

# THE MECHANISM OF FUSING URBAN LANDSCAPE FEATURES THROUGH VERTICAL GREENING IN A HISTORICAL URBAN BLOCK

## A CASE STUDY OF SHANGHAI TILANQIAO HISTORICAL LANDSCAPE AREA

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### ABSTRACT

Under the stress of high-density vertical cities, green spaces are also developing vertically. Despite the increasing usage of vertical greening in more and more Chinese cities, the focus of most cases is on the ecological effect of green façades in private buildings' indoor environments. Only a few studies have examined the promotion of vertical greening with respect to the aesthetic quality of public spaces.

This paper attempts to find an appropriate orientation to vitalize the universal value of vertical greening in public spaces based on its fusion with urban landscape features. Through the case study of vertical greening in historical blocks abroad, this paper explores the mechanism of fusing vertical greening with urban landscape features in historical blocks based on the classification and induction of context conflict when a regeneration process is carried out among buildings with different architectural styles in a historical landscape area. It also argues that this mechanism be adapted for the regeneration of Shanghai Tilanqiao historical landscape area and proposes corresponding renovation strategies for vertical greening.

This paper suggests that 1) fusing urban landscape features in historical blocks is a good opportunity to popularize and apply vertical greening in today's China and, in turn, 2) vertical greening is an effective design method for reconciling context conflicts in a historical landscape area, especially under the circumstance of conflict between an individual building and the surrounding context. In addition, in Tilanqiao historical landscape area, 3) the planning of vertical greening regeneration should be classified by taking the particular street conditions into account, and 4) the planning should be fulfilled in three periods based on the complexity, necessity and urgency of vertical greening regeneration projects.

### Key words

vertical greening, historical landscape area, urban regeneration, Shanghai Tilanqiao area

### 1. INTRODUCTION

With the rapid urbanization in China, urban public green areas have increasingly declined in high-density cities; therefore, vertical greening, a new green technique that takes up less ground sur-

face, has been more and more adopted in domestic and foreign high-density cities and has gradually become one of the main forms of high-density urban greening.

At present, the application of vertical greening at home and abroad mainly focuses on two aspects, ecological effects and urban beautification.<sup>1</sup> Ecological effects include cooling and humidification impacts, balanced proportions of carbon and oxygen in the air, sterilization, dust removal, reduction of pollution.<sup>2</sup> These effects are mostly realized inside single buildings where specific vertical greening techniques<sup>3,4</sup> are used, but less attention is paid to the impact on regional ecological problems that green façades can address. At the same time, from the collection and analysis of a large number of vertical greening cases,<sup>5,6,7</sup> it seems that this technique is more often used on façades of private offices and private residential units, which means that vertical greening ecological effects do not have much universal value at present.

Although the aesthetic value of vertical greening has also been mentioned in recent research,<sup>8,9</sup> which have defined it as a kind of public space design method, there is little statement on the universal value of improvement of urban style and features via vertical greening.

Specifically, the range of research and cases of vertical greening's aesthetic value applied to urban public space landscape improvement and reconstruction is narrow, mostly concentrated on façades of single buildings that serve the high-end crowd. Therefore, vertical greening as a systematic urban design practice has not developed to maturity in China.

In general, the main application of vertical greening is focused on single buildings, while less attention is given to its role in public spaces. In addition, the ecological effects of vertical greening are also a focus of attention, whereas its role in urban beautification is less-emphasized.

This paper attempts to explore the role of vertical greening in improving the style of historic districts and to analyze the adaptability of its regenerative effects in historic districts, especially in situations of conflict between old and new buildings.

## 2. THE MECHANISM OF FUSING URBAN LANDSCAPE FEATURES THROUGH VERTICAL GREENING IN HISTORICAL URBAN BLOCKS

Compared with the direct reconstruction of the building façade, vertical greening is a more moderate way to achieve

**1** Li Ronghua, *Effects of Vertical Greening on Urban Beautification [J]*. *Journal of Green Science and Technology*, 2011,03:20-21.

**2** Ebtessam M. Elgizawy, *The Effect of Green Facades in Landscape Ecology*, *Procedia Environmental Sciences*, Volume 34, 2016, Pages 119-130

**3** Irene Wong, Andrew N. Baldwin, *Investigating the potential of applying vertical green walls to high-rise residential buildings for energy-saving in sub-tropical region*, *Building and Environment*, Volume 97, 15 February 2016, Pages 34-39

**4** Yuan Bin, Wang Dawei, *Analysis of Evaluation Standard of Green Building in China [J]*, *Intelligent Building & City Information*, 2007,04:14-18.

**5** Antonio Maciá A&D. *A cafeteria within a green wall [EB/OL]*. <http://www.gooood.hk/a-cafeteria-within-a-green-wall-by-antonio-macia-ad.htm>. 2015-12-01

**6** Chartier-Corbasson Architectes. *Regional Chamber of Commerce and Industry [EB/OL]*. [http://www.gooood.hk/\\_d275463206.htm](http://www.gooood.hk/_d275463206.htm). 2012-10-22

**7** Chrisvan Uffelen, *Green Façade Design (M)*, Jiangsu: Jiangsu People's Publishing LTD, 2011:101-103

**8** Zhang Xiaokang, *A Study of the Building Façade Vertical planting Design Strategy [D]* (Doctoral dissertation), Chongqing: Chongqing University, 2011: 45-75

**9** Xu Jiaying, *Preliminary Study of the Building Façade Vertical planting Design Methods [D]* (Doctoral dissertation), Chongqing: Chongqing University, 2010: 29-38

	<b>Modular trellis green wall</b>	<b>Planter tiles green wall</b>	<b>Flexible bags green wall</b>
<b>Vegetation</b>	Climbing plant	Diverse herbs with linear leaf	Divers flowers and herbs with broad leaf
<b>Technique</b>	Grids for the plant to attach, set up a plant in 10m, the corresponding drainage irrigation facilities	Fixed planting bags and plants with perforated panels, corresponding drainage irrigation facilities	Provide more soil covered pots, fixed flower pots on the shelf, the corresponding drainage irrigation facilities
<b>Load</b>	Small Barely no limits on the floor height	Relative big Suit for 3-5-story building façade	Big Suit for 1-2-story interior façade
<b>Cost</b>	Low	Medium	High
<b>Maintenance</b>	Can support plants with high stress resistance, need less maintenance	Since the short life cycle of herbs and the limited cover earth, regular change of plants is needed	Since the short life cycle of herbs and the limited cover earth, regular change of plants is needed
<b>Ecological effect</b>	Climbing plants with large leaf area index, which has a good heat absorption, filtration and anti-radiation effect. But the plant species is single, and the degree of its ecological diversity is low	Herbs with small leaf area index but high diverse, can support insect's and bird's biodiversity	Plants with large leaf area index, which has a good heat absorption, filtration and anti-radiation effect., and can support insect's and bird's biodiversity
<b>Aesthetic value</b>	Although only climbing plants are suit to grow, but the seasonal change of landscape can certainly achieve by plant selection	The plant growth boundary is clear and controllable, and the type rich plants provide enough composition elements, which can better realize the art of green wall	The plant growth boundary is clear and controllable, and the type rich plants provide enough composition elements, which can better realize the art of green wall

fusion of urban landscape features in historical urban blocks. For instance, the urban landscape and streetscape can be integrated through making new buildings invisible under green walls between historical buildings and constructing a continuous green façade to unify the messy street interface. This section explains why vertical greening is a good opportunity to fuse urban landscape features. The next section will present some typical empirical cases which apply these fusion measures in construction projects in different countries.

**2.1 Vertical greening for an ecological aesthetics in historical urban blocks**  
Through the investigation of the Shanghai Tilanqiao historic area, it was found that the residents of the historic district generally face problems related to the poor visual quality of their living environment.<sup>10</sup> In addition to the dilapidated appearance of protected historical buildings owing to the lack of repair or reconstruction,

the green space of the district is very small. Residents try to realize their everyday need for green space through their own family plots. Therefore, the emergence of green building façades might help to decrease the lack of green surface and improve the ecological aesthetic of this historical area.<sup>11</sup>

**2.2 The conflict between old and new buildings in the historic block**  
In Shanghai's historic conservation area, most new buildings vary in style and height. An exception is the Tianzifang and Xintiandi business streets, which are regarded as the paradigm of historical area renovation and offer some excellent cases for the reconstruction of old buildings in recent years. The historic district therefore has a highly diverse and confused streetscape. As a consequence, the feature fragmentation of almost all of the historic area is significant. Now the main dilemma of historic district's renewal is the cramped public space and the high cost of reconstruction.

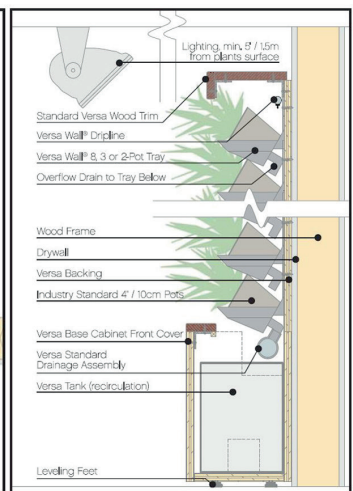
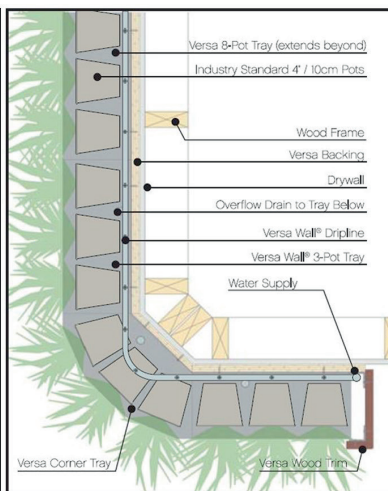
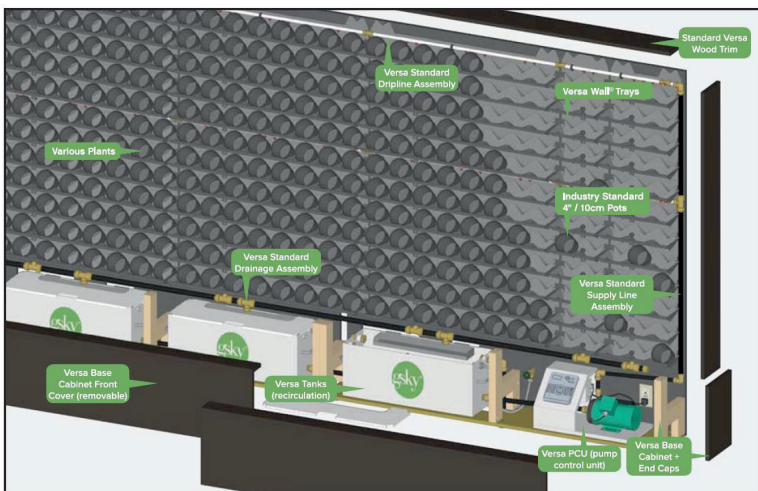
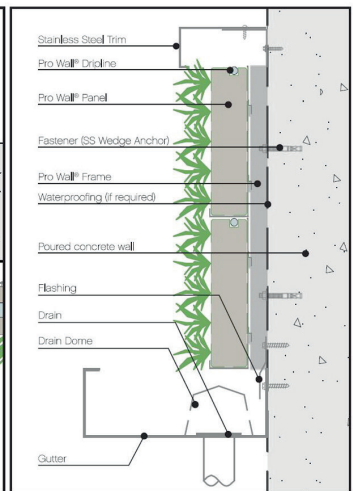
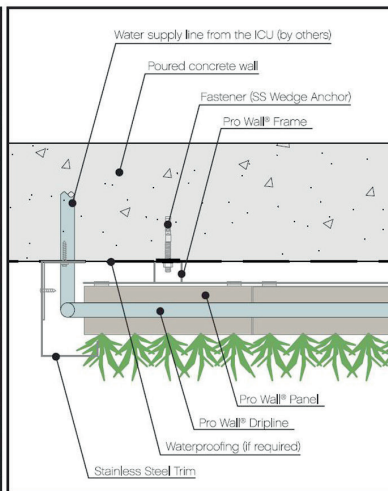
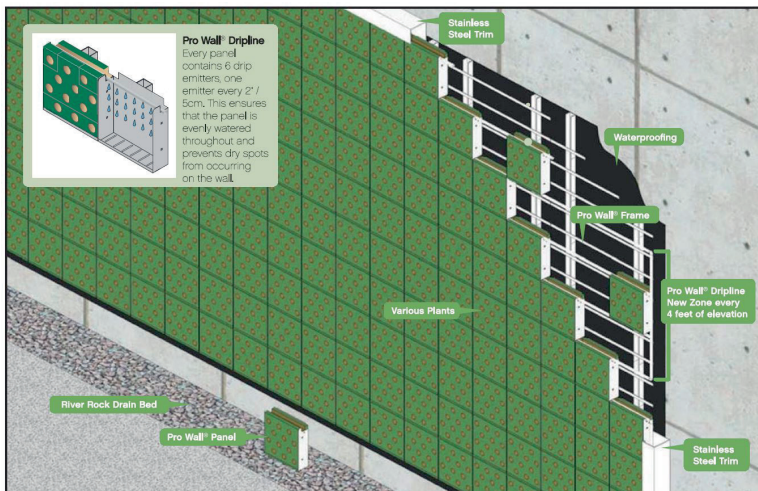
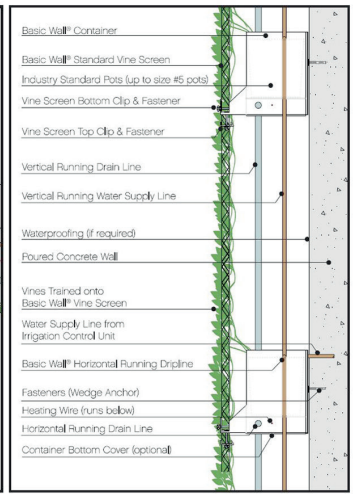
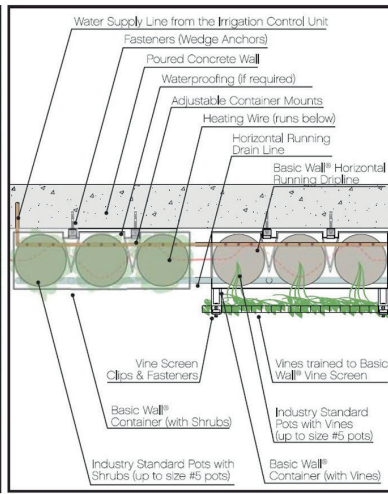
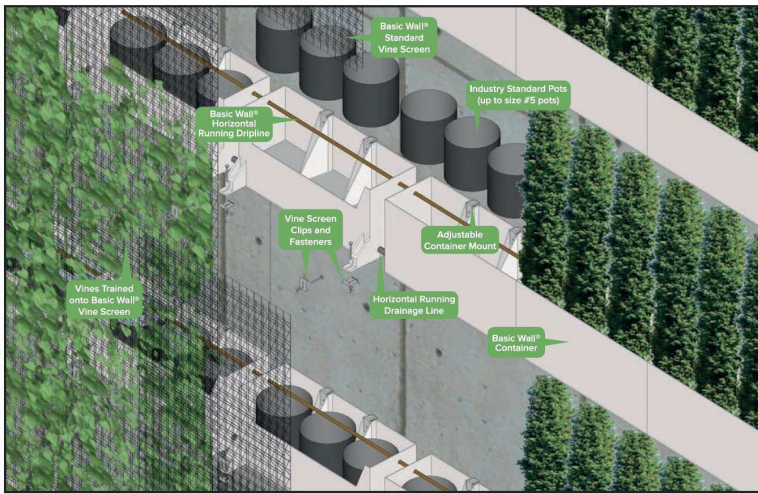
<sup>10</sup> ZHOU Jian, LIANG Jie, CHEN Fei, *A Study on the Compilation and Implementation of the Conservation Plan of Historic Areas—With Shanghai as the Example* [J], *Urban Planning Forum*, 2007,04:79-84.  
<sup>11</sup> Song Dexuan, Chen Yu, *The Renovation of Shanghai Alleys from Dual Angles of Historic Preservation and Ecological Energy Saving* [J], *Housing Science*, 2010,01:55-59.



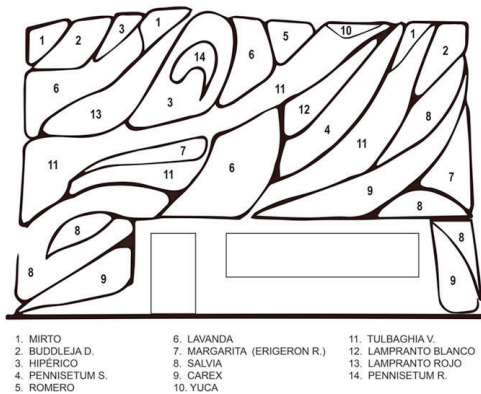
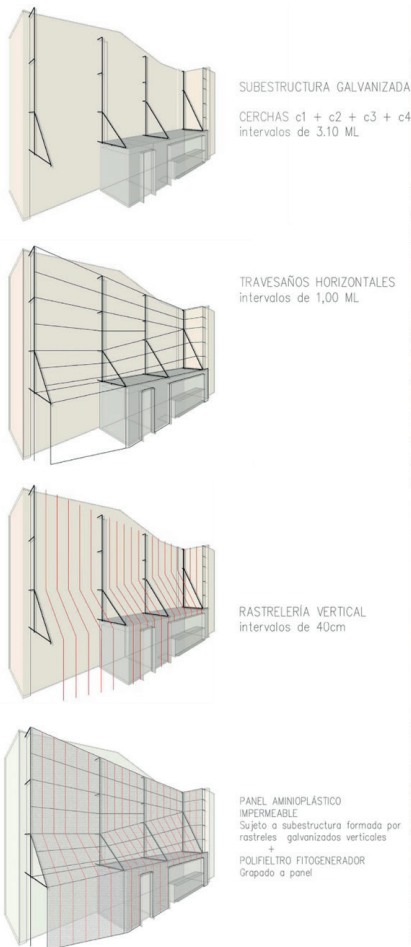
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**Table 1** show the three main methods of vertical greening and summarizes the background, building conditions, and effects of applying each technique.<sup>17,18,19</sup>

**Fig. 1, Fig. 2, and Fig. 3** show structural maps of a modular trellis green wall, planter tile green wall, and flexible bag green wall, respectively.







With regard to visual effect, vertical greening can effectively reconcile the contrast between the old and new buildings where a conflict exists.

### 2.3 Lack of public space in the historical block

It was also found that in historical districts, the plot ratio is higher; Tilanqiao historic district in particular faces a lack of green public spaces, such as parks and plazas. As a green compensation method for high-density areas, vertical greening has the advantage of occupying less ground space and is an effective design technique for improving the historic district's style and features.

As for technical feasibility, vertical greening can be modular.<sup>12</sup> Both the basic planting pool and grids can

support climbing plants and allow herbs to grow vertically by increasing the soil cover through planting bags, which are no longer a technical problem.<sup>13</sup> The cost of green façades is relatively low compared to reconstruction of a building's structure and façade redesign. Therefore, as a kind of flexible design method, vertical greening has strong adaptability to the improvement of urban style and features.<sup>14</sup> However, the installation of a green façade cannot completely substitute for the renewal of a façade or a building, and it is mainly aimed to improve the visual quality of the open space.

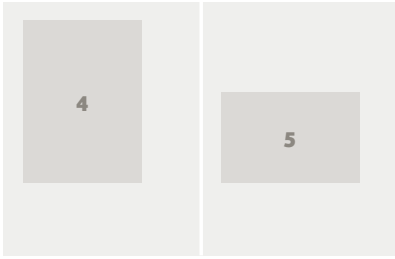
As for the classification of vertical greening, Maria Manso did a relatively complete review in the paper *Green wall systems: A review of their*

<sup>12</sup> Liu Guangwei, Liu Yingfang, *Pilot Study on Solid Green Model of Urban Space* [], *Urban Research*, 2000,06:32-35+62-63.

<sup>13</sup> Lin Bingyi, *The Characteristics and Effects of Urban Vertical Greening* [], *Guangdong Science & Technology*, 2011,22:53+5.

<sup>14</sup> Gui Chengfang, *The Development Prospects of Urban Vertical Greening*, [], *Journal of Green Science and Technology*, 2010,08:42-45.





**Fig. 4** illustrates pictures, structural map, and planting design of cafeteria in Santa Isabel square in Elche, Spain.

**Fig. 5** is the collection of pictures of Regional Chamber of Commerce and Industry.



characteristics.<sup>15</sup> This paper introduces three main kinds of green façades, which are classified based on the different vertical greening techniques they depend on, including modular trellis green walls, planter tile green walls, and flexible bag green walls. These three green walls have different visual effects and plant varieties.<sup>16</sup> (Table 1., Fig.1., Fig.2., Fig.3.)

### 3. CASE STUDIES

Through the analysis of several foreign cases, this part will show the role of vertical greening in improving the historical streetscape, especially in the fusion of urban landscape features in historical blocks.

#### 3.1 A cafeteria within a green wall<sup>20</sup>

A cafeteria within a green wall is located in Santa Isabel square in Elche, Spain, near Santa Maria church, Altamira palace, and Elche Municipal Park, which are ranked on the world heritage list. (Figure 4.) These old buildings constitute the historical context of the cafe. The government hopes to build a 20-square-meter cafe to revitalize this blank spot near city landmarks, as well as to avoid conflict between the new buildings and the historical context. The awarded scheme uses a vertical green wall to build an invisible cafe, integrates this building into the environment. Under the 150m<sup>2</sup> vertical green surface, there are bathroom, storage room, and coffee shop kitchen, and the rest of the square space is used for outdoor dining.

<sup>15</sup> Maria Manso, João Castro-Gomes, *Green wall systems: A review of their characteristics*, Renewable and Sustainable Energy Reviews, Volume 41, January 2015, Pages 863-871

<sup>16</sup> Liu Shuangyue, *Study on Three-Dimensional Afforestation Design of Modern Cities [D]*, Shanxi: Northwest A&F University, 2011:9-10

<sup>17</sup> gsky. Basic wall. [EB/OL]. <http://www.gsky.com/basic/>

<sup>18</sup> gsky. Pro wall. [EB/OL]. <http://www.gsky.com/pro-wall/>

<sup>19</sup> gsky. Versa wall. [EB/OL]. <http://www.gsky.com/versa/>

<sup>20</sup> Antonio Maciá A&D. *A cafeteria within a green wall* [EB/OL]. <http://www.gooood.hk/a-cafeteria-within-a-green-wall-by-antonio-macia-ad.htm>. 2015-12-01



**Fig. 6** shows a design sketch of the theater studio of Brno National Academy

**Fig. 7** shows pictures of protected historical buildings.

This case demonstrates the important effect of vertical greening in the visual conflict of new and old buildings with respect to visual, technical feasibility, and ecological aspects. However, the project has been considered to fulfill the demands of landscape aesthetics and ecological effects; therefore, the technical operation is complex, and the cost is not ideal. If it were just meant to achieve invisibility of the new construction, the technique could be substituted by a basic green wall. Despite all this, the case is still the typical and enlightened one to improve the features of the city.

### 3.2 Regional Chamber of Commerce and Industry<sup>21</sup>

The Bouctot-Vagniez Town Hall in Amiens is a remarkable building, an architectural testament to the glories of the 1920's Art Nouveau. This project is an extension to this unique building, which is home to the Picardy Regional Chamber of Commerce and Industry.

By building a layer of fresh and undulating green skin, the designers made the interior of the Chamber of Commerce's offices and gardens have close communication with each other, while allowing the construction to seamlessly connect with the outside garden.

Vertical greening plays a very important role in the project, as it effectively reconciles the conflict between modern architecture and traditional architecture without destroying the unity and integrity of the whole area. At the same time, since the new art movement emphasizes the naturalism of architectural decoration; the vertical greening is also a clever echo of the architectural style of France in the nineteenth century.

### 3.3 Theater studio for university<sup>22</sup>

The Theater studio of Brno National Academy is a design for the Archteam firm's competition. The site is located in the historical city of Brno, Czech Republic. Around the site there are old

<sup>21</sup> Chartier-Corbasson Architectes. Regional Chamber of Commerce and Industry [EB/OL]. [http://www.goood.hk/\\_d275463206.htm](http://www.goood.hk/_d275463206.htm). 2012-10-22

<sup>22</sup> Chrisvan Uffelen, *Green Façade Design (M)*, Jiangsu: Jiangsu People's Publishing LTD, 2011:101-103





Tilanqiao Prison



Jewish refugees Museum



Former site of JDC



No. 25-89, Lane 99, Lintong Rd residence



Xinhua Dyeing



Moxi Hall



Broadway theatre



No. 119-121 Huoshan Rd residence

houses, and the green façade of the main building is visually connected with the big garden. People can see outside through small windows in the thick foliage. Those small windows can let the sunshine in, but they will not destroy the continuity of the green façade.

As a historical city, Brno contains many monuments, including a fourteenth-century church. The monuments and buildings of Brno are a combination of Gothic and Renaissance style. The Theatre studio of Brno National Academy does not appear as a modern concrete building with a massive architectural body, but it is well hidden in the historical context by its green façade. The transition from the architecture to the garden appears natural.

The above three cases can be seen as applications of vertical greening techniques to improve the streetscapes, styles, and features of their historic districts. In the limited space of historic districts, green façades may be an appropriate design

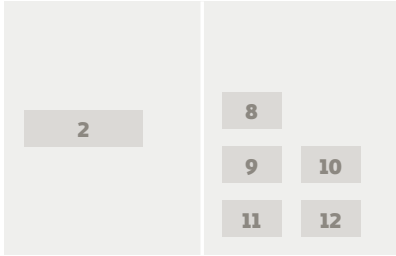
tool for reconciling an architectural conflict in a town or streetscape.

#### 4. ADAPTATION ANALYSIS OF VERTICAL GREENING FOR REGENERATION IN TILANQIAO HISTORICAL URBAN LANDSCAPE AREA

Shanghai Tilanqiao historic cultural district is compassed by four roads, East Daming Road, Yangshupu Road, Haimen Road, and Huoshan Road. It is well-known by its special buildings and residential neighborhoods, as well as the forms and features of its places of worship. Its biggest feature is the Jewish culture and its precious historical and cultural resources.<sup>23</sup>

Excellent historical buildings in this area include Tilanqiao prison, Moxi hall, Huoshan Road residence, the Jewish refugees' Museum, which are mainly characterized by the Jewish architectural style, simplified classical style, and Queen Anne architectural style.

<sup>23</sup> ZHANG Yanhua, WEI Ming, *Conservation on "Special City Heritage"—A Study on Shanghai Tilanqiao Historic Area*], *Urban Planning Forum*, 2007,06:90-93.



**Table 2.** shows specific information on obvious style conflicts in the historical area, including conflicts in architectural style, floors, functions and use conditions. (The conflict type is

marked in fig. 8, and the number of buildings is marked in fig.9). **Fig. 8** is a map of the distribution of protected historical buildings. **Fig. 9** is a map of the distribution of

conflicts in the historic area. **Fig. 10** shows the story heights of buildings in the historic area. **Fig. 11** is a map of the classification of planning for vertical greening.

**Fig. 12** is the map of planning stages of vertical greening.

Conflict type	No	Name	Floor height	Function	Surrounding context	Greening condition	Open space
Type1	1	Jianai Mansion	27	Office building	2-3-story Li-Long residential buildings	Border tree roadside green space	No large open space in the surrounding
	2	Yuanyang Hotel	30	Hotel	2-3-story Li-Long residential buildings	Plaza in front of hotel	Plaza Parking lot
	3	Suonate Hotel	3	Hotel	Next to Moxi Hall	No greening, a few climbing plants	No large open space in the surrounding
	5	Hongye lodging house	4	Lodging House	2-3-story Li-Long residential buildings	Border tree	No large open space in the surrounding
Type 2	10	Both sides of Lintong Road	2-6	mix of commerce and residence, Hotel, Office building, Plant	Low story dwelling	Border tree	No large open space in the surrounding
	11	North side of Huoshan Road	3-5	mix of commerce and residence	Low story Li-Long residence Historic buildings	Border tree	No large open space in the surrounding
Type 3	—	Barely all the mix of commerce and residence in the street interface	2-3	Store	Low story Li-Long residence	—	—

Despite the diverse architectural styles in this area, its walkable street scale, suitable architectural bodies, and the continuous street interface are seen in a harmonious dialogue. (Fig. 7)

However, in the process of renovation of the historic district, no attention was paid to creating unity with the original architectural context. The height and styles of new buildings led to severe disorder, a confused architectural townscape, and fragmentation of the street interface. At present, an architectural complex with a more unified style and the same relative scale as this historical area is located on the west side of the Zhoushan road, which is the area where the Jews had once lived.

#### 4.1 Tilanqiao historic district townscape investigation

An observation of the amount and types of conflicts in the historical landscape area revealed 1) conflict between individual buildings and the overall surrounding environment, 2) conflict

among individual buildings, and 3) conflict between the original and regenerated parts of individual buildings. (Table 2., Fig.8., Fig.9., Fig.10.)

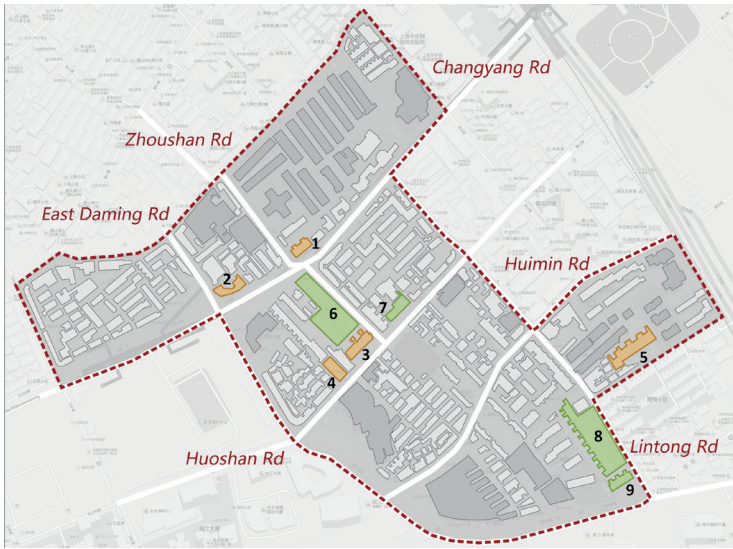
#### 4.2 Reconstruction Strategies of Vertical Greening

The planning of vertical greening in the Tilanqiao historical landscape area should be classified and graded based on the analysis of context conflict types, building height, and conflict position. Two typical types of conflict sites will be selected for designs.

##### 4.2.1 Vertical greening planning of Tilanqiao historic district

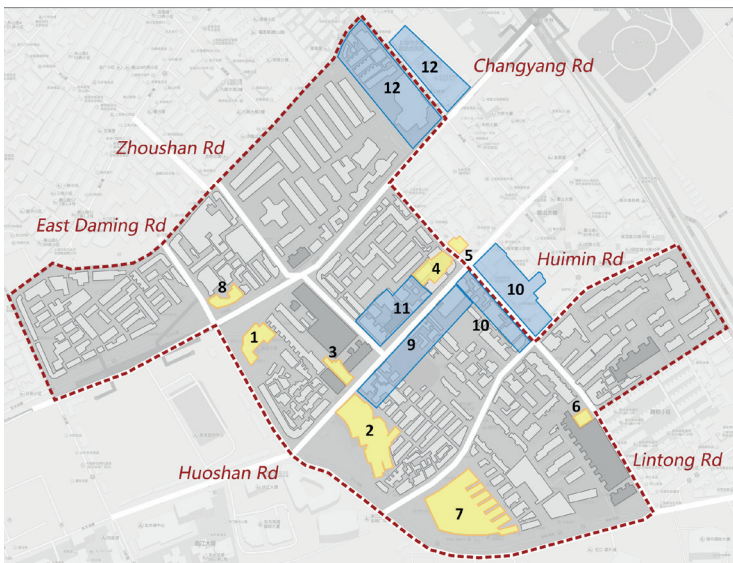
It is found that the construction of vertical greening is mainly suitable for reconciling the conflict between individual buildings and the overall surrounding environment. The building's floor has an important influence on its overall effect. For example, Jianai Mansion and Yuanyang Hotel have huge bodies and high stories, and they tower





- 1. Tilanqiao Prison  
Art Deco Style
- 2. Jewish refugees  
Museum  
Jewish architectural style
- 3. Former site of JDC  
European classical style
- 4. Broadway theatre  
European classical style
- 5. Xinhua Dyeing  
Simplified classical style
- 6. Moxi Hall  
Queen Anne style
- 7. No. 119-121, Huoshan Rd residence  
European classical style
- 8. No. 25-89, Lane 99, Lintong Rd residence  
Art Deco Style
- 9. Yangshupu Rd residence  
Art Deco Style

Low-story Li-Long   
 Modern architecture style



Type 1  Type 2  Protective Historical Building



2-3  4-6  7-10  >10  Fence



Modular trellis green wall  Planter tiles green wall  Flexible bags green wall



First-stage planning  Second-stage planning  Third-stage planning





strikingly in the historic district. Because of the strong contrast in height, it is difficult for vertical greening to become a very effective harmonic means to reconcile the conflict. But when new buildings are relatively close in height to their surrounding ones, such as Hongye hotel and Suonate hotel, it is particularly suitable for vertical greening to intervene.

As for the conflict between the original and restored parts within individual buildings, it usually occurs on the façade of stores under the residences on the street interface.<sup>24</sup> The signs that appear seriously affect the integrity and the aesthetics of the streetscape. And as for the conflict among the individual buildings, many new Li-Long residences that were built later have crude features, usually with messy façades. Those new buildings are also located next to the historical buildings across the street, such as on the east side of Zhoushan road and Lintong Road. Under those two circumstances, the cost and professional requirement of renewal on such large façades of historic buildings are relative high. Therefore, a layer of the continuous green skin can be considered as a way to unify the style and increase the amount of greening, which can serve as an effective means to improve the visual quality of the street interface.

#### a) Classification of planning for vertical greening

Modular trellis green walls can be partly used on buildings with huge bodies,

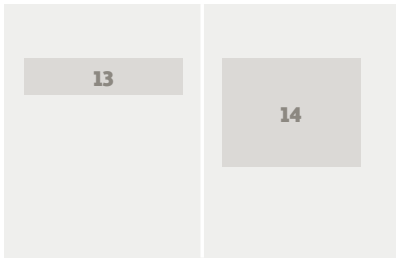
since the structures constitute a relative small load, which is an advantage in the case of high constructions.<sup>25</sup> In addition, the modular trellis green wall should be used in places with narrow streets and few people, because of the low cost of the structures, since vertical greening does not raise a major requirement for plant species and other elements. At the same time, the background of the building should also be considered when choosing a specific type of vertical greening. Modular trellis green walls should be used on a street interface with a messy background, and the plant selection should be relatively unified in color, so as to achieve a better unified style.

On buildings with fewer stories, such as low-story Li-Long residences with street interfaces and streets with higher flows of people, planter tile green walls should be used. They constitute a bigger load due to more earth cover, thus low-story buildings are very suitable for the construction of this type of wall. Besides, on busy streets, planter tile green walls can support more diverse plant species and planting design, which can better enhance the landscape quality of public spaces. Especially on street interfaces defined by fence walls, because of the simple background, diversity of plants can create rich visual effects.

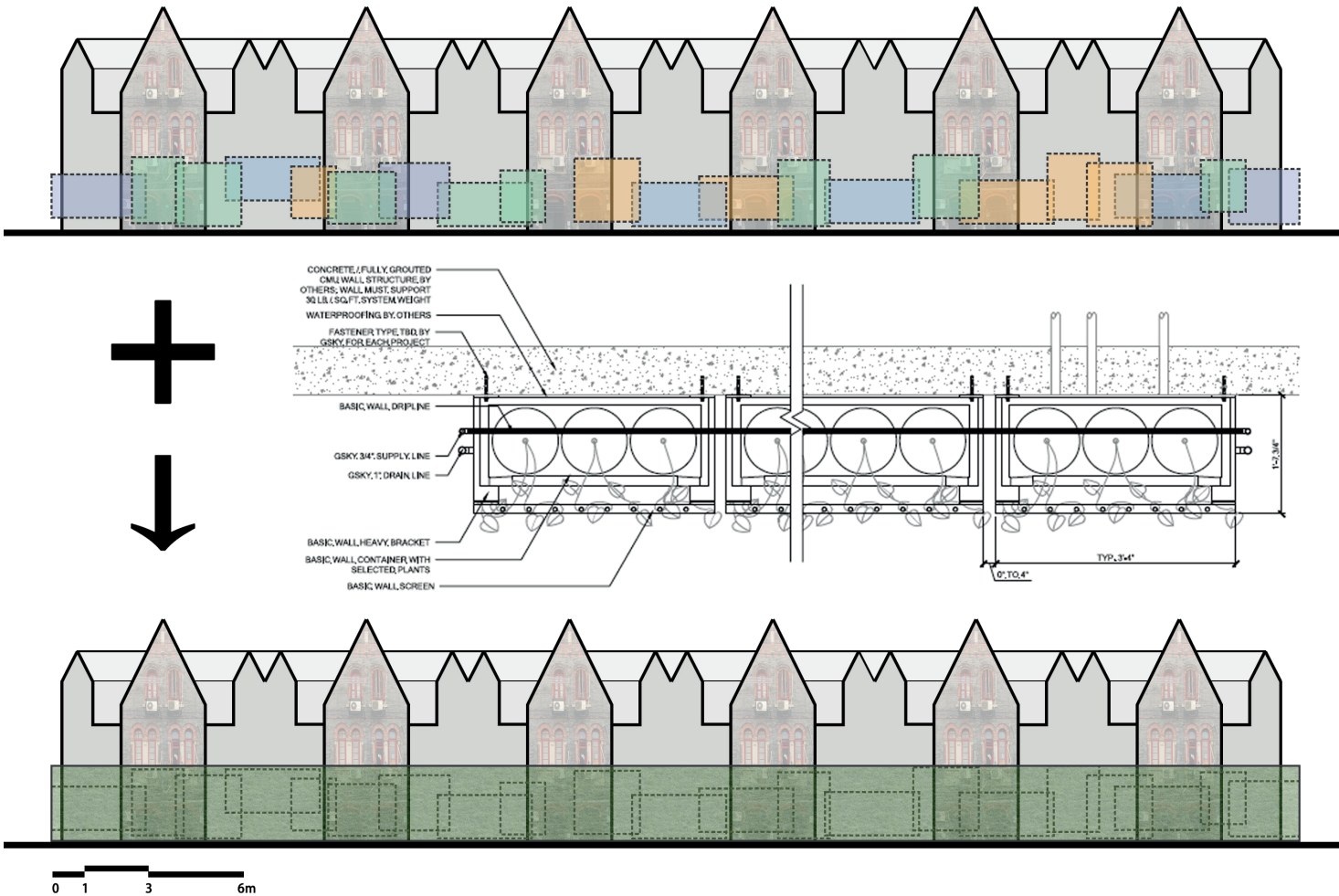
At junctions with more people and public spaces with lower-floor buildings, another option is to use flexible bag green walls to decorate open spaces. Since the earth cover of this technique

<sup>24</sup> Hu Zhengyan, *A Design Research for The Publicity of the Boundary Space of City Residential Quarters and Streets [D]*, Shanghai: Tongji University, 2007:18-20

<sup>25</sup> Che Fengyi, *The research of Application Design about Vertical Greening in Urban Public Space [D]*, Shandong: Qilu University of Technology, 2013:28-29



**Fig. 13** shows the location and current situation of the north interface of Huoshan road, and **fig. 14** illustrates its reconstruction strategies.



is high, flexible bag green walls could support the most diverse plant species and serve as a symbol of landscape renovation projects in this historic area.

There are some sections of roads with no planning for vertical greening, taking into account that 1) Tilanqiao prison walls are not suitable for vertical greening; 2) part of the street with a large scale have the condition for conventional greening; 3) on the part of the street that has a broken interface and building setback, the effect of vertical greening would not be obvious; and 4) part of the street has good greening conditions, and there is no obvious conflict in architectural styles. (Fig.11.)

**b) Planning stages of vertical greening**  
Taking the necessity and urgency of implementation into account,

the planning of vertical greening in the Tilanqiao district should be divided into three stages.

First-stage planning is suggested to occur where the reconstruction of vertical greening could be completed in the near future. This should be constructed in the road sections next to the historical buildings, this will entail obvious conflicts. In addition, the front elevation of residences should be constructed during the first period since there are many pedestrians and more regular uses on this side; thus the landscape reconstruction with vertical greening can be viewed by more residents.

Second-stage planning is expected to be completed within the next three to five years. This will involve main



sections of roads that have no protected historical buildings and have an unappealing architectural style that needs to be remediated, and parts of landmarks at street junctions which need to be decorated by a flexible-bags green wall.

Third-stage planning is expected to be completed based on the first two periods. This grade will focus on making repairs and improvements on the other sections, in order to develop the whole aesthetic of the Tilanqiao district. (Fig.12.)

#### 4.2.2 Vertical greening design diagram of two conflict types

Two reconstruction sites are selected to represent common conflicts. The north interface of Huoshan road contains a typical issue with the conflict between the area being regenerated and the original parts within individual buildings, whereas the Sunate Hotel's conflict is between individual buildings and the overall surrounding environment.

It is important to note that the current preservation status of historical buildings in Tilanqiao district is not ideal, which is different than those of the case studies. In fact, a diversity of first-floor grocery stores in historic buildings with different architectural styles and unattractive façades belong to the

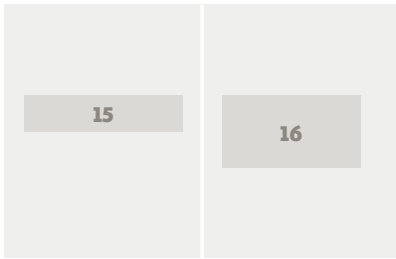
reconstruction-allowed parts and also has become a new section in between the conflict of the old and the new.

The main purpose of the exploration of vertical greening fusion mechanism in this paper is to improve the appearance of the historic district of Shanghai. Therefore, in this strategy, the installation of a green façade on the first floor of the historic buildings is considered in the reconstruction plan. Similar to what was previously mentioned, the redecoration of large-scale façade has a high cost and low feasibility. Because of this, the reconstruction of the north interface of Huoshan road offers a continuous green façade to fuse together the urban landscape. (Fig. 13., Fig.14., Fig.15.)

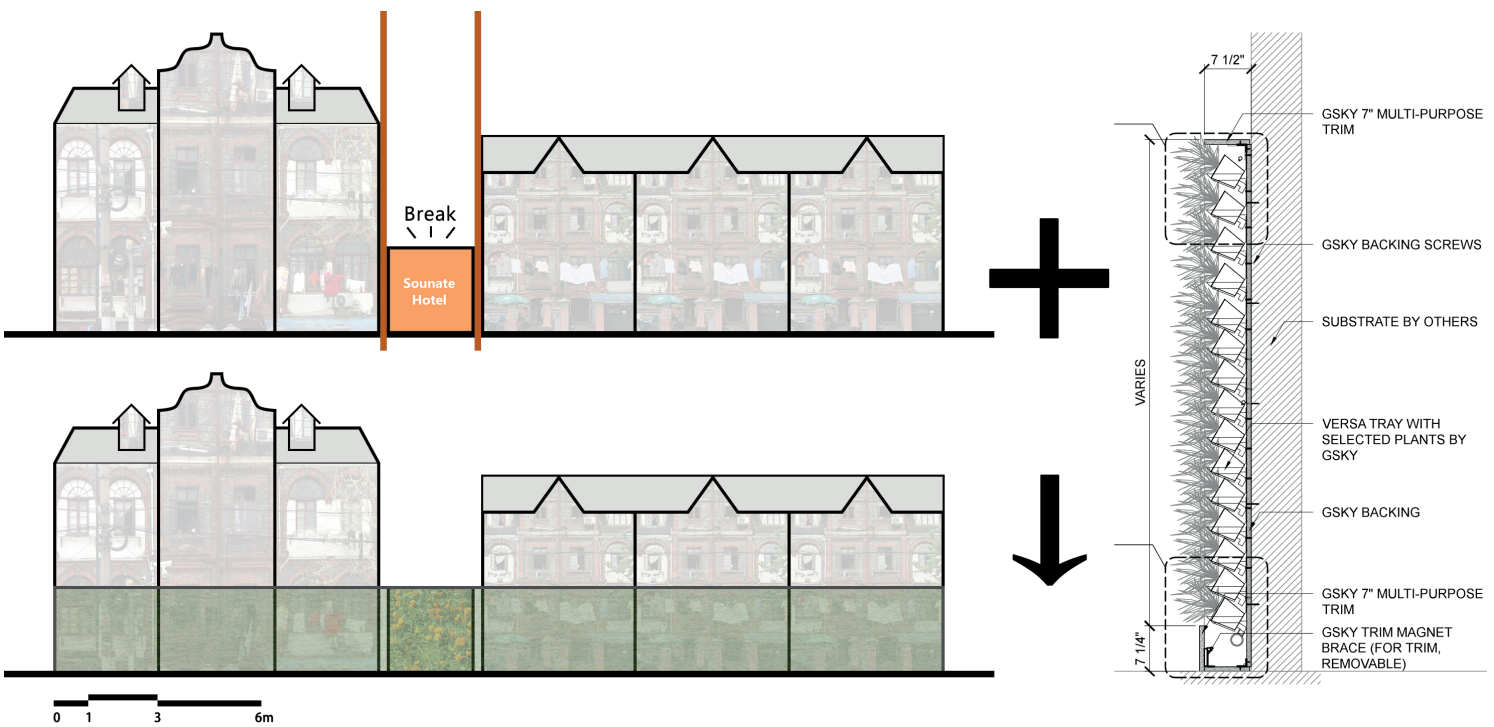
#### CONCLUSIONS

The overall planning layout, architecture design, and the construction of public space are indispensable for the coordination and uniformity of the new architectural style and the traditional context found in the old city. In terms of the actual situation, however, many historical urban landscape regeneration projects do not take the coordination of urban style and features





**Fig. 15** shows the location and current situation of Suonate Hotel, and **fig. 16** illustrates its reconstruction strategies.



into account. Messy streetscapes and the poor quality of the environment are main problems that the Tilanqiao historical area faces. However, in the process of the development of urban planning, those conflicts that cause disorder in the context should be gradually considered for reconstruction to find a proper solution. The harmony and unity of a cityscape's features are measures of a city's livability.

This paper argues that the promotion of vertical greening in the urban areas needs to find a suitable motivation. We have to admit that vertical greening often has a low chance being applied to a city because of the large amount of public space, the required techniques to install these features, and the high cost of future maintenance. However, to

resolve the coordination problems of a streetscape in a historic district, vertical greening is suitable for application in only the historical blocks with relatively cramped space. This paper thinks that through proper design, vertical greening is an effective method to solve the conflict between old and new buildings. At the same time, a trusted planner and designer should be called on to identify suitable scenarios and apply them to the renewal and development of the historical landscape areas.

# ÖSSZEFOGLALÓ

Sűrű beépítésű városokban a zöldfelület-létesítés egyik fő lehetősége a vertikális terjeszkedés. A kínai városokban egyre több zöldfal épül, elsősorban azért, hogy az épületfizikai jellemzőket, a belső terek komfortérzetét javítsák. Nem sok szó esik ugyanakkor a vertikális zöldfelületek városképi, esztétikai szerepéről.

Felismerve a zöldfalak erőteljes vizuális hatását a városi szabadterekre, a cikkben arra keressük a választ, vajon tudnak-e ezek az új zöldfelületi elemek összekötő, egységesítő szerepet vinni nagyvárosi környezetben. Néhány külföldi, történeti városrészben épült zöldfalrendszer elemzésével tárjuk fel a vertikális zöldfelületek fúziós szerepét a különböző építészeti korszakok épületgyűjtésével megjelenő városi tájban. Az új zöldfelület-fejlesztési módszer alkalmas város- és épületmegújítási eszköz lehet Shanghai Tilanqiao történeti városrészében is.

Az elemzések alapján igazoltnak látjuk, hogy 1) történeti városnegyedekben

alkalmazott zöldfalak jó összekötő szerepet játszanak, és ezért a függőleges zöldfelületek javasolt és hatásos módszert jelenthetnek napjainkban Kínában is; 2) a vertikális zöldfelületek alkalmasak a történeti városi táj vizuális konfliktusainak kezelésére, a különböző egyedi épületek és a környező szabadterek megjelenésének harmonizálásával; továbbá, hogy a Tilanqiao történeti városi tájban 3) a zöldfalakkal történő városmegújítást az adott környezet, ill. szabadterrendszer állapota és szerepe alapján kell tervezni; és 4) a tervezés során három szempontrendszert kell figyelembe venni: a zöldfalak komplex városképi szerepe, a megújítás szükségessége, és sürgőssége. ©