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城市宗地更新方法在广州高第街再开发地块的应用研究

作者姓名	刘子逸
学位类别	建筑学硕士
指导教师	导师组
所在学院	建筑学院
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A Study on the Application of Urban Plot Renewal Methods in the Redevelopment of Parcel in Gaodi Street, Guangzhou

A Dissertation Submitted for the Degree of Master

Candidate: Liu Ziyi

Supervisor: Mentor Group

South China University of Technology

Guangzhou, China

摘　要

自 1949 年以来，中国历史名城经历了巨大的变革。其中一个本质的变化是对土地格局的普遍重构。不断的城市更新严重破坏了历史地块格局，由先前小地块合并而成的超大地块已成为当代历史城区的显著特征。地块形态作为城市文化与历史的直观载体，其重要价值应在城市更新中凸显。历史地块格局的破坏表明，现行地块划分机制不支持历史文化名城的保护。因此，如何在现代城市高速发展中，延续历史肌理并建立新形态与传统形态的联系是关注的重点。

本文理论基础研究分为两部分，首先，基于宗地都市主义总结了街区形态密度与多样性的原则，旨在为设计片区的宗地划分与准则提供理论支撑。其次，通过对类型学实践操作手法的归纳和案例分析，从历史中提炼建筑特征，以此建立宗地平面上的建筑设计规则，并进行多样性的证明。最终，以探索本土适用性与实践的结合，构建一套设计应用框架，并选取了广州“高第街”历史街区为例进行城市设计实践研究。

本文由以下内容构成：（1）绪论，首先阐明了研究背景与目的，并论述选择高第街的原因，以及相关城市形态研究的综述，最后确定研究方法与框架；（2）基础理论研究，对宗地都市主义与类型学理论梳理及相关方法总结，为后续在地性设计提供依据；（3）通过高第街现状调研与历史文化资源的对比，理清保护更新问题与理论基础之间的适应性；（4）高第街宗地划分机制与街巷坊形态的历史特征总结；（5）设计方法的在地性调适及相关设计过程：梳理建筑规则、总体规划等；（6）在此基础上，应用该设计方法进行片区的详细设计实践与图则制定；（7）对整体研究进行总结，并提出不足和展望。

关键词：城市形态；类型学；宗地都市主义；历史街区；高第街

Abstract

Since 1949, China’s historical cities have undergone significant transformations. One fundamental change is the widespread restructuring of land patterns. Continuous urban renewal has severely disrupted the historical land parcel layout, and large superblocks formed by merging smaller parcels have become a defining feature of contemporary historical districts. As an embodiment of urban culture and history, the form of land parcels holds significant value, which should be emphasized in the process of urban renewal. The disruption of historical parcel layouts indicates that the current land division mechanisms do not adequately support the preservation of historical cities. Therefore, a key focus is on how to maintain historical urban fabric and establish connections between new and traditional forms in the rapid development of modern cities.

The theoretical foundation of this study is divided into two parts. First, it summarizes the principles of block form density and diversity based on plot urbanism, aiming to provide theoretical support for the plot division and guidelines of the design area. Second, through an analysis of typological practices and case studies, architectural characteristics are extracted from historical contexts to establish design rules for plots and demonstrate diversity. Ultimately, this research seeks to explore the integration of local applicability and practice, constructing a design application framework, with Guangzhou’s historical Gaodi Street as a case study for urban design practice.

This thesis is structured as follows: (1) It begins by outlining the research background and objectives, discussing the rationale for selecting Gaodi Street, providing a review of relevant studies on urban morphology, and establishing the research methods and framework. (2) A review and synthesis of plot urbanism and typology theories, along with relevant methods, are presented to form a basis for context-sensitive design. (3) Through a comparison of the current state of Gaodi Street and its historical and cultural resources, to clarify the adaptation between the conservation renewal issues and theoretical foundations. (4) Summarize the historical characteristics of Gaodi Street's plot delineation mechanism and "Street-Lane-Fang" morphology. (5) The design methods are adapted to the local context, and the related design processes, including the development of architectural design rules and master planning, etc. (6) Based on these methods, applying the design methodology for the different areas' detailed design practice and the development of the corresponding design guidelines. (7) The thesis concludes by summarizing the overall research, identifying its

innovations, limitations, and offering suggestions for future work.

Keywords: Urban Morphology; Typology; Plot Urbanism; Historical District; Gaodi Street

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Chapter 1 Introduction

1.1 Research Origin

Since the outbreak of the socialist revolution in 1949, China's major historical cities have undergone major changes. The large-scale reconfiguration of land layout has become a fundamental change. The land parcel division mechanism has been in a constant state of evolution since 1949, with large parcels gradually dominating the land development system, leading to the disappearance of the historical phenomenon of land subdivision. In 1988, the land tenure system established a growth-oriented objective, contributing to the prevalence of mega-parcel development. After 2002, the implementation of the land reserve system further solidified the status of oversized land parcels, despite the government's increased control over land development[1].

At the same time, the controlling plan ignored the land ownership issue, disconnecting the division of land parcels from the urban design, resulting in the continuous urban renewal seriously destroying the original pattern characteristics of historical land parcels, i.e., the meticulous division of plots. Oversized land parcels, which have been merged from small land parcels in the historical form, have become a prominent feature of today's historical urban areas.

The land parcel pattern is not only an integral component of the urban fabric; it also serves as a conduit for visualizing the cultural heritage and historical traces of a city. Consequently, it is of paramount importance to recognize the value of this pattern during the process of urban renewal. The destruction of the historical land parcel pattern demonstrates the shortcomings of the current land parcel delineation mechanism in the protection of historical and cultural cities.

Guangzhou has been founded for over 2,200 years without any break in generations or relocation, and has a deep humanistic and historical heritage. This city accompanied by water was once the only foreign trade port and the starting point of the Maritime Silk Road, and formed a set of more complete commercial city form. As the coastline migrated, Guangzhou

City continued to expand until its completion in the mid-Qing Dynasty. Following the founding of the Republic of China, the modern city concept changed the way feudal cities grew. Guangzhou, as a representative feudal commercial city, underwent drastic changes before becoming the modern metropolis it is today. However, after the reform and opening up, along with the rapid development of urbanization, the protection of historical and cultural heritage has been affected, and some land parcels and buildings with historical value have been gradually encroached upon by destructive remodeling, making the historical and cultural areas with rich material and cultural connotations face a potential crisis.

Based on this, we focus research on Gaodi Street and its surrounding lanes, a prosperous commercial street located in the center of Guangzhou's southern city. It originated in the Song Dynasty and serves not only as a commercial artery but also as a microcosm of Guangzhou's urban development, witnessing the gradual transformation of Guangzhou from a modest fishing village to a thriving metropolis.

Gaodi Street, constructed during the Song Dynasty, is adjacent to the Pearl River and is encircled by the customs. The street is home to numerous affluent merchants with towering mansions, hence the name "Gaodi Street". Historically, Gaodi Street was the first commercial pedestrian street in Guangzhou. Since the Qing Dynasty, it has been involved in the business of shoes, hair ropes, wedding accessories and fabrics. During the Republic of China, Gaodi Street was densely populated with stores on both sides and became a renowned distribution center for daily necessities in Guangzhou[2]. Following the founding of New China, its status and influence increased significantly. In 1980, the Guangzhou government officially positioned it as the "first industrial goods market", marking the birth of the country's first self-employed clothing bazaar.

At that time, garment wholesalers from all over the country and the world flocked to Gaodi Street, and the value of its trade culture and historical location was reflected in its continuing trade lifestyle. But nowadays, with the emergence of Guangzhou Baima, Shahe and other garment wholesale markets, as well as the rise of e-commerce platforms, Gaodi Street has become a glorious past. Upon approaching the street, the narrow street is in full

view, with few pedestrians and store owners absorbed in the viewing of short videos, watching TV dramas, or immersed in mobile games.

Furthermore, during the Republican period, Guangzhou's southern city underwent a process of urban regeneration through the "old city renovation" in terms of urban planning, and was not drastically altered. As a result, the Gaodi Street area has retained a considerable number of intact streets and lanes dating back to the Qing Dynasty, as well as houses belonging to the gentry and merchants, and townhouses constructed during the Republican period. These architectural forms offer insights into a wealth of social, historical, and cultural information. Through extensive field research, combined with the above mentioned discrepancy brought by the strong contrast between the past life and the present life of Gaodi Street business, it is found that Gaodi Street is facing the distinct contradiction between the development of traditional commercial wholesale market and the outstanding value of the historical area. This has resulted in a pressing need for an update and transformation of the street's form, function, and demonstration, and therefore serves as the object of this paper's research.

1.2 Research Scope

Gaodi Street stands out for its excellent historical location and functional value. Starting from the Song Dynasty, the commercial area along the river, due to the outward expansion of the river bank and southward relocation, used to be surrounded by the Yanchi City and the South City. Relying on the convenient transportation conditions - Yudaihao inwardly connected to the six-vein aqueducts and outwardly connected to the channel of the Pearl River - Gaodi Street has gradually become the center of commercial prosperity in the city of Guangzhou[3]. During the Ming and Qing Dynasties, Gaodi Street was not only close to the inner core of the city, but also an ideal place for land and water transportation, and at the same time gave birth to the famous Xu family in modern Guangzhou. Following the establishment of the Republic of China, Gaodi Street was not built on a large scale and became a commercial center for shoes, hats, clothing, stationery, medicine and food, and inns. After the

founding of the Republic of China, the business activities on Gaodi Street continued to flourish, from the diversification of state-run units developed into individual households collect trade and wholesale business. The accumulation of a thousand years of commerce and culture has given Gaodi Street a rich cultural heritage.

Additionally, Gaodi Street served as a site for the evolution of Guangzhou's southern city's urban spatial configuration and the alterations in its historical texture . During the Qing Dynasty, the incorporation of Guangzhou's southern city into the city's administrative system resulted in the construction of a city wall between the Guide Gate and the Zhengnanmen Gate. This wall restricted the connection between the Pearl River and the inner city (Fig. 1-1). Additionally, the area of Yudaihao was expanded, and transportation and commerce became more concentrated along the periphery of the city (Fig. 1-2)[4]. From Qing Dynasty painting of the Pearl River shoreline, the approximate location of Gaodi Street can be identified. It can be observed that ships along the Pearl River gather near Yudaihao through the Wuxian Gate (Fig. 1-3). Over time, this increased the commercial and trade value of Gaodi Street. The pattern of the southern city was not finalized until the latter part of the Qing Dynasty. It was not until the late Qing Dynasty that the pattern of the South City was finalized.

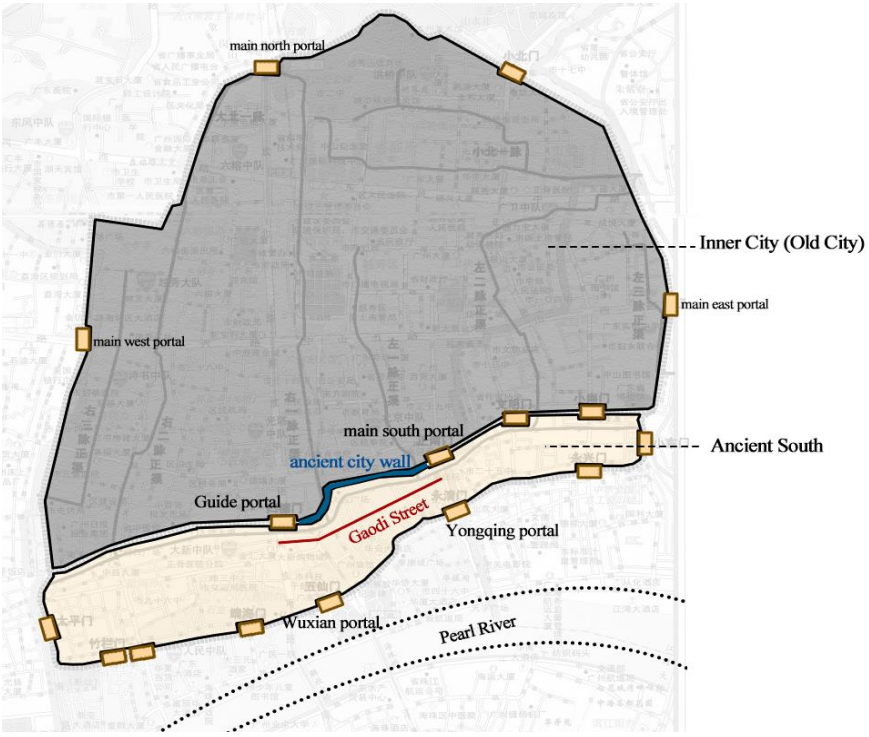


Fig. 1-1 Illustration of Guangzhou in the Qing Dynasty (Source: redrawn according to reference [5])

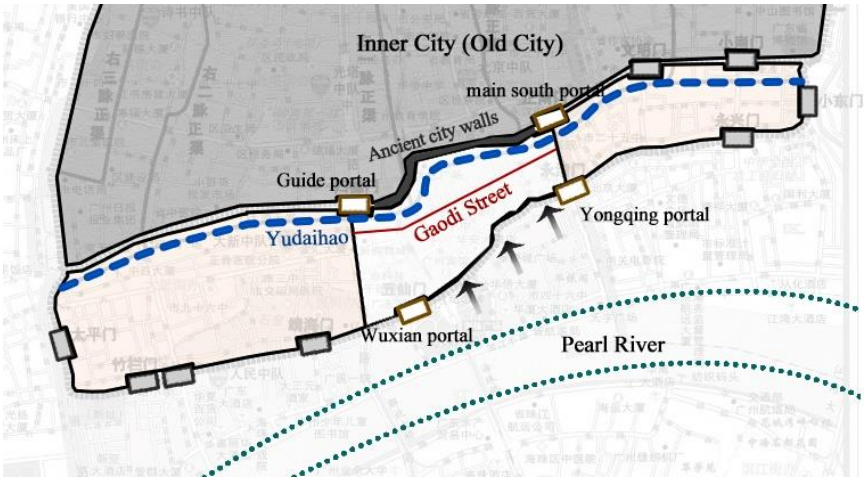


Fig. 1-2 Illustration of the location of Gaodi Street in south city during the Qing Dynasty (Source: redrawn according to reference [5])

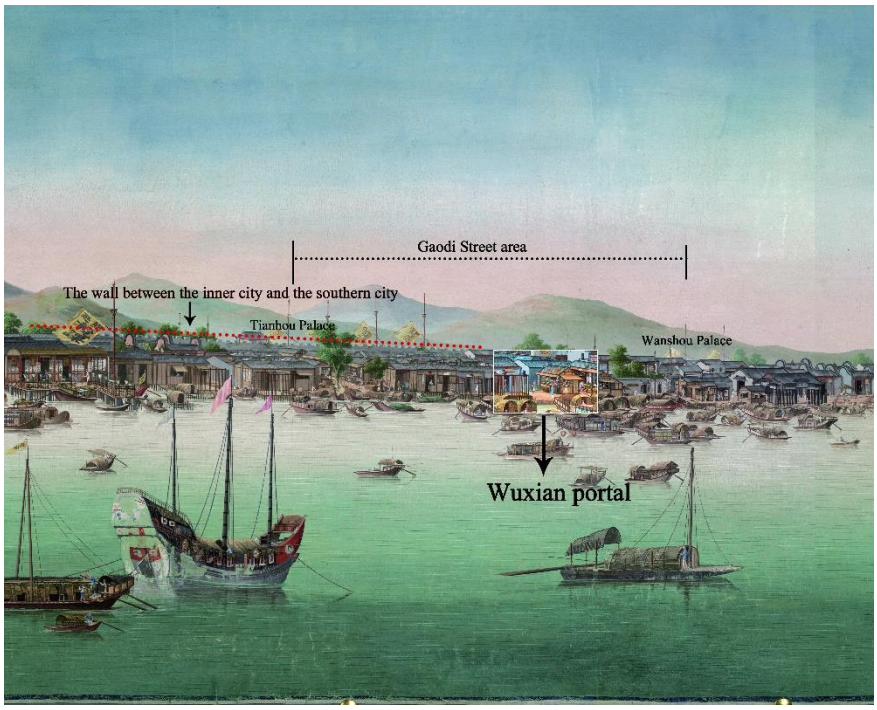


Fig. 1-3 The connection between ships and South city (Source: redrawn according to reference [6])

As a transitional zone between the old city and the outside world, the South City did not undergo large-scale development until the Republic of China. However, it is due to this slow renewal that many historical forms such as traditional houses, Qing Dynasty streets and lanes, mounted buildings, assembled residences, Republic of China foreign buildings, and modern residences have been preserved, reflecting the changing times of the old city of Guangzhou from the late Qing Dynasty to the Republic of China, and providing an opportunity for the study of Guangzhou's streets and lanes in the last century. The superimposition of the Gaodi

Street area in the Qing Dynasty and the present-day map reveals that the western boundary of Gaodi Street at that time was at the present-day South Jiefang Road, i.e., the area in the middle of Qiyi Road and South Jiefang Road was added (Fig. 1-4).

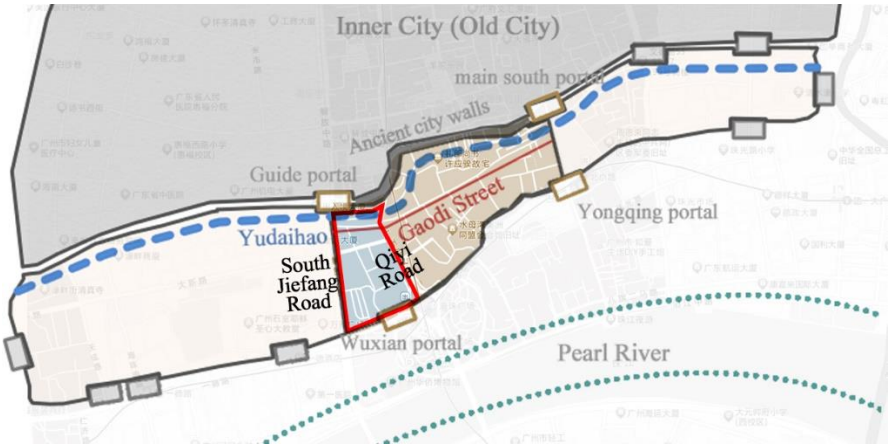


Fig. 1-4 Illustration of the Qing Dynasty Gaodi Street location superimposed on the current district location (Source: by the author)

In light of the historical evidence, it can be ascertained that the 1924 Guangzhou road map of the Republic of China and the 1928 Gaodi Street road reconstruction mapping provide a clear indication of the specific location and starting and ending ranges of Gaodi Street (Fig. 1-5). The street in the Republic of China period has already been established, i.e., the western boundary was moved from South Jiefang Road to the present Qiyi Road, and the east to Beijing Road, which is the same as the current official delineation of the area. Based on the aforementioned, it can be argued that few neighborhoods in Guangzhou possess a comparable depth of historical heritage to that of Gaodi Street, and its spatial layout and texture have become the witness of Guangzhou's millennium-long trade culture.

Fig. 1-5 Current Gaodi Street starting and ending ranges

(Above: A full map of the roads in Guangzhou in 1924. Source: Old maps online website. https://www.oldmapsonline.org/; Below: 1928 mapping of Gaodi Street pavement improvements. Source: reference[2])

After the above analysis, the historical value of Gaodi Street and the surrounding streets and lanes is particularly prominent. Based on the previous research on Gaodi Street and its scope in the historical data atlas, and combining with many on-site researches and the current official delineation of Gaodi Street, the scope of the study is determined (Fig. 1-6), which is also part of the core of the southern section of the Guangzhou Traditional Axis Historical and Cultural Neighborhood (Fig. 1-7).

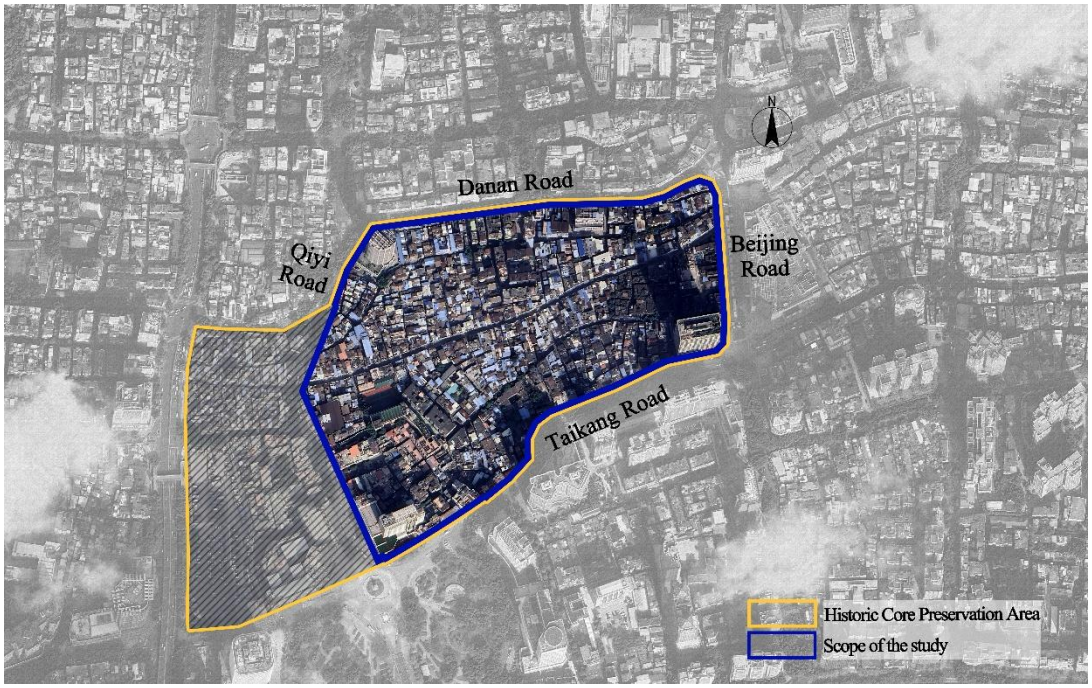


Fig. 1-6 Specific scope of the study (Source: by the author)

Fig. 1-7 The Location of Gaodi Street in Guangzhou historical and cultural neighborhoods (Source: redrawn according to Guangzhou Historical and Cultural City Protection Plan (2021-2035))

1.3 Review of Relevant Studies

1.3.1 Review of Study on Gaodi Street

The theoretical research on Gaodi Street Area started from 1987 to the present, and is

mainly divided into neighborhood morphology research, industrial development research, and Xu family change research. As of 2022, a total of more than 23 articles of related literature have been published on Gaodi Street Area (Fig. 1-8).

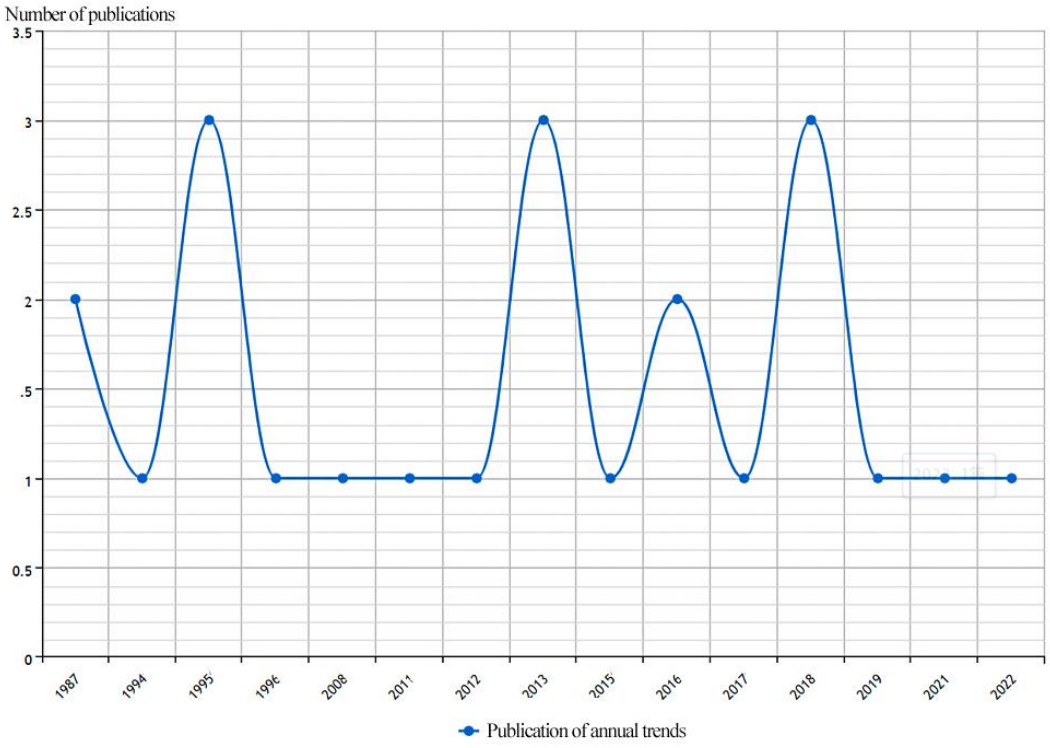


Fig. 1-8 Annual distribution of relevant literature published on Gaodi Street (Source: redrawn according to CNKI data)

In terms of neighborhood morphology research, the Conzen School's perspective is typically regarded as the dominant one, and Gaodi Street is often regarded as part of the study of the urban morphology of Guangzhou's Old Town or Beijing Road area[7]. In addition to this, a more comprehensive historical study provides a detailed account of the morphological evolution of the Gaodi Street neighborhood during the late Qing and Republican periods[2]. However, the existing studies on the morphology of Gaodi Street are primarily concerned with the portion of the street in question, and there is a relative lack of analysis on the texture of the Gaodi Street block, as well as the value of the architectural level and intangible cultural heritage. Literature related to industrial development mainly focuses on the industrial renewal and preservation of Gaodi Street[8], in addition to relying on government reports, bulletins, periodical literature and archival literature, such as government documents and business

statistics involving Gaodi Street, as well as oral history studies and reports on the changes in the business pattern of Gaodi Street after the reform and opening up.

Furthermore, the literature on Gaodi Street includes a large amount of literature on the Beijing Road area in Guangzhou, which mentions Gaodi Street as an ancillary part, but does not conduct in-depth and focused research on it. According to CNKI's topic statistics for Gaodi Street related literature, we know that the Gaodi Street area has gradually become the focus of attention in the fields of industrial renewal and historical area preservation in Guangzhou (Fig. 1-9).

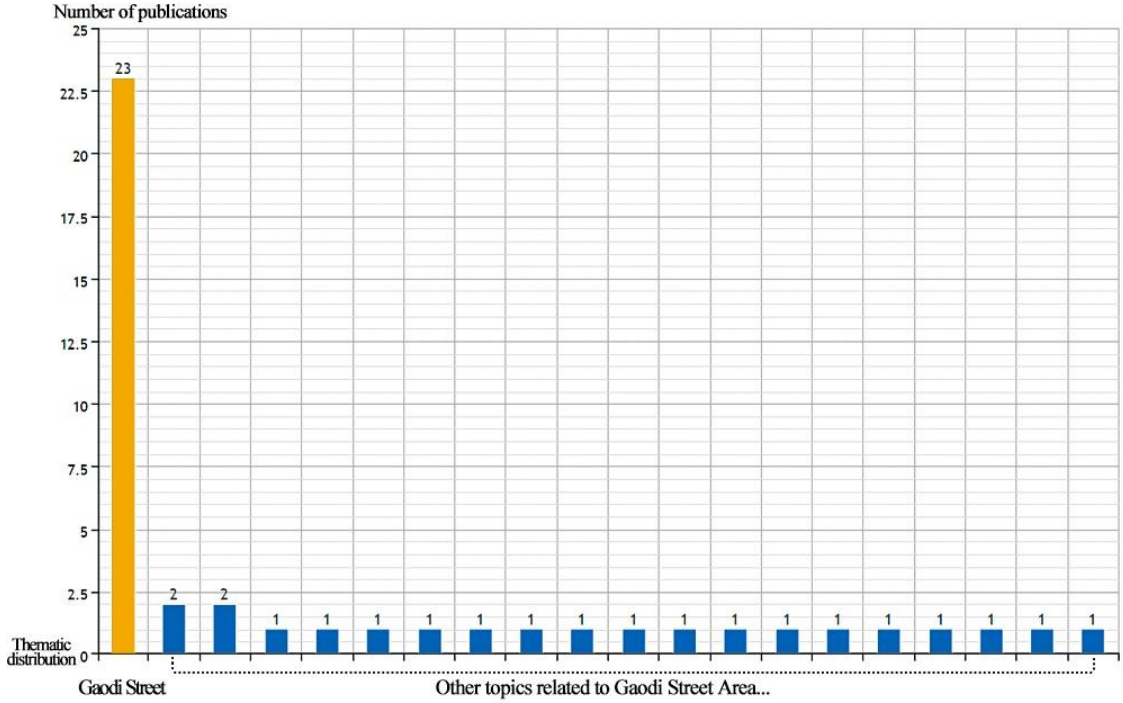


Fig. 1-9 Distribution of main themes in the literature related to Gaodi Street (Source: redrawn according to CNKI data)

1.3.2 A Review of Domestic and International Research on Urban Form

This section is dedicated to an examination of the theories and researchers who have explored the morphology of the plot and its relationship with architecture in traditional cities of China and the West. The field of plot urbanism is concerned with the division of plots and the establishment of architectural rules, which can be regarded as a detailed elaboration of the principles of typology. It serves as a pivotal perspective for examining the evolution of urban form, necessitating the integration of typological theoretical studies and case studies in the

analysis. Consequently, typology is frequently employed as an analytical instrument, focusing on the process of change of plots and elucidating the evolution of architectural texture in historical urban areas, that is, the dynamic developmental relationship of the interaction between buildings and plots. Before proceeding, it is necessary to understand the origins of the relevant concepts and provide an explanation.

(1) Review of Terms and Concepts

"Zongdi", typically referring to a piece of land with clearly defined boundaries and independent ownership, serves not only as a physical boundary for the division of land use rights and property rights but also as the foundation of social order and legal rights. "Zongdi" is often closely tied to family property and inheritance rights, and its stability and longevity are more prominent than that of individual buildings. In the context of this paper, "Zongdi" can be understood as a specific parcel of land delineated by boundaries such as walls (e.g., courtyard walls, gable walls, or eaves walls), serving as the basic unit for studying and preserving the traditional urban fabric.

A cadastral map is a detailed record of land ownership, usage rights, and plot boundaries. In this paper, cadastral maps are used as a crucial historical reference for studying plots and the traditional urban fabric. By comparing cadastral maps from different periods, changes in plots and their impact on urban form can be revealed.

The concept of a "plot" in Western urban morphology shares similarities with the Chinese "Zongdi". It refers to a unit of urban land with clearly defined boundaries and is one of the basic elements that make up the urban fabric. The following sections will introduce the concept of the plot and compare it with the Chinese "Zongdi" for further analysis.

Land tenure systems play a critical role in shaping and evolving plots and urban fabric. Changes from private land ownership to nationalization, followed by the establishment of compensated land use systems, have profoundly influenced urban spatial forms. Especially after land nationalization, the separation of land and building ownership has become more pronounced, leading to a neglect of the protection of plots and architectural fabric in urban renewal projects.

(2) Review of Western Studies

The study of urban plots is closely related to the study of typology. Within this field, the Conzen School and the Muratori-Caniggia School are the two main branches. Both schools emerged in the context of European urbanization in the 1950s and 1960s, focusing on the historical transformation of traditional cities and buildings and the factors that drove it. Rooted in historical perspectives, they aim to provide theoretical guidance for the future, and have gradually developed mature and stable theoretical systems and methodological frameworks through cross-regional and cross-cultural practical tests.

First and foremost, the path of urban form research was pioneered by geographer M.R.G. Conzen, who constructed a detailed and micro-level focused analytical framework. In his book, *"Alnwick, Northumberland: In his study, A Study in Town-Plan Analysis"*(1960), Conzen underscored the notion that the historical landscape, as a pivotal element of traditional memory, is not a fixed and unchanging entity. By comparing mapping data and city maps from different periods, he reinterprets the intrinsic connections of the urban fabric and the sequence of streets, land parcels, and buildings over time. The central component of this framework is land parcel analysis[9]. Moundon (1997) in this theoretical model, individual plots, comprising the buildings and open spaces on them, are regarded as the fundamental units of urban form. Whitehand (2001) proposes a series of subdivided land parcels arranged in close proximity along the street line based on Conzen's study, each with a street-facing interface, collectively constitute a land parcel area. The configuration of these adjacent plots can be regarded as a land parcel pattern when considered in isolation from other elements of urban planning. The street pattern, land parcel pattern, and building footprint collectively comprise the three morphological components of urban planning. The characteristics of the land parcel pattern encompass not only the shape of the parcel itself but also the interrelationships between parcels and the block configuration of buildings[11]. Stimmann (2009) argues that despite the difficulty in visualizing it on a physical level, the land parcel form maps the land ownership structure of the city and serves as the foundation for urban form[12].

The Italian School's research is rooted in the traditional concept of typology, which Muratori and others have expanded to encompass the study of historical city center areas. In his two seminal works, *"Studi per una operante storia urbana di Veneziaand"* (1960) and *"Studi per una operante storia urbana di Rome"* (1964), Muratori established a methodology and tools for interpreting the process of evolution of buildings and built spaces in historical cities[13]. Caniggia inherited this theory and sought to develop a scientific system for the interpretation of any urban settlement. In his book, *"Interpreting Basic Building",* he applied the concept of type within a continuous hierarchy of scales, from material components and architectural monoliths to towns and regions. This approach integrated the historical and the modern, the urban and the architectural monolithic, and became known as design typology[14].

After the 1980s, the two schools of thought gradually merged due to their similar and complementary research ideas. American scholar Moudon initially established a new research framework after the fusion in *"The Research Component of Typo-morphological Studies"* (1987)[15]. In his doctoral dissertation *"An Enquiry into the Definition of Built Form in Urban Morphology"* and *"Ambiguity in the Definition of Built Form"*, Kropf compared and integrated the core concepts and terminology of the two schools, and put forward a more complete framework for typology research[16, 17]. The establishment of the International Forum on Urban Morphology in 1994 facilitated a more frequent and in-depth exchange between the two schools of thought.

(3) Review of Domestic Studies

The evolution of land parcel subdivision in Chinese cities has closely followed the development of urban morphology. Therefore, to understand the evolution of urban morphology, it is essential to consider it within the context of the evolution of land parcel subdivision in China.

The historical progression of urban land subdivision in China aligns with the country’s broader development trajectory and can be divided into three major stages. From the founding of the People's Republic of China to the pre-reform era (1949-1978), land parcel subdivision primarily responded to the needs of industrialization and urbanization. Under the planned

economy, it was initially shaped to serve industrial layout and urban planning. Industrial land became a key focus of land subdivision, with adjustments in industrial distribution—such as those in coastal, inland, and border areas—driving the subdivision of relevant land parcels.

From the post-reform era to the late 1990s (1978-1999), the establishment of the market economy and the improvement of land use system reforms spurred the marketization of land subdivision. With the introduction of laws and regulations such as the "Urban Planning Regulations" and the "Urban Planning Law of the People's Republic of China," land parcel subdivision gradually became more standardized and legalized. During this period, large-scale urban construction and renewal activities, such as old city redevelopment and new district development, promoted the practice of land subdivision and reorganization.

Since the 21st century (2000-present), with accelerated urbanization, the demand for land parcel subdivision has become more urgent. Modern information technologies such as GIS (Geographic Information Systems) and remote sensing have driven new advancements in this area. Land subdivision now places greater emphasis on environmental protection and ecological balance, with a significant increase in precision. Additionally, the market mechanism plays a dominant role in resource allocation, enhancing the flexibility and autonomy of land parcel subdivision.

A substantial number of domestic scholars have conducted comprehensive studies on China's urban morphology, employing Western analytical methodologies to facilitate its interpretation. A plethora of disparate approaches and findings have emerged from domestic urban morphology research. For example, Gu Kai's *"Theory and Methods of Urban Morphology—Exploring a Comprehensive and Rational Research Framework"* (2001) offers a detailed elaboration on the definition, research content, and methods of urban morphology[18]. Duan Jin and Qiu Guochao's *"An Introduction to Foreign Urban Morphology"* (2008) provides a comprehensive overview of Western morphology research[19], while Liang Jiang and Sun Hui's *"Patterns and Motivations-The Morphological Evolution of Urban Centers in China"* (2007) examines the morphological evolution characteristics and drivers of change of urban centers and summarizes their developmental patterns using urban

morphology[20]. Zhang Jiantao's *"The Application of Urban Morphology Theory in Historical Landscape Conservation Area Planning"* (2004), Tian Yinsheng's *"Urban Morphology Research and Urban Historical Preservation Planning"* (2010), and Han Dongqing's *"The Status and Role of Urban Morphology in Urban Design"* (2014), among others, have provided detailed elaborations on the status and role of the theory of urban morphology in urban design and historical preservation planning from a variety of perspectives[21, 22, 23]. Finally, Guo Li's *"Cognition and Illustration of Traditional Chinese Urban Texture"* (2020) reveals the dominant role of ground boundaries in traditional urban texture, exploring how they affect neighborhood architecture. It also constructs a new cognitive framework and restores traditional urban texture[24].

In recent years, there has been a notable increase in the number of comprehensive morpho-typological studies. Shen Kening's *"Architectural Typology and Urban Morphology"* (2010) provides an in-depth examination of the historical development and interrelationship between these two fields[25]. Chen Fei underscores the significance of this comprehensive approach in the context of *"Western architectural typology and urban morphology-integration and application"* (2009)[26]. He also presents a research framework for Chinese cities in *"A New Research Framework in Urban Morphological Typology in China"* (2010)[27]. In *"The Theory of Morphological Typology and the Exploration of Localization"* (2015), Chen Jintang provides a comprehensive overview of the theory and application of Western morphological typology, while also examining the challenges and obstacles that the theory encounters during the process of localization[28].

Since the 1980s, China has been engaged in the application of Western urban form analysis methods, conducting comprehensive explorations and renewal practices in response to the challenges confronting its urban form. This has included initiatives to preserve and revitalize traditional urban forms in older cities.

A number of scholars have initiated research into the issues related to property rights and land parcels. However, China's traditional urban morphology is rooted in a unique social context and institutional framework, and there is a dearth of key cognitive perspectives,

especially a cognitive framework that aligns with the Western concept of "plot." In view of this, there is an urgent need to explore and establish a plot-based morphology strategy to facilitate the restoration of historical urban areas.

1.4 Research Objectives and Significance

1.4.1 Research Objective

The Gaodi Street area and the surrounding sample neighborhoods can be considered representative of the general characteristics of Guangzhou's old city development to a certain extent. By examining the industrial history of Gaodi Street with the current issues, the mechanism of dividing Street-Lane-Fang and morphological characteristics, a foundation is established for subsequent on-site adjustments. Additionally, a methodology for researching the morphology of neighborhoods with similar functional and industrial attributes in other cities is provided. This is done with the aim of ensuring the continuity and protection of the neighborhood's historical features. Additionally, the design method of plot regeneration and related research are employed to interpret and intervene in the design of the Gaodi Street area. This is done with the objective of establishing a design framework applicable to this study, as well as providing a theoretical basis and an entry point for the conservation and architectural design of historical areas.

1.4.2 Research Significance

(1) Theoretical Significance

This thesis employs the empirical learning and on-site methodological adjustments of Plot Urbanism and Italian typological morphology to investigate the methods of street morphology, typological interpretation, and plot regeneration applicable to the Gaodi Street historical area in Guangzhou.

The conventional approaches to historical preservation and regeneration have concentrated on heritage preservation and landscape control. However, these strategies have not fully addressed the underlying challenges and have not sufficiently investigated the intrinsic characteristics of street organization, plot morphology, and architectural typology, as

well as the patterns of evolution over time. Although the value of the plot as a key conservation element has been acknowledged, it is frequently overlooked in the conservation and revitalization of historical cities. Consequently, it may be beneficial to examine and develop a plot-based strategy to facilitate the restoration of historical urban areas.

(2) Practical Significance

The future of urban design and business methods is contingent upon the manner in which the city is interpreted and observed. The study of the evolution of plot patterns illuminates the impact on history and culture in urban renewal, which serves as a cautionary tale for future urban planning and project renewal. The study demonstrates that as a crucial medium for visualizing the culture and history of the city, the protection of the plot pattern is of paramount importance, opening up new avenues of thought and possibilities for urban planners and decision makers.

Furthermore, the objective of plot demarcation is not to implement an immediate, comprehensive transformation of the city, but rather to establish a long-term development framework for the historical city center. It is not merely a design guideline; it is also a supplement to the planning system. Its purpose is to ensure that the design principles set forth in the cadastral plan can be incorporated into the subsequent sale or lease of the plot. Furthermore, it allows for flexibility with regard to local site conditions, the level of resident participation, and integration with the local control plan.

This paper presents a design application framework with local applicability, developed through an empirical study of the Gaodi Street historical district in Guangzhou. The framework can be directly applied to specific historical district preservation and project renewal initiatives, and also serves as a model for other similar projects, thereby advancing the practice and innovation of historical district preservation.

1.5 Research Methods and Framework

1.5.1 Research Methods

This study emphasizes the evolution and theoretical practice of the old city area, starting

from practical problems, in-depth theoretical discussions, exploring the methodology of the plot study and urban renewal design for specific land parcels in the context of the environmental and social conditions of Gaodi Street in Guangzhou.

This paper focuses on the high-density, small-scale plots on Gaodi Street. It begins by clarifying the background, purpose, and origin of the research object. It then synthesizes related studies and further explores the theories of plot urbanism and typology. This is done in order to provide theoretical support for the design. Subsequently, through research and comparison of historical resources, we elucidate the interconnection between preservation and renewal and theory. Then, we summarize the characteristics of the plot and street, then adapt the design method to the local context. Finally, the refined methodology is employed to develop comprehensive design practices and guidelines for the preservation and renewal of historical districts.

The specific research methods employed include the following: (1) Field research; (2) Historical data study and summarization; (3) Current situation analysis; (4) Theoretical research; (5) Case study.

1.5.2 Research Framework

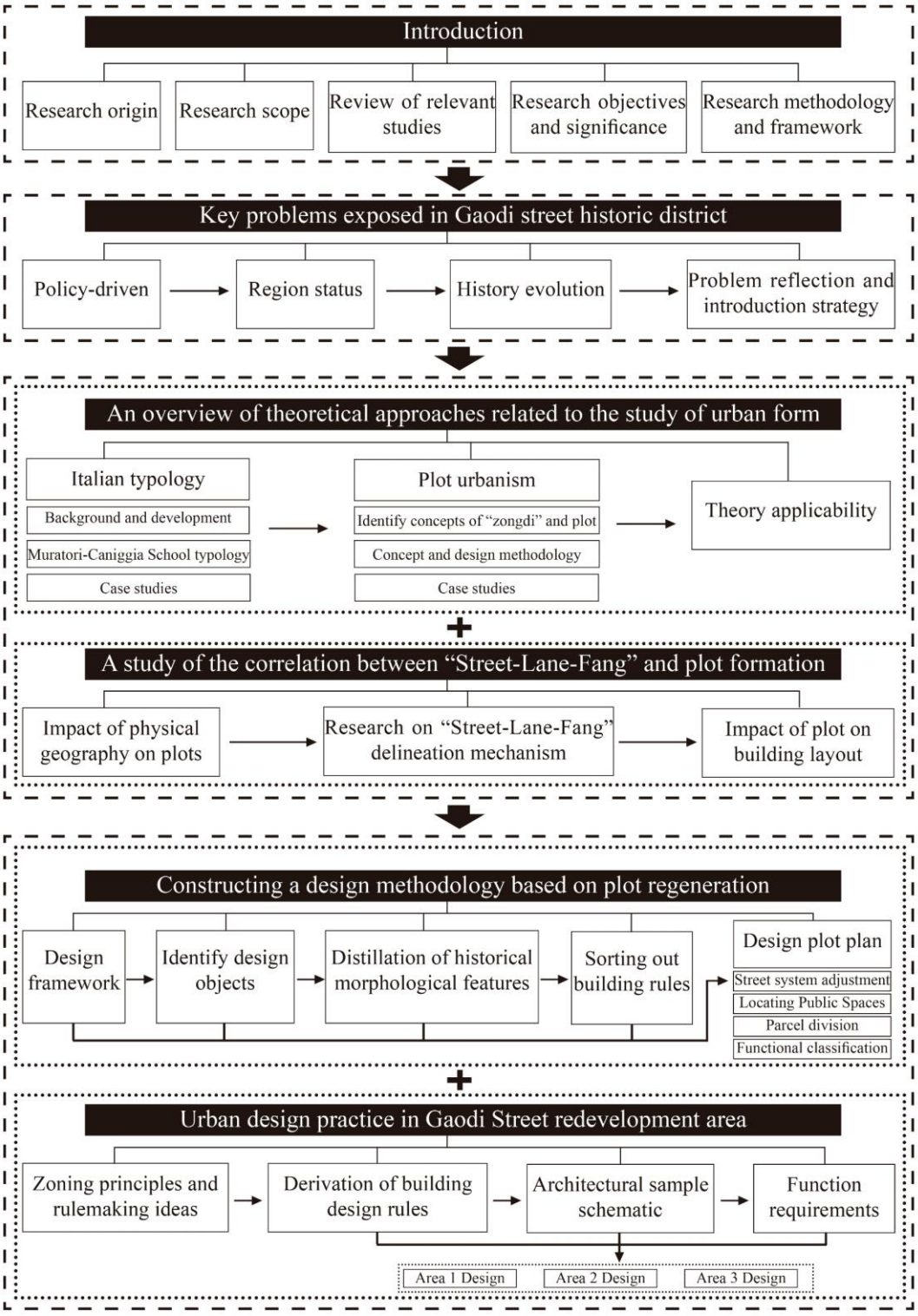


Fig. 1-10 Research framework (Source: by the author)

Chapter 2 A Review of Theoretical Approaches and Methods in Urban Form Research

As a morphological element that has been retained in the historical evolution of the urban fabric and continues to exert influence, the plot exemplifies the attributes of continuity and regeneration. Concurrently, the typological morphology research approach also reflects this regenerative character in the research results, which are oriented by the object of study and theoretical core. It is noteworthy that the emphasis on the delineation of plots and the regulation of buildings on them in plot urbanism can be regarded as a sophisticated subfield of typology. Concurrently, it serves as an entry point for the study of urban form pattern evolution. Consequently, the study of typology and the analysis of examples must be included in the exploration of plot urbanism theory. It is therefore essential to examine the intrinsic relationship between plot and typology, and to identify the shared elements in the research methodologies of these two approaches. When examining the diverse historical patterns of plots, it is possible to adopt either of these two approaches, which can be used in conjunction to achieve the objective of historical continuity. This allows for a more comprehensive understanding of the evolution of urban form and the provision of guidance for design.

Therefore, this chapter summarizes the relevant theories and methods in plot urbanism and type morphology, and lays the foundation for subsequent adaptive design methods.

2.1 Italian Typology

2.1.1 Background and Development of Typological Studies in Italy

After World War II, Italy experienced a rapid rebuilding of the "Italian Miracle", where the rise of industry and manufacturing boosted economic growth and employment opportunities, attracting large numbers of people from the countryside to the cities, but the devastation of the war and the population boom also led to urban problems and the transformation of historical city centers into slums. in the late 1950s, the interest in the preservation of historical city centers increased, based on the concept of the Enlightenment

typology. With increased concern for the preservation of historical urban centers, Italian architects began to investigate the reconstruction of urban form based on Enlightenment-era typological concepts.

A number of key figures and perspectives have been instrumental in the evolution of the school's theoretical framework. Gustavo Giovannoni, regarded as the founder of the Italian urban studies tradition, advanced a contemporary theory of urban design while vigorously contesting the effects of megacities' expansion on historical urban settlements[29]. Similarly, Giuseppe Pagano underscored the role of historical evolution in shaping urban form, and together they underscored the importance of contextualism and territoriality in urban design. Gianfranco Caniggia, a pivotal figure in the Italian school of urban morphology, concentrates on the evolution and categories of urban form, whereas Aldo Rossi directs attention to the concept of type and archetypes in the theory of urban form. He posits that urban form is the consequence of a synthesis of diverse elements[30]. Moreover, Saverio Muratori puts forth an approach that synthesizes the study of urban form with architectural typology, underscoring the significance of urban history and culture in urban design[31]. The perspectives and research methodologies of these scholars have established the Italian school of typological morphology as a prominent theoretical school in the domain of urban planning and design.

2.1.2 Introduction to the Muratori - Caniggia School

(1) Concept and Design Approach

Muratori has developed core design concepts such as "urban organization," "history of practice," and "process typology." He has also attempted to integrate the study of urban history with design methodologies that are integral to the evolution of urban history. In doing so, he aims to integrate the study of urban history with the design methodology, thereby making it an integral part of the historical evolution of the city. He considers the urban organism to be the core concept of Italian typological morphology, which refers to the cohesive and complex structure of the city or neighborhood as a whole, capable of withstanding historical change. He posits that the city can be conceptualized as a system of four scales: fine detail, architecture, neighborhood, and city. He further suggests that

neighborhoods and cities can be regarded as urban organisms, while dwellings can be viewed as analogous to words in a language—they constitute the basic elements of urban organizations such as neighborhoods and cities, as well as the concentrated expression and ultimate carrier of people's living and cultural behaviors.

Italian scholars concur that the concept of "typology" represents a significant means of addressing the architectural crisis associated with modern large-scale construction. On this basis, Muratori developed the concept of "dominant type." However, the traditional concept of the dominant type is currently under scrutiny due to shifts in people's perceptions of the ideal residential and social state. This has led to uncertainty regarding the desired outcome. Muratori proposed the concept of "type of process," which re-established the concept of type by studying the developmental patterns of various morphological types. This approach emphasizes a comprehensive understanding of historical building typologies and urban phenomena, and incorporates dynamic elements of social needs to derive possible dominant typologies.

The concept of "operational history" underscores the necessity of situating research within the context of real-world situations and everyday life. This entails not only examining historical events and processes, but also integrating historical insights and theoretical frameworks with practical challenges. The objective is to develop actionable insights and methodologies that can inform and enhance social, environmental, and urban planning initiatives[32]. In 1959, he published the monograph "*Studi per una operante storia urbana di Venezia*". This marked the formalization of urban morphology as a recognized field of study within the discipline of Italian architecture. In the same year, Muratori elected to test the theory of operative history in a design competition "The Barene di San Giuliano in Venice" (Fig. 2-1). Muratori believed that the new plan should not impede the final results of the research, but should be integrated into the distinctive urban fabric and structure of Venice. Based on the aforementioned concepts of "history of practice" and "types of process," the cyclical patterns of change based on the primary types of urban form, and considering the historical development of Venice, Muratori presented three proposals, of which the third one

was selected as the winner[33].

Fig. 2-1 Competition for the Barene di San Giuliano in Venice: Project Estuary III (Source: reference [33])

Caniggia played a key role in the academic transmission of the Italian school of typological forms. Based on the theoretical system of the school established by his mentor Saverio Muratori, he adopted his definition of "type" and his interpretation of the "urban organism", and also incorporated the experiences of his predecessors, Pagano and Giovannoni, on traditional and rural settlements. Pagano and Giovannoni's experience of traditional and rural settlements.

He further develops the concept of the four scales of urban form, namely elements, structures, systems, and organisms, and offers insights into the distinction between basic and specialized housing, the typological process, the method of interpreting the phases of urban history, and the notion of the habitat cycle system. The study will construct a theoretical framework of "type-morphology" from an architectural standpoint, offering a comprehensive approach to the interpretation of spatial material forms and their application in the interpretation of man-made environments, including urban built environments, rural colonies, and settlements[34].

(2) Methodological Tools

Architects of the Italian school preferred to use "typological maps" to depict different

historical periods, i.e. the ground plan of all buildings in a city or a specific area. This type of map shows the overall texture of the city and the ground level of the buildings on a single sheet of paper, which shows the structure of the urban form and allows for the study of specific buildings through analogies.

The history of typological mapping can be traced back to 1748, when the Italian Giovanni Battista Nolli produced the "New Map of Rome." This series of twelve maps, presented in the form of a "ground plan," detailed the construction of the city as a whole (Fig. 2-2). The map presents the entire public space of the city in a "ground-level plan," including squares, streets, public buildings, and the foyers and courtyards of residential buildings, while the interior and private parts are obscured (Fig. 2-3). This set of maps, due to its accuracy and completeness, became a crucial foundation for the interpretation of the historical city of Rome by subsequent scholars. It served as the original prototype for the typological maps utilized by the Italian school of urban typology and morphology over two centuries later, a tradition that persists to this day[35].

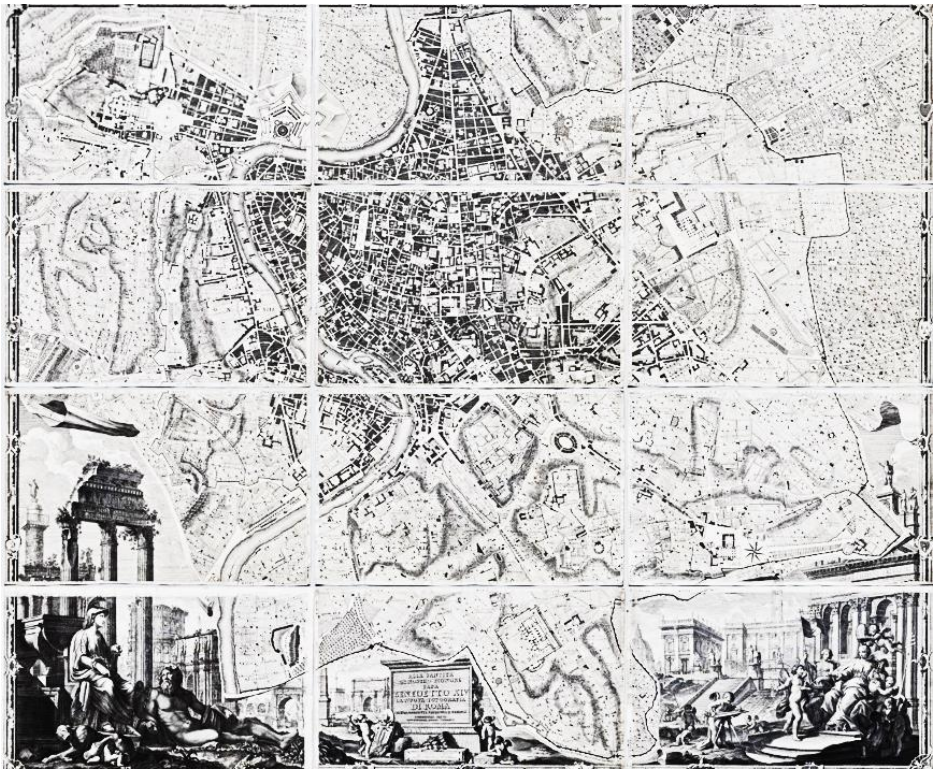


Fig. 2-2 Nolli's map of Rome (Source: https://www.clevelandart.org/art/2020.276)

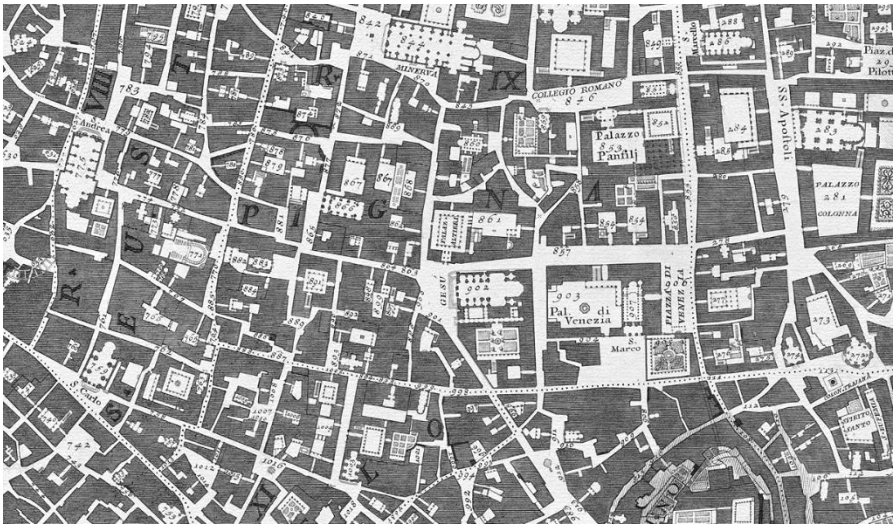


Fig. 2-3 A partial schematic of Nolli's map of Rome

(Source: https://www.clevelandart.org/art/2020.276)

In 1958, Muratori led his students in a detailed architectural survey of the Santa Sofia district and produced a ground-level plan, or typological map, of the area (Fig. 2-4). Subsequently, they produced a presumed typological map of the area for the Gothic period based on documentary sources and archaeological maps (Fig. 2-5). According to Muratori, these two maps show the urban morphology and building types of various historical periods, and their comparison allows for an in-depth study of their development and evolution[36].

Fig. 2-4 Ground floor plan of Santa Sofia in Venice in the 20th century (Source: reference [36])

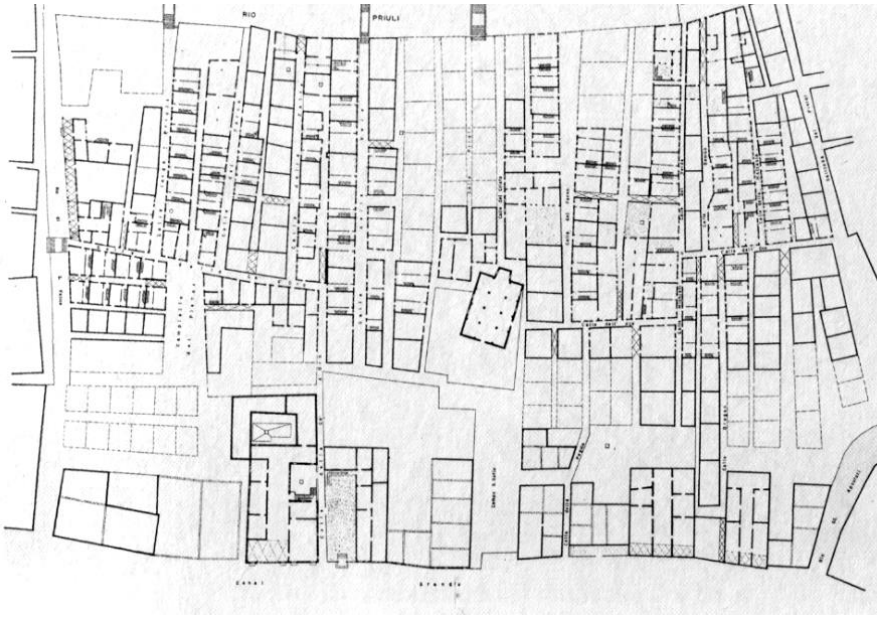


Fig. 2-5 Presumed first floor plan of the Santa Sofia district in Gothic-era (Source: reference [36])

Caniggia built upon the findings of his mentor Muratori in an attempt to develop a methodology capable of analyzing any urban settlement. His initial work was a study of the ancient city of Como. This resulted in a meticulous 19th-century ground-level plan of the central city of Como. By overlaying this plan with archaeological maps of the Roman period, it became evident that there was a relationship between the new urban constructions and the traces of the ancient buildings (Fig. 2-6). Subsequently, he conducted a comparative analysis of fundamental building types, both horizontally and vertically, to elucidate the evolution of historical urban morphology and building types. This involved the creation of typological maps and speculative typological maps of Italian cities, including Genoa, Rome, Como, and Florence, across different historical periods[37].

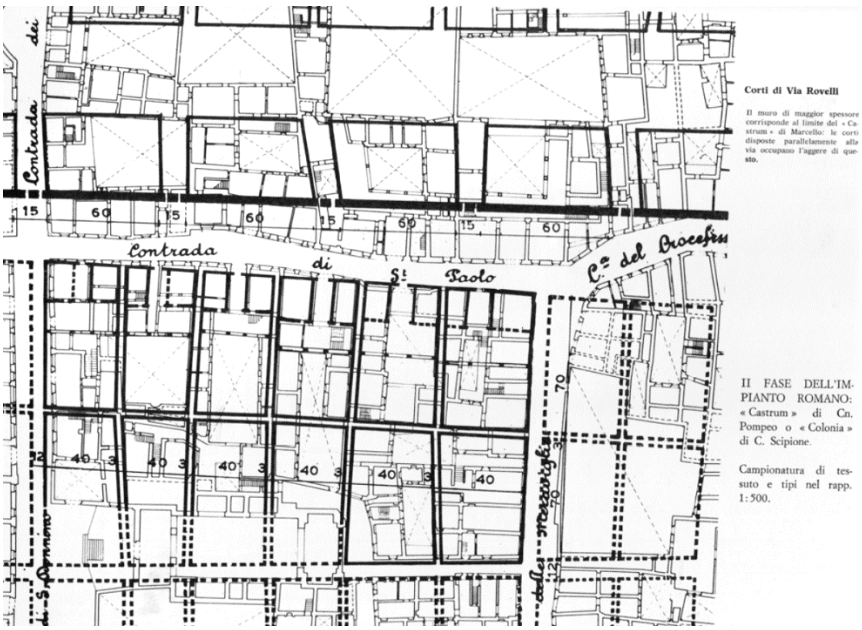


Fig. 2-6 Overlay of the 19th century typological map of Como with archaeological maps of the Roman period (Source: reference [37])

From a methodological standpoint, the current situation map will be overlaid with the historical street and plot texture in order to study the characteristics of their development types in different periods. This will provide a historical basis for the subsequent design, thereby ensuring the continuity of history.

2.1.3 Case Studies

(1) Proposal for a Rehabilitation Project in the Coronari District of Rome

Prior to World War I, Giovannoni developed methodologies that linked urban planning and conservation in the historical city of Rome. These methods were the first of their kind in Europe and informed much of Fascist Italy's urban renewal efforts, which drew on his conceptualization of Italy's historical cities.

In stark contrast to the practice of forced urban renewal, Giovannoni proposed the technique of "diradamento," which translates to "cleaning the urban fabric." He recognized the need for public health and circulation, and therefore was not opposed to demolition per se, but rather to the wanton destruction of buildings[38]. He developed more sensitive guidelines for the core of the old city, delineating not only what should be avoided, but also what should be done. In Giovannoni's view, the technique of diradamento must adhere to three

fundamental principles: 1. No presupposed straight lines and constant cross-sections of the streets; 2. The layout of the old neighborhoods should be respected; and 3. In the articulation of the old and the new buildings, the architectural system of the old city has to be respected. Giovannoni explains the last rule as follows: i.e. stylistically, there should be harmony between the old and the new. But each city has its own artistic atmosphere, that is to say, it should have its own sense of proportion, color and form, which are timeless elements[39].

While working in the Renaissance Quarter of Rome around 1910, Giovannoni discovered the convergence between architectural restoration and urban planning through the selective strategies described above in a city where modern planning perspectives were not common. Giovannoni successfully developed an urban plan for the Renaissance Quarter of Rome between 1907 and 1911 (Fig. 2-7).

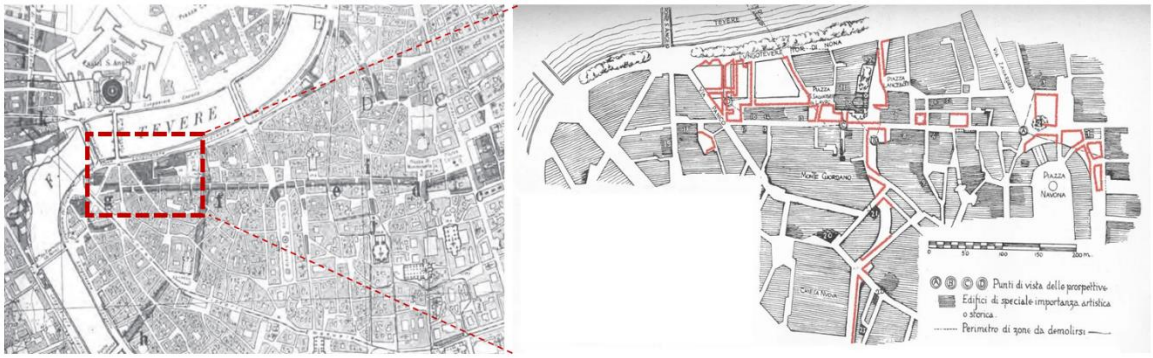


Fig. 2-7 Project for the redevelopment of the Coronari Quarter in Rome (Source: reference [39])

The book "*Vecchie città edilizia nuova*" was the first modern Italian handbook on urban planning. He understood the city as a whole and found it necessary to recognize the role of history in urban planning. It is not just a matter of love or nostalgia for Italian history, but of recognizing the complexity and potential of the city's historical fabric in its future development[40]. His strategic tool, the "diradamento", treats the old neighborhoods of the Roman city in a selective manner, but also strategically transforms the old centers into important spaces with integrated functions, thus preserving their contemporary character. (Fig. 2-8).

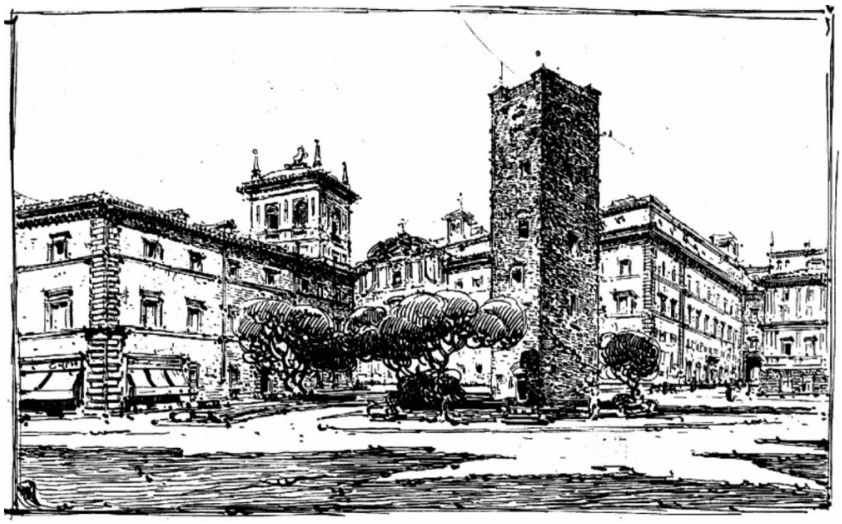


Fig. 2-8 Perspective view plaza (Source: reference [41])

(2) Medieval Neighborhood of Florence

1) Urban Context

The San Frediano district of Florence is situated on the south bank of the Arno River, with the western limit delineated by a section of the city walls and gates constructed in the 13th century. The medieval neighborhoods planned and developed by Caniggia are situated in close proximity to this area (Fig. 2-9).

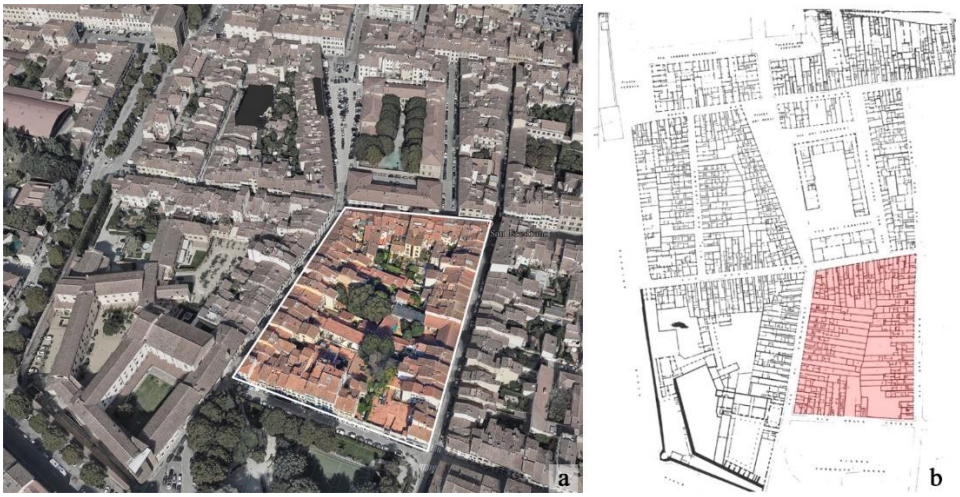


Fig. 2-9 Nerli neighborhood in San Frediano district of Florence. a.Current status (source: Google Maps); b.Ground floor plan (Source: reference [42])

2) The Planning Process

He analyzes in depth the evolution of streets, land parcels and buildings in different periods of history: in the middle of the 13th century, land parcels and buildings were

developed along the Via del Otto; after the construction of the walls, the streets leading to the gates of the city were built, which led to the creation of new land parcels and architectural layouts; and with the completion of the Castle of Cosimo I the division of land parcels was completed in the south, a pattern that lasted until the 20th century (Fig. 2-10).

Caniggia conducted an exhaustive survey and measurement of the target neighborhood, revealing that the majority of medieval land parcels were rectangular in shape with narrow widths and considerable depth. This was a consequence of the tax policy of the era, which was based on the width of the buildings along the street and the number of openings facing the street. The subsequent evolution of the neighborhood can be observed to exhibit three distinct trends. Initially, there is evidence of the continuation of the medieval pattern, albeit with partial expansion. Secondly, there is a discernible pattern of land parcel merging following the destruction of the buildings and their subsequent idling. Thirdly, there is a notable instance of land parcel merging, which ultimately resulted in the formation of buildings with large openings. In the restoration design, Caniggia re-planned the damaged area in accordance with the cadastral data of 1833, thereby re-demarcating the land parcel plan in order to reproduce the character of the medieval city. Furthermore, Caniggia incorporated the architectural rules of Florentine "townhouses" into his design for the new building, which was situated on a vacant land parcel and was intended to blend seamlessly with the medieval neighborhood (Fig. 2-11). This typology is illustrated as an archaeological map, which provides a visual representation of the original urban landscape[42].

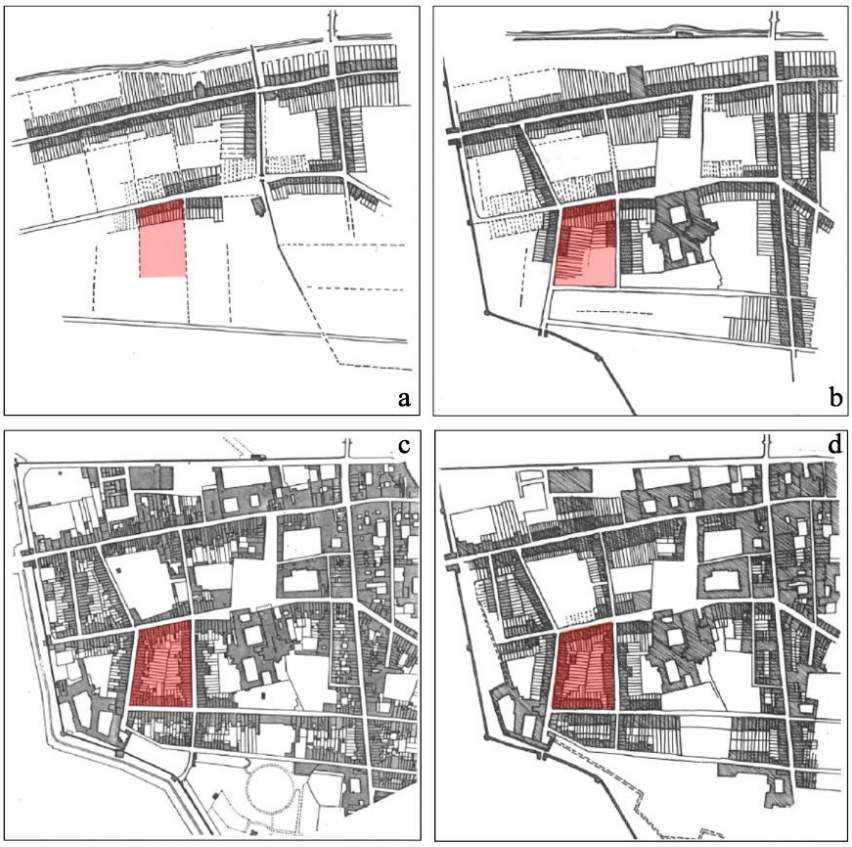


Fig. 2-10 Morphological derivation of the Nerli. a. Mid-13th century; b. After construction of the wall c. Peak of construction; d. Cadastral map of 1833 (Source: reference [42])

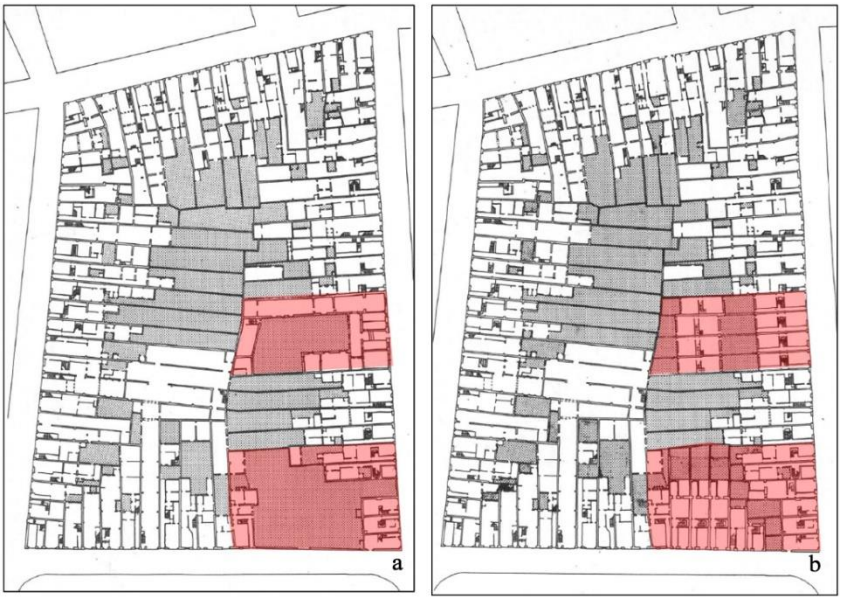


Fig. 2-11 a. Map of the current typology of the first floor; b. Design restoration results (Source: reference [42])

(3) Historical District of Bologna

1) Urban Context

After World War II, Bologna rapidly emerged as an important railroad hub and a new industrial city in Italy. The working class became the mainstay of the city, living mostly in urban centers with degraded built environments (Fig. 2-12). For the first time, the Bologna government introduced the concept of "integral conservation", i.e. "conserving people and buildings together", aiming at preserving the city's historical buildings and protecting the local inhabitants in order to maintain their collective memory[35].

Between the years 1962 and 1965, the Italian urban planner and architectural historian Leonardo Benevolo conducted a typological study of Bologna's urban and architectural heritage. The findings of this study were subsequently incorporated into the 1966 Bologna Town Planning Act. Subsequently, in 1973, Bologna's "Piano di Edilizia Economica e Popolare / PEEP" (Fig. 2-13) successfully translated this research into practice with the design for the restoration of the San Leonardo C area[43].

Fig. 2-12 Architectural degradation of the urban area of Bologna (Source: reference [44])

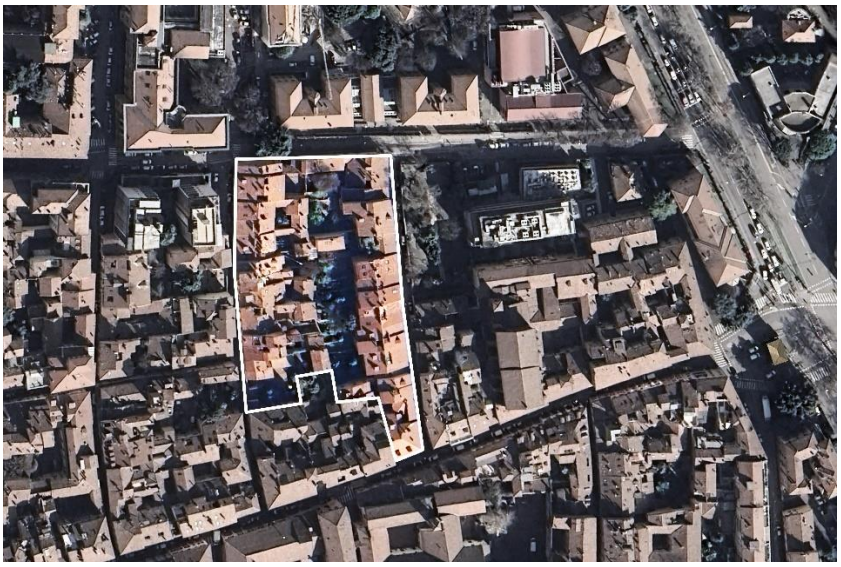


Fig. 2-13 Current status of S. Leonardo block C (source: redrawn according to Google Maps)

2) The Planning Process

The type and arrangement of public residential buildings from the 17th century onwards has been exhaustively counted by Cervilati (Fig. 2-14), and the residential buildings that form the basis of the historical city have been studied in depth. Based on the results of the study, areas in need of regeneration as well as multiple residences in the Old Town of Bologna were identified.

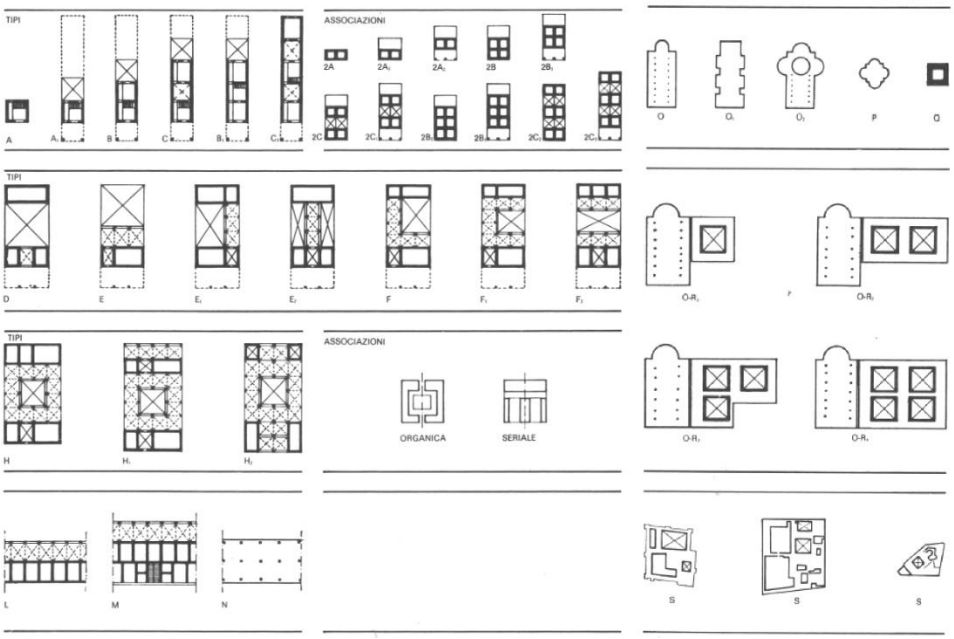


Fig. 2-14 A study of residential and public building types and assemblages since the 17th century (Source: reference [45])

In the restoration of San Leonardo C, Cervelatti initially compared cadastral maps from

disparate periods and discerned that the land parcels were predominantly rectangular in shape due to the imposition of urban construction taxes. In order to restore the architectural character of the medieval city, he subdivided the large plots based on the manner in which the land parcels were divided on the 1700 cadastral map (Fig. 2-15). Subsequently, he relied on traditional architectural features such as planes, roofs, and land use patterns, and incorporated new features to arrive at a new architectural plan (Fig. 2-16) and design rules (Fig. 2-17), which filled in the gaps in the traditional texture. Concurrently, irregularities were eliminated, the facade was restored, the colonnade along the street was rebuilt, and a wall was constructed in the center of the site to demarcate the land parcel and create an internal garden (Fig. 2-18). Its axonometric (Fig. 2-19) and inner courtyard effects (Fig. 2-20) are shown below. These elements can be regarded as illustrative of the architectural principles that inform contemporary plot urbanism.

The importance of the PEEP program in Bologna lies in the preservation of the urban building plan and land parcel organization patterns from the Middle Ages onwards, and the renovation of the Chervilati is more attuned to the historical urban fabric than the high-rise housing in the northwest during the same period.

In general, the study of Italian typological morphology based on the concept of "type" has gone through several generations of architects and scholars, and has developed into a complete system covering all aspects from urban analysis to typological mapping, and forming a design methodology based on the analysis of urban morphology and building types

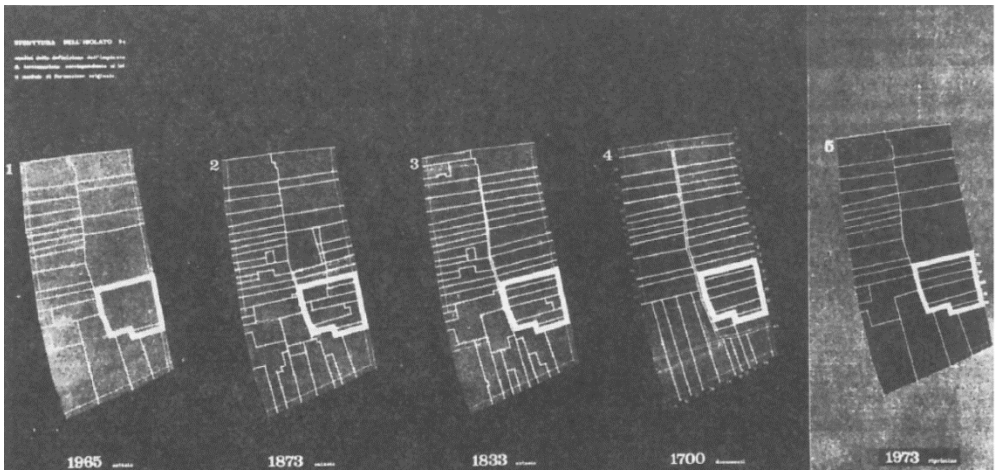


Fig. 2-15 Evolution of S. Leonardo block C land parcel (Source: reference [45])

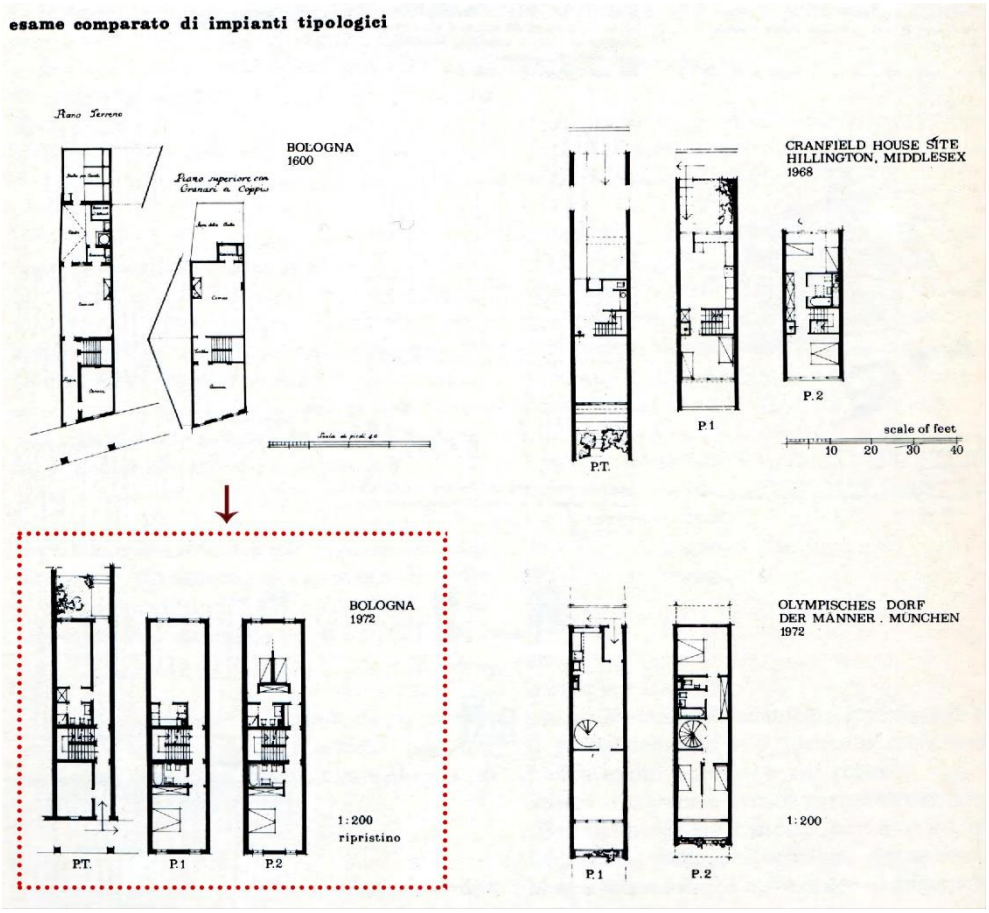


Fig. 2-16 New floor plan (Source: reference [44])

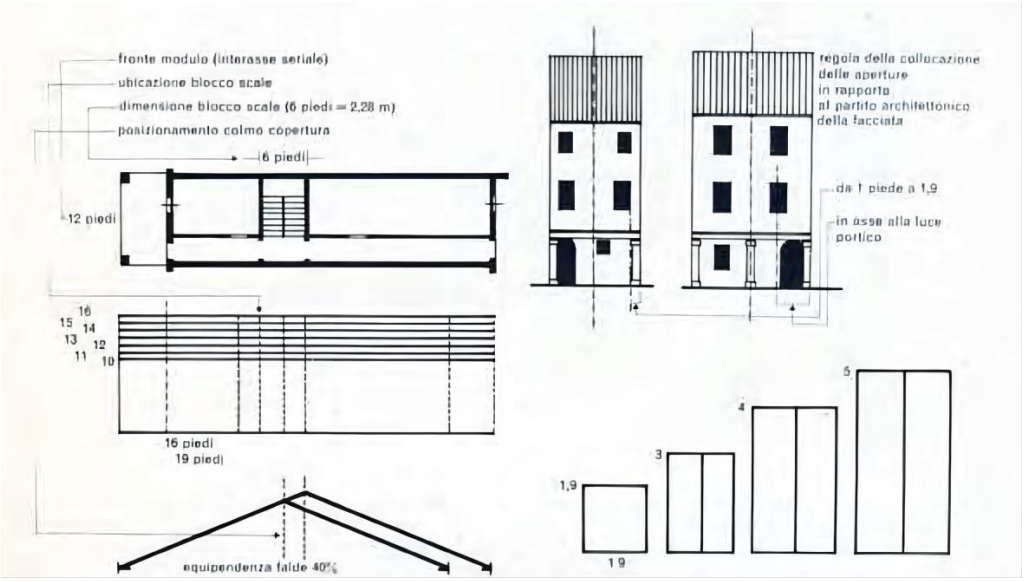


Fig. 2-17 Building rules on subdivided land parcels (Source: reference [44])

Fig. 2-18 Ground floor plan in S. Leonardo block C. a. Status plan; b. Design results

(Source: reference [45])

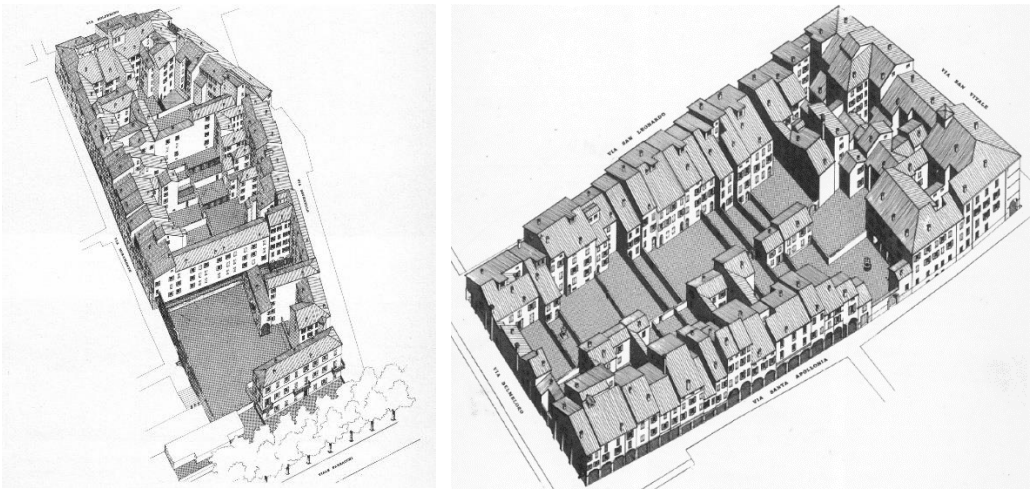


Fig. 2-19 Axonometric Schematic (Source: reference [45])

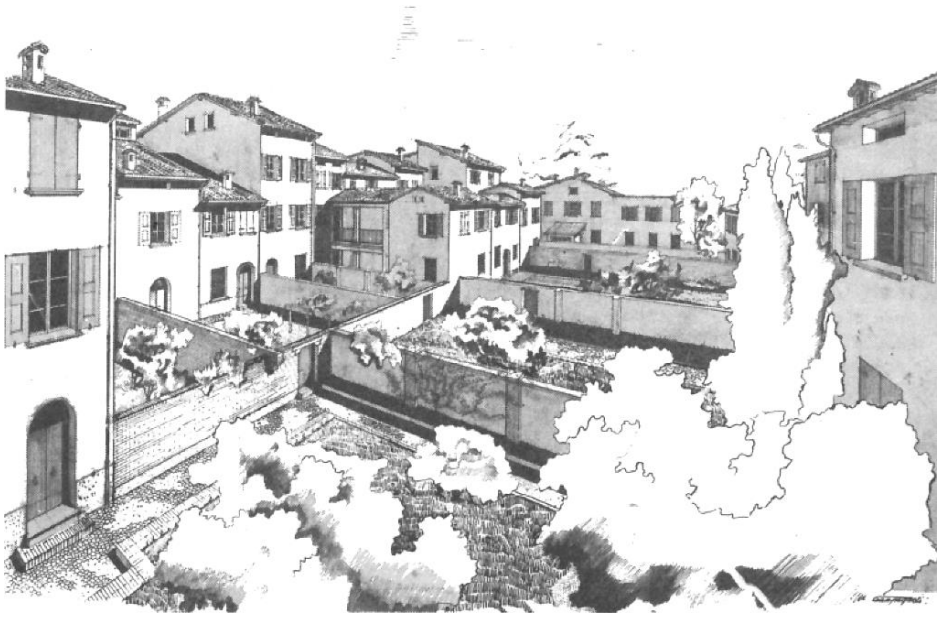


Fig. 2-20 Perspective view of inner courtyard (Source: reference [44])

2.2 Plot Urbanism

2.2.1 Discriminating the Concepts of Plot

(1) Concepts

The term "plot" is used to describe the area within the boundaries of a land user's tenure. In general, a plot is defined as a unit of tenure. In cases where a single land user occupies multiple areas that are not contiguous, each land parcel is considered a distinct plot. A plot represents the fundamental unit of land registration and cadastral survey. In Chinese historical contexts, the term "qiu" was used to refer to the plot. The term "plot" as used in this paper refers to a specific area of land that has been clearly delineated in accordance with established ownership rights. The size of a plot can range from the dimensions of an entire city or country to the boundaries of a single neighborhood or the extent of a household's home or farmland. As a result, the plot serves as the foundation for the economic stability of the landowner, delineating the boundaries of the family's property through legally binding covenants. The plot is not merely a tangible entity, manifested in concrete forms such as fences and boundary walls; it also encompasses intangible boundaries that define the extent of the land.

Western researchers have clearly defined the plot, noting that neighborhoods can be subdivided into smaller land parcels and that the architectural form of land parcels follows the

shape of the land parcel itself. This is regarded as an indispensable morphological factor in the process of urban development and evolution. The British geographer M.R.G. Conzen defined the term "plot" in order to facilitate the study of urban morphology. Plot:(1)colloquial Piece, usually small of ground(OED). (2)Conzenian terminology "A parcel of land representing a land-use unit defined by boundaries on the ground" (Conzen, 1969, p.128).It is a plan element[46].

(2) Identify Two Types of Plot

In the Chinese cultural context, the term "Zongdi" and its underlying concepts are widely used, whereas in the Western context, it corresponds to the concept of "plot" (Fig. 2-21). In everyday language and etymological analysis, the term "Zongdi" is used to indicate the boundaries of land, which may be either not visually discernible or in a physical form such as a solid wall. In contrast, the term "plot," in common usage, typically denotes smaller areas, such as cemeteries, vegetable gardens, and so forth. It is analogous to the terms "lot" and "parcel," although the latter is more frequently employed to describe extensive tracts of land under a single ownership.

In the Western context, "plot" first appears as the concept of land parcel on the material level, which is the basic element constituting the urban form. The Conzen School even uses "plot" as a professional term, defining it as a small land unit with a clear boundary, which is regarded as a part of the urban "plan unit", and derives the concept of "plot boundary". In the planning management of developed countries such as the West, "plot" is used as a basic unit for registration and numbering, and is applied in land transactions, leasing and development activities. Within the framework of the government's Geographic Information System (GIS), the "plot" is the core of control, management and information query functions(Fig. 2-22).

The relevant terms covered in this article are all expressed in "plot".

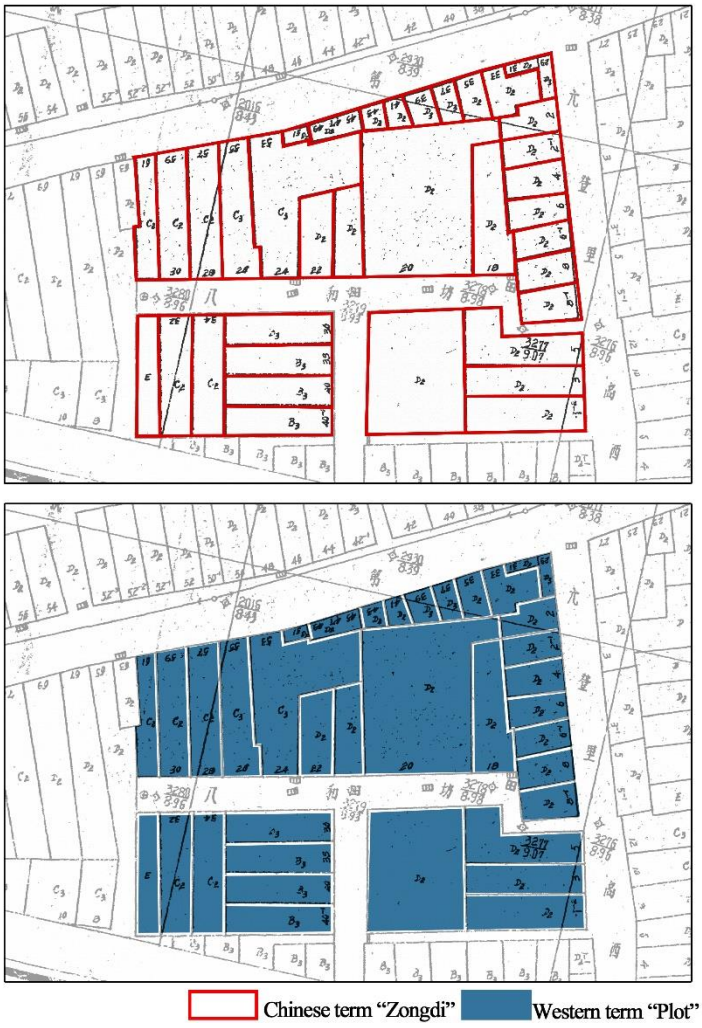


Fig. 2-21 Illustration of the discrimination between Zongdi and plot (Source: by the author)

Fig. 2-22 Expansion of plot as a technology tool in other countries (Source: www.google.com)

2.2.2 The concept of Plot Urbanism and Design Methodologies

" *The Plot: Designing Diversity in the Built Environment: A Manual for Architects and Urban Designers*" takes the plot as the fundamental unit of analysis, investigating the spatial configuration of the neighborhood and the urban fabric it comprises. The objective is to develop a more nuanced and diverse urban fabric, thereby advancing the goal of multidimensional diversity in the region. The project systematically examines the theoretical framework and practical applications of pragmatic urbanism. The objective is to provide guidance to architects on the effective incorporation of diversity in the built environment, as reflected in the diversity of architectural forms, the age of construction, and the mix of housing types. Furthermore, the dimensions of the edifice, the period of its intended use, and the combination and level of activity within its structure should be taken into account. Flexibility and adaptability of design are guaranteed through a comprehensive examination of the attributes of the plot and the surrounding environment, meticulous planning at the plot scale, and the integration of sustainability and ecological principles, as well as the actual needs of the culture and the community.

The operational level of plot urbanism is situated between macro-urban planning and micro-architectural design, serving as a pivotal nexus between the two. It effectively connects urban-scale neighborhood design with the design of plots and buildings at the monolithic level. Furthermore, neighborhoods exhibit a diversity of forms, including perimeter, townhouse, and monolithic, which can be further classified according to the intricacy of the urban fabric (Fig. 2-23). Among these forms, enclosed blocks are preferred due to their capacity to enhance the diversity of neighborhoods. This type of block pattern allows for the clear delineation of the external interface facing the public street and the internal interface facing the internal courtyard, thus defining the boundaries between public and private spaces with precision (Fig. 2-24). This clear delineation between interior and exterior spaces imbues the urban environment with vitality and security, while enhancing the legibility of the urban space by delineating the transition between public and private domains. Furthermore, the enclosed block design ensures the privacy and security of both shared and private spaces,

while integrating the walkways, parking, and daily activities associated with the front of the building into the street, thereby maintaining the coherence of the building's street interface[47].

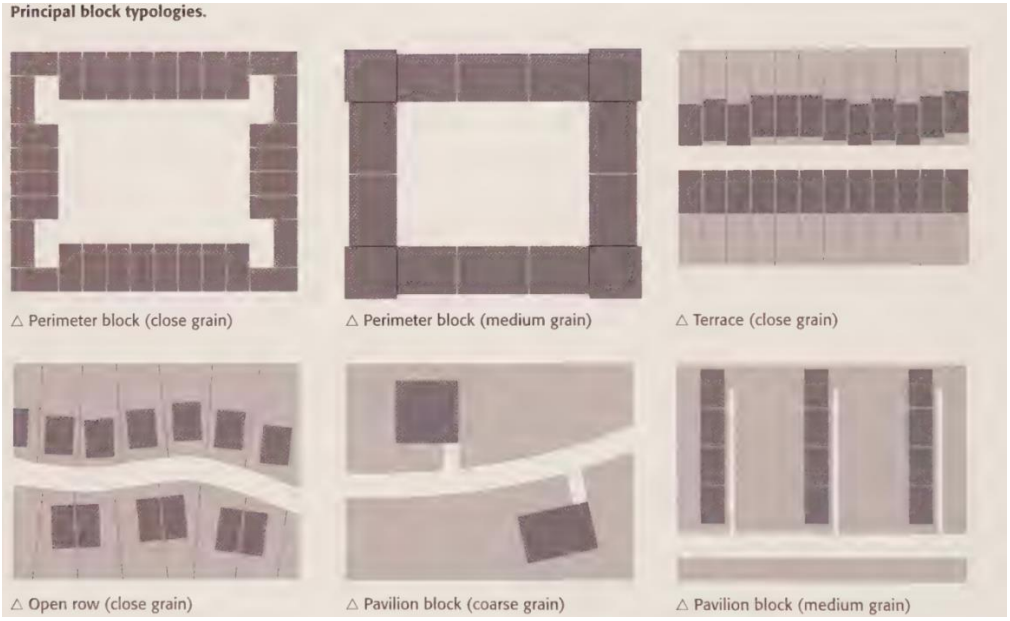


Fig. 2-23 Neighborhood patterns under plot urbanism (Source: reference [47])

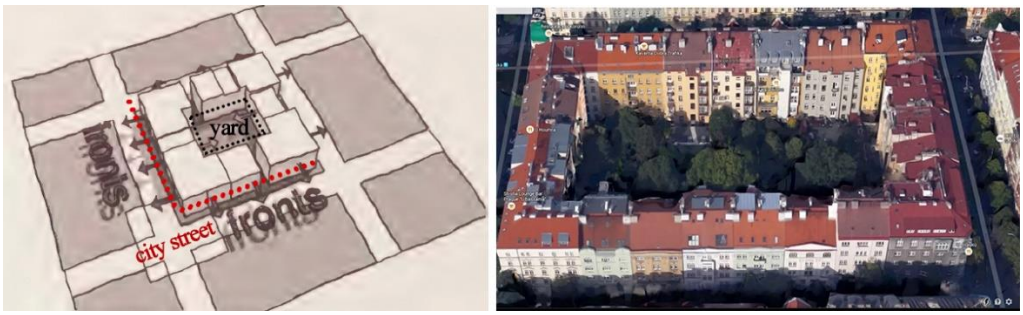


Fig. 2-24 Enclosed neighborhoods with clear public-private boundaries (Source: reference [47])

A plot can be defined as a unit of property rights on a two-dimensional plane. The consolidation of plots is referred to as amalgamation, whereas the subdivision of a single land parcel into multiple smaller units is known as subdividing. The dimensions and configuration of a plot are not only contingent upon the initial property rights, but also, in the case of newly developed areas, are inextricably linked to the intended use and scale of the building units that occupy them, as well as to the city's elements of privacy, public safety, and fire codes.

The subdivision of individual neighborhoods can be carried out at a variety of scales, depending on the specific needs and development patterns that are in place. A single neighborhood may be treated as a distinct land parcel and developed by a separate real estate

company. Concurrently, a neighborhood may be further subdivided into smaller units, which can then be developed by different entities, such as construction companies or developers. Furthermore, neighborhoods can be subdivided into building scales, i.e., plots, for construction by private developers (Fig. 2-25). A multitude of factors must be considered in the subdivision of a plot, including, but not limited to, diversity of tenure, differences in functional types, the relationship between public and private spaces, the layout of roads and entrances, the arrangement of parking facilities, planning for pedestrian and vehicular flows, and mixing patterns of functions.

Fig. 2-25 Neighborhood Subdivision Schematic (Source: reference [47])

Overall, the core of the approach to plot urbanism is to achieve a finer, more mixed urban fabric by designing the way plots are arranged at different scales of neighborhoods to achieve the goal of multi-dimensional diversity of building forms, design rules, building types, and uses.

2.2.3 Case Studies - Boeo-Sporenburg Residential area

(1) Urban Context

Following the fall of the Berlin Wall in 1989, a global wave of privatization swept through the Netherlands. During the 1990s, the Dutch government began to privatize residential construction by allowing non-government for-profit organizations and private developers to participate in the development of commercial housing. Similar to China, the Netherlands has implemented a system in which the government auctions the right to utilize leased land, and developers construct residential areas of varying sizes and qualities based on

market forecasts. In consequence of a decade of uninterrupted economic and population growth since 1984, the Dutch government initiated the VINEX program in 1995 with the objective of constructing 750,000 homes between 1995 and 2005. In this context, the Boeo-Sporenburg Island housing estate in Amsterdam was developed as a residential complex (Fig. 2-26).

Fig. 2-26 Current plan of the residential area of Boeo-Sporenburg in Amsterdam

(Source: redrawn according to Google Maps)

(2) The Planning Process

In the initial phases of the project, a number of real estate and residential development companies collaborated to establish the New Deal Collaborative. Previously, a considerable number of public housing developments had been constructed in the Docklands, with the primary objective of meeting basic housing needs. However, these developments were characterised by a lack of attention to quality and design standards. In response to the

emergence of new market demands, the developers put forth a proposal for a lower density of 30 dwellings per hectare, aligning with the standards observed in Dutch suburban areas. Following negotiations, the government consented to permit the minimum density to be reduced to 30 units per hectare while maintaining the overall inner-city development standard of 100 units per hectare. In particular, the 23-hectare land parcel would necessitate the construction of 2,300 dwellings, of which 30% would be social rented and 70% private, with a further 500 reserved for other developers or private development.

In light of the predominantly single and childless family structure in the marina area, it is imperative that the Boeo-Sporenburg residential area attracts a sufficient number of families with children while simultaneously meeting the density requirements to foster the creation of a complete community environment. In order to achieve this objective, the government and the developer have agreed that low-rise buildings with elevators and semi-public staircases should be constructed, and that the entrances to the residences should be accessible from the street or public space. Subsequently, the developer invited six architects to discuss the proposal and found that the low-rise building model could meet the density requirement of 100 households per hectare. However, the unconventional designs proposed by some of the architects might lead to higher costs and insufficient planning for public space. As a result, a second round of competition was held, resulting in the selection of the West 8 design firm's proposal as the blueprint for implementation.

This program not only considers the residential density and market demand, but also focuses on the balance between community building and residential structure, and strives to improve the quality of the living environment and meet the needs of different levels of residents while maintaining economic efficiency, and this process also reveals the rules and diversity of construction under the influence of different heads of household and architectural designers, and promotes the harmonious development of the community (Fig. 2-27).

Fig. 2-27 Model of the planning scheme for the residential area of Boeo-Sporenburg

(Source: https://www.archiposition.com/items/20180525101228)

(3) The Rules and Diversity of Building on Plot

The West 8 program combines low-rise, high-density townhomes with large-volume residences, with each low-rise townhome having its own entrance, garage, and integrating its internal spatial layout through internal courtyards.

While West 8 was ultimately selected, some of the architectural treatments did not meet the developer's expectations. In particular, the built-in courtyards in the low-rise townhouses increased the floor-to-wall ratio and, consequently, compromised affordability. As a result, the project commenced a third phase of optimization, soliciting input from low-cost housing experts to enhance the low-rise townhouses and engaging the services of a professional agency to plan the public space. In this third phase, particular attention was paid to elements such as street width and the number of parking spaces, with the objective of achieving more optimal results. Following a period of two months, the third phase of the design was approved, and the developer proceeded with haste to construct the initial 150 dwellings. Guided by West 8, the project attracted over 20 architectural firms to contribute to the design of low-rise housing on the east side of Boeo-Sporenburg Island. The architects devised creative solutions within a fixed land parcel, employing variations around a common prototype (Fig. 2-30). Of note, the majority of the original built-in courtyards were replaced with residential layouts centered around patios and terraces. This alteration enhanced the wall-to-floor ratio economy while preserving the character of the inward-looking spaces.

Subsequently, residential design and development became simpler, and a variety of

building types emerged, enriching the house types and market gradients. The richness of the interiors compensates for the simplicity of the linear public spaces and streets. While the exterior profiles of the buildings on all the plots remain highly consistent, the variety of materials and connections to the entrance streets avoids monotony. At the same time, the expansive water landscape complements the simplicity and clarity of the architectural style, creating a harmonious complementary relationship (Fig. 2-29).

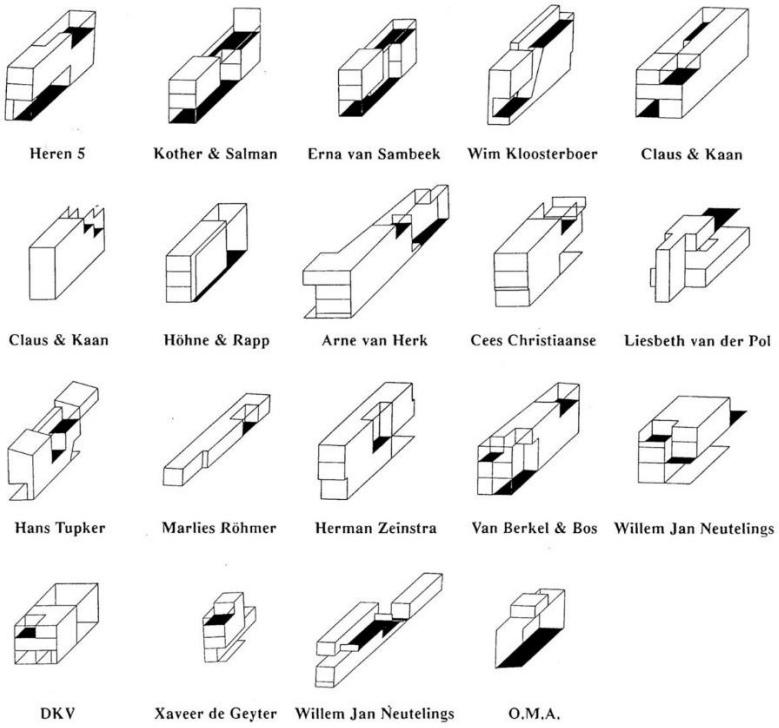


Fig. 2-28 Multiple dwelling type variants (Source: https://www.west8.com/projects/borneo-sporenburg/)

Fig. 2-29 Different types of dwellings along the street (Source: https://www.archiposition.com/items/20180525101228)

It is noteworthy that the local government designated a narrow strip of land in the center of the island as an experimental area. This area was divided into uniform plots measuring 5

meters in width and 16 meters in depth. These plots were then sold by lottery to private owners for self-builds. The purchasers were required to select a government-provided architect to develop a unified plan for the construction of their properties. The result is a residential street with a uniform height of 9.5 meters and a variety of forms (Fig. 2-30). This complex is a unique and direct expression of Dutch cultural identity: infinite differences in unity, reflecting the coexistence of cultural diversity and unity[48].

Fig. 2-30 Diverse building facades under uniform rules (Source: https://www.west8.com/projects/borneo-sporenburg/)

(4) Case Inspiration

First of all, strong intervention by the local government in commercial development is the key to safeguarding the interests of the local community and its citizens. The government can deploy resources and information to comprehensively assess urban problems and needs, and rationally plan and monitor projects. It has been proven that full marketization of housing can damage the urban fabric. Therefore, government intervention can ensure that development is in line with planning and public interest.

Second, there are many lessons to be learned from the project's implementation strategy. Rather than relying on one or a few architects, the project attracted the participation of more than a hundred firms, which ensured planning diversity and spatial quality. The pace of commercial residential development in the Netherlands is unique, unlike the "fast-track" model that is common in China, which prioritizes speed. This balance between architectural quality and speed of development is worth pondering and learning from.

2.3 Applicability of Theories

2.3.1 Similarities in Urban Form Contexts

First, the preservation backgrounds of China and Italy share similarities. After World War II, Italian cities experienced significant destruction but saw their historical buildings revitalized after a decade of restoration. However, during the 1950s and 1960s, historical neighborhoods faced challenges: traditional buildings were frequently damaged, and rapid population growth and industrial advancement brought numerous issues. By the 1970s, Italy began to reflect on its traditional development models, gradually recognizing the cultural value of historical relics.

During the same period, China faced a similar situation. Economic reforms triggered rapid socioeconomic growth, while industrialization and modernization drove environmental transformations. Both countries share comparable backgrounds in preserving historical buildings and districts, confronting similar problems. To ensure the revival of its traditions, the Italian government and preservation organizations implemented various conservation and transformation strategies, with significant contributions from the urban morphology school. This approach allowed cities to adapt to modern needs while retaining their rich cultural heritage.

2.3.2 Alignment Between Research Objects and Methods

The Italian typological approach and the Caniggia school emphasize in-depth studies of urban morphology and architectural typology. Through overlay analysis of typological and historical maps, they reveal patterns in the historical evolution of urban forms.

Guangzhou, with its 2,200 years of history, has a wealth of historical relics and documentation reflecting the evolution of its urban morphology and architectural styles. When studying the Gaodi Street area, Italian typological methods can be applied by organizing and analyzing historical records. Typological maps of Gaodi Street at different historical stages can be created to compare and analyze the evolution of its street patterns, plot divisions, and building layouts. This approach helps illuminate the historical morphological

characteristics of the area.

Additionally, the theoretical focus on regions rich in historical samples aligns well with the research context. Gaodi Street serves as a prime example, showcasing distinct historical textures and diverse architectural types, making it an ideal subject for applying these theories.

2.3.3 Insights from Practical Applications

For example, Bologna's holistic preservation plan for its historical center successfully maintained the city's historical memory and cultural identity by preserving its medieval urban layout and plot organization patterns. This concept of holistic preservation can be referenced in the urban renewal of Gaodi Street. By clearly defining requirements for street patterns, plot divisions, and building types, the updated urban form can be aligned with the area's historical character, emphasizing continuity of urban morphology and cultural identity.

2.3.4 Localization and Innovation

While Italian typological theories and the Caniggia school offer valuable insights for studying Guangzhou's urban morphology, they must be adapted and innovatively applied to fit the local context. First, Guangzhou's historical and cultural background and architectural styles differ from those of Italy. Second, as a rapidly developing modern metropolis, Guangzhou faces more complex socioeconomic challenges in urban renewal and preservation.

Thus, an in-depth exploration of the deeper connections between plot structure and typological morphology is crucial, highlighting the commonalities in research pathways and methodologies. These approaches complement each other when addressing plots with significant historical features and diverse morphological characteristics. By extending historical narratives, they provide a more comprehensive understanding of urban morphological development, offering practical guidance for design work.

Therefore, an exploration of the deep connections between plot structure and typological morphology is of great importance. Uncovering the commonalities between the two in terms of research pathways and methodologies provides valuable insights. When dealing with plots that exhibit significant historical features and diverse morphological characteristics, these two approaches can complement each other. By facilitating the continuity of historical narratives,

they offer a more comprehensive understanding of the evolution of urban morphology, thereby providing meaningful guidance for design practices.

2.4 Summary

This chapter presents a comprehensive analysis of the theoretical and intrinsic connections between plot urbanism and typological morphology. As a morphological element in the historical development of cities, the plot exhibits continuity and regenerative characteristics, which are further emphasized by typological morphology through its core theories and findings. Consequently, plot urbanism can be regarded as a refined branch of typology, focusing on plot demarcation and building rules, which is instrumental in studying the evolution of urban morphology.

The preceding paper provides an elaboration of the background, core concepts, and methodological tools of Italian typology, as well as a demonstration of the practical application of typology in urban preservation and regeneration through case studies of Rome, Florence, and Bologna. Concurrently, it examines the diversity and flexibility of the urban fabric that patriarchal urbanism strives to attain through meticulous planning. Case studies, such as the Boeo-Sporenburg residential area, illustrate the efficacy of integrating plot demarcation and architectural design in practice.

The chapter also highlights the similarities between China and Italy in terms of historical preservation and regional regeneration, pointing out that typological morphology has wide applicability in both countries. By exploring the commonalities between plot and typological morphology in terms of research objects, methodological paths, and conservation objectives, it is suggested that both have complementary strengths in dealing with urban areas with significant historical features and diverse morphologies, and provide a comprehensive methodological approach aimed at continuing the urban historical lineage. Overall, this chapter provides a theoretical foundation for subsequent research and application of adaptive design methods.

Chapter 3 Issues in the Historical District of Gaodi Street

This chapter begins with an analysis of the historical origins and evolution of Gaodi Street and its surrounding areas. Subsequently, it provides a systematic summary of relevant policy documents and field research findings, highlighting the stark contrast between the area's historical resources and residential conditions. Following this, the chapter identifies and summarizes the challenges encountered in conservation practices, including an unexpected discovery during the research: a future development site that offers an opportunity for subsequent design studies. Finally, by categorizing these issues in detail, the chapter explores the intrinsic connections between the identified problems and the theories of plot urbanism and typology, laying the groundwork for addressing practical challenges in the following sections.

3.1 Historical Evolution of Gaodi Street

Gaodi Street, which borders Yudaihao Street on the north side, is a typical section of commercial streets along the river. Bordered by Yangzhong Street on the east and Haopan Street on the west, it is the longest commercial street along the river in Guangzhou, with a total length of nearly 2.3 kilometers. From the Song Dynasty to the early Ming Dynasty, Gaodi Street faced Yudaihao in the north, which was a natural inner harbor for ships to avoid the wind, and there was an open pier on the south side of the street facing the river for loading and unloading goods, and the unique advantages of trade and transportation made many merchants compete to set up their businesses along the river.

Historical evidence suggests that before the founding of the city, there were some early settlements, probably located at the junction of the eastern plateau and the western alluvial plain, such as the Tang Dynasty Fan Fang area on Haizhu Road. At the beginning of the Tang Dynasty, what was once a trading settlement developed into a Fan Fang area that could accommodate 10,000 people and gradually expanded along the wharf where the ships docked.

3.1.1 Originated in the Song Dynasty

At the beginning of the Song Dynasty period, some commercial streets along the river, which is now Gaodi Street, made their debut in the southern part of the city because the commercial center area, along with the gradual siltation of the wharf at Fan Fang, kept moving southward along with the commercial waterway. In the late Song Dynasty, the commercial waterways around the western Fan Fang could not escape the result of siltation. Thanks to the newly silted beach, a long east-west commercial street, Gaodi Street, spontaneously formed along the beach (Fig. 3-1). At that time, Gaodi Street was flourishing, and the land along its main street was gradually divided for the use of merchants in the development of trade and commerce[54].

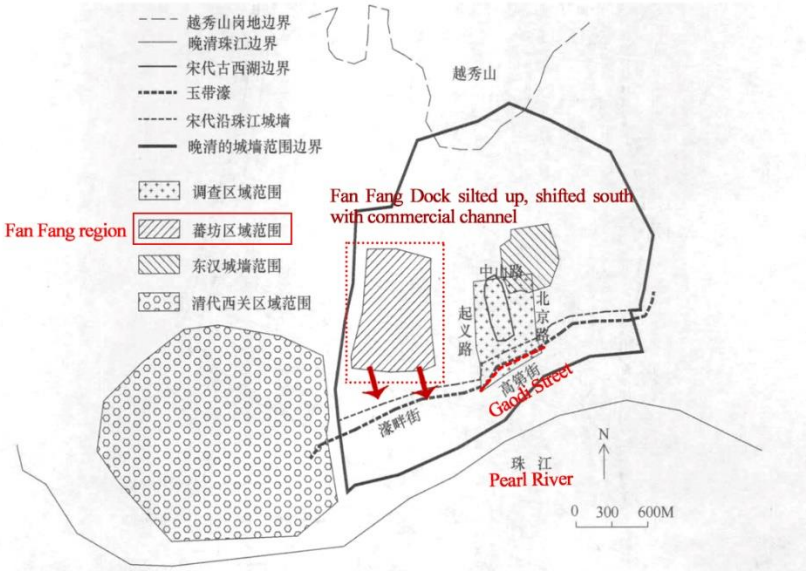


Fig. 3-1 Initial formation of Gaodi Street (Source: redrawn according to reference [54])

3.1.2 Flourished in the Early Ming Dynasty

It was not until the late Song and early Ming dynasties that Highland Street began to bustle with activity. With the increasing siltation of the Xiao port area, the commercial center and trade activities concentrated in the western Fan Fang in the early Song Dynasty began to shift to the riverside area along the southern bank of the Yudaihao.

3.1.3 Developed in the Qing Dynasty

During the Qing Dynasty, it played an important transportation role by connecting the main roads in and out of the city, enabling people to reach the inner areas of the city with ease.

In addition to this, the convenient transportation also greatly contributed to the prosperity of commerce, and Gaodi Street was also able to quickly connect with the government wharves and other land and water transportation hubs outside the city.

During this period, Gaodi Street became the ideal home for salt merchants, including the famous Xu family in Guangzhou, where Lu xun's wife, Xu Guangping, lived as a child(Fig. 3-2). Originally from Chenghai, Guangdong Province, the Xu family started out selling salt, but later settled on the north side of Gaodi Street in Xudi as a place to live and pass on the family business for generations to come. During China's social transition, several members of the Xu family participated in the changes of the times in different forms[53].

Fig. 3-2 The site of the Xu family ancestral residence (Source: by the author)

3.1.4 Decline in the Republic of China

During the Republican period, the authorities demolished the old wall and started to build a new road, which had a profound effect on the area of Gaodi Street. In 1918, the length of Gaodi Street had to be shortened due to the construction of the first phase of the road. Over the next two years, urban roads were built around Gaodi Street (Fig. 3-3), with the construction of Yonghan South Road (now Beijing Road), Taikang Road, Weixin Road (now Qiyi Road), and Danan Road. As a result, the inner lanes of Gaodi Street were extended toward the city streets, and shops were relocated along the streets.

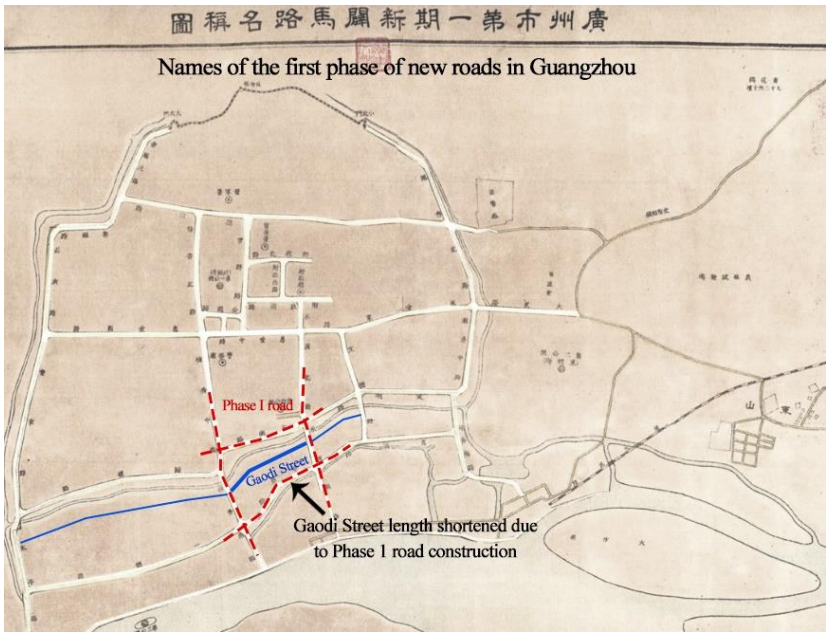


Fig. 3-3 Gaodi Street was shortened with the construction of the road

(Source: redrawn according to reference [2])

At the same time, the real estate development in full swing has led to the emergence of different styles of low-rise housing and small houses in the Gaodi Street area, which has enriched the architectural diversity of the neighborhood, but also brought the risk of a gradual disjunction between the traditional style of the traditional historical buildings and the neighborhood, which is dominated by green bricks and gray tiles and wooden bamboo tube houses.

3.1.5 Hidden after the Founding of the People's Republic of China

In the early years after the founding of the country, Gaodi Street is mainly engaged in daily necessities and other small goods, in the 1980s, Guangzhou, as China's reform and opening up the border region, the busiest section of the Beijing Road, in full of inefficiency, the structure of redundant state-owned enterprises, Gaodi Street has begun to explore the new way of self-employment of individual households in the business. A plaque named "Gaodi Street Industrial Products Market" was hung on the Gaodi Street plaza in Guangzhou's Yuexiu District, which opened its peak, and became a thriving marketplace for self-employed people, attracting countless entrepreneurs and businessmen to come and operate their businesses, with a variety of stalls full of rich Guangzhou characteristics, and even some women who had

married in Guangzhou would visit Gaodi Street to learn more about the history and cultural heritage of the local community.

Time is pushing the tide to adjust and transform itself. The background of this period is the drastic change of the real estate market in the late 90s. In 1998, the State Council issued the 23rd document, which proposed to "start domestic demand, start housing reform, abolish social housing and focus on affordable housing", which triggered the real estate market, and completely broke up the urban layout and structure of the mainland's big cities, and reshuffled the functions and positioning of each region. The functions and positioning of each region were reshuffled[55]. The advent of the real estate era has led to the emergence of new urban areas, residential areas, CBDs, commercial centers and other emerging concepts of modern society in first-tier cities, and at the same time has led to some of the functions of the commercial streets in the old city to be channeled to the new districts and transportation hubs. Had to force Gaodi Street to make changes, around 2000, Gaodi Street large number of old shopkeepers rolled away to the large wholesale market near Guangzhou Railway Station to continue business.

At the beginning of the 21st century, Gaodi Street was gradually transformed into a small wholesale market specializing in lingerie, which has lost its former elegance, but still continues to serve its commercial function. While the Xu family villa gradually faded from people's memories, the villa as a historical heritage was inadequately protected, recklessly used and rebuilt, and gradually disappeared into the iron and steel forest.

3.2 Policy Driven

Relevant planning policies involving the Gaodi Street lot include:

"Guangzhou Famous Historical and Cultural City Protection Plan (2011-2020) " has listed Gaodi Street, the southern end of the traditional central axis, as one of the 26 historical and cultural districts in Guangzhou, but at that time, Gaodi Street, together with Danan Road and Taikang Road, which are located on the north and south sides of the area, were not defined as traditional streets and lanes[49].

In August 2021, the Guangzhou Municipal Bureau of Planning and Natural Resources issued an announcement of the adjustment program for the land parcel of Gaodi Street project on Beijing Road (Fig. 3-4). Adjustment result: There is no longer any residential land in the area, but a purely commercial land, which is a great pity for Yuexiu District, where residential land is already scarce.

"List of Historical Buildings in Guangzhou" introduced in 2022, in order to systematically protect, utilize and pass on the historical and cultural heritage of Guangzhou, and to continue the historical lineage and other provisions of the city's scope of the first to the seventh batch of historical buildings to conduct a census and announce, after the statistics of the Gaodi Street lot memory of one relatively well-preserved Historical buildings, residences No. 2, 4, 6 and 8 of Lianyunli[50].

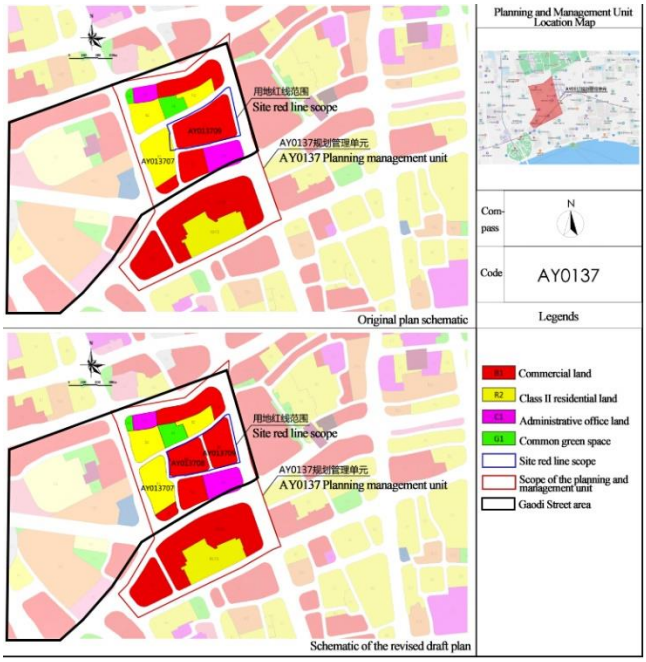


Fig. 3-4 Adjustment of a land parcel control plan

(Source: Guangzhou Municipal Bureau of Planning and Natural Resources official website. https://ghzyj.gz.gov.cn/ywpd/slgsnew/content/post_7432333.html)

In 2023, "Guangzhou Famous Historical and Cultural City Protection Plan (2021-2035) " identified Gaodi Street, the southern end of the traditional central axis, as one of the 27 historical and cultural districts in Guangzhou. The plan proposed to emphasize historical and cultural value as the guide and to protect the authentic historical information carried by the

historical and cultural heritage[51]. Furthermore, historical and cultural cities are regarded as organic systems, with the objective of coordinating the comprehensive protection and collaborative development of historical urban areas on a city-wide scale. Furthermore, the strategic value of historical and cultural resources in urban development is of great importance, as is the exploration of innovative paths of development in conservation and conservation in development. Additionally, the classification of traditional streets and lanes has been updated, with Gaodi Street classified as a Grade I traditional street and Danan Road and Taikang Road classified as Grade II traditional streets and lanes (Fig. 3-5).

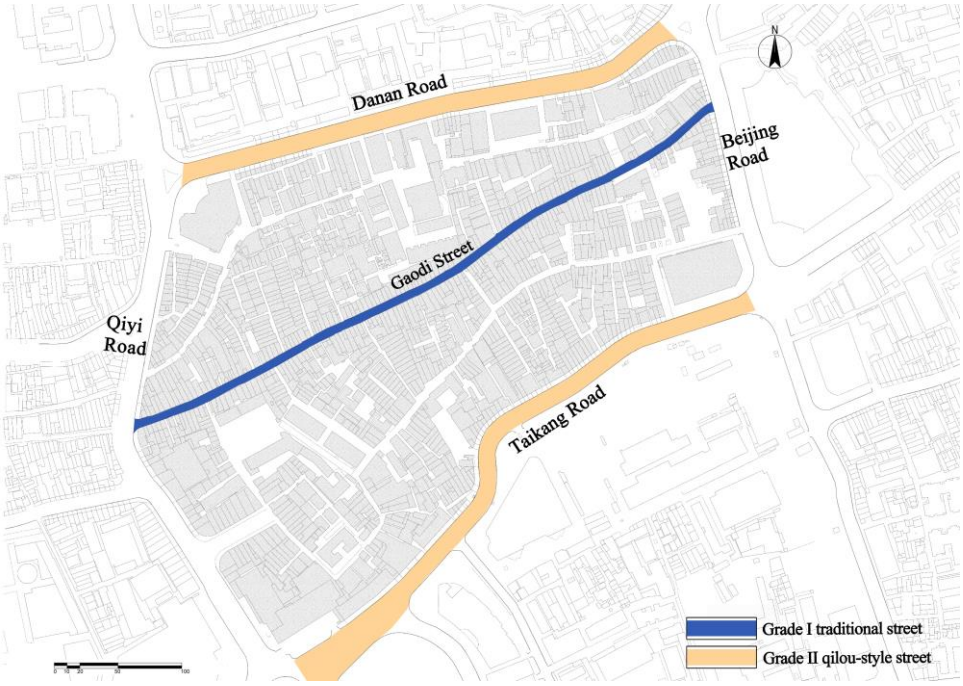


Fig. 3-5 Classification of streets (Source: by the author)

In 2023, (Gaodi Street Renovation Project Historical and Cultural Heritage Survey and Assessment Report) launched a historical and cultural heritage survey and assessment work on Gaodi Street Main Street, and verified that the scope of this study is located in the core protection scope and construction control zone delineated in (Revision of the Protection Plan for the Traditional Axis (Modern) Historical and Cultural Neighborhoods (2015-2020)), which involves the traditional style architectural clues, traditional streets and lanes, excellent traditional culture and intangible cultural heritage, and natural environment. In addition, it also involves the construction control zone of the municipal cultural relics protection unit Xu Dafu Family Temple and the protection scope of the site of the municipal cultural relics

protection unit Guangdong Provincial Lecturer Training Institute[52].

Although experts and the government have put forward general principles such as "small-scale, gradual approach, prohibiting large-scale demolition and construction", and this top-down model has enabled a large number of urban heritages to be restored and preserved, there is no one-to-one targeted preservation strategy for a particular historical lot or building, and the public's voice is seldom heard. With the departure of a large number of indigenous people, the social fabric of historical districts has gradually disappeared. At the same time, individual operators of urban heritage have not been able to obtain the property returns they deserve, which has led to a certain degree of social conflict and tension.

3.3 Status of Gaodi Street Area

The heritage within the Gaodi Street neighborhood includes Bamboo tube houses, riding buildings, assembled dwellings, and other residential forms, which were mainly born in the late Qing Dynasty to the Republic of China period. Compared to the popularity of the Xiguan Dawu and Shisanhang area, the residential types and historical commercial businesses in Gaodi Street are not prominent, resulting in less attention being paid to its value in previous studies. However, it can be clearly seen through the satellite map that the Gaodi Street area has preserved a large number of traditional architectural textures from its long commercial history since the Song Dynasty. Its scale and integrity have become very rare in all of Guangzhou, reflecting the evolution of the urban pattern and historical evolution.

Through several field studies and interviews with the aborigines, the author found and summarized the following characteristics of the current physical space and living conditions of the residents within the Gaodi Street lot:

3.3.1 Widespread Conversion of Dwellings into Warehouses

The land use functions of Gaodi Street and the surrounding neighborhoods are predominantly commercial, warehousing, and residential (Fig. 3-6).

Over time, the historical commercial status of Gaodi Street has been gradually replaced by the Tianhe business district and the Pearl River New City business district. The current

business of Gaodi Street is dominated by private businesses operated by individual households, such as underwear, belts, and clothing for the elderly (Fig. 3-7, a; b), and its economic benefits are not significant. In addition, the participation and recognition of indigenous people in the wholesale business is not very satisfactory. Compared with the retail business, the wholesale market does not attract popularity effectively, resulting in the lack of identification of the residents and tourists with the area[53]. During the visit and research, most of the merchants were only engaged in buying and selling activities limited to both sides of the street, and although they knew that they rented old houses, they did not know much about the history and culture of Gaodi Street, resulting in its long-term neglect. Many scholars and tourists who come to Gaodi Street can only learn about the historical and cultural heritage of Gaodi Street through the parcels and shelves in front of the shops and the carts passing through the main street.

The phenomenon of converting residential houses into warehouses has become increasingly serious due to insufficient storage capacity and the idle rate of residential houses caused by the massive out-migration of Aboriginal people (Fig. 3-7, c; d). Site visits revealed that storage areas were everywhere in the depths of branch lanes, with temporary goods piled outside the door, goods stacked high inside, dim lighting and crowded space, and if it happened to be raining heavily at the time of the research, the goods piled outside the door were soaked due to the lack of canopies or shelters, and most of the goods were flammable (Fig. 3-7, e; f). Follow-up interviews revealed that most of the renovations were carried out privately without proper permits, which to some extent also caused safety problems, such as fire hazards caused by flammable materials, traffic congestion caused by the transportation and stacking of goods, and even noise pollution, which undoubtedly lowered the overall quality of living conditions in the neighborhood and led to an increase in the rate of outmigration and vacancy, which further increased the amount of storage, forming a vicious cycle.

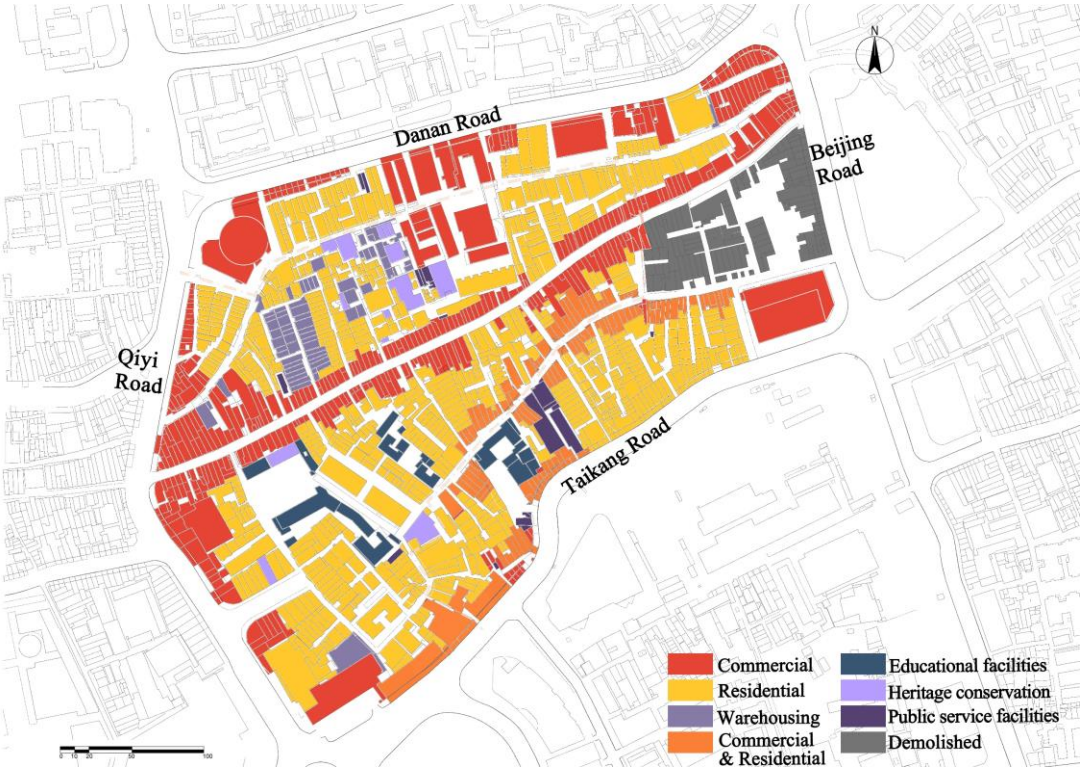


Fig. 3-6 Functional distribution illustration (Source: by the author)

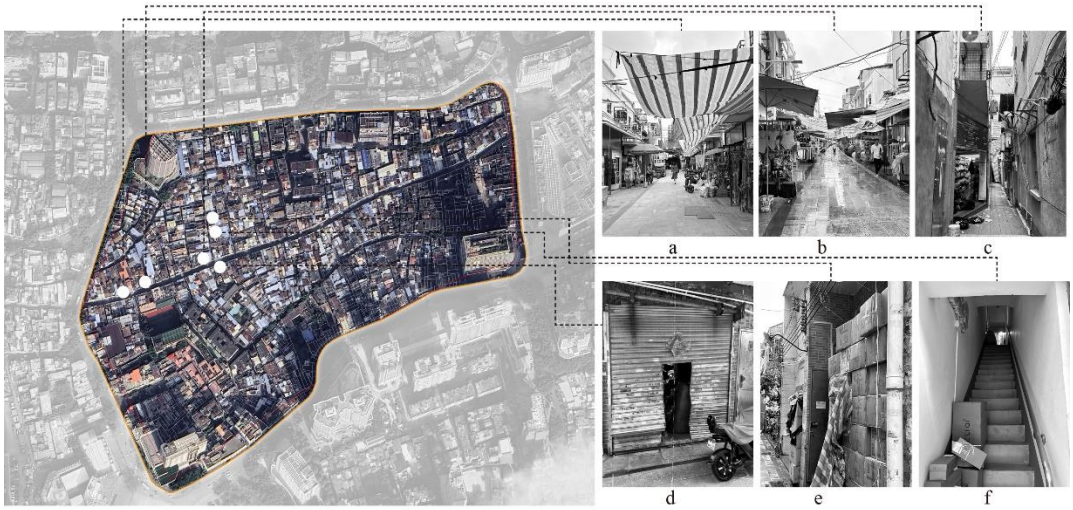


Fig. 3-7 Research on the status of housing conversion into warehouses (Source: by the author)

The visit revealed two distinct types of storage on Gaodi Street. The first type is found in one- or two-story residential buildings on either side of the inner side of the side streets. The second type is located on the second or third floors of stores on the main Gaodi Street. Additionally, some storage is situated within the interior of the first-floor stores, with the storage area separated out for temporary use (Fig. 3-8). These buildings are typically distinguished by their narrow frontages and elongated depths. They often feature shared

boundary walls between adjacent structures, with the ground floor exposed to the street. With the exception of the facade visible from the street, the remaining two or three sides of the building are constrained by neighboring development and shared interior walls. This configuration results in inadequate ventilation and illumination within the building

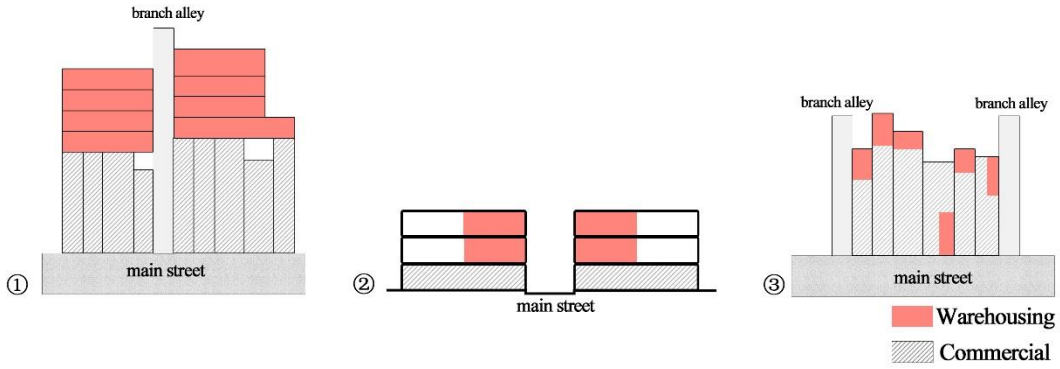


Fig. 3-8 Illustration of warehouses distribution on Gaodi Street (Source: by the author)

3.3.2 Fading of Traditional Lane Appearance and Texture Layout

During the on-site research, it was evident that the old residential buildings along the eastern section of Gaodi Street's main street as well as along Beijing Road were in disrepair, had high vacancy rates, and had severely deteriorated facades (Fig. 3-15, a; b; c). In addition, the satellite map shows that there are large-scale modern high-rise buildings in the current Gaodi Street area, destroying the traditional texture and historical architectural features (Fig. 3-9).

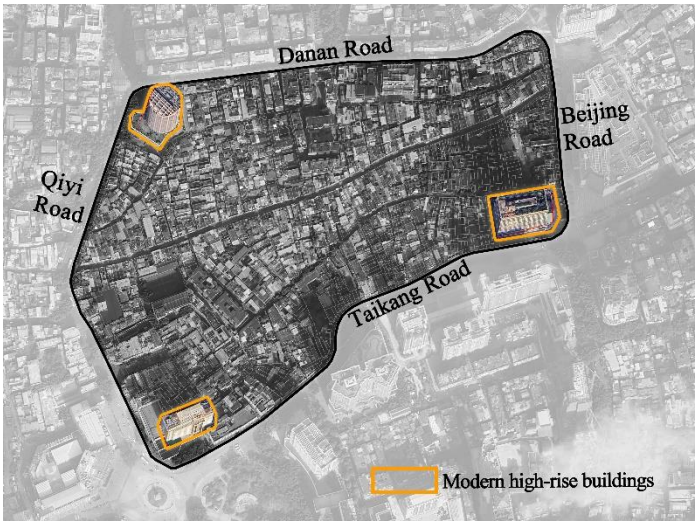


Fig. 3-9 Schematic distribution of existing high-rise buildings (Source: by the author)

As derived from the height schematic (Fig. 3-10), the buildings in the area are

predominantly low-rise residential buildings of 1-4 stories, which maintain their original historical appearance and texture. However, there are also many modern residential buildings over seven stories, with three such structures standing over 10 stories near the three main intersections, which have become disconnected from the neighborhood's character in terms of building height.

As can be seen from the landscape diagram (Fig. 3-11), there are various types of protected architectural objects in the area, including historical buildings, provincial and municipal protected cultural relics, and immovable cultural relics, etc., which are characterized by a high distribution on both sides of the main road and the area around Xu Di, while the rest of the area is scattered and therefore needs to be taken into account. While the architectural style of Xudi and the area around Mupaitou - Xiheng Street is relatively intact, most of the buildings on both sides of Yudaihao on the east side of Xudi are now modern residential buildings that are out of place in the traditional style. Shuimuwan on the west side of Mupaitou, although the old structure still exists, the study found that unauthorized building structures and random changes to the facade are more common, which have seriously damaged its architectural style.

Fig. 3-10 Illustration of current height (Source: by the author)

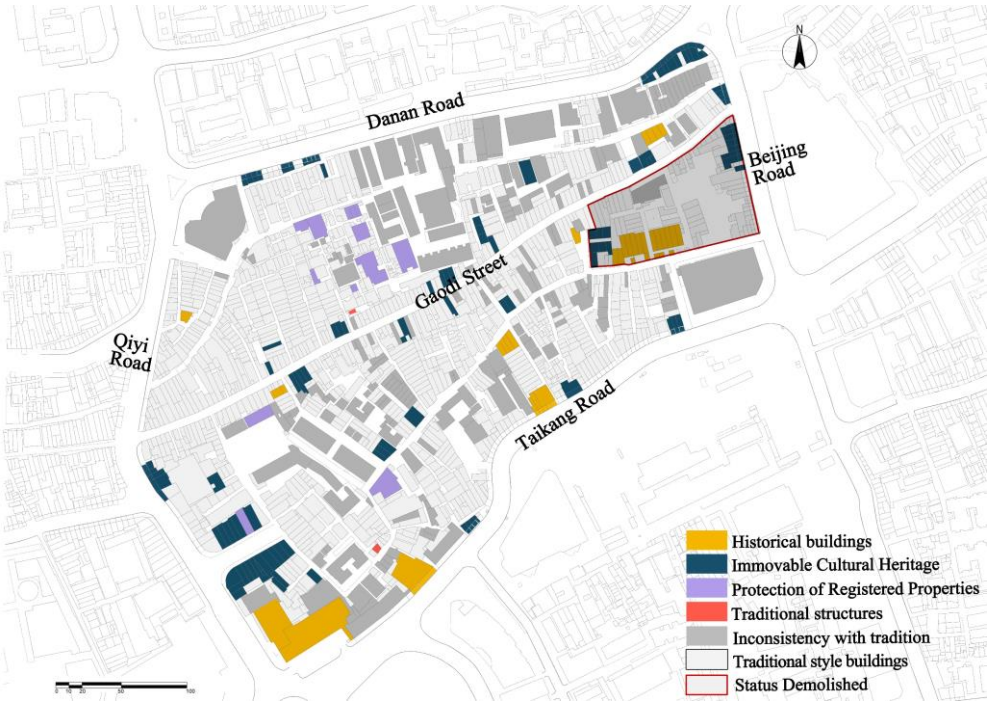


Fig. 3-11 Illustration of the architectural preservation style (Source: by the author)

By comparing the current situation (Fig. 3-12) with the historical plot texture (Fig. 3-13), the amount of construction and the demand for new functions in the community have caused some of the traditional texture land parcels to disappear, and the street pattern has been affected to varying degrees. For example, the construction of modern residential buildings has caused the east-west lane scale of the T-shaped lane of Bahe Fang to get out of control, the north-south lane of the T-shaped lanes of Jingyeyuan and Zhujili Lane are impassable and have been covered by modern buildings, the streets and lanes of Gaoxili Lane, Yuandeng Lane and Xiaorili Lane no longer exist, and the areas connected to them have been contracted by Hongyu Company and their current conditions have been demolished in preparation for secondary development and renovation

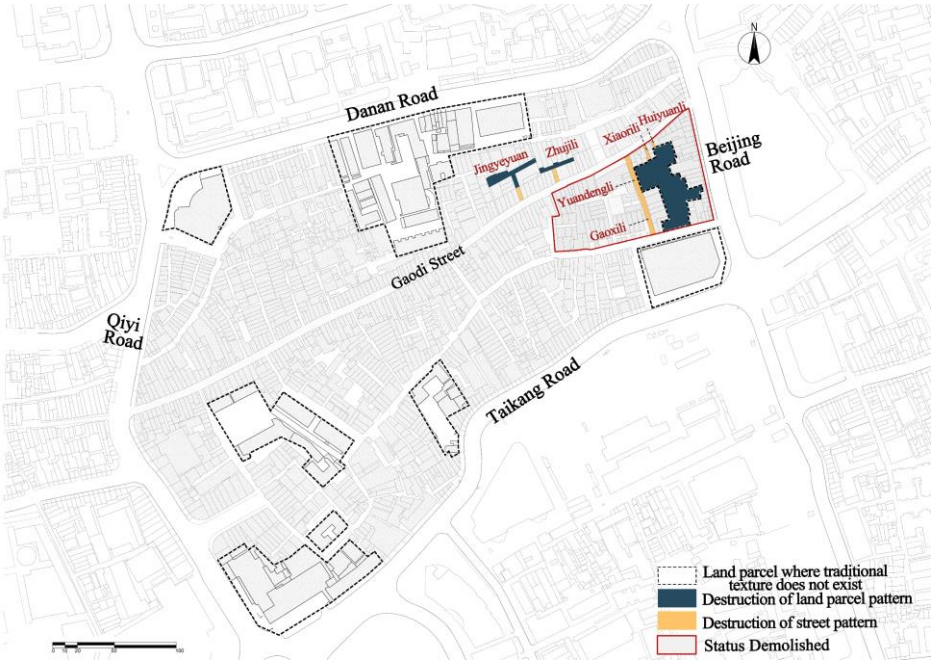


Fig. 3-12 Illustration of the current texture analysis (Source: by the author)

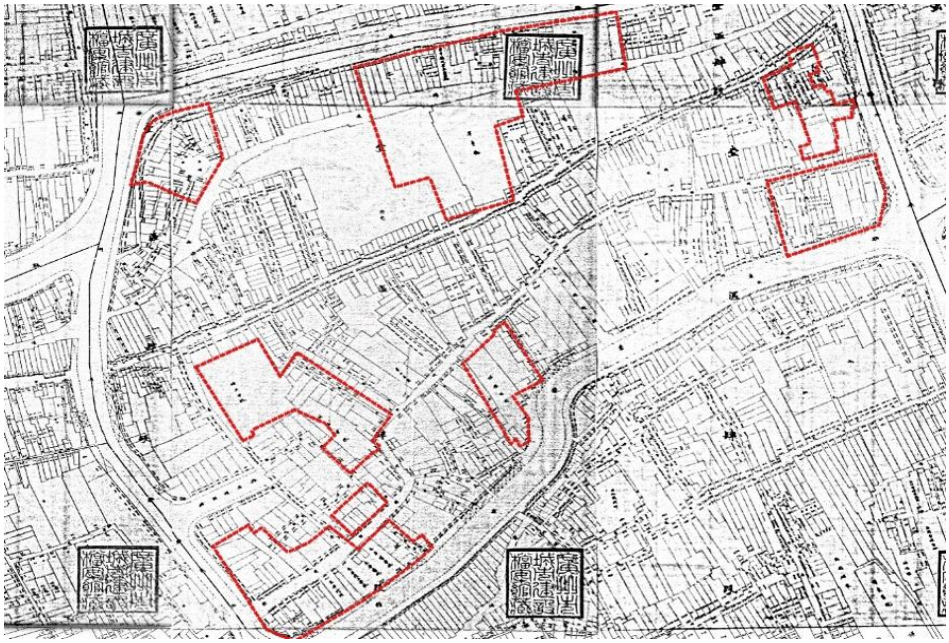


Fig. 3-13 Illustration of the non-existence of historical plot texture

(Source: redrawn according to Cadastral map of Guangzhou in 1935. Base map provided by GZPI "Guangzhou Urban Planning & Design Survey Research Institute" and will not be repeated in the following paragraphs)

3.3.3 Insufficient Attention to Heritage Conservation

The protection of the many tangible cultural heritages on Gaodi Street appears to be inadequate due to the shortcomings of the management mechanism. During the visit, it was

learned from the residents' committee that public buildings are managed by the government, private buildings are the responsibility of the owners, and unit buildings are managed by the unit. For those buildings that are left unattended, the residents' committee needs to apply for maintenance funds from the relevant departments. This situation has made it difficult to achieve uniformity in the repair standards for old buildings in terms of appearance and quality control.

In addition to this, some empty houses on Gaodi Street are rented by agents, and the new tenants usually do not pay attention to the quality of the buildings and the uniformity of their appearance, resulting in most of the private houses not being repaired for a long time. According to the "Gaodi Street Renovation Project Historical and Cultural Heritage Survey and Assessment Report" published in 2023, there are 11 protected buildings among them.

Although in recent years, some historical monuments and buildings have been protected by the government in a physical way-listing (Fig. 3-15, d), there are no other one-to-one protection measures that have been put into practice.

The former residence of Xu Xiangguang, located on the Gaodi Street land parcel within the Xudi traditional architectural complex, was announced as a registered protected cultural relics unit of Yuexiu District in 2012 and was built in the Qing Dynasty. Originally a three-room, two-door brick building, it was one of the earliest houses built by the Xu family in Xudi. In the 1960s and 1970s, a new reinforced concrete frame building was constructed on the site of the former residence. Although there is a sign on the wall of the entrance of Xu Xiangguang's former residence that has been registered as a protected cultural relics unit by the Yuexiu District Radio, Film and Television Press and Publication Bureau, there are still wholesale advertisements on the front door and cloth bags are used to fill the physical space on the front door, which is enough to show that the protection of Xudi's relics is too casual and not taken seriously (Fig. 3-15, e).

3.3.4 Ineffective Utilization of Historical Buildings

The entrances to the historical side streets on the main street are intermittently marked by door signs, yet the door signs are not adequately protected or displayed. Furthermore, the

upper floors of the individual door signs are utilized for the storage of construction debris (Fig. 3-15, f; g). The names of lanes that reflect changes in the Pearl River shoreline, such as Jiyin Lane, Shuimuwan, Subo Lane and Liankeli (Fig. 3-14), are only indicated on door signs. There are no specific signboards that provide textual and graphic descriptions.

Fig. 3-14 Status photos of Jiyin Lane Subo Lane and Liankeli (Source: by the author)

If you turn into a branch lane without realizing it, you will find buildings with "Guangzhou Historical Buildings" signs or buildings with a clear sense of age, but these buildings have a high vacancy rate and are locked by iron fences in front of their doors, and they are out of place among the grip buildings full of warehouses (Fig. 3-15, h; i), but the first floors of some of the old buildings have also been used for storage. storage use, or old buildings are affected when modern residential buildings are added privately (Fig. 3-15, j).

Several of the old buildings on the main street were found to be vacant and their facades had undergone many changes, while the shopkeepers on the first floor seemed to be used to all this and continued with their work (Fig. 3-15, k). At the eastern end of Gaodi Street is the bustling Beijing Road, whose current smoky atmosphere is clearly visible in the photo (Fig. 3-15, l), in stark contrast to the remaining buildings on the eastern side of the Gaodi Street area. Even more stunning, on the Mupaitou side, there are several historical buildings surrounded by construction fences, abandoned and isolated among overgrown weeds and dark, decaying trees (Fig. 3-15, m; n).

Fig. 3-15 Field research on the status of historical features (Source: by the author)

3.3.5 Mixed Traffic Flow

Because of the small scale of the streets, the main street is swarming with non-motorized human-powered trucks and pedestrians. The reliance on manual labor and the inefficiency of handling methods result in goods being stored in a manner that hinders traffic flow, particularly in front of stores and on the main street.

In such a chaotic situation, a variety of streamlines cross and run parallel to each other, with transporters going back and forth between storefronts and main street entrances, casual purchasing streams, and the living streams of Aboriginal people (Fig. 3-16, a; b). The intertwining of flow lines presents a significant risk to public safety and the local economy.

During the on-site research, it was observed that the primary mode of transportation was a rudimentary four-wheeled cart pulled by a two-wheeled electric vehicle (Fig. 3-16, c). Pedestrians frequently expressed concern about the sudden appearance of electric hand-pulled carts accompanied The sudden blare of a siren from the rear prompted us to reconsider our priorities. While we initially focused on the historical and cultural aspects of Gaodi Street, we soon realized that our primary concern was the personal safety issues caused by the rapid transportation. This made our experience of walking on the street less enjoyable. Furthermore, the crude and rough transportation method has also damaged the road surface of the main street. Potholes in the lanes and the newly paved floor tiles on the main street are evidence of this damage.

The unpermitted structures erected to satisfy the demand for storage space have resulted in the occupation of some street pavements by stacked goods and boxes, thereby impeding the efficiency of movement between streets.

In addition to this, the high density of vehicular and pedestrian traffic coupled with the narrowness of the streets makes it impossible to meet the basic needs of fire safety in the neighborhood. As can be seen from, the average width of the main street is 7 meters, but the stacking of goods outside some storefronts, the outward display of billboards, and the indiscriminate parking of man-powered trucks make the actual width much less than 7 meters(Fig. 3-16, d), and the requirement for a fire lane of less than 4 meters at the widest point of some secondary lanes makes it virtually impossible for fire trucks to enter the interior of the neighborhood.

3.3.6 Exposure of Safety Hazards

The remnants of the historical texture have led to the emergence of existing handshake buildings, as well as the seriousness of private construction by residents, such as exposed air conditioning units, random additions to the main street facade ignoring the historical originality, and especially on the roof portion, where privately built drying scaffolds or cargo areas are often seen (Fig. 3-16, e). In addition, the haphazard arrangement of electrical wires between residential buildings, temporary goods piled up in alleyways, bags of garbage

dumped at the entrance of alleyways, and high-density storage areas (Fig. 3-16, f; g; h), all of these phenomena have created serious safety hazards, as well as poor living environment and physical space conditions in the community.

3.3.7 Superficial Facade Improvement

During the on-site research, it was found that the main street facade was micro-remodeled, which only unified the color of the main street facade, but did not meticulously enhance its facade segmental proportions, balcony window openings, materials, etc. (Fig. 3-16, i; j). And after entering the branch lane from the main street, it can be clearly found that the part of the mountain wall along the branch lane is not unified with the facade color of the main street facade due to the low flow of passengers and is not in the field of view of the main street (Fig. 3-16, k; l).

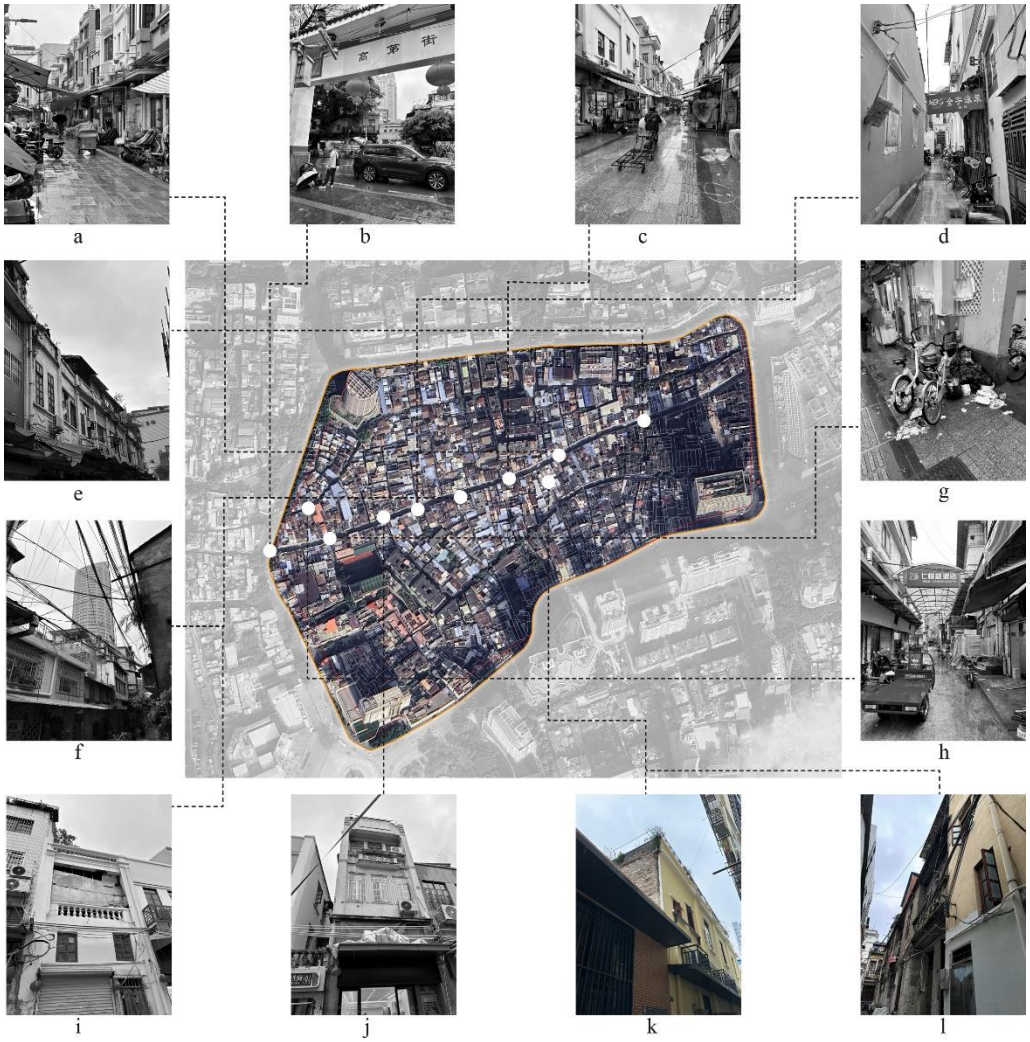


Fig. 3-16 Field research on architectural features (Source: by the author)

3.4 Problem Reflection and Strategy Introduction

A review of Gaodi Street's past preservation and regeneration efforts and field research has revealed that the historical buildings are in a state of disrepair, the living environment is of poor quality, the ownership structure is complex, and the wishes of the residents are not uniform. The past ten years of practice and deep reflection have demonstrated that the large-scale demolition and redevelopment mode, led by the government or developers, is no longer capable of adapting to the new development mode and people's demands. In addition, based on a comparison of historical records, the most fundamental issue in the Gaodi Street area is the large-scale destruction or disappearance of the historical land parcels that form the basis of its urban morphology. This has resulted in a disconnect between subsequent planning, newly constructed buildings, and the original historical form.

The investigation revealed that the area along Beijing Road, encompassed by Gaodi Street and sub-Street, was undergoing a secondary development phase, with buildings scheduled for demolition and construction waste accumulating on the site, encased within construction barriers (Fig. 3-17). A review of the on-site inquiry and online information search revealed that Hongyu acquired the land parcel in 2016. The company is now undertaking the construction of a project with the concept of a "Guangzhou New Urban Commercial Landmark." The rendering of this concept is provided in the following figure (Fig. 3-18).

The ownership of this parcel of land has historically been marked by multiple disputes and lawsuits. The first issue revolved around the project's transfer and land certificate. In the 1990s, Yuexiu Urban Construction Development Company obtained a demolition permit for a 9,182-square-meter plot south of Gaodi Street and west of Beijing Road. However, due to financial difficulties, the project was transferred in 2003 to Guangzhou Jin Hongshun Real Estate Development, a subsidiary of Hong Kong Zhengheng Properties. In 2004, Jin Hongshun acquired the land certificate from Yuexiu Urban Construction Development Company. At the time, however, the land certificate held by Gaodi Street residents had not yet been revoked, resulting in two separate land certificates for the same plot.

In response, Gaodi Street residents filed for administrative reconsideration. After multiple rounds of litigation involving the provincial government, Guangzhou Intermediate People's Court, and the Guangdong High People's Court, it was ultimately confirmed that the "duplicate certificates" issue existed, but Jin Hongshun Real Estate was deemed a bona fide purchaser. In 2011, the Guangzhou Planning Bureau revoked Jin Hongshun's construction planning permit and adopted revised planning proposals to preserve the historical character of Gaodi Street.

With the introduction of more protective regulations, Gaodi Street's historical buildings received greater protection. By 2020, Guangzhou released the "Implementation Opinions on Deepening Urban Renewal to Promote High-Quality Development", which included plans to redevelop Jin Hongshun's plot and other old neighborhoods within three years. Currently, the project is in the approval stage, with ownership issues resolved. The site is planned to be transformed into a comprehensive complex integrating commerce, cultural innovation, and tourism.

In view of this, it can be clearly understood that the future transformation of the land parcel is detached from the rich history of Gaodi Street and the architectural texture characteristics, which is not in line with the requirements of the historical process of development, so the area will be discussed in detail as a subsequent design research object.

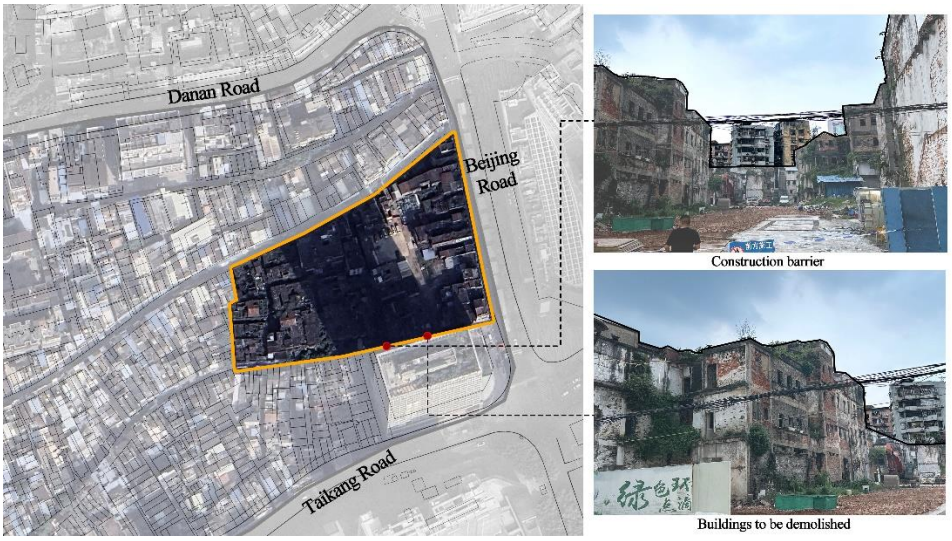


Fig. 3-17 The current status of the redeveloped area (Source: by the author)

Fig. 3-18 Rendering of future development of the area

(Source: Hongyu group official website. http://www.hongyugroup.com/)

Therefore, when examining the morphological characteristics of the traditional urban fabric, it is essential to utilize the inherent order of controlling the morphology of the traditional fabric - the plot, to identify the physical form boundaries delineated by the plot to implement the control, and on the basis of which, to further refine the typology and design rules. Accordingly, a comprehensive study of the structural division of streets-lanes-Fang in the Gaodi Street area, as well as the historical plots, will be conducted in the following section.

3.5 Summary

This chapter comprehensively and systematically compiles relevant policy documents and field research results, revealing the contrast between the richness of historical resources and the current living conditions in the Gaodi Street area. By analyzing the problems in conservation practice, such as the lack of targeted strategies and the low level of public participation, it points out the shortcomings and challenges of conservation work. At the same time, the parcels of land identified in the research offer important opportunities for future

design. In addition, this chapter describes in detail the physical space characteristics of Gaodi Street, the living conditions of its residents, and the problems it faces, including the fading of traditional features, inadequate heritage protection, mixed traffic, and potential safety hazards. Immediately after, the historical development of Gaodi Street from the Song Dynasty to modern times is reviewed to provide a historical basis for its preservation and regeneration.

Based on a review of conservation and regeneration efforts to date, and combining the theoretical research in the previous chapter, this chapter proposes new ideas: to use the physical form boundaries delineated by the plot to implement control and refine the typology and design rules. At the same time, the parcel to be developed is taken as the object of design research, and the morphological characteristics of the street and lane parcels of the Gaodi Street area are meticulously studied in the following section, with the aim of fully respecting and preserving the historical and cultural heritage of Gaodi Street.

Chapter 4 A Study on the Correlation Between Street-Lane-Fang Patterns and Plot Formation

Taking the fundamental issue of Gaodi Street as a starting point, this chapter focuses on the formation of plots, which serve as the basis of its historical morphology. The research is conducted at three scales: from the impact of natural geographical conditions on plots formation at a macro scale, to the correlation between street networks and plots at a meso scale, and finally to the relationship between building layouts and plots at a micro scale. By analyzing the historical morphological characteristics of plots, this study provides a historical foundation for the future re-division of land parcels in the designated areas.

4.1 Impact of Natural and Geographical Factors on Plots

Ancient Chinese city site selection emphasized integration with the natural environment, and the structure of historical cities in the south was mostly influenced by natural geography. Elements such as the distribution of water systems, the alignment of mountains, the undulation of the terrain and farmland were crucial to the layout and form of urban planning. Natural geographical conditions firstly guided the shaping of the street and lane network, while the layout of streets and lanes then played a role in the division of plots within the neighborhoods, and the plots determined the architectural layout.

4.1.1 Water System through the City

The Yudaihao is a significant water system located in the southern part of the city. During the Song Dynasty, it served as a moat surrounding the three cities in that region. The moat was not designated as "Yudaihao" until the Ming Dynasty. The eastern and southern moats originally flowed into the Pearl River together with Xihao. In the fifth year of Jiajing (1526), the water from the east and south moats was introduced into Yudaihao, which then flowed into Xihao and finally into the Pearl River.

During the Ming Dynasty, in order to reinforce the city's defensive capabilities, defensive structures were constructed at the entrances to the moat of the inner city, effectively

preventing the passage of vessels. In contrast, the South City was more open in its layout and served as the primary hub for the city's economic activities. Consequently, it placed significant emphasis on ensuring the uninterrupted flow of the Yudaihao waterways. Following the establishment of the South City in the Ming Dynasty, the commercial district became increasingly reliant on Yudaihao[4]. Consequently, the street plan of the southern city was reorganised along Yudaihao, particularly in the western part of the city, resulting in a market pattern aligned with its orientation (Fig. 4-1).

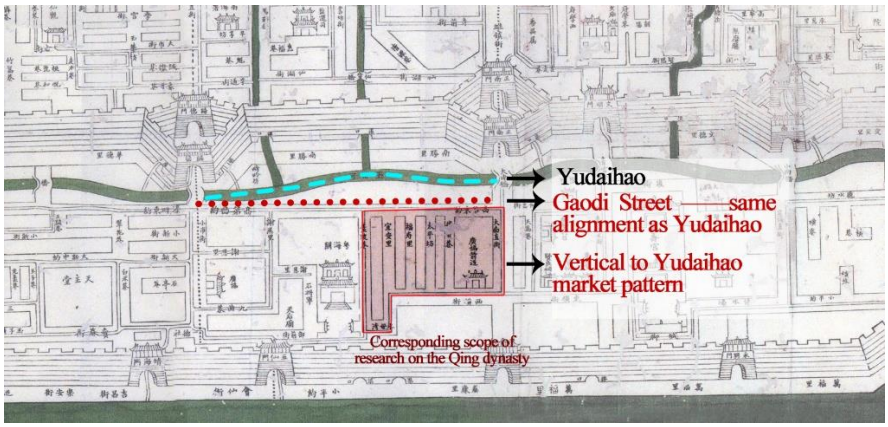


Fig. 4-1 Street in south city is laid out following the alignment of Yudaihao (Source: redrawn according to reference [5])

4.1.2 Pearl River Natural Features

The construction of the South City of Guangzhou differed from that of the present South City of Beijing. Rather than following the planning of square and regular city walls and lanes, Beijing's South City was built to follow the natural topographic and geographical conditions along the river. The city wall in the center of the South City turned to the northeast, and Yudaihao also turned with it. This turn is located on the west side of Gaodi Street in the Southern City. The shape of the Southern City reflects the influence of the natural topography of the Pearl River, as evidenced by the name of the street Shuimuwan on the south side of Subo Lane (Fig. 4-2). This area was originally a bay in the ancient Pearl River Plain. As a result of the gradual sedimentation of the bay and the subsequent shift of the shoreline to the south, the topographic contour became increasingly smooth, thereby stabilizing and establishing the shape of the streets and lanes along the shoreline. The street layout, comprising "Shuimuwan," "Shazhou Lane," and "Mupaitou," is connected in turn. Its naming

origin can be traced back to the early days of city, when the area was a riverside mudflat with distinctive features, including being surrounded by water bays and sandy beaches. The presence of water bays and sandbars, along with the frequent use of wooden rafts for transportation, resulted in a landscape where many rafts were often docked along the shore.

With the incorporation of the southern part of the city into the city's administrative system, the city wall limited the southern part of the city's connection to the Pearl River, while the influence of Yudaihao became more pronounced. The limited inner city space and commercial activities became more concentrated along the edge of the Hao. As can be seen from the street pattern (Fig. 4-3), the residential areas that developed along the periphery of Yudaihao were vertically dissected on both sides of the Hao edge, and this layout did not significantly change the shape of the plot. The streets are arranged parallel to each other on both sides of the Hao, and the distance between them is only a few dozen steps from the Hao. The streets are arranged in a row along the edge of the river, and the market is spread out on both sides of the street[4].

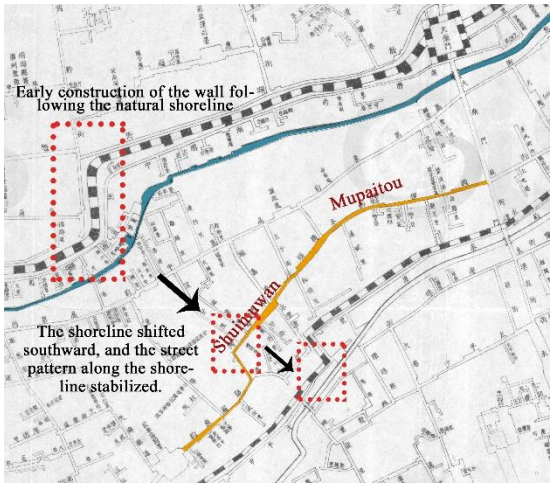


Fig. 4-2 Natural layout of the southern city wall along the river (Source: redrawn according to reference [5])

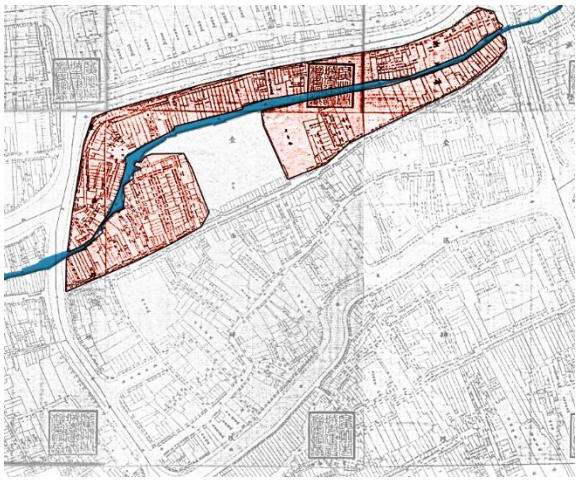


Fig. 4-3 Settlements perpendicular to both sides of Yudaihao (Source: redrawn according to Cadastral map of Guangzhou in 1935)

4.2 Mechanism for Dividing Street-Lane-Fang

The abrupt alteration of streets and land parcels facilitated the evolution of urban form, while streets also delineated the boundaries of the historical district and established the

internal organizational structure. The subsequent analysis reveals the mechanism and characteristics of the division of the Gaodi Street Historical Area from street to lane to Fang.

4.2.1 Street and Lane Morphology Study

The content is divided into two levels of feature research, the first level is the ephemeral features, that is, through the analysis of different periods of time, to summarize and illustrate the evolution of the street and lane morphology of Gaodi Street history and features. In this process, the exploration of the street network system focuses on the overall form and structure, while for the lanes, it is more inclined to its scale hierarchy and spatial characteristics. The following is a historical analysis of the different stages of evolution (Fig. 4-4).

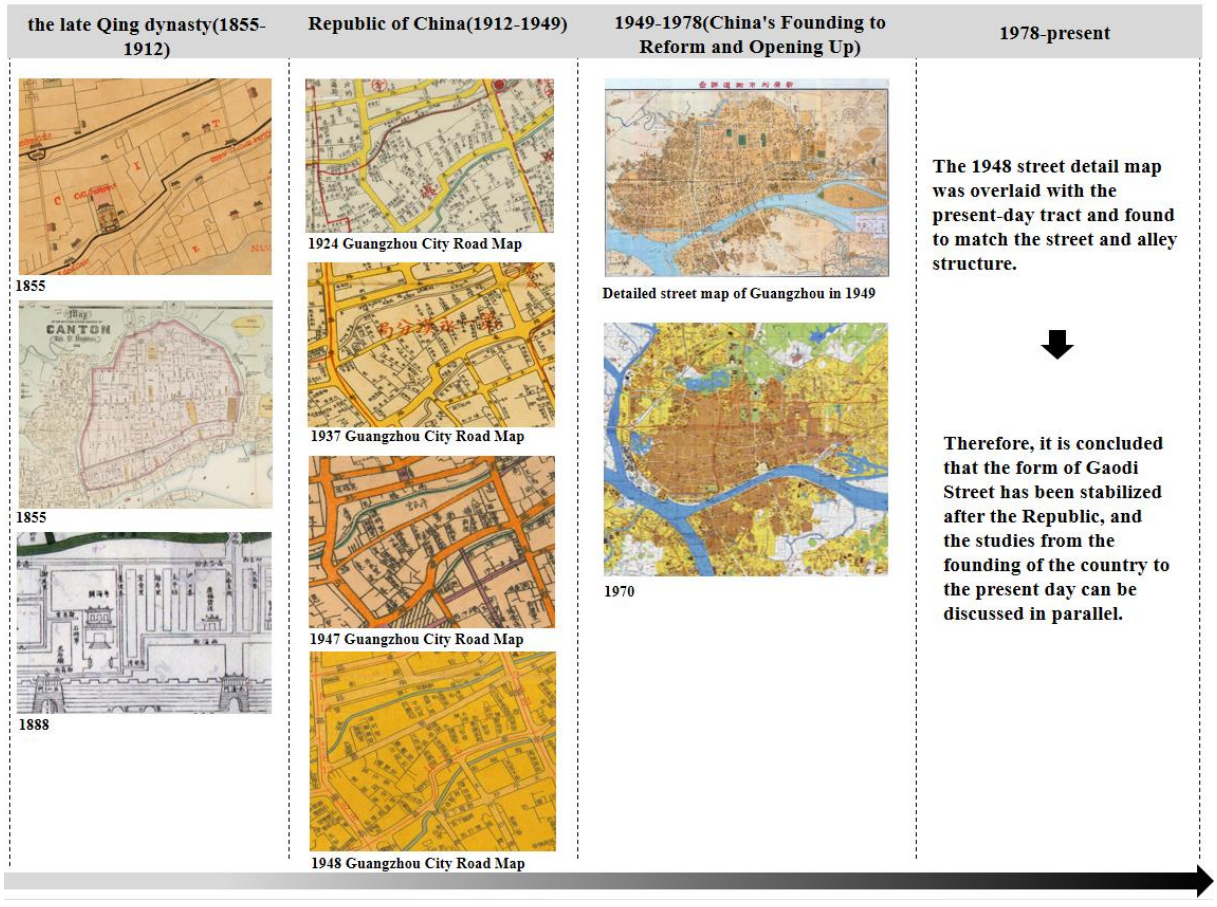


Fig. 4-4 The historical evolution of Gaodi Street Area (Source: by the author)

(1) Late Qing Dynasty (1855-1912)

1) Morphological Development

Gaodi Street originated during the Song Dynasty and was not enclosed in the center of the South City until the latter was established during the Ming Dynasty. The northern and

southern boundaries were the northern and southern walls of the Qing Dynasty South City, which correspond to the modern streets of Taikang Road and Danan Road. Following the establishment of the South City in the Ming Dynasty, the commercial area within the South City became increasingly reliant on Yudaihao. Consequently, the street and lane layout within the South City was reorganised along the edge of Hao at that time.

2) Morphological Characteristics

The development of transportation in the Yudaihao area facilitated the rapid development of commerce along Gaodi Street. This, in turn, led to the acceleration of transportation connections between Gaodi Street and the Shuimuwan-Mupaitou-Xihengjie area. The width of the main lanes between the two was increased, and new main lanes were constructed.

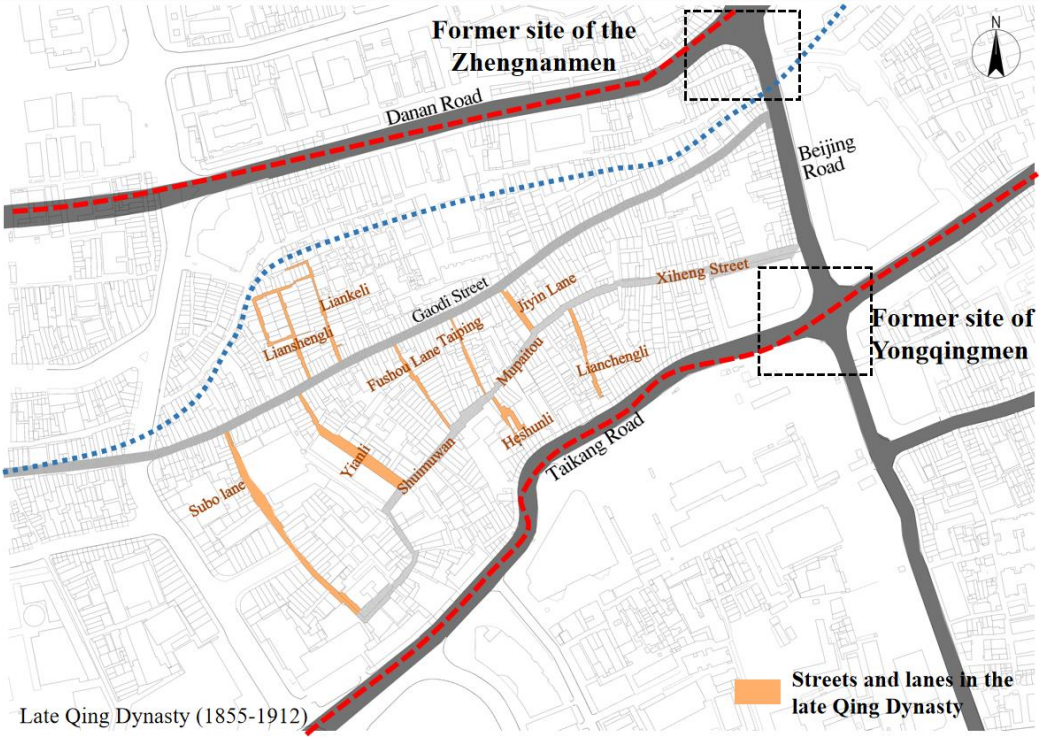


Fig. 4-5 Formation of streets and lanes in the late Qing Dynasty (Source: by the author)

(2) Republican Period (1912-1949)

1) Morphological Development

During the Republic of China period, the city experienced a period of rapid growth. Between 1918 and 1921, the old city wall was completely removed, and with it came the construction of city-grade roads with widths ranging from 25 to 33 meters. When the first phase of the road was constructed in 1918, Gaodi Street was separated into two parts by the

new city road (now Qiyi Road), which is now Gaodi Street and Gaodi West Street. During this period, the internal branch lanes of the block, along with the buildings erected during the R.O.C. period, began to undergo certain street widening and setbacks. Concurrently, additional branch lane roads and end roads, such as T-shaped and L-shaped lanes, emerged.

2) Morphological Characteristics

Productivity and population growth, due in part to rapid urban development, have further encouraged the subdivision of land and the rapid construction of housing, resulting in the creation of new internal roads to provide ingress and egress to the increasingly subdivided parcels within the subdivision. These roads are mostly end-loaded and narrow in width, but they provide basic traffic flow and allow houses on the transverse side of the T-shaped lanes to meet the southern orientation.

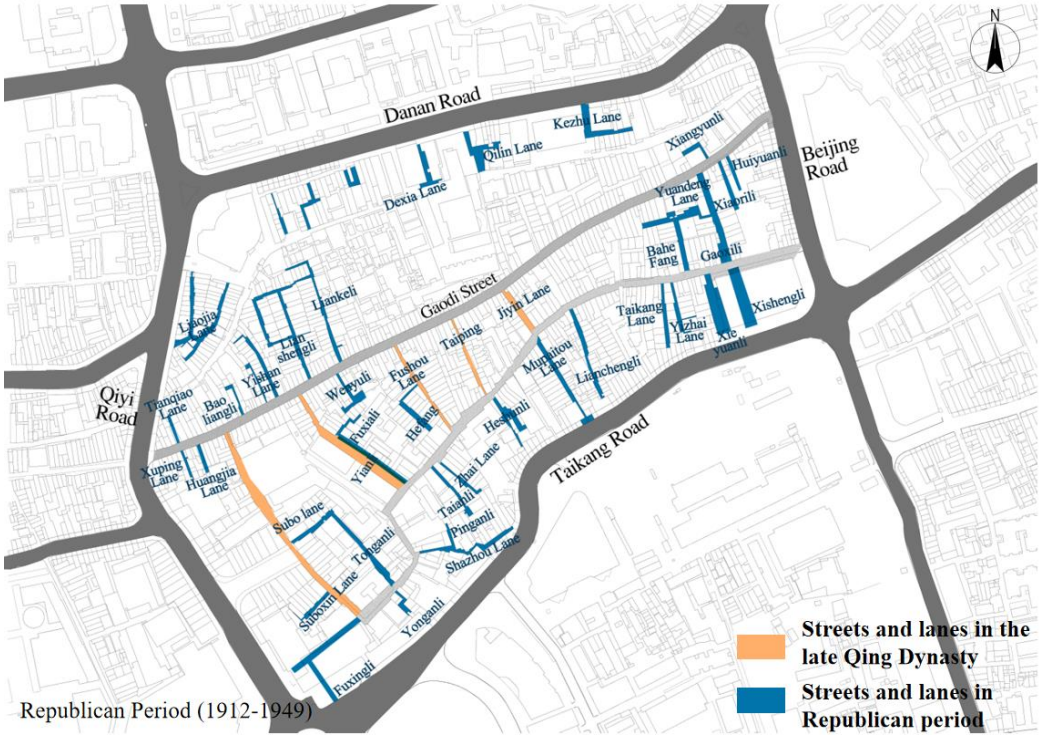


Fig. 4-6 Formation of streets and lanes during the Republic of China (Source: by the author)

(3) Founding of the State to the Present (1949-present)

1) Morphological Development

The rapid development of residential buildings in this period, both in terms of quantity and living conditions, thus led to the emergence of two states of some Republican era streets and lanes, one of which was directly demolished and new modern residential buildings were

built on it; the other was the renovation of the original branch lanes to achieve more construction volume, such as the original Jingyeyuan, which was a T-type lane, but in order to ensure the functions of living along the street or storing goods, some of the T-type lanes were covered and houses were built directly on them.

2) Morphological Characteristics

The characteristics of the streets and lanes were basically formed during this period. The main streets and lanes in the southern part of the district and the structure of the plot on both sides basically retained the historical characteristics of the early Republic of China, but the main lanes were widened on this basis, and the fishbone street structure that appeared in the late Republic of China is by far the most representative form, which can be seen in the planning of public transportation routes and private land parcels.

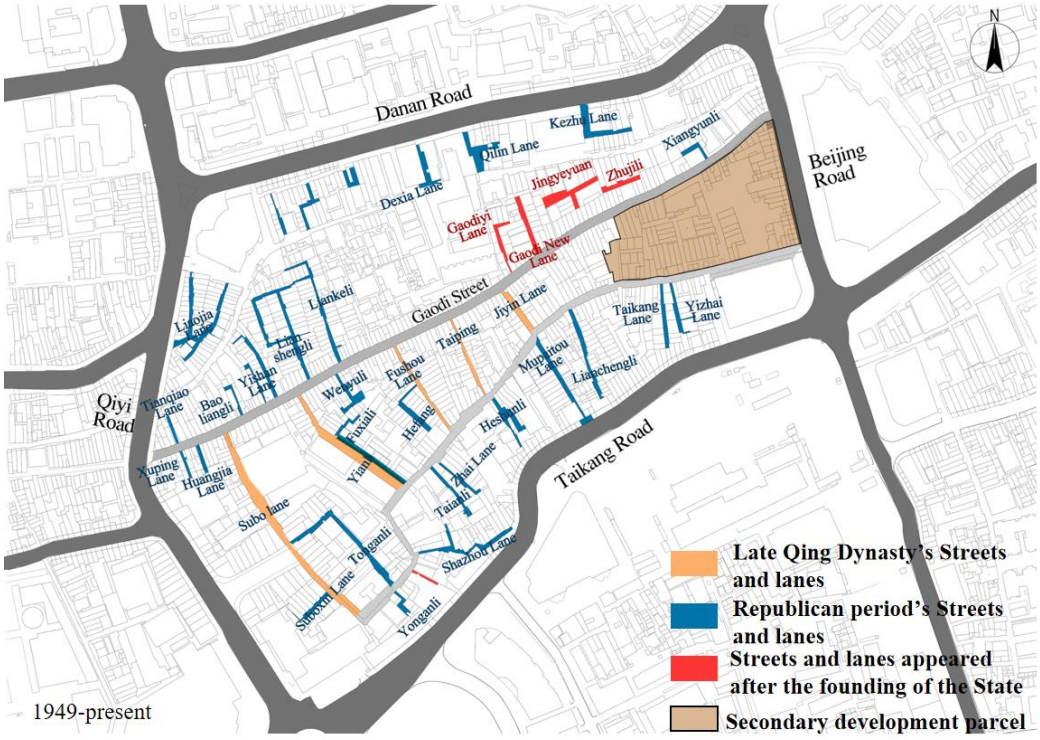


Fig. 4-7 Formation of streets and lanes from the founding of the People's Republic of China to the present (Source: by the author)

The second level of analysis is concerned with the in situ characteristics, with research, analysis, and comparison conducted with historical image data. As previously stated, by the conclusion of the Republican period, the street and lane morphology of the Gaodi Street area had reached a state of stability, exhibiting minimal alterations. Consequently, the 1948

Guangzhou road map and the present Gaodi Street area texture map were superimposed and subjected to analysis (Fig. 4-8). This analysis led to the establishment of grading criteria for the streets and lanes within the site, which were classified and evaluated, with the well-preserved streets and lanes listed first, followed by those that have been damaged and those that are no longer exist (Table 4-1).

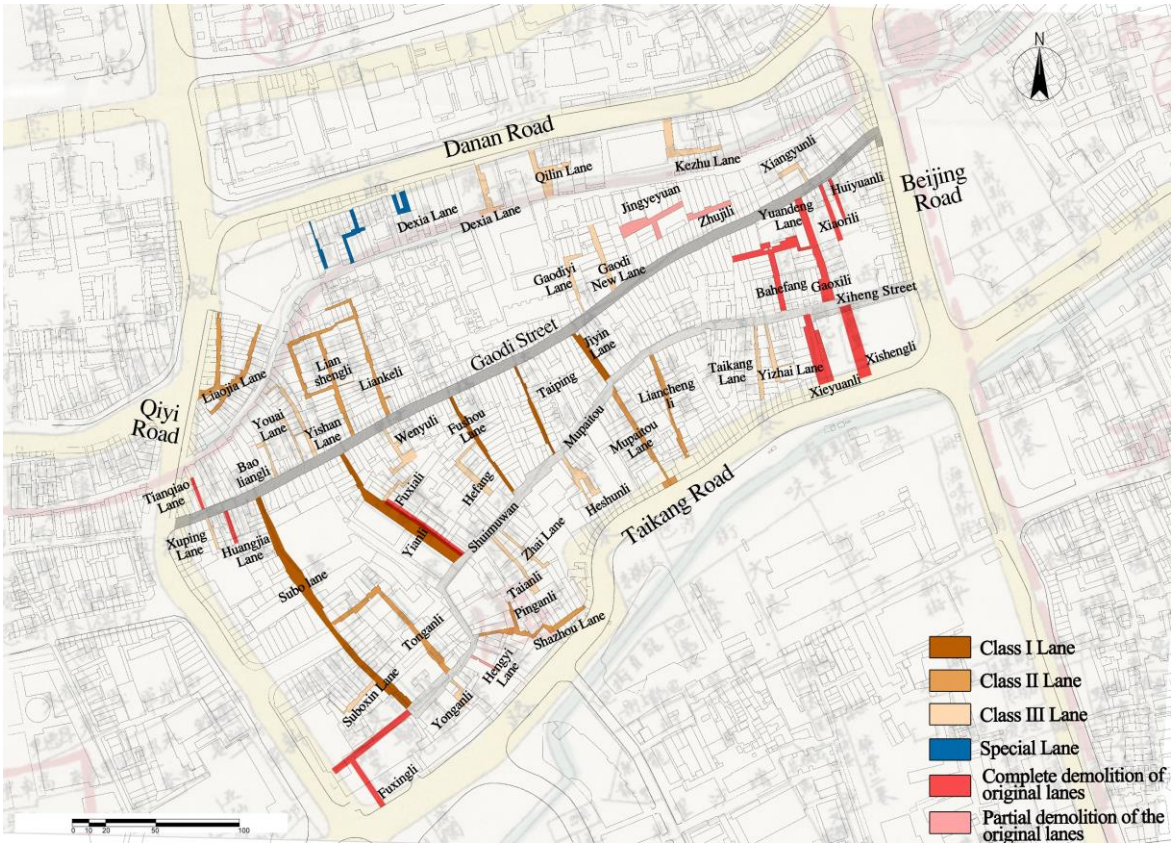


Fig. 4-8 Illustration of the detailed street plan of Guangzhou in 1948 superimposed on existing texture

(Redrawn according to detailed street map of Guangzhou City in 1948, Source: Old maps online website. https://www.oldmapsonline.org/)

Table 4-1 Evaluation and classification of lane grade (Source: by the author)

Lane Classification		**Class Ⅰ**	**Class Ⅱ**	**Class Ⅲ**	**Special form**
Classification Criteria	1. Connectivity	Connecting Gaodi Street and the Shuimuwan-Mupaitou area, playing an important transportation role	Extended to both sides of main street in an "L" or "T" shape, connecting subdivided plots to main street	Generally more "zigzag" in shape, with weaker transportation links	Connectivity is singular, distributed at the edges of sites adjacent to urban roads

Table 4-1 Evaluation and classification of lane grade (continued)

Lane Classification		**Class Ⅰ**	**Class Ⅱ**	**Class Ⅲ**	**Special form**
Classification Criteria	2. Functional richness	Both sides of the lane are dominated by warehousing and residential	Primarily residential, but with some annexation of warehousing spread over the ground floor	Residential, neighborhood small business oriented	Primarily residential and retail
	3. Formative period	the late Qing dynasty	Republic of China to the present		

According to the above analysis, the streets and lanes that have appeared in the late Qing Dynasty are mainly distributed in the area between the area of Shuimuwan - Mupaitou - Xiheng Street and Gaodi Street, i.e. Subo Lane, Yianli, Fushou Lane, Taiping fang and Jiyin Lane, which are well connected from north to south, and have obvious characteristics of the relation to the plot patterns on both sides, and have been classified as Grade I streets and lanes, therefore, an exhaustive characterization will be conducted to summarize the characteristics of the analysis in the following paragraphs. On the other hand, on the north side of the end of the area along West Cross Street, the Republic of China-era lanes such as Gaoxi Lane, and Yuandeng Lane no longer exist due to the demolition of the buildings as a result of the secondary development of the area by Hongyu Real Estate.

In accordance with the aforementioned hierarchical division of the street network system, representative streets and lanes in each hierarchy were selected for the field aspect ratio mapping work. This was done with the intention of providing the necessary data support and characteristic indicators for the delineation of the plot plan in the subsequent chapters.

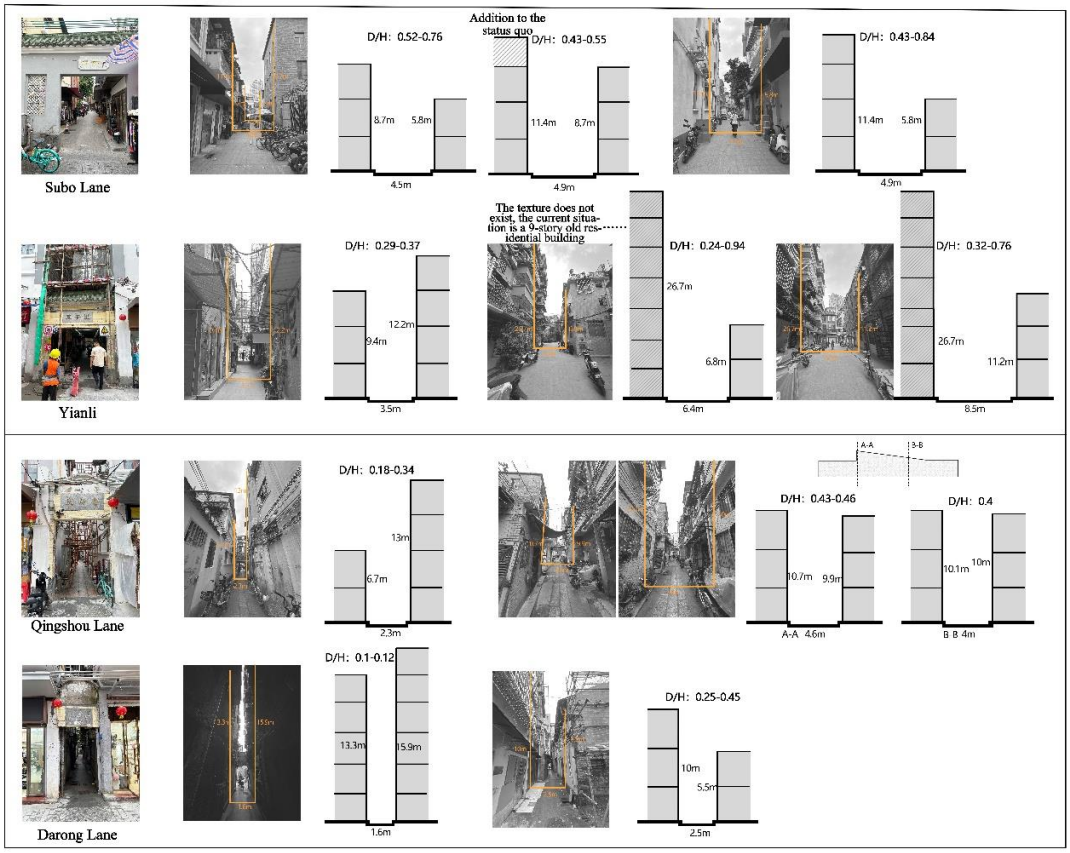


Fig. 4-9 Schematic results of D/H mapping of Class I streets and lanes (Source: by the author)

The current state of primary lanes accommodates both pedestrian and non-motorized vehicle traffic, with relatively wide dimensions that facilitate the connection between the northern and southern sections of Gaodi Street. The area along Subo Lane is characterized by modern low-rise residential buildings and an elementary school. This street is notably wider, aligning with the school's entrances and serving as a conduit for pedestrian flow. Yianli, being more open, features low-rise buildings, and the introduction of modern residential structures has led to noticeable changes in the height-to-width ratio in certain areas. In contrast, Qingshou Lane and Darong Lane present a narrower spatial experience, with taller buildings creating a heightened sense of visual enclosure and pressure (Fig. 4-9).

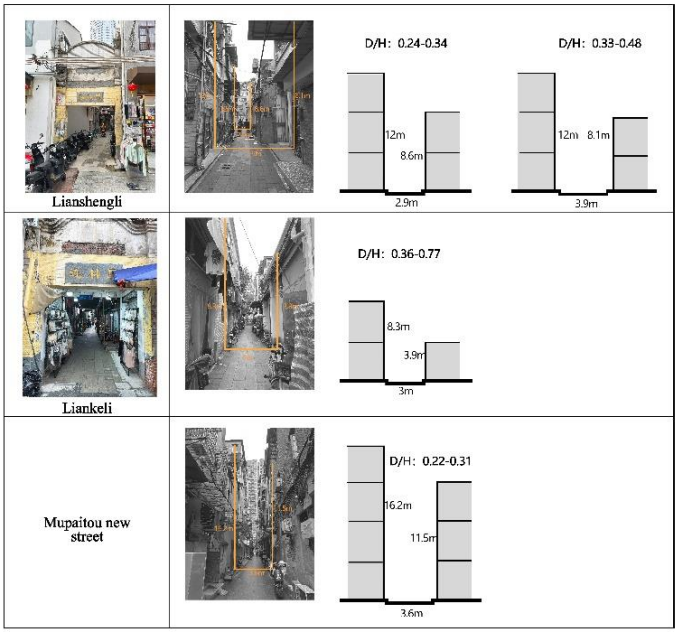


Fig. 4-10 Schematic results of D/H mapping of Class Ⅱ streets and lanes (Source: by the author)

Secondary lanes gradually narrow, accommodating a limited amount of non-motorized traffic and exhibiting relatively weaker connectivity. The height-to-width ratio in Lianshengli ranges from 0.24 to 0.48, characterized by dense building arrangements and compact spaces. In contrast, Liankeli displays a height-to-width ratio between 0.36 and 0.77, with wider streets and alleys. Mupaitou New Street has a lower height-to-width ratio, with clear signs of historical extensions evident on both side (Fig. 4-10).

Fig. 4-11 Schematic results of D/H mapping of Class Ⅲ streets and lanes (Source: by the author)

The width of tertiary lane is extremely narrow, predominantly featuring dead-end layouts, and the building heights have also decreased, with a primary focus on residential use (Fig. 4-11). It is evident that as the hierarchy of lanes decreases, their widths gradually narrow; however, the height variations of buildings on both sides remain relatively insignificant. Only in some dead-end lanes do the building heights appear more proportionate, reflecting substantial evidence of vertical extensions in modern and contemporary housing.

4.2.2 Relationship between Plots and Lane Morphology

As mentioned above, the middle section of Gaodi Street, i.e. the area of lanes along Shuimuwan - Mupaitou - Xiheng Street, is the earliest formed and has particularly distinctive morphological features, with regular or scattered plots and buildings, each representing a different cause of formation. In addition, the parcels of land between the lanes are divided into sections of varying sizes by land parcels, influenced by private land ownership, the commercial system, and the development of property rights. In addition to serving as the main lane from north to south, the area also contained a large number of secondary branch lanes and end lanes in front of households, which formed a unique textural character, so the middle section is used as an example for the study (Fig. 4-12). The following analysis is mainly based on the 1935 Guangzhou Cadastral Map.

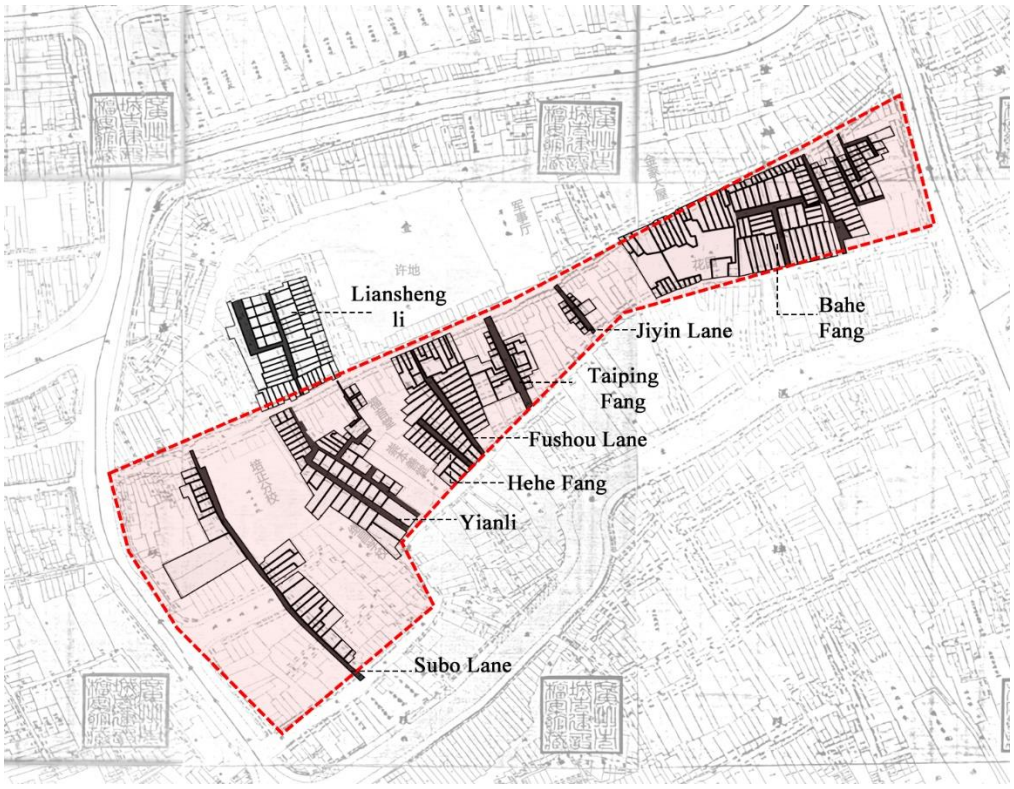


Fig. 4-12 Illustration of the middle section of the 1935 Guangzhou cadastral map

(Source: redrawn according to Cadastral map of Guangzhou in 1935)

(1) Renewal by Fang and Lane

Side by side, Taiping Fang and Fushou Lane show a clear difference in texture between them, reflecting their different formation histories.

Tai Ping Fang happens to be directly opposite the Xudi Family Temple and is equidistant from the entrances on the east and west sides of the Family Temple. Therefore, it is believed that the Xu family wanted to extend the entrance of the family temple to Shuimuwan in order to expand the entrance area, so they started to build this new road after the completion of the family temple. When Taiping Fang was opened up, only the land along one side of the road was purchased with sufficient width for the construction of the road, and the existing buildings on both sides of the road were not rearranged. As a result, after the opening of the road, the buildings immediately adjacent to the road on both sides were gradually transformed to face the road, with shallow depths and irregular textures. In contrast, Fushou Lane shows obvious traces of unified development, with a narrow entrance at its northern end near Gaodi Street and a width of only about 1.5 meters, preserving the original scale of the Qing Dynasty

lane; while the southern end is significantly widened, with the interface of houses on both sides of the lane remaining horizontally aligned with similar opening widths of about 4 meters, suggesting that it was rearranged and reconstructed after the centralized acquisition of land (Fig. 4-13).

During the Republican period, large real estate developers had serious annexation of land and tended to focus on building lanes. The spatial layout shows distinctive features: land parcels are divided in a regular manner, lanes are wider, housing openings are uniform in size, and the architectural style is mostly dominated by two- to three-storey houses, which are sold to make profits.

Hehe Fang located adjacent to Fushou Lane. The Fang adopts an end-type layout with a spacious lane and a width of 3 meters; all are three-storey, with the width of each building roughly maintained at about 4 meters, showing a high degree of consistency, and the facade style is uniform, characterized by the style of concave-type townhouses with balconies.

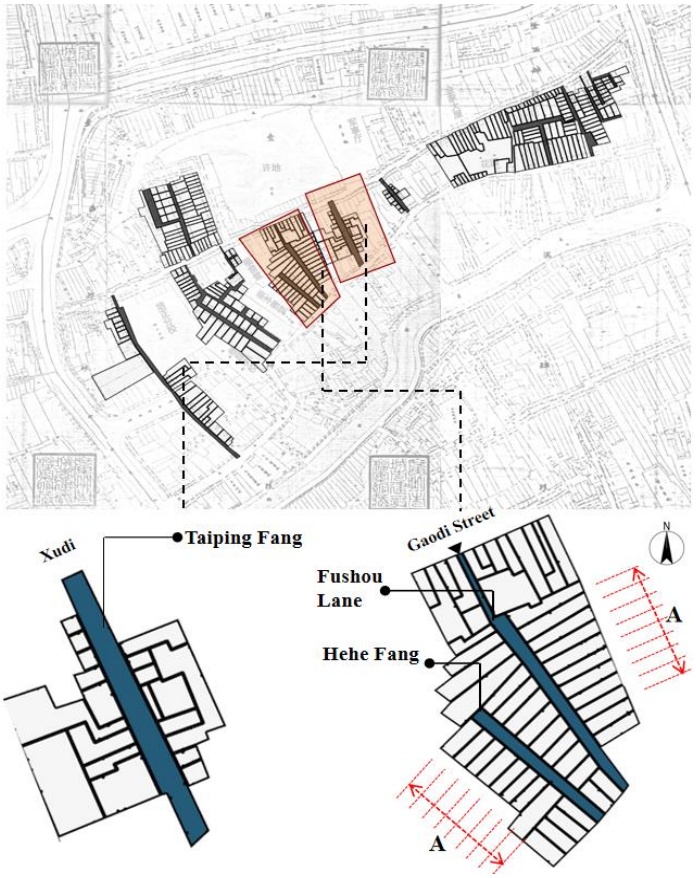


Fig. 4-13 Analysis of the mechanism of texture formation of Taiping Fang, Fushou Lane, and Hehe Fang (Source: redrawn according to Cadastral map)

After entering the Republican era, it is easy to find out from the cadastral map of 1935 that the area along Guanbu Street has started the construction of modern space on a large scale, and its morphological development has clearly surpassed Gaodi Street

In examining the spatial dissimilarities between Gaodi Street and Shuimuwan Street in 1935, Yianli connecting the two principal thoroughfares. It can be observed that, from north to south along Yianli, the construction on both sides of the lane demonstrates a tendency towards concentrated new construction. Specifically, beginning at Gaodi Street, small commercial establishments predominate, with their widths gradually increasing. Upon reaching Shuimuwan, these establishments transform into new-style residences, which not only have expanded widths but also increased depths. The overall scale of these buildings has also increased considerably. The width of residences along Shuimuwan has reached approximately twice the width of the traditional bamboo tube residences on Gaodi Street (Fig. 4-14).

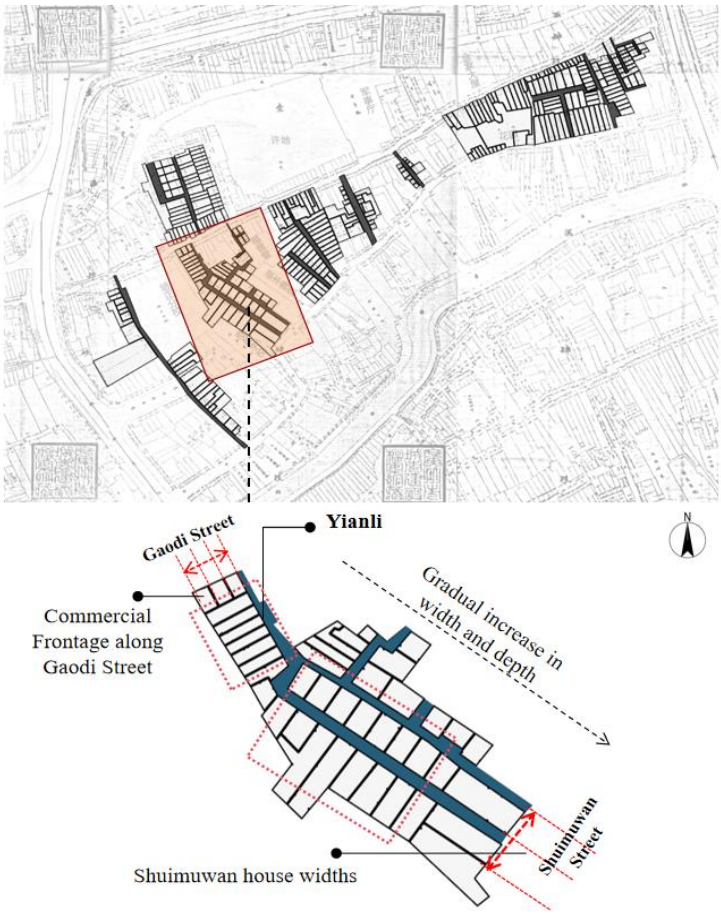


Fig. 4-14 Analysis of the mechanism of texture formation in Yianli (Source: redrawn according to Cadastral map)

(2) Renewal within the land parcel

During the Republican era, as the residential environment for houses tended to improve and the demand for houses increased, the land for the construction of houses was further subdivided, and in order to provide entrances and exits for the increasingly subdivided land parcels, T-shaped lanes appeared. Checking the information on the 1935 cadastral map, only the Bahe Fang T-shaped lane had been built at that time, while the Gaodi Street T-shaped lane was still undeveloped. It was only after the fire at that time that the Jin family house and the house on the east side were rebuilt, and three consecutive T-shaped lanes appeared (Fig. 4-15)

A review of the relevant literature reveals that the T-shaped structural layout of the street aligns with the established pattern of front stores and back houses. The shorter depths of the houses allowed the designers to implement a T-shaped lane layout, extending the length of the lanes and dividing the land parcel into proportions suitable for the construction of duplex houses[2]. This shift from the previous large houses with multiple depths to the vertical space of three-story townhouses reflects a significant evolution in the transition from courtyard-style houses to townhouses during the Republican period.

The aforementioned analysis demonstrates that as townhouses were constructed during the Republican Period, there was a gradual emphasis placed on light and orientation, while the intensity of land development increased. Consequently, a novel approach to house design was adopted, whereby the depth of the houses was reduced and the number of floors was increased. This resulted in a reduction in building density, an improvement in the plot ratio, and the transformation of the house type into a more economical and comfortable design.

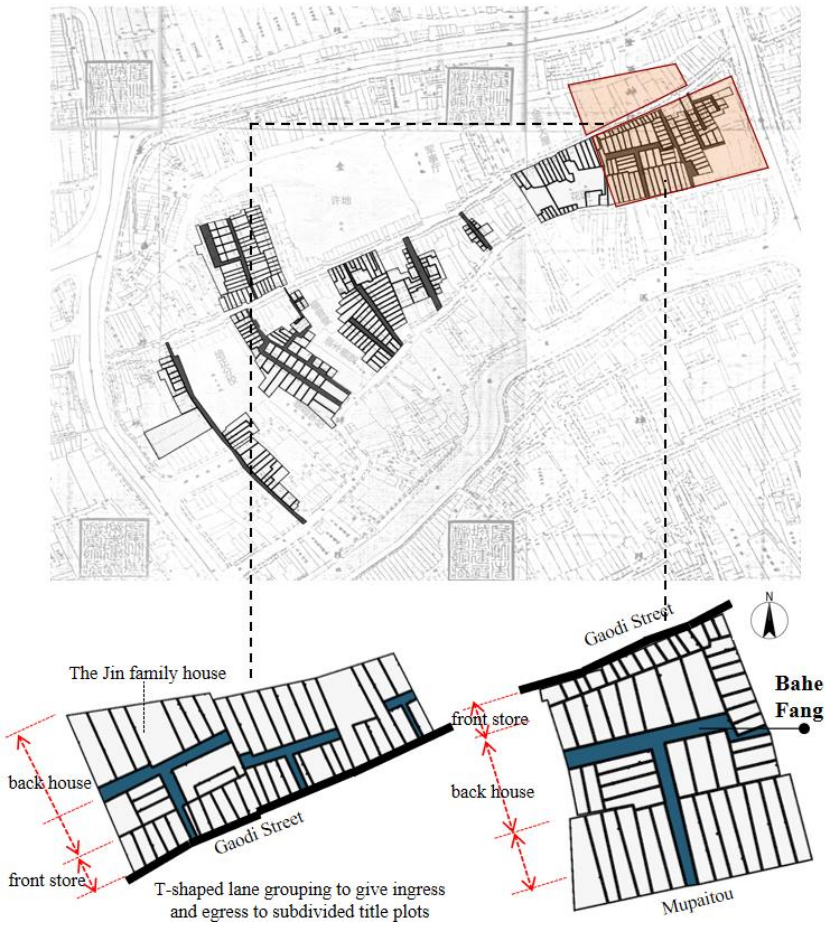


Fig. 4-15 T-shaped lanes appeared in the late Republican period (Source: redrawn according to Cadastral map)

According to the research results of previous scholars, the land parcel shown in the picture was purchased and developed by a joint venture of overseas Chinese merchants on Mupaitou Street. The stores at the end of the eastern section of Gaodi Street were acquired as a whole and became the Mupaitou land parcel. The 1935 cadastral map shows a "garden" open space on the west side of the land parcel, with a large house to the west, located behind the stores on the street.

In the development of the 1930s, the garden was divided into two parts, east and west, both of which were constructed as townhouses, and the large house on its west side was converted into a one-staircase, two-family townhouse (Fig. 4-16) The spatial treatment of these two lots, in contrast to the T-shaped streets and lanes on the east side, no longer relied on linear lanes, but rather organized the space by widening the inner courtyard (Fig. 4-17), reflecting the increased demand for newer residential environments in the old town and the

gradual expansion of the external space of the homes. In addition, the design of the townhouse floor plans has changed, with a narrowing of the length-to-width ratio and a greater emphasis on light and comfort.

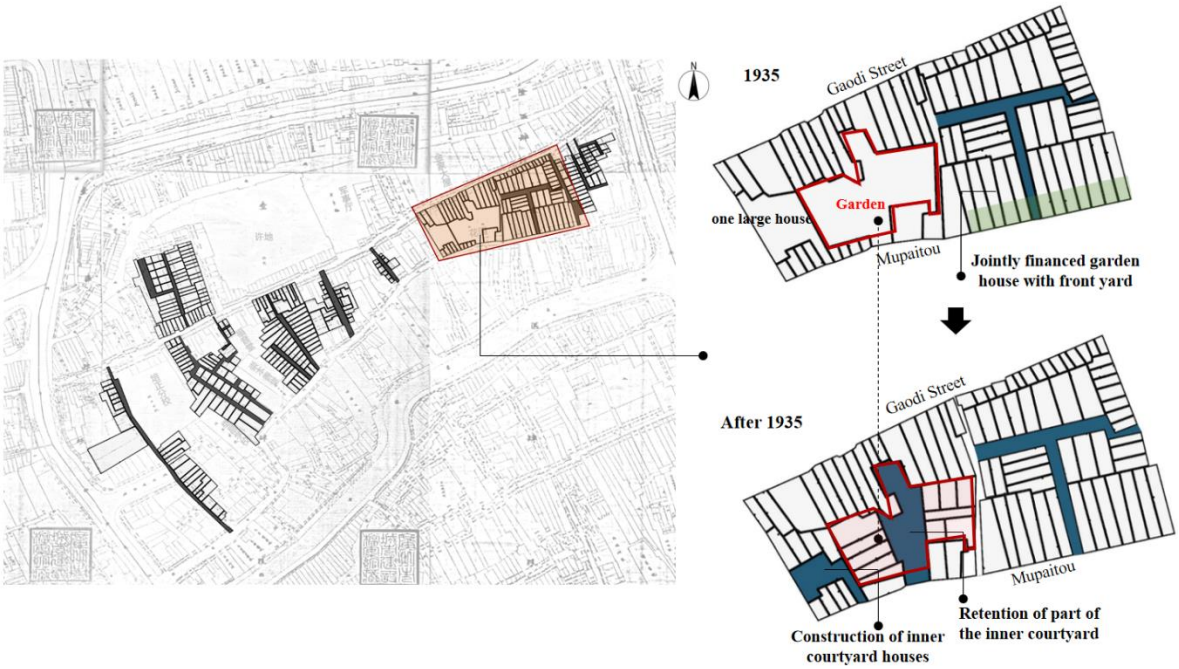


Fig. 4-16 The spatial layout pattern evolved into an inner courtyard organization (Source: redrawn according to Cadastral map)

Fig. 4-17 Status of the inner courtyard (Source: by the author)

4.2.3 Summary of Continuum Morphological Characteristics

The following is a summary of the characteristics of lanes and plot morphology under different contexts (Table 4-2), retaining usable features for streets and land parcels to provide

a basis for further subdivision of parcel: (1) The ratio of land parcel width to depth approaches 1:3 to 1:2.5. (2) The width of the streets can be set based on the height-to-width ratio of historical streets, while also considering the future building heights. (3) Spatial organization is gradually diversifying, transitioning from linear alleyways to T-shaped pathways, and ultimately evolving into courtyard layouts. (4) The external public spaces of buildings are gradually expanding, with an emphasis on enhancing landscape benefits. (5) Irregular vacant spaces resulting from concentrated development can be recommended for use as public spaces. (6) The density of plot gradually decreases with the enhancement of diverse spatial organizations and living environments.

Table 4-2 Summary of morphological features of historical lanes (Source: by the author)

	Taiping Fang	**Fushou Lane**	**Hehe Fang**	**Yianli**	**"T" shaped lane**	**Whole land development**
Phase	Qing dynasty	Qing dynasty	Republic of China	Republic of China	Republic of China	Republic of China
Developme-nt method	Xu family self-developme-nt	Centralized developme-nt	Centralized developme-nt	Centralized developme-nt	Family developme-nt	Family development
Lane width	4.5m	Entrance: 1.6m; 3m	3m	2.5m	4.5m	—
Plot width	4m	4m	4.1m	3.5m-7m	4.2m	6-6.3m
Plot depth	4-6m	12.9-22.4m	8.8-17.5m	12.8m-14m	12-16m	8.4-15m
Width/ Depth	1:1.5	1:3.2-1:4	1:2.1-1:4.2	1:3.6-1:2	1:2.8-1:3.8	1:1.3-1:2.3
Space organization	Linear lane	Linear lane (width variation)	Linear lane	Linear lane	"T" shaped lane	Reorganizati-on space of the inner yard
Public space	—	Partial front setback of plot	—	Lane corner space	—	Inner courtyard

4.3 Impact of Plot on Building Layout

Plots, as intangible elements of the traditional urban fabric, have the potential to control building layouts in traditional historical cities. Boundary walls, embodied in physical form

between dwellings, and permanent boundary stones at the junction between two households are still common today[24]. It is the combination of structures and subtle morphological relationships between house lots that together form the vivid street network and architectural texture of the traditional city.

The idea of this section is to compare and contrast the 1935 cadastral map of Guangzhou with the existing historical buildings - the relationship between the levels of the plots and the buildings. Plots may have been subdivided or merged, especially the building plan of large families would have been replanned with the rise and fall of the family, with the Xu family on Gaodi Street being the most typical. Two main scenarios are summarized to compare the relationship between the overall form of the historical building and the plot.

4.3.1 Single Plot Defines One Historical Building

Comparison of the current situation with the cadastral plan reveals that the boundary walls of the building largely match the plot, and that the plot corresponds to a single deed number and owner, and that it is an independent plot that has not been subdivided. Although a patio in the south-west corner was left in the later remodeling, it is still within the plot. Residences 93, 95 and 97 on Gaodi Street are relatively intact clues to immovable cultural heritage, and their boundary walls overlap with the boundaries of their respective plots by comparison (Fig. 4-18).

It can be seen that the restriction of a single plot to one building is predominant at the stores on both sides of Gaodi Street and at the surrounding stores along the town road.

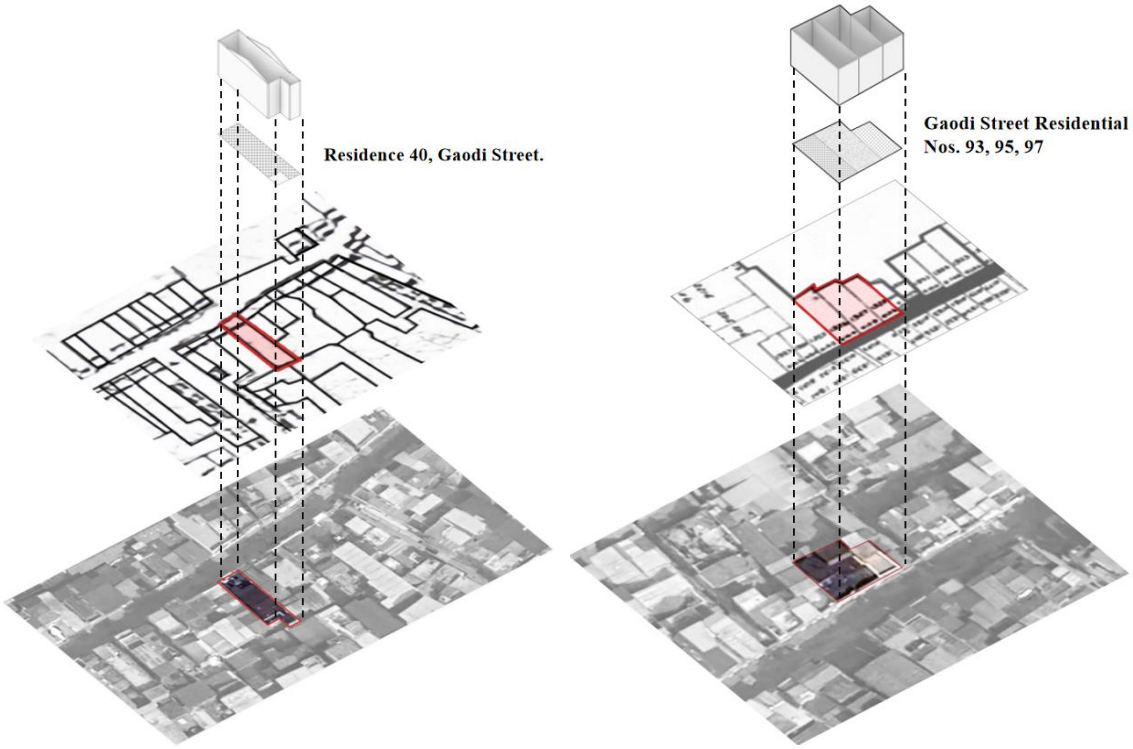


Fig. 4-18 Single plot limited to one building (Source: by the author)

4.3.2 Single Plot Control Multiple Historical Buildings

Current status of the houses in Zhujili: The demand for population size and housing area has led to a more detailed subdivision of the historical plots. At the same time, in order to provide access to the subdivided land parcels within the lot, there is a "T" lane connecting the entrances of each residence, with the "T" lane leading to the main Gaodi Street.

The current status of the residences on Mupaitou Street: Secondary development on the historically excluded parcel has subdivided the site plan, while leaving a public courtyard space and a final lane for access to the houses. The side of the lot is adjacent to other buildings, and the boundary wall still overlaps the edge of the lot (Fig. 4-19).

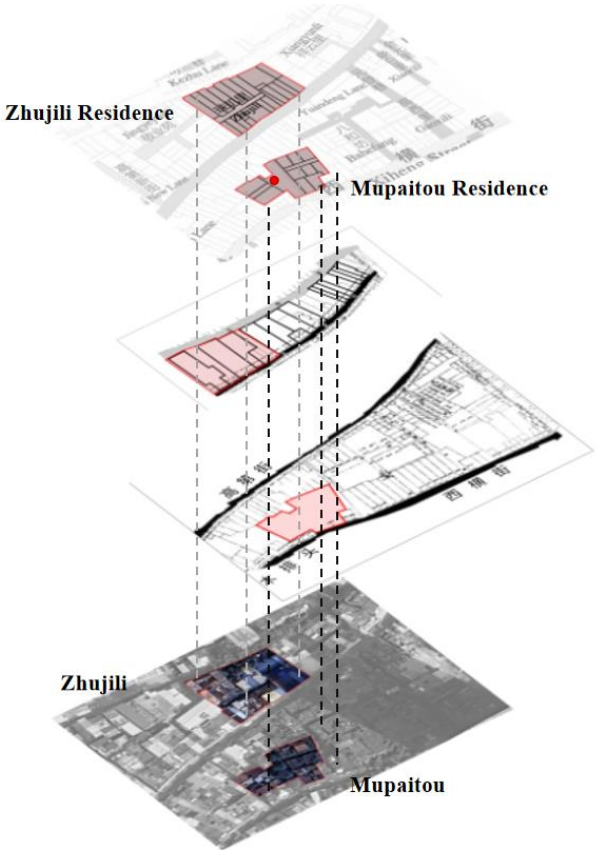


Fig. 4-19 Single plot limited to multiple buildings (Source: by the author)

In addition to this, Gaodi Street is also the largest surviving Qing Dynasty mansion, which flourished in the late Qing Dynasty. The main business was salt, and purchased a side of the house, and through the success of his children and grandchildren, gradually consolidated and built a family temple to expand its size. But now it has been reduced to a large courtyard that has been arbitrarily remodeled (Fig. 4-20).

Fig. 4-20 Photos of the Xudi family temple before restoration

(Source: Guangdong Literature and History Official Website. https://www.gdwsw.gov.cn/)

The creation of Xu family land was essentially a process of making up pieces of land and

turning them into whole pieces. The wealthy merchants of the Xu family purchased scattered pieces of land to form a complete mansion to build a large mansion. As the family's population grew, the house was divided among the family members, and the land rights were also divided among the houses. Each house then had the right to sell its house to others, reorganizing the land into fragmented units[53]. In this continuous cycle, new lanes and house layouts are created (Fig. 4-21).

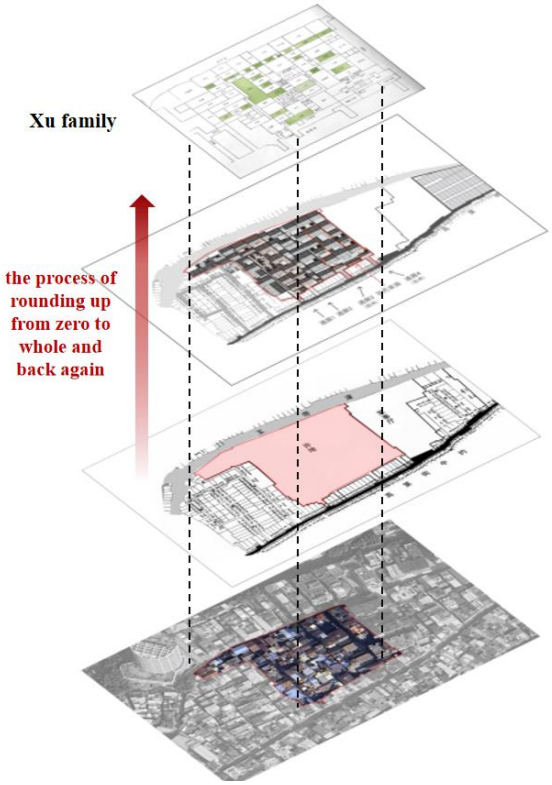


Fig. 4-21 Plot was subdivided as the family evolved (Source: by the author)

4.4 Summary

Chapter 4 examines the morphology of the Street-Lane-Fang on Gaodi Street. Initially, it analyzes the impact of natural geographic conditions on the plots and the mechanism of the Street-Lane-Fang division, particularly the distribution of the water system and the topography and geomorphology, which serve as guiding factors in the formation of the street and lane network and the division of plots. Secondly, the study on the division mechanism of Street-Lane-Fang demonstrates that the Gaodi Street historical area exhibits a hierarchical structure, progressing from Street-Lane-Fang. This structure has evolved through the late Qing Dynasty, the Republic of China, and after the establishment of the State. The streets and

lanes are classified into four categories based on their historical and local characteristics, and mapped during the fieldwork phase to establish a foundation for subsequent analysis. Furthermore, the relationship between plot texture and the morphology of streets and lanes is discussed, and the differences and causes are analyzed by taking Taiping Fang, Fushou Lane and other lanes as examples. Additionally, by comparing the 1935 Cadastral Map of Guangzhou City with the current situation, two modes of influence of the plot on the building layout are summarized.

In conclusion, Chapter 4 provides a comprehensive analysis of the morphology of the Street-Lane-Fang of Gaodi Street and its relationship with the plot and architectural layout. This analysis offers a crucial foundation for understanding the traditional urban street network and architectural texture.

Chapter 5 Design Method Based on Plot Regeneration

This chapter initially delineates the object of subsequent design, examines the historical morphological characteristics within the site, and synthesizes the preceding research on the relationship between the streets, lanes, and plots in the broader Gaodi Street area. It then continues and preserves the valuable morphological characteristics of the Street-Lane-Fang and applies them to the master plan of the site, adjusting the street system and redistributing the plot plan. Concurrently, the materials utilized for construction of building components, the architectural styles and layouts (plan form, facade style, storey height, etc.) observed in the Gaodi Street area are identified and their evolution and defining characteristics are delineated. This will serve as a foundation for the precise design of the area and the formulation of guidelines.

5.1 Design Framework

The design process is divided into two parts: preliminary preparation and design demonstration. In the preliminary stage, an interpretation of the historical morphological mechanisms is conducted, specifically focusing on the relationship between the Street-Lane-Fang patterns and the formation of plots, as well as summarizing the characteristics of local architecture. This provides a historical foundation for the subdivision of land parcels in the design area, and serves as a basis for the rational derivation of subsequent building regulations (Fig. 5-1).

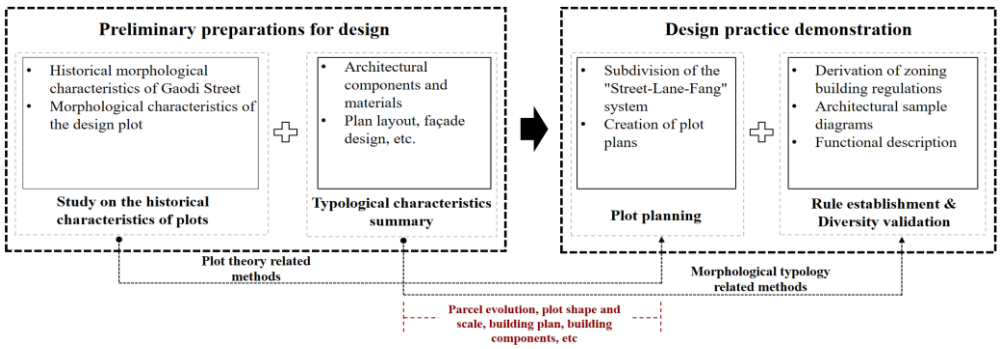


Fig. 5-1 Design framework (Source: by the author)

5.2 Identify Design Object

The field research exposed a multitude of issues in the Gaodi Street area, with one land parcel undergoing secondary development following its acquisition by Hongyu conpany. In 2023, the majority of the buildings of conservation value in the area will have been demolished, and Hongyu will commence planning the project with the objective of creating a "new urban commercial landmark for Guangzhou." According to the published rendering and online analysis, the project aims to develop the land parcel into an open commercial district, disregarding the original fine-grained character of the plot and instead adopting a large-volume embedded design combined with commercial interests, with the intention of reintegrating the area.

Consequently, the proposed renovation plan for this land parcel fails to perpetuate the existing rich street pattern and architectural style of Gaodi Street, which is contrary to the requirements of the historical development vein. Therefore, this area has been identified as a research object for subsequent in-depth design. Concurrently, it is essential to address the existing issues identified in the previous research, to gain a comprehensive understanding of the material composition of the site and the living patterns of the residents, and to communicate with the residents in a timely manner to ascertain their needs and suggestions. Finally, based on the research results and the requirements of all parties concerned, the most suitable solution for the site will be proposed.

5.3 Distillation of Historical Morphological Features

In this section, the pre-demolished myriad maps within the design area are overlaid and compared with the 1935 Guangzhou City Cadastral Map. The historical maps are then summarized in a morpho-archaeological analysis, which serves as one of the criteria for subsequent plot plan delineation (Fig. 5-2)

Fig. 5-2 Illustration of the site's pre-demolition texture superimposed on the cadastral map (Source: redrawn according to Cadastral map)

Fig. 5-3 Archaeological map of the morphology of the Street-Lane-Fang (Source: by the author)

The previous section concludes that Yuandeng Lane, Gaoxili, Huiyuanli, and Xiaorili are

lanes that were intensively developed during the Republic of China (R.O.C.) period, but in the current situation their texture no longer exists due to the demolition of adjacent buildings, and only Bahe Fang from the late R.O.C. period is still relatively well preserved.

The archaeological plans (Fig. 5-3) show that the entrance to the northern section of Yuandeng Lane and Gaoxili is narrow, only about 2m, while it widens considerably at the southern end. The plots on either side are flush with the lane and have similar openings, and would have been built as a result of centralized land acquisition and subdivision. The lane near Gaoxili forms a setback from the front of the lot, with wider entrances and shallower depths for each house.

The "fishbone" double-lane organization of Xiaorili and Huiyuanli is the most typical lane pattern in Gaodi Street, with a large number of plots and houses, and the addition of new internal roads connected to the entrances of the plots of each household, which were continuously divided. During the Republic of China period, the construction of houses led to an increase in the number of households and a gradual shift in focus towards light and orientation. This resulted in the emergence of the lane organization observed in Huiyuanli, which features a side-by-side arrangement of front and rear plots, complemented by an end-type loop that provides entrances for each household. The similarity of the width of the plots and the shallow depth indicate that the spatial organization of the lanes in the Republican period pursued more diversity and living.

The plan of Bahe Fang is in the shape of "T", due to the limited land resources, the small depth of the houses is utilized to extend the length of the lanes through the T-shaped design, and the land parcel is reasonably divided to build the duplex houses. The change from horizontal multi-depth space to the vertical space of three-story houses reflects the transition from courtyard houses to townhouses during the Republican period.

The above features are summarized below:

(1) Plot ratios: With similar openings and shorter depths, the ratio of width to depth corresponds to two types of organization, namely, close to 1:1.8-1:2.2 and 1:3-1:3.6, the former mainly for square and regular plots on both sides of the interior of lanes, and the latter

corresponds to long and narrow plots along the main street and in irregular areas;

(2) Living environment: As the intensity of land development has increased, emphasis has been placed on lighting and orientation, and the floor area ratio has been increased by shortening the depth of the house type and increasing the number of floors of the house;

(3) Street organization: The historical period has pursued the diversity of spatial organization of lanes, i.e. the linear organization of the courtyard dominated or the regular change of street width. In future planning, the preservation of historical lanes and lanes can be considered, the width of which must be adapted to today's functional needs, etc. Lane height-to-width ratios, interface organization, etc. can be based on history;

(4) Public space: The formation of outdoor space is diversified and its area is gradually expanding.

5.4 Review of Architectural Features

Following the completion of the study and refinement of the macro level of the city, including the texture, street layout, and plot characteristics, the study then turns to the exploration of the specific architectural design guidelines. To this end, the first step is to study the Gaodi Street area, covering building component materials, building types, plan layout, facade styles, and floor heights, etc., with the aim of revealing its evolution and characteristics through a systematic compilation. This will provide a practical basis for the subsequent design of the area.

5.4.1 Building Components and Materials

(1) Early Republican Period

1) Morphological Process

The localization of components and materials can be observed with clarity in the early residences in the Gaodi Street area. However, fewer residences from this period have been preserved. In contrast, the type of Republican house, which is influenced by Western elements to a greater or lesser extent, exhibits a greater diversity of components and materials.

2) Morphological Development Characteristics

The materials are mainly green bricks and stones and tiles, which are used for walls and roofs, and the colors of the bricks and stones and the masonry methods are varied (Fig. 5-4), mainly due to the differences in the building types of the Bamboo tube house, the Western-style house, and the residential house. The materials and practices of the components of ordinary houses and Bamboo tube houses, such as facade decorations, continuous walls, and closed eaves boards, continue to be traditional, but in the type of house, influenced by Western elements, the practices of the components are more complex, such as projecting balconies, cornice lines, doors and windows, etc. (Fig. 5-5).

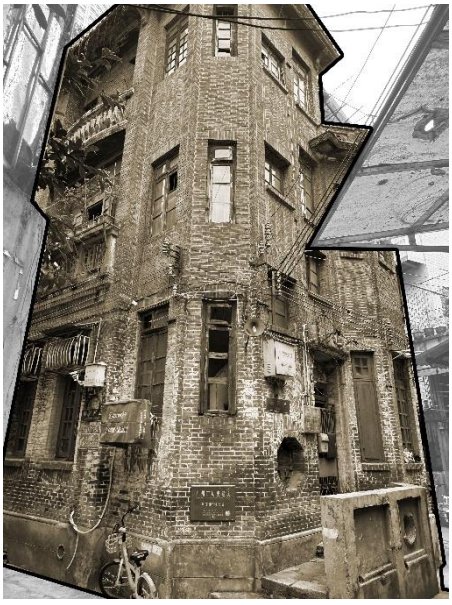


Fig. 5-4 Blue brick and stone walls dominate (Source: by the author)

Fig. 5-5 One of the Bamboo tube house facade forms (Source: by the author)

(2) Late Republic of China-1978

1) Morphological Process

The roof form and materials were moderately simplified, and the facade decoration was kept simple. In addition, with the rapid growth of the population, the demand for housing far outweighed the concern for quality of life. As a result, many buildings were constructed using less expensive materials, such as sheet steel, asbestos tiles, and solar panels, and their use increased significantly as the area of unauthorized construction continued to expand,

damaging the historical landscape of the area.

2) Morphological Development Characteristics

In terms of proportions and forms, the style of the Republican era is continued, while the material decoration and form construction are rationalized. The roof design introduces flat roofs or partially added balconies, and the facade abandons traditional brick elements in favor of plastered brick or stucco (Fig. 5-6). At the same time, the fabrication process of the elements has been simplified and redundancies eliminated. However, some key elements were retained, such as the balcony balustrade, the cornice line decoration of the facade, and the cornice boards of the roof (Fig. 5-7).

Fig. 5-6 Partial addition of balconies on the roof and brickwork on the facade (Source: by the author)

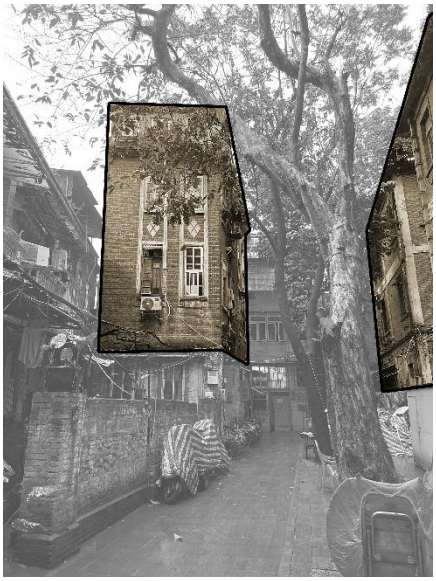


Fig. 5-7 Wall panels with simple relief and footer decoration (Source: by the author)

(3) 1978-Present

1) Morphological Process

In the late 1980s, as technology advanced and the need for rapid production increased, the building form tended to become more minimalist. Improvements in construction technology led to higher floors, less elaborate ornamentation, and simplified roof designs. These features catered to the rapid growth of the small goods sales industry on Gaodi Street.

2) Morphological Development Characteristics

During this period, residential buildings were mainly constructed of brick and frame, and most were designed with flat roofs, which allowed people to move around and facilitated the creation of roof gardens. Facade design emphasized the incorporation of elevated platform spaces (Fig. 5-8), marking a gradual shift from the pursuit of living space to a focus on quality of life. Wall decorations are more modern, mainly painted or mosaic tiles, modern doors and windows are used, and in recent years vertical elevators have been added to some of the houses (Fig. 5-9), and summarized in the following table (Table 5-1).

Fig. 5-8 Painted walls and elevations with balcony additions (Source: by the author)

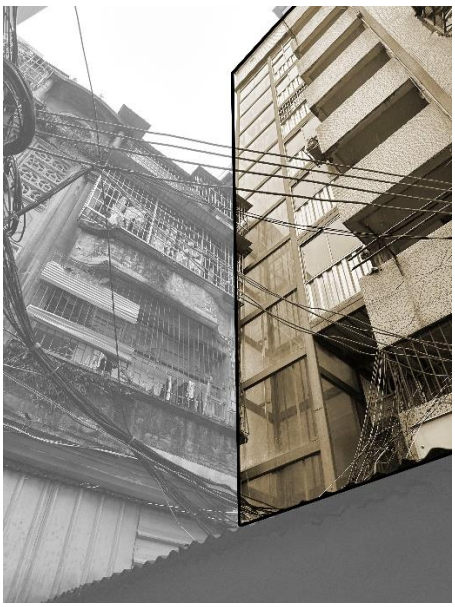


Fig. 5-9 Mosaic tiling, additional hanging ladders (Source: by the author)

Table 5-1 Summary of components and materials (Source: by the author)

	Early Republican period	**Late Republic of China-1978**	**1978-present**
Examples of status quo			
Structure	Mixed brick and wood construction	Brick hybrid structure	Brick or frame construction

Table 5-1 Summary of components and materials (continued)

	Early Republican period	**Late Republic of China-1978**	**1978-present**
Elevation elements	Wooden windows, Shanhua, etc.	Iron railings, wall cut-outs, curved balconies, etc. (Western-style elements influence)	Contemporary windows and doors, raised benches, additional ladders
Wall	Brick wall	Painting or tiling	Painting or tiling
Roof	Double-slope, single-slope, flat roof, etc. rely on building type	Flat roof (color steel or asbestos tiles)	Concrete flat roof

5.4.2 Building Form

(1) Early Republican Period

1) Morphological Process

In the early Republican period, the building types were mainly adapted bamboo tube houses and houses. The layout of the bamboo tube house in the Republican period was characterized by a single room, with functional rooms arranged vertically in sequence to form a tandem structure (Fig. 5-10), and the upper and lower floors were usually occupied by the same family, but later a single-floor, single-family layout was also common (Fig. 5-11)[56]. Each floor is equipped with independent entrances and stairs leading to the ground floor. As a result, the staircase was moved to the front of the building against the side. In order to maximize the use of space and maintain the integrity of the street frontage of the first floor, and taking into account the limitations of the width of the openings, the staircase is of the direct run type. The first floor is accessed through the front door, while the second floor and above are accessed through the stairwell landing. Some of the buildings are designed to further save space by using a symmetrical double housing block sharing a single straight-run staircase, which may be a form of the same width duplex bamboo tube house (Fig. 5-12).

The core of the planning layout of the buildings on both sides of Gaodi Street lies in defining the basic width of the street frontage of the building units, which directly determines the sparseness of the lane structure. Under this planning framework, neighbors carry out house construction independently without interfering with each other, thus maximizing

construction efficiency.

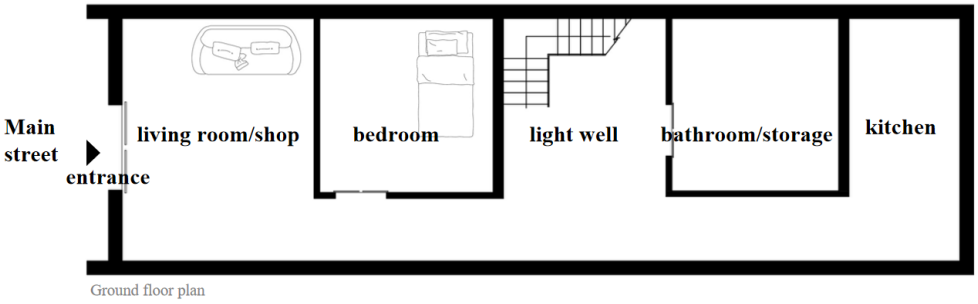


Fig. 5-10 Schematic layout of Bamboo tube house in the Republic of China (Source: by the author)

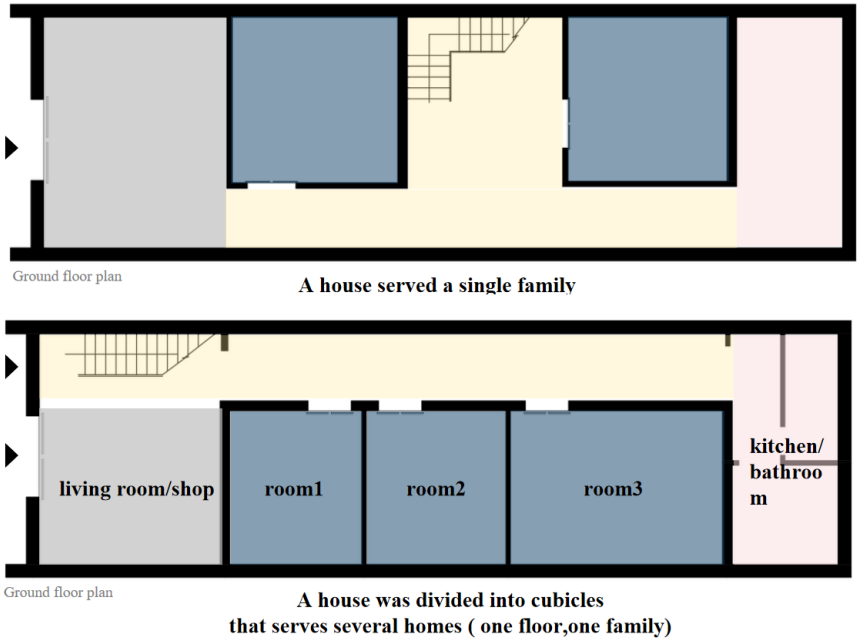


Fig. 5-11 Different use cases within the household (Source: by the author)

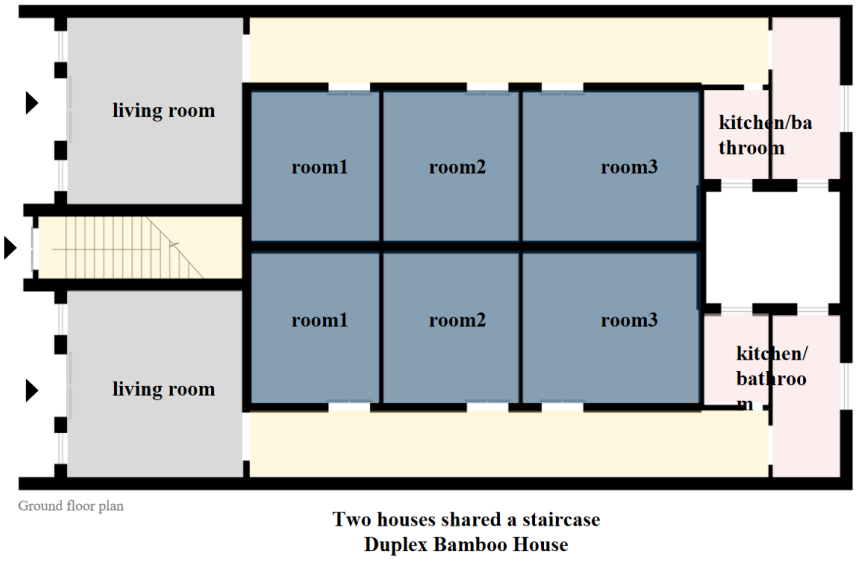


Fig. 5-12 Schematic plan of the duplex Bamboo tube house in Gaodi Street (Source: by the author)

2) Morphological Development Characteristics

From the late Qing Dynasty to the early Republic of China, there was a rise in western-style houses, but the western-style buildings on both sides of the street did not break through the scale of the face width, and most of them were newly built based on the foundations of Bamboo tube houses. For example, the 12 garden houses standing along the street of Mupaitou's Bamboo tube house have a face width of 4.5 meters and a long and narrow house type, which is similar to the layout of a bamboo tube house: one type of design is that the three floors of the house are connected with each other by a single straight staircase; another type of design puts the staircase inside the house, so that the three floors of the whole house belong to the same family.

The early development of the house was influenced by the following factors: first, the Bamboo tube house was based on the same plot demarcation, so its design naturally continued with its specifications; second, the restriction of face width as the basic unit of scale limited the modification of the house type, resulting in the merging of households to obtain a large face width.

As for the facade features, the period emphasized the segmental proportions, decorations, and the use of traditional materials. The number of floors of the buildings is mainly 3-story, with a few 4-story.

(2) Late Republic of China-1978

1) Morphological Process

The architectural style prevalent in the vicinity of Mupaitou and Xiheng Street on Gaodi Street is characterized by townhouses with adaptable household configurations. The other older areas of Gaodi Street are still influenced by the bamboo tube house model. At that time, overseas Chinese invested heavily in real estate in Guangzhou, and were able to circumvent the limitation of openings by centralized land purchase and re-planning. Concurrently, with the pervasive use of concrete materials, the construction of houses was no longer constrained by the material itself, and the types of houses were therefore more diverse.

The design of the facade of bamboo tube houses tended to become more simplified, and

the materials used diversified. For example, coloured plaster was replaced by tile veneer, and later additions and modifications were made to the roof structure. Furthermore, as the population grew, the demand for building space was reflected in the increase in the number of floors in the vertical direction.

2) Morphological Development Characteristics

During this period, the townhouse changed from a single-sided width to a duplex, and the staircase straight-line type changed to a folded-line type with the requirement of one staircase and two households. The house type gradually changed from the narrow rectangle of the early period to a square layout with a width-to-depth ratio approaching 1:1.

The height of the floors was increased, accompanied by a design that flexibly combined localized additions with roof space. The facade is influenced by Western elements such as openwork wall decorations, iron balustrades, and flower windows, but the choice of materials has been adapted to reflect the aesthetic trends of the time as well as the progress and changes in construction technology (Fig. 5-13).

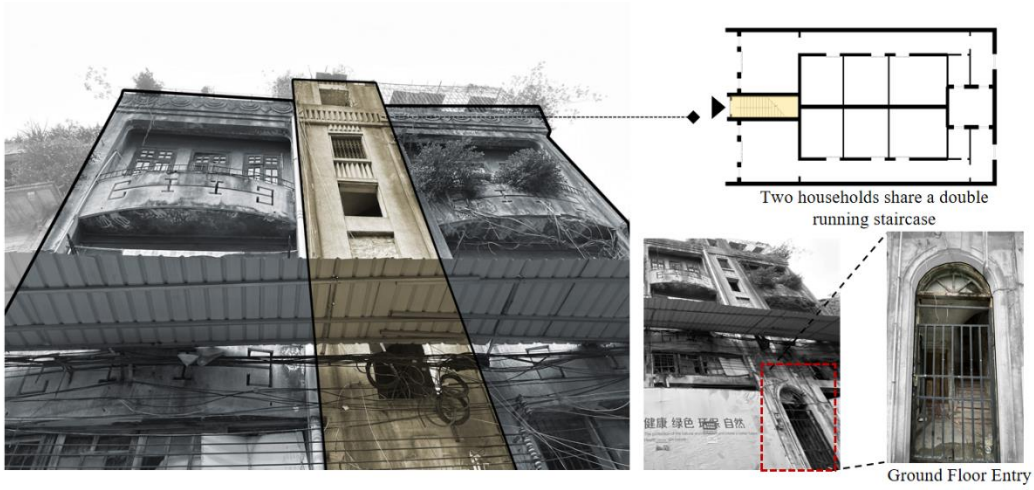


Fig. 5-13 Duplex houses appeared in the late Republican era (Source: by the author)

(3) 1978-Present

1) Morphological Process

The Gaodi Street Market opened in October 1980, with local residents initially trading mainly in cloth, shoes and daily necessities, with simple stalls built on the main street, densely populated with shops on either side, and mobile stalls separated by wire in the middle. The

population boom brought about by the small business boom led to the appearance of multi-story buildings in the area. In addition, a new style of high-rise residential buildings with brick or frame structures and brick treatment on the exterior walls appeared.

Bamboo tube houses and houses in other areas continued to expand. Although the building facades on both sides of the main street basically maintain a single wide pattern, the overall coherence has been damaged by private construction, forming the current facade style after the historical additions.

2) Morphological Development Characteristics

As the number of residential floors increases significantly, the floor area ratio increases. The layout of the building plan became more elaborate, and the facade design tended to be simple. Structurally, frame construction dominated, with a few brick mixes still used, and the floors were usually no less than 8 stories (Fig. 5-14). The boom in population and trade contributed to the expansion of building footprints. These new building facades show a marked difference from the remaining bamboo tube houses and houses (Fig. 5-15).

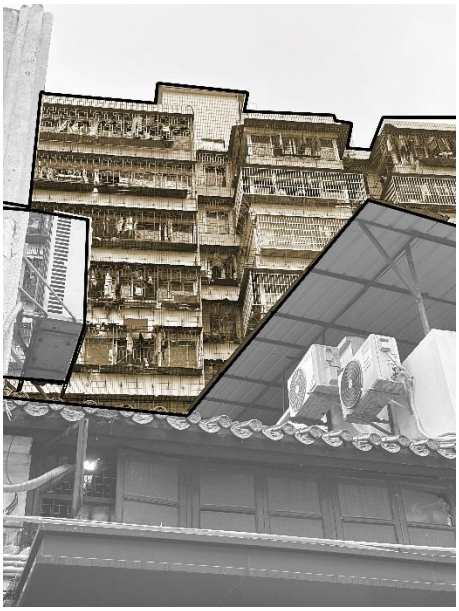


Fig. 5-14 Multi-storey modern residence (Source: by the author)

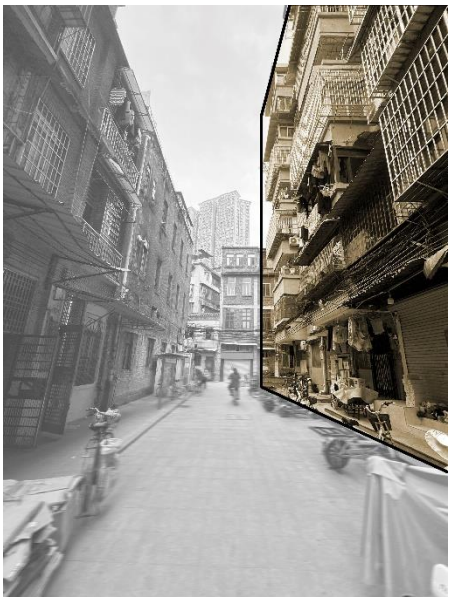


Fig. 5-15 Multi-story residence with historical building to its left (Source: by the author)

5.5 Plot Planning Design

Based on the above, the logic of plot generation in Gaodi Street is the process from street to lane to Fang. The next step is to plan the plot.

5.5.1 Adjustments to the Street and Lane System

Firstly, the street and lane system is adjusted to align with the design scope, thereby restoring some of the historical streets and lanes with enhanced connectivity and resilience to accommodate future functional demands, while also incorporating new branch lanes. The overall delineation principle must consider three aspects of constraints. The first is to respect the historical characteristics, based on the interpretation of the evolution of the street pattern, focusing on the relationship between street pattern and scale. The second is to consider the fire code. The length of the fire along the interface of the street must be considered, as well as the necessity of setting up a driveway through the building. The net width of the driveway, along with the height of the net high requirements, must also be taken into account. Finally, the feasibility of through traffic and walking in different road levels must be assessed (Fig. 5-16).

Fig. 5-16 Illustration of street and lane system adjustments (Source: by the author)

This phase serves to enhance the diversity of the spatial structure by eliminating redundant lanes, particularly those that are too closely spaced. This results in the creation of insufficient land parcel depths, which are difficult to utilize and subdivide. Furthermore, this

lays the foundation for more detailed subdivision and effective management of large land parcels in the future. Concurrently, some historical lanes with good connectivity and potential for widening were restored.

Following the previous step, the street hierarchy was divided into four tiers. The first tier is the main urban road with a width of 8-9m; the second tier is the roads within the Gaodi Street neighborhood (Gaodi Main Street and Xiheng Street area) and the main streets within the design area (Gaoxili - Yuandengli, Bahe Fang Historical Lane) with a width of 6-8m; the third tier of the roads is the sub-streets within the design area with a width of 5-7m; and finally the lanes that depend on the Fang area, which are about 4-5m

5.5.2 Locating Public Spaces and View Corridors

Based on the clear layout of streets and lanes, and according to the existing environmental conditions in and around the site, open spaces or miniature public squares are planned on the ground floor in the area of equestrian buildings, houses, residential buildings adjacent to Gaodi Street, and the area where the pedestrian flow inside the site is intensively intertwined. At the same time, the layout of the visual corridor is rationally determined by combining the characteristics of the adjacent streets and lanes and considering the future architectural planning (Fig. 5-17).

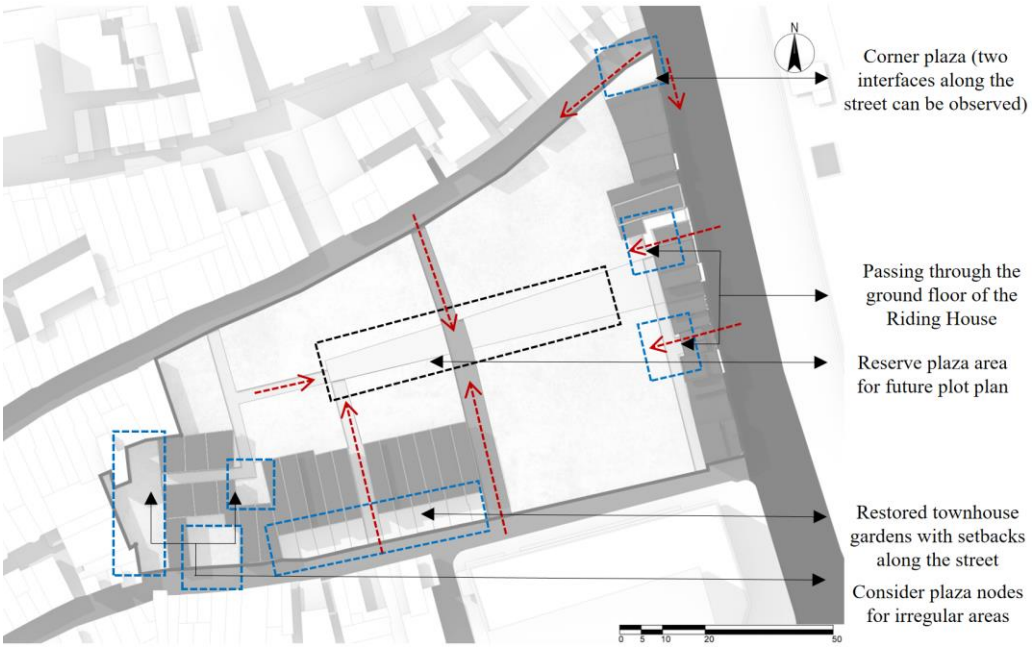


Fig. 5-17 Illustration of the location of public spaces and view corridors (Source: by the author)

5.5.3 Land Parcel Delineation and Functional Orientation

Due to the design scope not reaching the block level, the area is named using the term land parcel. This step ensures that the shapes of the land parcels are regular and that the streets and lanes are interconnected. By adjusting the layout of the land parcel and establishing preliminary functional zoning based on local commercial and residential conditions, the aim is to promote more refined future management efforts, thereby enhancing the clarity and order of the urban structure (Fig. 5-18).

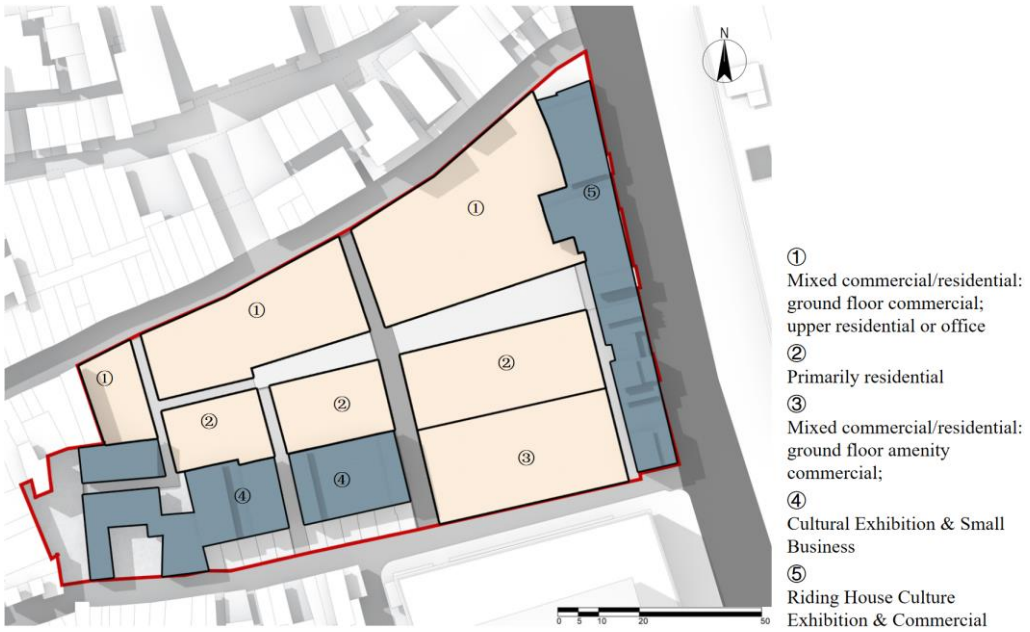


Fig. 5-18 Illustration of the delineation of parcel and functional classifications (Source: by the author)

5.5.4 Create the Plot Plan

In accordance with the aforementioned procedure and based on the refinement of the historical form characteristics outlined in the preceding chapter, a plot delineation plan is formulated for the design area. This plan provides specific control and guidance guidelines covering three distinct aspects: First, the boundary type of the plot is provided with a variety of control requirements. These include the rules of width and depth of the plot under the two forms of narrowness and squareness, the distance of the setback along the street, the continuation of the facade, and the treatment of space at the historical interface (Fig. 5-19). Secondly, the public area is to be designed in accordance with the aforementioned view corridor location and public area, landscape, or public space design. The objective is to

establish a rear yard setback rule for individual plots that will enhance the quality of life for residents, while also restoring the front gardens of houses constructed during the Republic of China period (Fig. 5-20). Thirdly, the plan delineates the feasibility of motorized vehicles and pedestrians under different road classes, as well as the establishment of a fire truck flow line and the stipulation of time limits for transportation vehicles (Fig. 5-21).

Therefore, in future redevelopment, irrespective of whether the implementing entity is a real estate developer, a private individual, or a government agency, the bottom-up planning and design of the plot can be carried out in accordance with the control and management guidelines set out in the plan.

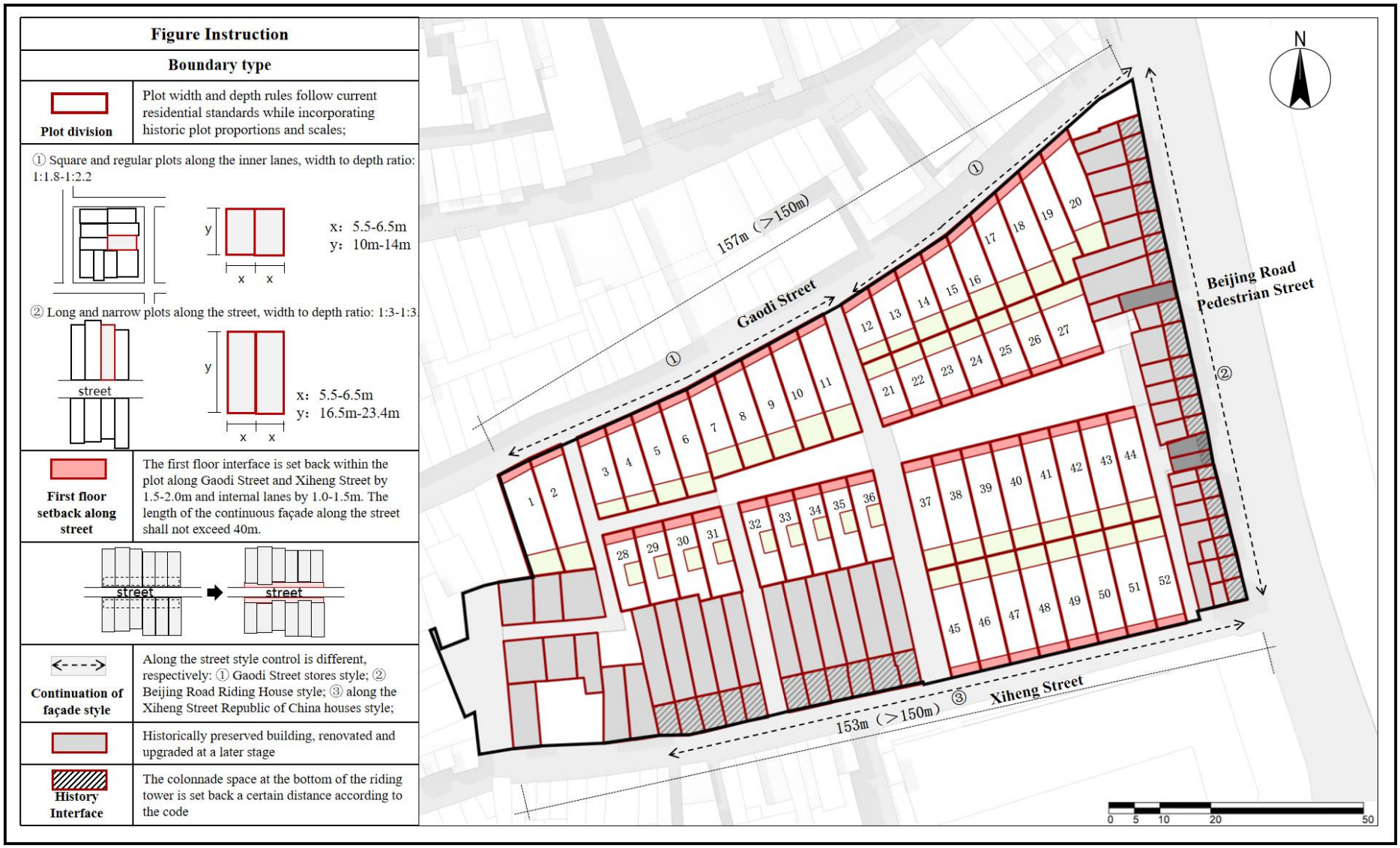


Fig. 5-19 Plot boundary types illustration (Source: by the author)

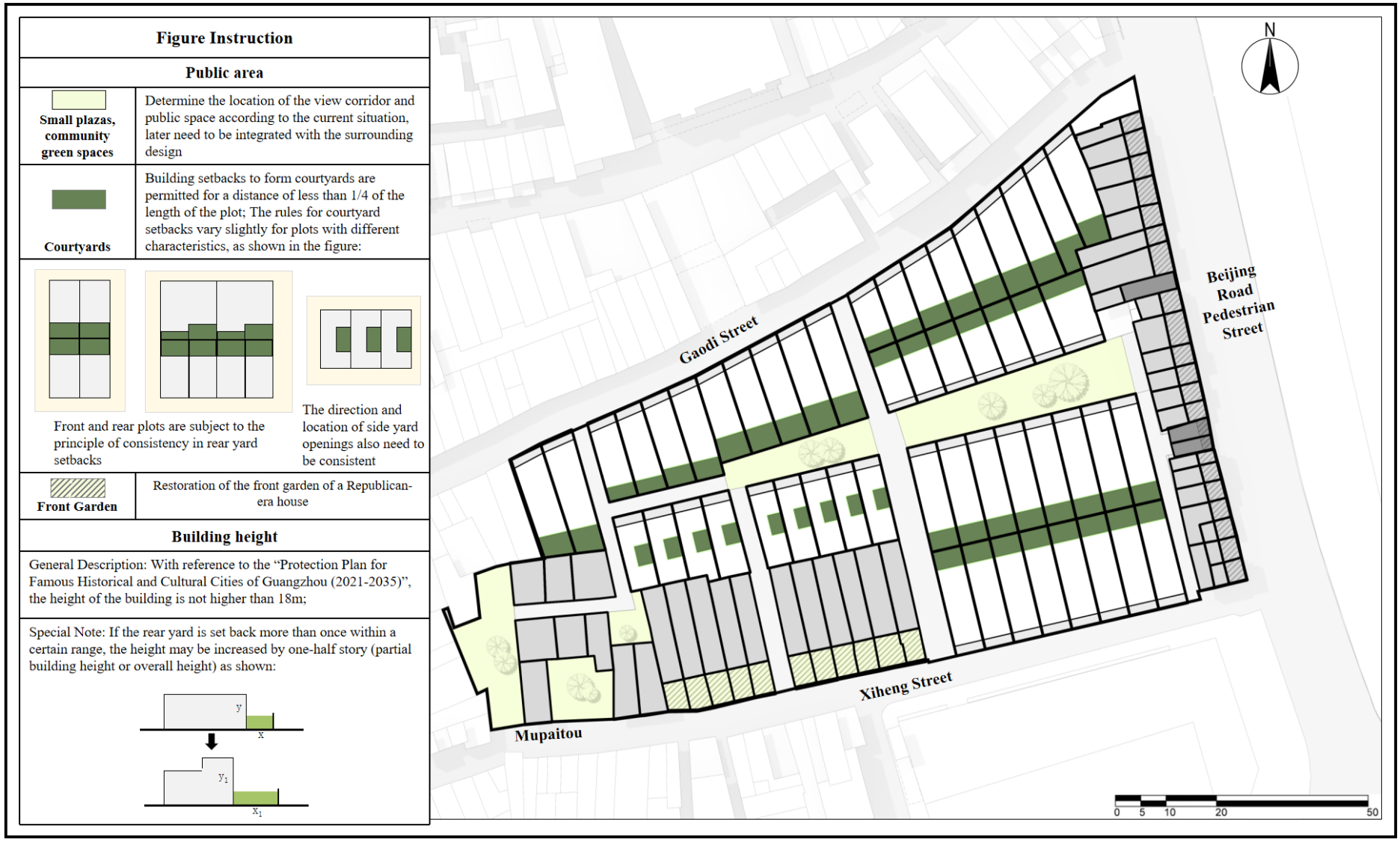


Fig. 5-20 Private and public areas illustration (Source: by the author)

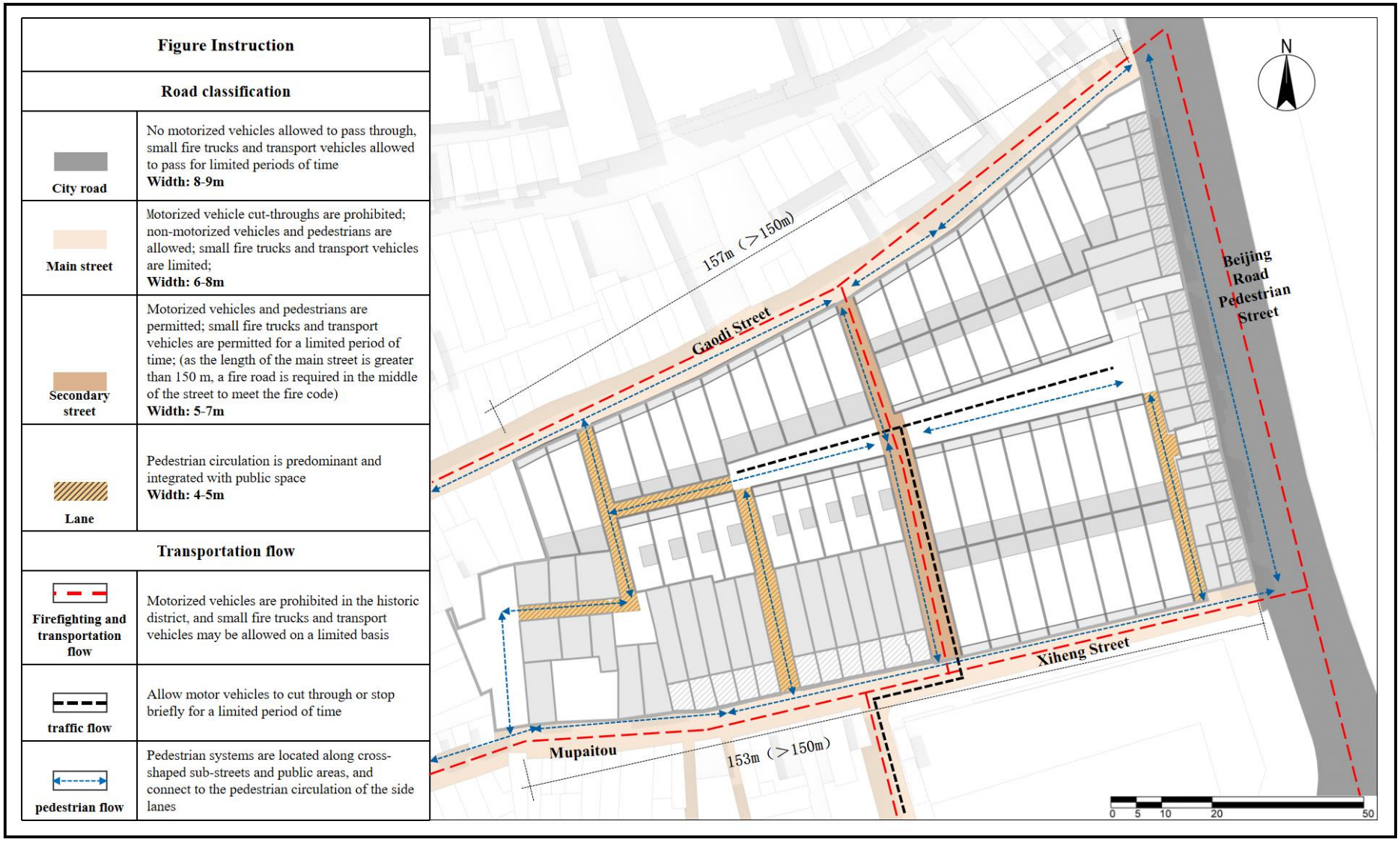


Fig. 5-21 Road classification illustration (Source: by the author)

5.6 Summary

Based on the research method of plot regeneration, this chapter provides an in-depth analysis and design construction of Gaodi Street area. First of all, by establishing the design object, studying the historical morphological features of the site, and combining them with the study of the lane and plot relationship of Gaodi Street as a whole area, valuable morphological features are refined and applied to the master planning of the site.

In terms of establishing architectural design rules, this chapter provides a detailed analysis of the evolution process and characteristics of building component materials, building types and layouts of the Gaodi Street area in different historical periods. This analysis provides a basis for the specific design and guideline formulation of the area at a later stage. By comparing the architectural forms of different historical periods, the changes in structural system, facade components, wall decoration and roof design are summarized, thereby revealing the evolution of the Gaodi Street architectural style.

Ultimately, based on the results of the previous research, different levels of streets and lanes were delineated, public spaces and view corridors were located, and land parcels were segmented and functionally positioned, thus creating the plot plan. Through the development of the plot plan, specific control and guidance requirements are provided, providing bottom-up guidance requirements for future planning and design.

Chapter 6 Urban Design Based on the Gaodi Street Redevelopment Area

After determining the new plot layout, the next step is to establish building regulations to exercise a certain degree of control over architectural forms. In the future, architects with diverse styles can design buildings on the plots, provided they adhere to the established rules, resulting in a variety of architectural styles.

6.1 Principles of Zoning and Logic of Rulemaking

6.1.1 Zoning Principles

The urban design is firstly divided into four different zones based on the plot plan in the previous chapter. Due to the different status quo of the streets around the site, there are different morphological characteristics of the Street-Lane-Fang area, which corresponds to different characteristics of the plot plan, functional zoning and architectural features, and is divided into four different zones (Fig. 6-1), and each zone is given its own adaptive urban design guideline. By formulating the rules, the architectural forms on the plan of the plot are controlled, which can effectively guide the future design.

Fig. 6-1 Illustration of different partitions (Source: by the author)

6.1.2 Rule-making Logic

In consideration of the characteristics of the plot layout and the zoning of the landscape, it is recommended that the construction include a variety of building types that align with the local construction norms. To this end, the following dimensions should be taken into account in the formulation of construction guidelines: 1) the relationship between the street space and the first floor must be controlled; 2) the facade form must be regulated; 3) the roof form, as well as the height of the storey and the number of storeys, must be specified. Subsequently, the details and corresponding designs will be studied in depth.

6.2 Specific Design for Area 1

Area 1 is situated at the southern periphery of the site, in close proximity to Xiheng Street, east of Beijing Road, and west of the "T"-shaped branch lane (Fig. 6-2). The current situation of this area is defined by the presence of Republic of China-style houses, with surrounding buildings serving a clear residential function. Small restaurants and small supermarkets are located on the ground floor along Xiheng Street, while the upper floors and inner lanes are primarily residential in character. The street is lined with garden house buildings that date back to the Republic of China period. These buildings are currently fenced off by the construction site, but the facade separation of their houses and the interface relationship with the sub-street are well-preserved. It is evident that the garden area at the front of each house still exists, and it is crucial to consider the unified shaping of the facade style, such as the separation density and the front setbacks, in the future. In terms of roadways, the width of Xiheng Street is less than that of Gaodi Main Street. On weekdays, this street is not accessible to motor vehicles. Additionally, the presence of stalls selling small commodities has resulted in congestion along the sub-street, which is not sufficiently wide to accommodate the current volume of traffic. To address these issues and preserve the traditional characteristics of Area 1, the relevant building code requirements have been formulated.

Fig. 6-2 Status of area 1 (Source: by the author)

6.2.1 Derivation of Architectural Regulations

(1) Control of the Spatial Relationship Between the First Floor and the Street

1) Area 1 adjacent to the west cross street is located in the area of living residential areas, the first floor is usually set up such as small restaurants, meat and vegetable stores, and the street interface to form a 0-1.5m setback relationship. At the same time, along the street there are historical buildings of Republic of China houses, the front of which has a garden area, and the first floor is elevated. Consequently, the design of Area 1 needs to control the setback relationship between the first floor and the street (Fig. 6-3), and needs to take into account that the corresponding street setback relationship for residential and retail is distinct.

Fig. 6-3 Illustration of the relationship between first floor and street frontage setbacks (Source: by the author)

(2) Elevation Form Control

1) Schematic composition of the facade: refine the necessary architectural elements and features contained in the facade of a house, and construct and simplify them to a certain specification in a modern way, so as to improve the image of the facade and the quality of living, rather than imitating and restoring the tradition (Fig. 6-4).

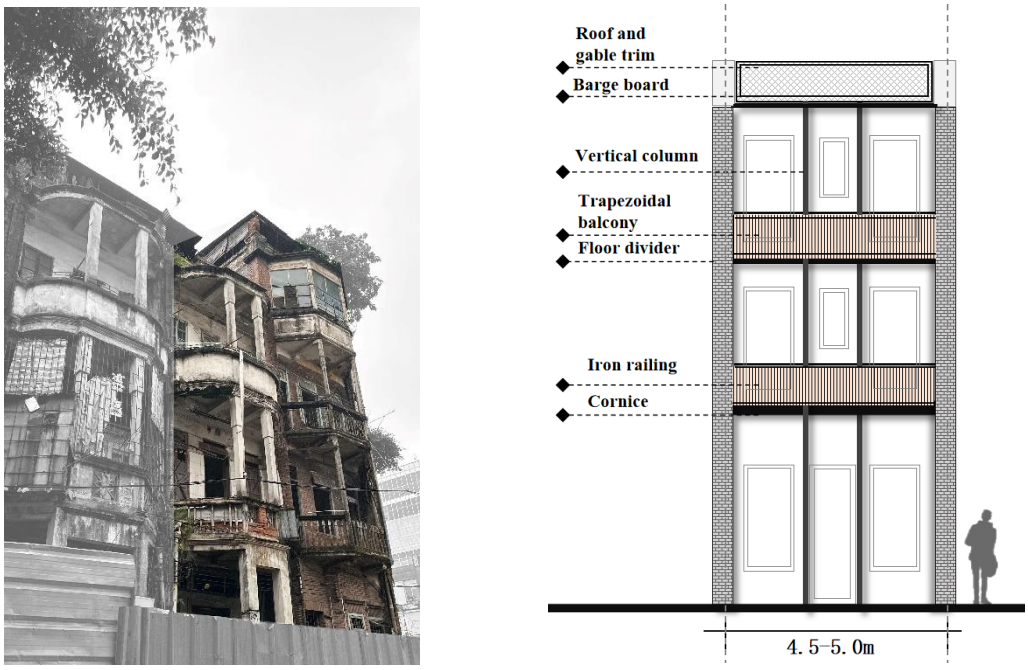


Fig. 6-4 Feature extraction of traditional facade elements (Source: by the author)

2) Facade separation and form (Fig. 6-5):

a. The reconstruction of the facade should be in harmony with the existing buildings on the street and the buildings of Republican-era houses in terms of color and composition ratio, and can be simplified to a certain extent.

b. The horizontal and vertical separation density of the new building should be in accordance with the density of the facades of the houses along the street. The width of the building should be controlled at 4.5-5.0m. The same form of external balconies can be set up on the second and third floors to harmonize with the facades of the houses.

c. The ground floor should be accessible from the street, while the upper floors may be either open or closed, according to the occupants' requirements and the architectural design. The material style may also be simplified.

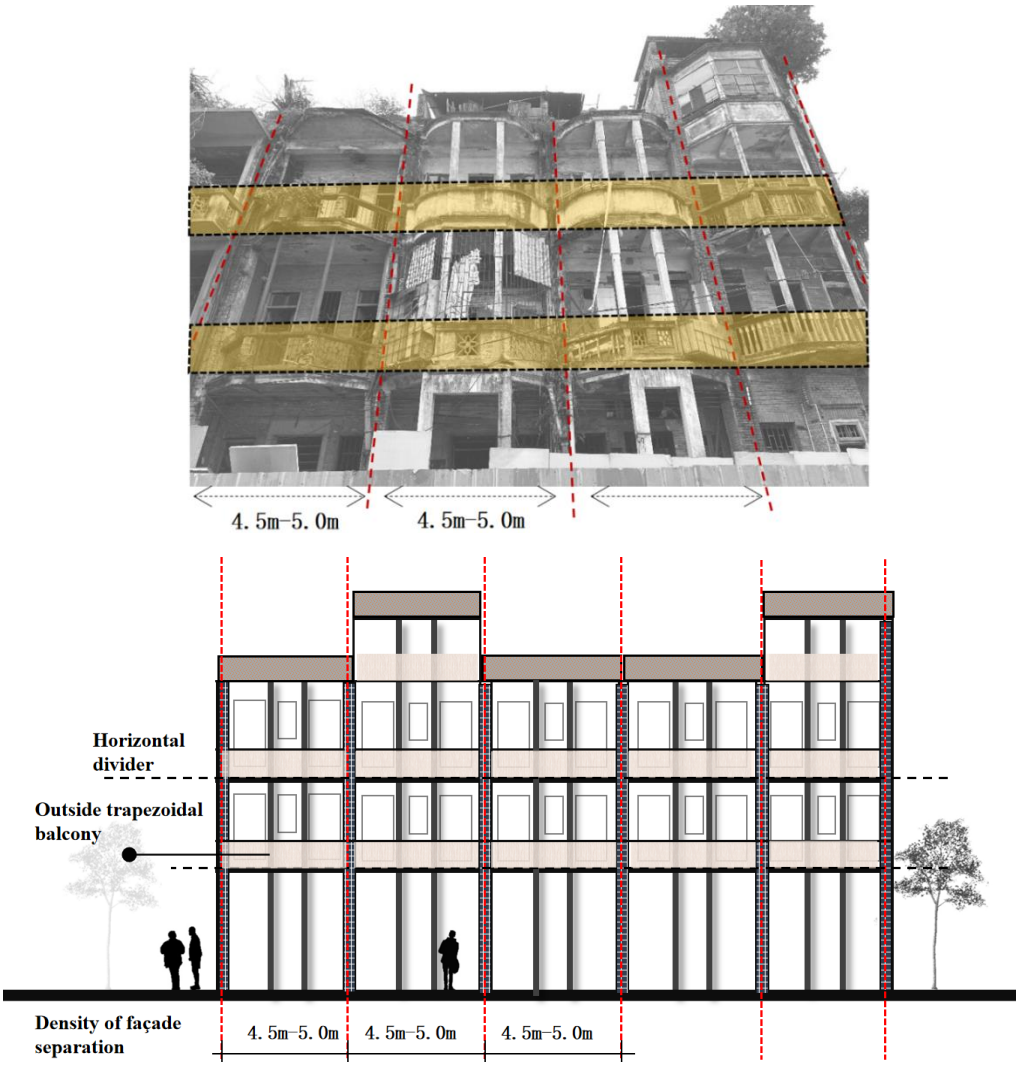


Fig. 6-5 Illustration of facade density form (Source: by the author)

3) Column forms (Fig. 6-6):

a. In order to ensure the density of facade separation along the street, it is necessary to ensure that the building facade on each plot is set up with columns. However, its vertical continuity can be interrupted, such as one or two floors set up columns, three floors do not set up columns.

b. Number of columns: not more than 2 columns on each plot of facade separation.

c. Column cross-section: it can be a column or square column, with a diameter of 300-400 mm.

d. Intersection of columns and other components: the bottom of the columns can be intersected with the balustrade or set up independently of the balustrade.

4) Balcony form (Fig. 6-6):

a. need to ensure that each plot of the building facade should have a pick balcony.

b. pick length: projecting 1.0-2.0m.

c. pick shape: can be continued in the form of historical pick, that is, trapezoidal balcony boards, can also be deformed into a rectangular balcony, expanding the area to improve the current level of residential comfort. But in principle, the plane shape must be controlled within the projection of the balcony dotted line.

d. Balustrade style: height in accordance with the current standards, materials and styles can be simplified, and the balcony will be fully closed or open processing.

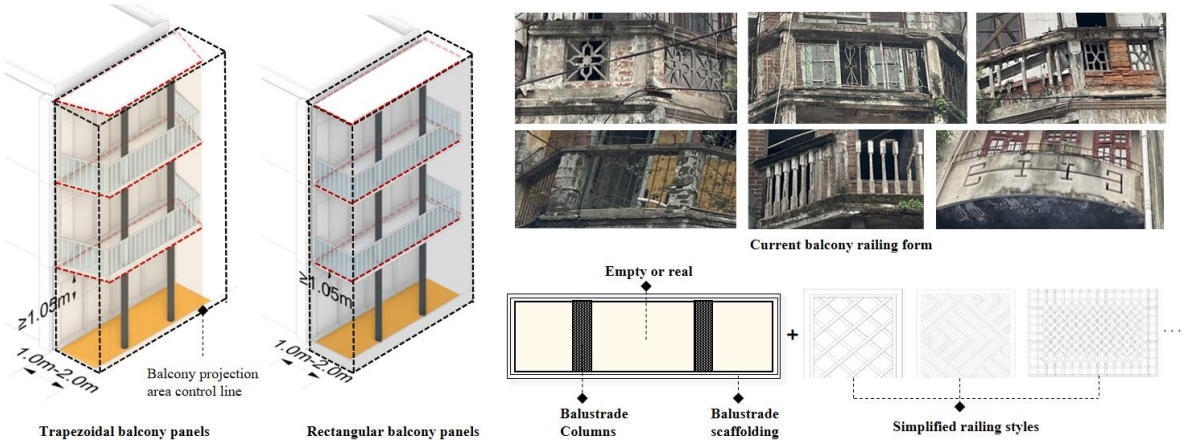


Fig. 6-6 Illustration of balcony styles and components (Source: by the author)

(3) Roof Form Control

Research results show that most of the flat roof is dominated by its daughter wall height of 600-700 mm, and with the development of the times, some of the townhouses in the form of local additions to set up roof terraces and recreational areas. In terms of height control, if it is a three-story house, the roof is flush with the eaves line of the third floor, and at the same time ensure that the balcony canopies are on the same level. If the backyard has more setbacks on the lot, a partial addition can be built on the fourth floor, with height control at one-third the height of the third floor, to create an attic or recreation area (Fig. 6-7).

Fig. 6-7 Illustration of partial roof addition (Source: by the author)

(4) Height and Number of Storeys Control

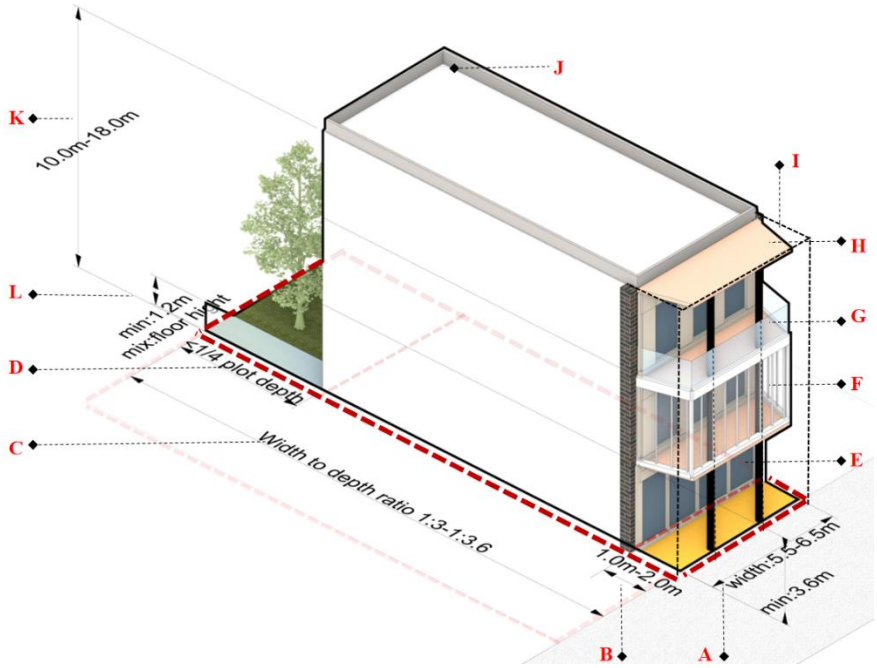
The average width of the street along Xiheng Street - Mupaitou is about 7m, preserving the historical scale and pattern. The height of the houses on both sides is about 10 to 16m, and the aspect ratio of the street is about 0.44 to 7. The number of stories is mostly 3 stories, with some 4-story additions. The height of the first floor should be considered to be consistent with the height of the neighboring houses, which is about 4m (Fig. 6-8).

Fig. 6-8 Illustration of floor height and number of floors (Source: by the author)

6.2.2 Architectural Sample Schematic

Based on the refinement of architectural rules along the West Cross Street, a representative sample of architectural rules for Area 1 is constructed, and expressed in the form of diagrams (Table 6-1). Within the framework of this rule, a variety of design deformations and form compositions are derived, which are mainly determined by the fusion of the individual needs of the owners of the different lots and the design style of the architects, and the following developments and combinations are only one of many possibilities (Table 6-2). This description will not be repeated in the other areas that follow.

Table 6-1 Sample illustration of building regulations for area 1 (Source: by the author)



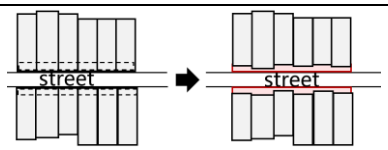
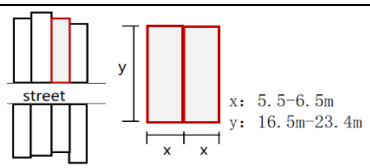
Position	Building layout	
A	The width of the plot is taken as 5.5-6.5m according to the rules of plot layout.	
B	Ground floor is residential, front setback 1.0m-1.5m and fencing is required; if it is commercial, the setback is 1.5m-2.0m.	
C	Plot depth is set by combining the width to depth ratio of 1:3 to 1:3.6.	
D	Rear setbacks less than 1/4 of the length of the plot.	

Table 6-1 Sample illustration of building regulations for area 1 (continued)

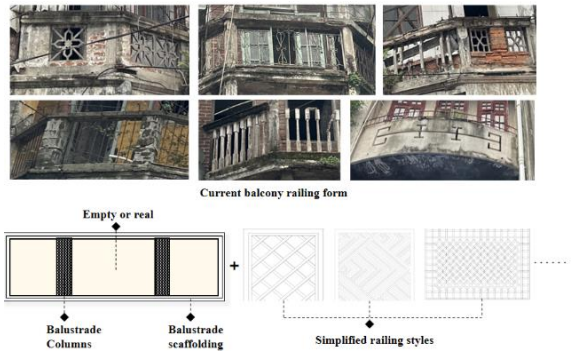
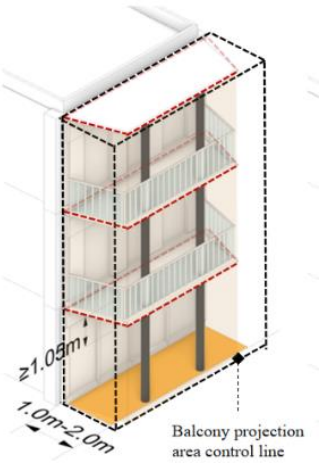
	Elevation form	
E	The first floor elevation follows the Xiheng Street store elevation density: 2.5-2.75m.	
F	a) Floors 2-3 follow the historical facade separation density of 4.5-5.0m for the first level; b) The second level is separated by the spacing of columns on the facade; c) 2 separating columns per plot elevation; the cross-section may be round or square, with a diameter of 300-400mm;	
G	a) Ensure that each floor is provided with an external balcony with a 1.0-1.5m projection; b) Shape: trapezoidal or rectangular; c) Railing: style simplified according to the current situation; height 1.1m;	
H	Eave pick out 0.6m; canopy pick out 1-1.5m.	
I	The dimensions of the facade elements must not exceed the projection of the front boundary of the plot.	

Table 6-1 Sample illustration of building regulations for area 1 (continued)

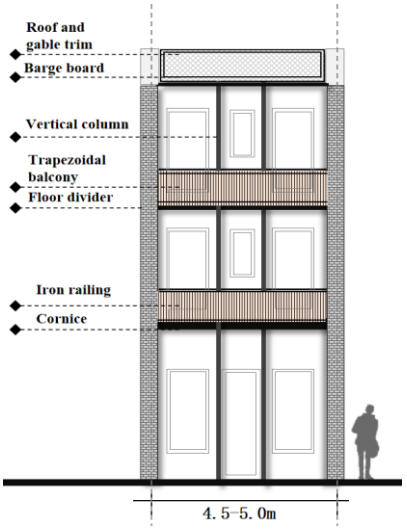
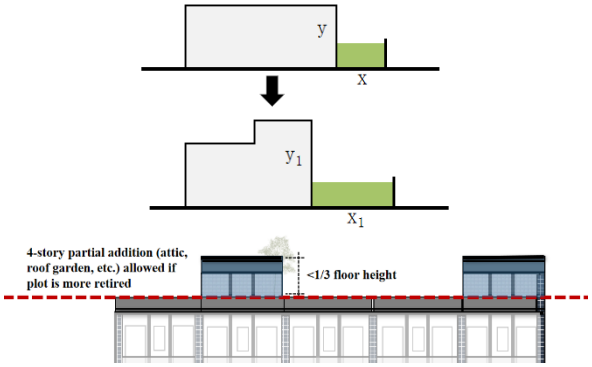
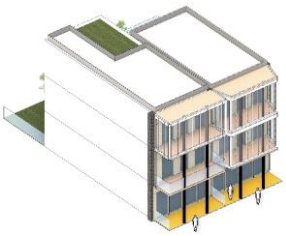
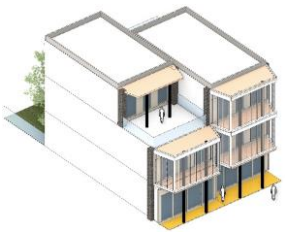
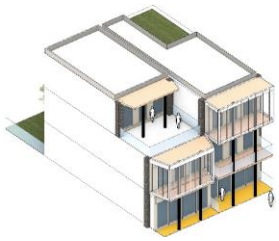
<table>
<tr><td colspan="3">Elevation form</td></tr>
<tr><td colspan="2">The elements and characteristics of the components of the facade are refined, constructed and simplified in a modern way.</td><td> 
</td></tr>
<tr><td colspan="3">Architectural features</td></tr>
<tr><td>J</td><td colspan="2">Flat roof with parapet, 600mm high; closed light well on traffic core possible.</td></tr>
<tr><td>K</td><td>a) According to the conservation documents, the total building height <18m;
b) If the rear yard has more setback within the regulations, the fourth floor may be partially added to, with a limit of one-third of the height of the third floor, not exceeding 2m;
c) The height of the first floor is 3.6-4.0m.</td><td> 
</td></tr>
<tr><td>L</td><td colspan="2">Minimum fence height 1.2m, maximum boundary wall possible. Depends on the requirements of the householder.</td></tr>
</table>

Table 6-2 Illustration of architectural diversity in Area 1 (Source: by the author)

Different building unit under the rule	Diversity under the unit combinations		
A1 Inner courtyard terrace + enclosed balcony + other detailed rules **A2** Street-facing terrace + continuation of columns + closed balcony + other detailed rules **A3** Higher building setbacks for partial additions + open balconies + other detailed rules **A4** Roof garden with access + rectangular balcony (closed or open) + other detailed rules	 A1+A4	 A1+A2	...
...(Other possibilities)	 A2+A4	 A1+A3	...
	 A3+A4	 A2+A3	...
	...(other combinations)	...(other combinations)	

6.2.3 Functional Requirements

Secondly, it is essential to establish the functional requirements for new buildings in Area 1. Given the distinctive spatial configuration and functional attributes of the Street-Lane -Fang, the connection between the residential building and the front street and the back lane is not merely a physical space, but also serves as a vital conduit for public activities and social interaction.

The functional layout is divided into two main cases, taking this design plan as an example (Fig. 6-9), with commercial establishments on the ground floor and residential units on the upper floors (Fig. 6-10). The stores along the street can be utilized as venues for public activities, such as souvenir shops, small restaurants, or convenience stores. As the properties

are privately owned, the commercial tenants have the option of leasing out their upper residential floors or using them independently. The rear yard can be utilized as storage or a private event space, and it is adjacent to the rear yards of other plots. Therefore, it is necessary to fence it in order to emphasize privacy.

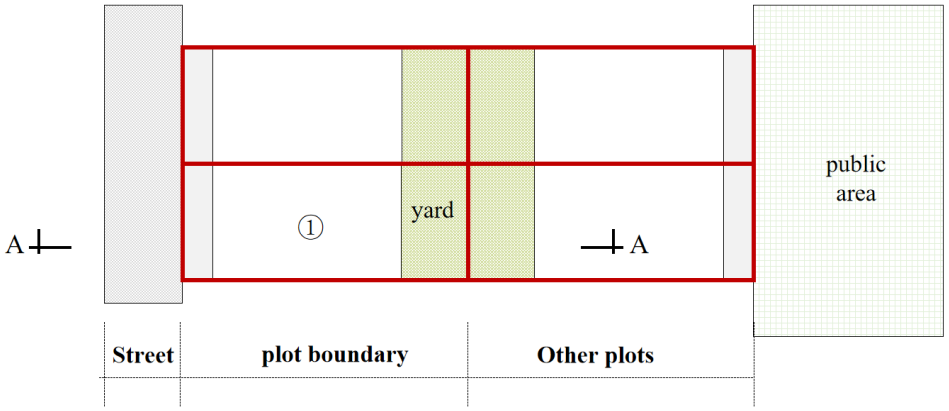


Fig. 6-9 Plan diagram of Area 1 (Source: by the author)

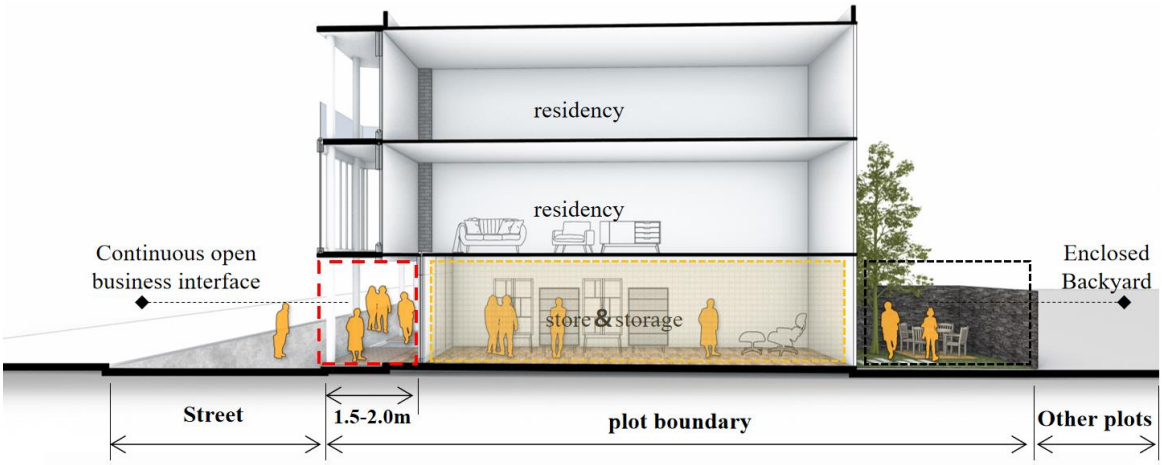


Fig. 6-10 A-A Section functional illustration I (Source: by the author)

The second distribution is characterized by a residential configuration on both the ground and upper floors. The ground floor is situated along the street, while the rear yard is adjacent to the rear yards of other plots. To guarantee private ownership, the street and rear yard areas are enclosed by fencing and designated as non-public spaces, with gardens allocated for recreational purposes and other uses. These areas are accessible exclusively to the owner of the property (Fig. 6-11).

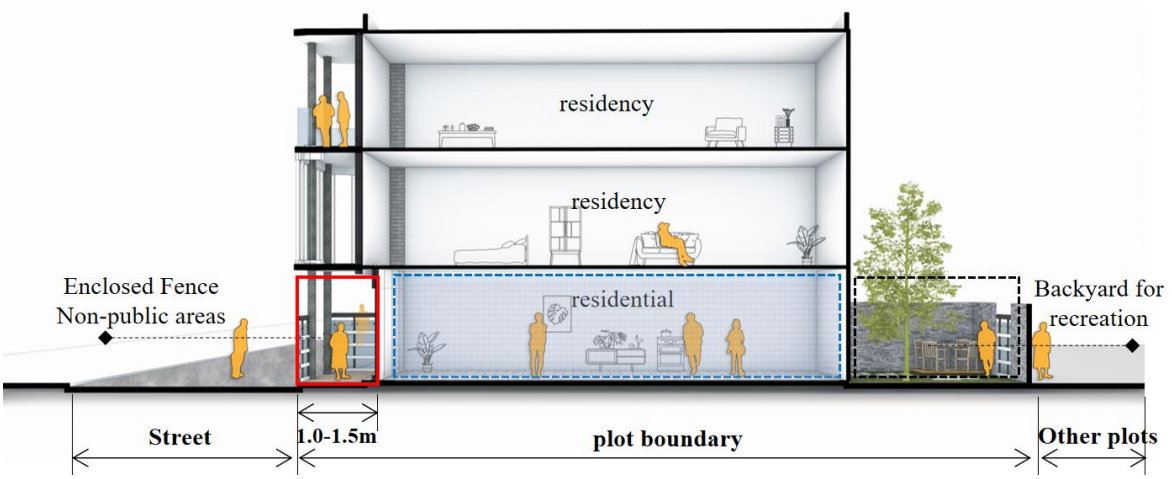


Fig. 6-11 A-A Section functional illustration II (Source: by the author)

6.2.4 Axonometric Drawing

The rules are used to design one of the monolithic nodes. Due to the diversity of the architectural rules presented, there are multiple combinations of forms, so the other monoliths are represented schematically using the blocks under the rules (Fig. 6-12). Similar effect drawings are made in other areas as described below without repeating the description.

Fig. 6-12 Axonometric illustration of Area 1 (Source: by the author)

6.3 Specific Design for Area 2

Area 2 is an area surrounded by Beijing Road, Gaodi Street and the 'T' shaped lanes

within the site (Fig. 6-13). The area is distinguished by the following attributes: it is situated on the northern periphery of the site, contiguous with Gaodi Street, and the surrounding context is predominantly defined by ground-floor commercial establishments and upper-floor residential units. The interface along the street has undergone numerous rounds of repair and enclosure, resulting in a diverse array of architectural styles. In establishing rules, it is essential to refine the facade characteristics, including separation density and specification form. With regard to the road, the temporary occupation of space on both sides of the road for the sale of small commodities has resulted in a poor sense of passage along the main street, which is not wide. Consequently, the relevant building rule requirements have been formulated to address the current problems and characteristics of Area 2.

Fig. 6-13 Status of area 2 (Source: by the author)

6.3.1 Derivation of Architectural Regulations

(1) Control of the Spatial Relationship Between the First Floor and the Street

The main street sales include morning market and day market, the morning market uses

the 1m-2m depth space along the street and part of the street space left after the day market shops close to set up stalls (Fig. 6-14), and the day market is open for business after the morning market closes. In the following design, attention is paid to the setback scale of the first floor to the street, ensuring the ability to conduct commercial activities in time Segments.

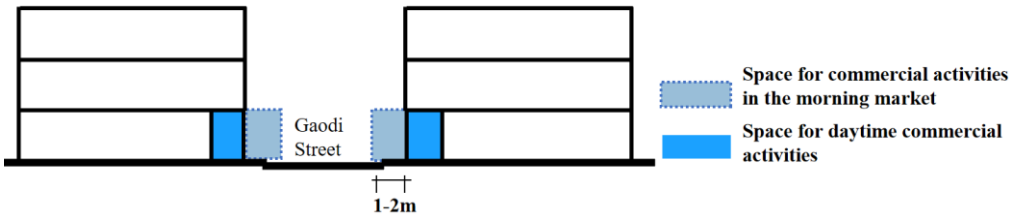


Fig. 6-14 Illustration of first floor commercial activity in relation to the street (Source: by the author)

(2) Elevation Form Control

1) Schematic composition of the facade: The facade along the main street of Gaodi exemplifies the combined effect of historical evolution and different periods of additions and repairs. The dominant facade types along the street, as illustrated in the figure, feature window openings, material elements, balcony additions, and other features that align with contemporary living requirements. These facades are constructed and streamlined at a moderate scale (Fig. 6-15). Only a few historical bamboo tube houses remain along the street, which will be discussed in other areas.

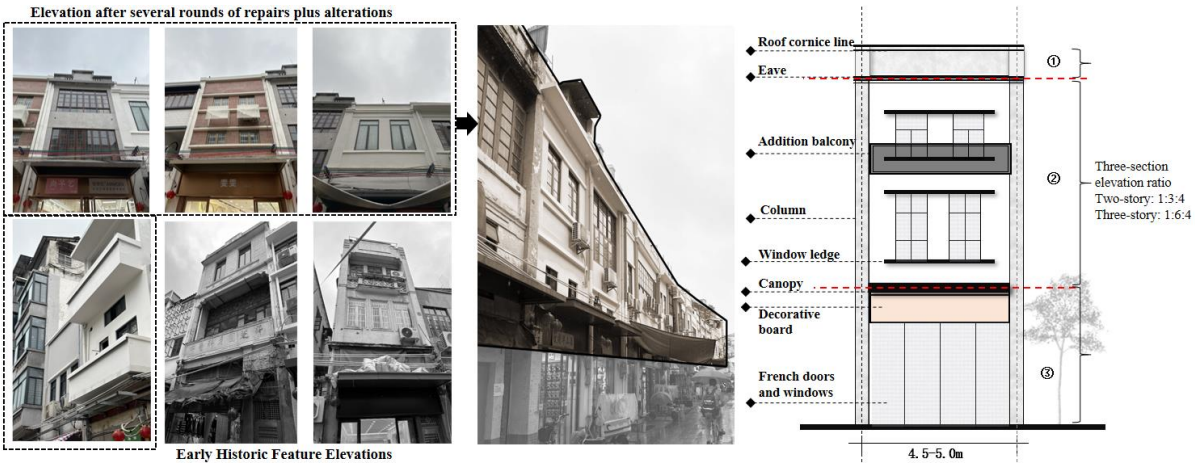


Fig. 6-15 Characterization of street facade elements (Source: by the author)

2) Elevation and Street Interface: Sorting out the rules of facade evolution along the street, the continuity of store canopies, localized balcony outcroppings, and top-floor sunshades can be used as setback rules for the design of the facade (Fig. 6-16).

Fig. 6-16 Illustration of continuity of facade elements (Source: by the author)

3) Facade separation and form (Fig. 6-17):

a. Vertical separation width need to follow the status quo facade density, 5-5.5m belongs to the first level of separation, basically the face width of each property unit as a separation.

b. the second level of separation control in the second level between 2.5-2.75m.

c. The third level for the ground floor of the sale of the facade of the separation, generally 1.2m.

d. Pay attention to the horizontal division between the first floor and the second floor as a canopy as a demarcation line, the second floor and the upper floor is generally to the protruding balcony line or separating decorative line to separate.

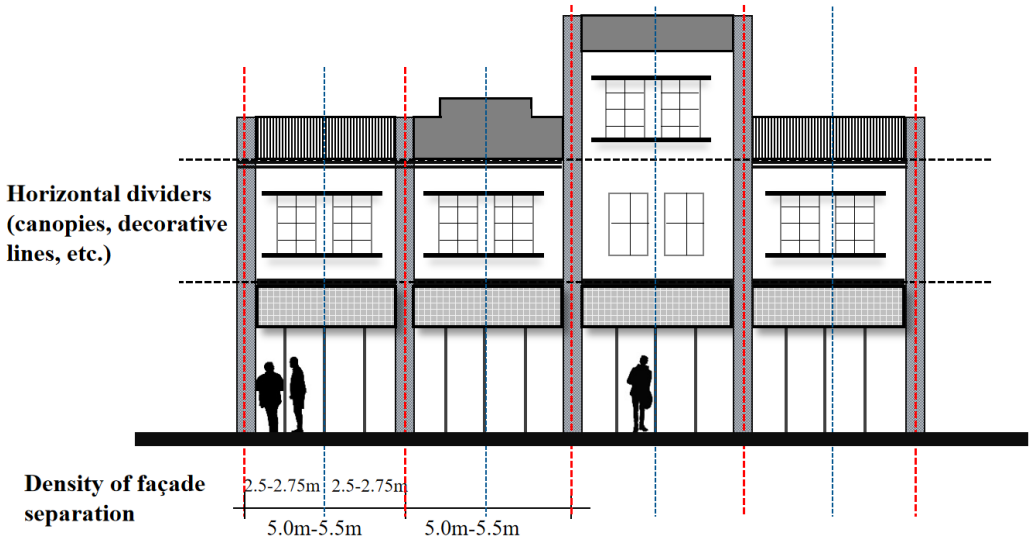


Fig. 6-17 Illustration of facade density form (Source: by the author)

4) Canopy form: The length of the canopy protrudes 0.5-1.0m, and the width depends on the size of the face width of the selling stalls; the plane form of the canopy is mainly rectangular.

5) Balcony form: The presence or absence of a balcony may depend on the requirements of the homeowner as well as functional needs. If a balcony is provided, the following requirements should be followed (Fig. 6-18).

a. The length of the balustrade should be 1.0-2.0m, and its projection should not exceed the street boundary of the lot; the shape of the balustrade should be rectangular.

b. The shape of the balustrade should be in accordance with the specification in terms of height, and the material and style should be simplified. And the main road traffic is large, need to pay attention to privacy, so the balustrade can be full or half package processing.

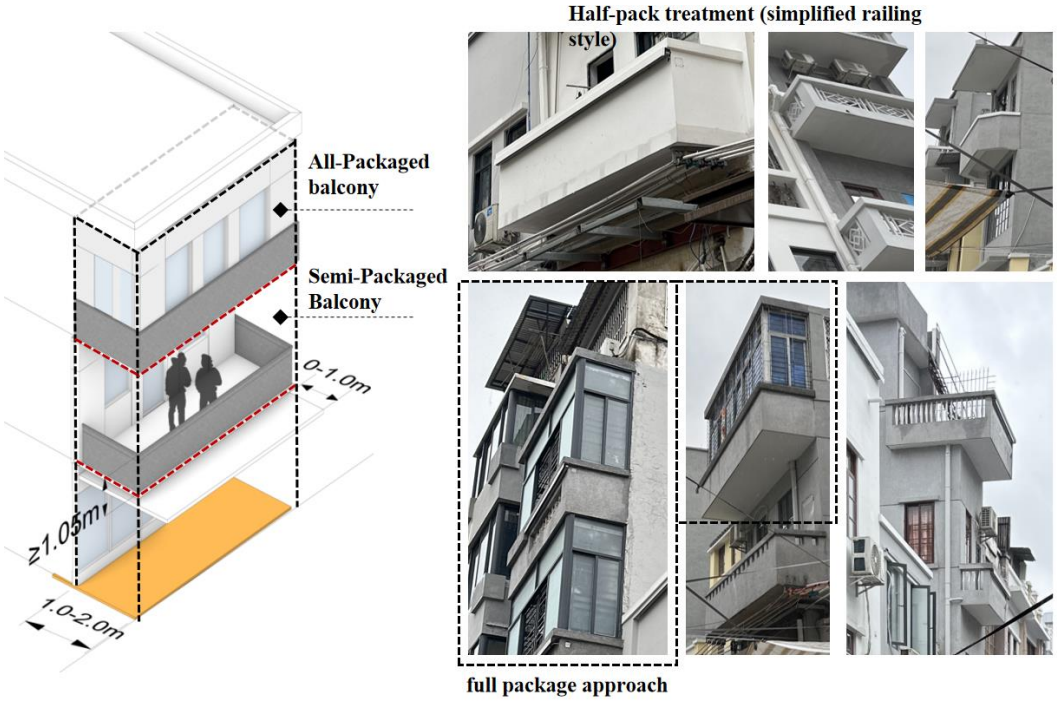


Fig. 6-18 Illustration of the form of balcony addition (Source: by the author)

(3) Roof Form Control

The roof forms that can be expanded are as follows:

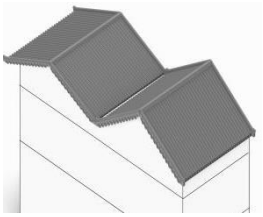
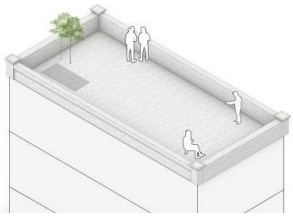
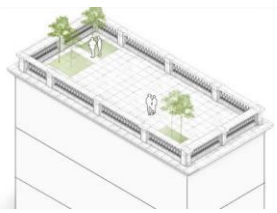
a. Double-sloped roofs left over from the evolution of the early bamboo tube house.

b. Daughter-wall roofs that allow people to walk up to the roof.

c. Roof garden areas with fences.

This process is the result of the evolution of the continuous pursuit of a high-quality living environment (Table 6-3).

Table 6-3 Roof style summary (Source: by the author)

	Double-sloped roof	**Parapet roof**	**Conversion to roof garden**
Schema			
Structure	Brick and wood construction, concrete	Reinforced concrete	Reinforced concrete, frame structure
Material	Iron, plastic	Concrete, stone	Concrete, glass, steel
Decorative element	Gable wall decoration	Cornice, parapet decoration	Railing, cornice
Status quo			

(4) Height and Number of Storeys Control

The width of the main street is about 6-8m, and the height of the houses on both sides is about 10-18m, and the height-to-width ratio must be controlled between 0.38 and 0.7. The height of the first floor is 3.6-4m, the total height of the building does not exceed the normative height limit of 18m, the number of floors is mostly 3 floors, and some of them seem to be 4-floor localized additions (Fig. 6-19)

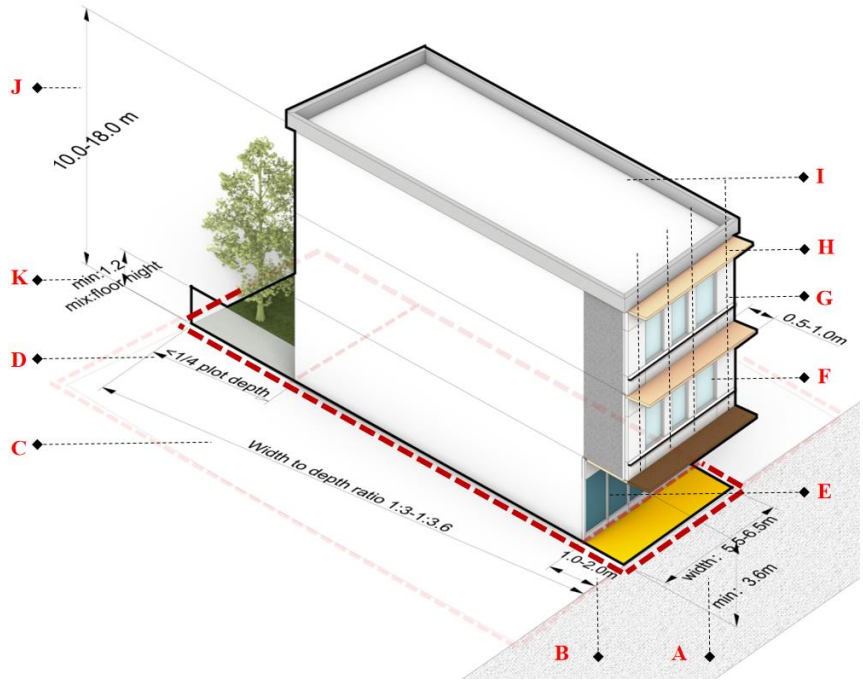
Fig. 6-19 Illustration of floor height and number of floors (Source: by the author)

6.3.2 Architectural Sample Schematic

Exploration and summarization of the relevant building rules along the main street of

Gaodi, forming a sample of the buildings in Area 2 (Table 6-4) and a schematic of one of the diversities (Table 6-5).

Table 6-4 Sample illustration of building regulations for area 2 (Source: by the author)



Position	**Building layout**
A	The width of the plot is taken as 5.5-6.5m according to the rules of plot layout.
B	Front setback 1.0m-2.0m.
C	Plot depth is set by combining the width to depth ratio of 1:3 to 1:3.6.
D	Rear setbacks less than 1/4 of the length of the plot.
Elevation form	
E	First floor facade according to the main street store separation density: 1 opening corresponds to 3-4 vertical frame separation.
F	a) 2-3 compartments: first level: 5-5.5m; b) Second level: 2.5-2.75m; c) Third level: ground floor sold elevation separation;

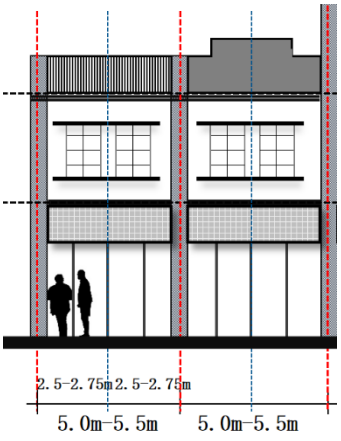


Table 6-4 Sample illustration of building regulations for area 2 (continued)

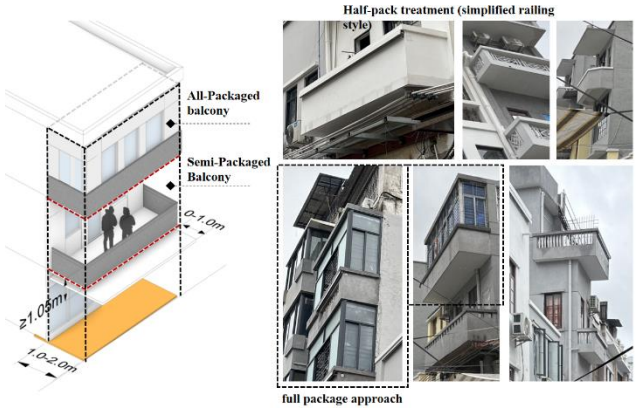
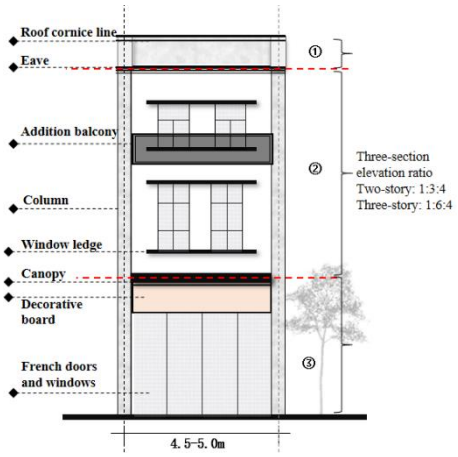
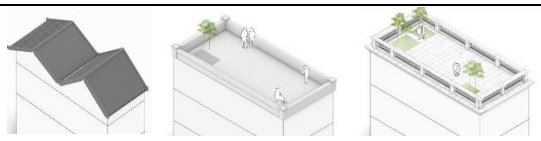
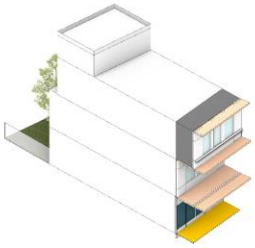
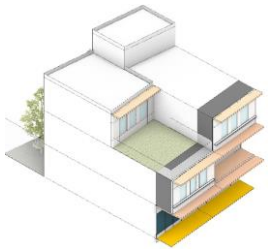
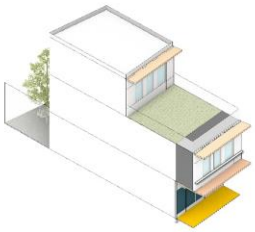
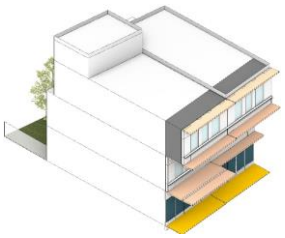
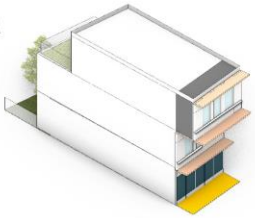
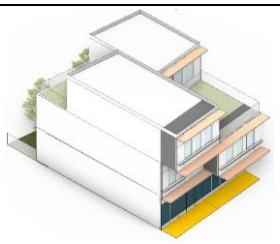
Elevation form		
G	a) Balcony projection length 1.0-1.5m; b) Shape: rectangular balcony slab; c) Balustrade: Considering the privacy problem caused by the passenger flow in the main street, it can be handled as a full package or half package; the style is simplified and the height is 1.1m;	
H	Eave pick out 0.6m; canopy pick out 0.5-1.0m	
This is the dominant type of facade along the route, built and streamlined at scale using a modern approach.		
Architectural features		
I	a. Double-sloped roofs; b. Roofs with man-accessible parapet wall, 1.1m high; c. Roof gardens with fences,	
J	a) The total building height does not exceed 18m according to the conservation documents; b) The height of the first floor is 3.6-4.0m;	
K	Minimum fence height 1.2m, maximum boundary wall possible. Depends on the requirements of the householder.	

Table 6-5 Illustration of architectural diversity in Area 2 (Source: by the author)

Different building unit under the rule	Diversity under the unit combinations	
B1 Building setbacks more for partial additions + full package balcony additions + other detailed rules 	 B1+B2	...
B2 Roof garden + balcony addition + other detailed rules 	 B1+B3	...
B3 Inner courtyard terrace + balcony addition + other detailed rules 	 B2+B3	...
...(Other possibilities)	...(other combinations)	

6.3.3 Functional Requirements

Taking this design plan as an example (Fig. 6-20), The setback area along the street serves as a continuous open interface for public activities, such as small-scale retail, and defines the future function of this area as a new type of business that can combine online and offline retail on the ground floor along both sides of the main street, and residential or office space on the upper floors. Because it is privately owned, the backyard can be used for storage or private activity space (Fig. 6-21).

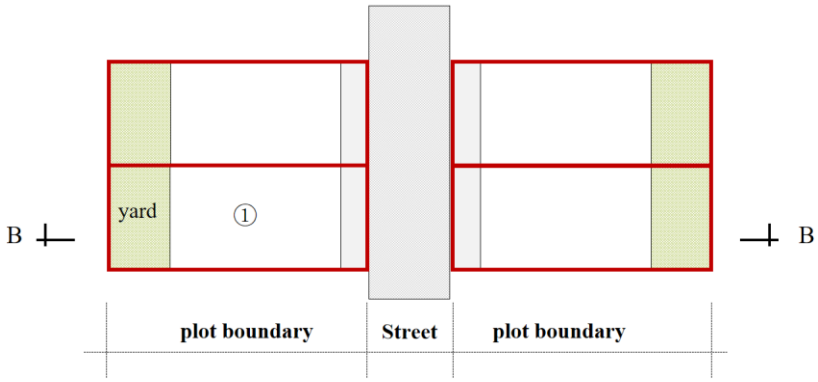


Fig. 6-20 Plan diagram of Area 2 (Source: by the author)

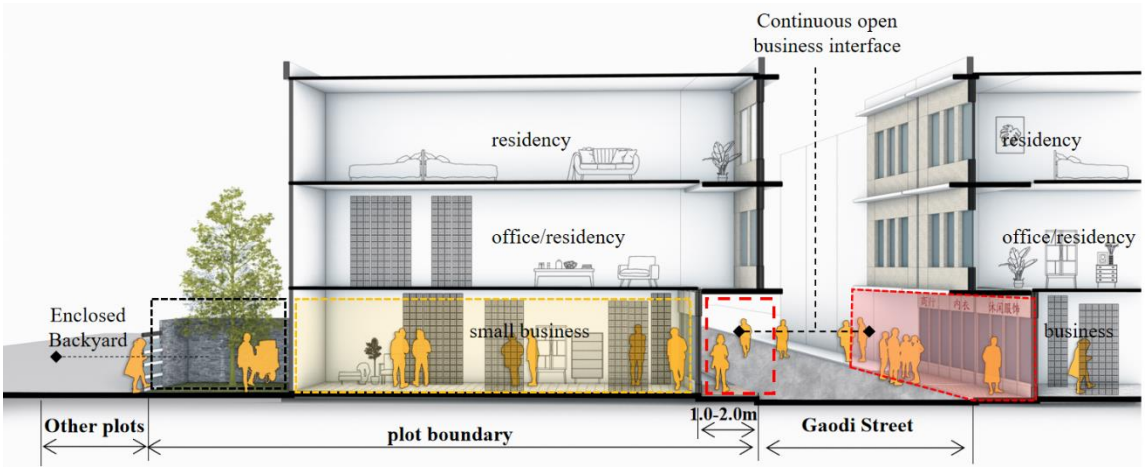


Fig. 6-21 B-B Section functional illustration (Source: by the author)

6.3.4 Axonometric Drawing

The axonometric drawing of Area 2 is as follows (Fig. 6-22).

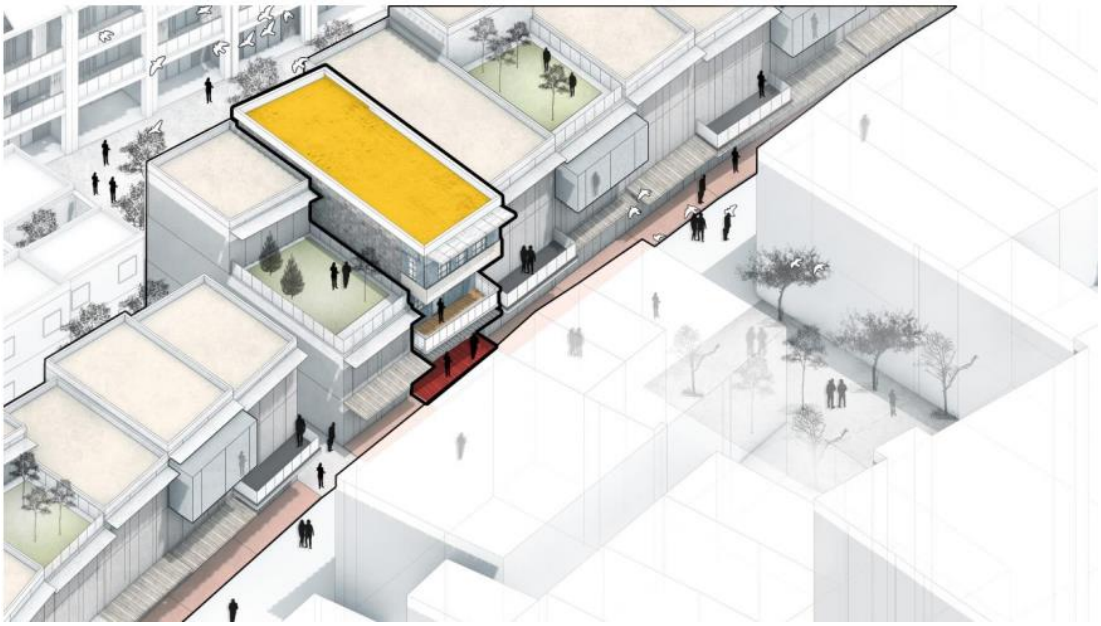


Fig. 6-22 Axonometric illustration of Area 2 (Source: by the author)

6.4 Specific Design for Area 3

Area 3 is situated in the central portion of the site (Fig. 6-23). The previous configuration of traditional bamboo tube houses, arranged in a fishbone pattern, has been dismantled. Only the remaining riding building on the side of Peking Road remains. It is intended that a new Street-Lane-Fang area will be established, comprising cross-shaped sub-streets and lanes. The primary function of this area will be residential and commercial, with ancillary functions such as small plazas, corner greening, and cultural displays. These will serve to attract residents and tourists, while respecting the history and culture of the area. In light of the aforementioned planning objectives, it is imperative to evaluate the proposal of a "new-style bamboo tube house" and formulate pertinent design guidelines. Prior to this, it is essential to gain a preliminary understanding of the evolution of Guangzhou's residential bamboo tube houses.

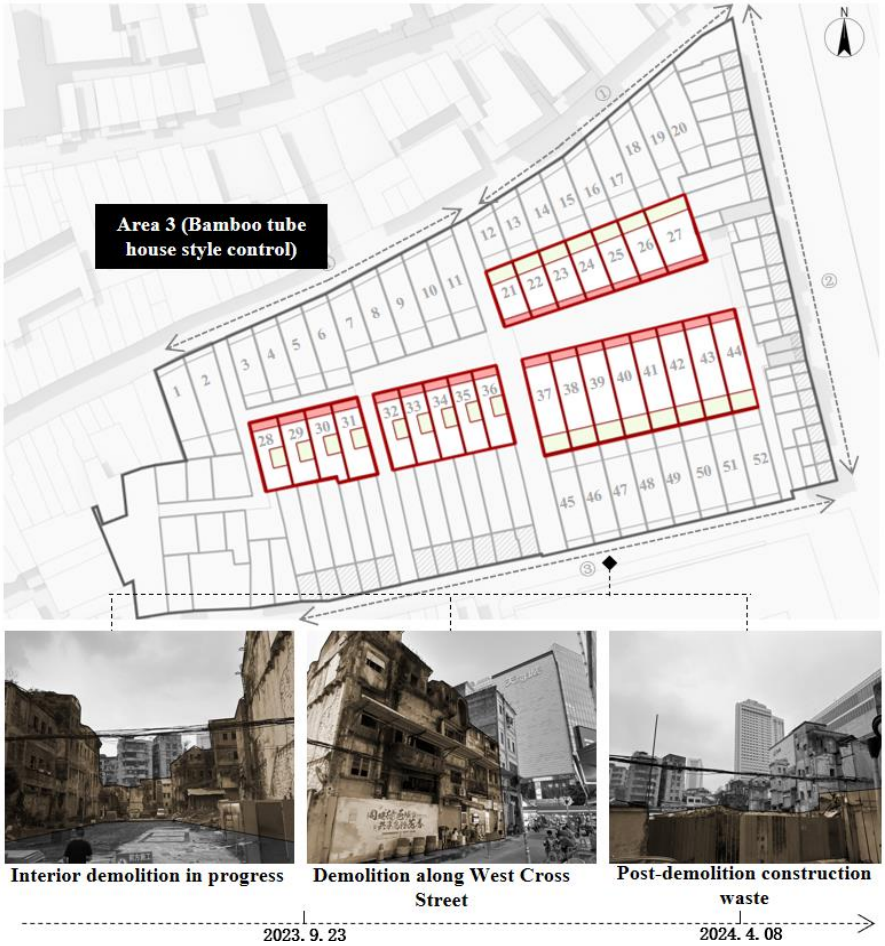


Fig. 6-23 Status of area 3 (Source: by the author)

6.4.1 Evolution of the Bamboo Tube House

(1) Traditional Bamboo Tube House

The bamboo tube house, a common residential architectural style in Guangzhou, is defined by narrow openings and elongated depths. The width of the openings typically ranges from 3 to 4.5 meters, while the depths are as short as 7 to 8 meters. The dimensions of these structures range from 3 to 4.5 meters in width and 12 to 20 meters in length. The ratio of the openings to the depths can reach 1:8. The name "Bamboo tube house" is derived from the resemblance of its plan to the joints of bamboo. At the beginning of the nineteenth century, the population experienced a significant increase, accompanied by a flourishing of commerce and a surge in land prices. In order to optimize the use of space along the street, residents began to expand into the depths of their houses, leading to the emergence of the bamboo tube house. Furthermore, the narrow street facades are capable of withstanding the typhoons and intense sunlight that are prevalent in coastal areas, demonstrating an ability to adapt to the hot and humid climate[57].

In the beginning, Bamboo tube houses were mostly single-storey buildings. As a result of the expansion of foreign trade and the introduction of Western architectural styles, the number of storeys was increased to two or three, and Western elements were incorporated into their appearance. This resulted in the creation of an important physical example of the fusion of foreign architectural styles with local architectural techniques in the Guangzhou. The bamboo tube houses, which still exist in large numbers in the old town, characterize the high-density urban planning of the area.

However, times have changed, the production and living style of the city has changed dramatically, and the traditional layout of bamboo tube house is difficult to meet the contemporary functional needs. Therefore, how to realize the effective transformation and utilization of house to enhance the quality of living space and improve the human environment has become an important issue to be solved.

(2) Problems Raised by the Unusual Evolution of Bamboo Tube Houses

Over time, the traditional bamboo tube house has shown an irrational development trend,

causing environmental and urban design problems in the region. The core of the problem lies in the phenomenon of residential expansion driven by population growth. However, due to the constraints of natural geography and administrative boundaries, Guangzhou's urban spatial expansion has been limited to relieve the pressure on housing, and thus has been concentrated in the old urban areas, where the over-expansion of bamboo tube houses has been particularly severe[58].

The expansion is firstly horizontal, i.e. the transformation of patios or open spaces within plots into dwellings. With the increasing contradiction between population density and land scarcity, residential expansion is not only limited to the ground level, but also develops vertically, turning into vertical extensions, where the original one- or two-story bamboo tube house is built up to three or four stories, which becomes a distinctive feature of the changes in the expansion of bamboo tube houses in Guangzhou. The resulting abnormal increase in plot ratio and building density, the lack of courtyards resulting in poor ventilation and lighting conditions, the lack of public space, the increased risk of fire, the deterioration of the living environment, and the failure to meet the basic standards of human habitat in a number of aspects.

(3) New-style Bamboo Tube House

The contemporary anomaly of the traditional bamboo tube house is an unavoidable consequence of the passage of time. However, if renewed, the house and traditional urban form can be improved in terms of economic efficiency, functional adaptability, and heritage identity. The current idea of the renovation is to restore the core of the building - the patio, to ensure ventilation, lighting, greenery and quality of life, but at the same time to balance the living area. Therefore, the unauthorized part of the building was demolished and then stacked vertically, which not only meets the needs of the patio, but also ensures that the floor area remains basically unchanged (Fig. 6-24).

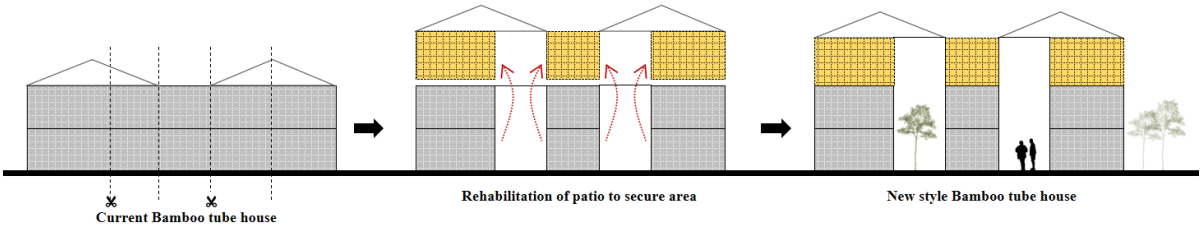


Fig. 6-24 Renovation Strategy (Source: by the author)

Although the area of the previous extension was created through non-compliant means, it was intended to meet actual needs. Reducing the area of the extension solely for the purpose of improving living quality will increase the social risk associated with the renovation project. Furthermore, by restoring the patio and increasing the compliant floor area, the creation of unauthorized building works was effectively avoided, and the fundamental economic efficiency of land use was maintained without reducing the floor area ratio.

Therefore, the following architectural rules were summarized for the reconstruction in the form of a "new-style Bamboo tube house" on the plot of Area 3.

6.4.2 Derivation of Architectural Regulations

(1) Layout Control

The spatial layout of the Bamboo tube house is characterized by a distinctive feature. On the one hand, the elongated and narrow spatial structure incorporates a horizontal extended courtyard. On the other hand, the plan form adheres to the principle of a gradual transition from openness at the front end to closure at the rear. The existing bamboo tube house on Gaodi Street has undergone horizontal expansion due to the growth of small businesses and population density. As a result, the majority of the original patio and courtyard spaces have been transformed into residential or commercial functional spaces. While this has increased the efficiency of the building's use of space, it has also led to a decline in the quality of life for those residing or working there.

Therefore the following requirements are made for plan control:

1) In order to enhance the living environment and improve comfort, the patio area can be expanded or converted into a courtyard space, or the number of patios can be increased in accordance with the depth of the property.

2) As the distinction between the traditional bamboo tube houses and their modern counterparts lies in the increase in the number of floors, the patio must serve the function of vertical transportation. Therefore, the location and size should be adaptable to facilitate the installation of stairs.

3) Furthermore, in addition to the upper floors intended for residential use, the street area must also accommodate the prospective commercial requirements of the house, such as the potential for small restaurants, retail stores, and B&B hospitality.

In summary, there are two floor plan layout patterns for the new-style Bamboo tube house, while the specific functional arrangement of the rooms is determined by the design of the head of the household (Fig. 6-25).

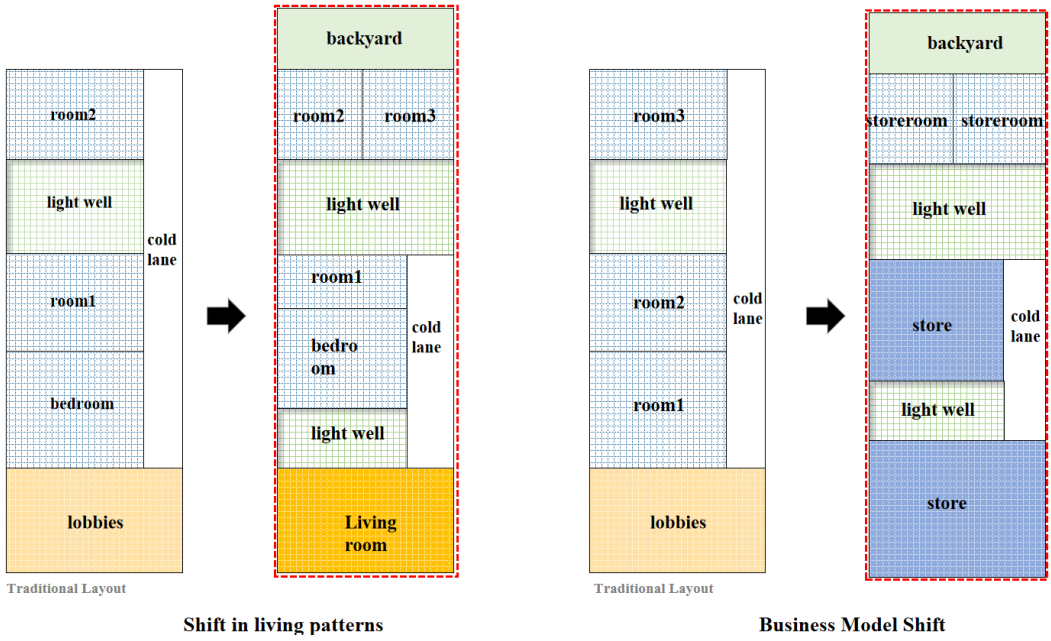


Fig. 6-25 Floor plan layout of a modern bamboo house (Source: by the author)

(2) Control of the Spatial Relationship Between the First Floor and the Street

1) According to the above requirements, the first floor should be used for residence or shop, so the first floor should form a setback relationship with the street or public area. If it is a shop, it must take into account the space for people to gather and stay for a short time, so the setback is 1.0-2.0m; if it is a residence, it only takes into account its internal use and privacy boundaries, so there is no need to make too much of a setback, only 1.0-1.5m (Fig. 6-26).

2) The projections of the boundaries of buildings and their constituent elements (e.g.,

canopies, balconies) on the first floor and above do not extend beyond the street boundary of the plot (Fig. 6-26).

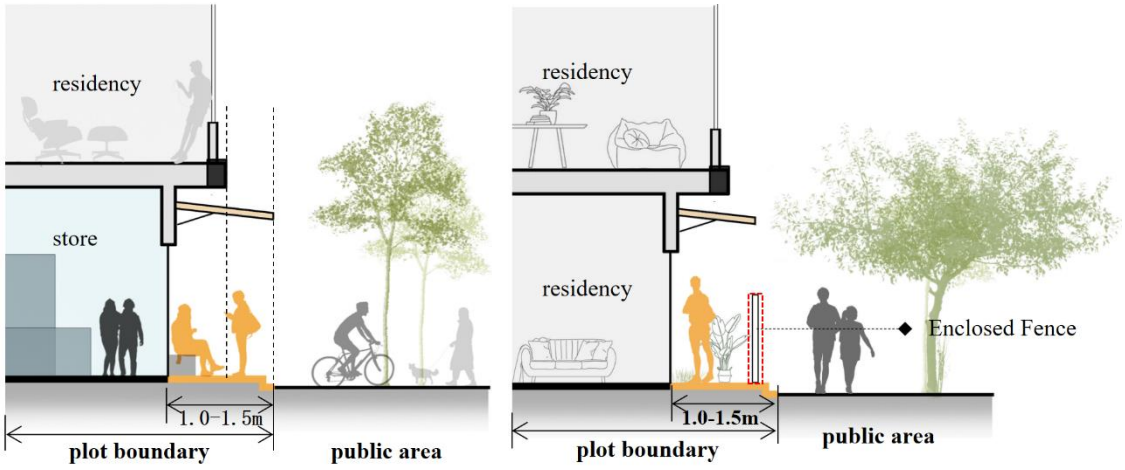


Fig. 6-26 Spatial relationship between the first floor and street interface (Source: by the author)

(3) Elevation Form Control

1) Schematic composition of the facade: From the existing traditional bamboo tube house facade, the elements and characteristics of the components are extracted (Fig. 6-27), such as the double-sloped roof, the crescent balustrade, and the grille separation, etc., and the core parts are preserved. Then, a moderate scale of construction is carried out with modern means to optimize the facade appearance and living experience.

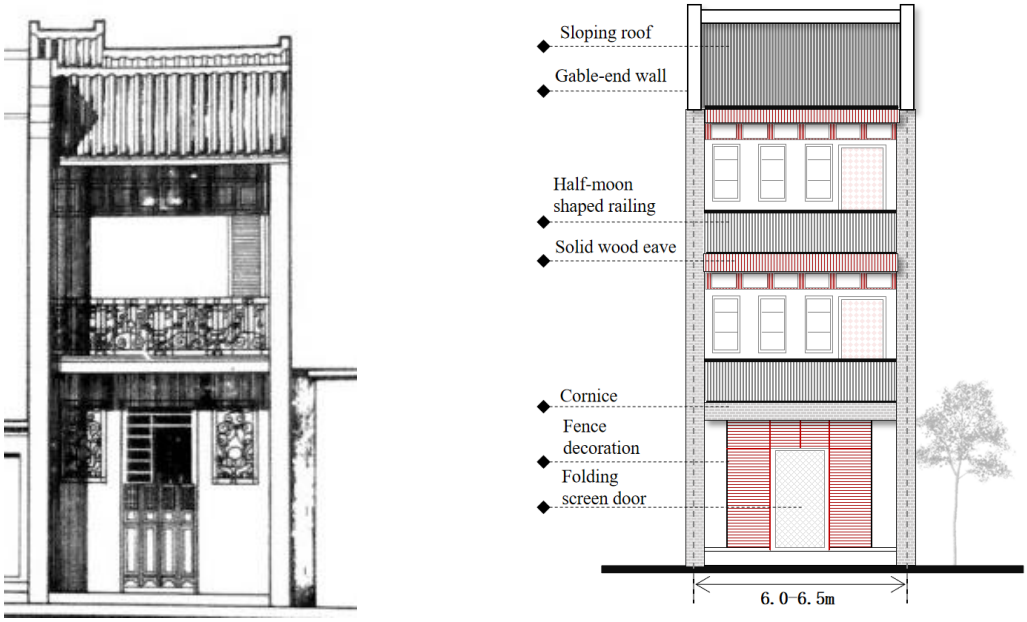


Fig. 6-27 Extraction of traditional facade elements (Source: by the author)

2) Facade separation and form:

a. Vertical density is not strictly required, just follow the width scale of the lot. However, it should follow the horizontal density of the traditional facade, about 3-3.6m, consistent with the height of the floor.

b. For traditional components, materials, and separation forms, etc., the old can be removed.

c. Continuation of necessary facade components such as: pitched roof form, solid wood closed eaves boards, crescent balustrades, railings, screen doors, etc., and can be updated and replaced with modern materials on this basis.

d. Each floor can be set terrace, flexible treatment of its space form. Such as indoor local two-layer height treatment, the balcony can be set up to the third floor, to ensure a good indoor landscape. In addition, half of the terrace space can also be considered to increase the interaction of internal living.

3) Number of exposed facades: The traditional house has three elevations adjoining the neighboring buildings, with poor ventilation and lighting. Therefore, the plot layout was designed to ensure that only two long sides of the plan are adjacent to neighboring buildings, providing setback areas on both the front and back elevations, better lighting and ventilation, and a recreation space in the backyard (Fig. 6-28).

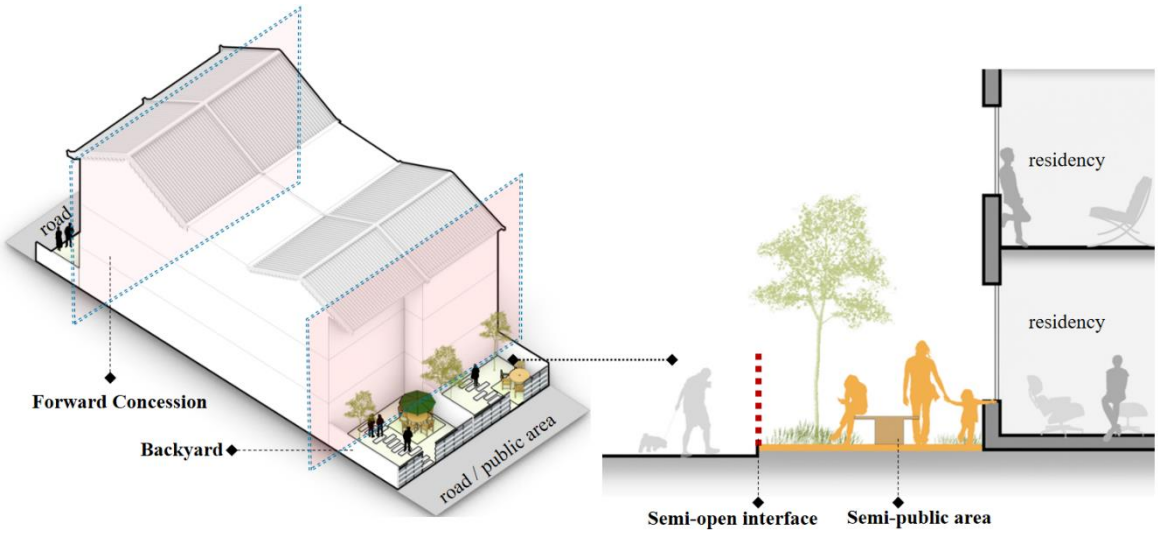


Fig. 6-28 Illustration of front and back interface concessions (Source: by the author)

(4) Roof Form Control

Continuing the tradition, the double-sloped roof form is used, but the material and style

can be modified. Also, if the structural load allows, it can be combined with the patio and the surrounding platform area to create recreational spaces such as terraces, roof gardens, etc., supplemented with sunshading elements or greenery (Fig. 6-29).

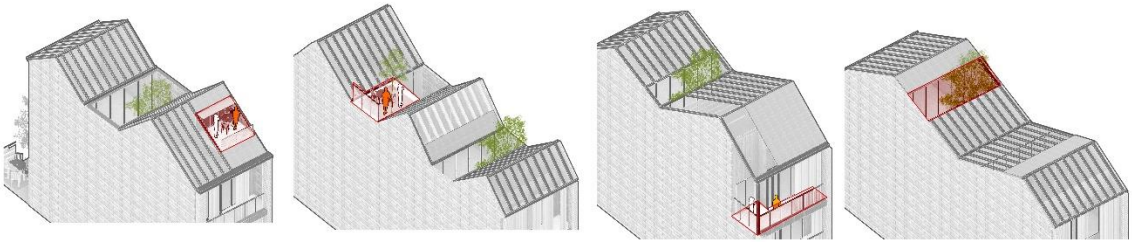


Fig. 6-29 Roof space utilization (Source: by the author)

(5) Height and Number of Storeys Control

In order to ensure good living quality, to restored patio and sufficient floor area, the new-style Bamboo tube house needs to have some additional floors, but not more than 4 floors. And the overall building height is harmonized with the surrounding, no higher than 18m with reference to the normative documents.

6.4.3 Architectural Sample Schematic

By analyzing the problems of the traditional bamboo tube house and combining the improvement strategies and design rules, the representative architectural prototypes in Area 3, the new-style bamboo tube house (Table 6-6) and the diversified design variants were established (Table 6-7).

Table 6-6 Sample illustration of building regulations for area 3 (Source: by the author)

Position	**Building layout**
A	The width of the plot is taken as 5.5-6.5m according to the rules of plot layout.
B	Ground floor stores, front setback 1.0m-2.0m; if residential, front setback 1.0-1.5m.
C	Plot depth is set by combining the width to depth ratio of 1:3 to 1:3.6.
D	Rear setbacks less than 1/4 of the length of the plot.
Elevation form	
E	The density of the first floor facade separation is based on functional requirements, while the other floors do not strictly require vertical density.
F	The traditional Bamboo tube house is built next to each other on three sides, and the new Bamboo tube house has open front and rear elevations.

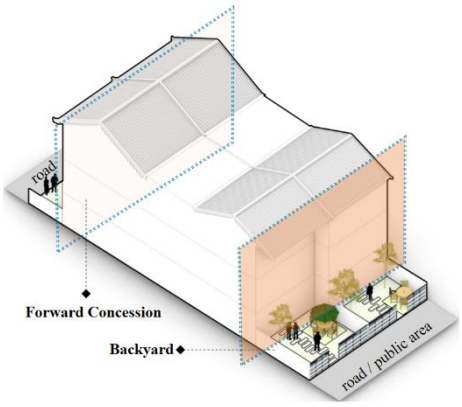


Table 6-6 Sample illustration of building regulations for area 3 (continued)

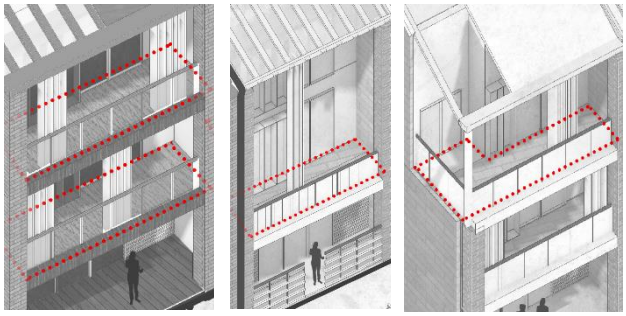
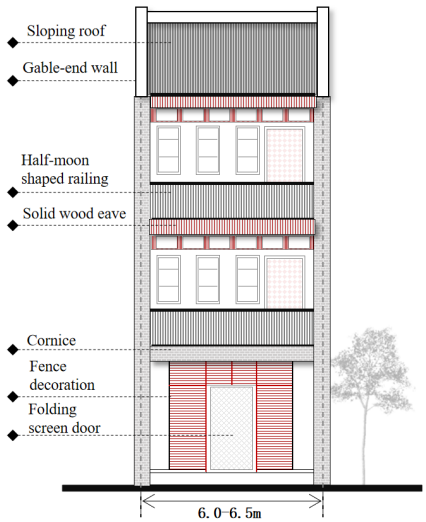
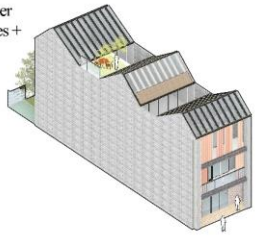
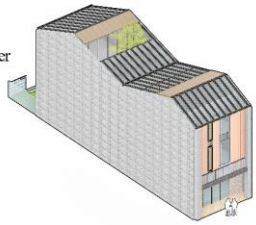
Elevation form		
G	Terraces on each floor, with flexible handling of their spatial form; picket length 1.0-1.5m, not exceeding the front boundary.	
H	Eaves pick out 0.6m.	
From the traditional Bamboo tube house facade, key elements and features such as double-sloped roof, half-moon balustrade, and lattice partition are extracted.		
Architectural features		
I	Adopting double-slope roof, suggesting to update the material and practice; providing balcony, roof garden, etc. when condition permits.	
J	The number of patios is determined according to the depth of the plot, not more than 2; the depth of the patio does not exceed 4m.	
K	a) The total building height does not exceed 18m according to the conservation documents; b) The height of the first floor is 3.6-4.0m;	
L	Minimum fence height 1.2m, maximum boundary wall possible. Depends on the requirements of the householder.	

Table 6-7 Illustration of architectural diversity in Area 3 (Source: by the author)

Different building unit under the rule	Diversity under the unit combinations		
C1 Rooftop terrace + varied facade treatments + other detailed rules 	 C1+C2	 C2+C3	...
C2 Increase the number of patios + roof terraces + other detailed rules 	 C1+C3	 C2+C4	...
C3 Flexible balconies + roofing practice updates + other detailed rules 	 C1+C4	 C3+C4	...
C4 Through-height balcony area + roof practice updates + other detailed rules  ...(Other possibilities)	...(other combinations)	...(other combinations)	

6.4.4 Functional Requirements

This plan diagram as an example (Fig. 6-30), the functional layout of this area can be configured in two ways. One option is to utilize the ground floor as a retail establishment, bed and breakfast reception area, coffee shop, or similar, while the upper floors are designated for residential use. The ground floor setback along the street can be designated as an activity space. However, due to the private nature of the property, the backyard is restricted for internal use only and can be designated as an activity or business space for the owner of the ground floor business (Fig. 6-31).

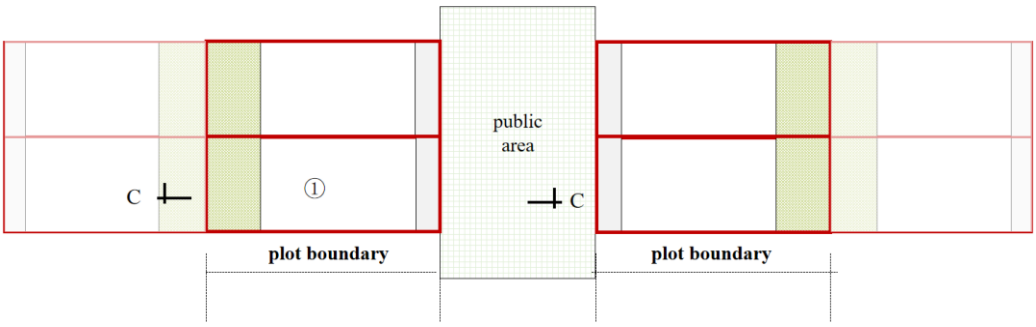


Fig. 6-30 Plan diagram of Area 3 (Source: by the author)

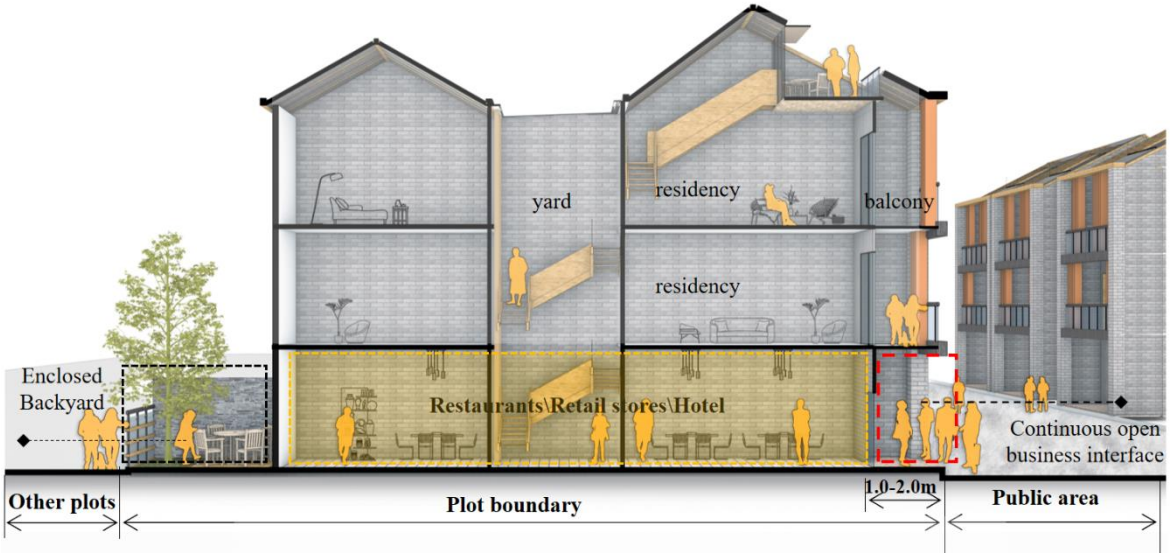


Fig. 6-31 C-C Section functional illustration I (Source: by the author)

The second is the whole as a residence, which belongs to a single family or the head of the family rents out the upper floor, and the backyard is for the private use of the head of the family only. Considering the privacy issue, transportation is set up in a different way. If it is a single-family house, the head of the household can set up an internal staircase; if it is rented out, the transportation of the ground floor and the upper floor must be set up separately and independently (Fig. 6-32).

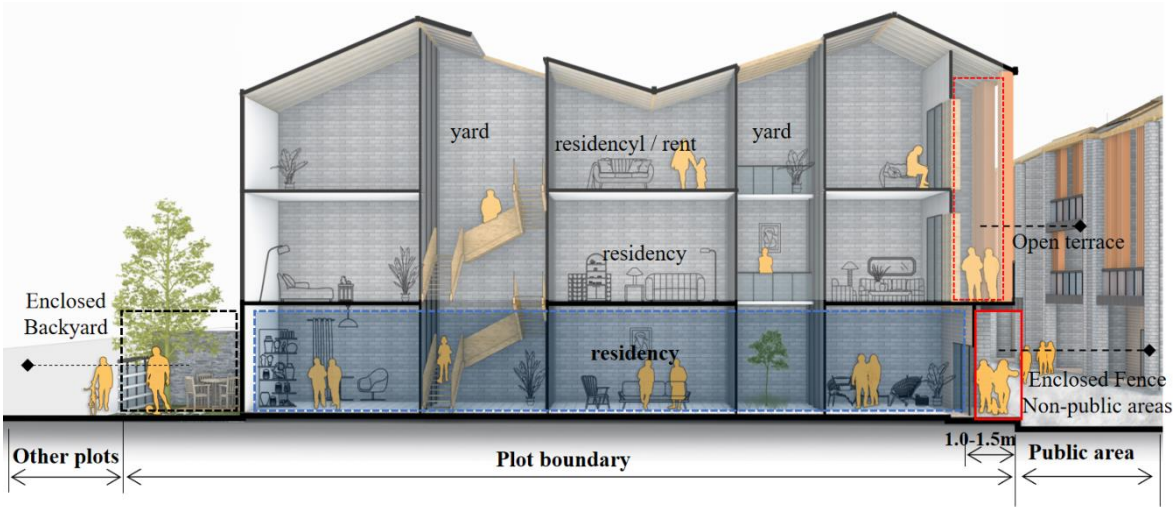


Fig. 6-32 C-C Section functional illustration II (Source: by the author)

6.4.5 Axonometric Drawing

The axonometric schematic of Area 3 is as follows (Fig. 6-33).

Fig. 6-33 Axonometric illustration of Area 3 (Source: by the author)

6.5 Design Proposal for Area 4

This area is located on the eastern side of the site, adjacent to Beijing Road. The district's current situation differs from that of other districts in that it is primarily characterized by historical riding buildings (Fig. 6-34), with a high degree of correlation between its architectural forms and the integrity of the street interface. However, there are still some

general problems that remain (Fig. 6-35): (1) The street facade reflects the superimposed effect of historical evolution and multiple additions, resulting in the loss of the original style characteristics; (2) The elevated colonnades have undergone multiple rounds of renovation, with different styles and weaker vertical separation; (3) The roof additions are disorganized in terms of material and color; (4) There are blank areas of buildings caused by old repairs and demolitions; (5) The interface continuity is poor. (3) The materials and colors utilized in the construction of roof additions are haphazard and lack cohesion; (4) The continuity of the architectural interface is compromised, and there are architectural voids resulting from previous repairs and demolitions; (5) The architectural components are in a state of disrepair.

Fig. 6-34 Status of area 4 (Source: by the author)

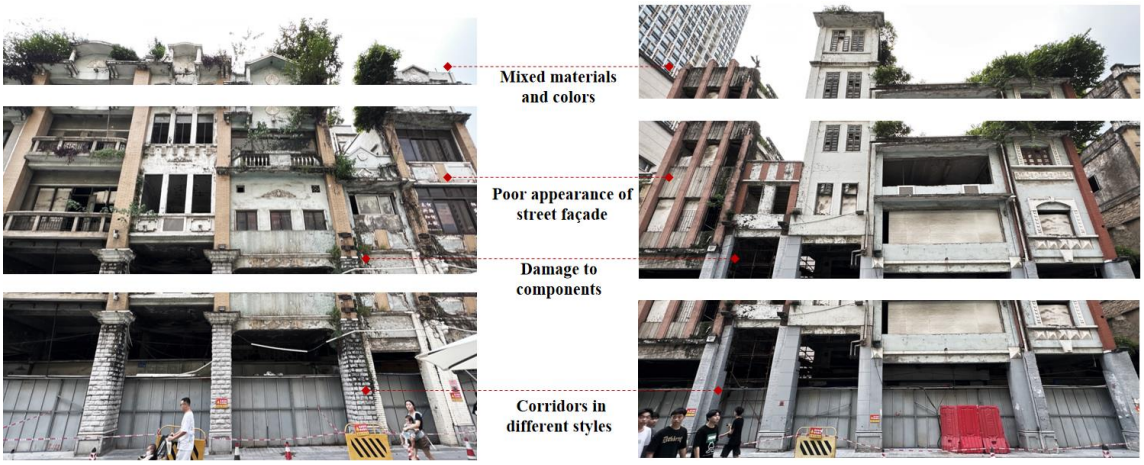


Fig. 6-35 Existing problems in Area 4 (Source: by the author)

With this in mind, the future planning strategy for Area 4 is to optimize and renovate the riding house based on the existing layout of the plot to avoid large-scale demolition and construction. A localized new building design is recommended based on the dimensions of the plot width. In addition, it is recommended to refine the morphological control features of the facade of the riding house that can be inherited, and to carry out restoration and renewal of the facade. While respecting the historical features, new materials and styles should be introduced in order to reactivate the commercial value of the space.

6.6 General Plan and Axonometric Schematics

After a detailed study of the architectural rules of the plots in each area, the resulting axonometric schematic (Fig. 6-36) and general plan (Fig. 6-37) are only one of many morphological possibilities and are not unique, but are for illustrative purposes only.

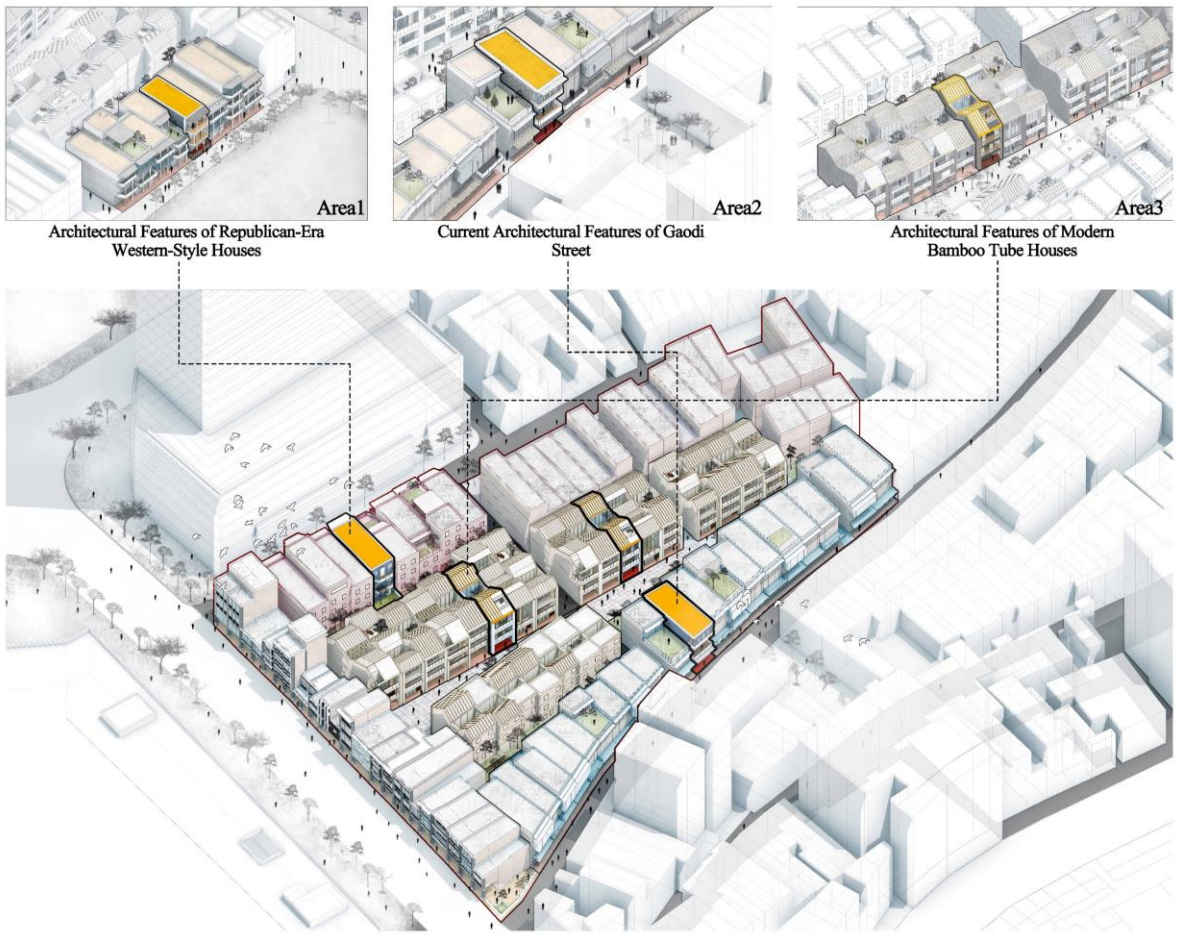


Fig. 6-36 Axonometric Schematic (Source: by the author)

Fig. 6-37 Master plan schematic (Source: by the author)

6.7 Summary

This chapter employs the Gaodi Street redevelopment land parcel as a case study to elucidate the zoning principles and rule-setting ideas of urban design, and to conduct an exhaustive design analysis for specific zones. In accordance with the plot plan, the land parcel is subdivided into four distinct zones, each reflecting the current street frontage situation around the site and the morphological characteristics of the internal Street-Lane-Fang area. Adaptive urban design rules are then formulated for each zone. These rules are constructed from multiple dimensions, including the spatial relationship between the street and the first floor, the facade form, the roof form, as well as the floor height and the number of storeys. The objective is to effectively control the building form and guide the subsequent design.

In conclusion, this chapter illustrates the urban design methodology, from the land parcel plan to the formulation of architectural rules, through the example analysis of the Gaodi Street redevelopment plot. This provides a reference for the renewal and renovation of similar historical districts.

Conclusion and Prospects

1. Conclusion

This study focuses on the method of urban renewal based on land parcels, with the redevelopment plot of Gaodi Street in Guangzhou serving as the application object. The research methodology employed involves a comprehensive analysis of the current situation, a systematic identification and categorization of problems, a rigorous theoretical sorting, and an in-depth historical evolution analysis.

Firstly, the various problems faced by Gaodi Street historical district are analysed and summarised, and relevant theoretical research is adapted accordingly. Accordingly, we undertake a systematic sorting of the relevant theories of plot urbanism and Italian typological morphology, thereby revealing the commonality of their research paths and methodologies. Furthermore, we underscore the significance of the delineation mechanism of the plot as a key element in the evolution of urban morphology for the regeneration of the urban fabric. By analyzing the key elements, including street and lane morphology, plot division, and building layout, we demonstrate that the plot serves as the basic unit for the evolution of urban morphology.

Secondly, an archaeological study of historical maps of Gaodi Street reveals that the Street-Lane-Fang texture morphology is closely related to the formation of the zoning. It is thus concluded that the street network and zoning of Gaodi Street are deeply influenced by natural geographic conditions, historical evolution, and property rights structure, which have formed a unique texture characteristic and thus constructed the design framework.

Finally, the above mentioned morphological characteristics of the Street-Lane-Fang related to the plot are applied to the planning and design of the existing area. Firstly, a plan layout of the land parcel is made on a plot unit basis, and the specific layout is schematized through a drawing. In this floor plan layout, the two-dimensional plot regulations are defined. Based on the plot and its surrounding conditions, buildings with different stylistic characteristics are identified, leading to the derivation of corresponding design guidelines and

architectural sample diagrams. This meets the need for residential quality and creates architectural diversity, while at the same time respecting the local culture and perpetuating the historical character within the constraints of the plot rules.

2. Innovation

(1). In terms of research methodology, the combination of plot urbanism and typology theory is applied to urban renewal design, and an urban design framework based on plot division is proposed. By refining the morphological characteristics of historical land parcels, adjusting the street and lane system, establishing the rules of architectural design, and utilizing other refined design tools, the diversity and functionality of buildings are enriched, and specific and feasible operational guidelines are provided for the renewal of historical districts.

(2). In terms of application prospects, this method can also provide a reference for the transformation of land parcels to be redeveloped in other similar urban historical areas, thereby preventing the obliteration of historical vestiges associated with the subdivision of land parcels. By beginning with the morphological substrate, rational subdivision of plots and formulation of architectural design rules through the manipulation of history can effectively continue the morphology of the historical district.

3. Limitation

(1). The discussion of plot rules is constrained by the dearth of information on certain cadastral maps. The reasoning and formulation are predominantly based on historical documents and on-site research. Conversely, there is a lack of more diverse perspectives in the process of formulating building rules, and there is still scope for further in-depth refinement of different details.

(2). While localized design methods and plans are proposed, further research and practical verification are needed to determine how to better combine the improvement of the quality of life of local residents and the needs of economic development in the concrete

implementation.

4. Prospects

In future research, the theoretical application of plot-based urbanism and typology should be further expanded to explore its applicability in other urban renewal projects. At the same time, an important direction of future study will be to promote the intersection and integration of plot-based urban renewal methods with other related fields, such as urban planning, architectural design, and cultural heritage preservation, in order to form a more comprehensive and systematic practical model. Furthermore, the value of this research extends beyond the specific case of Gaodi Street. It also has broader implications, providing important references and insights for the preservation and renewal of other similar historical districts.

(1). Universal Applicability: The plot-based regeneration design approach proposed in this study, which focuses on identifying and preserving the land subdivision and street patterns of historical districts, offers a core concept and methodology that is applicable to other cities with similar historical backgrounds and district forms.

(2). Promoting the Retention of Local Characteristics: In the context of rapid urbanization, many historical districts face the risk of demolition or homogenization. This study, through detailed land subdivision and architectural regulations, preserves the uniqueness and local characteristics of the district, offering a replicable model for other cities to maintain cultural diversity and local identity during urban renewal.

(3). Enhancing Community Participation and Sense of Belonging: Future efforts should focus on strengthening the importance of resident participation in district renewal. Through communication and collaboration with residents, not only can the feasibility of the plans be improved, but a stronger sense of recognition and belonging can also be fostered. This bottom-up community engagement model can be applied to other urban renewal projects as well.

(4). Bridging Policy and Practice: Based on this research, a combination of government

policies and practical operations can be implemented through policy guidance and multi-party coordination, ensuring the smooth execution of plans. This approach provides valuable insights into how to coordinate the relationships between the government, developers, and residents in similar urban renewal projects.

(5). Enhancing Urban Cultural Soft Power: By preserving and showcasing the historical culture of Gaodi Street, this study strengthens Guangzhou's status and influence as a historical and cultural city. This methodology can also be applied to other cities to enhance their overall urban image and cultural depth.

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During my undergraduate studies, I completed my academic tasks in a methodical manner, which gave me a sense of stability shaped by my habitual thinking patterns. However, during my graduate studies, I increasingly felt the need to break free from this sense of stability. I sought unconventional experiences, from studying abroad in Europe to traveling across various countries, which not only broadened my horizons but also deepened my foundational perspectives on various issues. Now, I find myself more resolute and determined, actively pursuing my established plans while also having the courage to say no, approaching challenges with confidence and composure.

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Finally, I would like to say that after over twenty years of studying, I have only recently begun to contemplate how I should present myself in my future as a graduate student. To be honest, I still don't have a clear answer. I feel there should be a moment when we can temporarily step away from everything, free ourselves from all social connections, and be completely alone in unfamiliar surroundings—much like an astronaut lost in the vastness of space. I believe this feeling must exist.