

Article

Housing Renovation Evaluation in Perspective Landscape Conservation Zone for Preservation of Historical Neighborhoods and Landscapes: A Case Study of Qishan Old Street in Kaohsiung City, Taiwan

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Abstract: The preservation and remodeling of buildings have been contradictory issues all the time in Taiwan, and preservation oftentimes means a smaller floor-area ratio and less economic benefit. Thus, house owners are generally against building preservation policies. In order to eliminate the opposition of house owners whose buildings have higher floor-area ratios and cannot make use of them for preservation, we look into the possibilities of developing the houses of different historical significance in the “perspective landscape conservation zone” for a maximal volume of each building. We aim to enable each building to make full use of its floor-area ratio and, at the same time, to maintain the streetscape. Several types of remodeling for single or semi-detached structures are recommended by taking into consideration the needs of daily life in modern times as well as the appearances of the old street. Based on the abovementioned remodeling approach, the findings of the current study are as follows: (1) it helps to keep the minimal preservation of facades and arcades, (2) it appears to maintain the maximal preservation of facades, arcades, and atrium of the first layer of compounds, (3) the depth of the building sites must not be shorter than 16.5 m to make full use of the 240% floor-area ratio, (4) 62 out of the 95 simulated cases of the study are able to make full use of the floor-area ratio, and (5) the building sites with larger depth ratios (two layers of compounds with an atrium in between) are able to have physical preservation as well as the lifestyle and images of the sites. As the floor area is not used up, it is recommended to transfer the development rights to the remaining floor area or to another place for avoiding the loss of the original housing economic benefits. At last, a timely, flexible, and diverse option for volume controlling is set up so the street is preserved in time through appropriate approaches. Hopefully, the partial preservation and remodeling approach allows the preservation of the historical environment in practice without sacrificing the floor areas that the house owners would like to preserve in general.

Keywords: Qishan old street, Simulation for remodeling, Perspective landscape conservation zone

1. Introduction

Taiwan's neighborhood preservation work has to meet two conditions. One is that owners have rights to their favorable floor-area ratio because of the historical building being privately-owned, and the other is that we also need to preserve historic neighborhoods and landscapes. Now, we face four issues: (1) the two-sided problem of “preservation” and “renewal” from the discussion of the historical building and how to create a win-win situation, (2) the “strategic” and “tools” for historical building preservation and a way to benefit such preservation work, (3) eliminating the opposition of property owners whose buildings have higher floor-area ratios and making them preserved, and (4) looking into the possibilities of developing the “perspective landscape conservation zone” with a maximal volume of each building with different historical significance. It is necessary to enable each building to make full use of its floor-area ratio and, at the same time, to maintain the streetscape. Several types of remodeling for single or semi-detached structures are recommended, by taking into consideration the needs of daily life in modern life as well as the appearances of the old street.

2. Qishan Historical Neighborhoods and Their Preservation Value

The Qishan Street House was completed during the Japanese occupation period. It has been built more than 70 years ago during the Japanese occupation period. It is a Baroque-Like building with great historical value. Its facade and gable are also the most historical preservation value of Qishan Street House. The overall image of the block facade is shown in Figs. 1–3.



Fig. 1. Scenery of the Qishan old street.



Fig. 2. Facades of houses in the Qishan old street.



Fig. 3. Gable of the houses in the Qishan old street.

The scope of this study is the Qishan Zhongshan Road (the road width is about 11 m) whose street number is No. 71–107 Zhongshan Road. There are 20 buildings in total. The structure of the buildings is mainly brick buildings, and the buildings have mostly 2 to 3 floors. A small number of buildings have been converted to have the 4th floor. The building coverage ratio and the floor-area ratio of the houses in this area is 80% and the floor-area ratio is 240%.

3. Methods

The goal of house renewal is to perform simulation operations under the premise that the floor-area ratio is used up, and try to simulate the possibility of "partial preservation" and "partial renewal" of various buildings. In addition to it, we propose a strategy to preserve historic neighborhoods and landscapes. It is a common development type for buildings to be renewed by a single house or combine multiple houses. Compared with the renewal of a single house on a renewed plane, the combined multiple houses are conducive to a suitable plan that is convenient for use, and the interior can also be configured with reasonable space. In addition to the simulation of the renewal of a single house, the follow-up floor-area ratio control simulates the joint construction of more than two buildings, providing more diversified options for the partial preservation and partial renewal of the houses.

3.1 Perspective Landscape Conservation Zone

We adopt "partly preservation, partly renewal" as a way of the renewal of these traditional houses. We simulate the shape of buildings by "volume control", and use it for "the restrictive line of historical landscape preservation" to control the height of the reconstructed space. Originally, the "perspective landscape conservation zone" is the main technique for house renewal. We use this technique to discuss the common problem of the historical area which are "preserved" and "renewed". The "perspective landscape conservation zone" method also helps to discuss the capacity of house renewal. The result is used for win-win preservation and renewal.

A building is divided into various units (such as elevation, arcade, and first intake space) to preserve the historic and important parts, while other parts are altered or added to have the qualities of modern life and increase the building volume without affecting the overall historical features of the street environment (Fig. 4).

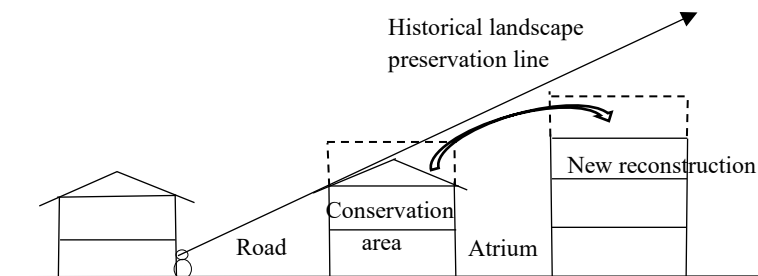


Fig. 4. Diagram of "volume control" for renewal.

To allow a house to be reconstructed while preserving the historical architectural landscape, we propose the reconstruction methods of different preservation levels with the four principles of the perspective landscape conservation zone mode (Figs. 5 and 6).

- (1) The idea of "Minimum preservation space" means "limited preservation work", partly conserved and partly renewed.
- (2) The basis of legal norms for preservation is the Building Act not with "Implementation Rules for the Cultural Heritage Preservation Law".
- (3) Preservation tools: " Perspective Landscape Conservation Zone " and " historical landscape preservation line"
- (4) Reasonable indoor configuration: In response to the value of life today

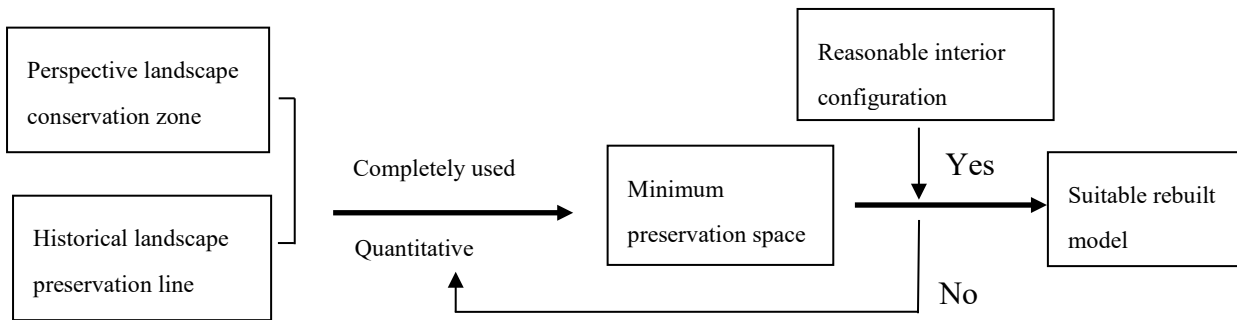


Fig. 5. Process for the perspective landscape conservation zone model.

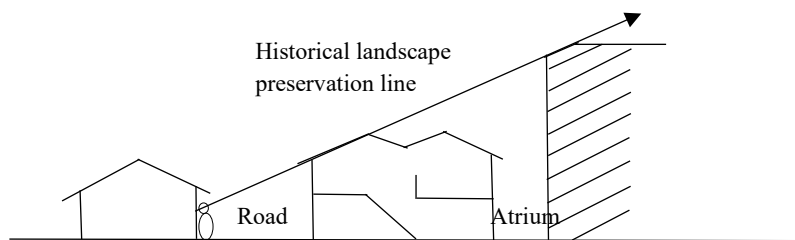


Fig. 6. Diagram about the historical landscape preservation line for the preservation area and renewal area.

Five architectural preservation levels of "Partial Preservation and Partial Renewal" are as follows (Fig. 7).

- (1) The minimal preservation range: building facade
- (2) The secondary preservation range: the building facade to arcade
- (3) The third preservation range: the building facade to the first entry space
- (4) The fourth preservation range: the building facade to the atrium
- (5) The fifth preservation range: the building facade to the second entry space
- (6) The maximal preservation range: preserve all space

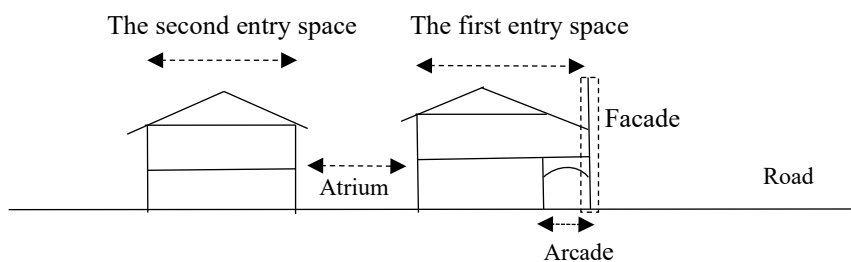


Fig. 7. Six levels of the house preservation

4. Results

The architectural simulation method of historical building preservation is designed in two types: short base and deep base. We use "single house renewal" and "multiple houses renewal" to simulate these buildings' renewal.

4.1 Simulated Design Drawings of the Short Base

There are 33 simulation renewal plans for the short base. The houses are affected by insufficient base depth and historical landscape control lines. Therefore, 240% of the floor-area ratio cannot be used up in any simulated case. The maximum perspective landscape conservation zone of the short base is the facade and the arcade (Tables 1 and 2).

Table 1. Renewal plan and floor-area ratio use of the single house renewed cases for the short base

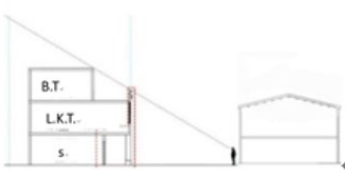
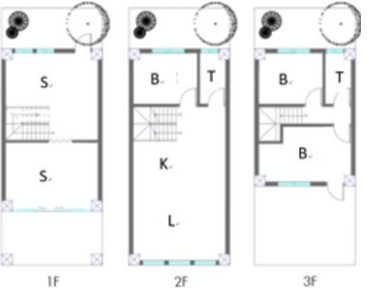
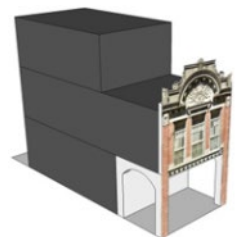
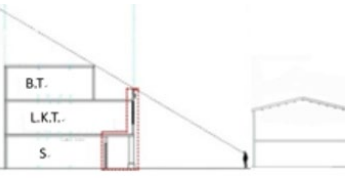
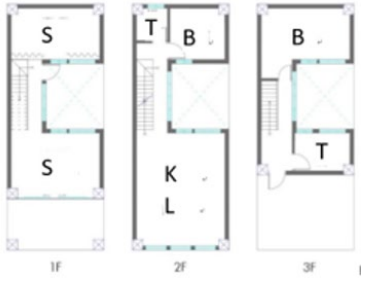
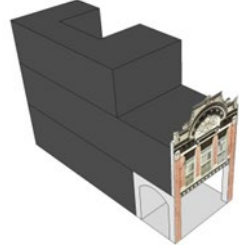

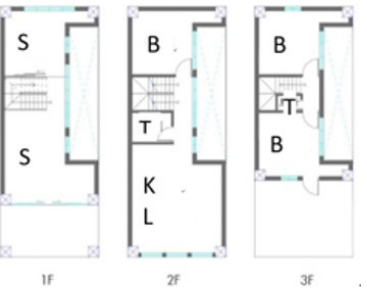
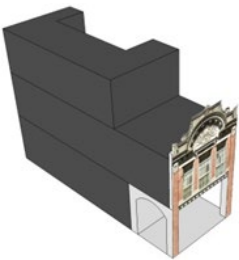


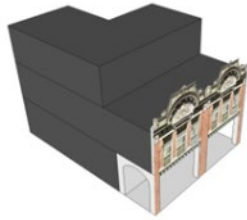


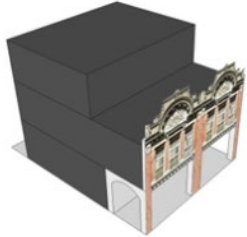

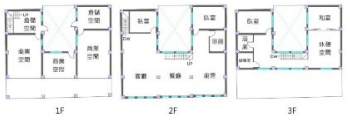
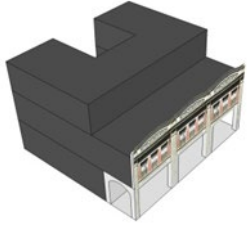
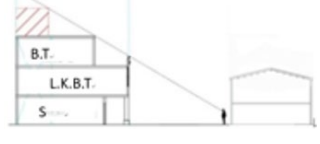

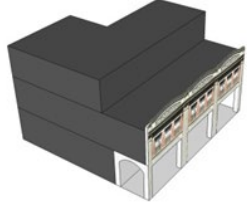

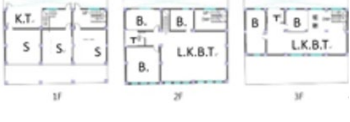
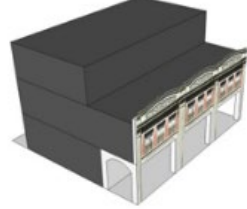
	Drawings under Historical Landscape Control Line	Renewal Plans	Perspective Drawings	Floor Area Ratio
Case 1				200.4%, unused
Case 2				201%, unused
Case 3				201%, unused

Table 2. Renewal plan and floor-area ratio use of the multiple houses renewed cases for the short base.

	Drawings under Historical Landscape Control Line	Renewal Plans	Perspective Drawings	Floor Area Ratio
Case 1				240% , used up
Case 2				198.5%, unused
Case 3				201.3%, unused
Case 4				201.3%, unused
Case 5				119%, unused

4.2 Simulated Design Drawings of the Deep Base

There are 62 simulation plans for the renewal with the deep base. The houses are affected by insufficient base depth and historical landscape control lines. Therefore, 240% of the floor-area ratio can be used up in any simulated case. The maximum perspective landscape conservation zone of the deep base is the facade, arcade, and the first entrance to the first atrium (Tables 3 and 4).

Table 3. Renewal plan and floor-area ratio use of the single house renewed cases for the deep base



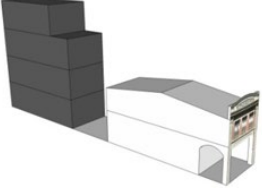


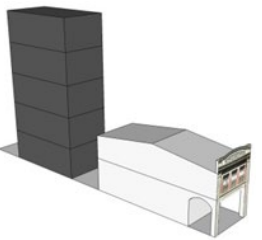


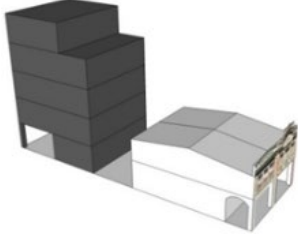


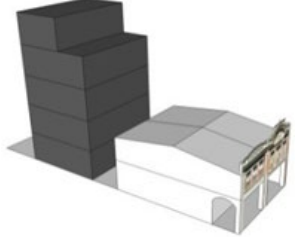


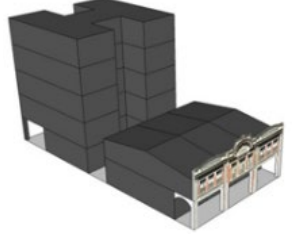

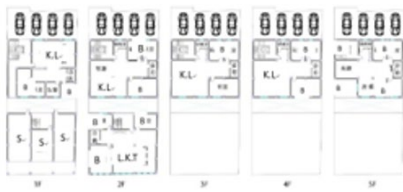
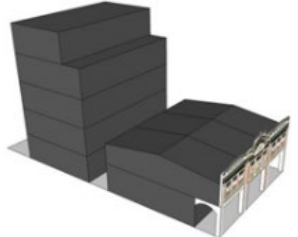
	Drawings under Historical Landscape Control Line	Renewal Plans	Perspective Drawings	Floor Area Ratio
Case 1				240%, used up
Case 2				240%, used up

Table 4. Renewal plan and floor-area ratio use of the multiple houses renewed cases for the deep base

	Drawings under Historical Landscape Control Line	Renewal Plans	Perspective Drawings	Floor Area Ratio
Case 1				240%, used up
Case 2				201%, unused
Case 3				240%, used up
Case 4				240%, used up

5. Discussion

From the simulated design drawings of the renewal, it is found that the building preservation and renewal plan is greatly affected by the depth of the building base and also affects the preservation range of the building due to the limitation of the historical

landscape control line. The building preservation area of the short base preserves the gable facade of the building, while the preservation of the building of the deep base preserves the first entry or more.

According to the restriction of the "historical landscape control line", the first entry and the third floor of the building within the research area must be retracted by 3.67 m, and the fourth floor or above must be retracted by 8.71 m to be built. The volume is not easy to use and complete. The second entry space of the deep base building can be increased to five or six floors under the limit of 240% of the floor-area ratio, and the volume can be easily used up (Figs. 8 and 9).

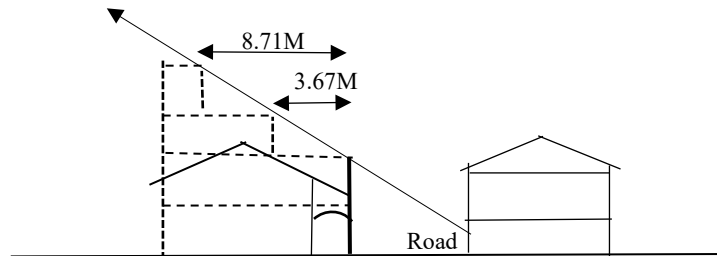


Fig. 8. Schematic diagram of the renewal and preservation of the short base

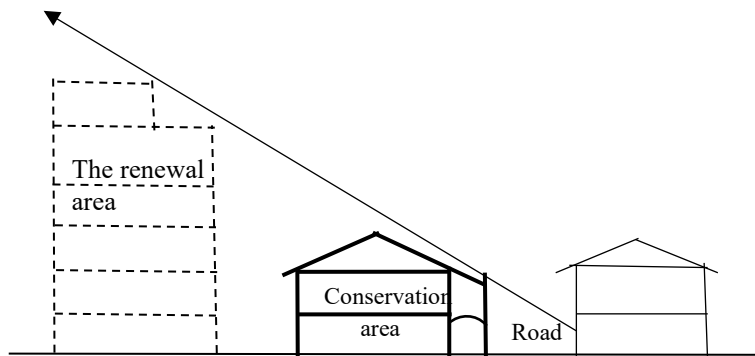


Fig. 9. Schematic diagram of the renewal and preservation of the deep base

The preservation range under the maximum floor area utilization rate usage is as follows. The preservation area is the gable facade and arcade space and the reconstruction of the space behind the arcade. There are 33 plans for the simulation of the reconstruction of the short base. The houses with short bases are affected by insufficient base depth and historical landscape control lines. Therefore, 240% of the volume cannot be used up in any simulated case (Fig. 10).

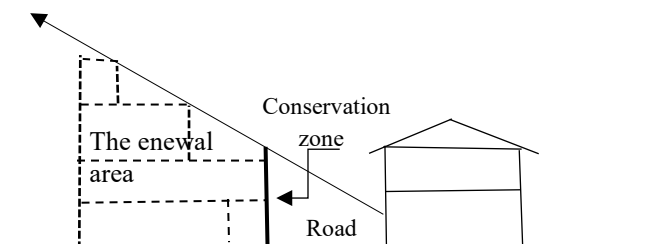


Fig. 10. Minimal range of the conservation zone

The reconstruction and preservation of the deep base are conducted as follows. The maximum preservation area is the facade, arcade, and the first entrance to the first atrium. There are 62 plans for the simulation of the reconstruction of the deep base. The houses with short bases are affected by insufficient base depth and historical landscape control lines. Therefore, 240% of the volume can be used up in any simulated case (Fig. 11).

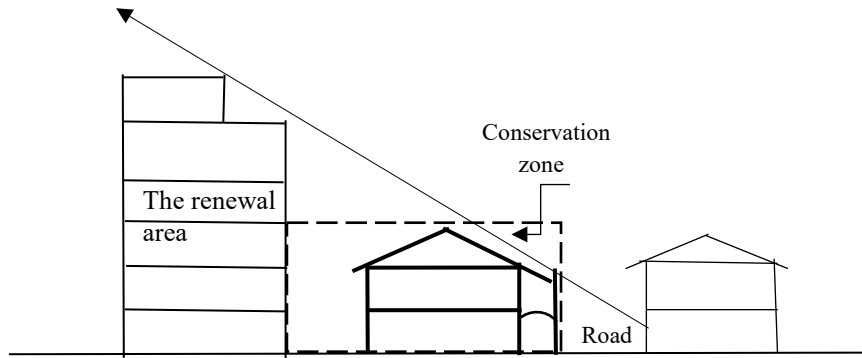


Fig. 11. Maximum range of the conservation zone

The most suitable preservation area and floor area utilization rate for building reconstruction is presented in Table 5.

The complete situation of the floor area ratio is as follows.

- (1) The number of plans that meet the floor-area ratio used up to 65% (62/95)
- (2) The number of plans that meet the floor-area ratio unused up to 35% (33/95)

If the floor area is not used up, it is recommended to use the transfer of development rights method to transfer the remaining floor area to another place to avoid loss of the original housing economic benefits. The preservation area and the renewal area are shown in Fig. 12.

Table 5. Schematic table of the most suitable preservation area and floor area utilization rate for house renewal

Simulation schemes		Short base prese	Deep base preservation area
Preservation area	Single building reconstruction	Gable facade and the arcade space	Facade, arcade, and the first entrance to the first atrium
	Two buildings merged and reconstructed		
	Three buildings merged and reconstructed		
	Four buildings merged and reconstructed		
Floor area utilization rate (240%)	Single building reconstruction	192%~208%	240%
	Two buildings merged and reconstructed	195%~203%	
	Three buildings merged and reconstructed	189%~201%	

Table 5. cont.

	Four buildings merged and reconstructed	193%~198%	
Multiple houses simulation schemes		33	62
Complete situation of floor area rate	There are 62 plans that meet floor area ratio used up. (62/95) There are 33 plans that meet floor area ratio unused up. (33/95)		
Remarks	If the floor area is not used up, it is recommended to use urban building capacity transfer method to transfer the remaining floor area to another place to avoid loss of the original housing economic benefits.		



Fig. 12. Light gray part is the preservation area and the dark gray is the renewal area

5. Conclusions

A model is proposed for the protection of historical districts in Taiwan to explore the architectural double-sided problem of cultural protection and floor-area ratio. The main issue is that Taiwan's historical neighborhood preservation work has to satisfy two conditions. One is that owners have rights to their building volume because they own the historical buildings, and the other is that the owners need a fast preservative method for rebuilding their old houses. From a practical point of view, Taiwan's historical neighborhood preservation work requires ideal conditions of "volume control" and "perspective landscape conservation zone" for cultural preservation and building volume. Then, it is possible to prevent the decay of the architectural and cultural assets from the old building facing rebuilt.

Based on the abovementioned remodeling approach, the findings of the renewal plans are as follows.

- (1) The plans help to keep the minimal preservation of facades and arcades.
- (2) It is possible to maintain the maximal preservation of facades, arcades, and atrium of the first layer of compounds.
- (3) The depth of the building sites must not be shorter than 16.5 m to make full use of the 240% floor-area ratio.
- (4) 62 out of the 95 simulated cases of the study are able to make full use of the floor-area ratio.
- (5) The building sites with larger depth ratios (two layers of compounds with an atrium in between) are able to have physical preservation as well as the lifestyle and images of the sites.
- (6) The floor area is not used up, and it is recommended to transfer the development rights method to transfer the remaining floor area to another place to avoid loss of the original housing economic benefits.

Historic neighborhood preservation is about "partial preservation and partial renewal", "the historical landscape preservation line", "the perspective landscape conservation zone", and "the floor-area ratio". The significance of the preservation theory is to value the great importance of contemporary life and allows the heritage preservation work in the perspective landscape conservation zone with the preservation policies of "variety, multiple, soft, zoning". At last, we set up a timely, flexible, and diverse option for the floor-area ratio controlling, so the street can be preserved through appropriate approaches. The partial preservation and renewal

approach does not sacrifice the floor areas and preserves the historical environment so that the house owners accept heritage preservation.

Future studies present residents' perceptions of this building's remodeling that needs discussion and participation of the public sector, cultural and historical groups, or academic experts in planning. Then, the result is used for the realization of the win-win situation of architectural cultural preservation and building renewal.

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Conflicts of Interest: The authors declare no conflict of interest.

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