoshi Street outside the GuiDe Gate, the double gate inside the south Gate, the Qingyun Straight Street outside the WenMing Gate, the Panyu Straight Street inside the XiaoNan Gate and the DingHai Straight Street outside. The

intersection with the YuDai Moat is connected by Bridges (figure), and the east-west Long Street and the north-south Straight Street serve as the main road network system of the eastern section of the inner city wall area of Guangzhou in Ming and Qing Dynasties.

In addition to the parallel long streets near YuDai Moat, there are several north-south short streets perpendicular to YuDai Moat, connecting waterway transportation and commercial streets, these streets are relatively narrow, the width does not change much, mainly to facilitate the circulation of people and goods. Near the city wall there is a road on the outside that runs along the direction of the city wall, while on the inside there are north-south streets leading straight to the city wall. In the inner city, there are many T-intersection roads and the density of alleys is not high.

a) Photo of Shuangmendi street in 1870

b) Photo of the DaNan Gate from the Gongbei Tower

c) Photo of the inner city taken from the GuiDe Gate

Figure 3-10 City streets in Ming and Qing Dynasties

Source: a)、c）Old news of Guangzhou（mp.weixin.qq.com/）；b）Reference[68]

It was difficult to form a large public space in ancient cities, and streets, as the main body of ancient urban living space, carried a large number of residents' daily activities and festivals. The buildings outside the city walls of Guangzhou are almost built next to the city walls. Photos taken from GuiDe Gate to the north (Figure3-10 c)show that the building gables run parallel to the city wall, and the top interface of the street (which is today Jiefang Middle Road) is not open, but the roof of the two buildings is built on the roof to block Guangdong's overly hot and rainy climate, and the space under the shed is convenient for people to move through.

3.3.3 Ground plan and land utilization

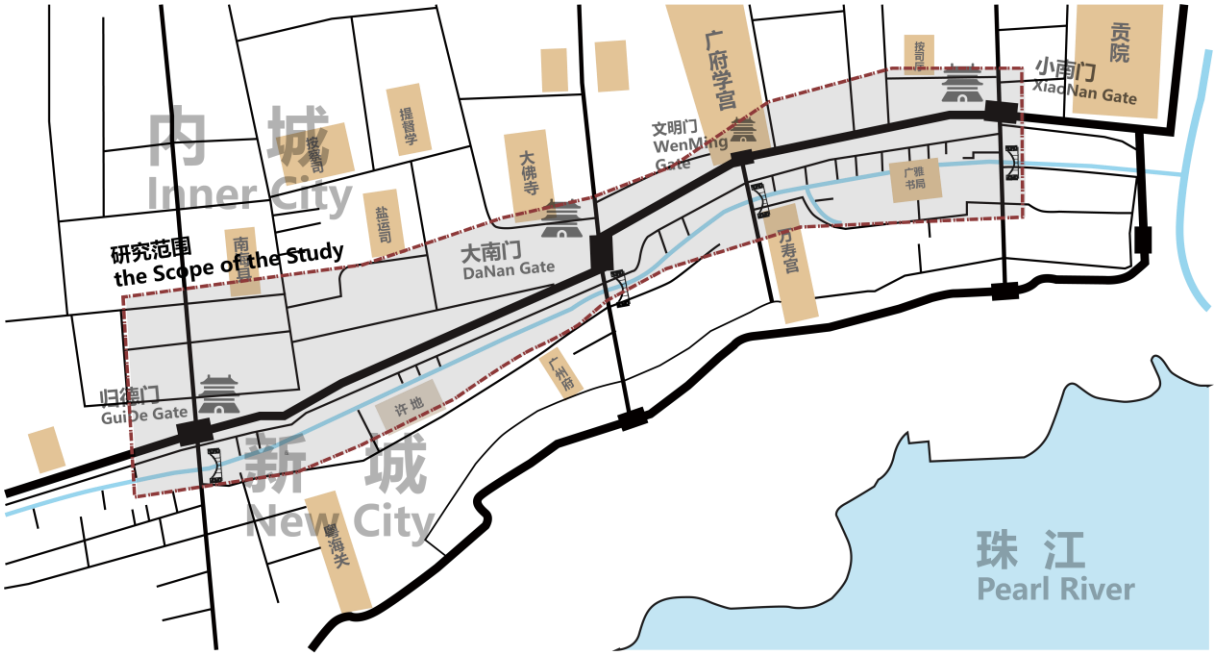


Figure 3-11 Land utilization in Guangzhou in Ming and Qing Dynasties

Source: Drawn by the Author（Base map of Guangzhou, 1860）

From the historical map of Guangzhou in Ming and Qing Dynasties, it can be seen that the roads in the inner city are irregular and often zigzag and changeable, and the direction of the six channels has an influence on the direction of the roads to a certain extent. The street blocks formed by the main roads in the city have different sizes.

The land within the inner city wall area wall is divided into larger plots, and the inner city, as the core area of the official government, is distributed with more official buildings and public buildings, such as the Guangfu Academy and the Tribute Courtyard in the eastern section of the city wall. In the Song Qingli (1041-1048), the imperial court ordered the establishment of a government school, and rebuilt the Guangfu School Palace by using the old Confucian temple at Fanfang in Xicheng (around today's Guangta Road). After several migrations, the Guangfu School Palace was located in the southeast of the city and had formed a large scale in Ming and Qing Dynasties. The WenMing Gate opened in the 27th year of Wanli (1599) was the gate directly to the outer city opened for the main gate of the Guangfu Academy. The school not only teaches schoolwork, but also serves as a place for the first test of the year and scientific examination. In the past, scholars passed the WenMing Gate after the examination in the Guangfu School Palace, and then walked on Qingyun Street, aiming to take a good idea of " rapid advancement in one's career ". Guangzhou Chengfang records that during the reign of Song Shenzong, Guangdong Tribute Courtyard was built in the second mile northeast of

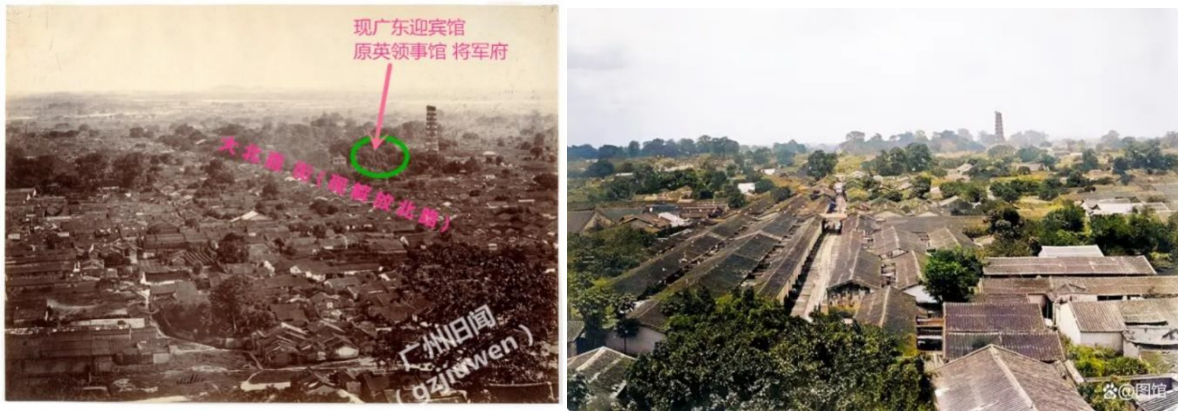
Juncheng (around Hongqiao Street, Xiaobei Road today), which was destroyed in the war of Yuan Dynasty[6].After Gong Yuan five changed its location，In the twenty-second year of Kangxi of Qing Dynasty (1683), the tribute courtyard was located in Chengenli, the southeast corner of the inner city, and the south wall was located in the east of the Fuxue. In the sixth year of Tongzhi of Qing Dynasty (1867), the grand scale was one of the "four great tribute courtyars".

Outside the inner city wall is the commercial space of the Southern City, and several streets perpendicular to the YuDai Moat divide the part near the city into smaller plots to facilitate the sale and delivery of goods. According to the map of the Qing Dynasty, the part of the land near the city wall has no marked road division, showing the shape of east-west long, north and south narrow. This section is not very deep, so it is assumed that the front of the block faces the road and the back faces the city wall. The building arrangement is relatively dense, and the building base can be regarded as the land area. Because the YuDai Moat was very prosperous at that time, attracting wealthy businessmen and gentry to build houses in the bank of moat one after another, which is known as the "first family of modern Guangzhou" Xu family. Xudi is located between Gaudi Street and YuDai Moat, according to the documents of the land and housing management department, the permitted area is 9675.88 square meters, with the "Temple of the Temple of Xu Doctor" as the core, and the other houses are arranged next to it in a hierarchical order and extend to the outer layer, forming a huge family gathering community[69].

3.3.4 Building Type

1）Basic Type

In 1722, Jesuit missionary Father Yang Jialu wrote in his letter: "The houses are all bungalows, almost all earth houses, mixed with some bricks, and the roofs are covered with tiles." The street was full of shops and the shops were very clean[9]." From the photos of the Qing Dynasty, it can be seen that the houses in the city adopted double-slope tiled roofs, and the external walls were relatively closed with brick and earth structures and almost no Windows. Overlooking Guangzhou City, the impression is that the building density is extremely high, and the continuous slope roofs occupy most of the land in the city. These slope roofs are not completely chaotic, but they are not like the strict north-south orientation of Beijing in Ming and Qing Dynasties. In some areas, the main orientation of some buildings can be seen, and the slight fluctuations between the roofs are scattered, and the combination of buildings and streets is very tight.



a) Standing on Yuexiu Mountain overlooking Guangzhou in 1862

b) Overlooking the ancient city of Guangzhou from Zhenhai Tower

Figure 3-12 Arrangement and distribution of Guangzhou architecture in Ming and Qing dynasties

Source：a) Old news of Guangzhou（mp.weixin.qq.com/）；

b) https://baijiahao.baidu.com/s?id=1783088622719851805

The basic types of buildings in Guangzhou in the 19th century are mainly residential, commercial and residential houses, which have the characteristics of line construction, direct opening to the street, and a large number of single rooms. Such buildings not only occupy their own plots, but also squeeze around to grab more space[41]. In the wide direction, small rooms are used to accommodate more street-facing buildings, while in the deep direction, they are extended to the interior of the plot, and the compact and intensive high-density texture formed to adapt to the urban land is called bamboo tube house, also known as shop house.

The word “bamboo tube house” was first called by the people. It is a common building in Guangzhou city with small openings and large depth, sloping roof, multi-entry pattern, patio characteristics, and combination of rows. Qing Dynasty literati Chen Kun described: "In the province of building houses more than a number of single rooms, called bamboo tube house." The origin of this type of architecture may be related to the Tanka people's occupation of water, the construction of markets, the construction of stalls[70].

Bamboo tube house was formed under a special historical background. In order to accommodate as many buildings as possible on the commercial side of the street, a small room of about 4 meters was formed. Due to the needs of internal living, it continued to extend in the deep direction, and many measures were taken to improve the indoor environment, such as open room, patio, cold alley, etc. Bamboo tube house can be divided into front, middle and back three parts, the front for the open room, the back for the kitchen, the middle of the bedroom and a number of small ventilation patios. A small ventilation patio is set up every few bedrooms, mainly for lighting and ventilation. The long, narrow pattern is jointed like bamboo. The room

inside the building is connected by a narrow single corridor, because the narrow outer wall and the channel are not exposed to the sun and the temperature is low, forming a "cold lane". When the well is exposed to the sun in summer and the temperature rises, it is conducive to the formation of drafts. The outer wall is used as a partition wall, and the bedroom is basically a darkroom. In order to circulate air, the partition of the bedroom is generally not to the top[43].

In terms of function, it often adopts the form of living in the front shop or living in the lower shop, and some bamboo tube houses located in the YuDai Moat form an ultra-long and deep layout.

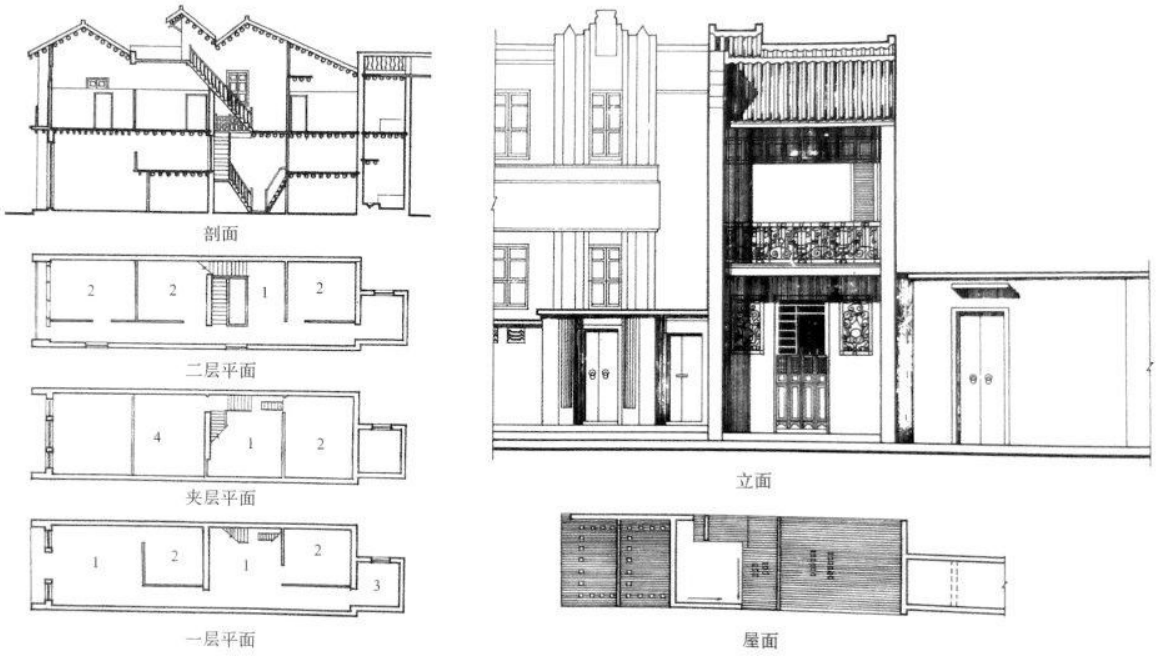
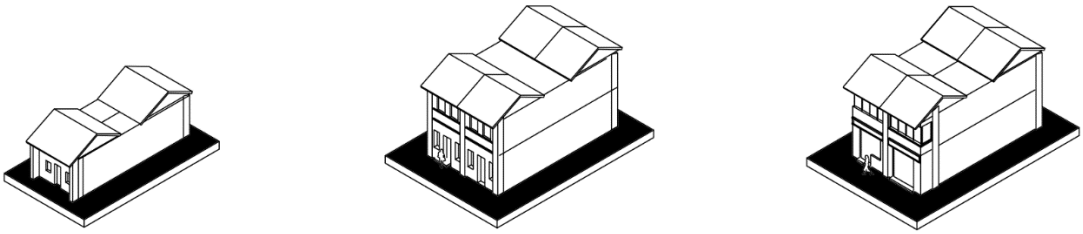


Figure 3-13 Typical bamboo tube house

Source：Reference，Guangzhou Baohua Road Hua Zhong No. 24 a residence [71]



a) Single-storey bamboo tube house　　b) Two-storey bamboo tube house - living type

c) Two-storey bamboo tube house – bottom commerce upper living type

Figure 3-14 Basic type of building - bamboo tube house

Source: Drawn by the Author

After the development of the Song and Yuan Dynasties, especially the commercial function of the six channels gradually transferred to the YuDai Moat, which had become a very bustling commercial street in Guangzhou at that time. All kinds of goods transported by Chinese and foreign ships are concentrated here. Every day loading, unloading, docking, offshore, shuttle back and forth, busy[72]. On both sides of the YuDai Moat, there are various commercial and residential buildings, which are more free than inner city buildings. The water side leads directly to the interior of the building, or from the dock into the narrow laneway leading to the commercial district. Houses on the edge of the city often add wooden steps, terraces, or attics or trellises to gain more living space. There is no photographic record of the YuDai Moat in the Ming and Qing dynasties, but the architectural forms of the YuDai Moat City bank at that time can be compared with the photos of the Suzhu river, which is 1.2 kilometers away from the YuDai Moat.

Figure 3-15 Buildings on both sides of Suzhu River in Henan,1870s

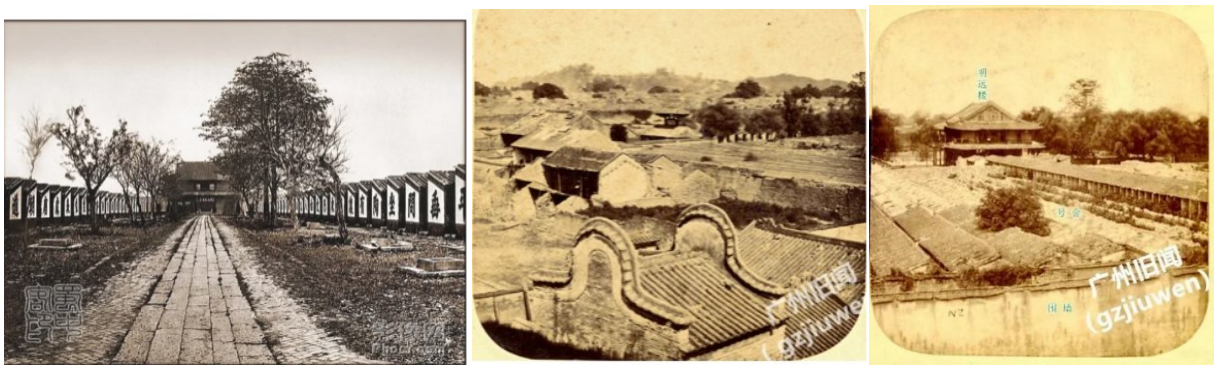
Source：hotz collection, https://m.weibo.cn/status/4731 707993886988?

2）Special Type

①state building

Along the city wall, there are government offices, academies, temples, and administrative structures, such as the Nanhai County Office, the Salt Transport Department, the Buddhist Temple, the Guangfu Academy, and the Tribute Courtyard. These official buildings are complex in shape and form, and they stand out from the ordinary folk houses and become the unique buildings in the dense folk houses at that time. For example, the Guangdong Tribute Courtyard in Xiaonan Gate was built in the Song Dynasty and expanded several times until the sixth year of Tongzhi (1867), with a number of 11,708 rooms, which was one of the four great tribute

courtyards in the late Qing Dynasty. Its shape is regular, and the central axis is successively arranged with various gatehouses, halls, houses, etc.



a) Guangdong Tribute academy

b)WanShou Palace in 1870 c) Guangfu Academy ,1859

Figure 3-16 Special types of buildings in the Ming and Qing dynasties

Source：a)Old news of Guangzhou（mp.weixin.qq.com/），

b) https://baijiahao.baidu.com/s?id=1783088622719851805，

c)https://weibo.com/1273276401/EaGAwhYvW

②City Gate and tower

Photos of ZhengNan Gate at the end of the Qing Dynasty show that it is different in shape from other low dwellings along the wall. The three-eaves tower is imposing and the corners are raised. ZhengNan Gate may be the only three-eaves building among the 18 gates of the Ming and Qing dynasties. Officials must enter the city from the Tianzi Pier through Zhengnan Gate, and the Zhengnan Gate tower became the landmark building of Guangzhou at that time.

GuiDe Gate was located at the boundary between Nanhai County and Panyu County. During the Ming and Qing Dynasties, it could run through the city from south to north. The only line connecting the gate with the southernmost city wall of Guangzhou was the line of Dabei Gate Straight Street-Sipai Lou - GuiDe Gate Straight Street-Xiaoshi Street (the location of today's Jiefang Road). GuiDe Gate Tower adopts heavy eaves to rest on the top of the mountain, and the city wall has a gate stone forehead engraved with the word "Gui De", which is the only Ming Dynasty gate stone forehead left in Guangzhou.

WenMing gate, facing the Guangfu Academy, is the only gate without a barangue in the

four gates of the southern wall of the inner city. Due to the war, this gate has been opened and closed many times, which is a convenient gate to open.

DingHai Gate, to the north is the Panyu Academy, to the east is the Guangdong tribute Academy.

a) DaNan Gate tower b) GuiDe Gate tower

Figure 3-17 Gates and towers in Ming and Qing dynasties

Source：Old news of Guangzhou（mp.weixin.qq.com/）

3.4 In the Republican period morphological evolution of inner city wall area（1912-1949）

3.4.1 Reconstruction of urban space form of old city

During the period of Republic of China, the society was in turmoil, and the successful revolution of 1911 overthrew the feudal monarchy, which made Lingnan city enter the modern transformation period of breaking the old order and rebuilding the new pattern [34]. Because Guangzhou is located in the coastal area, new ideas and new practices have been spread very rapidly, and industry, commerce, banking and transportation have developed rapidly, catching up with the pace of modern world development. The urban spatial form under the rule of the traditional feudal dynasty in Guangzhou is in conflict with the new urban planning, and the old urban volume can no longer accommodate the needs of the new life and production. In the early years of the Republic of China, there were more motor vehicles in Guangzhou, but except for some main streets, the rest of the roads were only suitable for pedestrians to walk the width, and it was difficult for vehicles to pass in the twists and turns of the narrow roadway in the old city, and it was not conducive to fire protection and health. The city wall also lost its defensive role in the cold weapons era of the feudal period, and its isolation of the urban interface became an obstacle to modern development.

In 1918, Guangzhou Municipal Office was established to carry out large-scale municipal construction, advocating the demolition of the city wall, widening the original site of the city wall and using the wall foundation to open up roads to build a new form of Guangzhou city. The formation of the new road has brought new changes to the urban pattern of Guangzhou, opening the physical boundary closed by the original city wall, making the streets open and active, connecting the tortuous and broken fabric of the city, forming an urban form of dividing the blocks by the main roads of the city, while the traditional old street forms are still preserved inside the blocks. The junction of the city gate is called the intersection of the new urban pattern because of the interconnection of roads.

The remarkable characteristics of the evolution of urban spatial form in this period are not only the combing and reconstruction of the street system, but also the reconstruction on the architectural level, such as the construction of high-rise buildings caused by the emergence of new arcade streets and new building materials. In the early years of the Republic of China, the "Regulations and Implementation Rules of the Guangdong Provincial Police Department for the current Prohibition of Construction" was promulgated, in which article 14 stipulates: "Every embankment and road to build houses should be built on private land, with a width of eight feet to build a shophouse with feet to facilitate traffic..."[73] . For the first time, the term "arcade building with feet" was proposed, requiring private houses located on both sides of the new road to set aside about 2.6 meters of overhead walking space at the bottom, which can be seen that the government attached great importance to the pedestrian in the public space of the road at that time. In the ninth year of the Republic of China, the City Hall revised and re-promulgated the "Temporary Ban on Construction Regulations", clarified "arcade building" as the official title, and put forward requirements for the width and height of the arcade building beside the road with different widths, and considered the proportion of the road width and the height of the arcade building[38]. At that time, the main roads were marked by shophouses, which were learned and improved from Western countries and brought a unified new look to Guangzhou. However, because of the "sidewalk is too narrow", "the road is not wide", "lack of greening" and other problems, in 1932, the "Guangzhou City revised the Ban on construction Regulations" has clearly stated several roads that are not allowed to build the arcade building list.

From the end of the 19th century to the early 1920s, with the development of urban infrastructure, Guangzhou gradually equipped with modern power and tap water systems, thus replacing the original life scene that relied on artificial water fetching from rivers and Wells. Guangzhou has always had the saying that "the six veins are all connected to the sea, and the green mountains are half into the city". The convenient water transportation network from Song

to Ming and Qing dynasties not only transported commercial materials, but also undertook the discharge of water and household waste. The use of the new urban water supply and drainage system makes YuDai moat lose its function, and the residents increasingly occupy the river and pollute it, so that the city moat is silted up after many years of berthing, and until the Republic of China, Yudai Moat has become an impassable smelly ditch for ships. The city of the Republic of China generally faced this situation, at that time, the government and civil organizations (such as the river improvement Office) had many river improved actions, but the YuDai Moat melo was not properly dealt with at that time.

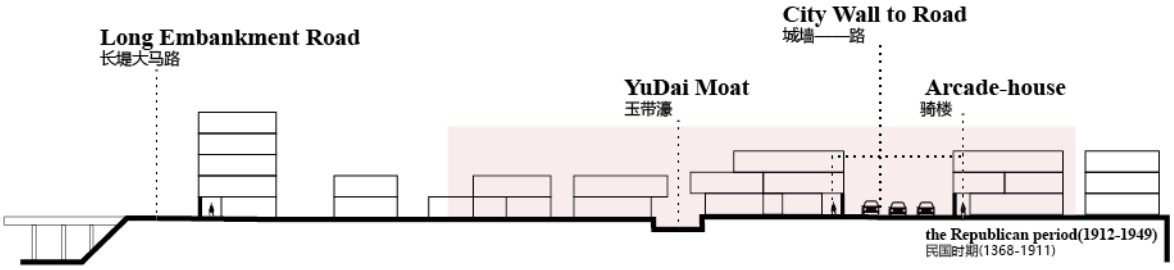


Figure 3-18 Section diagram of Guangzhou inner city wall area during the Republican period

Source: Drawn by the Author

3.4.2 After the demolition of the city wall to build the road

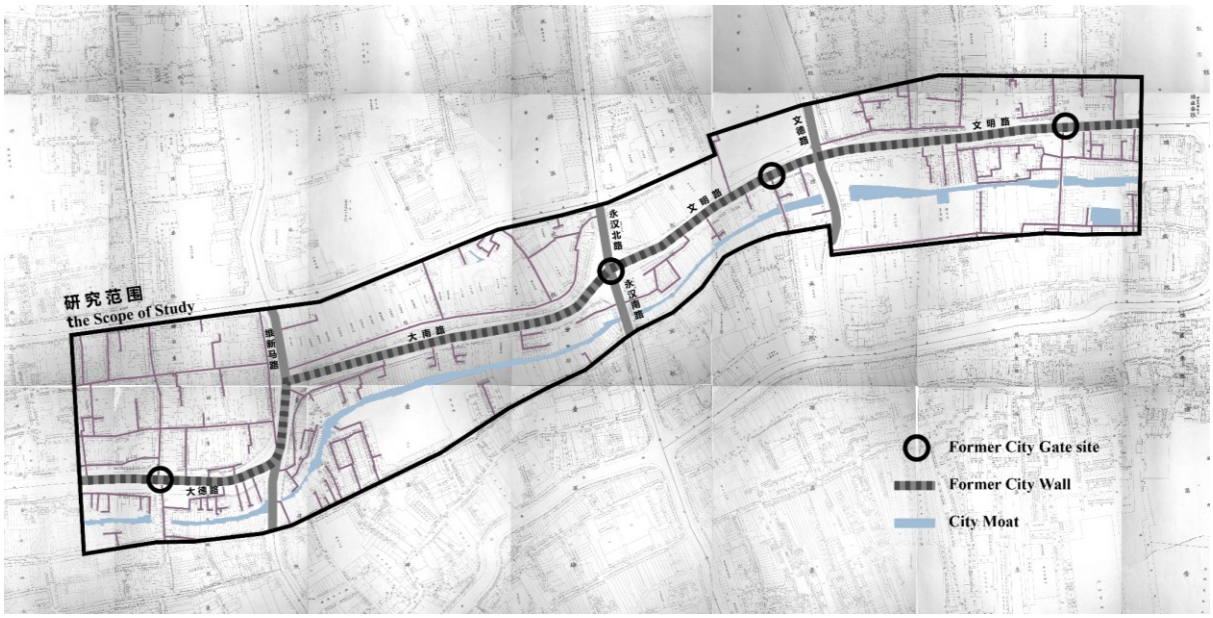


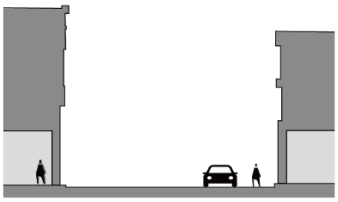
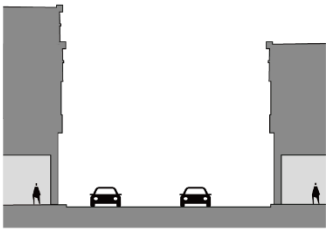
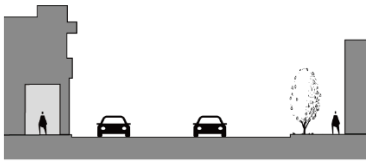
Figure 3-19 Guangzhou inner city wall area street network in the Republican period

Source: Drawn by the Author（Base map: Guangzhou Boundary Map）

After the construction of urban roads, the reconstruction of traditional streets and ports in the old city, the texture of T-shaped streets in the old city is almost replaced by modern square streets[33]. The east-west roads of the inner city wall area of Guangzhou were opened up by the

demolition of the city wall, and the main north-south roads were mainly formed on the basis of the original gates connecting the inner and outer roads, except the Wende Road beside the WenMing Gate (because the WenMing Gate leads to the Guangfu Academy, the roads are opened on both sides of the plot).

Table 3-2 The road formed after the removal of the inner city wall

Road name	**Length (m)**	**Width (m)**	**Time (year)**	**Photo**	**Section**
DaDe Road	1194	16	1921		
DaNan Road	294	12. 2	1920		
WenMing Road	960	24. 7	1922		

Source: Drawn by the Author

After the southern wall of the inner city of Guangzhou was demolished, the arcade street was built in the name of the city gate, such as Da Nan Road and Wenming Road. As shown in (Table 3-2), with the gradual convergence of commerce into the arcade street, the originally closed wall interface becomes open, gathering people and becoming a place for people's public life. The streets inside and outside the city are connected, and the buildings separated on both sides of the city wall also provide a unified street interface because of the arcade buildings on both sides of the street. The map drawn during the Republic of China clearly shows the difference between the new road for cars and the roadway suitable for pedestrians. Some roads extend from the main road to the interior of the block, and some roads close to the city wall and parallel to it, which used to be the commercial channel of the water transportation of the YuDai Moat, due to the loss of the water transportation function of the YuDai Moat, the opening of new roads, these roads have lost their role and were banned.

In the Republican period, the newly opened arcade road formed a sharp contrast with the traditional streets. Traditional streets and alleys in Guangzhou are compact in space, and terraced buildings such as bamboo tube houses and courtyard residential buildings such as Xiguan Big houses usually have strong closure, which reflects the tight structure and privacy of family units in the past. In contrast, the shops on the ground floor of the arcade building are open to the street, reflecting the openness and interaction of citizens in commercial activities.

3.4.3 Plan units and combinations

Figure 3-20 Plan units and combinations in the Republican period

Source: Drawn by the Author（Base map: Guangzhou Boundary Map）

The inner city wall area boundary forms a superposition of traditional streets dominated by river surges and new streets dominated by road networks[74]. The group of plots is divided by the road as the benchmark framework, and the road construction principle is maintained "only through, not straight". Due to the cutting of the new road network, the neighborhood is divided into plots of different sizes. The formation of these plots is greatly affected by the city wall and the city moat, and the shape of the city wall basically maintains the trend of the city wall. The plots on both sides of the YuDai Moat are still separated by water, but at this time the river surge has been reduced to several meters wide, and residents can cross the river through roads and Bridges. Due to the intensification of space erosion to the YuDai Moat during the Republic of China period, the contour shape of the land along the two sides of the YuDai Moat is relatively irregular.

The internal functions of the plot are mixed and there is no clear boundary. There are more bamboo tube houses in the plot, the establishment of a new type of road arcade street, and the conversion of bamboo tube houses on both sides of the road into elevated arcade buildings on the ground floor, and the introduction of more commercial functions, the new combination of arcade buildings - bamboo tube houses are "upper and lower commercial" or all commercial forms.

During the period of the Republic of China, the building base covers a large area, and the alleys connecting the buildings are relatively narrow. Most of them are street organized units, which are divided into 5 types of units according to different combinations of plots:

1) Single row long street type unit

①long street along the city moat

Relying on the plan unit formed by the city moat and the long street of the city moat edge, it is mainly dominated by a single row of bamboo tube houses with narrow face and large depth.The main entrance and exit of the bamboo tube house is at one end of the street, the interface is more unified and regular, and the other end is near the moat, and different degrees of construction are added to occupy the moat area.

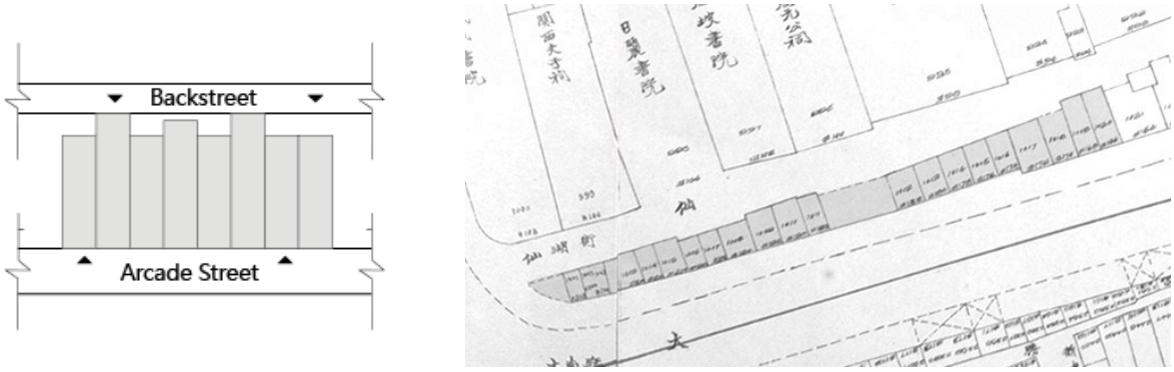
a) Pattern b) Instance

Figure 3-21 Long street along the city moat

Source: Drawn by the Author

②Along the city wall of the arcade street

After the demolition of the city wall, the arcade street was built along the road, which was rebuilt or newly built by the original houses. The main entrance was the main road behind the demolition of the city wall, and it was backed by the back street. The arcade building was built on the ground above the sidewalk, and the first floor was mostly commercial shops.



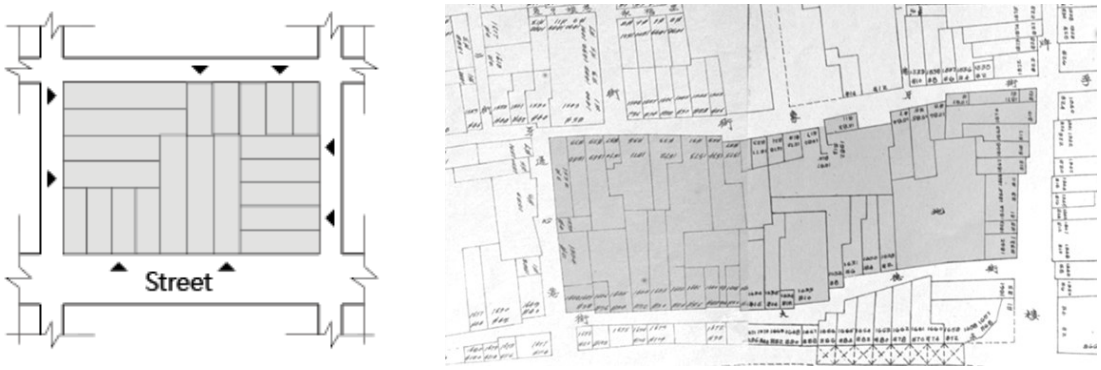
a) Pattern b) Instance

Figure 3-22 Arcade street along the city wall

Source: Drawn by the Author

2）Multi-row combined unit

Most of the multi-row combined units face the street on all sides, dividing and reorganizing the large plots to form rich organizational forms. The buildings in the plots are close to each other, share external walls, and there are almost no laneways inside. The buildings face the streets on all sides with entrances and exits.



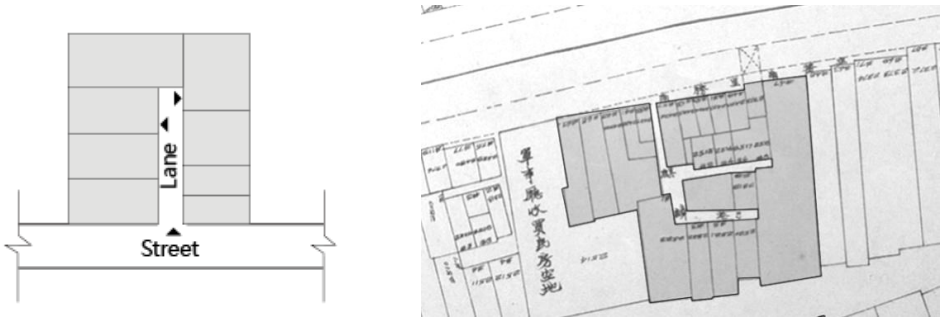
a) Pattern b) Instance

Figure 3-23 Multi-row combined unit

Source: Drawn by the Author

3）Inner lane layout unit

This kind of unit uses the inner street lane to organize the building layout, the inner lane is mostly the end road, relatively narrow and long, forming a "cold lane" form, and the entrance and exit of the building are located in the inner lane.



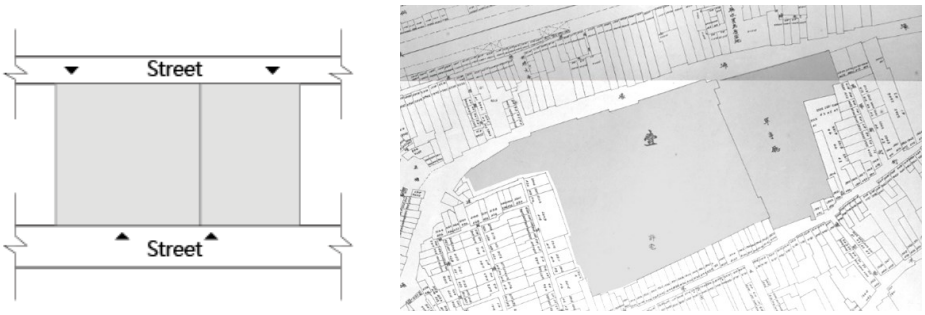
a) Pattern b) Instance

Figure 3-24 Inner lane layout unit

Source: Drawn by the Author

4）Large plot unit

Most of these units face the street on both sides, a few face the street on all sides, often have multiple entrances and exits, and most of them belong to the government building land, or are religious temple buildings and large family settlements.



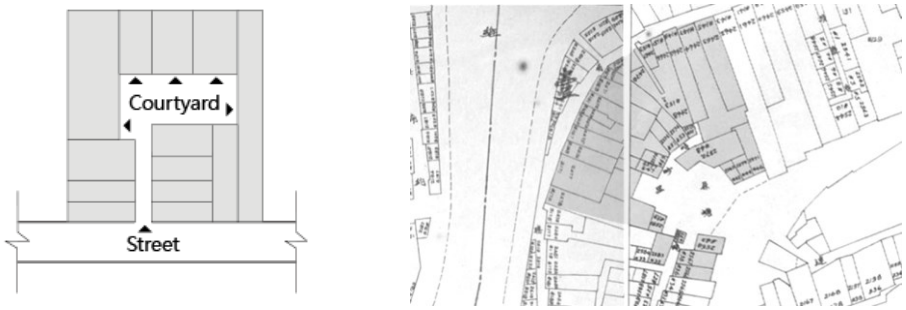
a) Pattern b) Instance

Figure 3-25 Large plot unit

Source: Drawn by the Author

5）Courtyard layout unit

The courtyard layout unit is a derivative version of the inner street, and the end of the inner lane expands to form the courtyard space. This kind of unit is less in the scope of inner city wall area research.



a) Pattern b) Instance

Figure 3-26 Courtyard layout unit

Source: Drawn by the Author

3.4.4 Building Type

There were two significant changes in building types during this period, one was the establishment of arcade buildings, and the other was the widespread use of new building materials, which made the city full of high-rise buildings (multi-storey buildings).

In 1918, after the establishment of the Municipal Council, a series of guidelines and relevant implementation rules for the construction of arcade buildings were formulated. After the width of the road was demarcated, the owners or the government would demolish the shophouses and place the sidewalks under the elevated arcade buildings. The way of building the arcade is generally to demolish part of the bamboo roof according to the demarcated width of the road, keep the main part of the building unchanged, and then build back the arcade part on the sidewalk. Therefore, the arcade preserves the original bamboo tube house with narrow face and long depth characteristics.

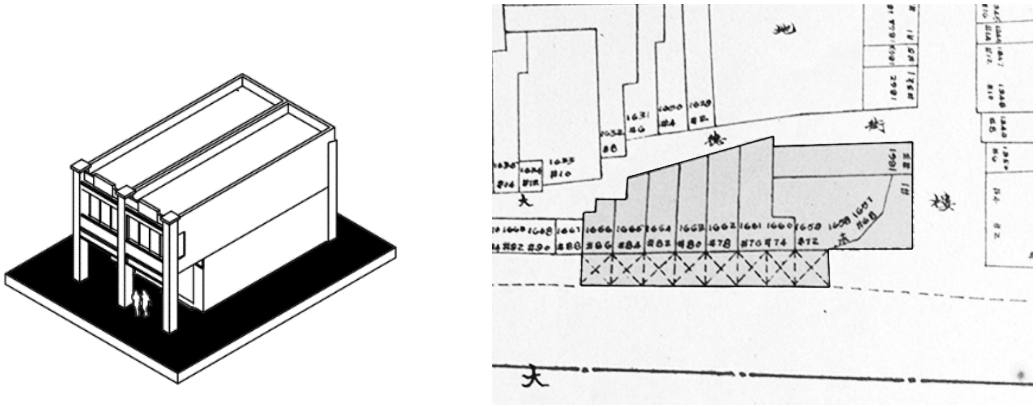


Figure 3-27 Bamboo tube house transformed into arcade building

Source: Drawn by the Author

The arcade retains the form of the original bamboo tube house type street house "upper living under business", the upper floor is generally independent residence, the bottom floor is the open gallery, the side facing the street is the commodity window, customers can shop along the open gallery. Arcade building is a typical form of interaction between buildings and streets. The ground floor of the arcade building is open to the public facing the street, providing a corridor for shops to shelter from the wind and rain, forming a unique mode of coexistence between commerce and the street.

Shophouses are funded by the government or shopkeepers. For shophouses built by the government on the same street, the facade may have a similar style. Shops lack enthusiasm for the building of shophouses, and the street surface of shophouses is often not continuous [36]. The facade of the arcade street is a wide variety, integrating the elements of eastern and Western architectural culture, absorbing the Western style of open corridor, column, arch style such as

ancient Rome, Greece, Baroque, Southeast Asian style, etc., in the cornice, decorative out.

Table 3-3 In the Republican period, the facade style of the arcade building

Name	**Photo**	**Facade styles**	**Feature**
DaNan Road Arcade 170、168、166、164		modern simple	Windows are arranged in groups to emphasize the rhythm of the facade
WenMing Road Arcade 17-27		Western porch style	Divided by a continuous arch, the balcony runs through the entire opening to form an outer corridor
DaNan Road Arcade 44、46、48、50		Art-deco	A vertical line protruding from the wall runs through the entire facade, dividing the parapet into three parts and projecting a triangle in the middle

Source: Drawn by the Author

New materials and structures make it possible to raise the ground floor of the arcade and break through the limitations of the number of building floors. New materials such as cement and steel bars appeared as early as 1918, which provided the basic conditions for the development of street houses to heights in modern times and the changes in facade styles[41].

The demolition of the city wall opened up the connection between the city and the outside, and some of the lifestyle and behavior activities previously associated with the city wall and gate were replaced. The market at the city gate and the waterborne commercial space at the city moat were transferred to the reconstructed arcade street after demolition. The arcade building is adapted to the humid, hot and rainy climate of Guangzhou. The overhead pedestrian space can not only provide shelter from the rain but also block the sun exposure. The first floor also has the function of commercial service. The change from the closed wall interface to the open and active arcade, the opening of the interface and the placement of new forms also changed People's Daily life behavior.

Modern large-scale construction activities such as the demolition of city walls and road construction were limited to both sides of the road, and did not go deep into the inner blocks. During the period of the Republic of China, the YuDai Moat clogged seriously, gradually lost the ability to pass, became a sewage channel for residents, aggravated the blockage, and the odor was unpleasant. Hao Chung land is gradually invaded, fill the surge building, riding Hao house phenomenon occurs from time to time, "check the city has channels such as human blood, it can not allow it to have a moment of siltation, and Guangzhou Hao Chung especially vent the total amount of water in the city's channels."[75] It can be seen that the government attaches great importance to the city moat water system as urban infrastructure, and constantly renovates it.

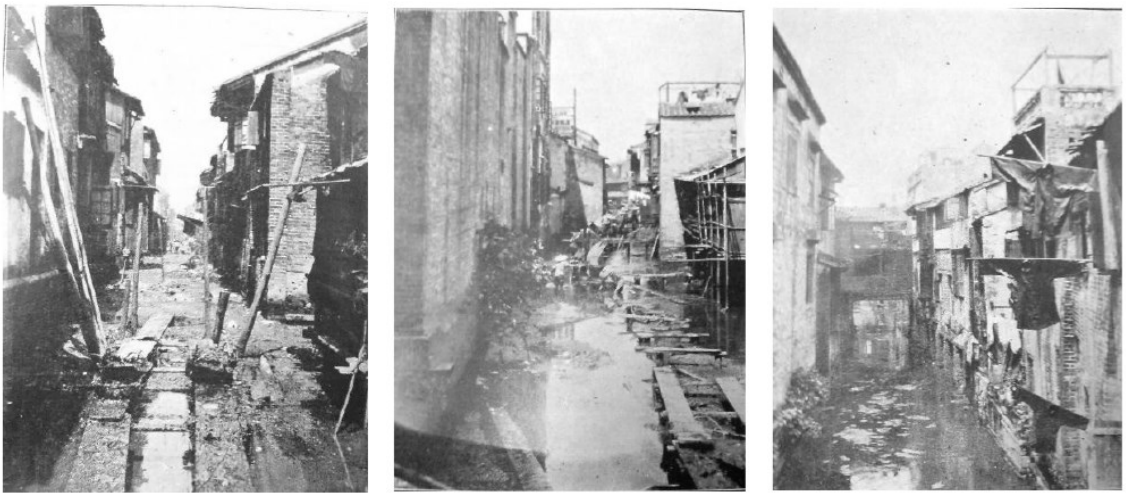


Figure 3-28 YuDai Moat clean-up process

Source: Reference[76]

Before the clean-up, a large amount of land was occupied by houses on the edge of the city moat, and the buildings rushed to build ancillary buildings to the city moat. The scaffolding was supported by wooden frames on the sidewalk to occupy space, and the city of the city only left a small canal a few feet wide. In order to clean up and renovate it, we must first remove these illegal additions and dredge the river.

After the clearance, no road along the river is set up in the YuDai Moat. The river bank is a monotonous and homogeneous vertical revetment, and the position of the river swell is lower than the first floor of the building. At this time, the bottom of the building along the YuDai Moat is a waterproof thick brick wall, and the upper part of the building is a more transparent wooden structure, which reduces the connection and interaction between the building and the water.

3.5 In the early period of founding of China morphological evolution of inner city wall area（1949-1978）

3.5.1 The expansion and adjustment of urban spatial form

In 1949, the built-up area of the old city of Guangzhou was about 36 square kilometers, and by 1978 it had reached 76 square kilometers. In this period, although the city has expanded and developed, it is still centered on the old City of Guangzhou, which retains the historical form, land structure, road system, river swell, arcade street and so on. There are few construction activities in the old city, mainly the renovation of individual buildings by wooden houses[36]. In the first three years after the founding of the People's Republic of China, urban development mainly focused on post-war urban reconstruction, economic recovery, the restoration of civilian life and production, and the opening of some new villages for workers to ensure the livelihood of residents. After that, the first five-year plan was mainly oriented to the development of production. Since Guangzhou has been a developed commercial city since ancient times, with a weak industrial base, the city was positioned to develop light industries such as textile and food. There were many factories and enterprises in Guangzhou during the period of the Republic of China. After liberation, they underwent socialist transformation, and some factories continued to become an important part of light industry factories.

At this stage, remarkable changes have taken place in the YuDai Moat area. Due to the sedimentation pollution of the river for many years, the narrowing of the channel, the reduction of water volume, and the stench, the clearing action of the past dynasties is difficult to achieve results. After the founding of the People's Republic of China, the government formulated the "road filling plan" to transform the water system of the old city moat. In March 1951, Yudai moat began to carry out cover treatment and was transformed into a reinforced concrete box culvert. The lush and wide commercial water system of the Song Dynasty was eventually buried underground. After the cover, the YuDai Moat into a pedestrian urban road, land instead of the original water traffic.

During this period, the urban development of Guangzhou also showed a very rapid speed. The industrial zone expanded to the periphery of the city, and the scope of urban construction land expanded outward from the old city as the center. In 1965, the country implemented a large-scale third-line construction, industry moved inland, Guangzhou's urban planning also paid more attention to the construction of surrounding small cities and suburbs. The "Cultural Revolution", which began in 1966, lost the government's control over urban development and construction due to some wrong political struggles, some cultural relics were destroyed, and the

city was in chaos. During this period, the government proposed to lower the construction of factories to the streets, resulting in a large number of small street factories and workshops mixed with residential areas. These small workshops had low productivity, backward equipment and caused environmental pollution, and were gradually shut down.

In the late 1970s, many urban problems broke out, such as the increasing shortage of housing for residents and the chaos of urban layout. Urban construction land barely expanded, and the built-up area remained at 76 square kilometers in 1977[33].

After the founding of the People's Republic of China and before the reform and opening up, China was in the exploratory period of the primary stage of socialism, and the system and policy were still being adjusted constantly. The overall urban development of Guangzhou expanded to the east, west and south with the old city as the center, developed the suburban industrial zone and the construction of workers' housing, and the construction in the old city was mainly transformed. The development of this period gradually enriched the urban function of Guangzhou, which had been dominated by a single commercial and trade nature for two thousand years, and laid the foundation for the development of the city into a multi-functional comprehensive metropolis after the reform and opening up [33].

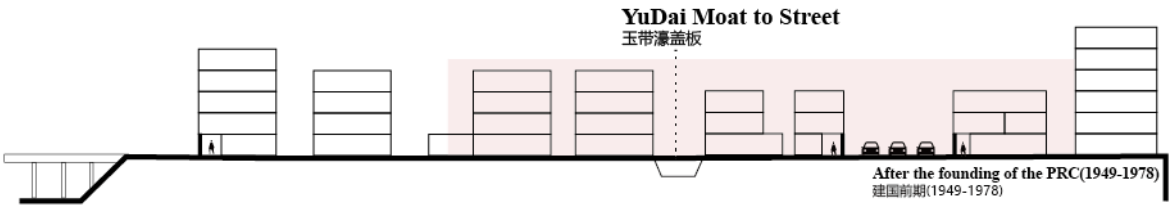


Figure 3-29 Section diagram of Guangzhou inner city wall area in the early period of the founding of China
Source: Drawn by the Author

3.5.2After cover the city moat the street and road network

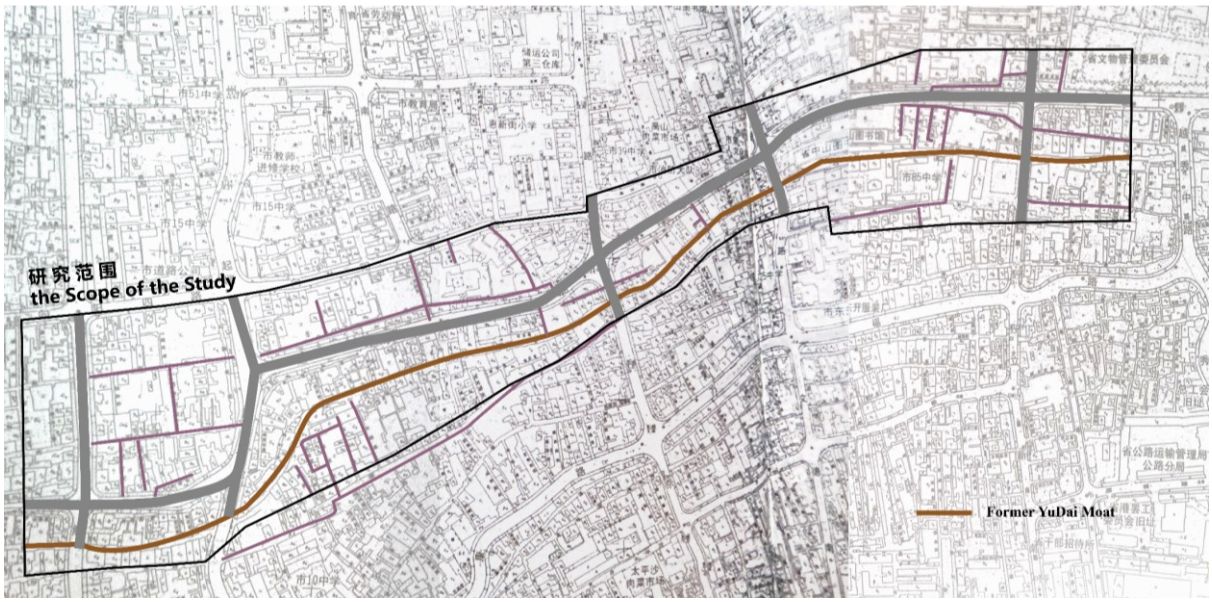


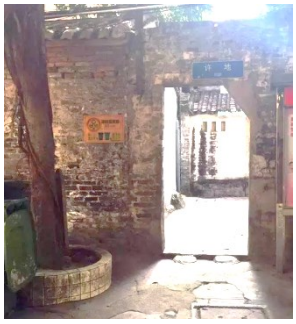
Figure 3-30 Guangzhou inner city wall area street network in the early period of the founding of China

Source: Drawn by the Author(Base map: Guangzhou Map in 1978)

In the early years of the founding of the People's Republic of China, the most significant change in the street network system within the scope of the study was that the cover plate of the whole line of the YuDai Moat turned moat into a block road. After the founding of the People's Republic of China, the houses on both sides of YuDai Moat were encroachment seriously, and the moat flood became increasingly narrow. For its thorough rectification, the government decided to transform YuDai Moat into a reinforced concrete box culvert in March 1951, which was completed in January of the following year, with a total length of 2 781 m and a section of 2.4 ~ 4.5 m, becoming the first major drainage project in Guangzhou after the founding of the People's Republic of China[77].

YuDai Moat is still used as an urban sewage drainage canal, but the drainage capacity of Yudai Moat is not fully verified during the cover plate process, resulting in insufficient drainage holes of the culvert set in the cover plate, causing inconvenience to the life of coastal residents during the use process, and water accumulation often occurs after completion. Therefore, residents spontaneously opened holes in the cover plate, and set up leads to help drainage, and now you can see a total of more than 20 or 30 holes on the YuDai Moat. These holes not only bear the drainage of rainwater, but also serve as a cleaning and pouring water for the neighbors every Friday.

Table 3-4 The historical site behind the cover of the YuDai Moat

Name	**Location**	**Photo**	**Description**
Residential stairs sinking	Building 16, Xudi		After the cover plate, the ground level entrance of the building is lower than the road
The hole in the cover	Along the YuDai Moat Road		The neighbors spontaneously opened holes in the cover plates to drain water
Pier remains	XuDi		A dock for the Xu family

Source：https://www.sohu.com/a/196572687_99955758

According to local residents, after the moat cover is opened, you can walk down through the iron frame stairs, and you will see that the ground is about 1.5 meters high from the previous river bottom. Therefore, the entrance of the original building connected with the YuDai Moat water is located below the road behind the cover plate. There is no unified plan for the road width and trend of the reconstruction of YuDai Moat, but it is directly reconstructed according to the shape trend of YuDai Moat in each place. Such as the current Wende Road community, the YuDai Moat here is wider, so the road behind the cover will be wider than other places.

From the satellite image in 1978, it can be seen that both sides of YuDai Moat are occupied by houses, and the street interface is relatively continuous except for the connection with the branch lane. The YuDai Moat is covered into an east-west street between the blocks, which can be used by people and non-motor vehicles, and is connected with several north-south end roads before, which strengthens the connection within the block and jointly forms the traffic network within the block. The cover plate of the YuDai Moat increases the road density of the block, improves the bad environment and facilitates traffic at the same time, but the behavior of disposing of the simple cover plate of the YuDai Moat loses the spatial pattern of the

traditional historical water system of Guangzhou, which is the loss of historical memory and historical scene.

In addition, the road system was also adjusted. Before 1965, a large number of the original sand and stone roads and mud roads in Yuexiu District were changed into asphalt and concrete roads[78], the road network density was increased on the basis of the original streets, and the difference between main roads, secondary roads and block roads was clearly divided. Based on a comparison of aerial images from 1978 and 1955, the block road system remained largely unchanged, with the addition of some bypass roads to the interior of the block.

3.5.3 Plan units and combinations

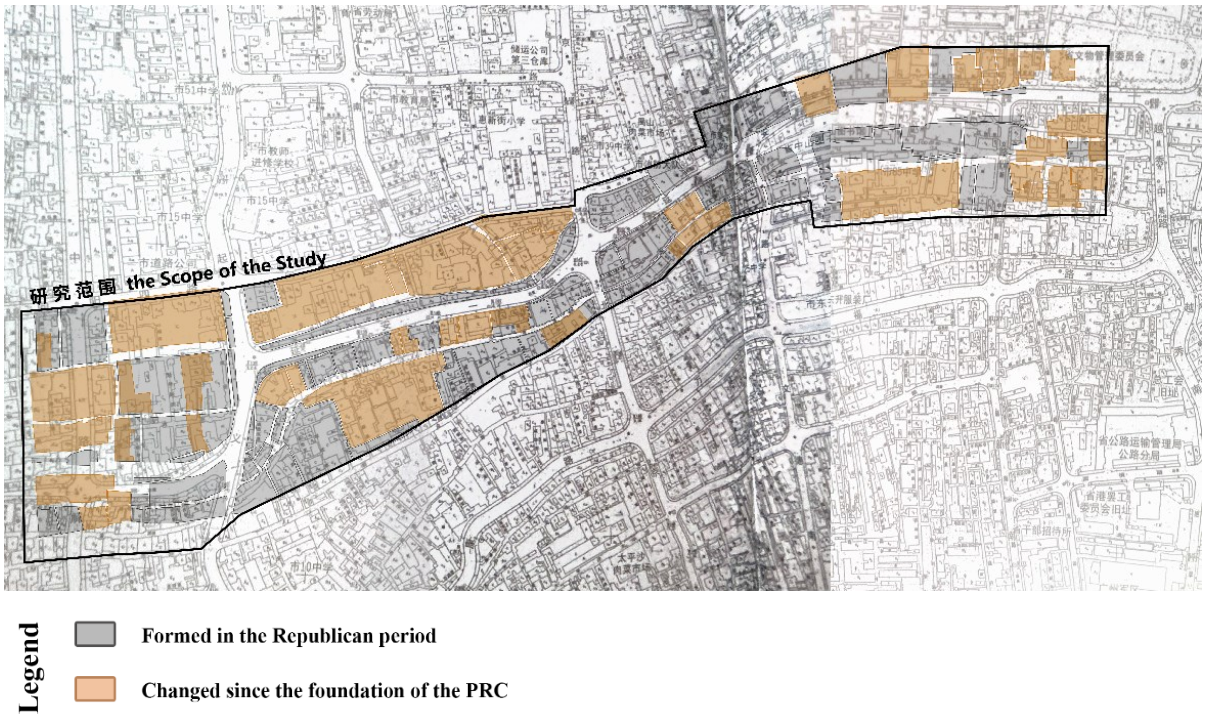


Figure 3-31 Guangzhou inner city wall area plan units in the early period of the founding of China

Source: Drawn by the Author (Base map: Guangzhou Map in 1978)

After the founding of the People's Republic of China, the government re-adjusted the block plots of different sizes, and some small plots divided by roads were merged to form a suitable plot size. As the YuDai Moat has become the inner road of the block, the plots once separated by water are also linked together and combined into a whole. Some traditional large plots near the city were disintegrated after liberation, such as the Xudi in Gaudi Street, where the Xudi clan only kept part of the houses used for living, and the others were taken over by the government and rebuilt for other functions, while the private alleys used by the original families in Xudi were also opened into public alleys.

In the traditional period, there was little difference between the morphology of the plots,

and the individual plots were relatively homogeneous, but the overall combination formed distinct morphological characteristics, such as the mixed shack area formed by the city wall, the market formed by the city wall edge along the water, and the feudal patriarchal order formed by the family settlement. After the founding of the People's Republic of China, due to the disappearance of city walls and city moats, the land is no longer limited by the inherent city boundaries, and the connection between the land is more and more, and the possibility of combination is also increased. The building volume, type and style in the plot are also changing to the modern, and the form of a single plot is more prominent.

Compared with the plan units in the Republic of China period, three new units have been added:

1）Semi-recombination large block unit

This type of land is a recombination of some plots in the period of the Republic of China to form large plots, some of which are still divided into small plots. The large plots formed are irregular in shape, and some of them are empty land after demolition, which is in the transitional period.

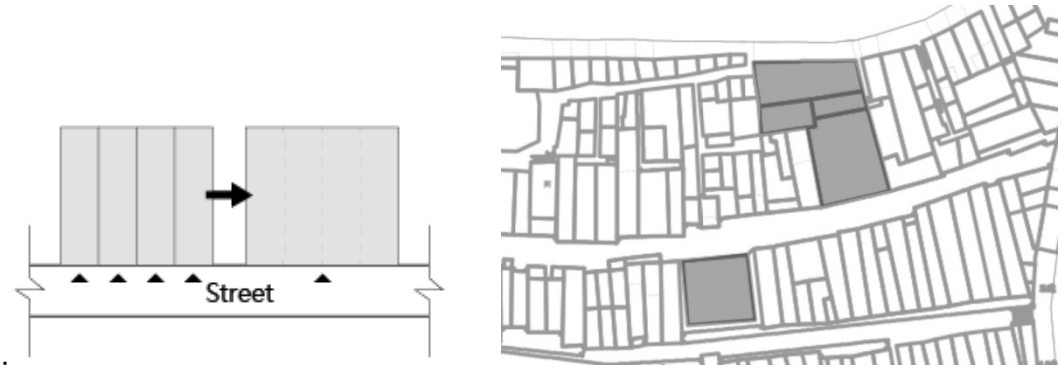
a) Pattern b) Instance

Figure 3-32 Semi-reconstituted large block unit

Source: Drawn by the Author

2) Recombination block unit

The small plots are merged and reorganized into larger plots, most of which are combined by single row of long street units. Several adjacent bamboo tube houses are merged or demolished to build new plots. The type or function of the buildings in the reorganized plots will change, and the plots are still in the traditional blocks, becoming a sudden part of the traditional fabric



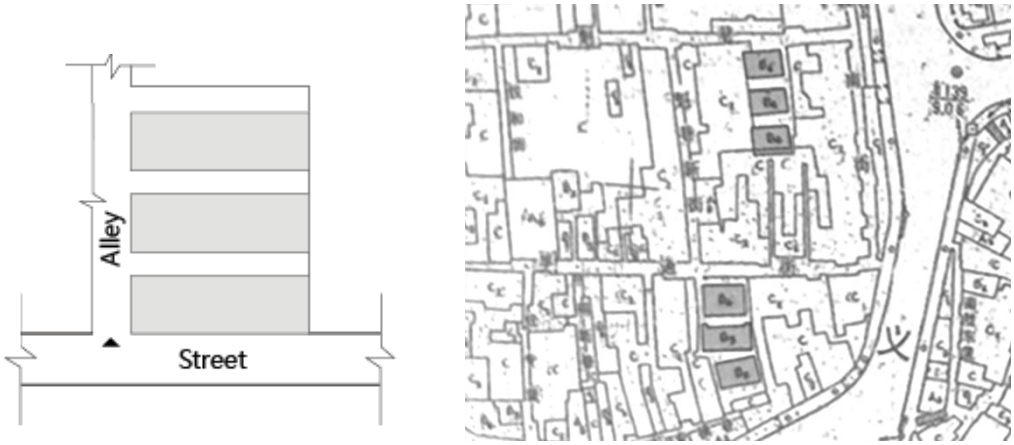
a) Pattern b) Instance

Figure 3-33 Recombination block unit

Source: Drawn by the Author

3）Slab-type building combination unit

The Slab-type building is a series of cylindrical buildings and unit buildings established after the founding of the People's Republic of China to solve the housing problem. The residential buildings are uniformly arranged and distributed in rows, using the same architectural form, and there are road connections between the buildings.



a) Pattern b) Instance

Figure 3-34 Slab-type building combination unit

Source: Drawn by the Author

3.5.4 Building Type

In the early days of the founding of the People's Republic of China, the houses in the research area were mainly brick and wood structures, and most of the houses were in urgent need of repair. Due to the lack of financial and material resources of the government at that time, the construction and repair of houses in this period were mostly carried out from the bottom up by the residents themselves. In February 1966, the Guangzhou Municipal Committee of the Communist Party of China issued the "Let go to mobilize the masses, comprehensively carry out the renovation of the wooden house Notice", adopting the "three self", "three gang",

"three guarantees" approach, a total of 4,667 wooden houses were rebuilt, 26 ancestral halls and colleges were renovated, 5,650 households, the population of 25,399 people, and 11,425 square meters were increased after the renovation than before Thus, living conditions have been improved and housing difficulties have been alleviated[79] . Although the bottom-up model can solve the problem easily and quickly, it will cause some confusion to the urban spatial form because each part of the unit is carried out independently and lacks the overall planning and systematic guidelines.

The architectural construction style of this period adopts a simple modern architectural style, based on economy and applicability, the external wall is divided into various stone materials such as cut stone and brush stone, without additional decoration, the form rules of opening Windows are unified, and the roof is multi-purpose flat roof.

In order to solve the large-scale housing problem, many apartment buildings have been built in the city. The unit building is generally a brick-concrete structure or reinforced concrete structure, and the floor height is usually between 5 and 6 floors, in order to not rely on elevators and reduce construction costs. Each building has several units, each connected by a staircase, with two to four families on each floor. Corridors are usually narrow and the building density is higher to conserve land resources.

The layout of the unit building has the characteristics of standardization and modularity, and the layout of each unit is almost identical, showing a symmetrical and regular architectural form. These units are compact, usually one - or two-bedroom, and meet the basic living needs of a family. The distribution of units within each unit is also relatively uniform, and the units are small, usually with bedrooms, living rooms, kitchens and bathrooms, designed to maximize the limited floor space.

3.6 Since reform and opening up morphological evolution of inner city wall area（1978-）

3.6.1 Rapid development of urban form

In 1978, the Third Plenary Session of the 11th Central Committee proposed to "shift the focus of work to economic construction" and implement the reform and opening up policy of internal reform and opening up to the outside world. The social and economic system has been transferred from socialist public ownership to the form dominated by public ownership, the common development of various ownership economies and the socialist market economy. As Guangzhou is located in the coastal area and close to Hong Kong and Macao, the state has provided a series of preferential policies, and Guangzhou has taken the lead in entering a period

of rapid development. This change greatly affected the morphological evolution of Guangzhou. The city boundary of Guangzhou has expanded rapidly to the east, the scale of urban construction is large, and the city center has gradually shifted from the old city.

Building has become a commodity, and China's housing system has shifted from unit welfare housing to commercial housing for personal consumption. With the rapid development of the real estate industry, the development of Guangzhou Old City has changed from partial repair to the overall transformation combined with real estate development. The real estate development of Guangzhou also expanded rapidly, and a large amount of land was quickly leased in the whole city. A large number of old neighborhoods in the city center were demolished through market-oriented transformation, and a large number of high-rise office buildings and residential buildings were built. Due to the excessive supply of all kinds of sales buildings and the imbalance between supply and demand, the housing price in Guangzhou has fallen continuously for years after the national bubble burst, and the market has been depressed for a long time, and many "rotten buildings" have been left in the urban area.[36]. A number of new commercial and residential areas have been built in the old city of Guangzhou, which are not confined to the slab-type building and adopt a variety of flexible apartment forms.

In 1998, the government-led dilapidation project and the urban beautification campaign, the urban infrastructure was modernized and improved, and individual housing blocks and land clusters were also transformed. After 2000, commercial services in the old city of Guangzhou entered a relatively stable period, mainly in the form of partial renewal and transformation, and the architectural forms were mostly in the form of complex with podium buildings and towers. The layout of commercial service buildings constructed in the 1990s is relatively scattered, mostly distributed along the main road or beside the intersection of the main road [36]。

After the reform and opening up of Guangzhou Old Town, with the gradual outward movement of the city's commercial center and economic functions, the traditional commercial functions of the old town have been greatly impacted. For example, the original traditional commercial district of Guangzhou was centered on the arcade street in the past, which integrated the street system of living, shopping and handicraft production. However, with the rise of new commercial and financial centers such as Tianhe and Zhujiang New City, many traditional businesses in the old city have gradually declined, some traditional shops have been gradually replaced by large modern shopping malls, and even some areas have completely lost their original commercial functions and become cargo warehouses. The lively streets in the old quarter gradually lost their vitality.

With the relocation of the economic center and the promotion of modernization, the

original residents in the old city gradually moved out, especially many old city residents were relocated to the outer residential areas of the city. The residential function in the old city is weakened, replaced by the wholesale market, which leads to the gradual disappearance of the life atmosphere of the block.

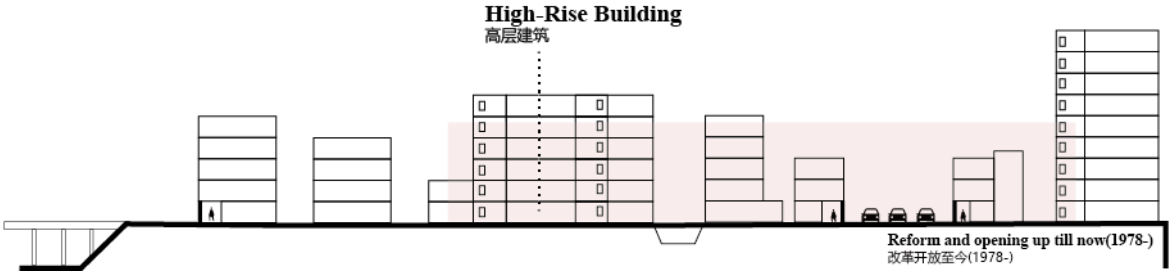


Figure 3-35 Section diagram of Guangzhou inner city wall area after the reform and opening up

Source: Drawn by the Author

3.6.2 Streets and Roads Network

Figure 3-36 Guangzhou inner city wall area street network after reform and opening up

Source: Drawn by the Author

After the reform and opening up, the main street skeleton has not changed, and traffic planning has been paid attention to, forming a relatively complete traffic network. Roads have been expanded and upgraded on a large scale, and the original narrow streets have been widened, making the traffic mobility of the city greatly enhanced. It not only improves the traffic capacity of vehicles, but also improves the traffic conditions of pedestrians and non-motor vehicles.

With the surge in population and vehicle numbers, Guangzhou has made great efforts to develop public transport, gradually establishing an extensive subway and bus system, which is

closely integrated with the road system.

Some streets have been renovated and transformed, forming a unique historical and cultural district atmosphere, so that the city retains its historical charm in the development. For example, in 2001, Beijing Road became an all-weather pedestrian street, and since then, the Beijing Road Pedestrian Street area has been continuously transformed and upgraded.

Figure 3-37 Beijing Road historical and cultural pedestrian street

Source: Drawn by the Author

The current status of the YuDai Moat is the internal road between the blocks, which has different functions in different blocks, such as parking lot, activity area, commercial exhibition, pocket park. Within the residential blocks, the YuDai Moat is used as a parking lot to park residents' private vehicles, such as Dinganli community, or to place some activity equipment, which becomes a public activity point for residents, such as Wendi community. In commercial and residential blocks, commercial outsides will be placed on the YuDai Moat street, or as a passage for food and beverage kitchens, such as Yingenli community. In the Gaudi community, some buildings have been converted into warehouses, and the sides of the YuDai Moat are used to temporarily store goods. In the commercial block, YuDai Moat Street should not only be used as a commodity exhibition space, but also accommodate the area of goods stacking and management, such as Xiaoxin Street community. Some of the YuDai Moat locations have been transformed into pocket parks, such as in front of the Gaodi Neighborhood Committee, where the narrow street interface was opened and residents raised funds to build public pavilions.

After becoming a street, YuDai Moat has been integrated into the lives of residents. Residents use this street together, but few people remember that it used to be a city moat of Guangzhou, and both sides of YuDai Moat are occupied by private people such as illegal occupation and construction of shelters, which affects the environmental style of YuDai Moat, and its own shape pattern is no longer recognizable.

Figure 3-38 YuDai Moat street status

Source: Drawn by the Author

3.6.3 Plan units and combinations

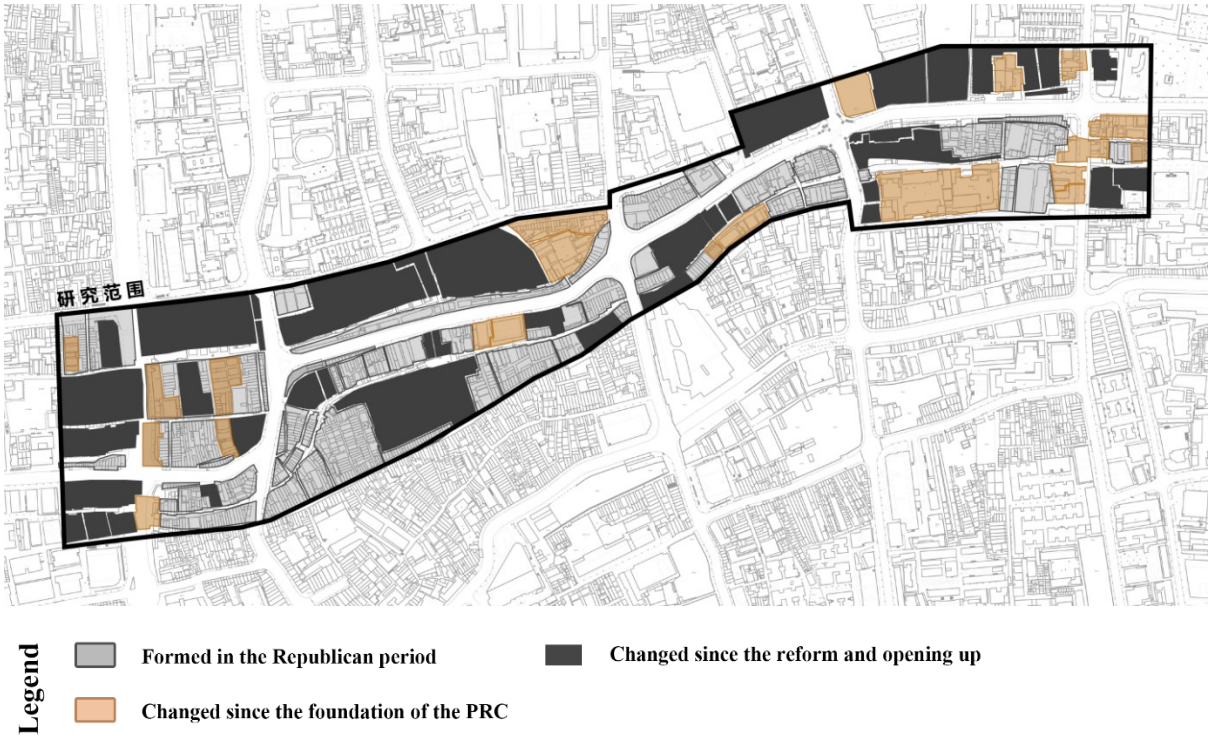


Figure 3-39 Guangzhou inner city wall area plan units after reform and opening up

Source: Drawn by the Author

After the reform and opening up, modern independent units were added to the inner city

wall area:

1）modern independent units

①Business unit

Form units formed by modern complexes and high-rise buildings, at least on both sides of the road, due to the large buildings around the entrance and reserved buffer space, often form a square space.

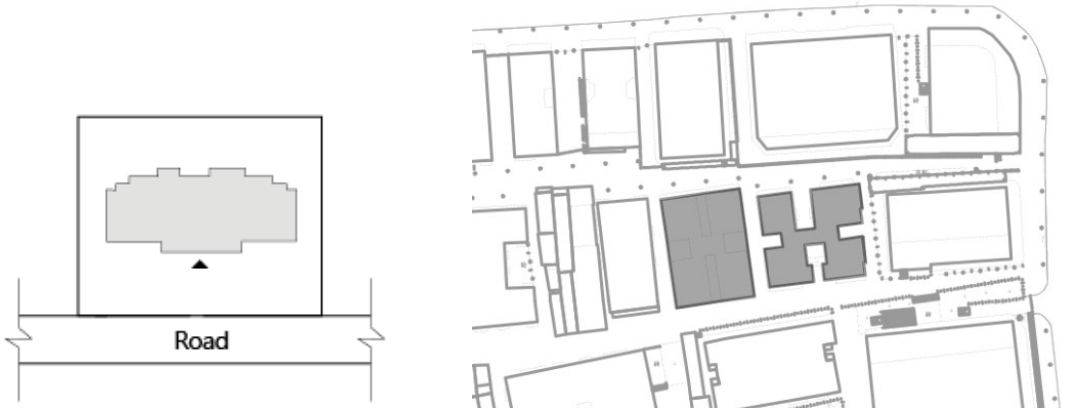
a) Pattern b) Instance

Figure 3-40 Modern independent business unit

Source: Drawn by the Author

②Residential unit

The residential buildings constructed after the reform and opening up are independent buildings, and pay more attention to the housing type and living space compared with the cylindrical buildings and unit buildings before the reform and opening up.



a) Pattern b) Instance

Figure 3-41 Modern independent Residential unit

Source: Drawn by the Author

3.6.4 Building Type

With the rapid economic development, a large number of modern high-rise buildings have gradually emerged in Guangzhou. Most of these buildings are office buildings, hotels and commercial complexes. Some high-rise buildings appear in the inner city wall area, such as the GuiDe Gate to the west, the DaNan Gate to the east, the WenMing Gate to the north and so on. The emergence of these high-rise buildings has greatly changed the height and density of buildings in the old city, and the skyline of the old city has undergone significant changes.

In response to the rapid growth of the urban population, many traditional low-rise residences in old urban areas have been demolished and replaced by high-rise residential buildings. These high-rise residential buildings are usually more than 10 floors, with modern elevator facilities and public services. The old city has gradually changed from low-density, low-rise buildings to high-density, high-rise residential areas.

In the process of urban renewal, many old buildings have been repaired or transformed to retain the characteristics of history and culture. For example, the arcade buildings along Beijing Road have undergone conservation restoration and reuse. While retaining their external form, the interior Spaces have been modernized and transformed into restaurants, bars, hotels, etc. In this way, historic buildings are integrated into modern commercial and tourist activities without losing their cultural heritage value, enhancing the vitality of the old town.

Figure 3-42 Chronological classification of buildings

Source: Drawn by the Author

As Guangzhou has become an international metropolis, some cultural and tourism buildings have gradually appeared in the old city. These buildings are specially built to meet

the needs of tourism, cultural exhibition and commercial activities, and have distinct Lingnan cultural characteristics.

And the buildings of the YuDai moat, after the founding of China, YuDai moat became a backstreet alley deep inside the block. The improvement of living conditions caused some residents to move out of the dense bambus-tube house buildings, and now the interior of the buildings has been reused as a wholesale market and warehouse for small commodities.

3.7 Summary

This chapter combs the historical morphological evolution of the inner city wall area of Guangzhou, and analyzes the overall spatial form of the city, the network of streets and roads, the combination of plots, and the types of buildings. The analysis of the historical evolution of the inner city wall area is the basis of understanding the overall form type of the region.

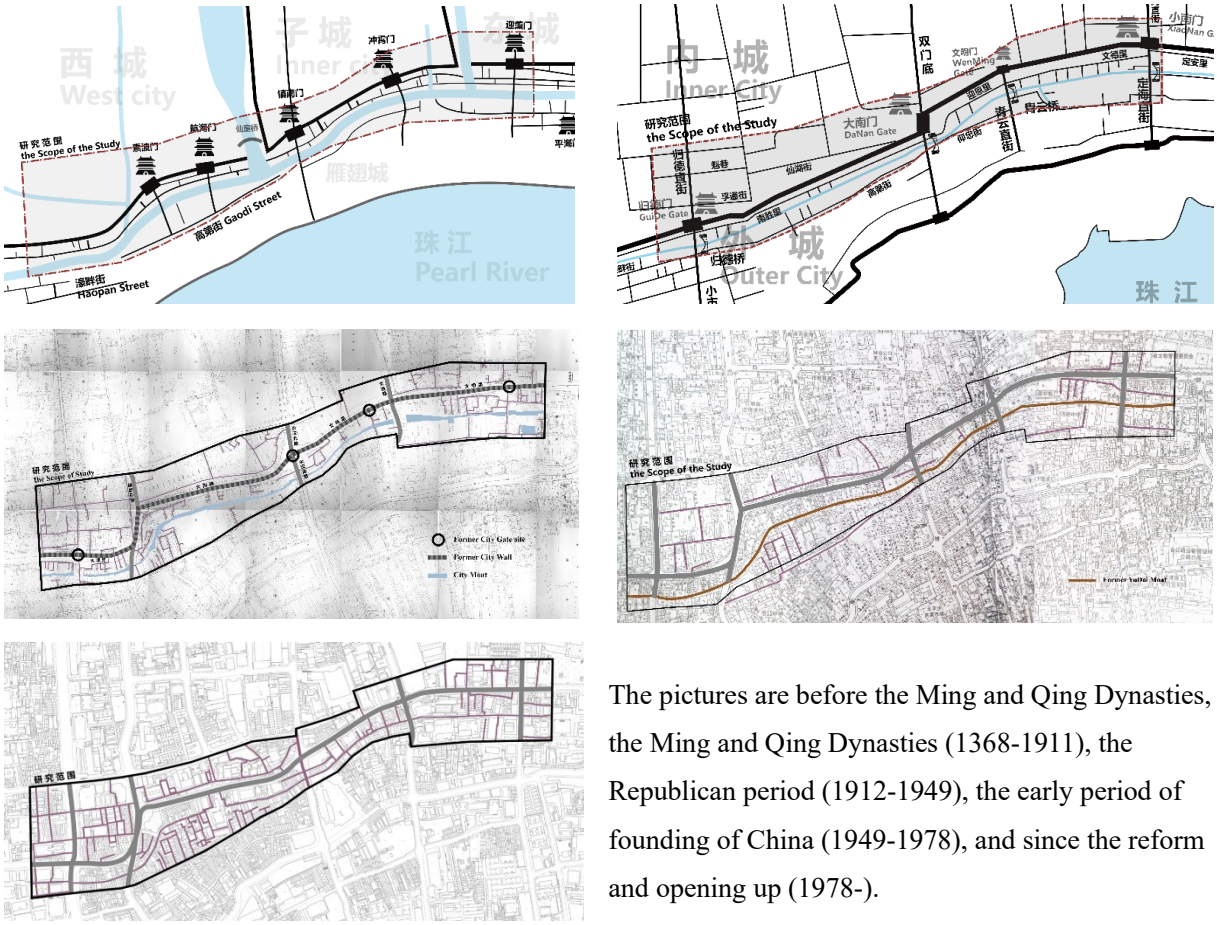
The overall spatial form of the city is a summary of the inner city wall area pattern of Guangzhou at that time. The inner city wall area of Guangzhou in successive dynasties has undergone maintenance, damage and reconstruction to a certain extent. The southern part of the inner city wall once belonged to the outer city of Guangzhou. In the Song Dynasty, YuDai Moat served as the moat of the outer city for water conservancy. In the Ming and Qing dynasties, the government built the new city on this basis to protect the commercial and residential areas, making the area of the moat also become the scope of Guangzhou city. During the period of the Republic of China, the urban development broke through the restrictions of the boundary outline, dismantled the city wall of Guangzhou, built new roads with the foundation of the wall and built shophouses on both sides of the road. In the early years of the founding of the People's Republic of China, the city further expanded, and the main activities were the management of the built environment and the solution of the housing problem, and the YuDai Moat was covered. After the reform and opening up, the city entered the road of rapid modern development, and a large number of construction activities were concentrated in the newly built districts, while the spatial form of the inner city wall area was mainly updated and transformed.

The element of the street and road network is relatively stable and rarely changes greatly except for special events since its formation. The initial formation of the inner city wall area street system is related to city moat and city gate. The prosperity of commerce in YuDai Moat has formed a number of streets parallel to and perpendicular to moat. The opening position of the city gate affects the direction of the main streets of the city. The city wall of the Republic of China was changed into the arcade street, which transformed this space from a closed to an open road and connected the north-south straight street gates to converge into an urban

intersection, completely affecting the shape of the inner city wall area, and the city wall continued to develop in the form of the arcade street. After the founding of the People's Republic of China, YuDai Moat this influencing factor has also changed into a part of the road system.

Due to the different degree of map drawing, the analysis of land parcel combination is mainly based on the form of the Republic of China. Since the demolition of cities and the construction of roads in the Republic of China, there are 9 plan units and combination forms in the inner city wall area. Among them, the main form types are single-row long street type, multi-row combined type and inner lane layout type.

The building type is the most active element, which is closely related to the combination of plots, and directly reflects the economic, social and cultural development in different historical periods. In Ming and Qing dynasties, the bamboo tube house with a single room and a long depth embodies the shortage of land housing resources and the combination of commerce and residence. This form of residential house changed in the period of the Republic of China, when some bamboo tube houses along the road were converted into shophouses. With the development of building materials and structures, the buildings became diversified and the number of floors increased. In the early days of the founding of the People's Republic of China, housing followed the economy and practicability, and many collective houses were built to solve the housing problem. The buildings inside the block also develop vertically in the narrow plots of bamboo tube houses. After the reform and opening up, the large-scale development of real estate is no longer limited to the former plots and architectural forms, and the old neighborhoods are demolished and built as a whole.



The pictures are before the Ming and Qing Dynasties, the Ming and Qing Dynasties (1368-1911), the Republican period (1912-1949), the early period of founding of China (1949-1978), and since the reform and opening up (1978-).

Figure 3-43 The evolution of street and road network in Guangzhou inner city wall area

Source: Drawn by the Author

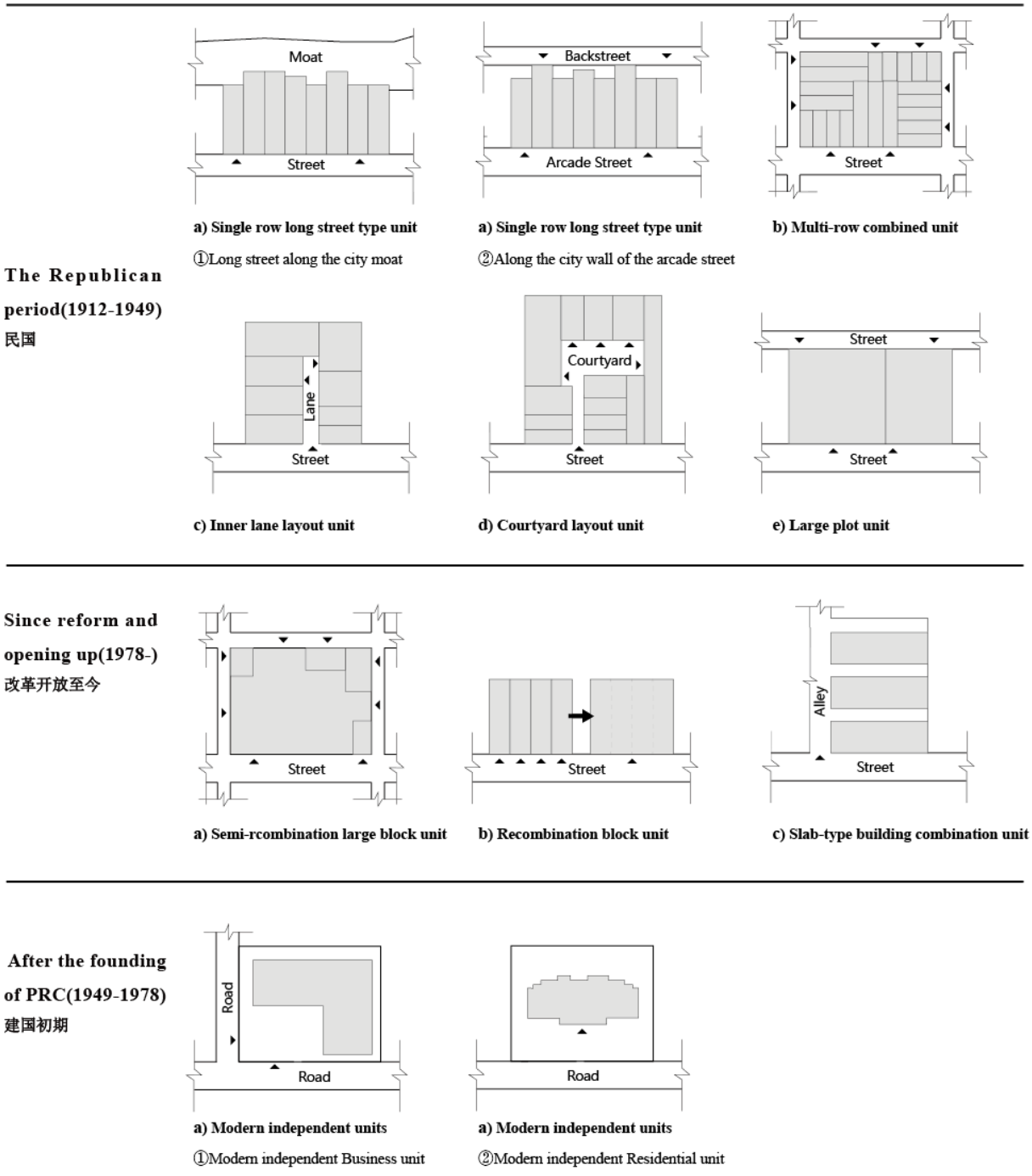


Figure 3-44 The evolution of plan units and combinations in Guangzhou inner city wall area

Source: Drawn by the Author

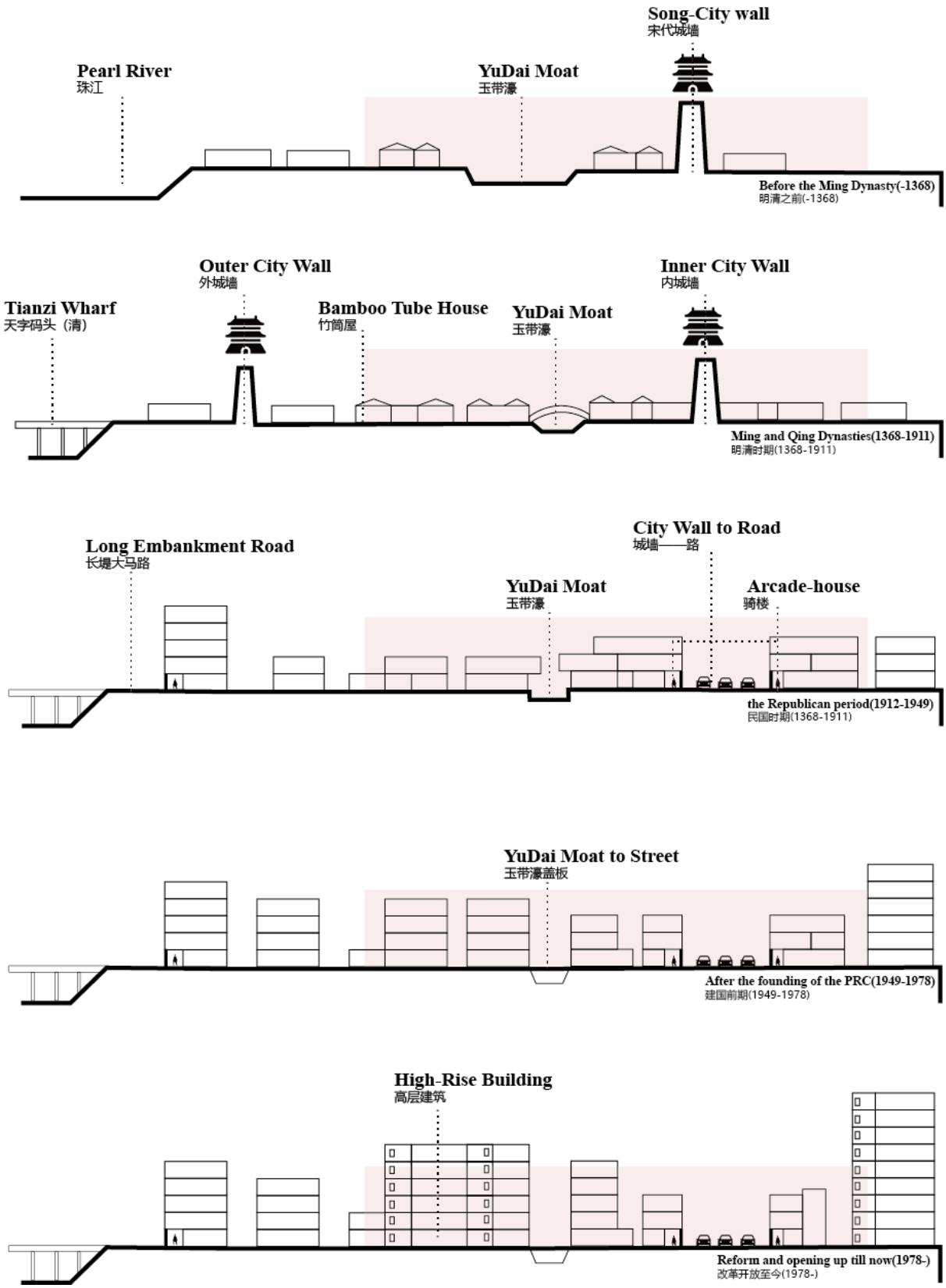


Figure 3-45 The evolution of section in Guangzhou inner city wall area

Source: Drawn by the Author

Chapter 4 City gate node current situation analysis

The previous chapter analyzed the evolution of the overall spatial form of the inner city wall area, and this chapter selected important gate node space from the inner city wall area for further analysis. The city gate node has multiple functions in the historical urban spatial form, and has a profound impact on the traffic, function, culture and social life of the surrounding urban space. It is not only a physical transportation hub and defense node, but also a cultural symbol of the city and the core of spatial organization.

1) Transportation hub and urban spatial organization

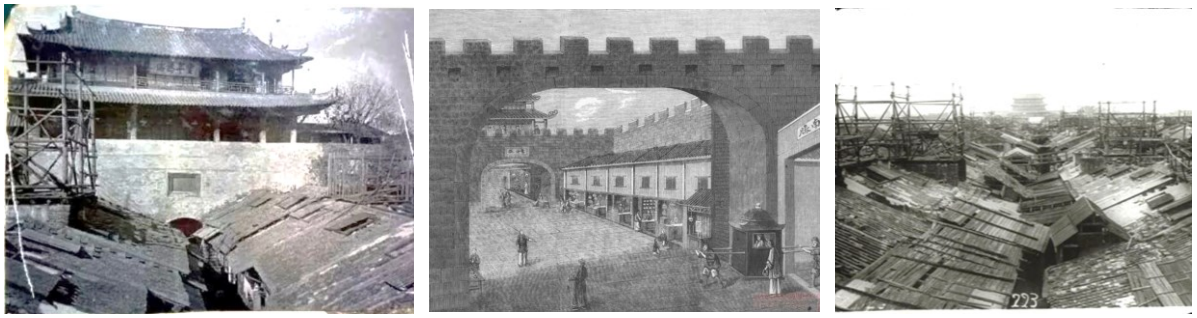
The city gate is the main passageway connecting inside and outside the ancient city. As a transportation hub, it has a decisive influence on the layout of the city's road network. The city gate node connects the main road of the city, radiates from the city gate to the interior of the city, and forms the network structure of the main and secondary roads. These roads not only assume the traffic function, but also directly affect the distribution and spatial structure of the city blocks, and the surrounding streets and buildings are organized around this node.

Due to the large traffic flow at the city gate, the vicinity of the city gate often becomes a distribution center for commercial activities. The markets, shops and markets near the city gate will develop rapidly relying on the transportation advantages of the city gate to form a bustling business area within the city. As the hub of economic activities, the city gate also affects the functional zoning of the city perimeter space.

2) Cultural symbols and social life

The gates also have important cultural symbolism and have a profound impact on the shape of the city. As a landmark building of the city, the city gate carries the city's history, culture and symbols of power.

The existence of the city gate makes the form of the city have a clear spatial node, which enhances the city's identity and local characteristics. Ancient cities often took the city gate as an important place of cultural memory, and the surrounding area often became the site of festival celebrations, official greeting, military parade and other activities. These activities combined with the city gate architecture formed a unique urban spatial culture, promoted the development of commercial and cultural activities, and enhanced the spatial vitality around the city gate node.



a) The road, buildings and market in front of the GuiDe Gate

b) the market in the gate of GuiDe Gate

c) the arrangement of buildings in the DaNan Gate

Figure 4-1 The importance of city gate nodes

Source: a) 、b) 、c)Old news of Guangzhou（mp.weixin.qq.com/）

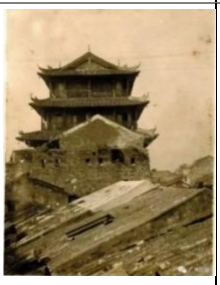
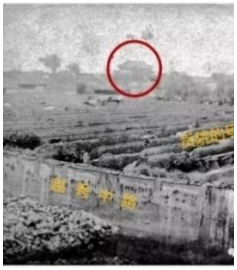
Through the introduction of landscape design, public art and cultural activities, the spatial form around the gate node has been reshaped, making it a new focus of urban public life.

Therefore, whether as the entrance of the city in the past or as a cultural site today, the node space of the gate has a profound impact on the form and function of the surrounding urban space, carrying the historical memory of the city and the transformation of modern functions, making it an important entry point for the study of the inner city wall area. Although the site of gate node in the inner city wall area of Guangzhou no longer exists, its influence on the spatial form of the surrounding city still exists.

4.1 City Gate node selection

The study on the inner city wall area of Guangzhou includes four gates: GuiDe Gate, DaNan Gate, WenMing Gate and XiaoNan Gate, which are the gates connecting the inner and outer cities, and each of them is located at an important node. GuiDe Gate is the dividing point between the two counties in the city, and the DaNan Gate is the southern gate of Guangzhou to the outside world. In the Ming and Qing Dynasties, on the north-south central axis of the old city of Guangzhou, both inside and outside the city are the official Avenue, which is the gate for officials to enter the city. The WenMing Gate and the small XiaoNan Gate are located near the Guangfu Academy and the Tribute Academy. They are the only way to study in ancient times and have cultural heritage.

Table 4-1 Comparison of four gates in inner city wall area

Gate	GuiDe Gate	DaNan Gate	WenMing Gate	XiaoNan Gate
Photo				
Function	To distinguish the boundary between South China Sea and Panyu county	The vital gate, the symbol	It is directly opposite the Guangfu Academy and connects the inner and outer cities	Nearby the Tribute courtyard connects the inner and outer cities
status quo	Road intersection	Road intersection	T-junction end point	Road intersection
heritage	The gate stone forehead is in the stele Gallery of Guangzhou Museum	none	The name of the gate	none
Historic district	To the east is Guangzhou traditional central axis historical protection area	Part of it belongs to Beijing Road Historical and cultural Block	To the south is Guangzhou Wendenan Historical and cultural District	not belong to
Block format	Comprehensive commercial, east of the Gaodi West shoe Street main footwear display, sales	Business, Beijing Road Pedestrian Street cultural business experience	Residential, up and down business model	Residential

Source: Drawn by the Author

The four gates can be classified into two categories according to their shape, one is GuiDe Gate, DaNan Gate and XiaoNan Gate. These three gates were important gates in the inner city wall area during the city wall period, with gate towers and barges, and were in key positions for the north-south road communication between the inner and outer cities. After the demolition of the city wall, the positions of these gates became road intersections, while the WenMing Gate belongs to the second category. A single gate does not set a walled city, the road from the outer city to the Guangfu Academy, after the demolition of the city to form a T-junction endpoint, the name of the gate is still preserved in the WenMing Road arcade street.

GuiDe Gate is a comprehensive nodal space, with residential commerce to the west and commodity wholesale industry to the east. The DaNan Gate is located in the walking block of

Beijing Road, and the surrounding area belongs to the nature of commercial experience, while the surrounding area of WenMing Gate and XiaoNan Gate belongs to the residential category.

The paper selects GuiDe Gate and WenMing Gate from the four gates in the inner city wall area to further analyze the status quo and evolution of the city gate historical block.

4.2 GuiDe Gate Node

GuiDe Gate, located at the junction of today's Jiefang South Road and Dade Road, was a special gate in the Ming and Qing dynasties. It used to be the boundary between Nanhai County and Panyu County. In the Qing Dynasty, it was bounded by the GuiDe Straight Street inside the GuiDe Gate. The west was the residence of the eight Banners of Manchu Han Dynasty, and the east was the residence of the Han people. Once closed after the night ban cannot be opened. During the Ming and Qing dynasties, the area around GuiDe Gate was very prosperous. Yu Xunqing in the "Lotus gallery notes" in this record: "Guangzhou south of the right for the GuiDe gate, back city area for the old evil land, south of the city water, Zhu Lou painting pavilion, scale next to each other, across the bank of the city street, merchants gathered." Inside and outside GuiDe Gate, especially the flower market, lantern market, quail market is the most famous.

Figure 4-2 The research scope and design scope of GuiDe Gate

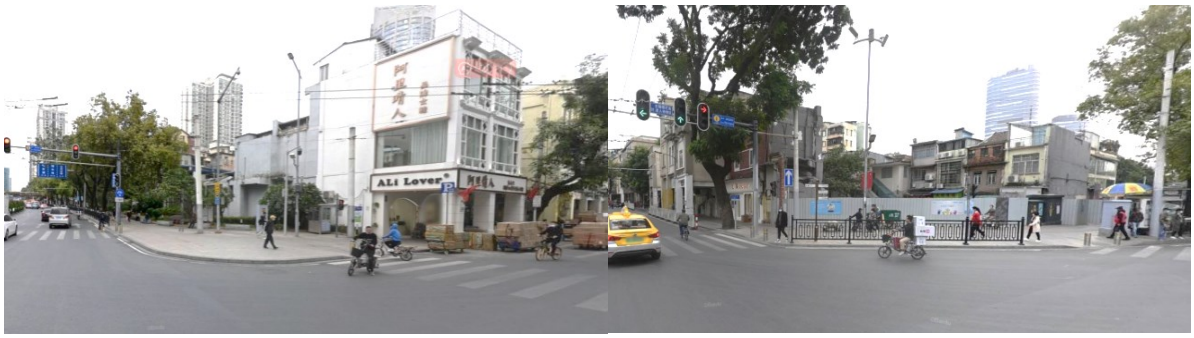
Source: Drawn by the Author

The present site of GuiDe Gate is located at the intersection of the road, and the east is the southern section of the historical protection area of the traditional central axis of Guangzhou. The study area of the block is about 265 meters from east to west and 155 meters from north to south.

Figure 4-3 Aerial view of GuiDe Gate

Source: Drawn by the Author

a) Northwest corner b) Southwest corner



c) Northeast corner d) Southeast corner

Figure 4-4 The street corner of GuiDe Gate

Source: Drawn by the Author

4.2.1 Streets and Roads Network

1）Street system evolution

After the demolition of the city wall at Guide Gate in 1921, there were still some gate ruins

left at Guide Gate, and the new east-west wide road was named Dade Road after Guide Gate, while the north-south streets still retained the traditional road scale. There are four archways along the road north of the GuiDe Gate. During the Ming and Qing Dynasties, this road was called the Four archways. (Figure 4-3)

At the beginning of 30 years of the Republic of China, Sipai Lou widened the road, and the construction of the Arcade Street was renamed Zhonghua Middle Road. In 1947, Zhonghua Middle Road was badly damaged in the war, and four archways were moved to other places to facilitate transportation. In 1954, the north-south straight street was renamed Jiefang (North, Middle and South) Road to commemorate the PLA's entry into Guangzhou. Since the 1970s, Jiefang Road has been the main road of the city for a comprehensive widening project, and in 1994, the arcade along the street was gradually cleared, and Jiefang Middle Road and Jiefang South Road formed a two-way 6-lane carriageway, while the crossing of Dade Road is a one-way 3-lane. At this point, the Guide Gate node is formed by the closed city wall and gate structure to form a cross-type urban road intersection.

Street roads between plots are relatively stable, except for the complete replacement of morphological units to produce new unit roads, most of the other roads continue the trend of the Republic of China period. After the founding of the city, the cover plate makes the YuDai Moat become an east-west road, and the south and north banks of the YuDai Moat are connected with each other, but some inner roads still maintain the original pattern.

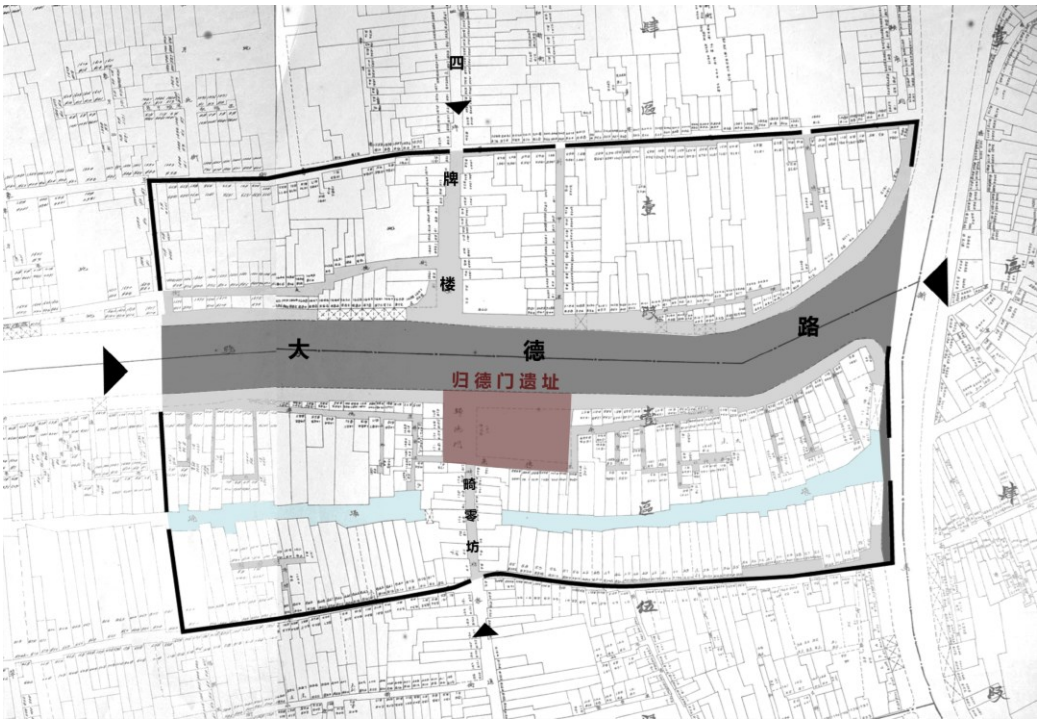


Figure 4-5 Ruins after the demolition of Guide Gate during the Republic of China

Source: Drawn by the Author（Base map: Guangzhou Boundary Map）

2）Street status analysis

Guide Gate is now the intersection of Jiefang Road and Dade Road, Jiefang Road is a two-way 6-lane urban trunk road with a relatively high level. The road is separated by flower beds in the middle of the road, and there are no non-motorized lanes on both sides. The original 7-9 meters pedestrian area above the curb is now enclosed by partitions, leaving less than 5 meters of space. From the road profile, it can be seen that the height difference between the two sides of the building is large, and the street width to height ratio varies from 0.5 to 11.6. Dade Road is a one-way 3 lanes, with railings on both sides of the non-motorized lane, less than one meter, both sides of the road for the street, the street width to height ratio of 1.2-1.6, the bottom is mostly shoes wholesale shops, often the goods carton pile on the roadside to occupy the non-motorized lane space.

Figure 4-6 GuiDe gate status map

Source: Drawn by the Author

In addition to the main roads, there are many pedestrian streets in the site, some of which are commercial streets such as Gaudi West Street, where goods are piled on the road surface,

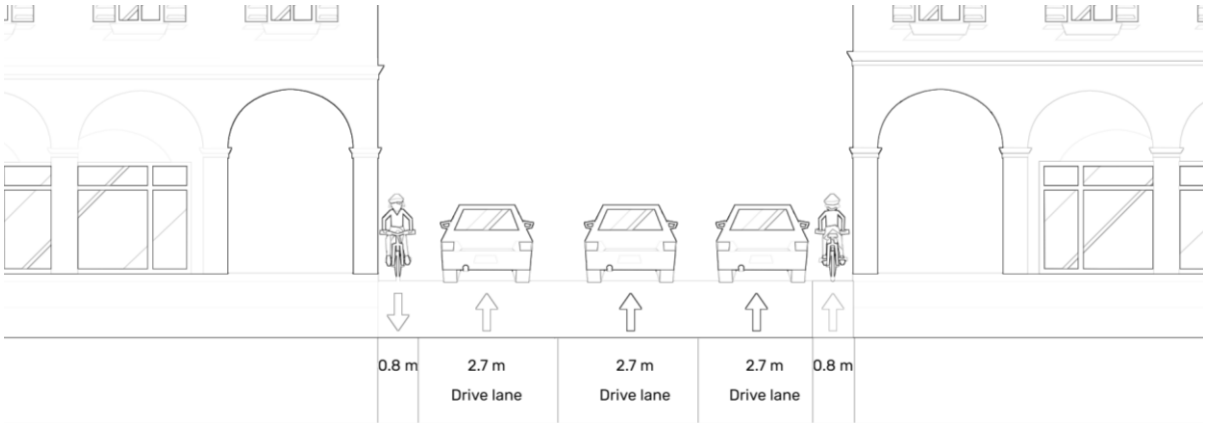
and the actual walking width is small and there are often non-motor vehicles to transport goods. The other most of them are in the traditional texture of the "cold lane", located between the building exterior wall and the surrounding wall or between the adjacent two sides of the building, the width is narrow and the height is high, which is easy to form the wind effect, but the existing state of the environment is poor, the dark and sanitary situation in the roadway is not good, often the upper air conditioning water is low, and pedestrians often pass the roadway quickly and rarely stay.

a）DaDe Road　b）Jiefang Middle Road　c）Jiefang South Road

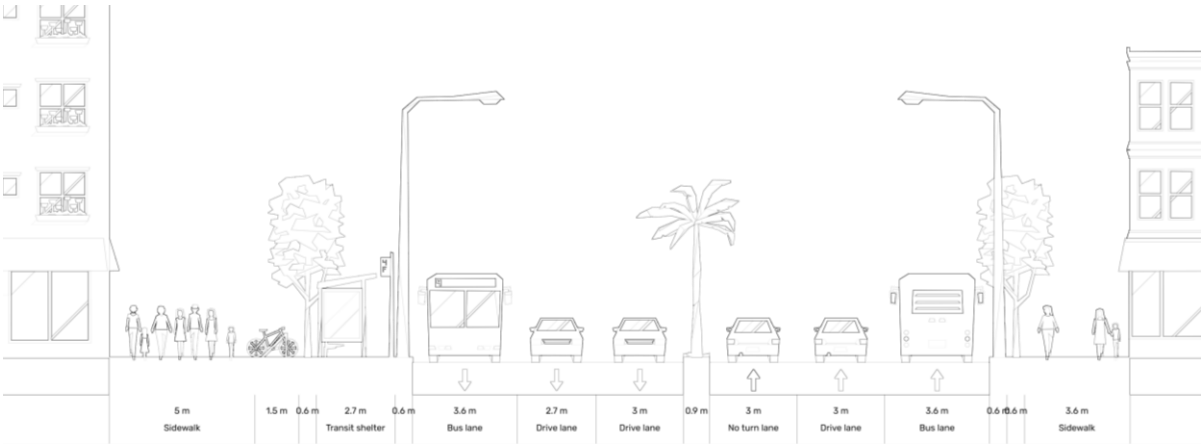
d）Gaodi West Shoe Street　e）HaoPan Street　f）Futong street　g）Hongzho Li

Figure 4-7 Street status of GuiDe Gate

Source: Drawn by the Author



a）DaDe Road

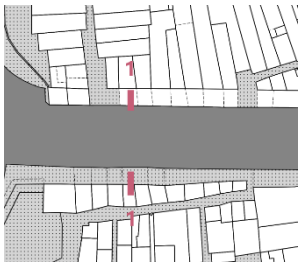
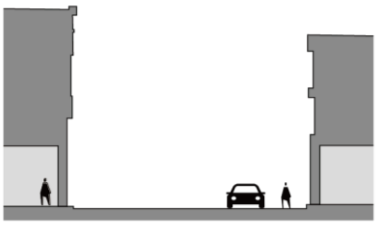
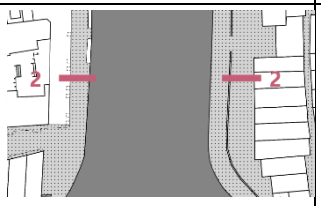
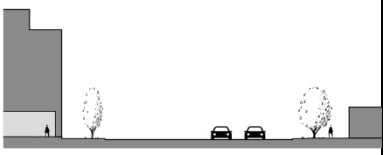
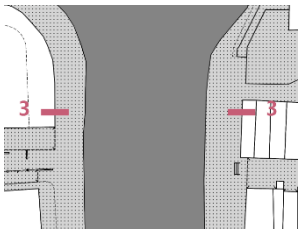
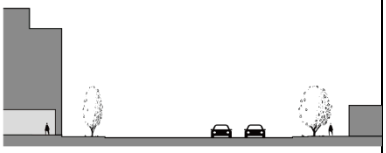
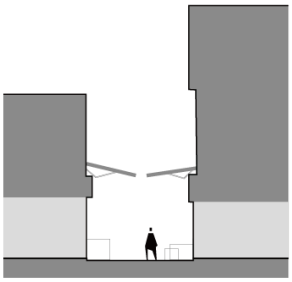


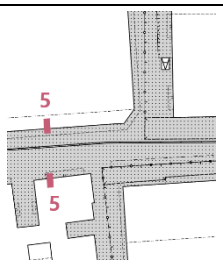
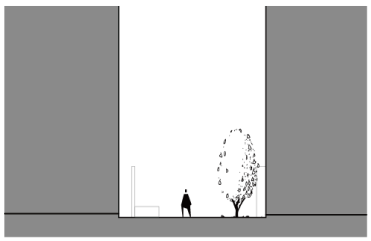
b）Jiefang Road

Figure 4-8 Section diagram of the crossing road at the city gate

Source: Drawn by the Author

Table 4-2 GuiDe men street width to height ratio

Name	**type**	**Plan**	**section**	**D/H**
DaDe Road	One way 3 lanes Second level Arcade Street			1. 2−1. 6
Jiefang Middle Road	Main road			2. 7−11. 6
Jiefang South Road	Main road			0. 5−3. 9
Gaodi West Shoe Street	Third traditional streets			0. 5−1. 0

HaoPan Street	plot road			0. 2−0. 4

Source: Drawn by the Author

4.2.2 Plan units and combinations

Figure 4-9 Plan units and combinations in GuiDe Gate

Source: Drawn by the Author

Figure 4-10 Degree of plan unit change

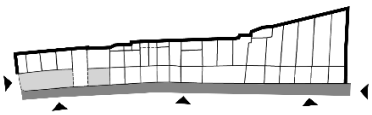
Source: Drawn by the Author

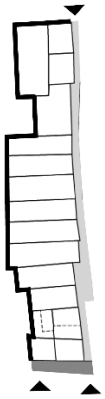
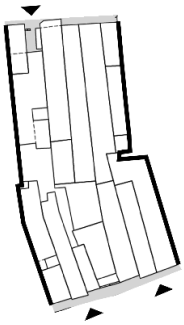
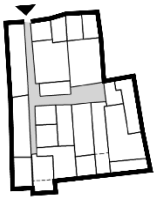
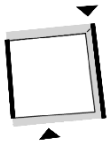
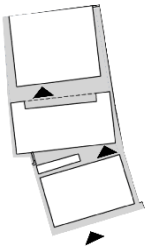
Figure 4-11 Degree of plan unit change

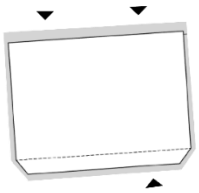
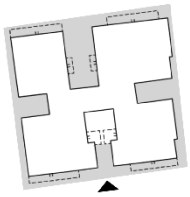
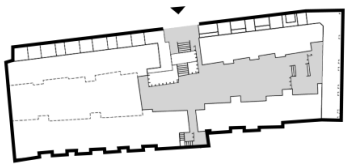
Source: Drawn by the Author

There are 7 types of units in Guide Gate block, including single-row long street, multi-row combined, inner lane layout, reorganized plot, panel building combination and modern independent unit. Among them, the land units west of Guide Gate changed greatly. In the Republic of China, the layout of single-row long street and inner alley were mainly composed of bamboo tube houses. After the founding of the People's Republic of China, it was updated and reorganized into larger plots, and independent form units were formed after the reform and opening-up. Most of the land to the east of Guide Gate remained in the form of the Republic of China.

Table 4-3 Analysis of unit type of Guide Gate block

Plan unit	type	Unit example	description	Number	Degree of variation
a-1	Single row long street type unit		The rebuilt arcade street after the demolition of the city wall	3	Maintain the overall shape framework of the Republic of China, with little change
a-2	Single row long street type unit		Single row bamboo tube house along the original YuDai Moat	3	After the cover, there are more additions to maintain the traditional

					texture as a whole
a-3	Single row long street type unit		Reconstruction and expansion of the reserved form units of Jiefang Middle Road	1	Continue the form of the Republic of China period, maintain the traditional texture
b-1	Multi-row combined unit		residential community	2	Continue the form of the Republic of China period, maintain the traditional texture
c-1	Inner lane layout unit		Today, it serves as a wholesale market for shoes and accessories on Gaudi West Street	1	Continue the form of the Republic of China period, maintain the traditional texture
e-1	Recombination block unit		Reorganized bamboo tube house plots into single-family houses	1	After the founding of the new reorganized
f-1	Slab-type building combination unit		Residential building	1	After the founding of the new reorganized

g-1	Modern independent business unit		High-rise apartments and office buildings along the road	3	High strength development, change the original texture
h-1	Modern independent Residential unit		Jiefang middle Road commercial and residential building	1	After the reform and opening up, it was re-developed and the original texture was changed
h-2	Modern independent Residential unit		Dade Zhong Community residential building 70	1	After the reform and opening up, it was re-developed and the original texture was changed

Source: Drawn by the Author

4.2.3 Building Type

1）Building type evolution

GuiDe Gate is located on the boundary line of the protection range of historical blocks, and there is a large gap between the east and the west of the buildings in the block, which is usually manifested as the incompatibility of local street corner buildings and the overall style, and the inintegration of modern construction and traditional style[80]. The buildings in the west are mostly newly built buildings after the reform and opening up, with the characteristics of modern architecture, while the buildings in the east retain the traditional fabric of Guangzhou during the Republic of China, forming a high-density block form. The analysis of buildings in the block can be divided into basic types and special types according to Caniggia's classification of building types. Basic types refer to traditional residential, commercial and residential buildings, such as bamboo tube houses and their variants and shophouses, while special types refer to high-rise buildings formed after the reform and opening up due to the needs of modern commercial offices.

① Basic Type

According to the plot information recorded in the Map of Guangzhou Economic Boundary during the period of the Republic of China, it can be inferred that there are a large number of

long and narrow bamboo tube houses with a wide distribution area of about 4 meters and the depth direction changes with the street block, especially along the coast of Yudai Moat. On both sides of Dade Road are some shophouses rebuilt from bamboo tube houses or built independently.

Figure 4-12 Current situation of arcade building in the Republican period

Source: Drawn by the Author

a. Building façade evolution

From the existing Republic period arcade buildings in the block, it can be seen that the number of floors of bamboo tube houses and shophouses in the Republic of China is usually 2 to 3 stories, most of the houses built at the time are flat roofs, and the facade uses terrazzo brush, reinforced concrete components, and Western decorative elements, such as columns, Western molding, arch.

After the founding of the People's Republic of China, the facade level began to be simplified, only retaining the basic form, and the use of materials gradually diversified, from color plastering to tile veneer, and later added to other structures on the roof. At the same time, due to the increase in population, the number of residential floors gradually increased.

b. Building entrance direction evolution

Before the YuDai Moat of Gaodi West Street is covered, the buildings on both sides occupy the river space, and because the YuDai Moat is often silted, when the water level is high, it will be poured back into the block room, so the main entrances and exits of the buildings along the two sides of the street are opened on the land side. After the cover plate is formed into a road, the bamboo tube house itself has a large gap between the opening direction and the depth direction, emphasizing the characteristics of a single radial, which can flexibly change the direction of the entrance and exit, and the buildings along both sides of the YuDai Moat road begin to be rebuilt to set the main entrance and exit to the road of the YuDai Moat cover plate.

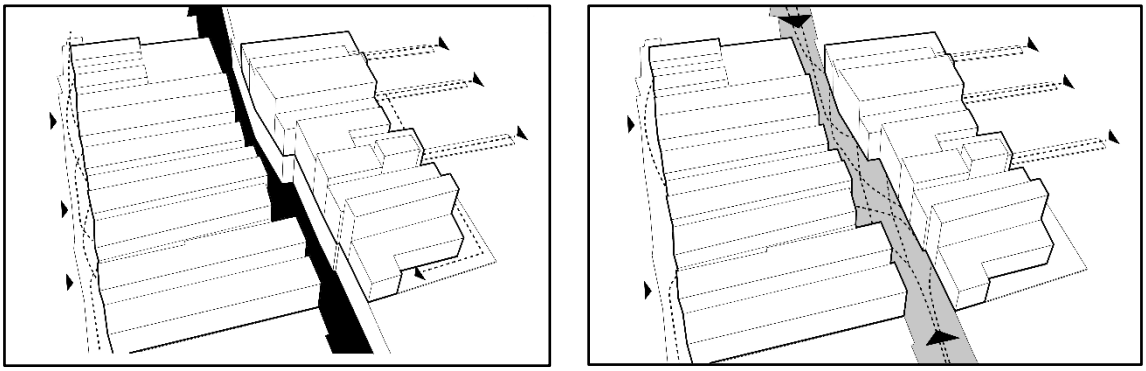


Figure 4-13 Schematic diagram of the evolution of the entrance direction of the building after the cover of the YuDai Moat

Source: Drawn by the Author

c. Building function evolution

The expansion and rapid development of the city after the reform and opening up have brought more business opportunities to GuiDe Gate District. Due to the narrow space of traditional bamboo tube houses and poor permeability and lighting, residents began to withdraw bamboo tube houses and move into new residential buildings, and these traditional buildings can accommodate more shops in the same frontage area because of their single row, row distribution and small opening characteristics, so they have been favored by commercial needs. The bamboo tube house complex of Gaudi West Street and Haopan Street together form a professional shoe market. The bamboo tube house complex north of Dade Road is in the form of multi-row combination, the building opening and orientation are not uniform, but the building density is high, and it has become the commercial storage space of Gaodi West Street.

d. Bamboo tube house commercial type evolution

The traditional rows of bamboo tube houses are separated by walls. When they are used in the professional market, a new variation is generated. The interior of the bamboo tube houses is opened up, and the appearance still maintains the original shape texture.

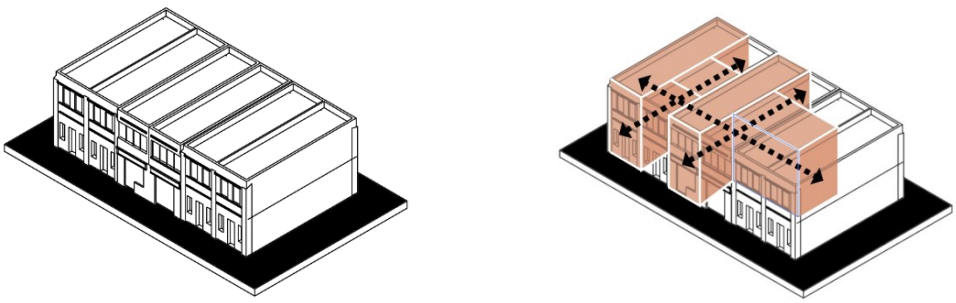


Figure 4-14 Bamboo tube house interior opening diagram

Source: Drawn by the Author

Figure 4-15 Gaodi West Street internal opening status quo

Source: Drawn by the Author

e. Bamboo tube house residential type evolution

There is also a modern residential building translated from bamboo tube houses in the block, which is a commercial and residential building located in the northwest of Liberation. The residential building, built in 1965, has two rows, with four sides enclosing a large internal public space and the ground floor elevated to provide parking or commercial shops. Its characteristic is that the facade is roughly divided into 4 meters of space to divide the unit, part of the volume proposed, the bottom is raised with columns, forming a convex and concave change, the height above is also similar to the traditional form, the street part has 3 floors, the street part has 4, 5 floors, from the street view with the traditional bamboo tube house form, maintain the texture of the bamboo tube house around the site.

a) Pattern b) Instance

Figure 4-16 Bamboo tube house modern residential evolution

Source: Drawn by the Author

② Special Type

The special types of buildings in Guide Gate block are the apartment and office buildings Yuexiu Cube Talent Innovation Center, Entry-exit Building and Jiefang Building located in the southwest of the block. These buildings were built after the reform and opening up. The ground floor is not elevated, the number of floors is 30 stories higher, the land area is much larger than the traditional scale, and modern materials and structures are used. The appearance adopts a unified window opening way, and the facade is regular and simple.

This kind of special building is too far away from the historic district on the east side, and the design makes less use of traditional form elements.

a) Immigration building b) Talent innovation center (Jinyi building)

Figure 4-17 GuiDe Gate block special type building

Source: Drawn by the Author

2）Building status analysis

① building height

The research area is the highest in the southwest, where the highest building is 30 floors, while the historic districts with traditional textures in the northeast and southeast are generally 1-3 floors, and a few residential buildings and arcade buildings are more than 4 floors. It is high in the southwest and low in the northeast. (Figure 4-18)

② building function

West of Guide Gate is mainly residential and business office. In the southwest of the research area, Haopan Street is flanked by Dade Zhong community on both sides, and high-rise business and office buildings are located on both sides of urban road. In the northwest, shophouses facing the street are hardware and supplies retail stores, in the north, commercial and residential buildings of Jiefang Middle Road, in the east of Guide Gate, retail and wholesale small businesses are dominated, and in the southeast, Yudai Moat is Gaodi West Street shoe wholesale Market. Shops and shooting and exhibition Spaces are distributed in close succession. These buildings are generally 2 floors, the bottom floor is used for display and sales, and the upper floor is used for shooting samples, broadcasting rooms and other functions. Part of the building north of Dade Road is used for shoe warehouse, part is residential housing, along the ground floor of Dade Road is a signature arts and crafts shop street. (Figure 4-19)

③ Historic preservation buildings

There are 8 historical buildings on both sides of the site along Dade Road, which are the shophouses built during the Republic of China and belong to the immovable cultural heritage protection clues. Among them, No. 317 Dade Road Arcade is a 2-story arcade, the lower floor is a furniture store, No. 319 Dade Road Arcade is 3-story, No. 321 Arcade is a Debond express point, No. 323 Arcade is no longer a part of the arcade, only the ceiling, the bottom floor is a restaurant, No. 325 Arcade is 3-story, and the next is a trophy crafts shop. No. 327, Dade Road, 2 storeys high, has been reconstructed into a modern form, used as a wholesale shoe store, No. 390, Dade Road, 4 storeys high, the top is built, the bottom floor is a shoe store, No. 392, Dade Road, 3 storeys high, the bottom floor is a shoe store. These historical buildings are used for commercial storage and other purposes, and some of the exterior is still retained in the form of the Republic of China, but the structure is broken and the external walls have fallen off and have not been properly maintained. (Figure 4-20)

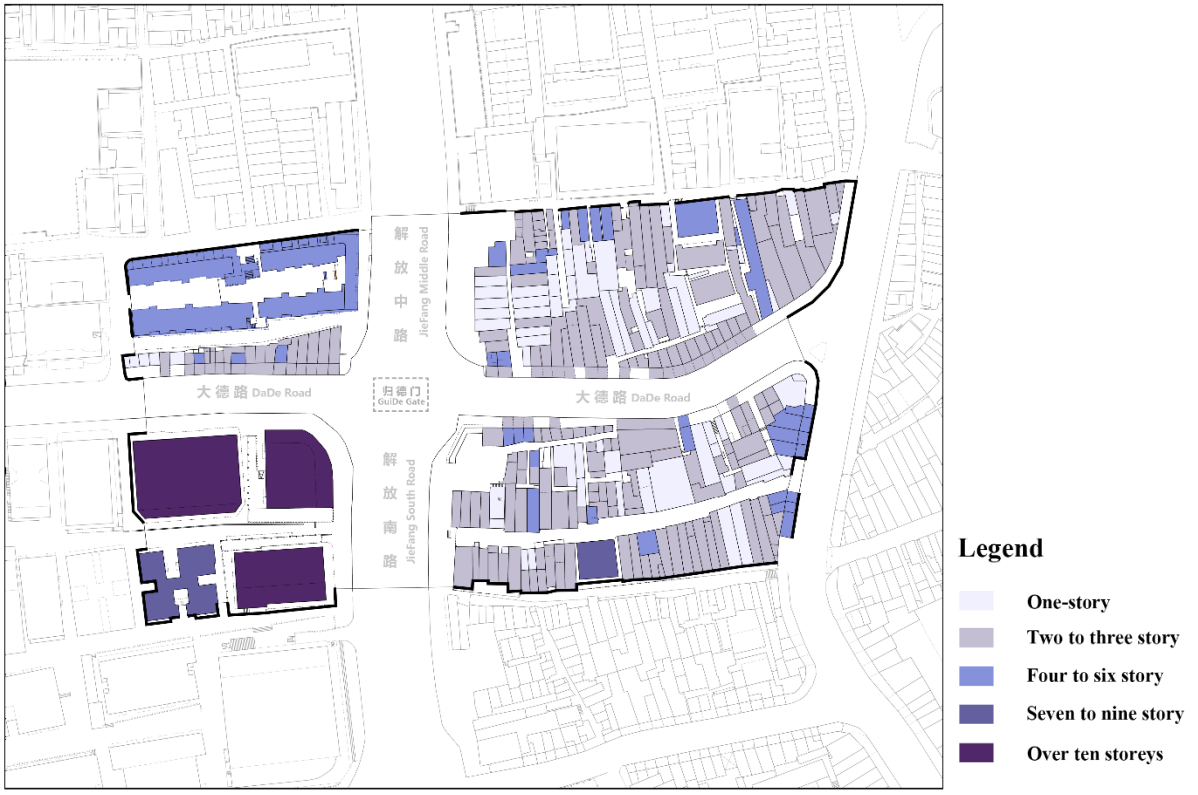


Figure 4-18 Height analysis of Guide Gate building

Source: Drawn by the Author

Figure 4-19 Function analysis of Guide Gate building

Source: Drawn by the Author

Figure 4-20 Historical clues analysis of Guide Gate

Source: Drawn by the Author

4.2.4 Interface and arcade space

In addition to the southwest plot, there are some arcade buildings distributed along the road of Dade Road and Uprising Road. These arcade buildings have different architectural forms, and several connected buildings are often of the same style. A notable feature of the arcade building is the corridor space formed on the ground floor of the building.

The height of the buildings in the arcade block may vary depending on age, owner, functional needs, etc. Some buildings may have been raised or altered in their original design during renovation or new construction, resulting in a mismatch in height between the coherent arcades and corridors. The function of the arcade building also changes with the change of social needs. Some new buildings after the demolition of the arcade building do not continue this form, which makes the interface of the arcade street and the bottom corridor space discontinuous. The corridor is a walking space that can provide shade from the sun and rain, but this function is lost due to the fracture of the arcade interface.

Figure 4-21 Discontinuous street interface

Source: Drawn by the Author

Figure 4-22 GuiDe Gate street interface and arcade space

Source: Drawn by the Author

4.2.5 Morphological region

Based on the analysis of land units and combinations, building types, land and building use patterns, historical and cultural background, the research scope can be summarized into 6 types of morphological region:

1) Traditional bamboo tube house Morphological region R1

The traditional bamboo tube house is formed by the combination of bamboo tube house buildings, and the combination of land plots has three kinds of single-row long street, multi-row combined and inner lane layout, which maintains the traditional texture of Guangzhou city. The height of this type of area is generally not more than 3 floors, the building density is high,

and the narrow laneway between the buildings forms the traditional "cold lane" form. Due to the users' construction of bamboo tube houses, the buildings are crowded and blocked, and it is easy to form "sick" bamboo tube houses[81].

2) Arcade building street Morphological region R2

Arcade building street refers to the shophouse street built on both sides of the new road in the period of the Republic of China. The combination of such regional plots is generally single-row long street. Arcade street construction along the street, the bottom level is raised to facilitate traffic, including the overhead generally not more than 4 floors, the function of the bottom is the shop, the upper level is either for living or for shops, storage. It can be seen from its depth and side facade form that some of the arcade streets in GuiDe Gate are transformed from bamboo tube houses, and some are independently constructed. At present, the arcade building street is for selling shoes and crafts shops.

3) Collective Housing Morphological region R3

Integrated residential buildings are a series of residential buildings established after the founding of the People's Republic or after the reform and opening up to solve the housing problem of residents. The combination of this type of regional block is generally reconstituted block unit or modern residential unit. The height varies, most residential buildings are 4-5 stories high, some are 9 stories high. The exterior shapes are diverse, and the interior layout focuses on practicality. Do not reserve too many bases between houses.

4) Modern high-rise building Morphological region R4

Modern high-rise buildings are built after 2000, mainly commercial buildings, apartments, such form of regional land combinations for modern independent unit form, the height of 10-30 stories. It does not belong to the traditional urban form because of its large size and area.

5) City Gate node Morphological region R5

GuiDe Gate is located at the intersection of urban roads, and the original site of GuiDe Gate is taken as the boundary, with the traditional central axis historical protection area to the east and modern high-rise buildings to the west. Taking GuiDe Gate as the center, the nearby street space, corner open space, road intersection and so on are classified into the gate node space, and the unused corner space can be used to shape the historical and cultural atmosphere of the node.

6) Yudai Moat Street Life Morphological region R6

In the east section of YuDai Moat is the commercial shop street of Gaodi West Street, selling shoes. On the one hand, the street is used as a display surface for shops, and on the other hand, many shops will pile their goods on both sides of the street. The middle is interrupted by

Jiefang South Road. The western section is the internal road of Dade Zhong community. At the entrance of this section, there are YuDai Moat, HaoPan Street historical and cultural publicity walls, and corridor landscape facilities.

The different evolution directions of Yudai Street have formed different commercial and residential atmospheres.

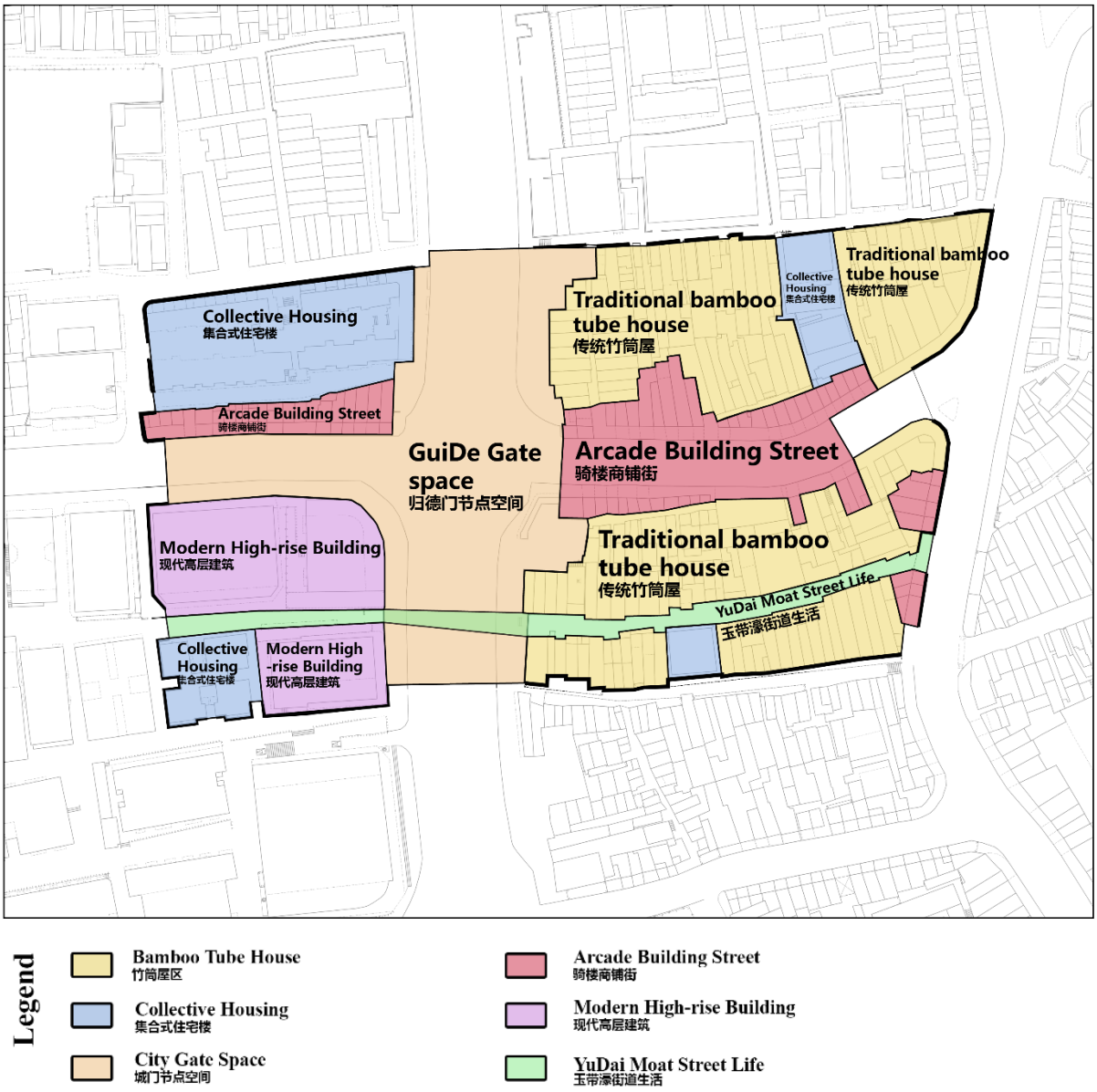


Figure 4-23 GuiDe Gate Morphological region

Source: Drawn by the Author

4.2.6 Users and activities

1）Wholesale shops

Activity type Selling customers, sorting and shipping

Activity time：10： 00−19： 30 Occasionally work overtime 21：00-22：00

Wholesale shops are the main users of businesses in the historic districts east of Qui Tak Mun, such as the shoe street in Gaudi West. They mainly sit outside the shop to entertain customers and meet customers and couriers

2）Customers

Activity type: purchase replenishment, special commodity search

Activity time：10：30−19：30

Customers can be divided into wholesalers and retail consumers. Wholesalers often purchase goods in stores in order to resell them to consumers. They will come regularly to restock, pay attention to market dynamics, select hot goods, and negotiate prices with wholesalers. Retail consumers are the customers attracted by the shoe industry specialty street, they make small purchases in shops, look for special items or seasonal goods, or just stroll around the street.

3）Logisticians

Activity type: Distribution and handling

Activity time：9：30−21：00

Logistics companies or specialized transportation personnel are responsible for transporting goods from the wholesale market to the customer's location, and they carry out the loading and unloading, sorting and distribution of goods. Because the goods waiting to be shipped in Gaudi West Street are piled up in the street,

logistics personnel often have streamline conflicts with pedestrians in the street. Logistics personnel also need to connect with the warehouse in the northeast of Guide gate block.

4）Residents

Activity type: Daily life, socializing, shopping

Activity time: all day

Local residents are usually long-term users of the Guide Gate block, and their activities are mainly closely related to daily life. In the neighborhood, residents usually engage in activities such as shopping, dining, leisure, walking, etc. Residents also socialize with neighbors or friends here.

5）Office commuters

Activity type: Commuting

Activity time：7：00-9：00；17：00-18：00

This kind of crowd belongs to the passing type and the short stay type in the block, and they will appear in large numbers at the GuiDe Gate intersection or waiting platform during commuting time. Due to the lack of non-motorized lanes on roads, large numbers of people driving non-motorized vehicles will gather on motorways and sidewalks.

Figure 4-24 GuiDe Gate users and activities

Source: Drawn by the Author

4.3 WenMing Gate Node

The original site of the WenMing Gate in the present WenMing Road, Guangzhou first workers' cultural Palace opposite, its opening can be traced back to the Ming Dynasty Wanli period. The Gate of WenMing was a side gate in the south wall and had no gatehouse. In the past, there was Guangfu School Palace inside the WenMing Gate, and there was Qingyun Straight Street built across the YuDai Moat, and the name Qingyun implied that scholars who

entered the house through this bridge could rise quickly to the top. Since the Gate of War WenMing had been closed several times during the Ming and Qing Dynasties, and because it was facing the Guangfu Academy, officials believed that reopening the gate would promote the cultural movement.

Due to the abolition of the imperial examination system, the former Guangfu Academy was selected by the Guangzhou Municipal Government to establish the Municipal Zhongshan Library in 1933, and the Tribute Academy was also converted into the campus of Sun Yat-sen University. During the occupation of Guangzhou by the Japanese army, most of the walls of the Academy were destroyed and the rubble was everywhere in the palace. After the victory of the Anti-Japanese War, the Guangdong Provincial government set up the Guangdong Provincial Library in the southern part of the Academy in January 1947. After 1949, the library building was gradually demolished, and the First Workers' Cultural Palace of Guangzhou was built[82].

WenMing Gate is now a T-intersection of the road, south of which is the core protection area of Guangzhou Wendenan Historical and Cultural block. Its remaining gate name arch still exists in the WenMing Road arcade. The research area of the thesis block is about 120 meters from east to west and 80 meters from north to south.

Figure 4-25 The research scope and design scope of WenMing Gate

Source: Drawn by the Author

Figure 4-26 Aerial view of WenMing Gate

Source: Drawn by the Author

a) WenMing gate opposite Guangfu Academy　　b) Present situation of WenMing Gate

Figure 4-27 WenMing gate node status map

Source: Drawn by the Author

4.3.1 Streets and Roads Network

1）Street system evolution

In 1922, the city wall connected to the WenMing Gate was demolished, and the original city wall base was turned into a road after being leveled, which became the WenMing Road in the name of WenMing Gate. In 1967, the WenMing Road was renamed Yan 'an Second Road, and in early 1980, it was renamed WenMing Road. The road is 4 lanes in both directions. The main buildings on the road include Guangdong Province Zhongshan Library, Guangzhou First Workers' Cultural Palace, the former site of the Guangdong District Committee of the

Communist Party of China, Lu Xun Memorial Hall, etc., which is quite a humanistic road[83].

The laneway between blocks is relatively stable, and its general shape has not changed since the Republic of China. After the founding of the People's Republic of China, the YuDai Moat covers formed a road and formed a cross roadway at the original Qingyun Bridge, which basically maintained the original shape trend except for some local additions.

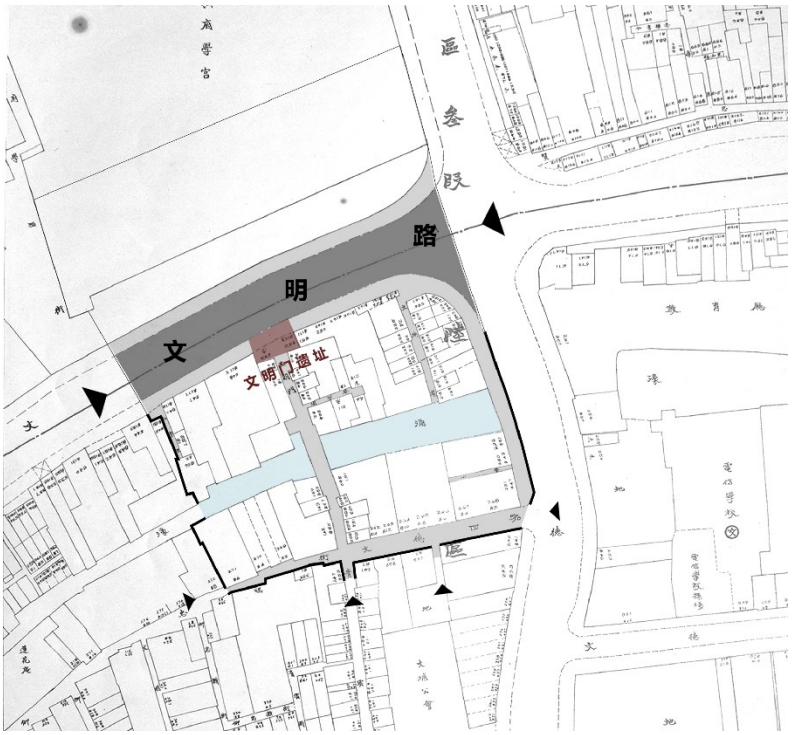


Figure 4-28 Ruins after the demolition of the WenMing Gate in the Republican period

Source: Drawn by the Author （Base map: Guangzhou Boundary Map）

2）Street status analysis

Wenming Gate is located at the T-intersection of Wenming Road and Qingyun Straight Street. Wenming Road is a two-way four-lane street with a width of 24.7 meters, belonging to the first class arcade street in Guangzhou. Within the research scope, there are relatively continuous arcade buildings on the south side of Wenming Road, and the shops on the ground floor of the arcade are mainly sugar-water snack shops. There is a 5-meter pedestrian area in front of Guangfu Academy on the north side of the road, and there are no non-motorized lanes on either side of the road. The street aspect ratio is 1.8-3.2.

The Qingyun Street in the WenMing gate is a stone slab street, the street width to height ratio is 0.3-0.7, and there are commercial shops such as retail chess and card at the bottom, which can be used by non-motor vehicles. The width to height ratio of the street formed by the YuDai Moat covers is 0.7-0.9, and the street has an additional one-story residential building.

Figure 4-29 WenMing Gate status map

Source: Drawn by the Author

a)WenMing Road b)YuDai Moat c) WenMing Gate d)QingYun Street

Figure 4-30 Real scene of street status of WenMing Gate block

Source: Drawn by the Author

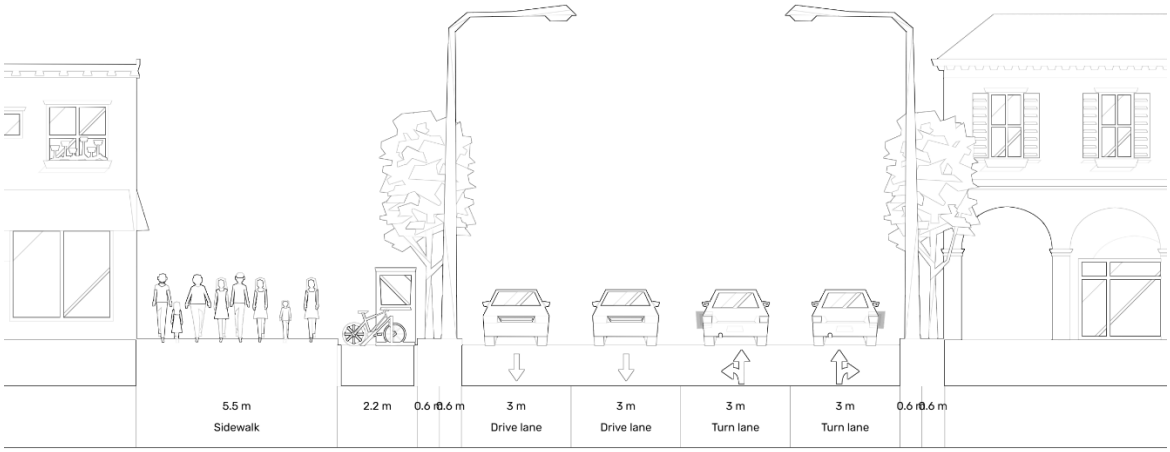
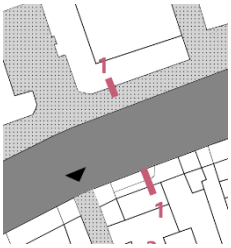
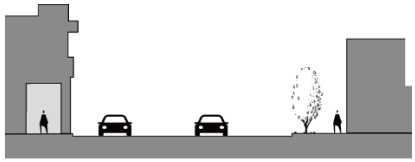
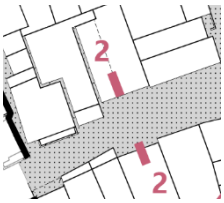
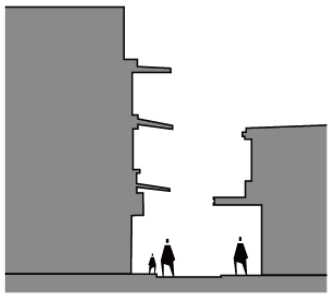
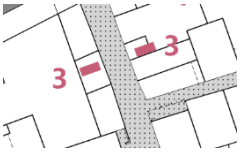
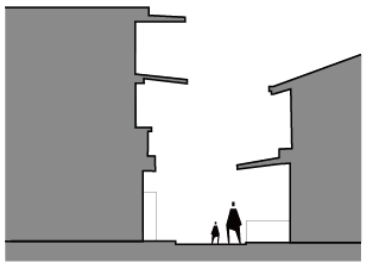
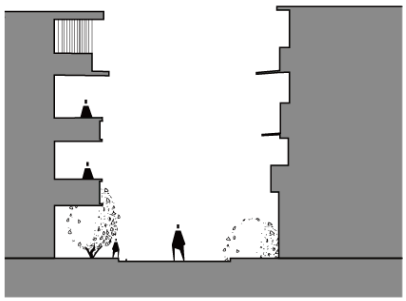


Figure 4-31 WenMing Road section diagram in front of the city gate

Source: Drawn by the Author

Table 4-4 WenMing Gate street width to height ratio

Name	**type**	**Plan**	**section**	**D/H**
WenMing Road	Two-way 4 lane First class arcade street			1.8-3.2
YuDai Moat	Third traditional streets			0.7-0.9
WenMing Gate	The slate street			0.3-0.7

QingYun Street	The SLATE street			0.4-0.6

Source: Drawn by the Author

4.3.2 Plan units and combinations

There are mainly multi-row combined form units in the block of WenMing Gate. It is divided into the outer land near the arcade street and the inner land along the YuDai Moat, which is the same as the block unit in the Republic of China, and maintains the traditional texture form. From the further division of the land after the Republic of China, the changes around the WenMing Gate are relatively moderate, mostly after the reform and opening up, and the rest of the changes are small.

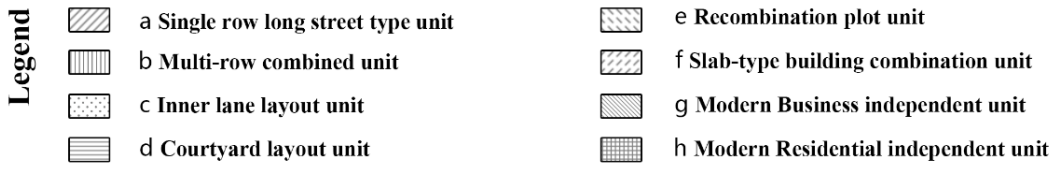


Figure 4-32 Plan units and combinations in WenMing Gate

Source: Drawn by the Author

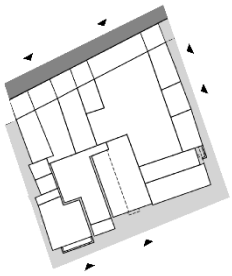
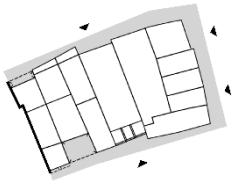
Figure 4-33 Degree of plan unit change

Source: Drawn by the Author

Figure 4-34 Time of plan unit change

Source: Drawn by the Author

Table 4-5 Analysis of plan unit type in WenMing Gate

Plan unit	type	Unit example	Description	Number	Degree of variation
b-1	Multi-row combined unit		After the demolition of the city wall, the street interface is neat and straight, and the buildings are attached to the line	3	Maintain the overall shape of the Republic of China frame, local addition, the overall change is small
b-2	Multi-row combined unit		Along the original YuDai Moat bank multi-row bamboo tube house, the street interface convex and concave changes	2	After the cover, it is built to maintain the traditional texture

Source: Drawn by the Author

4.3.3 Building Type

1) Building type evolution

The building type of WenMing Gate block is relatively stable. In the Ming and Qing Dynasties, WenMing Gate was mainly surrounded by residential areas. The upper floor houses can be rented by students, and the lower floor shops can sell goods. There are some special types of buildings in the north of the block, such as the Guangzhou First Workers' Cultural Palace (referred to as the City's First Palace), which was the Guangfu School Palace in the Ming and Qing Dynasties. In 1950, the original site was rebuilt into the city First Palace, which was a comprehensive shopping mall to the west and high-rise office buildings to the east

The building type in the block is the bamboo tube house type, but it is different from the traditional form and belongs to the variation of the type evolution of bamboo tube house. The appearance of these buildings is no longer like the traditional bamboo tube houses, using modern doors and Windows, external walls, the height of 4-6 layers, but still retain the characteristics of bamboo tube houses with small rooms and large depth, in the evolution process has the following characteristics:

① The merger of bamboo tube houses

Bamboo tube houses merge adjacent bamboo tube houses into a larger unit with a consistent appearance. Some of the merged bamboo tube houses share symmetrical mountain flowers and similar exterior finishes. The interior Spaces are kept separate or connected to adjust to a more suitable layout pattern.

② The bamboo tube house has evolved into a collective housing

The traditional bamboo tube house has a low number of floors and a small internal use area. Usually, a bamboo tube house only belongs to one household. In the late Qing Dynasty, bamboo tube house began to transform into a collection house, and the same house was subdivided by different households. Insert a double running staircase between two adjacent buildings or set a staircase on the side, each floor or a different room of each floor belongs to a household. Usually inserted staircases are narrower than standard measurements.

a)WenMing Road 76-1 b)WenDe West 12、14 c)YangZhong Street 2

Figure 4-35 Insert stairs into bamboo tube houses

Source: Drawn by the Author

③Commerce at the bottom is combined with upper-class households

Most of the bamboo tube houses in the block are a combination of commercial and residential buildings on the ground floor. Usually, ordinary commercial and residential buildings have different entrances and exits, while catering businesses have entrances and exits on the street front, kitchens and goods on the back street back, and the entrances and exits for residents on the upper floors are located on the side street. Several types of commercial and residential entrances and exits have evolved:

a. The ground floor business and the upper floor residents belong to the same owner, and the stairs are shared inside the shop;

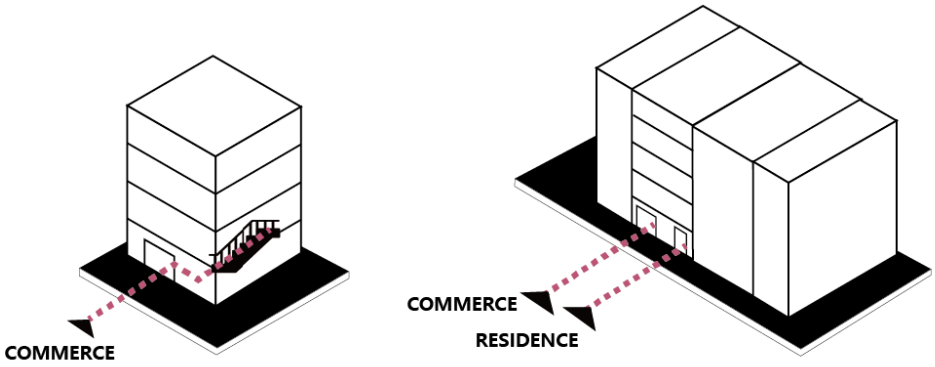
b. When the business and the residence are not owned by the same owner

1. The building is located in the block with only one side facing the road. A secret door is opened on the same side next to the entrance of the shop, and inside the door is a staircase leading to the upper floor. The stairs are generally set against the wall and run in one or more sections;

2. The building is located on two sides of the block, and shops and residents adopt different entrances;

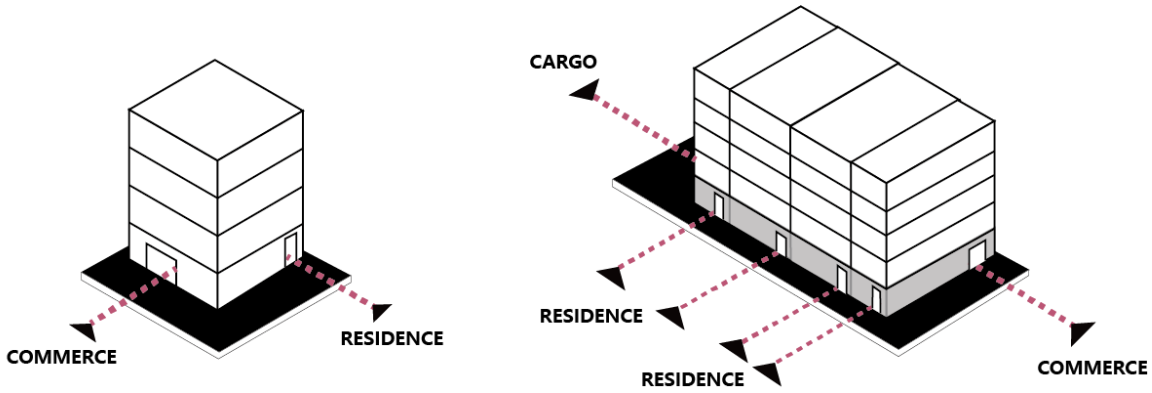
3. The shops connect the ground floor of the adjacent plots, and the upper floors are still separate household units with different entrances;

4. The building as a whole shall use the internal stairs or the upper floors shall use the external stairs alone.



a) Same entrance, shared internal staircase

b) One façade facing the road, the same side of the entrance



c) Two roads, different entrances and exits

d) The commercial bottom is connected, and the upper level has entrances and exits

Figure 4-36 Schematic diagram of the combination of bottom commerce upper living

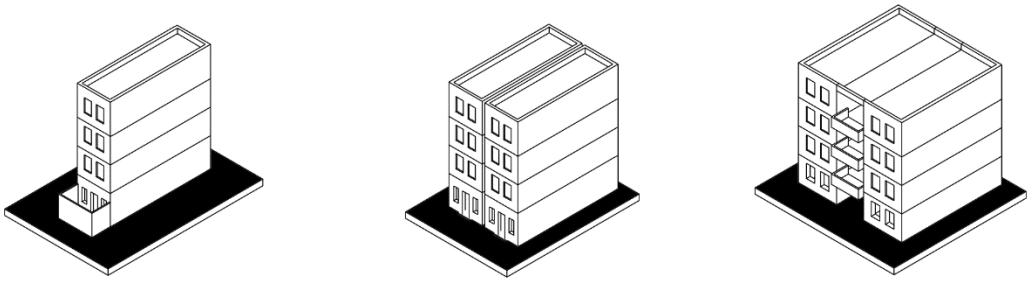
Source: Drawn by the Author

④ Measures to improve the living environment

a. Set up an entry garden. Some residents divide a private entry garden with walls and railings at the bottom entrance of the bamboo tube house, or occupy the space with flowerpots and green plants, forming a transition from public to private;

b. Set a side lane. The two adjacent bamboo tube houses do not share the external wall, but insert a side lane of about tens of centimeters in the side facade, which is not enough to pass through people, but this measure improves the ventilation environment, and the side facade of bamboo tube houses can also open Windows;

c. Set an outdoor staircase to release the staircase in the bamboo tube house from the facade and become an open stairwell to improve the ventilation and lighting performance inside the bamboo tube house.



a) the entrance garden b side lanes c) outdoor staircase

Figure 4-37 Bamboo tube house measures to improve the living environment

Source: Drawn by the Author

2）Analysis of building status

① Building height

The WenMing Gate block has 2-4 floors as a whole, and some of the roofs have been added. The 1-3 floors of the City Palace to the north of the WenMing Gate, the 7 floors of Kimberly Plaza, and the 30 floors of the Jinde Building are the highest in the block, with the WenMing Gate as the center, showing the characteristics of high north and low south.

② Building function

The south part of the WenMing gate is mainly for commercial and residential buildings or residential buildings, and there are commercial shops such as gourmet food, retail, chess and card at the bottom. The north part is facing the WenMing Gate is the Guangzhou Workers' Cultural Palace, the left is the Kimberly Square, the right is the Jinde Building, art shopping mall, hotel, apartment office and other functions. Due to the historical influence of the tribute Yuan and the Guangfu Academy, there are more painting, calligraphy and other cultural supplies shops in the Wende Road area.

③Historic preservation buildings

There are 7 historic buildings on the southeast side of the block, including No. 53, 55, 57 and 59 shophouses on Wende Road; Wende Road 45, 47 residential houses; No. 43, 43-1, Wende Road; 4 residences of No. 12 and No. 14 Wende West Road belong to historical buildings, and 4 residences of Wende West Road; 2 Yangzhong Street; The 3 residential buildings of No. 60 Qingyun Zhi Street belong to immovable cultural heritage protection clues.

No. 53, 55, 57 and 59 of Wende Road are four consecutive storehouses. The top floor of the three storeys is partially constructed, and the bottom floor is a painting material mounting shop. No. 45 and 47 Wende Road residential buildings, No. 43 and 43-1 Wende Road residential buildings are 3 floors high. The top floor may have two additional floors. The appearance is red

brick wall with white hollow-out finish, which is well maintained. The residential buildings of No. 12 and 14 Wende West Road are three storeies high, with red brick walls and unique shape. The units on both sides are hexagonal, with double-running stairs in the middle and a painting material mounting shop at the bottom (Figure 4-38). No. 4 Wende West Road houses 3 floors, the ground floor is a hair salon, No. 2 Yangzhong Street houses 4 floors (Figure 4-38), No. 60 Qingyunzhi Street houses 3 floors, the appearance of red brick walls, the ground floor is a bar.

a)WenDe Road 53、55、57、59

b) WenDe Road 45、47，WenDe Road 43、43−1

Figure 4-38 Historic building in WenMing Gate

Source: Drawn by the Author

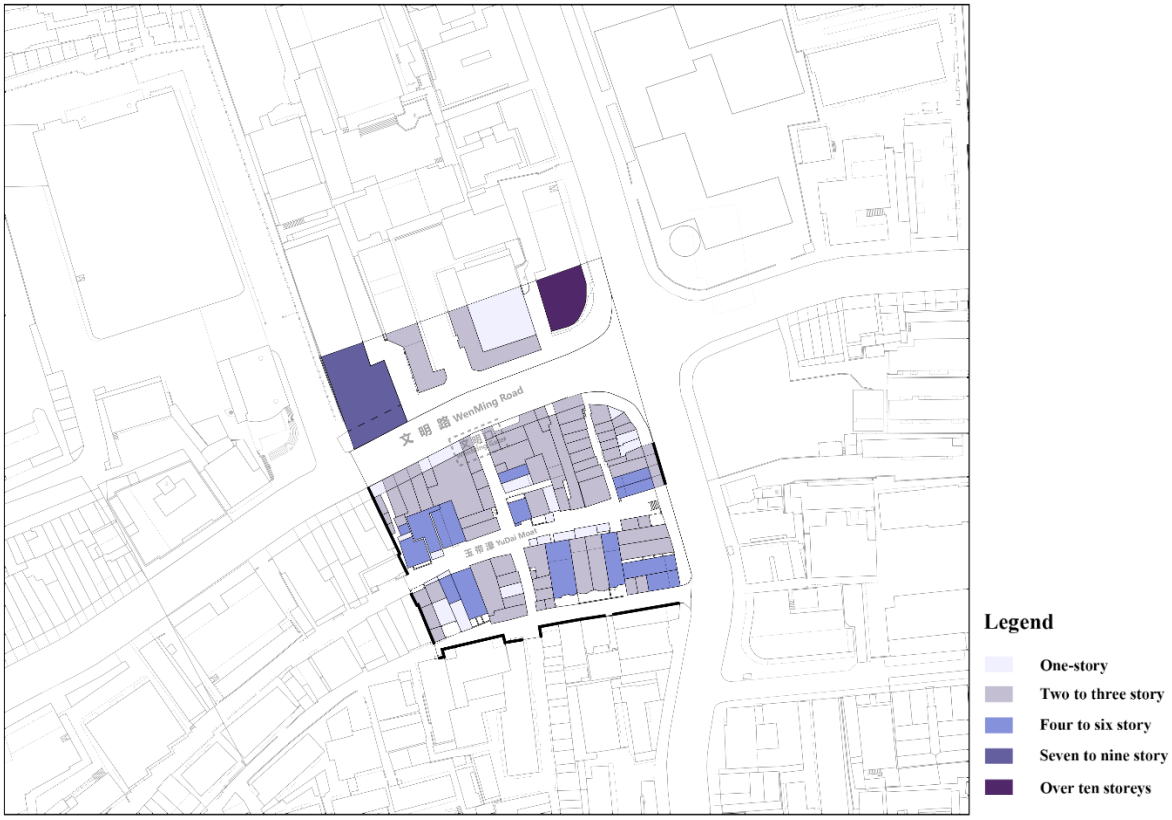


Figure 4-39 Height analysis of WenMing Gate building

Source: Drawn by the Author

Figure 4-40 Funcion analysis of WenMing Gate

Source: Drawn by the Author

Figure 4-41 Historical clues analysis of WenMing Gate

Source: Drawn by the Author

4.3.4 Interface and arcade space

WenMing Road is a first-level arcade street, the street has a continuous arcade interface, and the form of the arcade is built in batches, these arcade buildings are not unified, but gradually connected into a building after building up. During the period of the Republic of China, most of the roads were rebuilt by private houses with private investment. Therefore, the style of the arcade is full of flowers, designers show their strengths, there are imitation Gothic, there are Nanyang, there are retro, there are modernism; Decorative styles range from Baroque to Rococo, and almost every element of Western architecture can be found in the arcade. It can be divided into several different combinations, while only part of the historic buildings on Wende Road retain the arcade, and the rest are not traditional interfaces.

Figure 4-42 WenMing Gate street interface and arcade space

Source: Drawn by the Author

4.3.5 Morphological region

Based on the analysis of land units, combinations and building types, the research scope can be summarized into 4 types of morphological region:

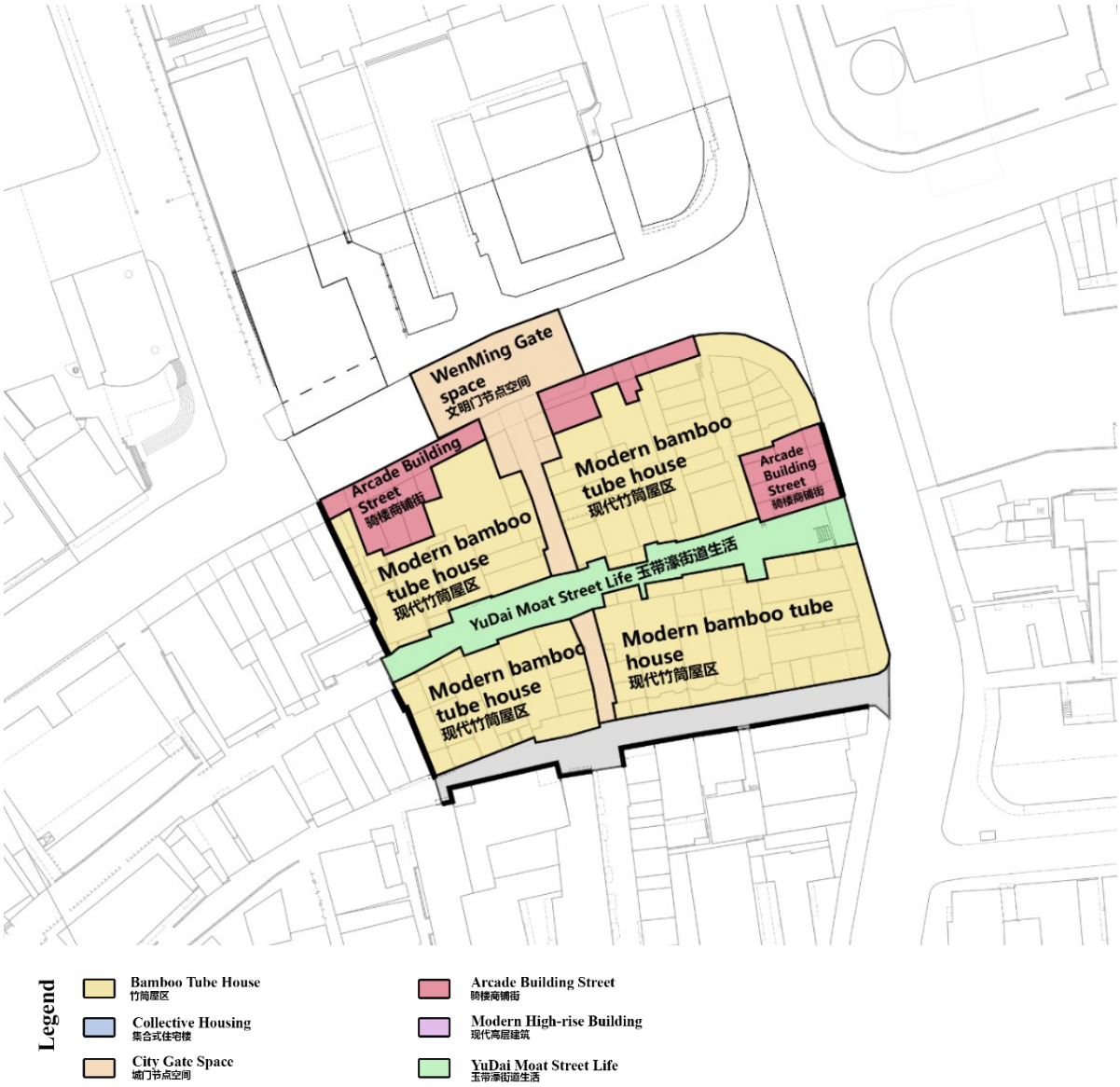


Figure 4-43 WenMing Gate morphological region

Source: Drawn by the Author

1) Modern bamboo tube house variant Morphological region R1

The modern bamboo tube house variant consists of the modern type evolution variant of bamboo tube house, and the land composition is the same as in the Republic of China period

It is still a multi-row combined type with little change in the plot, but the building has changed from the traditional bamboo tube house type, the number of floors can be 4-6 floors, and the appearance is also in modern form. The traffic between the multiple rows of plots is organized through the YuDai Moat and Qingyun Straight Street, and the road is relatively spacious, forming a suitable scale inside the residential area.

2) Arcade building street Morphological region R2

Shophouse shop street refers to the shophouse street rebuilt on the side of the newly built

road at the WenMing gate during the Republic of China period, maintaining the multi-row combination of internal blocks, most of which are within 3 floors, with mountain flowers and Cornwall, the bottom floor is a shop, and the upper floor is a residence or a shop.

3) City Gate node Morphological region R3

The WenMing gate is located at the T-intersection of the block road, and there are WenMing Gate archways left in the arcade street, but they are not obvious. Within WenMing gate, the bamboo tube house blocks and the hemp SLATE streets have not combined with the historical and cultural background to become an important node to highlight WenMing gate.

4) Yudai Moat Street Life Morphological region R4

Yudai Moat is the street inside the residential area here, and there are more illegal buildings on both sides of the road, occupying the land of Yudai Moat street. Because the Yudai Moat covers used to be a moat, the current status of the road is undulating, and there is often a height difference at the junction with the main road, so there are more stairs on the street, causing problems to residents' daily life activities.

4.3.6 Users and activities

1）Shops

Activity type：Sales, catering

Activity time：10：00-23：30

Most of the businesses at the bottom of the WenMing Gate are snacks and catering, and these shops operate for a long time, from morning to late at night, attracting many customers to patronize. Some belong to the convenient life of the block, such as convenience stores, barber shops, chess and card rooms and so on. There are many painting and calligraphy mounting shops along Wende Road.

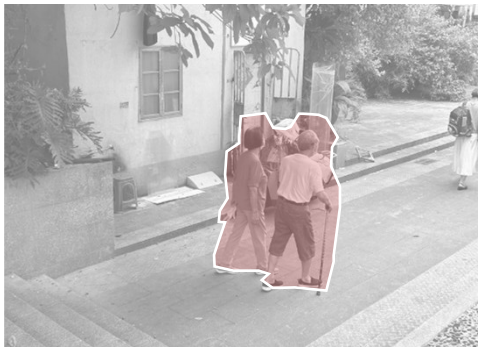
2）Tourists

Activity type：Leisure play, clock in

Activity time：10：00-21：00

As there are Beijing Road Pedestrian Street, Zhongshan Library, Lu Xun Memorial Hall and other historical and cultural attractions around the WenMing

Gate, WenMing Road is also a first-class arcade street. The neighborhood attracts a group of tourists, who come to the WenMing Gate mainly for the purpose of tasting food, few people notice that there was once a gate of Guangzhou.



3）Residents

Activity type：Daily life, socializing, shopping

Activity time：all day

Residents of WenMing Gate often take leisure walks, take care of green plants, shop and buy on the YuDai Moat road. Older residents think there are too many steps in the YuDai Moat to walk easily.

Figure 4-44 WenMing Gate users and activities

Source: Drawn by the Author

4.4 City gate node status problem

1) The city gate node is poorly shaped

At the current intersection of GuiDe Gate, there are four corners of the corner building retreat, but it is not fully utilized. The northwest corner is the gable of the arcade building, the southwest corner is the retreat of the high-rise building, the northeast corner is the gable of the bamboo tube house covered by the trees, and the southeast corner is the idle space used for parking. Street corner space is not used to form the atmosphere of historic areas, and the recognition of historical nodes is weak.

The WenMing Gate is hidden in the arcade building street, and the historical and cultural atmosphere of YuDai Moat and Qingyun Straight Street and Qingyun Bridge has not been shown, and the whole block has weak recognition of historical nodes. According to the investigation of the current situation, the node at the intersection of Wenming gate and Yudai Moat intentionally created the atmosphere of the historical area, reshaped the archway of Wenming gate, and painted historical murals about Qingyun Bridge and tribute courtyard on the walls. However, the front of the murals was occupied by debris, but it was not well maintained.

2) Arcade building interface fracture

During the period of the Republic of China, after the demolition of the city wall, both sides of the road were rebuilt, and the Dade Road at the GuiDe Gate was a second-class arcade street,

while the WenMing Road at the WenMing Gate was a first-class arcade street. The interface of some arcades is broken, and the corridors under the arcades are discontinuous. The broken corridors cause inconvenience for pedestrians to walk in them, and are not conducive to the morphological consistency of the arcades.

3) Lack of expression of city moat

The Gaodi West Shoe Street, which evolved from Yudai Moat near GuiDe Gate, is relatively narrow. On the one hand, it is necessary to provide the display surface of shops to facilitate customers to browse and purchase; on the other hand, shops will pile the goods to be packed and distributed on both sides of the street, and non-motor vehicles will also shuttle among them, resulting in the conflict of flow lines, which is difficult to form a good commercial street experience.

The Yudai Moat Street at the WenMing Gate is located in the residential area. The Yudai Moat Street is occupied by illegal buildings on both sides. The street image is not good, and the atmosphere of cultural block is not formed. In addition, among the shops on both sides of the Yudai Moat, some restaurants have reduced the environmental quality of the block. The main entrance of these restaurants faces the Wenming Road, and the entrance of the kitchen is located in the Yudai Moat street, bringing odors to the Yudai Moat street. Some shops on the ground floor are also idle.

4) The building form of bamboo tube house needs to be improved

The blocks around the city gate node are mostly bamboo tube houses. Most of the bamboo tube houses at GuiDe Gate were used for commerce and storage, while in the WenMing Gate the residential functions were retained. Since WenMing Gate Block has been a residential area for a long time, residents have built more buildings in the form of original bamboo tube houses, such as increasing the number of layers and covering the original patio space for internal room use, resulting in poor ventilation in the multi-row combined interior.

4.5 Summary

In this chapter, two gates, GuiDe Gate and WenMing Gate, are selected from the inner city wall area for specific analysis. The evolution and current situation of street and road, block unit and building type are sorted out respectively, and the shape area map of gate block is put forward based on three kinds of analysis. And analyzes the street interface and corridor, suitable people and activities, and finally puts forward the problems existing in the block according to the current situation of the site.

GuiDe Gate is located at the intersection of the city. During the Ming and Qing Dynasties, there was a flourishing market near the gate, while the city wall City Moat is mainly used as a special street for the wholesale of commodities. The variation degree of land units is large, especially in the blocks west of GuiDe Gate. The evolution direction of building types is commercial types, and the street interface breaks, forming 6 types of morphological region. WenMing door is located in the neighborhood of t-shaped road intersection, the Ming and qing dynasties up to now is as a living area, the plan unit is maintained in multi-row combined type. The evolution direction of building type is mainly residential type, street interface continuous, there are 4 types of morphological region.

The diachronic/synchronic variation analysis diagram of architectural types was drawn based on the evolution of the two architectural types of GuiDe Gate and WenMing Gate (Figure 4-45).

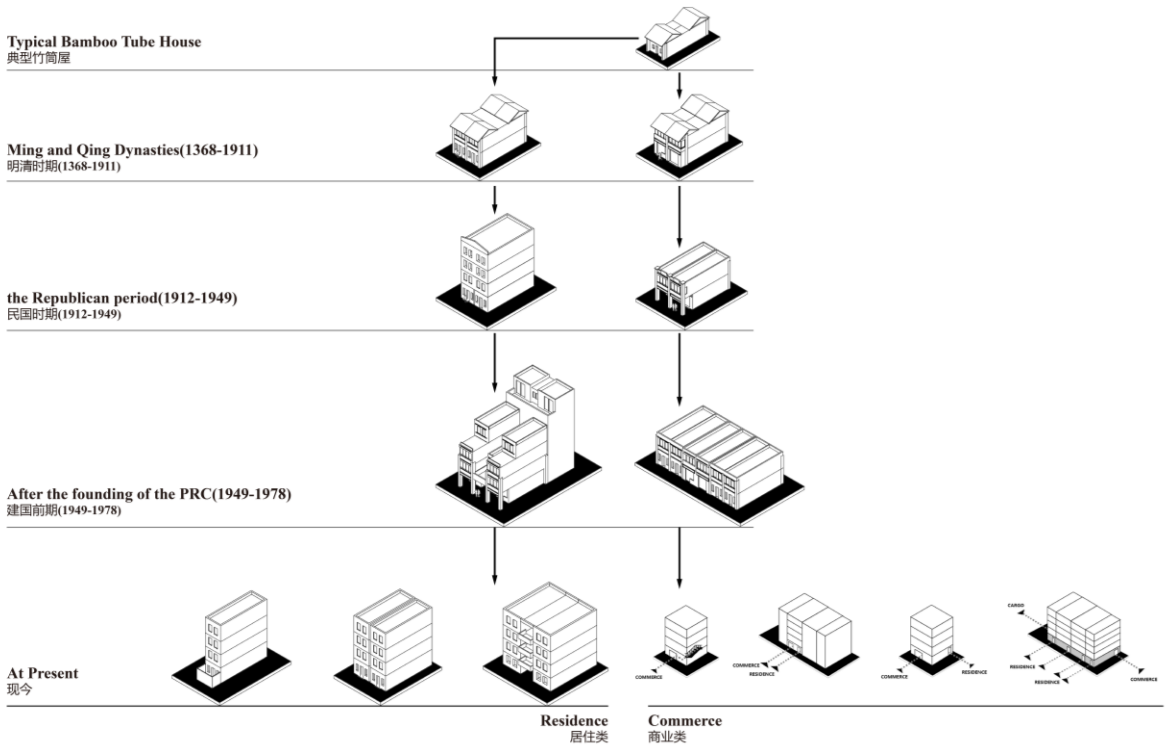


Figure 4-45 The diachronic/synchronic variation analysis

Source: Drawn by the Author

Chapter 5 Inner city wall area and city gate node renewal design

Based on the analysis of the morphological evolution of the inner city wall area(GuiDe Gate to XiaoNan Gate) in Chapter 3 and the analysis of the status quo of the two gate nodes of GuiDe Gate and WenMing Gate nodes in Chapter 4, the design strategy of the inner city wall area renewal is proposed, with emphasis on the design of the two gate areas of GuiDe Gate and WenMing Gate

5.1 Design strategy of inner city wall area spatial form

According to streets, plan units and combinations, and building types, the material form area of the inner city wall area is divided into 4 categories: bamboo tube house area, arcade building street, collective housing and modern high-rise building. According to the historical and cultural background of the inner city wall area and the spirit of the place, the non-material form area is divided into 2 categories: City gate node space and YuDai Moat Street life area.

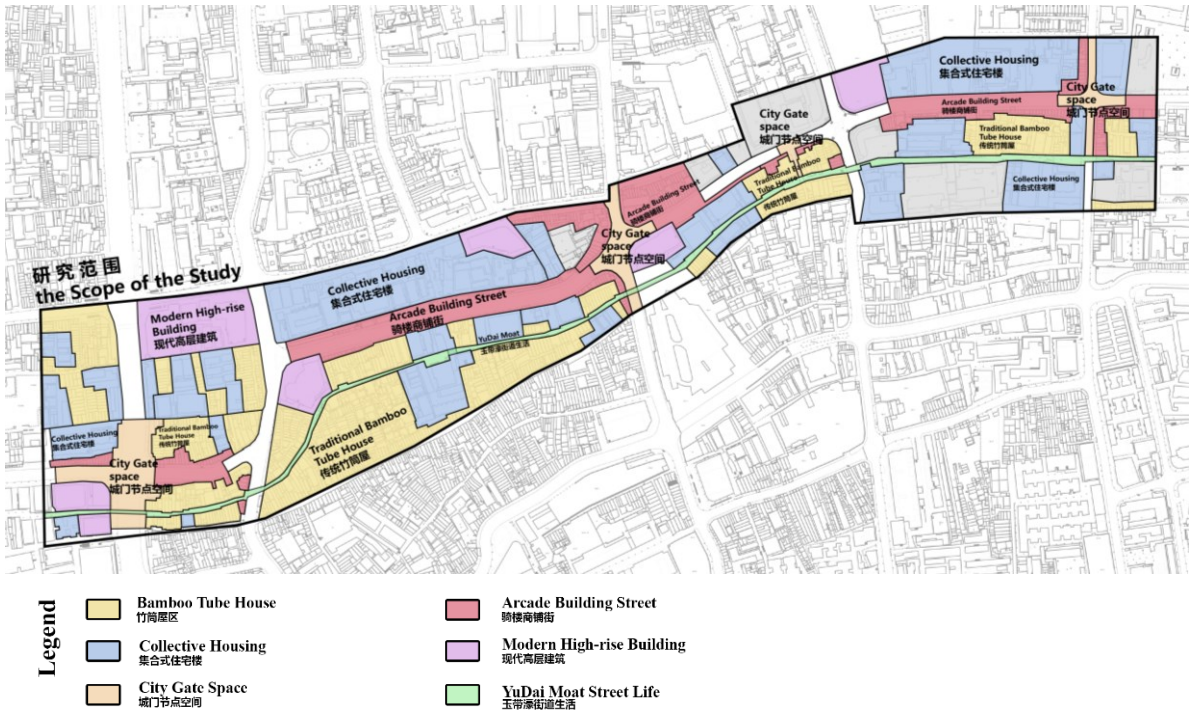


Figure 5-1 Status of inner city wall area morphological region

Source: Drawn by the Author

Within the scope of inner city wall area research, in the traditional urban form period, the main basic type was the dense bamboo tube house combination of multiple forms of land units, among which some special land forms were scattered, such as the land occupied by official buildings. The inner and outer cities had walls as a clear boundary division, and the city moats were integrated into the urban fabric as a water system closely related to residential life. After

the Republic of China, the city wall was replaced by the arcade street, and the city moat was occupied by roads after the founding of the People's Republic of China, and the outline of the traditional city was gradually indistinguishable. To this day, various types of buildings have replaced the original bamboo tube house texture, dividing the shape area of the inner city wall area. Bamboo tube houses have changed from the background color of the city to the remains of the traditional city (Figure 5-1).

The objective of this chapter is to protect and rebuild the traditional spatial texture of the inner city wall area, and to shape the important outline and nodes of the inner city wall area by means of type translation, morphological continuation and historical and cultural metaphor.

5.1.1 General guidelines

1）Preservation of historical form

Based on typo-morphology analysis, the historical street grid and spatial pattern of the plots with stable morphological units are given priority to be protected, and the linear layout of the streets with historical significance is preserved or restored to enhance the continuity and sense of history of the urban space. For sites with large historical morphological changes, it is important to ensure that the newly developed buildings are in harmony with the existing blocks.

2）Spatial structure protection and reorganization

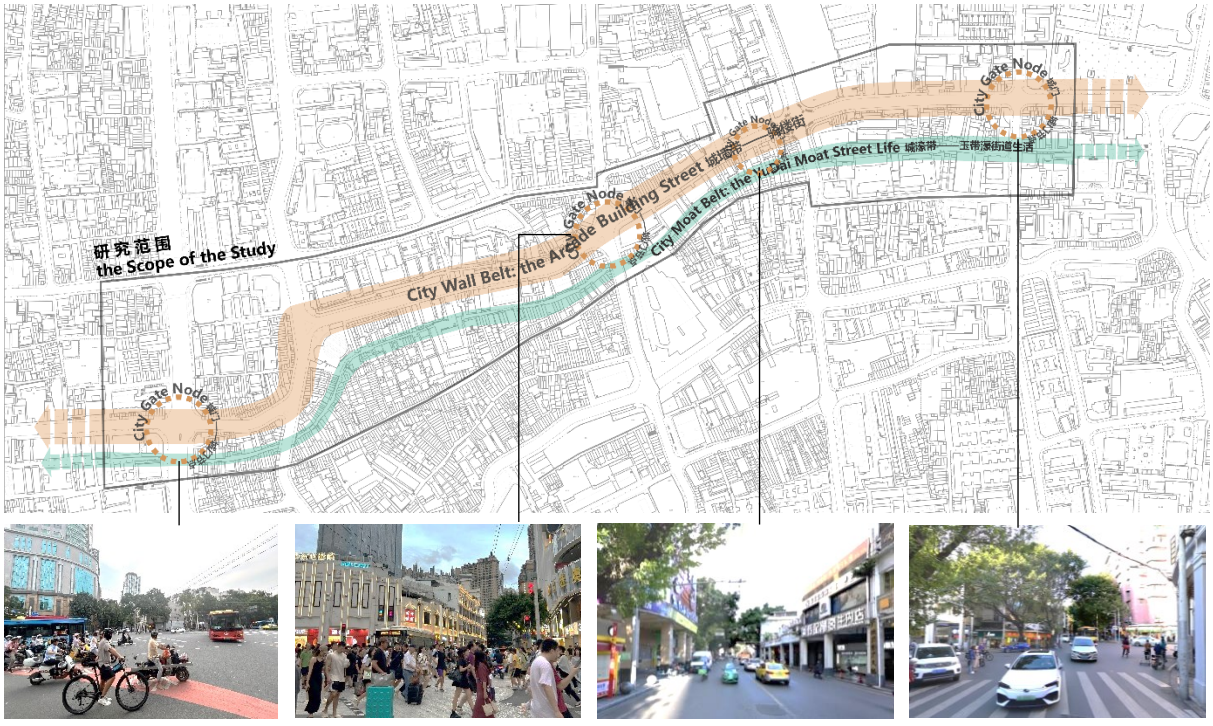


Figure 5-2 “Two-belt and Four-node” spatial structure

Source: Drawn by the Author

① Historical pattern of “Two-belt and Four-node”

Shape the outline of the historical form of the inner city wall area, emphasizing the continuation of the expression of the city wall, city gate city moat in the present day. " Two-belt " refers to the city wall belt - the Arcade building Street and the city moat belt - the YuDai Moat street life, and " Four-node " refers to the four city gate node Spaces in the inner city wall area.

② The city wall historical belt

In the Republican period, the city wall has evolved from the limitation of the outline of the city boundary in the traditional period to the symbol of the spacious and open street in the new era, namely the arcade street. The city wall belt changed from closed to open, and some continuous shophouses built during the Republic of China no longer exist today.

Strategy: For the shaping of the city wall belt, on the one hand, the existing arcade street interface should be remedied, the broken arcade texture should be repaired, and the bottom corridor space should be extended. On the other hand, the buildings in the city wall belt should try to use the form of elevated arcade, and the facade of the buildings with big differences should be transformed.

③ The city moat historical belt

The current situation of YuDai Moat is a life-type street passing through the residential land, and river still has the function of drainage and drainage as a culvert. In addition to the drainage hole on the ground, it is difficult to distinguish the historical outline of the YuDai Moat in the current street.

Strategy: Demolish illegal buildings and temporary buildings in YuDai Moat, renovate building facades and important space nodes on both sides of streets, and depict the historical landscape water system vein of YuDai Moat through design means such as ground paving, greening and watercourse landscape.

④ City gate node space

The city gate node space is the main design area in the inner city wall area, and the city gate is the focus of the city space in the traditional form period. The city gate node is also the concentrated expression of the city wall gate and city moat. Its shaping is the focus of inner city wall area renewal.

Strategy: For each city gate node, analyze how to strengthen the positioning of its historical spatial nodes in the modern urban structure. Through the design of squares and public Spaces, the spatial axis and visual focus of the gate node can be highlighted, making it the center of organizing urban life.

3）Functional layout and traffic organization

Respect the existing functions of the inner city wall area, properly adjust the functional distribution to better meet the development needs of the block, rationally divide the functional areas, and avoid single function layout. For example, the core historical and cultural protection nodes can be set up at the City gate node and the Arcade street. Promote vertical functional mixing, promote the appropriate integration of functions to improve space utilization, such as setting the lower business and upper residence of bamboo tube house buildings, or setting multi-functional buildings that can be used in time segments. Optimize the traffic organization around the city gate node, sort out the road relationship between the city wall and the city moat, and improve the system of motor vehicles, non-motor vehicles and people flow at the current stage of the site, so as to improve accessibility.

Balance the needs of permanent residents and visitors in functional and traffic planning to avoid commercialization or traffic congestion.

4）Cultural narrative and place spirit shaping

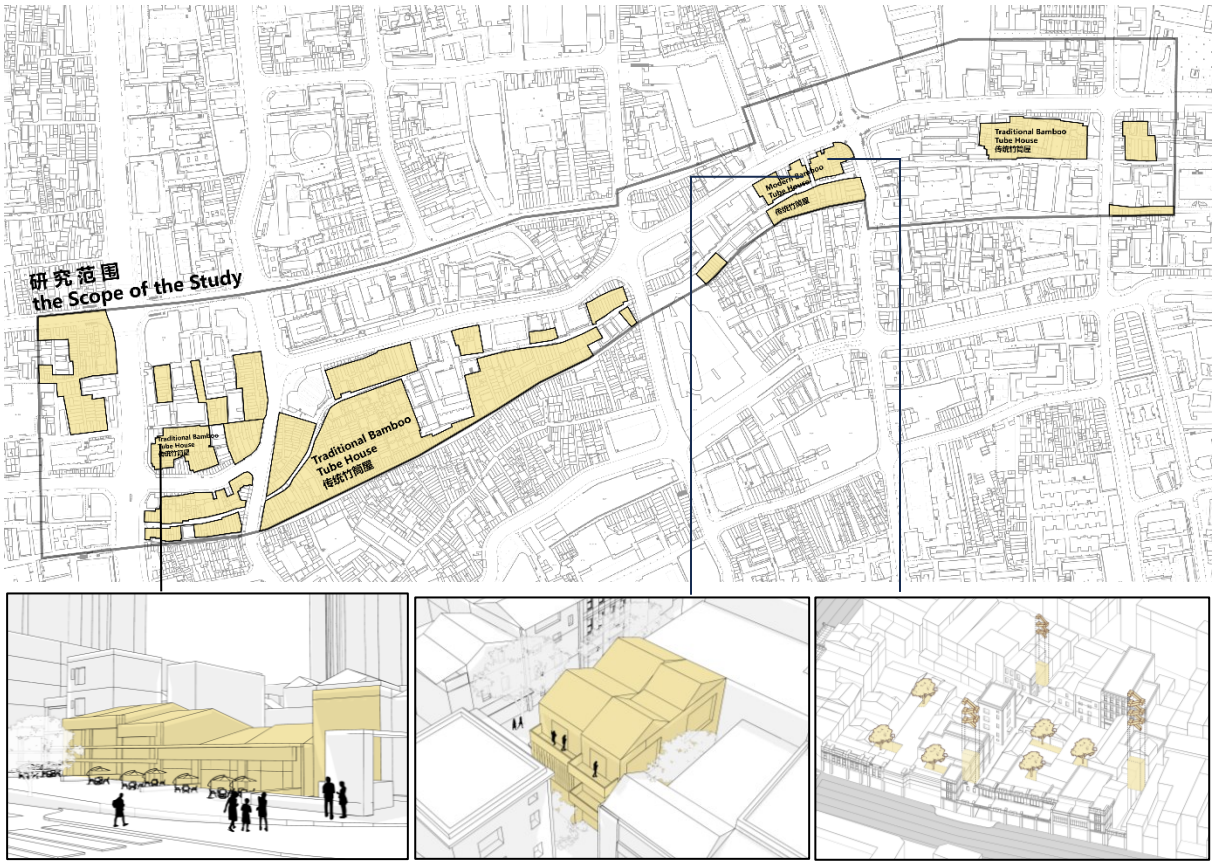
Integrate the historical and cultural elements of the city wall into the urban design, such as the ruins of the city wall gate, historical event monument, historical water system, etc., and display the historical and cultural connotation through the ground paving, signs, sculptures, art installations, landscape pieces and other ways. For those that still have iconic gate sites, such as the WenMing Gate morphological analysis can also be performed to determine the gate and the surrounding visual corridors, ensuring that key viewing corridors are not obstructed by modern buildings or other obstructions.

5）Community engagement and public interaction

Community residents, historians, architects and others are invited to participate in the design update process to ensure that the design is respectful of history and meets the needs of the public. Through participatory design, residents can identify with history and culture.

5.1.2 Bamboo tube house morphological region design

Bamboo tube house is a common form texture in the inner city wall area, which appeared in large numbers at the end of the 19th century, reflecting the highly dense population and scarce land resources at that time. The bamboo tube houses on the edge of the city moat were built along the coast and the encroachment on the shoreline made the depth of the houses continue to extend. During the road construction, the bamboo tube houses on the edge of the city wall were demolished along the road and rebuilt into the elevated shophouses at the bottom.



a) Entrance reversal b) Interior renovation c）Regional environment optimization

Figure 5-3 Bamboo tube house morphological region design

Source: Drawn by the Author

It can be seen that the shape of bamboo tube house is closely related to the shape evolution of the inner city wall area, and it is the most basic type of shape area, which has also developed and evolved many variants.

1）Typo-morphological control

Bamboo tube houses should maintain the plot unit characteristics of the area in which they are located, such as the single-row long street layout, and the illegal buildings and temporary buildings in the form of destruction should be removed. The internal texture of multi-row combined and inner lane layout should be repaired mainly to restore the traditional style. If conditions permit, the street space can be enlarged locally, and the street environment can be improved without destroying the traditional texture.

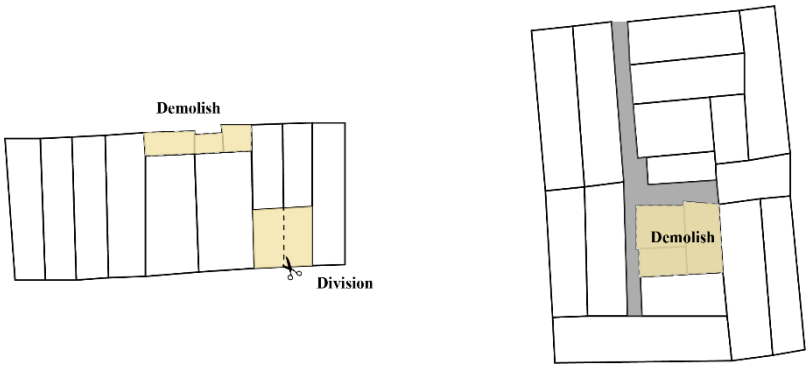


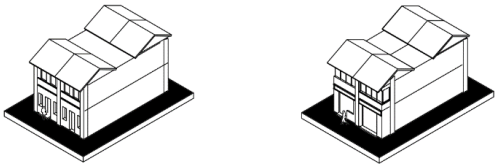
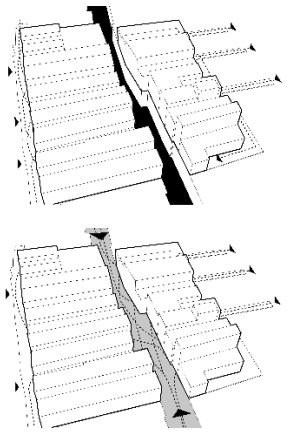
Figure 5-4 Bamboo tube house typo-morphological control

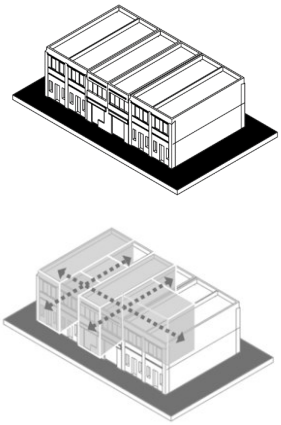
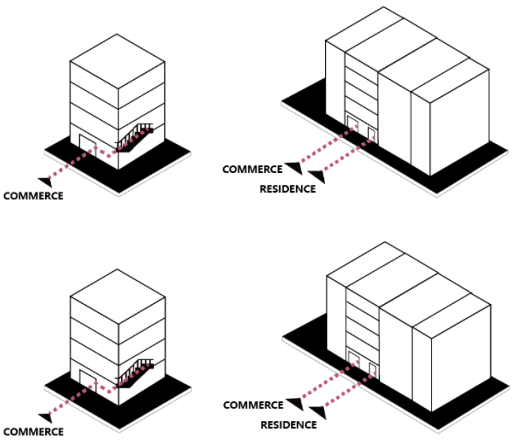
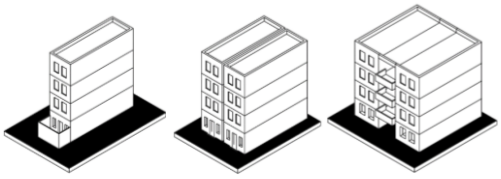
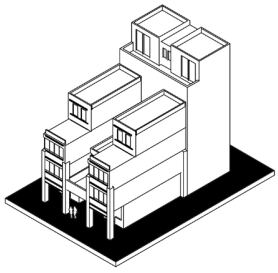
Source: Drawn by the Author

2）Building

Based on the above summary of the evolution of bamboo tube house building types, it can be seen that bamboo tube house has two evolution directions: commercial type and residential type.

Table 5-1 Bamboo tube house type variants can be used into strategies

Type	**Diagram of Bamboo Tube Houses and Variants**	**Description**	**Strategy**
Typical Bamboo Tube House		Residential and mixed-use types, small units using sloped roofs, courtyards, and cold alleys.	Restore the original form of bamboo tube houses, address some irrational additions, and improve the overall environment.
Reversed Entrance of Bamboo Tube House		After the covering of the city moat, the surrounding bamboo tube houses reversed their entrances, leading to potential adjustments in the interior space.	The reversal of the bamboo tube house entrance can transform previously passive interfaces into more active and lively ones.

Internal Connection of Bamboo Tube Houses		Partial internal connections between rows of bamboo tube houses for better commercial organization.	Bamboo tube houses can freely divide interior spaces, breaking away from the rigid narrow layout of the original.
The entrance of bamboo tube house		The different ways of opening the entrance of the lower business and upper residence are related to the types of owners and the functions used	When changing the form of bamboo tube house, reasonable planning of the relationship between lower business and upper residence, the distribution and use of internal stairs
Improving Residential Environment		Residents' modifications and improvements to the bamboo tube house form.	Improve the residential environment of bamboo tube houses. Such as improving the entry space, placing side alleys, opening stairs and so on.
Modern Interpretation of Bamboo Tube House		Modern residential buildings located within the texture of bamboo tube houses.	Incorporate bamboo tube house elements in appearance, using setbacks to blend with the traditional

			texture.

Source: Drawn by the Author

3) Morphological elements

Bamboo tube house building should emphasize its traditional form elements, laneway, patio, double-layer insulated roof form, open hall, balcony, etc., remove the disorderly addition part, restore the traditional pattern. The bamboo tube house building is divided vertically on the facade to mark the characteristics of the room.

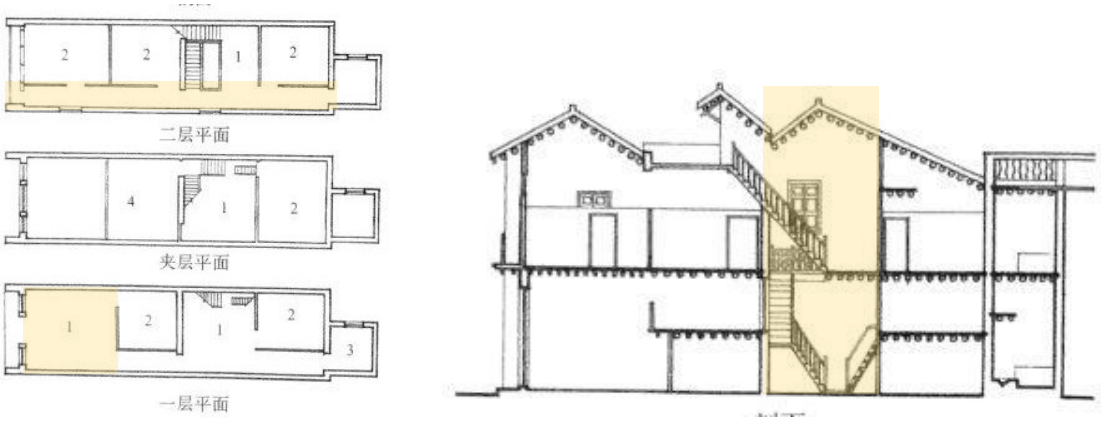


Figure 5-5 Bamboo tube house morphological elements

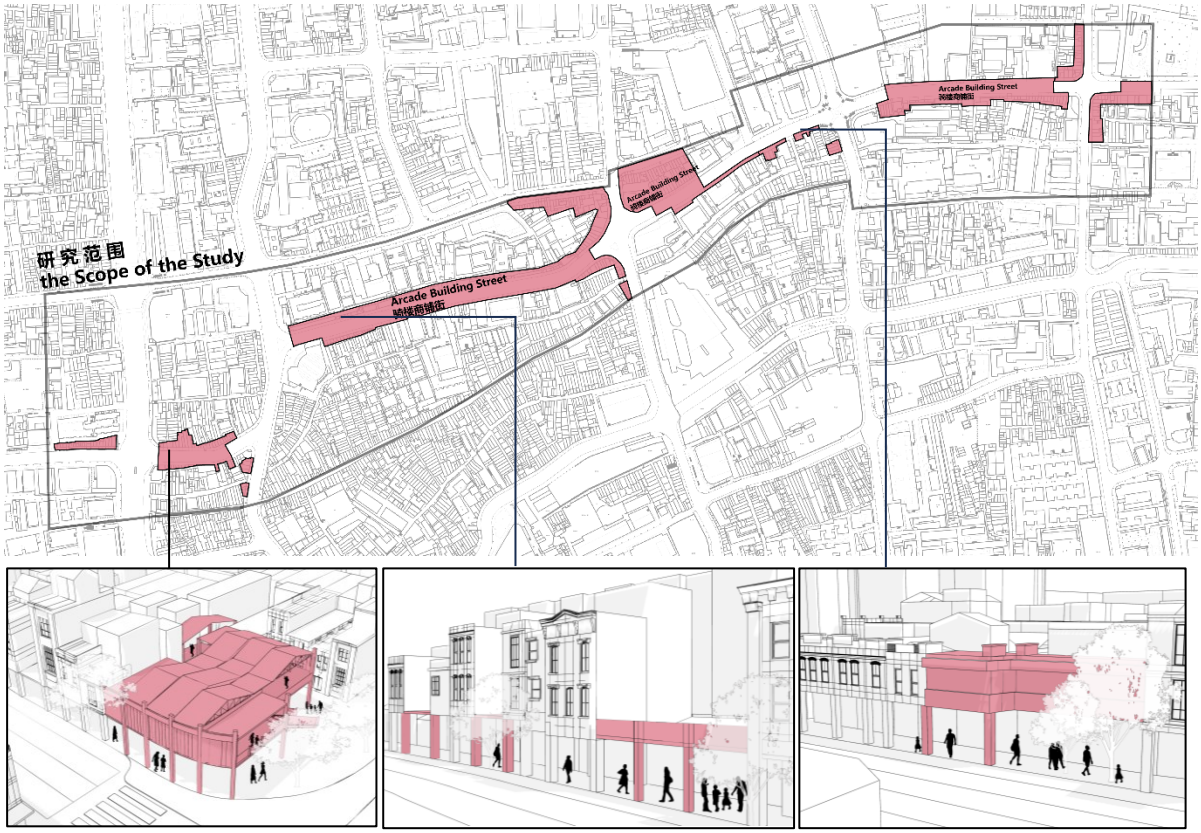
Source: Reference

4) Function

Historical buildings, immovable cultural heritage protection clues and other buildings with protection value: encourage the activation of utilization, set up museums, memorials, community libraries, folk culture experience pavilions, etc., encourage the introduction of creative Spaces, business offices, cultural creativity, science and technology incubation, special catering, homestay inns, etc.

For general buildings, it is encouraged to legally and appropriately give new commercial or cultural business value, and introduce specific functions such as cultural display, traditional residence, characteristic business, and leisure experience.

5.1.3 Arcade building street morphological region design



a）The coordination of the new building with the arcade street

b）Continue the arcade street texture

c）Street tree and arcade building

Figure 5-6 Arcade building street morphological region design

Source: Drawn by the Author

1）Typo-morphological control

Arcade building street should emphasize coordination and protection, coordinate the relationship between arcade building and modern architectural styles, and protect the width, height, aspect ratio, section form and intersection characteristic interface of arcade building.

2）Building

Where the arcade street is repaired, the street facade shall continue the architectural form of the arcade building, the height and depth, scale, proportion and cornice height of the ground arcade building along the street facade shall be coordinated with the adjacent arcade building, and the outer wall boundary line of the street facade shall be kept flush with the adjacent arcade building.

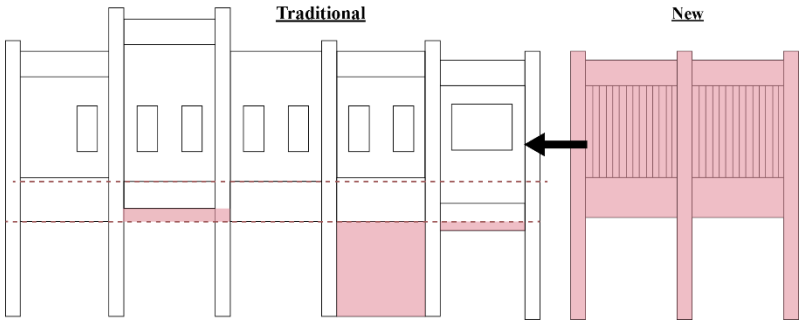


Figure 5-7 Arcade building typo-morphological control

Source: Drawn by the Author

When new buildings are built on the arcade street, the original building scale should be continued. To maintain a unified interface retreat from the surrounding arcade buildings, the width and depth of the opening should adopt appropriate scales. The building height of the arcade street should be coordinated with the surrounding buildings, which not only respects the skyline of the traditional neighborhood, but also meets the modern commercial and residential needs. Emphasize the openness of the ground floor space.

Continuation of the traditional style of the fifth facade, new construction, expansion, reconstruction and other construction activities, the building roof should be a combination of flat roof and slope roof.

3）Street

The street can maintain the complete and continuous form of the arcade street, and the missing section can be supplemented by renovation or addition, and the arcade street style can be maintained with the arcade building and the street trees.

① Maintain the aerated corridor at the bottom of the arcade street;

② Where there are street trees on the sidewalk, the width of the corridor can be reduced to give up the space of trees.

The width of the gallery is usually 2.5-4 meters in order to provide sufficient space for pedestrians. The height of the corridor should consider the effect of shading and rain, while ensuring good ventilation conditions. In order to maintain the functionality of the arcade street, the corridor should be as continuous as possible and should not be interrupted at will. maintain the consistent flow of the bottom interface.

a) Corridor connection　　b) Street trees and corridors

Figure 5-8 Continue the arcade interface

Source: Drawn by the Author

4) Function

The ground floor of the arcade street is usually used for commercial purposes, and shops should follow uniform facade design requirements, keep the block clean and beautiful, and avoid disorderly billboards. Uniform fonts, colors and signboard styles can be used to enhance visual consistency. Modern arcade street can be combined with commercial, residential, office and other multi-functional use. The functional layout of the different floors should be rationally distributed, the ground floor is mainly commercial, and the second floor and above can be used as residential or office space, to ensure the diversity and vitality of the block. The building design should have some flexibility to adapt to possible future functional changes or spatial adjustments.

5.1.4 YuDai moat street life morphological region design

a) Building retreat and arcade form　b）Plaza memorial node

c) The intention of the "bridge" over the moat

Figure 5-9 YuDai moat street life morphological region design

Source: Drawn by the Author

1）Typo-morphological control

The spatial form of YuDai moat can be defined by controlling the aspect ratio of the street. The ratio of aspect ratio of YuDai moat street is different in different sections. When it is located

in the residential community, the ratio is 0.2-0.9, when it is in the bamboo tube house commercial street area, the ratio is 0.5-1.0, and when there are high-rise buildings on both sides, the ratio is far less than 0.1. The aspect ratio of the street reflects the intuitive feeling of the material form property of the street. At the important nodes, the aspect ratio of the YuDai moat should be controlled to maintain the amenity of the space. The appropriate aspect ratio is generally 0.5-1.0. Due to the consideration of the approachable scale of the building, the part of the enclosed building that is higher than the appropriate height can be withdrawn, such as the modern translation of bamboo tube house (Table 5-1).

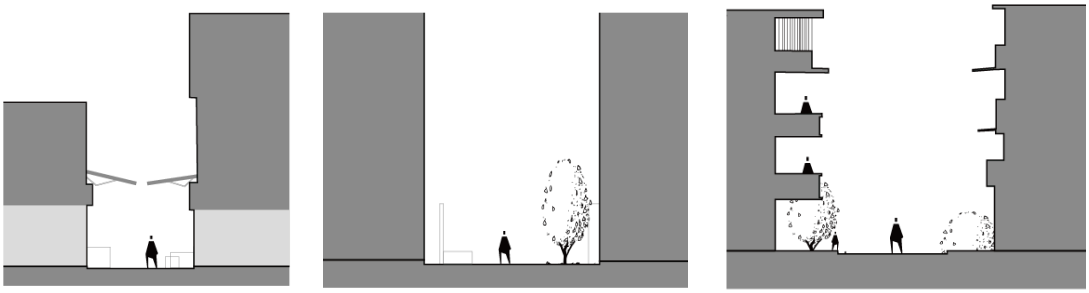


Figure 5-10 Width to height ratio of Yudai Street

Source: Drawn by the Author

Encourage the layout of buildings along the street, remove the illegal buildings and temporary buildings on the YuDai moat, retreat the building bottom wall or adopt the form of arcade and corridor, increase the continuity and openness of the functional activities of the building interface, and expand the scope of activities of the street space. Avoid the space behind the original water system cover plate becoming too narrow and repressed. The retreat space can be used to arrange casual seating, greenery, art installations, etc., to increase vitality.

a) High-rise building retreat b) remove the illegal building c) Ground floor retreat

Figure 5-11 YuDai moat street life typo-morphological control

Source: Drawn by the Author

2) Street

① Street interface

The surrounding buildings should encourage the harmonious interaction between the building facade and the street space, and avoid the monotonous high-rise buildings to close the street space. A variety of building materials and details can be used, such as masonry, wood,

metal, etc., to enhance the diversity and affinity of the facade. Encourage buildings along the street to adopt vertical greening design, combined with green wall climbing, balcony planting and other ways, not only to enhance the street landscape, but also to increase the ecological benefits of the city.

Reasonable control of the height of the building to ensure the vision of the street space of Yudai moat. The buildings along the street should be mainly medium and low-rise buildings, which are more matching with the pedestrian scale. High-rise buildings should be far away from the water system renovation area to avoid occlusion.

② Street function

Mixed commercial and residential functions can be flexibly planned on both sides of the Yudai moat, and the commercial and cultural displays at the bottom, such as cafes, bookstores, art exhibitions, etc., form a diversified community service node, making the street not only a traffic channel, but also a gathering place for culture and life.

3) Water system historical memory shaping

YuDai Moat water system has been covered, the design at this stage is mainly to shape the space environment of its upper street, and in the long run can be combined with the actual situation to carry out the local space node.

The historical logo and node design of YuDai Moat can retain the historical memory of water system through commemorative pieces, sculptures, ground paving patterns and other ways. Signs reflecting the history of the water system can be set up at prominent positions such as street expansion corners and square nodes, so that the public can perceive the original water pattern of the street. For example, the historical change cultural node of the YuDai Moat can be set up in the pedestrian square of Beijing Road.

Figure 5-12 The paving expresses the intention of water

Source：gooood(gooood.cn/)

4) Landscape visual guidance

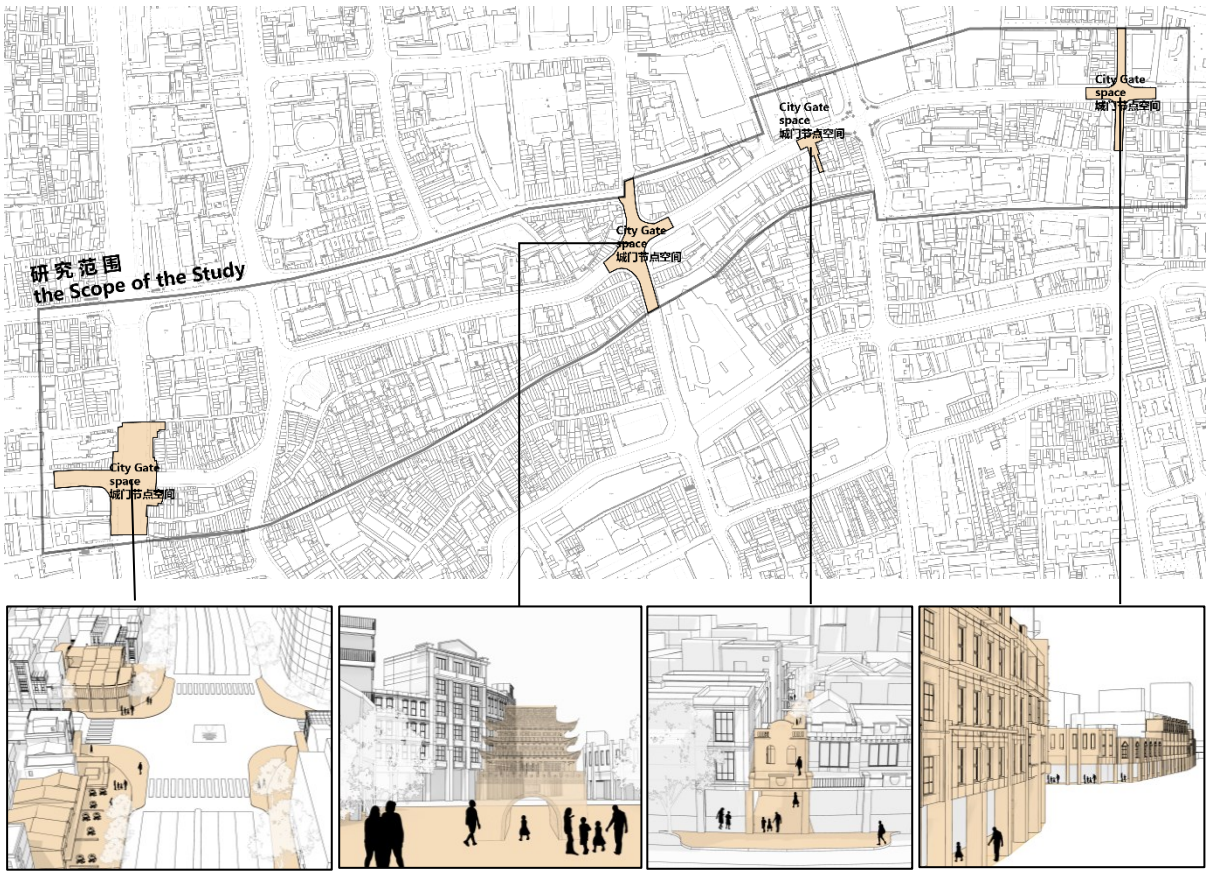
Along the direction of the historical water system, the visual guidance is designed to form the landscape axis of the street, so that people's sight can naturally feel the continuity of the water

system and historical memory. At night, the shape of the street and the history of the water system are also displayed through lights, such as using soft lights to illuminate the water signs on the ground or the facades of the surrounding buildings, to enhance the readability and attractiveness of the night environment.

Figure 5-13 The light expresses the intention of water

Source：gooood(gooood.cn/)

5.1.5 City gate space morphological region design



a）Street corner space utilization

b）The square sculpture highlights the city gate node

c）City gate visual corridor

d）Unified interface for nodes

Figure 5-14 City gate space morphological region design

Source: Drawn by the Author

1) Typo-morphological control

The city gate is located at the intersection of the city road, and the construction of the city gate node needs to consider the concentrated expression of the city wall, city gate and city moat. Since the original gate was once an important node in the area, a new node design should be formed at the intersection. It can expand pedestrian Spaces, squares and public activity areas, avoid the fragmentation of traffic space, and enhance the accessibility and openness of the block. Create new urban focal points in public Spaces by means of plazas, sculptures, ground paving or water features, while harmonizing with the layout of the surrounding buildings and preserving the spatial memory of the historic district.

2) Street

Most of the lot where the city gate is located is in the historical and cultural protection block, so the traffic design should be set up at the node of the city gate with chronic priority, and the pedestrian square, buffer zone or pedestrian street should be set around the intersection. The spatial organization based on the pedestrian will help enhance the vitality of the block. Clear crossing facilities such as sidewalks, green dividers and slow traffic signs are set up on the necessary vehicle lanes to guide vehicles to reduce their speed when passing through the junction of the city gate, ensuring pedestrian safety and the continuity of the block.

3) Surrounding architectural form and style control

The traditional architectural texture still preserved should be maintained at the junction of the city gate, such as the bamboo tube house. Buildings along the street should adopt building facades and materials that are in harmony with the style of the historic district, such as traditional brick, stone, wood and other elements. In modern buildings that are quite different from traditional buildings, especially high-rise buildings, the design elements of historical city gates can be borrowed from the architectural details, such as arched doorways and city wall decoration, so that the architectural style and historical memory can be matched. Pay attention to the fifth facade of the surrounding buildings, and keep the roof of the building consistent with the overall skyline of the block. The traditional slope roof design of the new building can avoid the abruptness of the flat-topped tall buildings, and the roof space of the building can be enriched through the appropriate roof garden or greening design, so as to make it harmonious with the surrounding landscape.

4) Shaping the vitality of historical context

①Functional replacement

Introduce commercial functions, such as bookstores, cafes, handicraft shops, etc. into the city gate node square or around the street to create a commercial space full of cultural

atmosphere. At the same time, regular cultural fairs, exhibitions and other activities are held to strengthen the cultural communication function of the block, making it a multi-functional area integrating leisure, culture and historical display.

②City Gate reappears

To express the reproduction of historical scenes at the gate node, relevant sculptures can be set up near the original site, so that people can quickly perceive the historical and cultural information of the gate. For example, a small sculpture of the DaNan Gate can be set up in the location of the Beijing Road Pedestrian street near the original site of the DaNan Gate.

③Metaphor and symbol

In the area where city walls and city moats used to exist, different materials, patterns, or ground signs can be used in pavement design to recessive reproduce the flow line of historical space and help pedestrians identify the historical context. For example, light-colored stone or specially textured floor tiles were used to outline the location of the original city gate. At night, through moderate lighting design, highlight the historical memory of the city gate ruins or crossroads. Lights can be arranged along the outline of the original city wall or gate, recreating its historical character while enhancing the neighborhood atmosphere at night.

Figure 5-15 The design technique of metaphor symbol

Source：Reference[29]

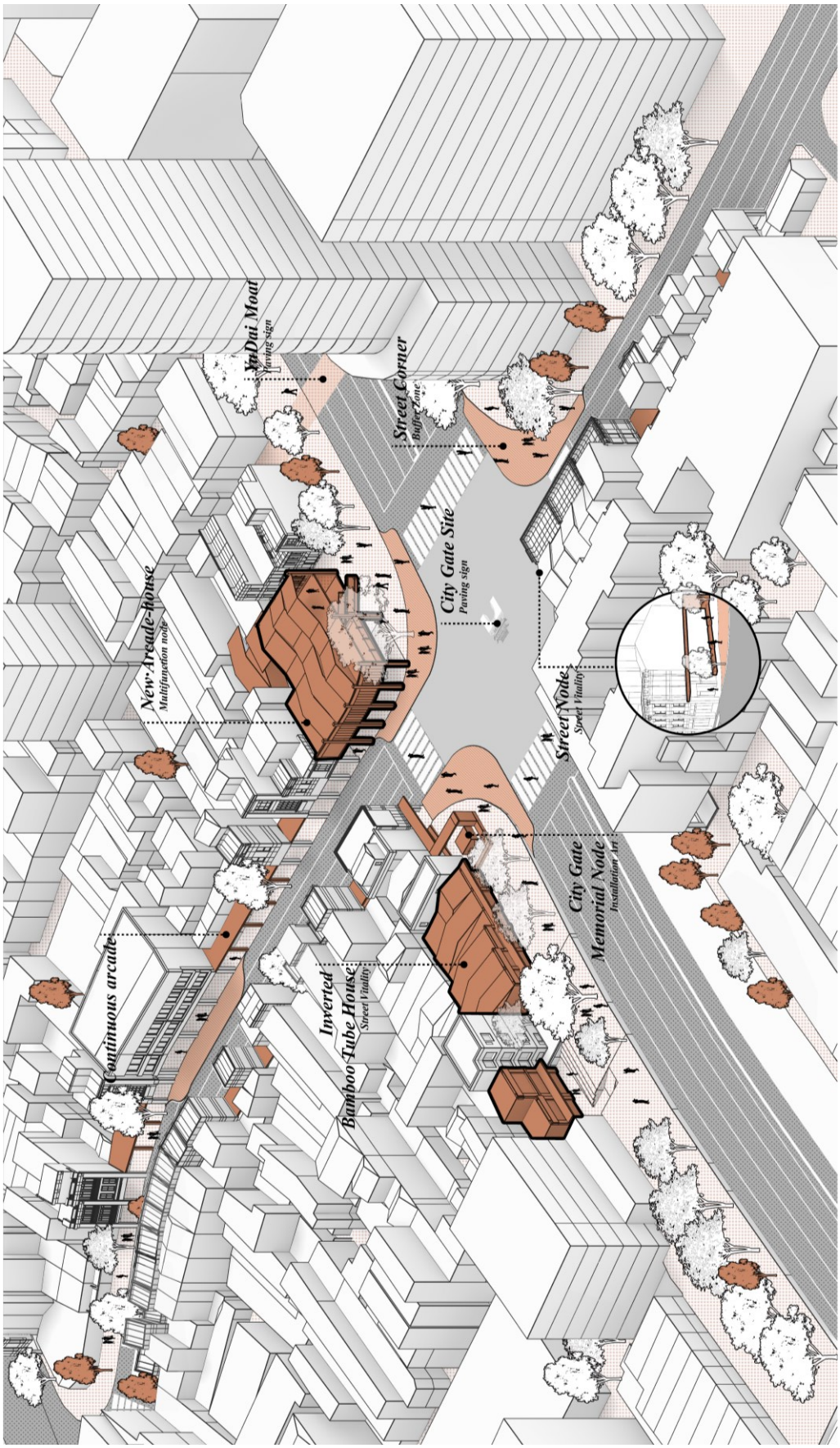


Figure 5-16 GuiDe Gate Aerial View

Source: Drawn by the Author

5.2 GuiDe Gate

In Chapter 4, GuiDe Gate is now an intersection, and the surrounding area is mainly a commercial street and storage space formed by arcade building, single rows and multiple rows of bamboo tube houses. According to GuiDe Gate 's current positioning and traditional history, the design sets up various commercial and cultural Spaces, and uses the evolution of the type and form of bamboo tube houses to continue the historical fabric. Create an attractive historical space node of the city gate.

5.2.1 Gate node overall design

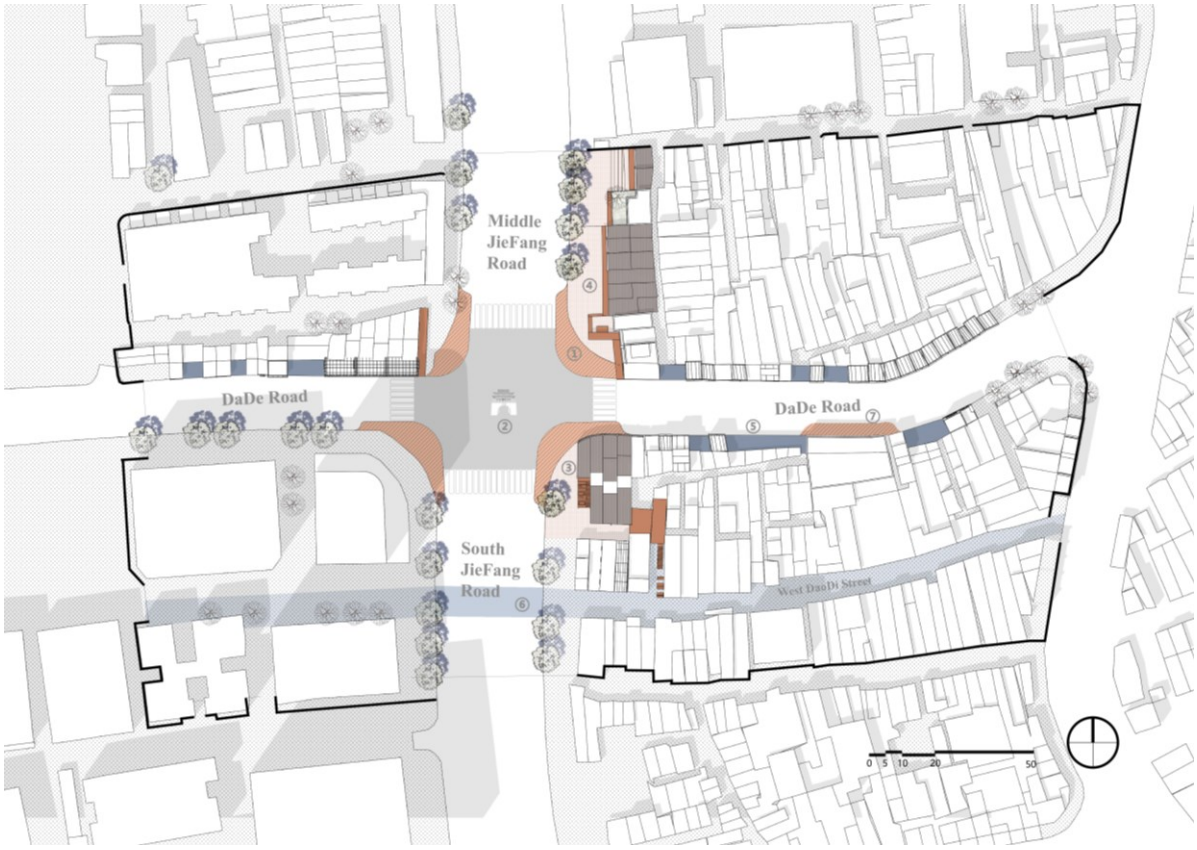


Figure 5-17 GuiDe Gate Master Plan

Source: Drawn by the Author

1) City Gate node buffer

In order to shape the historical node space of the city gate, a corner buffer zone extending the sidewalk is set up at the intersection, which is about 2-3 meters wider than the sidewalk. This type of buffer zone design is often used to reduce the turning radius of the road, which can reduce the speed of the car, but also effectively improve the overall function and environmental

quality of the area.

① Pedestrian safety

At the Guide Gate intersection, the flow of pedestrians and non-motor vehicles is usually large, and the open vision and slow speed can give drivers more reaction time, and pedestrians have more opportunities to pass the intersection safely. The extension of sidewalks also reduces the amount of time pedestrians are exposed to traffic, helping to create a safer and more comfortable street environment.

② Enhance the space utilization of blocks

The corner buffer is not only a functional design, but also can enhance the overall beauty of the city gate node by improving the space utilization and visual effect of the block. In the buffer zone, street pieces, green facilities, historical information signs and so on can be reasonably set up to improve the environmental quality of the street and make the block more attractive.

The buffer zone is used to increase the use space of pedestrian blocks, and better organize the flow of people and functional arrangements. The expanded intersection also provides space for more functions, facilitating the subsequent design of the two corner nodes.

③ Highlight historical nodes

The narrowing of the lane at the turning point of the road helps to create the atmosphere of the historic city gate node, and the combination of the sketch helps to highlight and identify the spatial node of the historic city gate.

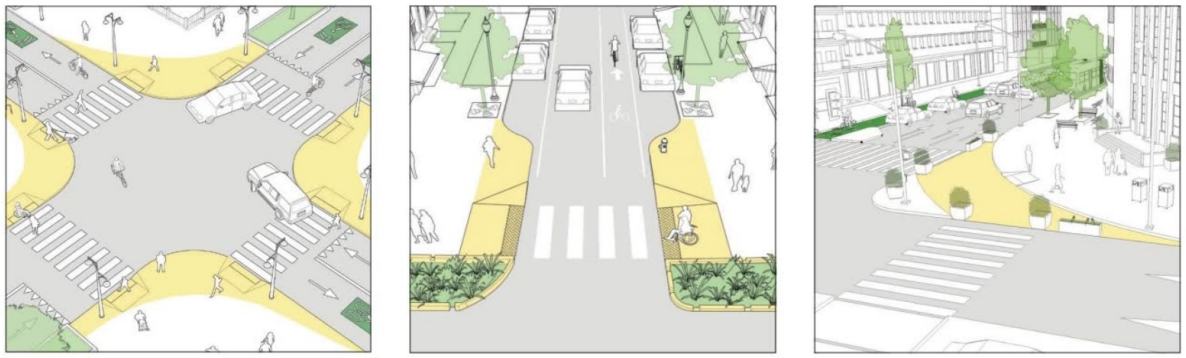


Figure 5-18 City Gate node buffer zone

Source: Reference[84]

2) City Gate site sign

On the road surface of the original site of the GuiDe Gate, the location of the gate is marked by paving.

3) City gate - corner cultural experience node

Two characteristic plots are set at the corner of city gate node, and the two plots are transformed by typo-morphology analysis to emphasize the history and culture of city gate node, and the old site space of city gate can be better identified in the inner city wall area.

One is the new arcade - multi-functional node located at the southeast corner, the appearance of this node continues the form of the arcade, the bottom floor is elevated; The interior uses bamboo tube house space to connect freely and set up multi-functional space. The other place is the reversed bamboo tube house - Vitality street located at the corner of the northeast corner. This node will reverse the entrance of the bamboo tube house, which is originally not active, and make it face the side of the gate node, and set up the gate memorial on the street corner, creating a dynamic street and enhancing the historical and cultural atmosphere of the gate node.

Figure 5-19 City gate - corner cultural experience node

Source: Drawn by the Author

5.2.3 GuiDe Gate - Corner cultural experience node

1）New arcade - Multi-functional node

Figure 5-20 New arcade - Multi-functional node

Source: Drawn by the Author

It was a vacant lot on the southeast side of the old gate, 20 meters long from east to west

and 24 meters wide from north to south. It is currently used as a parking lot for small cars. Because the site is located on a street corner, the access of motor vehicles will cause disturbance to the operators. The arcade street of Dade Road is interrupted here, and the corner of the historic city gate node fails to form a good cultural atmosphere, which is incompatible with the whole block.

A new building in line with the overall style of the block is built at the corner of GuiDe Gate. On the one hand, the texture of the facade of the arcade and the shape of the street are continued, and the space with historical and cultural atmosphere is shaped. On the other hand, the node of the corner of the city gate is shaped, which can also enhance the vitality of the block. The design strategy is mainly reflected in the following aspects:

1) Continue the facade texture of the arcade

The corner building continues the existing arcade facade of the block, and forms a consistent architectural language with the surrounding arcade buildings through reasonable proportion, scale and selection of building materials. It retains a certain distance from the original arcade building on the site, adopts the ground floor to form a corridor space of the same height, and the opening space is consistent with the south bamboo tube house, about 4 meters.

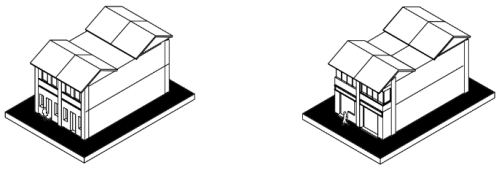
2) Architectural form and style

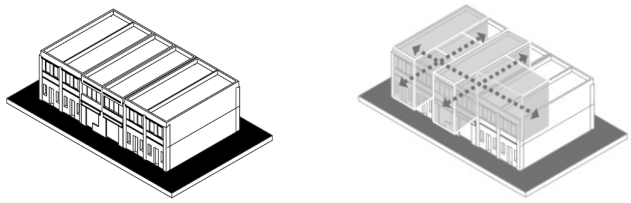
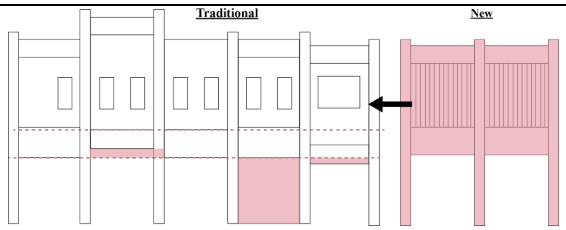
The roof is in the form of a pitched roof, consistent with the traditional arcade buildings in the block.

3) Integration of function and culture

The new building has both a temporary storage of goods on the ground floor and a public function, providing a space for citizens to interact. Combined with the arcade and corridor space, the modern community activity place is introduced, so that the building becomes the carrier of the block culture. The upper floor is a multifunctional space of bamboo tube house that can be freely used.

Table 5-2 The typo-morphology prototype adopted by arcade building

Type	Typo-morphology prototype	Use-pattern
Typical Bamboo Tube House		The new building adopts elements such as small width of bamboo tube houses, pitched roofs and patios

Internal Connection of Bamboo Tube Houses		The upper space is based on the bamboo tube house, and the internal partition wall is freely divided
Arcade morphological control		The new building forms a consistent architectural language with the surrounding arcade buildings

Source: Drawn by the Author

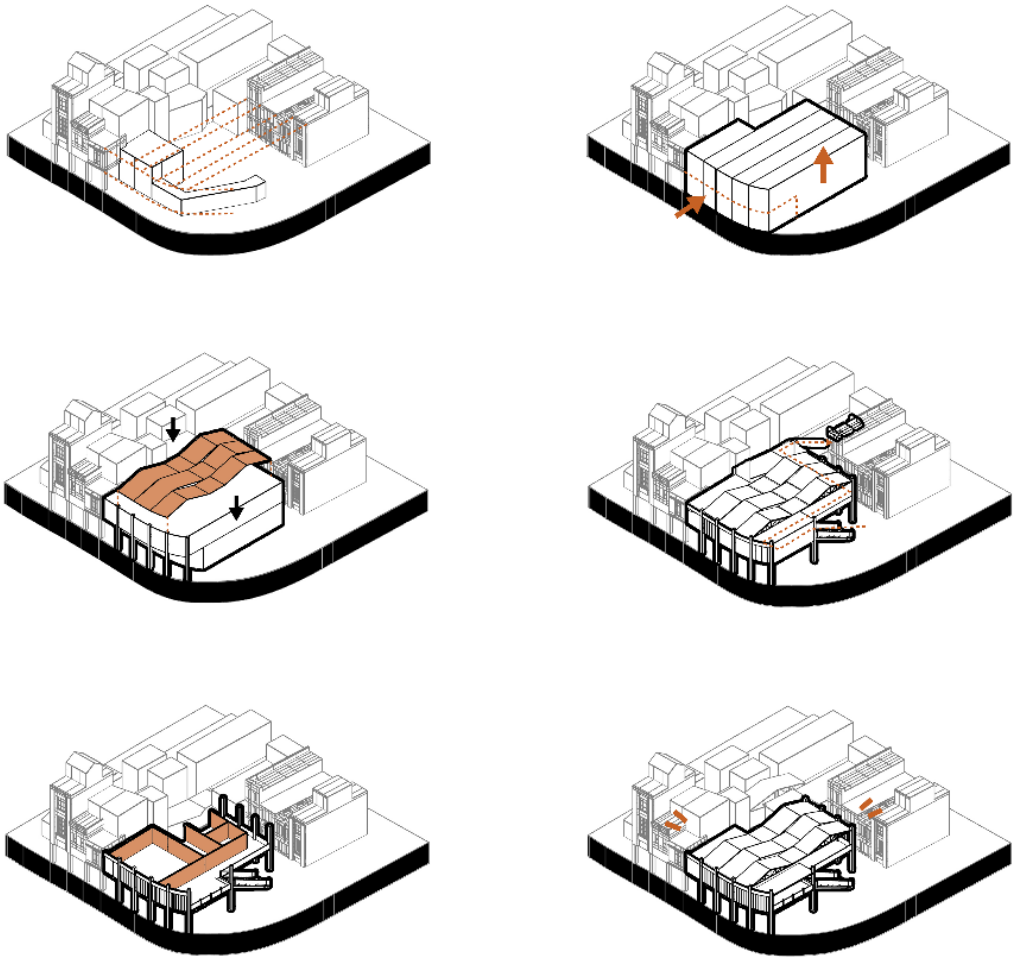


Figure 5-21 New arcade - Multi-functional node generating

Source: Drawn by the Author

The steps of node generation are as follows: Demolish the two buildings and parking lot enclosure facilities in the original site which are very different from the arcade street. With reference to the opening and height of the south bamboo tube house building, the volume relationship is established, taking into account the shape of the adjacent arcade street building,

and the connected arcade building adopt the same overhead width and height to maintain the consistency of the corridor space. Reference surrounding bamboo tube house adopts the form of pitched roof, with patio lighting in the middle. The sloped roof adopts truss structure to facilitate the free setting of the internal space of the second floor. The ground floor is completely raised, and the site can still be used for temporary parking of vehicles, and can also be used as a cargo storage point for the storage of goods in Gaudi West Shoe Street.

a)Ground floor b)Second floor

Figure 5-22 New arcade - Multi-functional node plan

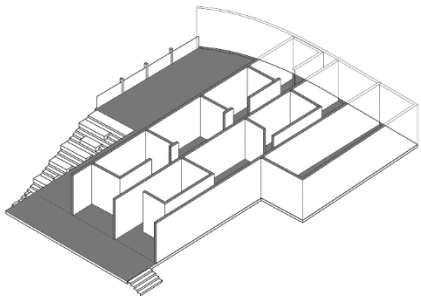
Source: Drawn by the Author

Non-motor vehicles can be parked on the ground floor, and a nearby bamboo tube house can be demolished and transformed into a cargo transport channel of Gaodi West Shoe Street, so that goods can be piled in the bottom goods storage area on the ground floor, which is convenient for street shop management. The upper floor uses the staircase corridor to organize the use of public facilities. For example, before using the toilet, people often have to detour from the end of the street, which brings inconvenience to users. After the renovation, a staircase is used from the public rest area to connect the toilet and the multifunctional node on the second floor through the corridor, improving the accessibility of the path.

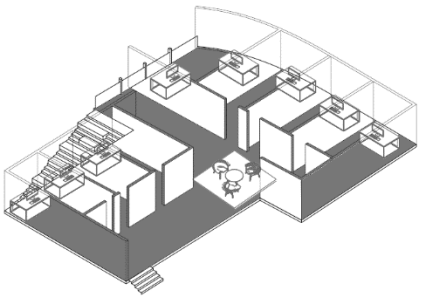
The second floor of the multifunctional node is formed according to the shape of the bamboo tube house. Because the interior of the bamboo tube house can be connected with each other, the new bamboo tube house space can be used as a multifunctional space for residents, shops and tourists in the block. The interior uses light movable walls, which can be divided into

different forms according to different needs, such as shared office, activity room, creative workshop, city gate historical and cultural exhibition.

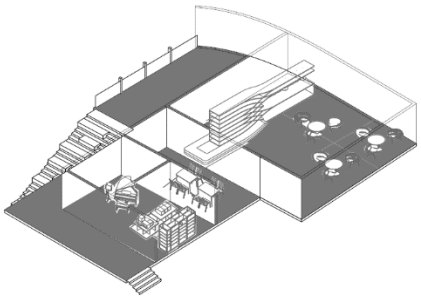
Through this new multi-functional node of bamboo tube house, the streamline organization and functional activities of the block are updated, and rich functions are added, modern community activity places are introduced, and the building becomes the carrier of the block culture.



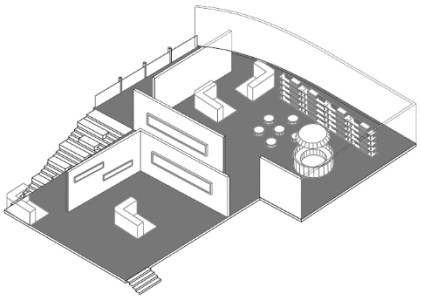
a) Traditional bamboo tube house interior division



b) co-working



c) Flash MOBS, creative activities



d) City gate historical and cultural exhibition

Figure 5-23 New arcade - Multi-functional node internal space division combination

Source: Drawn by the Author

2）Inverted bamboo tube House - Vibrant street

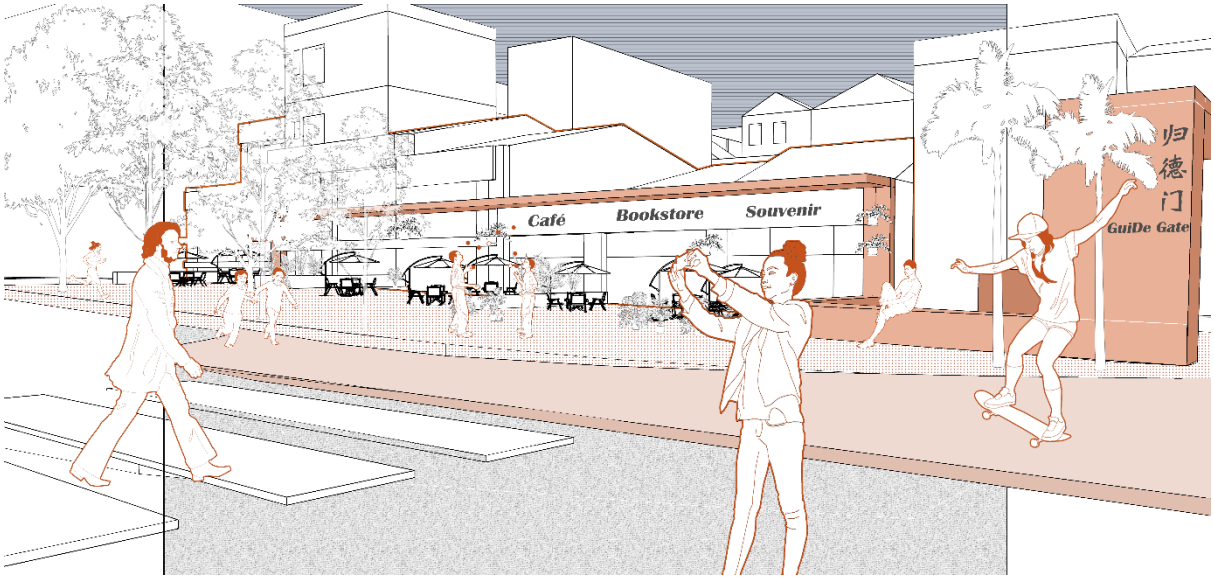


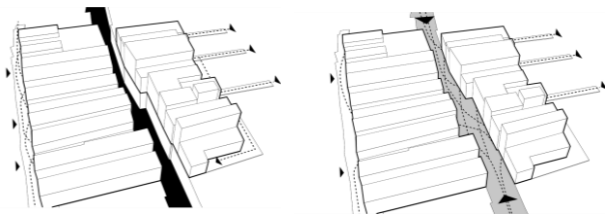
Figure 5-24 Inverted bamboo tube House - Vibrant street

Source: Drawn by the Author

The northeast corner of the original Guide Gate is a street corner space with green treatment, which has limitations in practical effect. The historical and cultural facilities - GuiDe Gate and Sipai Tower - are placed far away from the intersection, and the surrounding vegetation is dense, resulting in their appearance being obscured by greenery and more mottled under the erosion of time, which is difficult to attract people's attention and fails to effectively play its due role in popular science and cultural dissemination.

The single row of bamboo tube houses arranged along the street, the current situation is relatively simple, and its opening direction is towards the inner street. From the point of view of functional use, some of these bamboo tube houses are idle, and the other part is mainly used as a commercial storage space, which lacks interaction with street space and attraction for people.

Table 5-3 The typo-morphology prototype adopted by bamboo tube house

Type	Typo-morphology prototype	Use-pattern
The entrance direction of the bamboo tube house is reversed		Reverse the direction of opening the entrance of the bamboo tube house building here, shaping the vitality of the street corner of the city gate

Source: Drawn by the Author

To optimize this spatial form, try to flexibly adjust the entrance direction of the bamboo tube house, so that it faces the street, so as to enhance the visual connection and functional interaction with the street. Introducing a variety of functions, such as commerce, experiential Spaces, exhibitions, etc. into the bamboo tube houses further activates the vitality of this area. Through this design adjustment, the area where GuiDe Gate is located is built into a core node attracting people, creating a more attractive and participatory street space, making it a dynamic block combining urban memory and modern functions.

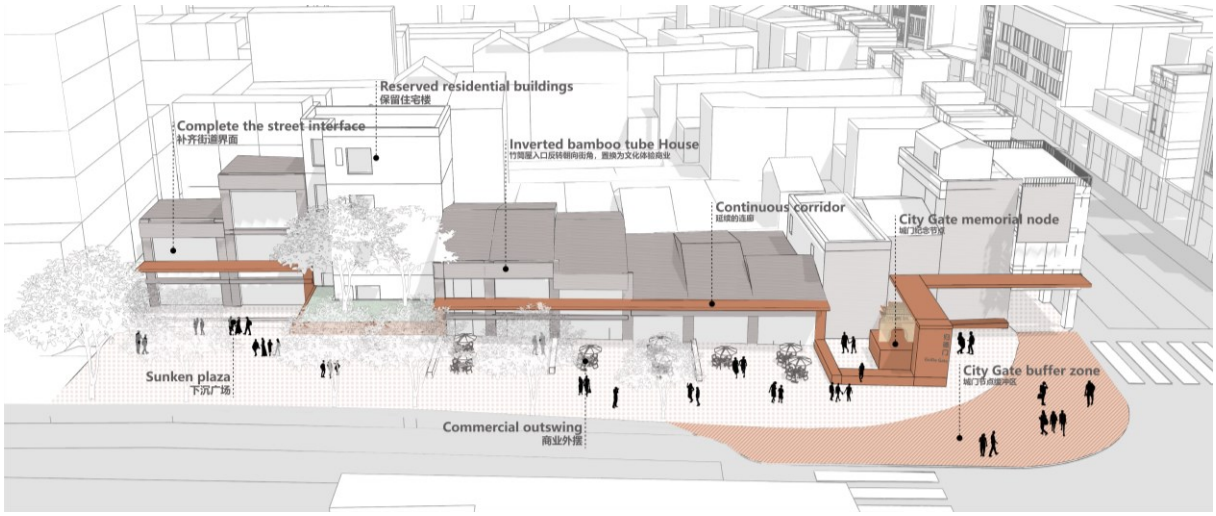


Figure 5-25 Inverted the bamboo tube house segment design

Source: Drawn by the Author

Figure 5-26 Comparation of the street

Source: Drawn by the Author

5.2.2 City Wall - Arcade Street

The shape of the intention of the city wall around Guide Gate is expressed by the interface of the arcade street on both sides of the street. Dade Road is a second class arcade street, the interface of the arcade is partially broken, and the pedestrian corridor system is discontinuous. In order to shape the atmosphere of the arcade on Dade Road, the broken part is made up to create a complete gray space of walking corridor.

The broken part is located on the sidewalk. In the arcade building group, a corridor with the same height as the ground floor of the arcade building can be used to connect the two sides of the arcade building, and a well-connected corridor space can be formed at the ground floor. The spacing between the opening columns of the corridor is as much as possible the same as that of the surrounding arcade building. It is also possible to renovate the surrounding buildings

When there are trees or obstacles on the sidewalk, the feasibility of continuing the arcade street needs to be evaluated. The width of the corridor can be narrowed by transforming the surrounding buildings to form a harmonious coexistence of trees and the arcade.

Figure 5-27 Continue the arcade interface

Source: Drawn by the Author

5.2.2 City Moat - Street optimization

1) YuDai Moat with historical sign

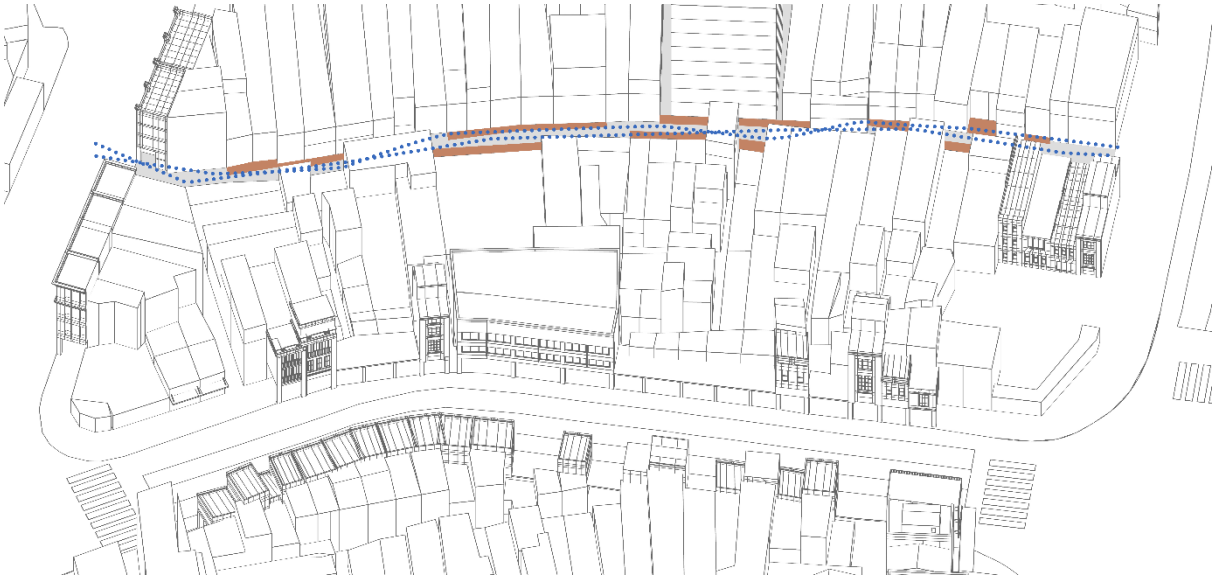
In the form of linear continuous paving, the historical information of YuDai Moat is marked in the street. Some locations can be enlarged as a pocket park of YuDai Moat, or a corridor landscape can be set up, such as the entrance of Dade Zhong Community.

2）Street flow line optimization

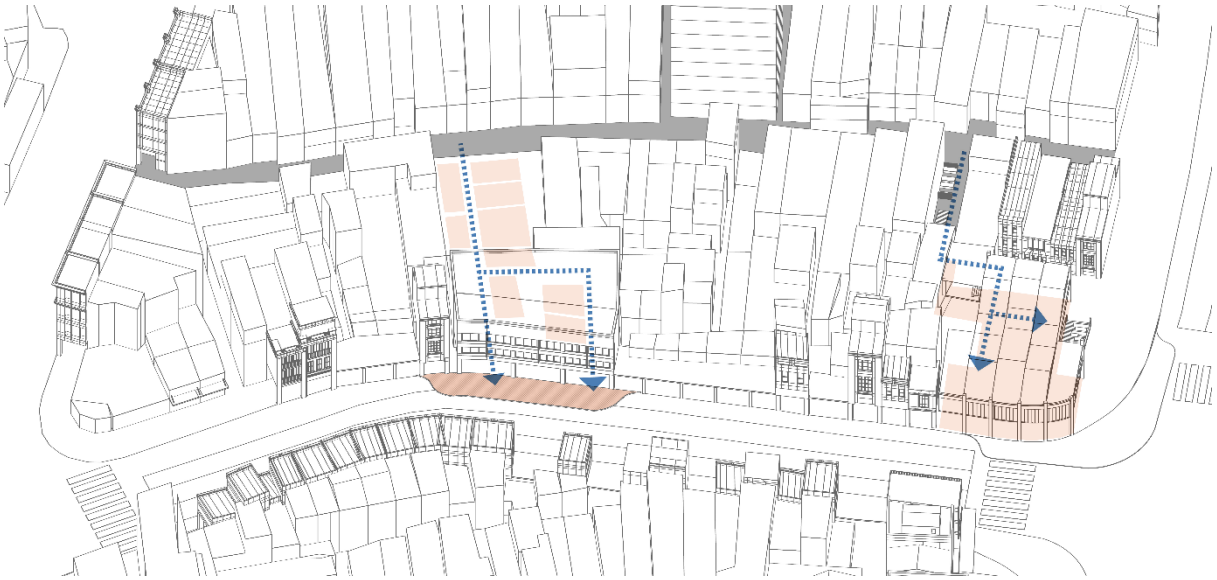
The Gaodi West Shoe Street formed after the YuDai moat cover is relatively narrow, pedestrians and non-motorized trucks are mixed, and a large number of goods are piled up on both sides of the road, which is not conducive to forming a better business atmosphere. Two methods are adopted to separate freight flow line from commercial flow line in flow line design.

1. Set up temporary storage points for goods using the passageway opened inside the original row of bamboo tube houses, and non-motor vehicles will not enter the street to pick up goods from the temporary storage points. A buffer zone is set up in front of the temporary storage point to facilitate non-motor vehicle parking.

2. Use the overhead ground floor at the southeast corner of the city gate to organize the transportation of goods.



a) The current situation of non-motor vehicles, people and goods coexist, and the streets are mostly congested



b) Set up two temporary storage points for goods to separate pedestrians from goods

Figure 5-28 Comparison of flow analysis

Source: Drawn by the Author

A temporary storage point is set up in the middle and end of Gaodi West Street, and each store will arrange the goods sent to the temporary storage point, so as to facilitate better contact between the northern warehouse area and the southern sales area. Logistics personnel do not have to enter the street interior, enhancing the walkability experience of Gaudi West Shoe Street. In the long term, it can also combine the history and culture of YuDai Moat city to develop characteristic business.

Figure 5-29 WenMing Gate Aerial View

Source: Drawn by the Author

5.3 WenMing Gate

In Chapter 4, WenMing Gate is now a T-junction junction, and the surrounding area is mainly a residential area formed by shophouses and rows of bamboo tube houses. The archway of WenMing Gate is hidden in the arcade. The design uses the methods of function replacement, appearance transformation and node highlighting to shape the and the related nodes of Qingyun Straight Street and Yudai moat to create the cultural characteristic living area of WenMing Gate by using the characteristics of the original residential area.

5.3.1 Gate node overall design

Figure 5-30 WenMing Gate Master Plan

Source: Drawn by the Author

1) Gate node buffer

The buffer zone of the gate on Wenming Road is similar to the method of GUI De Gate, which is set in front of the arch of Wenming Gate, helping to highlight the spatial node of the old site of the historical gate. Take the WenMing Gate as the landmark building, follow the tour path into the cultural life area of YuDai Moat - Qingyun Straight Street behind the WenMing Gate.

2) Shaping cultural and creative living areas

The replacement of the bottom commercial functions along the road behind the WenMing gate will replace the businesses that originally affected the living environment of residents and were not conducive to the construction of historical districts with cultural creativity. According to the historical and cultural tradition of WenMing Gate, build WenMing Gate cultural streets and form characteristic blocks with profound cultural and commercial deposits.Shape the YuDai Moat - Qingyun straight street node behind the WenMing gate, telling the story of the city wall, city gate and city moat.

3) Improve the living environment of WenMing Gate Node

Since the period of the Republic of China, WenMing Gate block has been in the form of Multi-row combined unit. The buildings within the block compete to occupy the use space, and the external walls are shared between the buildings. The patios of the original bamboo tube houses are filled in, and the internal ventilation and lighting effect of the multi-row blocks are poor. In order to improve the living environment in the block, the bamboo tube house patio was restored in situ. In some bamboo tube houses, staircases are confined to the inside of the building, leaving them open to serve as ventilation channels for the building.

4) Protect the arcade form of WenMing Road

WenMing Road is a first-level arcade street, and the arcade interface on the side of WenMing Gate is more continuous. The facade of the arcade should be maintained and partially restored to retain its original architectural details and decorative elements. In addition, it is necessary to renovate the corridor space and commercial interface under the arcade building to make it a comfortable place for pedestrians to rest and communicate, while reducing debris stacking and improving the overall environmental cleanliness.

5.3.3 WenMing Gate - Historical and cultural belt

1) Key viewing corridor

Remove the temporary buildings and facade additions along the road of the WenMing Gate, restore the traditional facade of the bamboo tube house, and ensure that the key view corridor of the WenMing Gate is not blocked.

2) Function replacement

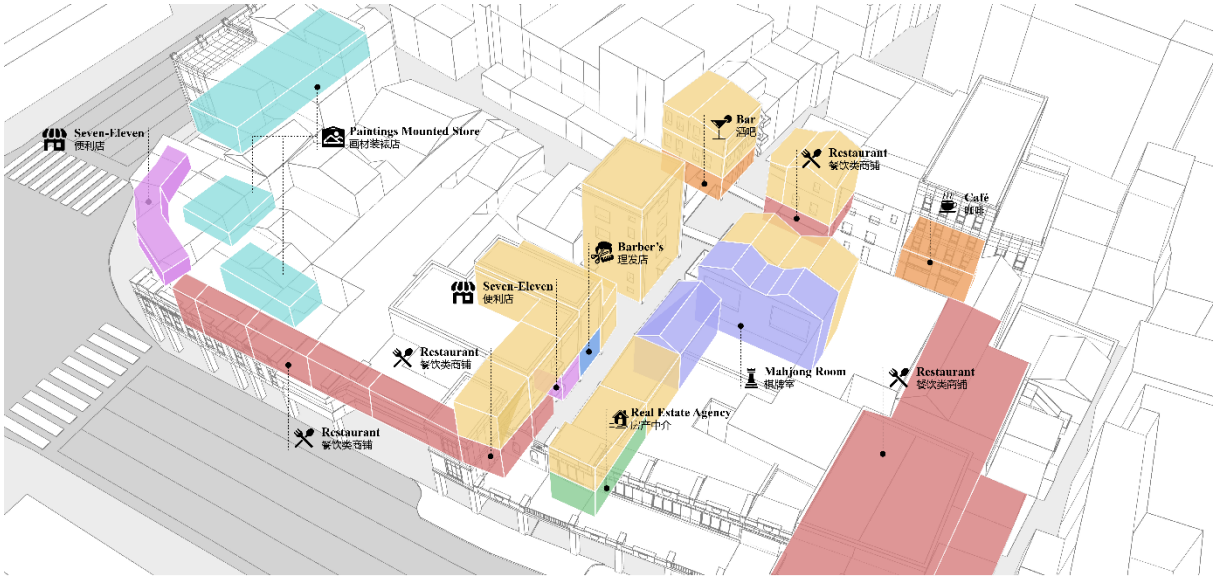
The bottom business of the bamboo tube house in the original historic node is mainly catering and playing board functions, some of which are easy to cause bad feelings of the environment, the smell of the kitchen affects the environment, pedestrians have to cover their noses and rush, which is not conducive to the formation of a good neighborhood atmosphere.

WenMing Gate and Qingyun Street are the ancient places for students to take examinations, "WenMing", "Qingyun" and other words were placed high hopes. There are some painting material decoration shops on both sides of Wende Road next to the block. It is considered to replace the business in WenMing Gate historical node into a cultural and creative area related to history and culture. On the one hand, such functions can easily combine with Wende Road to form a cultural atmosphere and have an attractive effect.

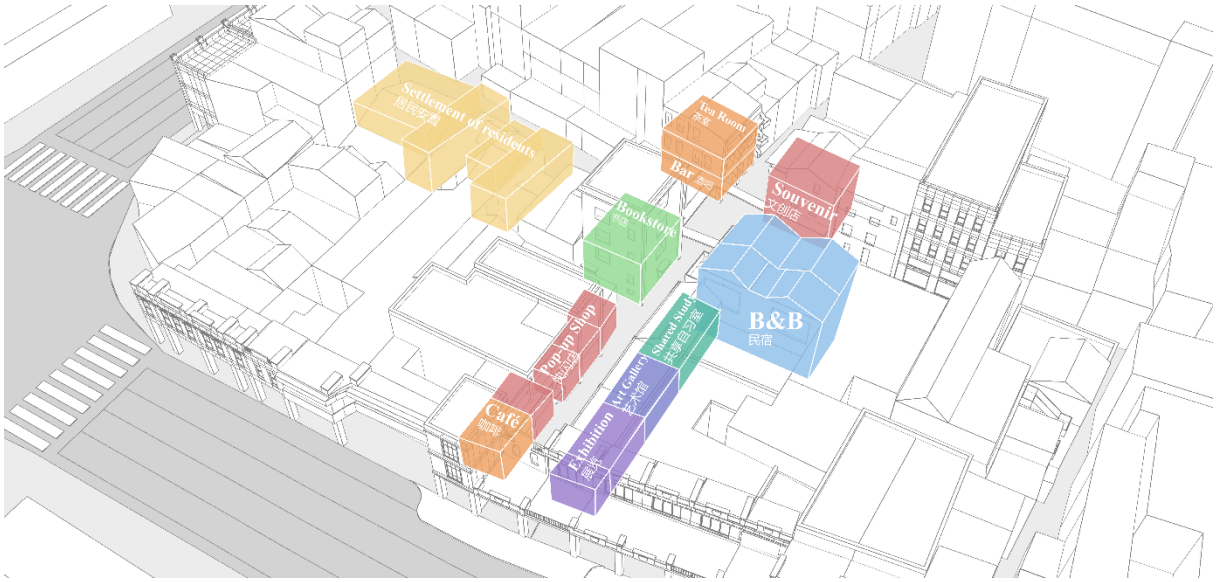
If the functional replacement has an impact on the living space of the original residents, additional low-rise buildings can be built elsewhere in the site.

Figure 5-31 WenMing Gate Key viewing corridor

Source: Drawn by the Author



a) Current functional distribution



b) Function distribution after replacement

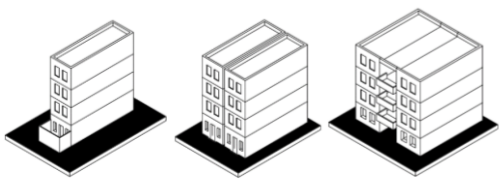
Figure 5-32 Functional replacement comparison

Source: Drawn by the Author

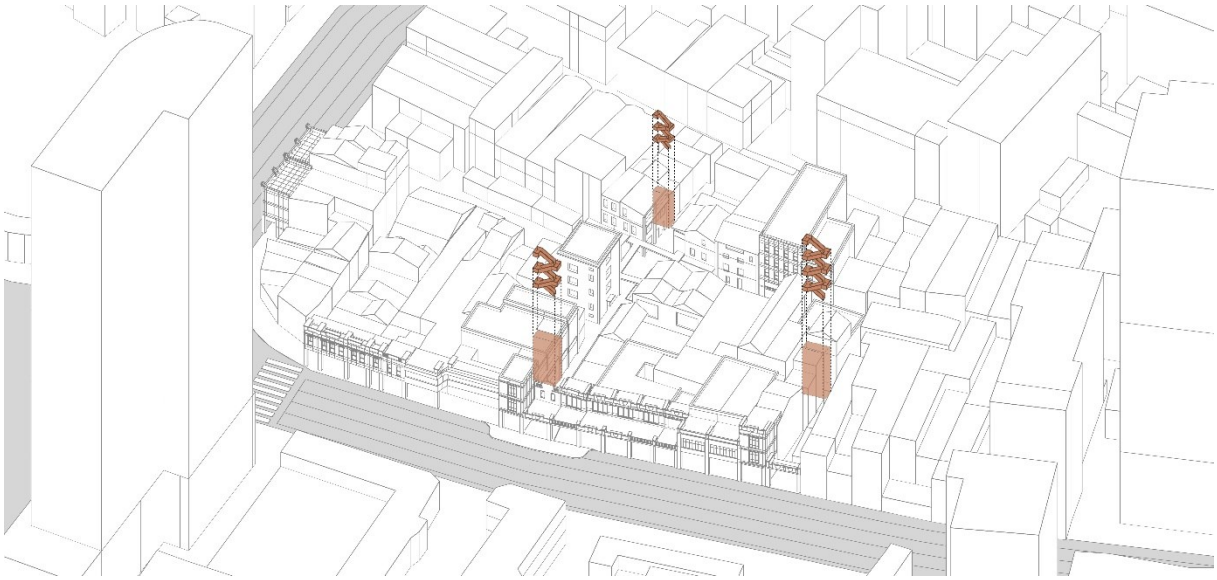
5.3.2 Block - bamboo tube house area optimization

In order to improve the overall environmental quality and space utilization of the block, the bamboo tube house will be comprehensively renovated. First of all, the blocking facilities in the courtyard of the bamboo tube house are removed to reopen the patio and restore the original ventilation and lighting function of the building, so as to improve the indoor air circulation and enhance the living comfort. Secondly, the closed staircase space was optimized to make it more transparent and spacious, convenient for residents' daily travel, and at the same time, safety measures were added to enhance the traffic experience. Finally, the multi-row layout of the bamboo tube house is re-planned, the space resources in the block are rationally utilized, and the unique architectural beauty of the bamboo tube house is displayed with the orderly architectural layout.

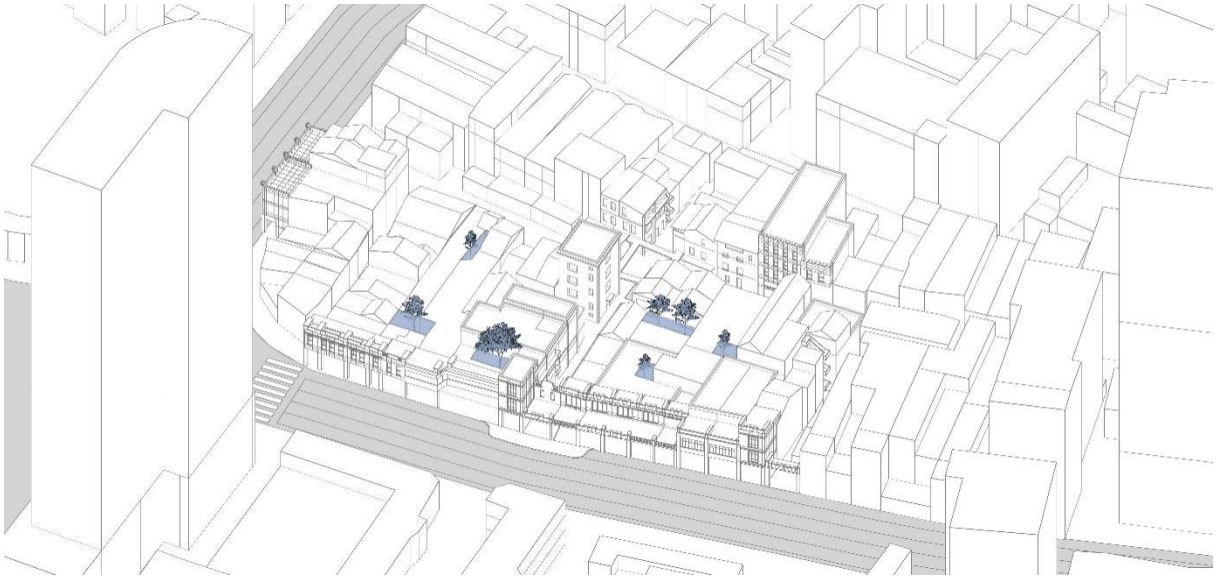
Table 5-4 The typo-morphology prototype adopted by block

Type	Typo-morphology prototype	Use-pattern
Improving Residential Environment		Optimize partially enclosed stairwells to improve the living comfort of bamboo tube houses

Source: Drawn by the Author



a) Open staircase



b) recover patio

Figure 5-33 Measures to improve the living environment

Source: Drawn by the Author

5.3.4 City Moat - cultural and creative block

At the junction of YuDai Moat and Qingyun Straight Street, there is Qingyun Bridge before the YuDai Moat is not covered, and you can cross the Qingyun Bridge and enter the WenMing gate of the inner city to Guangzhou Guangfu Academy. The walls of the buildings around this node are painted with murals of Qingyun Bridge and Guangfu Academy, and there are many non-motor vehicles parked in front of the murals, which does not form a good atmosphere.

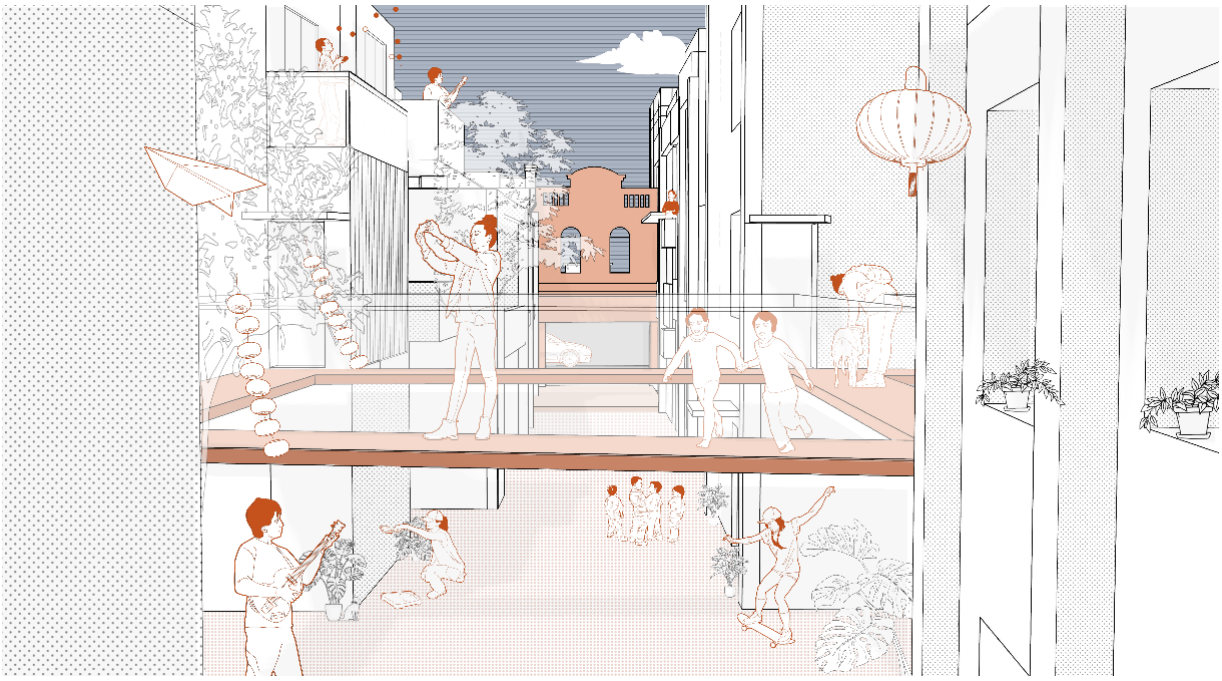


Figure 5-34 YuDai Moat - Qingyun Straight Street

Source: Drawn by the Author

1）Function

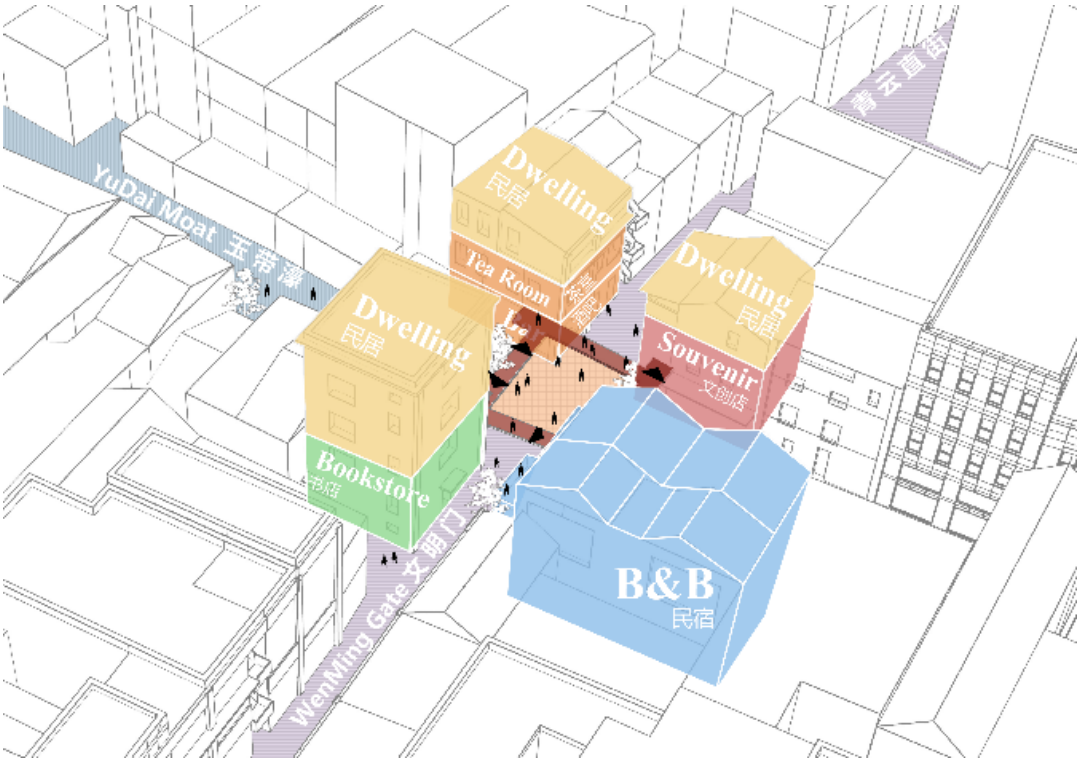


Figure 5-35 YuDai Moat - Qingyun Straight Street Node function

Source: Drawn by the Author

Some restaurant businesses that have an impact on the block environment in the ground floor and second floor of buildings around the node are replaced with painting and calligraphy exhibitions, coffee and tea breaks, residential buildings and other functions. The "bridge" is

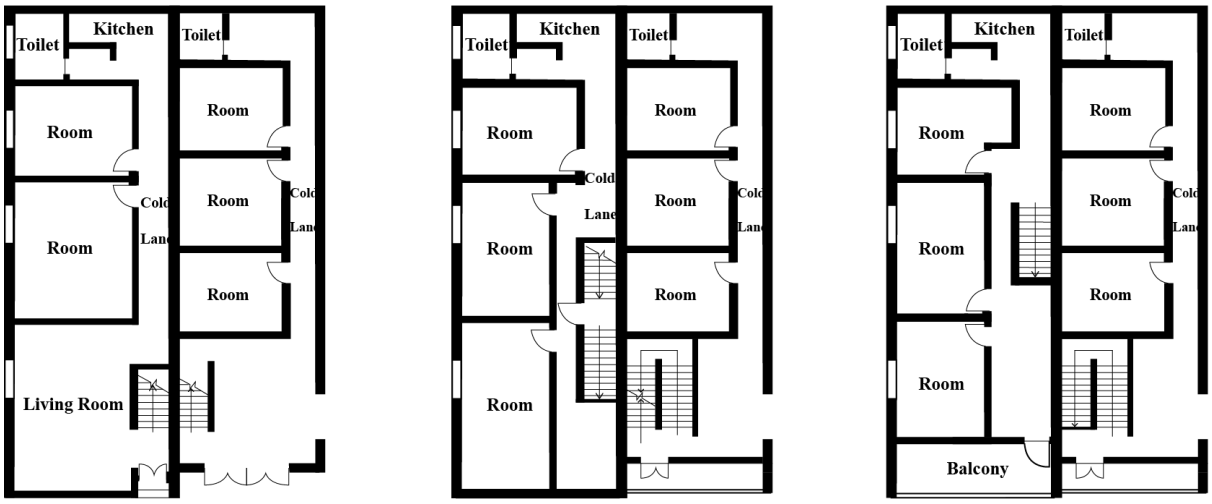
used as the intention to connect the surrounding buildings through the action path, and the second floor space can be connected with each other. Through function replacement and device addition to create the intention of YuDai Moat and Qingyun Bridge. Form a unique city moat node cultural creative block.

2）Residential building renovation

The whole building of a bamboo tube house at the junction of YuDai Moat - Qingyun Straight Street was renovated. The building is now a rental house, and another bamboo tube house adjacent to it is a chess and card room. The two are uniformly transformed into WenMing Gate B&B buildings, combined with the patio space created on the side to form a good living experience.

The original two buildings were not connected internally and each had staircases leading to the upper floors. The front end of the interior space is a hall, the middle is a room, and the end is a kitchen, toilet and other auxiliary rooms. The rooms are connected in series by a narrow and long cold lane.

After the two buildings are merged, they will be transformed into B&B, with single or double occupancy rooms, capsule rooms, etc. There are 14 rooms, with showers and toilets on each floor, and a shared kitchen on the ground floor. The room is arranged on both sides, the middle retains the cold lane, retains the original partition wall, and partially opens up for passage. In the hall, a folding staircase is arranged to connect the upper and lower floors, and the second and third floors form a double-height space. Retain the balcony of the original building to form a rich space arrangement.

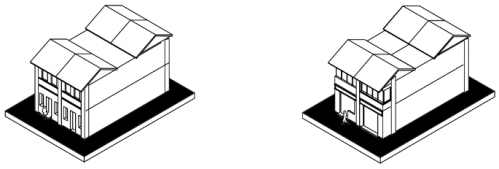
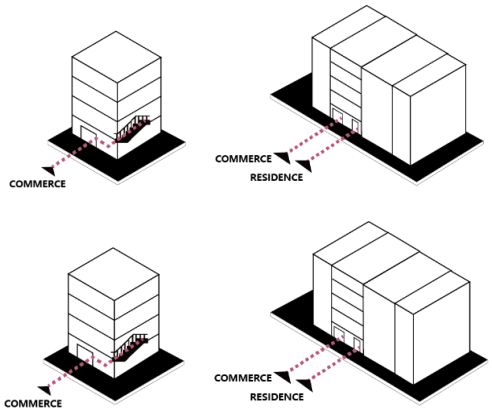


a) First floor b) Second floor c) Third floor

Figure 5-36 Building status function and internal division

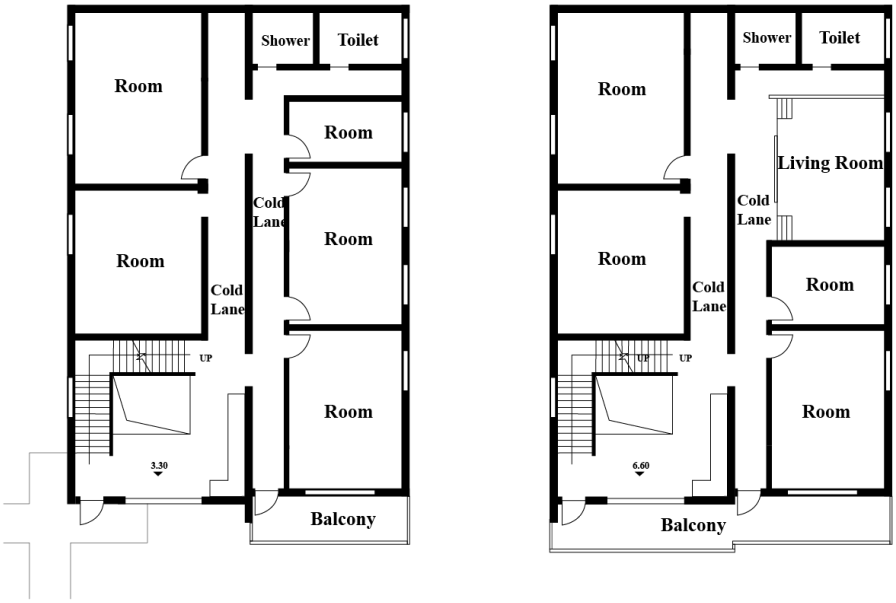
Source: Drawn by the Author

Table 5-5 The typo-morphology prototype adopted by B&B

Type	Typo-morphology prototype	Use-pattern
Typical Bamboo Tube House		The renovation of the original bamboo tube house retains the elements of small width, pitched roofs, patios, cold alleys, balconies and so on
The entrance of bamboo tube house		Reasonable planning of the number and direction of entrances and exits of B&B

Source: Drawn by the Author

a) First floor



b) Second floor c) Third floor

Figure 5-37 Plan after renovation

Source: Drawn by the Author

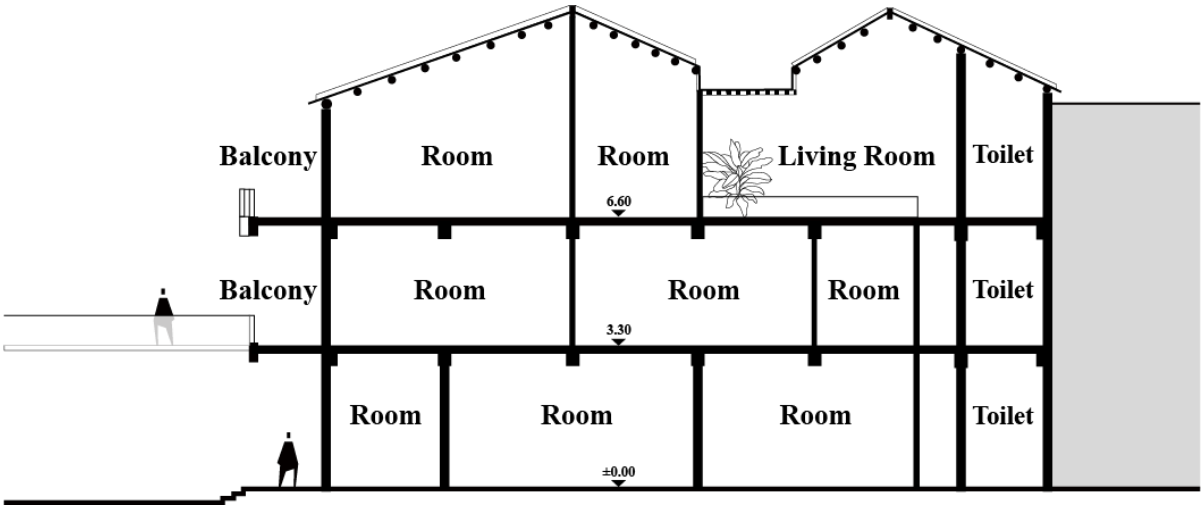


Figure 5-38 Section after renovation

Source: Drawn by the Author

Conclusion

From the perspective of typo-morphology, this dissertation systematically analyzes the historical evolution of the inner city wall area of Guangzhou (GuiDe Gate to XiaoNan Gate section) and the original city gate node space, and probes into the typo-morphological change, function evolution and historical and cultural significance of the city gate space. In the historical development of Guangzhou city, the city gate node, as an urban defense, transportation hub and cultural symbol, has gradually transformed its spatial form with the change of city development. Based on this, the study reached the following conclusions:

1. Main research results

1. 1 Evolution logic of inner city wall area spatial form

The morphological evolution of the inner city wall area of Guangzhou can be divided into several important stages. The first stage is from its foundation to the development of city walls and YuDai Moat in the Ming and Qing Dynasties, and even the whole city of Guangzhou laid the basic spatial pattern, which belongs to the formation period of the traditional historical pattern of Guangzhou. The second stage is from the Republic of China to the early period of the founding of the People's Republic of China, when the inner city underwent the demolition of city wall to build the roads and the cover of city moats, and the shape of the inner city changed greatly. In the third stage, since the reform and opening up, the inner city has taken a series of measures to update and optimize the material form elements, such as roads, plots, buildings, etc. Due to the lack of overall planning for the form of inner city wall area, the traditional historical sites and historic blocks within the inner city wall area become fragmented.

The dissertation selects the important city gate node space in the inner city wall area for further study, from the defense function of the city gate in the early stage, to the traffic and commercial node combined with the city moat in the later stage, and then to the cultural and urban landscape node today. The morphological evolution of gate node in Guangzhou has a certain regularity, that is, from closed to open, from single function to compound function. For the city gates in different locations, their historical functional positioning has also continued to evolve, affecting today's layout planning from the aspects of block morphology and building types.

1.2 Study on the current situation of City Gate node

Since the city gates in the inner city wall area of Guangzhou were dismantled during the Republic of China period, most of the ruins have been turned into road intersections. On the whole, the part of the gate node located in the historic district retains the traditional

morphological texture, while the part not belonging to the historic district has a greater degree of change. The main road in the node has undergone the evolution of the city wall - the arcade street - road widening, while the secondary road is more stable. The variation degree of plan units at different nodes is different. The building type has evolved from the most basic bamboo tube house in the inner city to several different variants of commercial and residential types. Based on the analysis of roads, plots, buildings, etc., the morphological region of each gate node is summarized.

Based on the analysis of the current situation of the city gate node, this dissertation puts forward 4 site problems, which are lack of shaping of the city wall, city gate, city moat and their evolution form in the general direction. The current situation of the city gate node does not respond to the historical shape outline of the inner city wall area and the historical and cultural background, and the node lacks of recognition. In addition, there are some problems such as the overall block environment is cluttered, and the road streamline at the node is chaotic.

2. Research innovation

2.1 Construction strategy of inner city wall area spatial form

The construction of inner city wall area spatial form is based on the classification of morphological region, which can be divided into material morphological region and non-material morphological region in general. In order to reshape the historical shape outline of the inner city wall area, a historical spatial structure of "two belts and four nodes" was proposed, including the city wall belt, the city moat belt and the city gate node, focusing on the optimization of the main morphological region.

Gate node is a concentrated expression of the inner city wall, gate and city moat. Specific construction design is proposed for the two gate nodes analyzed above. The optimization of gate includes the optimization of node street corner, key viewing corridor and key identification of the original site of gate. The shaping of the city wall includes the maintenance of its form of the arcade street. The shaping of the city includes the emphasis on the important nodes, the key marks of the historical water system, and the processing of the street flow line.

2.2 The renewal value and practice path of gate node space in Guangzhou

The renovation of gate node is not only the restoration of historical form, but also the reconstruction of urban function and cultural value. According to the research, the renewal value of Gate node of Guangzhou is mainly reflected in three aspects: First, through renewal and transformation, activate the city's historical and cultural resources and enhance the city's image; Second, the city gate node is re-endowed with multiple functions, combining public

space, cultural display and commercial development to enhance its social function; Third, the transformed city gate node will become a cultural landmark of the city, connecting the past and the future, and promoting the continuation and innovation of urban culture.

2.3 The value of typo-morphology to current heritage conservation

The typo-morphology provides theoretical basis and method support for the analysis and renovation design of City Gate node. Through the analysis and refinement of historical types, the development and evolution of the complex inner city wall area morphology and its current situation are summarized into different plan units and morphological regions, so as to intuitively see its development and change. Based on the analysis of the types, several different types of variants are summarized and the strategy reference can be used in the update optimization design.

The renewal strategy based on typo-morphology can not only preserve the historical morphological characteristics of gate node, but also meet the needs of modern urban development. Specifically, in the process of transformation, the design should emphasize respect for the original spatial pattern and urban texture, and at the same time carry out adaptive regeneration in combination with modern functional requirements. The tools of type morphology enable the design process to find a balance between historical form and modern function to achieve sustainable renewal of urban Spaces.

3.Research deficiencies and prospects

3.1 Research deficiencies

As a city with a long history, the evolution of Guangzhou city morphology involves many dynasties and historical stages. However, due to the absence or incompleteness of historical documents, it may be difficult to restore key information. For example, due to the different depth of historical maps drawn in different periods, the inner city wall area of Guangzhou lacks detailed plot data before the Republic of China, so the research on the plot hierarchy in the gate node can only be conducted from the Republic of China period after the city wall was dismantled.

Secondly, the thesis's morphology construction strategy for the inner city wall area is based on the morphological region of the inner city wall area and the " Two-belt and Four-node " spatial structure, and puts forward strategic guidelines for the four key morphological regions. The scope of the thesis's research and update design operation focuses on the gate node where the inner city information is centrally expressed. In the follow-up research, should also supplement the systematic discussion on the protection objectives and design strategies of the

overall linear space of the inner city wall belt/ city moat belt, and the overall area of the inner city wall area.

The research on the renovation design of the city gate node is conceptual, focusing on the expression of historical form and type elements in shaping the city gate node, and further research on specific urban and architectural space should be combined with the conservation of important historical buildings or the spatial regeneration of bamboo tube houses.

3.2 Research prospects

This study provides an idea based on typo-morphology for the renewal of City Gate node in Guangzhou, but in practice, it needs to be further combined with specific urban development planning, block needs and policy orientation. At the same time, future studies can further explore the combination of typo-morphology and other urban renewal theories to further optimize the conservation and reuse strategies of historical space nodes. The future gate node of Guangzhou will not only be the bearer of historical memory, but also an organic part of modern urban life.

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