

REUSING OLD MATERIALS | VILLAGE RENOVATION for the AGED PEOPLE

Table of Contents

- Acknowledgements
- Abstract
- Case study
 - Scale of surface
 - Aizkibel Library Extension pg. 7
 - Ningbo Historic Museum pg.9
 - Bima Microlibrary pg. 11
 - Museum at China Academy of Art pg. 13
 - Scale of component
 - Hotel Hotel Lobby and Nishi Grand Stair Interior pg. 15
 - The Prahran Hotel pg. 17
 - Big Dig House pg. 19
 - Scale of building (adaptive reuse architecture)
 - Refurbishment Viaduct Arches pg. 22
 - Yun House Boutique Eco-Resort pg. 24
 - The Dovecote Studio pg. 26
 - Warehouse pg. 27
- Reusing old materials / village renovation
 - Existing Condition and History of Site pg. 30
 - Activities and Needs of aged People pg. 36
 - Concept of Space Organization pg. 42
 - Project Overview pg. 46
 - Wall Renovation pg. 52
 - House Renovation pg. 60

"The subject of material is clearly the foundation of architecture"
William Morris (1892)

Luping Yu, Master's Research Project
University of Florida
Spring 2017

Chair: Bradley Scott Walters
Co-Chair: Lisa Huang

Acknowledgements

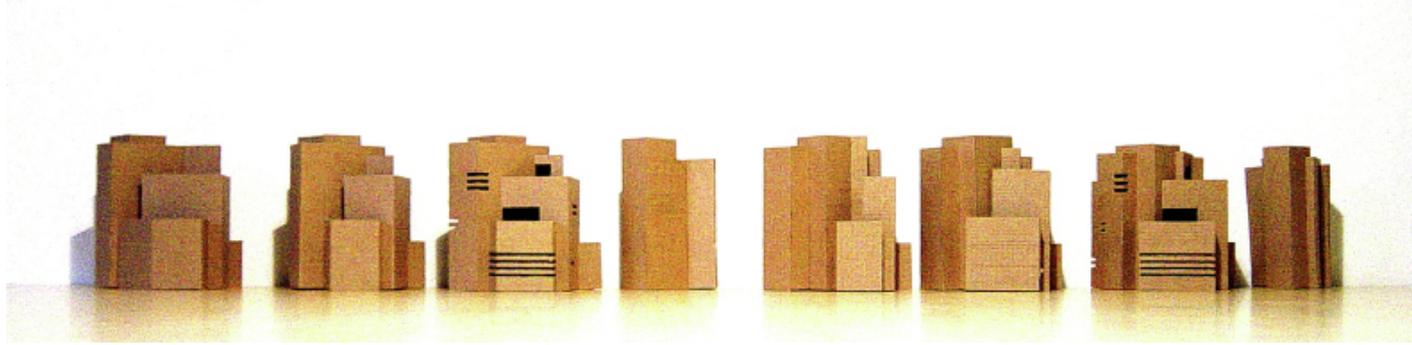
To professor Bradley Scott Walters and professor Lisa Huang
Thank you for all the things that you have done for me, I can not finish my MRP so well without your encourage and effort.

Abstract

This project is based on the materials that have been ignored by people, trying to seek the new life for those materials. Using old materials and giving them a new life in a building not only keeps those materials from wasting away in a landfill, but also adds a considerable amount of character to the finished project. Most common building materials today have the possibility to be reuse. Concrete, metal, glass, brick and plastics can all be produced with some form of the previously used materials, and this process of production lowers the energy requirement and emissions by up to ninety percent in most case. And this kind of materials can be easily found in old and demolished buildings which are no longer serving people. Also, more unorthodox materials such as soda cans and tires are being discovered as reusable building materials.

China is developing very fast in last few decades, a lot of old buildings are replaced by new and modern constructs. There are also policies that may affect the buildings in China and “new rural reconstruction” is one of them. The main goal of this policy is “clean and tidy village” which means lots of old houses in village should be rebuilt. The site of this project is in a Chinese rural village with many aged people. Architecture is always about the people that it is severing. So, another main purpose of this project is making a comfortable and reasonable space for this group of people. Before the design process, the research of aged people is a big part. The needs and activities of old people are the top priorities in this project.

Combined these two purposes, this project is based on materials from the old demolished buildings and ruins in a Chinese rural village, trying to design a community center for the aged people in that village.

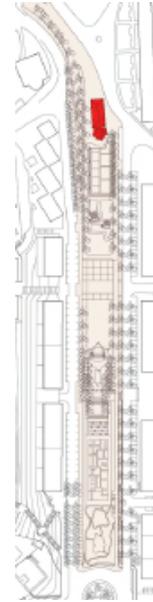


Azikibel Library Extension

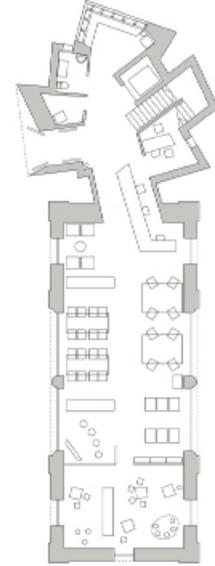
Architects: Estudio Beldarrain
 Location: 20720 Azkoitia, Gipuzkoa, Spain
 Main Material: Wooden Railway Sleepers



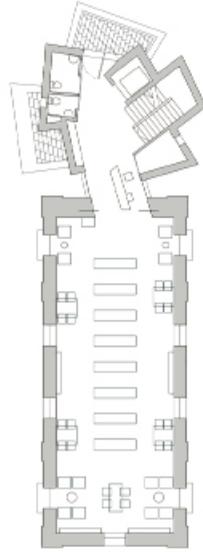
The Azkoitia station extension is an irregularly-shaped box clad in wooden railway sleepers that reference the old station’s history. Estudio Beldarrain designed the structure to accommodate three large rooms which will house part of the existing library and give the project a sense of place. The architects covered the extension in wooden railway sleepers as if the tracks that once ran near the station were dismantled and stacked to create a new piece of architecture. Another reason behind the choice of cladding is the fact that, after the railway disappeared, the remaining building felt oddly out of place. By creating a visual connection to its past, the architect managed to root the location into its context and relate the library with the Train’s Boulevard. Irregular, sculptural volume of the structure houses the extension of the library, vertical communication, access, service premises and terraces overlooking the boulevard. “The project is generated from the inside to the outside taking advantage of the flexibility that the during design process allows the irregular geometries,” said the architects.



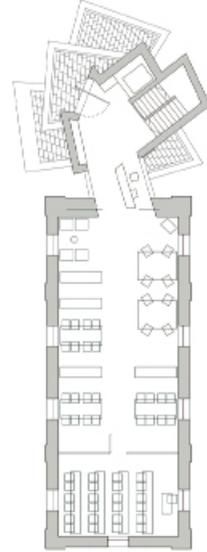
Site



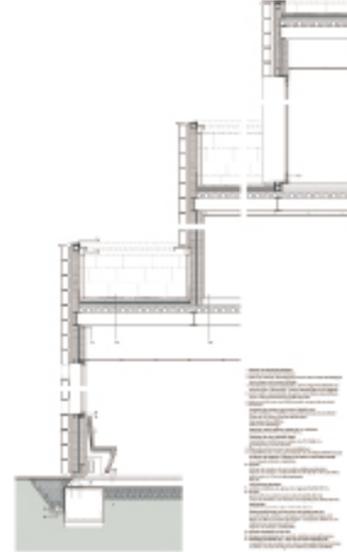
Ground Floor Plan



First Floor Plan



Second Floor Plan



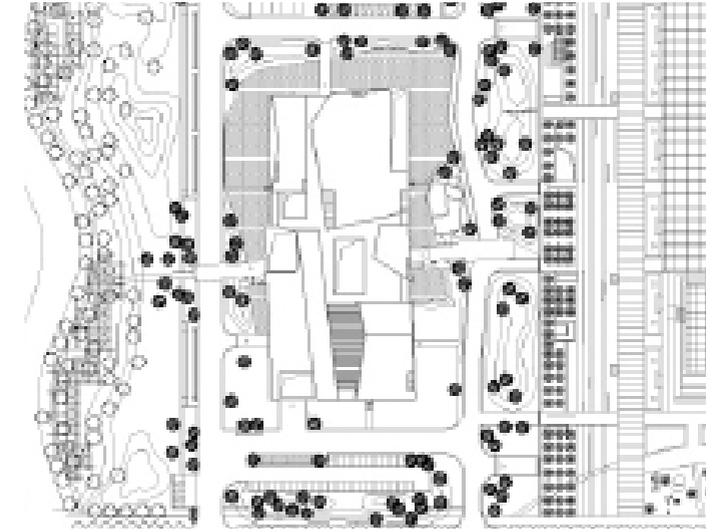
Detail Section

Ningbo Historic Museum

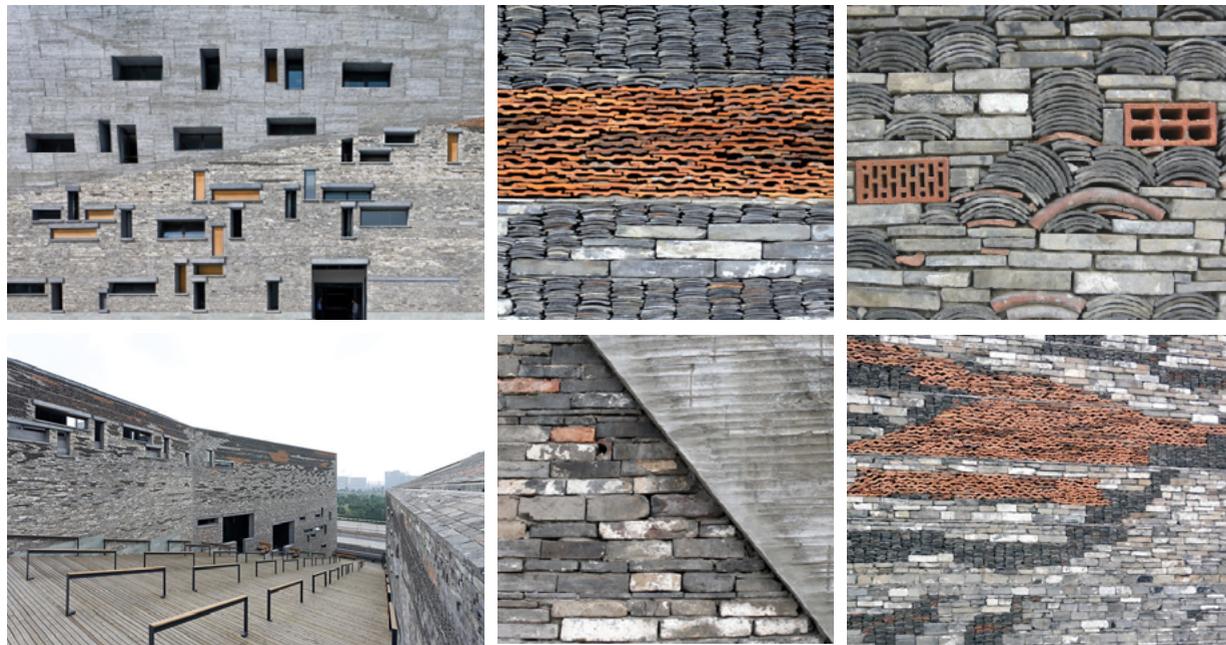
Architects: Wang Shu, Amateur Architecture Studio

Location: Ningbo, Zhejiang, China

Main material: Recycled Bricks



In the construction of Ningbo Museum have used lots of recycled materials, along with other key aspect to create a sustainable space as vernacular building strategies, public spaces, accessibility for disabled, integrated planning, renewable building materials, materials environmentally innovative, low-cost design, using modern tools and user participation in the planning process.



On the outer wall were used lots of traditional bricks, tiles and recycled tiles, reflecting the trend of building sustainable and fusion between ecology and culture. A lot of these materials comes from the scrapping of old buildings, in response to the phenomenon of deconstruction and massive construction in the urbanization process in China.

The gray conglomerate of the facade, with orange splashes, was prepared by local artisans, creating collages invites you to discover places or traces of a historical past, like the old hidden from the companies that made the original materials seals. In an interview Shu said:··· “They are not bricks, it is history, time and experience. Many people have touched these bricks .”



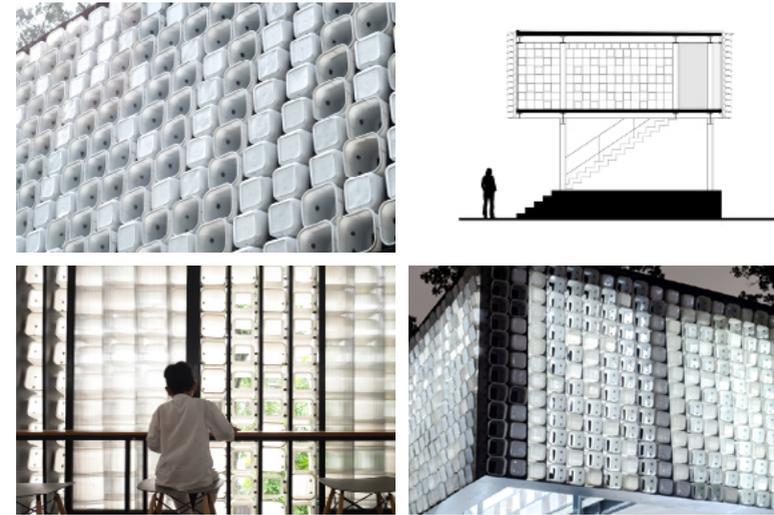
Bima Microlibrary

Architects: SHAU Bandung
 Location: Jl. Bima, Arjuna, Cicendo, Kota Bandung, Jawa Barat, Indonesia
 Main Material: Recycled Ice Cream Tubes



Two thousand ice-cream tubs form the walls of this small community library in Bandung, Indonesia, and some of them have been perforated to display a subtle message (+ slideshow).

For the facades, the project team tried to find an affordable, locally available material that would provide shade whilst enabling air and natural light to reach the interior. The initial idea was to use white and translucent plastic jerrycans, but these were not available in the quantities required at the time of construction. Used ice-cream tubs provided the eventual solution, as they could be purchased in bulk. An added benefit of the tubs is that they are stable when the bottoms are removed, meaning they can also be used to bring in ventilation.



The plastic tubs are fixed to vertical steel ribs and are angled outwards to provide an effective rain screen. Translucent sliding doors mounted behind the facade can be closed to create a completely impermeable facade during more severe tropical storms.

Museum at China Academy of Art

Architects: Kengo Kuma & Associates
 Location: Hangzhou, Zhejiang, China
 Main material: Tiles



The outer wall is covered with a screen of tiles hung up by stainless wires, and it controls the volume of sunlight coming into the rooms inside. Old tiles for both the screen and the roof came from local houses, their sizes are all different, and that helps the architecture merge into the ground naturally.

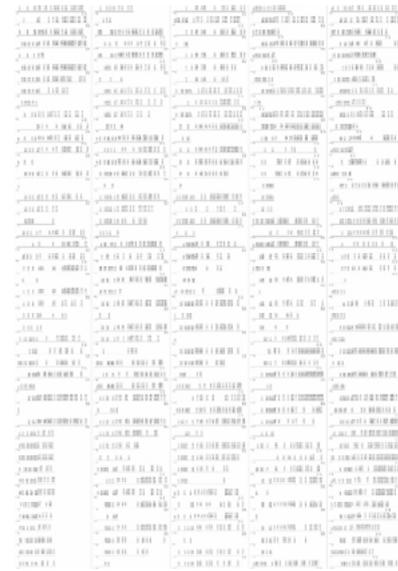


Hotel Hotel Lobby and Nishi Grand Stair Interior

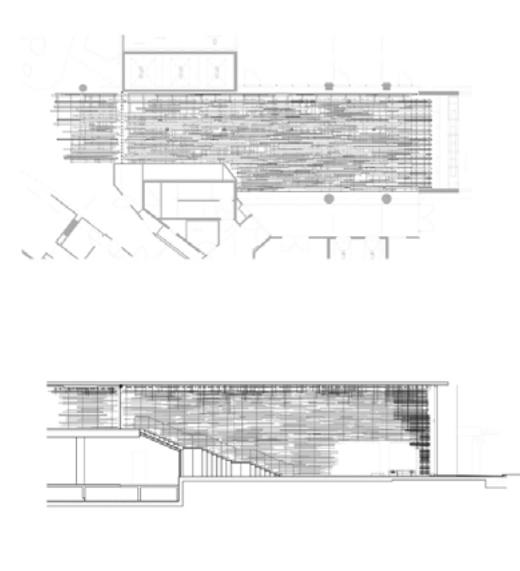
Architects: March Studio
Location: 25 Edinburgh Avenue, Canberra ACT
2601, Australia
Main material: recycled timber



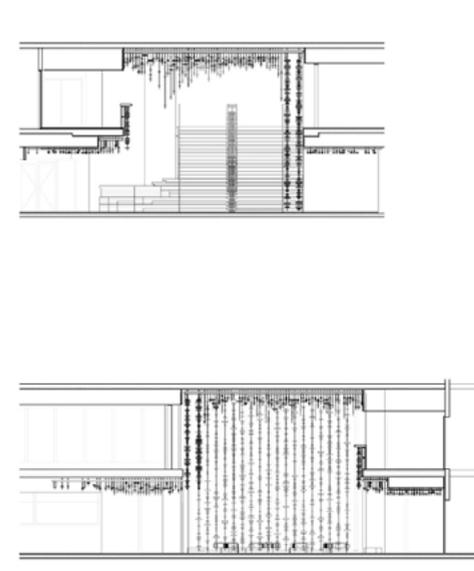
March Studio's role in the Hotel Hotel project was to design the ground floor spaces, which run between the building's two entrances. The studio's response was to plan an interior filled with recycled timber, concrete beams and steel panelling. In the lobby, over 5,000 wooden offcuts were fixed around the walls and ceiling. The lengths are supported by steel rods that run from floor to ceiling, while more reclaimed timber was used to create a grand staircase.



Detail



Sections

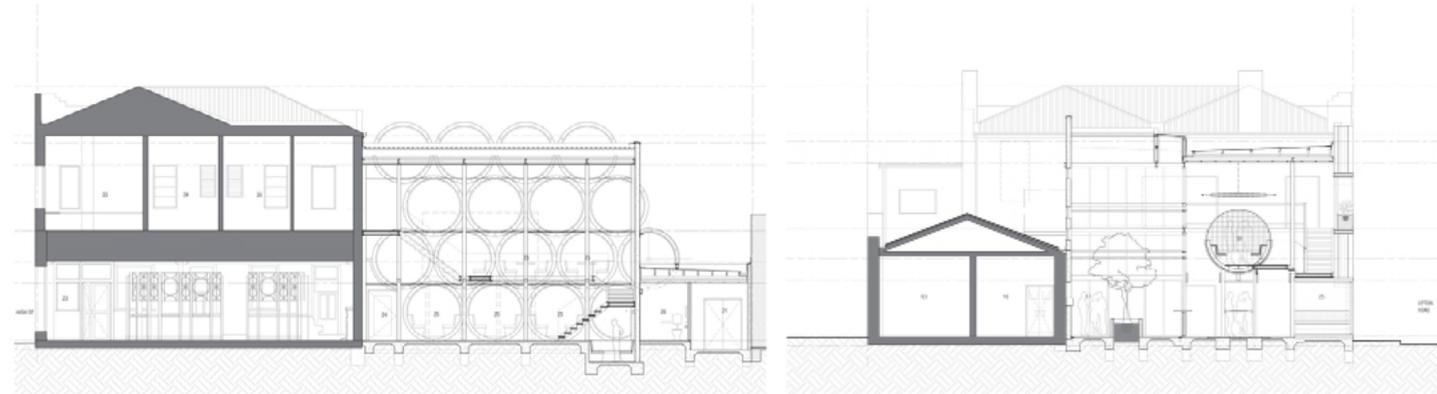


The Prahran Hotel

Architects: Techne Architecture + Interior Design
Location: Victoria, Australia
Main material: concrete pipes

The Prahran Hotel is a substantial two storey corner pub with a striking streamlined art deco facade. The rear of the venue had a poorly proportioned, internalised single storey extension and the clients brief for the project called to demolish and replace it with a dramatic double height space with a central courtyard.
The use of large stacked concrete pipes for the street facade of the addition struck a chord for multiple reasons: they have a depth and can be interactive, they have a dramatic, sculptural quality, they reference existing internal circular motifs and they suggest stacked kegs or barrels.





Sections



Big Dig House

Architects: Sing Speed Design
 Location: Lexington, MA, United States
 Main material: steel and concrete



The Big Dig is the most expensive highway project in the history of the US. The project included rerouting the Central Artery into a tunnel under the heart of Boston, requiring a tremendous engineering work due to underlying metro lines and pipes and utility lines that would have to be replaced or moved. Tunnel workers encountered many unexpected geological and archaeological barriers, ranging from glacial debris to foundations of buried houses and a number of sunken ships lying within the reclaimed land. The Big Dig House by Single Speed Design reutilizes materials from the Big Dig. In that aspect, it is a remarkable example of recycling in architecture.

Case Studies-scale of building (adaptive reuse architecture)



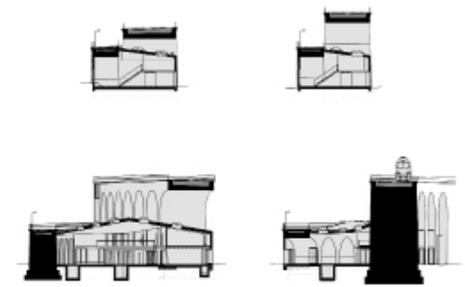
Refurbishment Viaduct Arches

Architects: EM2N
Location: 8005 Zurich, Switzerland
Existing construction: railway viaduct

In this project the architects examine two essential questions: How can an infrastructure element that is a protected monument be programmed and made part of the urban system? In an area with an increasing amount of regulations (energy, hygiene, fire protection etc.) and greater demands for comfort, how can low-budget projects be carried out?
The infrastructure element, originally used as a railway line, is to form a linear park that will be part of a culture, work and leisure mile. This reprogramming of the viaduct initiates two decisive urban impulses: a spatial barrier becomes a linking structure, and the outdoor spaces bordering it are



Ground Floor Plan



Cross Sections

Yun House Boutique Eco-Resort

Architects: Ares Partners, Atelier Liu Yuyang Architects
Location: Xingping Scenic Area, Yangshuo, Guilin, Guangxi, China
Existing construction: old farm houses



First Floor Plan

Second Floor Plan

Site Plan



Yun House is a boutique eco-resort nestled within a village at north eastern part of Yangshuo which situated along the dramatic landscape of the Li River. The site consists of nine renovated old farm houses and one new addition which functions as an all-day dining restaurant for hotel guests. Taking on a sensitive approach to the local culture with villagers still living nearby, the overall planning and landscape design blends into the original village structure without creating new boundary conditions to the villagers.

The Dovecote Studio

Architects: Haworth Tompkins
Location: Snape Maltings, Snape, Suffolk
Existing construction: dilapidated old building

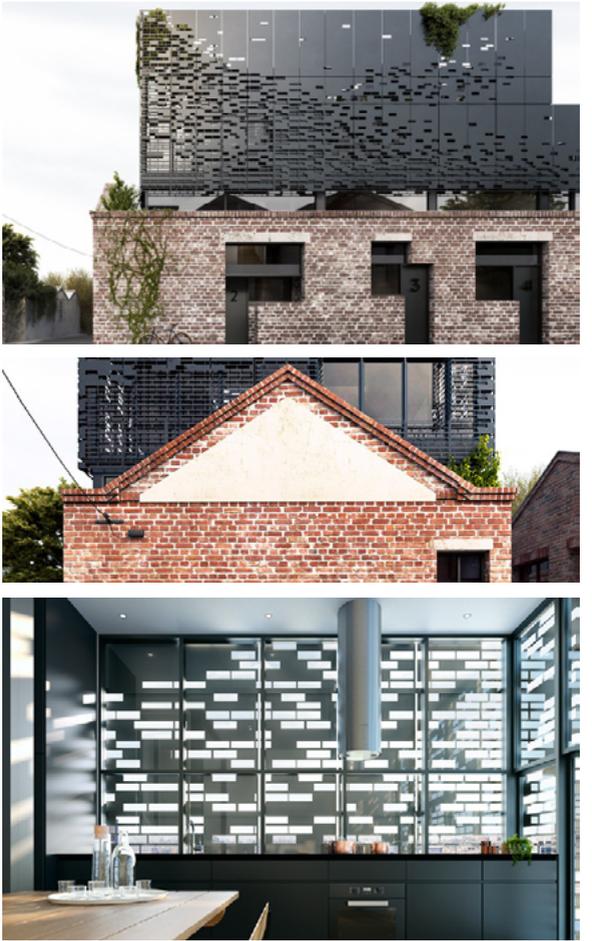


The existing ruins once formed a two-storey brick dovecote, and although decayed, the enigmatic quality of this ruin became well known to concert-goers and visiting musicians. The new construction which is built into the existing ruins is using original industrial feel material and almost it seems to gracefully grow from the old.

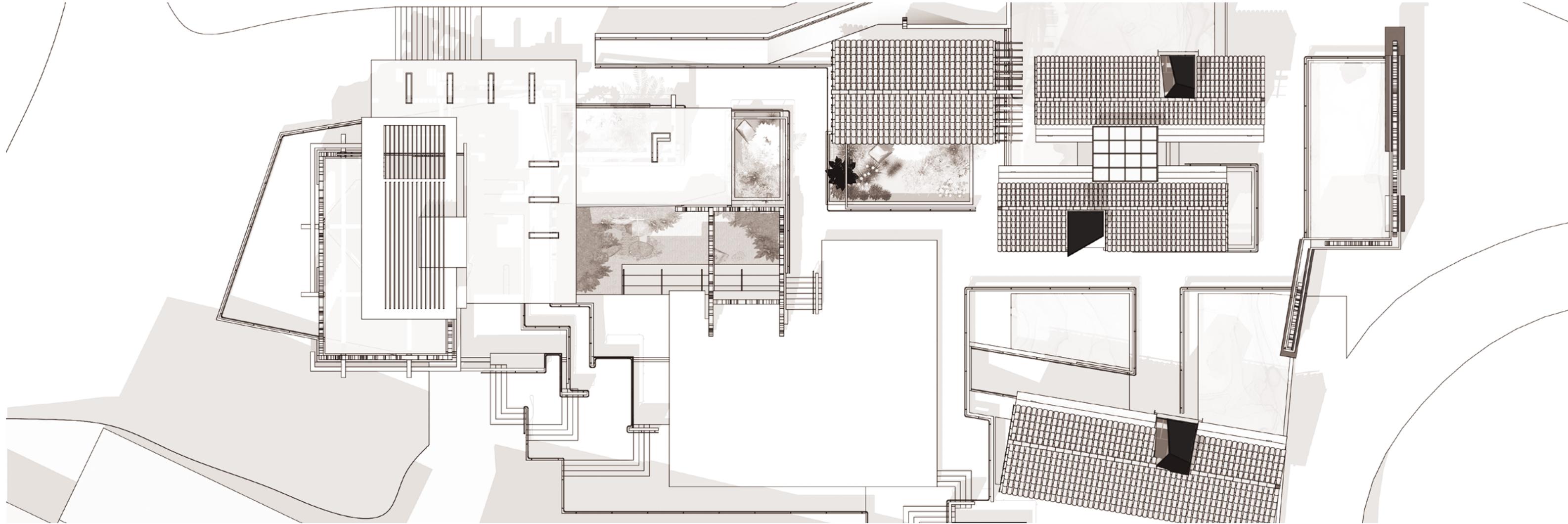
Warehouse

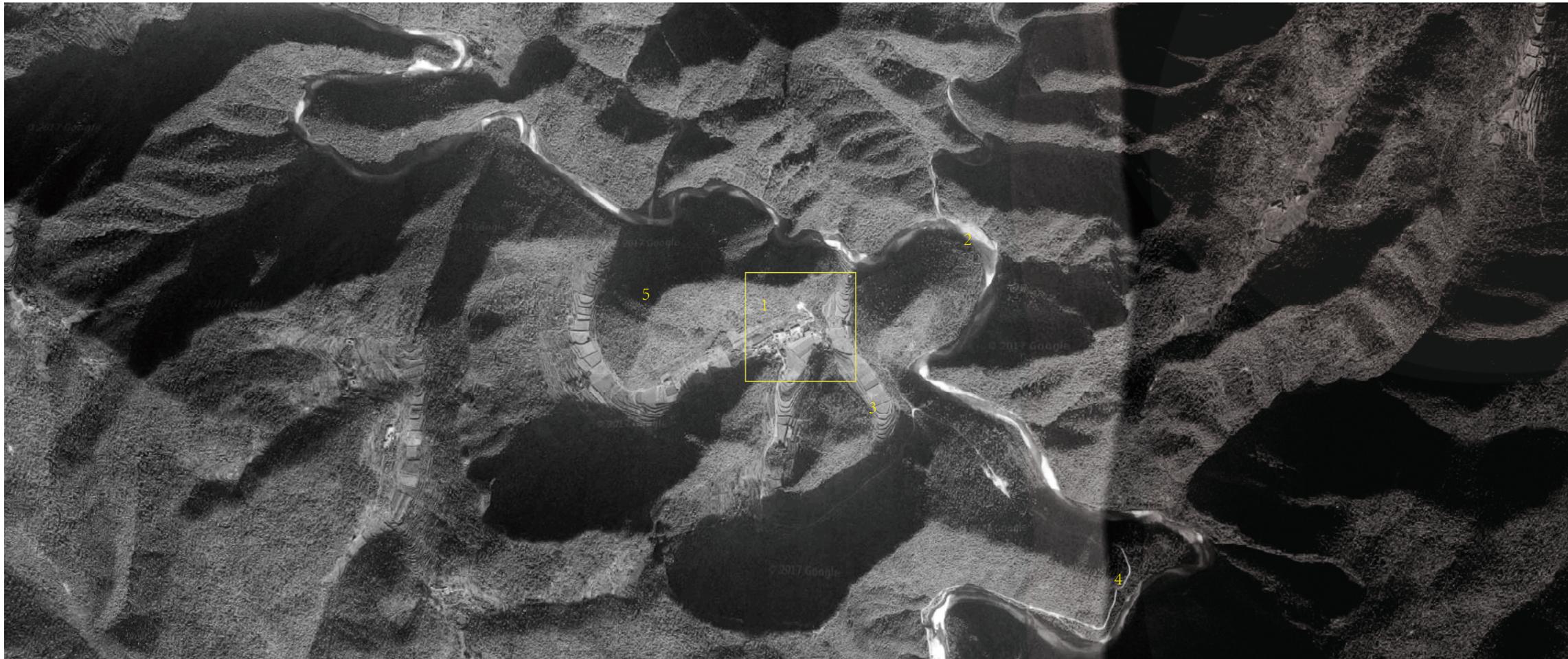
Architects: DKO Architecture
Location: Waterloo St, Carlton, Melbourne
Existing construction: textile factory

This design references the brick patterns and simple geometry of the surroundings and the adjacent St. Jude church. Retaining the original exterior, the architects came up with a creative way of combining old and new. The pixelated perforations in the black metal facade provides privacy for the occupants and references the brick patterns below. The screens open to provide cross ventilation and allow natural light into the space. It is important to keep the culture of this area in mind, the architects really wants to be sensitive and careful to respect it. So they are giving a bit of history back to the site.



Reusing old materials / village renovation





- 1 The Village
- 2 Zhanghe River
- 3 Terraced Foeld
- 4 211 Country Road
- 5 Mountains
- 6 Site in the Village
- 7 Main Road
- 8 Walking Street
- 9 Farm Land
- 10 Existing Farm Houses



This is the existing buildings and ruins on the site. It is located in the center of the village, at the south of the site, there is a 150 meter long pathway which was built nearly 400 years ago. The width of the pathway is irregularity, the widest part is 4.8 meter and the narrowest is only 1.8 meter. The whole pathway is paved by unmerous different sizes of quartzite. After hundreds of years treading, the quartzite become very smooth. Near the pathway, some farm houses are located there. Also, there are some other farm houses located at the north of the site. People can get access to the farmland through the stair at the west of the site, also, there is another stair at the edge of the path way which connect the site and the houses. Three of the hosues on the site are residences, but they are abandoned already. Some stone ways are remaining on the site which have some historical values to the villagers.



Manyun village(Diffuse clouds), an ancient village which is located in the town of nanzhang county in Hubei province, used to be an independent natural village. In 2006, combined with the original GanXi village. In China's satellite map, we can find "Manyu village(diffuse valley)", the word "village" fits to the geographical characteristic of the village. In ancient times, the area has set up the camp station, so before the qing dynasty, this place was called "camp" . The area is adjacent to the mother river- Zhanhe River, every early morning and dusk, the cloud and mist rise from the river, vanish in the valley . The truth of the smoky cloud can not be distinguished easily, walking in mountain is just like walking in the cloud, so the villagers used to call this place "diffuse cloud", the poetic appellation has been in use till today.

Manyun village(Diffuse clouds) is near the source of the Zhanhe river, border on Banqiao town and Xiaoyan town, 90 kilometers away from the Nazhang county. Travel east from the Ganxi sector of 028 county road, about one kilometer before entering into gorge of Zhanhe river, then westing 6 kilometers, the enterance of Manyun village(Diffuse clouds), gate, appears. Stand in front of the gate, you can see the terraced fields on the mountainside, the vivid mountain looks like a rat, a 1 meter wide locust and the old farm houses built around the mountian. The cambered steep mountians surround the village which extends from east to west.



The village hides deeply in the mountains, surrounded by water on three sides and one side by mountain. The mountain is so steep which looks like a wall, the water wriggling like a belt, the landscape is amazing. According to the written records, 400 years ago, it was a bustling and prosperous town. In ancient times, the war was frequent, because this area was quite difficult to attack, the strategic position is very important, so the area became the first choice of breeding. After several years building, this place had become a land of idyllic beauty. The government, army and other state institutions derived from the person's breeding. School, shop, pharmacy and other civilian installations are also equipped. There are lots of ancient fortress, workshop, dwellings, tombs, trees and temples which are showing the prosperity and prosperity of this place ever have. After the liberation, with the stability of the society, traffic developed, this area is gradual depression, decline, broken, and then forgotten. Nowadays, stroll along the narrow street paved with green flag, you can vaguely feel the historical prosperity and years of vicissitudes.



Dwellings in manyun ancient village(Diffuse clouds) were built according to terrain, mostly located at the foot of the mountain, centering on the lowest valley. In front of each family, there is a field or street, but different in size.

Most ancient houses in this village were preserved well. Their architecture style imitates the hui-style from the south. They are all two-layer structure, use the local stone to make the foundation. The walls were made of clay bricks, the black tiles were covering the roof, exterior walls were painted by white lime, wall under the eaves and point of the gable wall were decorated by auspicious clouds decoration. Most ancient dwellings have a gate, after entering the courtyard, wing-room is located at both sides, the central room is facing the yard. The central room is bigger than the wing-room, major family affairs generally happen in here.

There are 7 buildings well preserved here, the homeowners are AoMinggui, AoYaoguo, AoGuangzheng, AoGuanghui, AoGuangzhao, AoDeying and WangGuozhi. The oldest and most representative among these are the houses owned by Aominggui and AoYaoguo.

Due to the bad traffic situation, this village is very fall behind, infrastructure is not very well. There is no school, no hospital. And it is hard for young people to support the whole family just by farming. Children should get educated. So the young people and their children are no longer living in this village. But the aged people have already living in this place for a long time, the life here make they feel good, so they do not want to leave. Right now, there are 67 families in this village, nearly 130 people, more than 90% are old people. So, in this project, I focus on this group of people.

Based on the age of people, I have done some research about these people who are living in Chinese rural village. Nowadays, the aged people do not work on the land for a long time, as a result, they will have a lot of leisure time, if they do nothing all the day long, they will feel lonely emptiness. In order to improve the quality of their lives, they need a place to speed their time. Due to the characteristics of low educated degree of the rural elderly, set up some courses and lectures about language literacy, health care, current events, laws and regulations, singing and dance to help them to improve the cultural quality, foster a concept of value, spiritual pursuit, aesthetic taste and the ability to distinguish the true and false.

Daily activities of aged people



Take a walk



"Bamboo bed" talking the daily life



Play magjong



Play cards



Play Chinese chess

Mostly happen in outdoor

Occasional activities



Watch opera



Health lecture

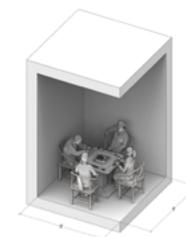


Physical examination

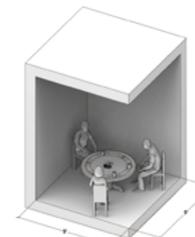


Traditional activities

The space for these activities can be shared because they do not happen at the same time



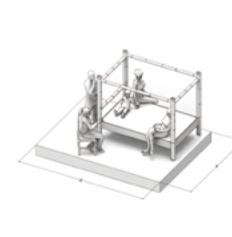
Space for playing mahjong (8'x8')



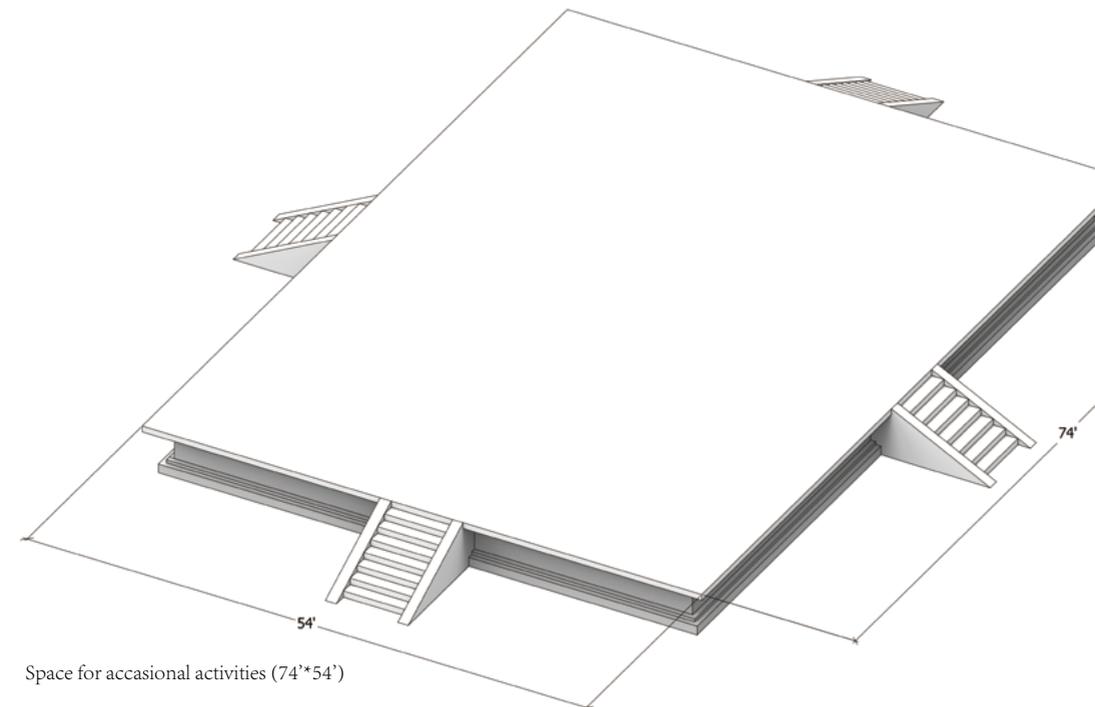
Space for playing card (9'x9')



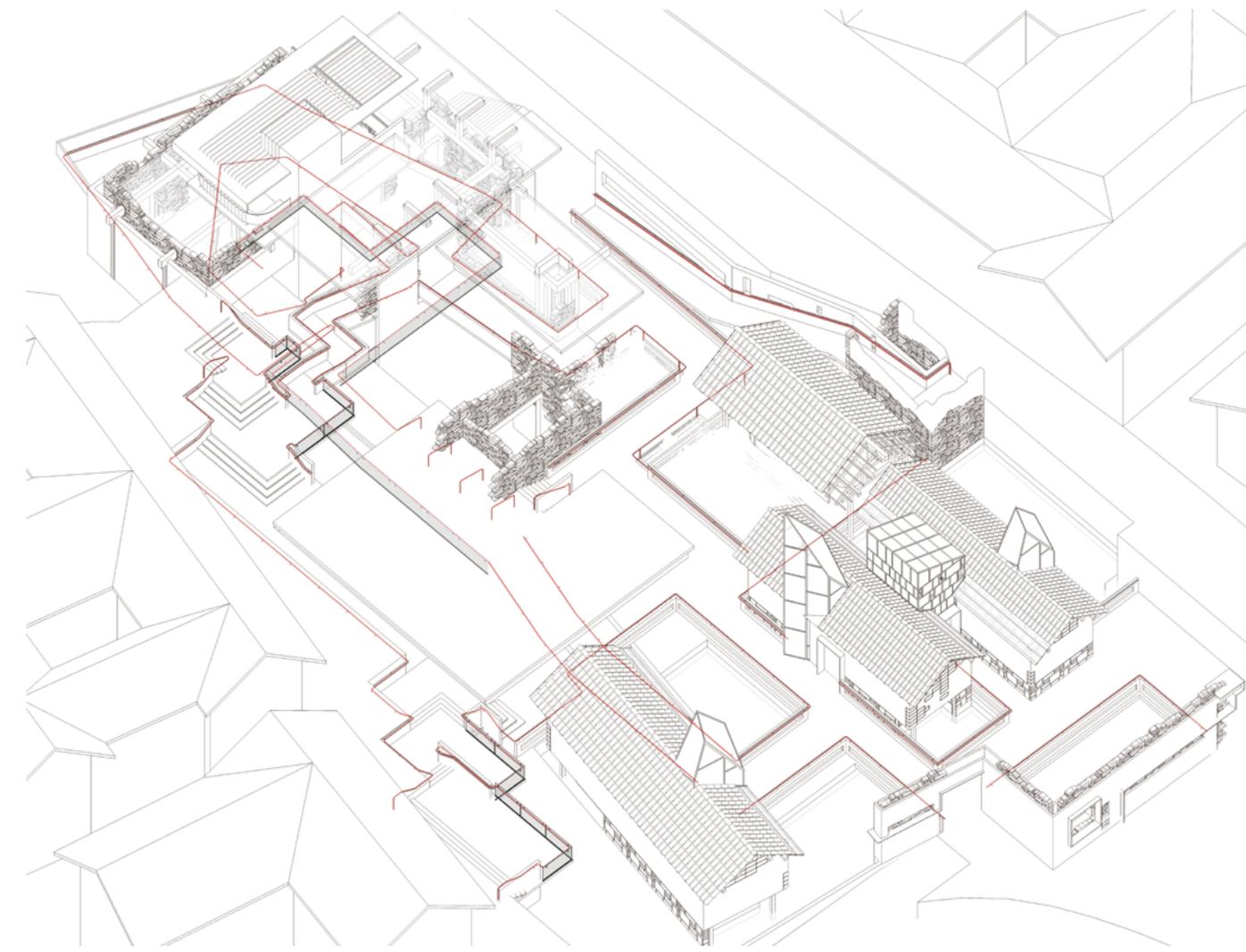
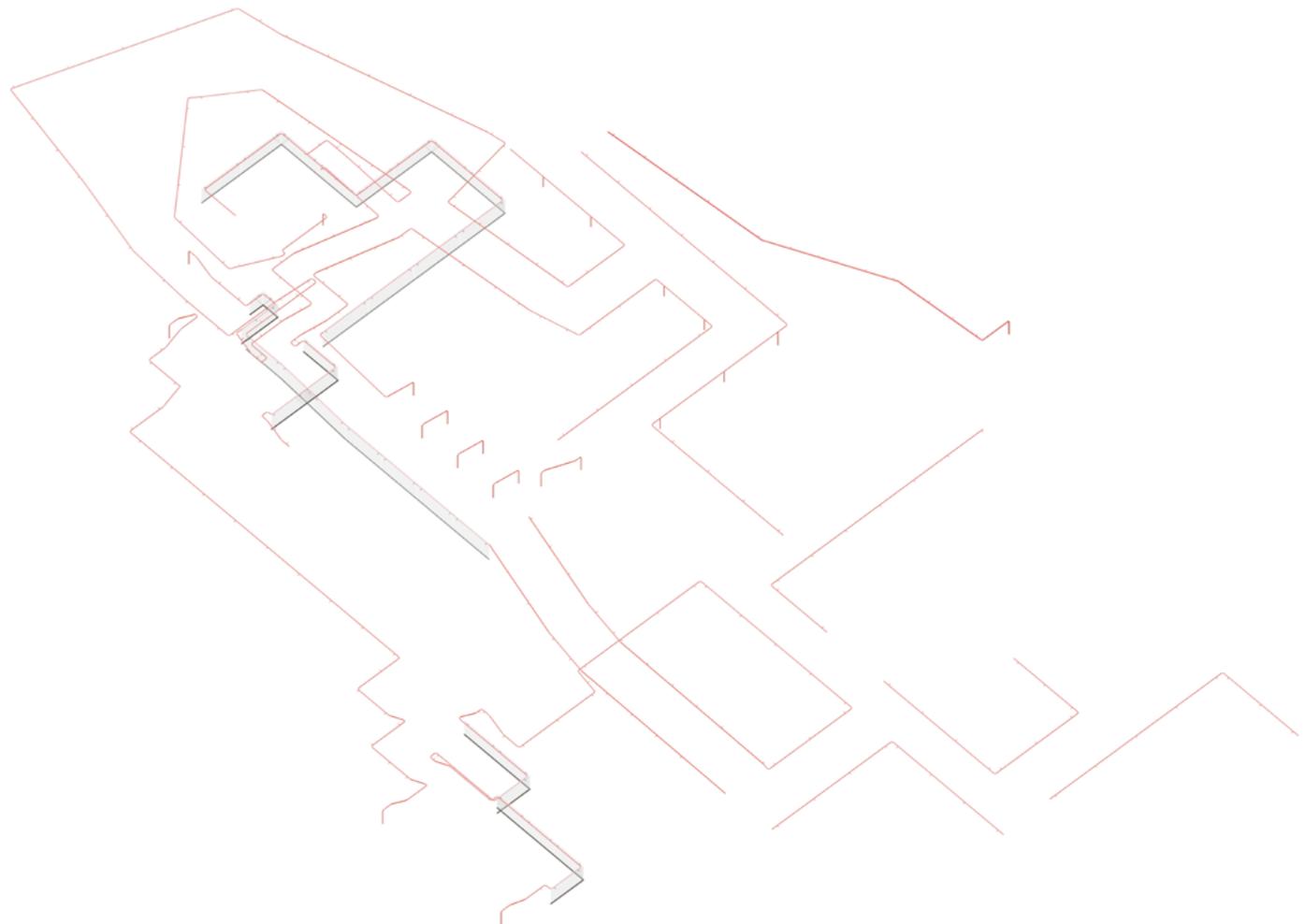
Space for playing Chinese chess (8'x5')



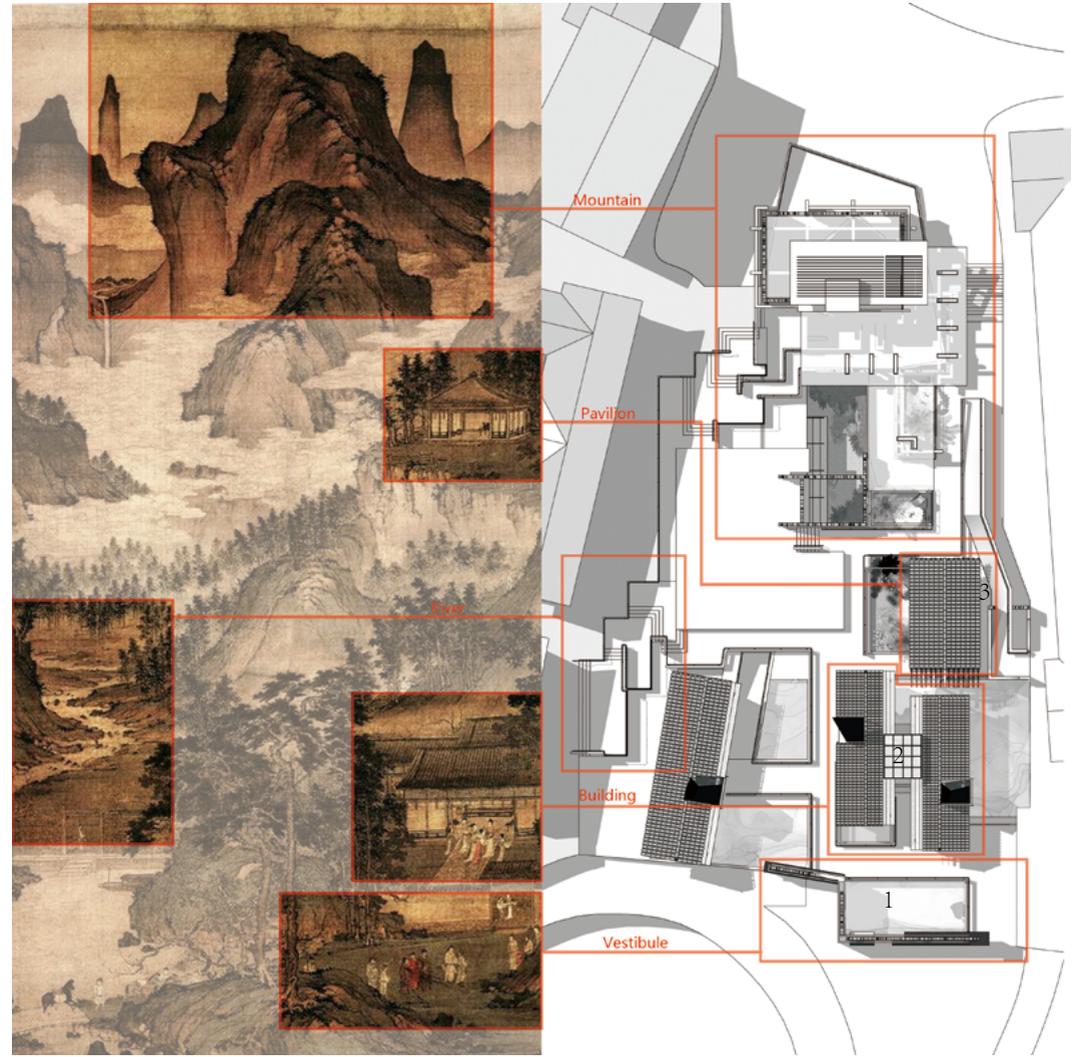
Space for talking the daily life (12'x9')



Here are the activities that happened in this village and the needed space for each activity. Some activities happened every day like "taking a walk after eating, talking the daily life on "bamboo bed", playing mahjong, cards and Chinese chess" and mostly, these kinds of activities happen indoor. Some activities happen occasionally like watching opera, health lecture, physical examination and some traditional activities. Because these kinds of activities do not happen at the same time, the space for these activities can be shared.

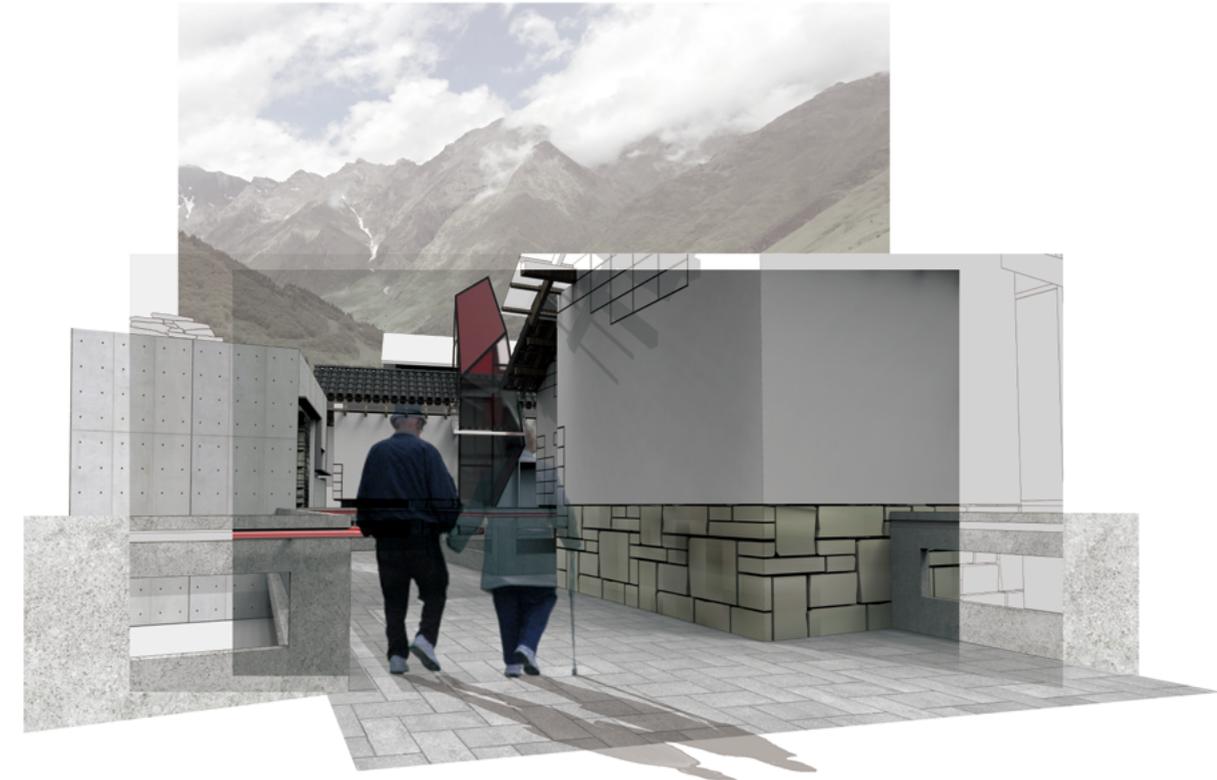
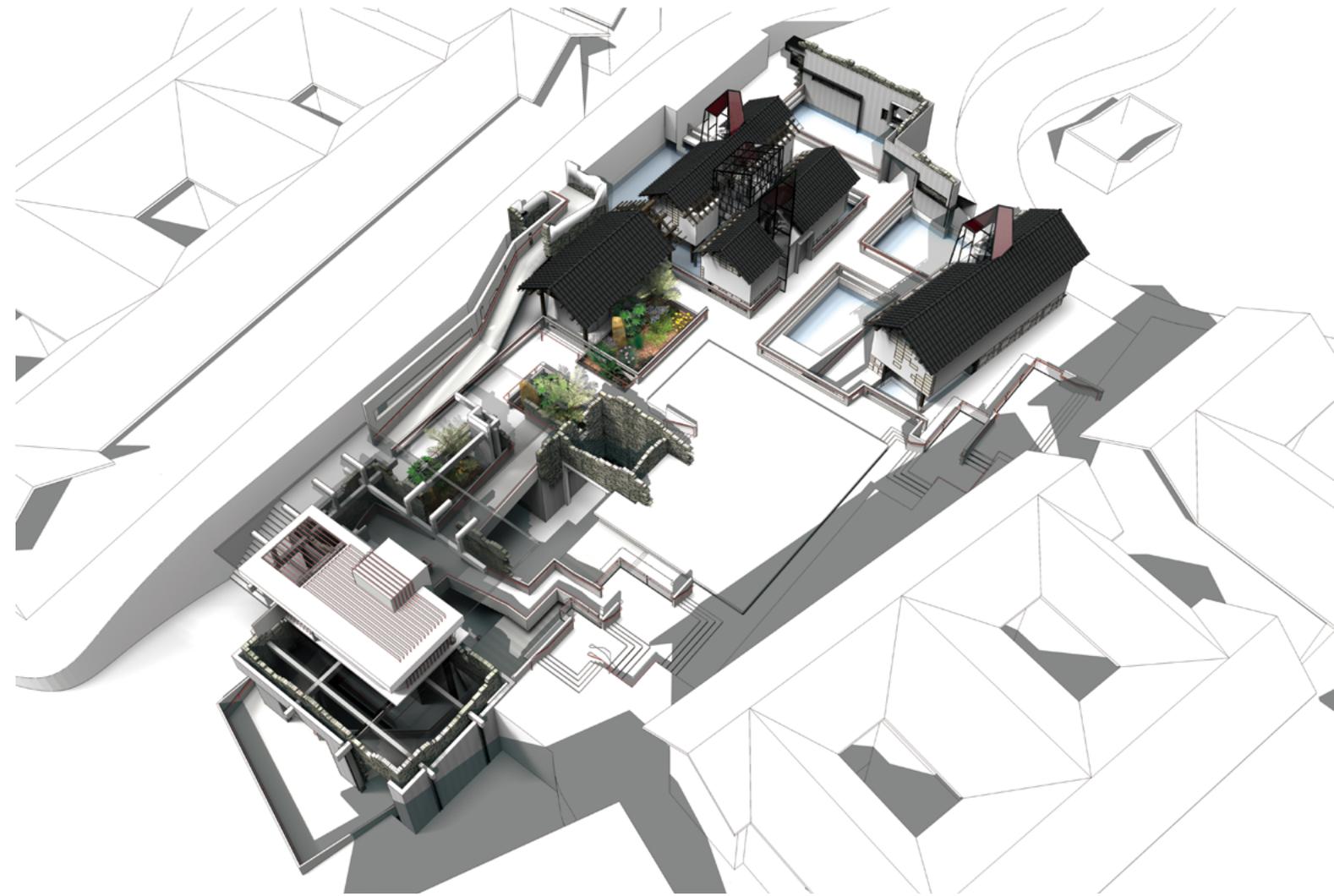


Handrail system for the elderly. This is designed to help old people walk in the garden.

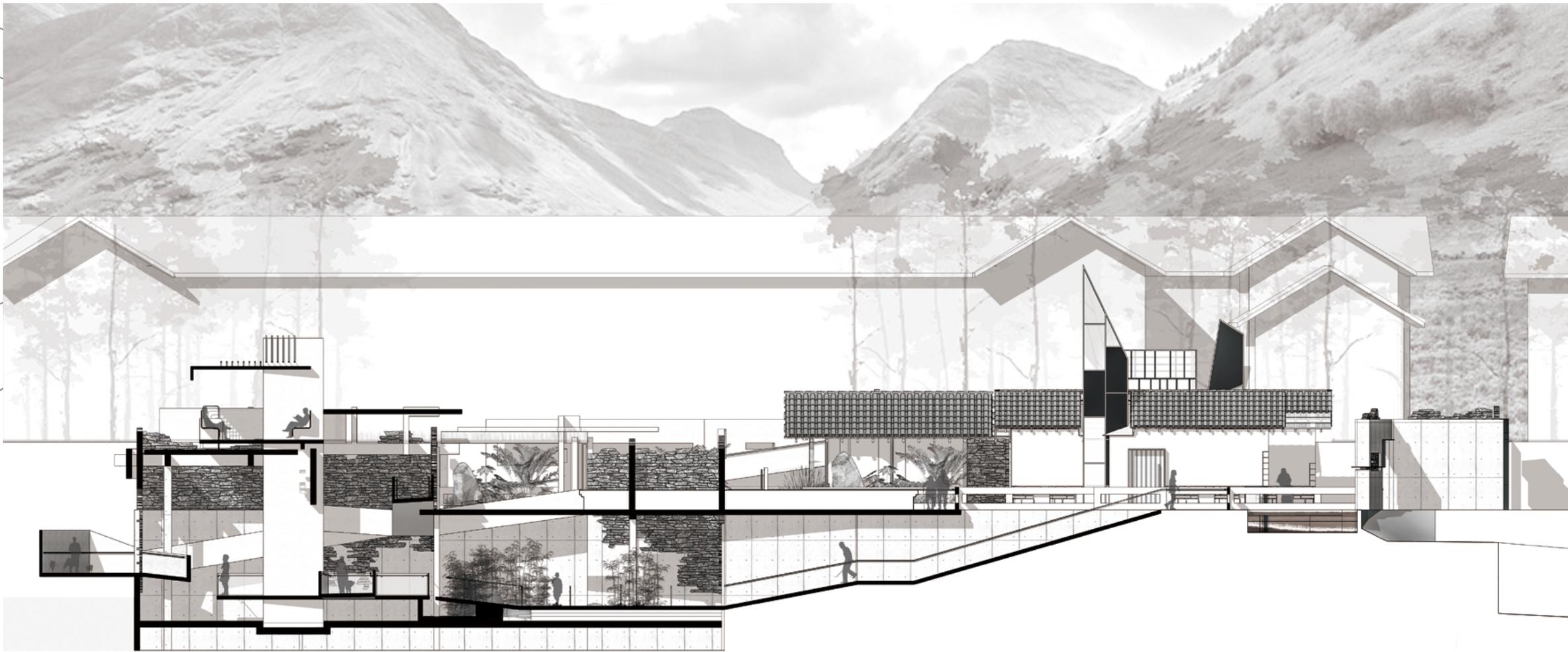
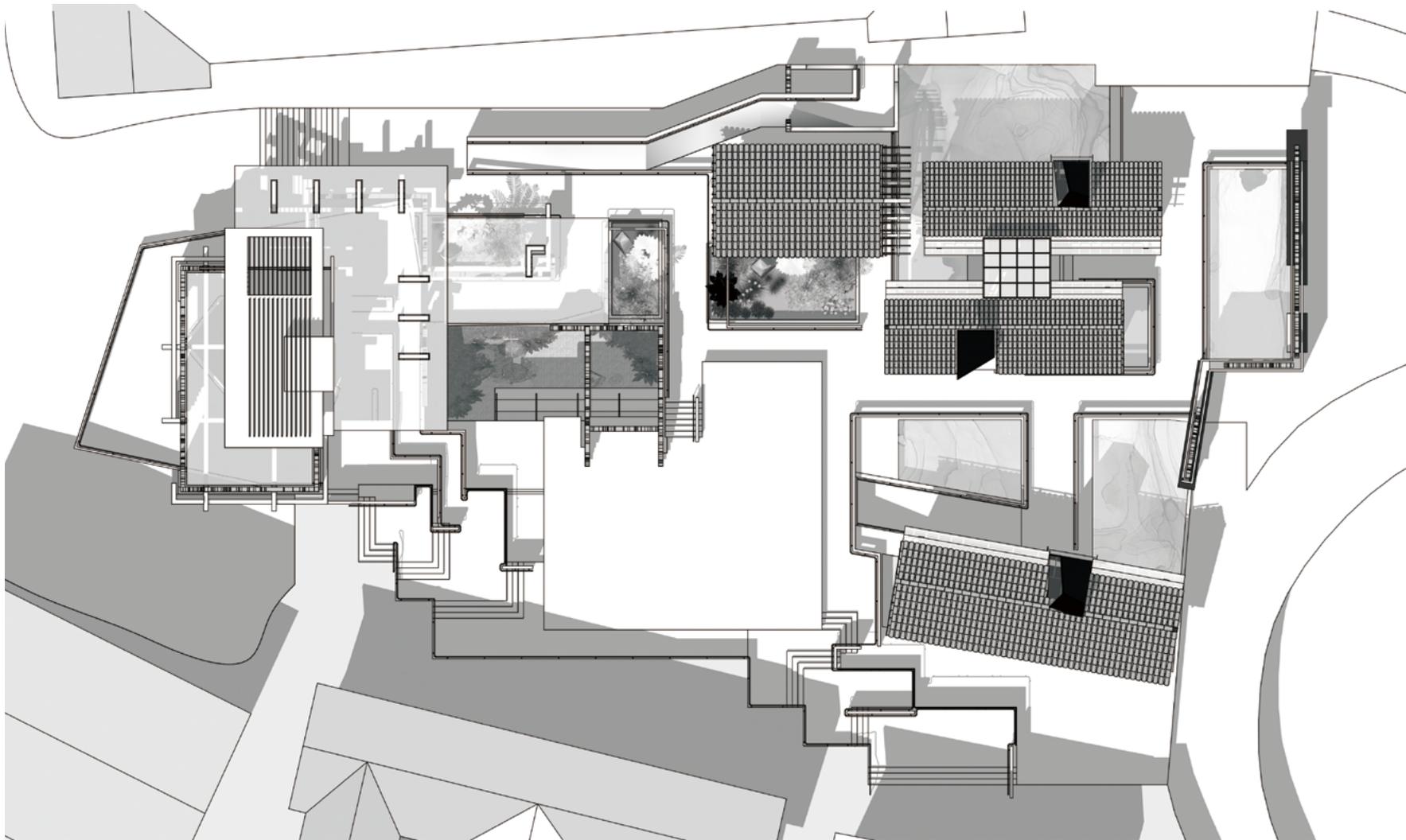


When ancient Chinese people make some drawings, they always put their wishes of the desired garden space in the drawing. So according to this Chinese drawing, I start to organize the garden. At very bottom of the drawing is the vestibule, then is the building, at the left of the building is a river, behind the building is a pavilion. And the mountain is located at the top. This also happen in my garden. Location "1" is the entrance of the garden, which is the vestibule in the drawing. the building is at location "2". I imitate the shape of the river to design this step. Pavilion is the location "3", it is a restroom in my project. And the last one is the mountain.

This project is composed of two main parts-wall renovation and house renovation. In general, it can be defined as a community activity center. Most of this project is outside, this kind of space can be called "garden", and also some indoor space for people to rest and play. Chinese have a long history about building garden, so Chinese always have a ideal thought about the garden design, this project is based on the Chinese culture to start the design. In order to let the villagers reach some new things, there are also some modern ideas fit in the traditional design. Because this is a project for the elder, some special designs can be seen here.

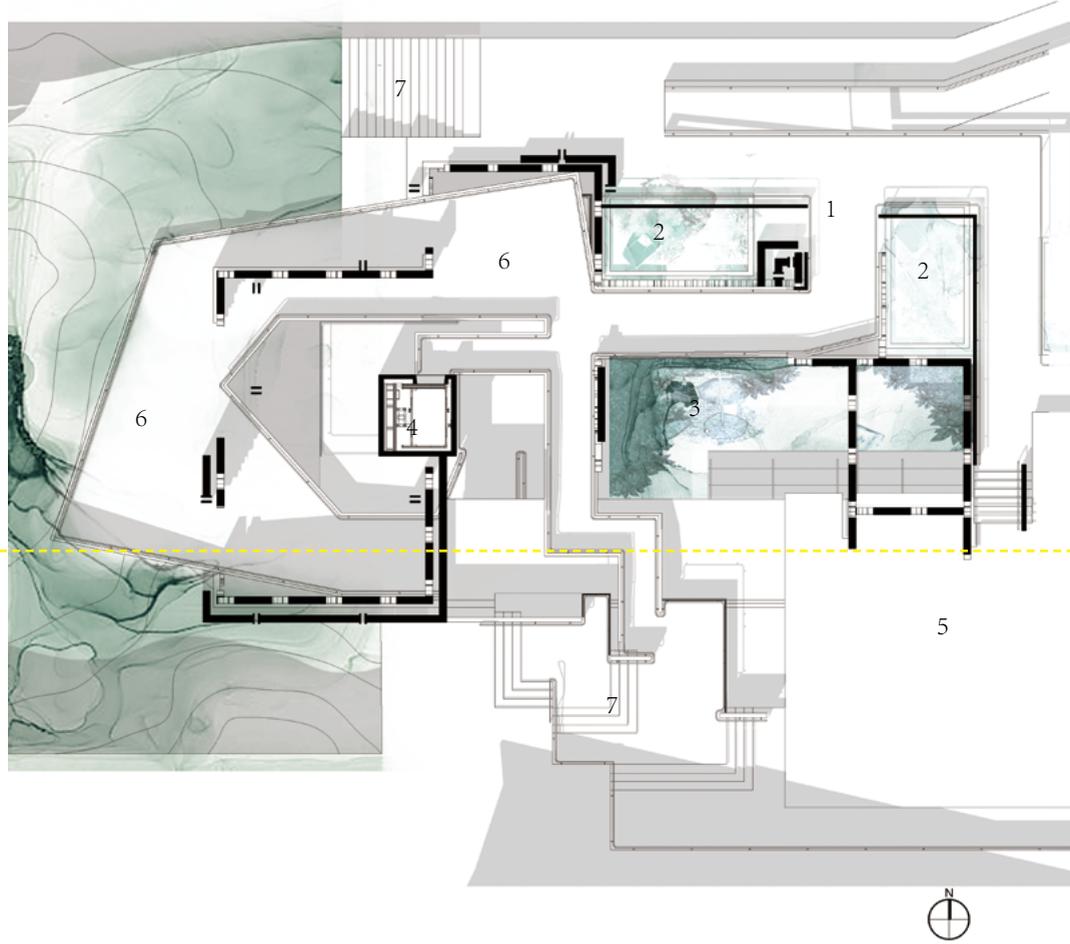


Perspective view of garden main entrance

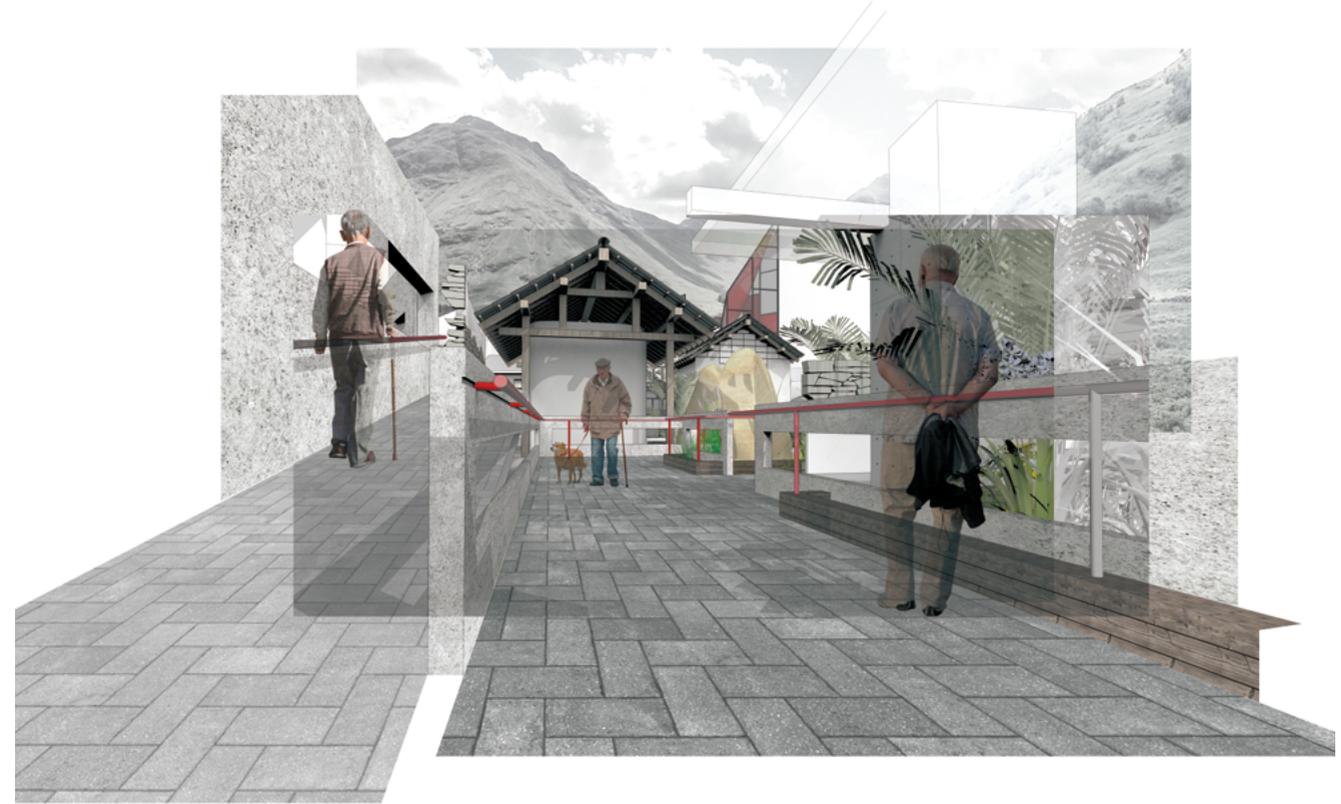


This is the wall renovation section. There are some stone walls existing on the site which are very old and have historical significance to the villagers. Because this is so special to the villagers, especially the aged people who are more nostalgic than the young people, I will keep the footprint of the stone walls which can refresh people's memory when they are walking here. As I said before, I call this part "mountian". In a real mountain, people will climb it, explore it. But this is designed for the aged people, it is not easy for them to climb a mountian, so I create a big underground space with a ramp which goes gradually to the bottom. In this process, the elderly can easily stroll in this space. The most existing thing of climbing the mountain is to reach the top and enjoy of the beautiful scenery. This can also happen in this space, there is a high level space with a elevator helping people go up. This space derives from the "bamboo bed". In the past, the villagers will get together and sit on a fitment called " bamboo bed" after dinner. They will chat with each other and talk the daily life. Now, this activity may take palce in this new space.

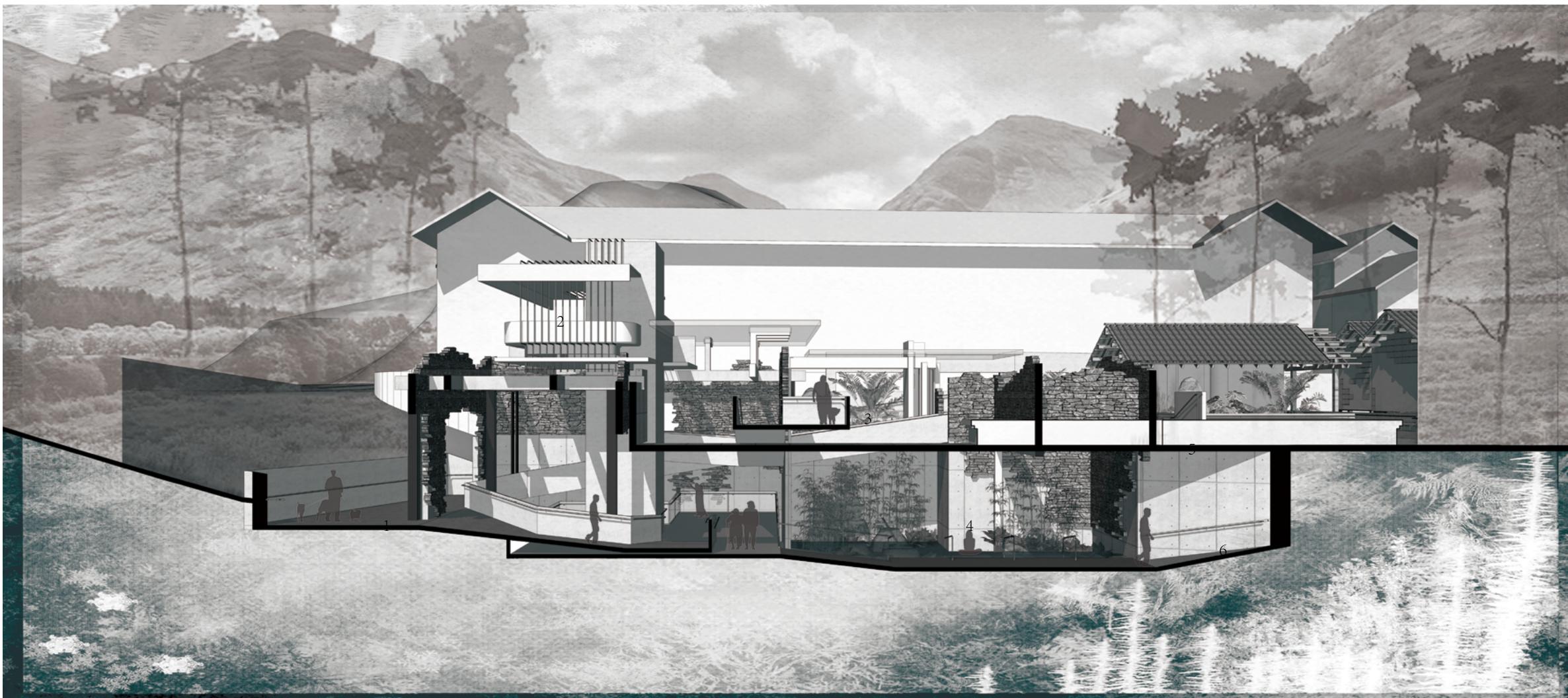
Section A-A



- 1 Entrance
- 2 Flower bed
- 3 Underground garden
- 4 Elevator
- 5 Stage
- 6 Ramp
- 7 Steps



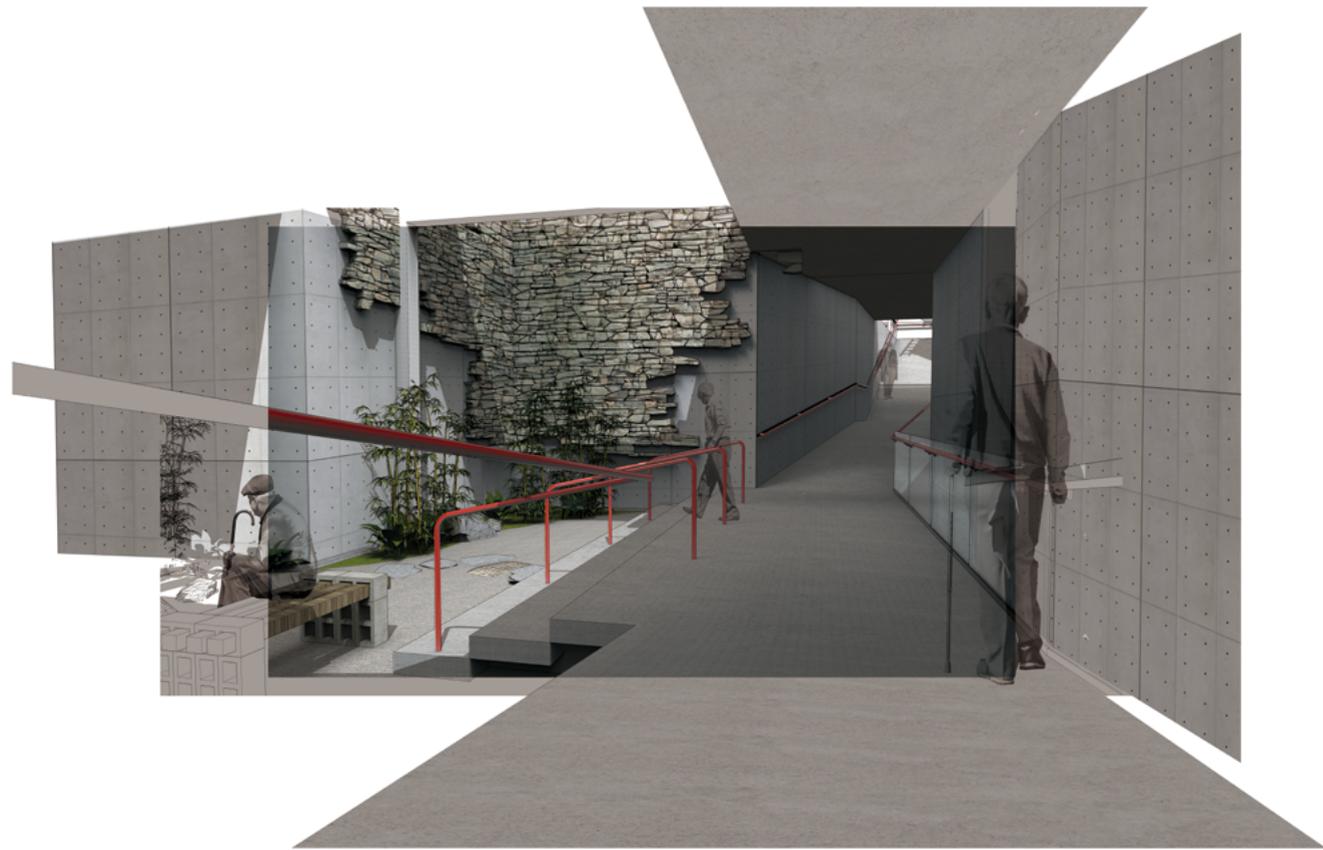
Perspective view looking from the steps near the farmland to the restroom



Section A-A

This is the perspective section of the big underground space, people can enter this space from location "3", and then walk down to the bottom through the big ramp. On their way to the bottom, they will see a composite wall which is combining the old stone wall and new concrete wall. At the bottom, there is a small garden exposed to the air, people can take a rest here. Through the elevator located at the mid, people can reach the "bamboo bed" space. At the location "6", people can go out of the space.

- 1 Ramp
- 2 "Bamboo bed" space
- 3 Entrance
- 4 Underground garden
- 5 Stage
- 6 To the exit

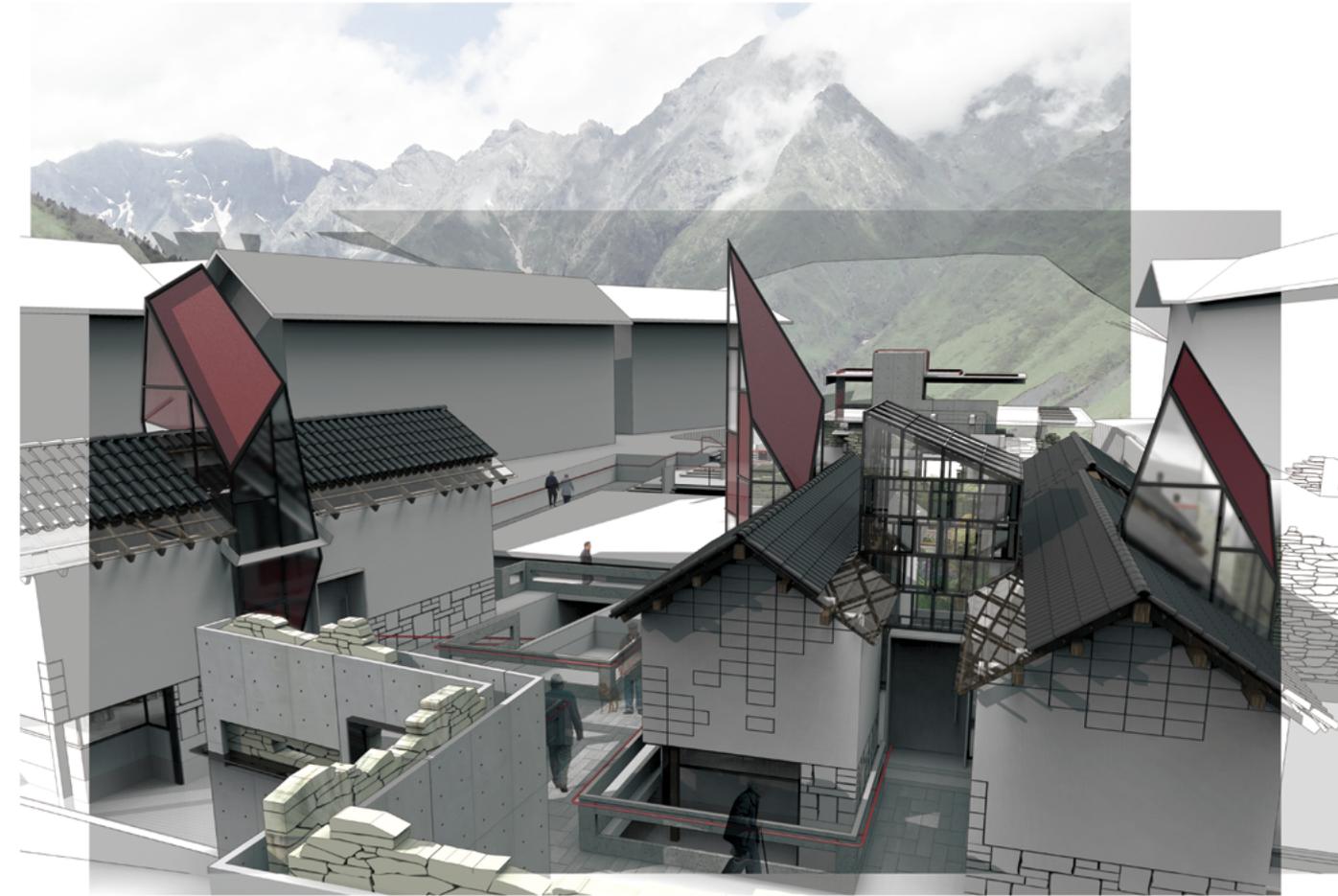
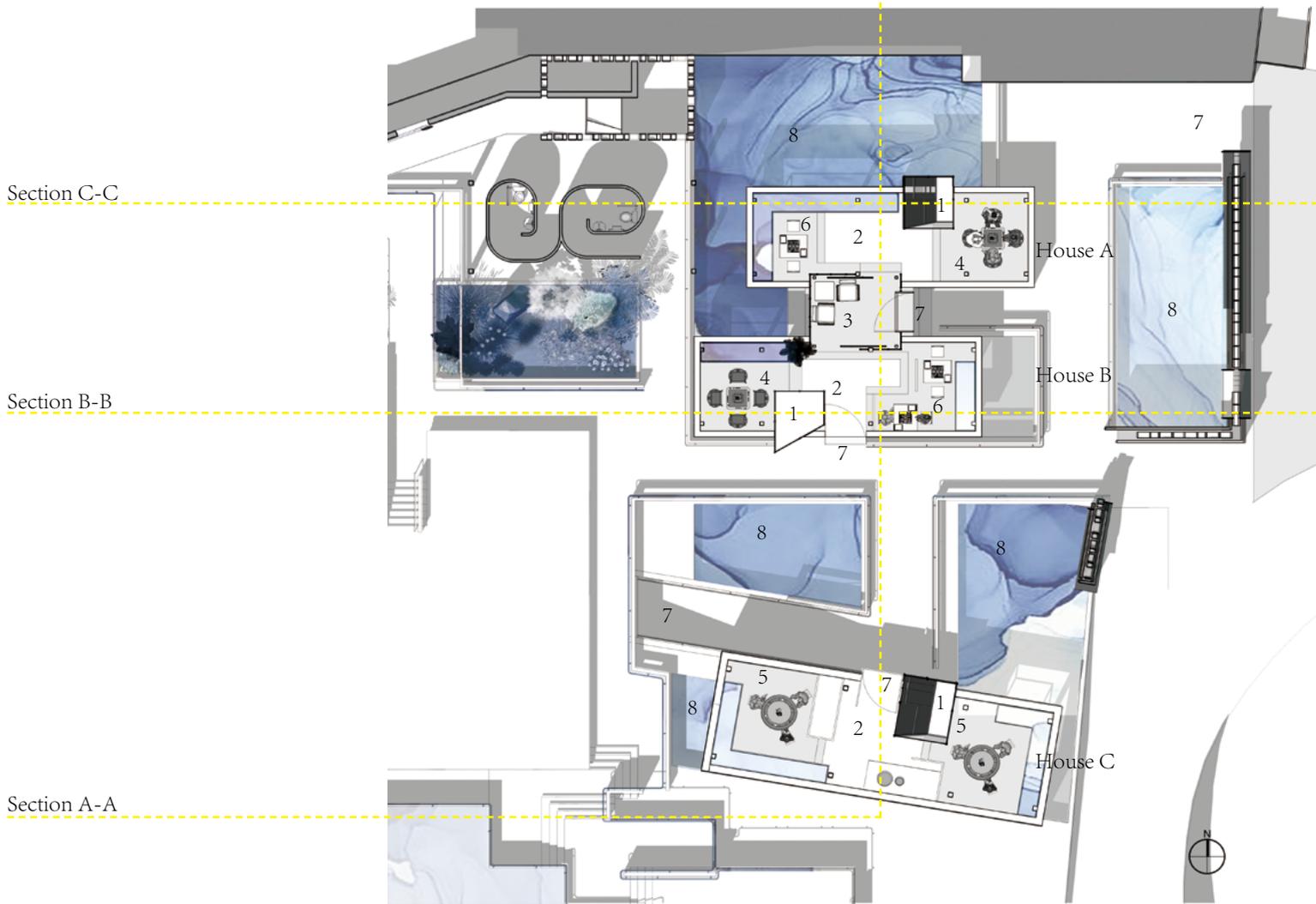


Perspective view located at the ramp along the underground garden

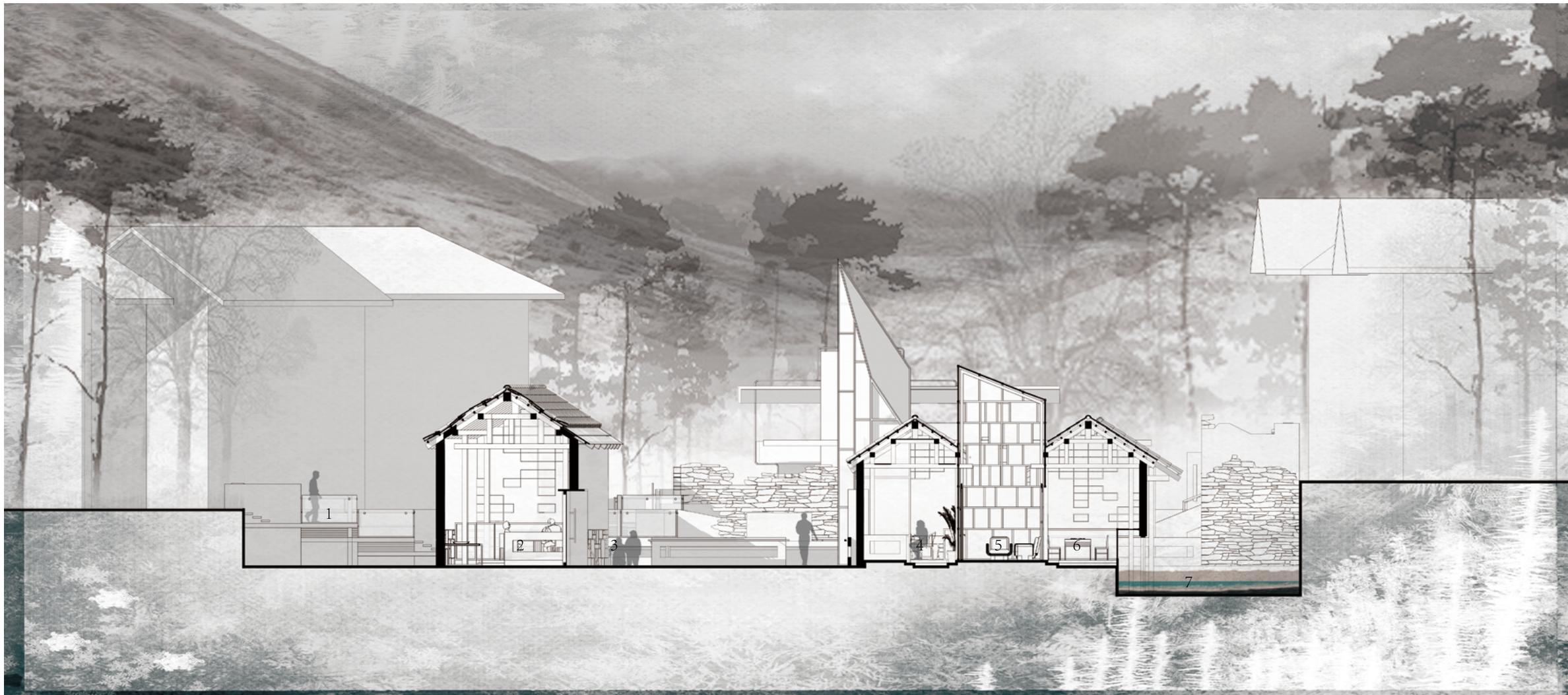


Perspective view looking the west of the "wall renovation" part. In order to show the comparison between the new concrete and old stone wall.

This section is about the renovation of the existing houses which were built nearly 400 years. The wall of the house was built by clay bricks, after so many years, it is very fragile. And the structure of this house is made by wood which is still workable. The roof is paved by tiles. Because the opening of the house is too small, so the light condition of these houses is not very well. So one main goal of this renovation part is to improve the light quality. In order to achieve this idea, I decide to insert a big glass light box into the existing building which can guide sunlight into the house. At the same time, I also design some ground windows with steel frames. With the help of the water in the pools locating around the houses, the sunlight can reflect into the house through ground windows.

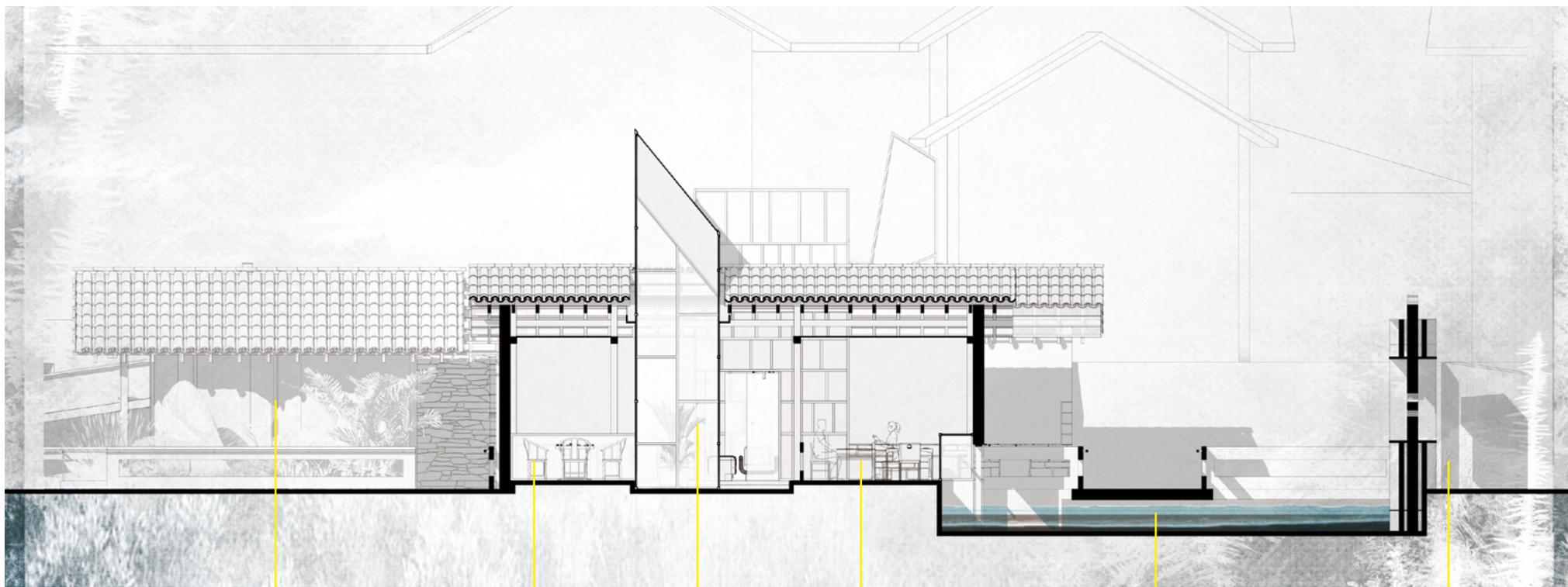


This is the perspective view looking from the east of the site. There are two main types of light boxes. The first type is located at the mid of house A and house B and it is used to create a lobby space to connect these two houses. In some ways, it can allow sunlight goes into the hosue. The second type is inserted at the houses which is used to reflect the sunlight. It can block the sunlight during the summer and improve the light quality in winter. Because the location of lighth boxes and function of space are different, this type of light boxes is not totally the same. They may vary in some ways.



Section A-A

- 1 Steps
- 2 Space for playing cards
- 3 Entrance of the underground space
- 4 Space for playing mahjong
- 5 Lobby
- 6 Space for play Chinese chess
- 7 Pool



Restroom

Space for playing mahjong

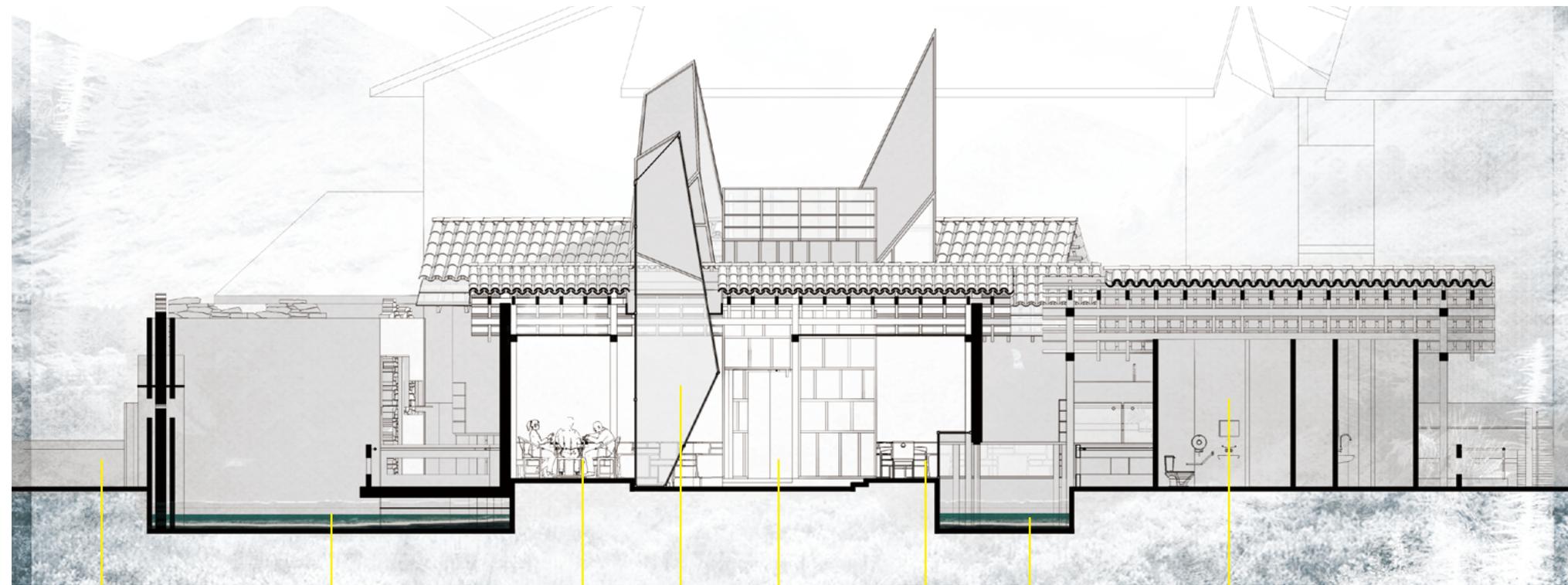
Light box

Space for playing Chinese chess

Pool

Main entrance of the garden

Section B-B



Main entrance of the garden

Pool

Space for playing mahjong

Light box

Lobby

Space for playing Chinese chess

Pool

Restroom

Section C-C

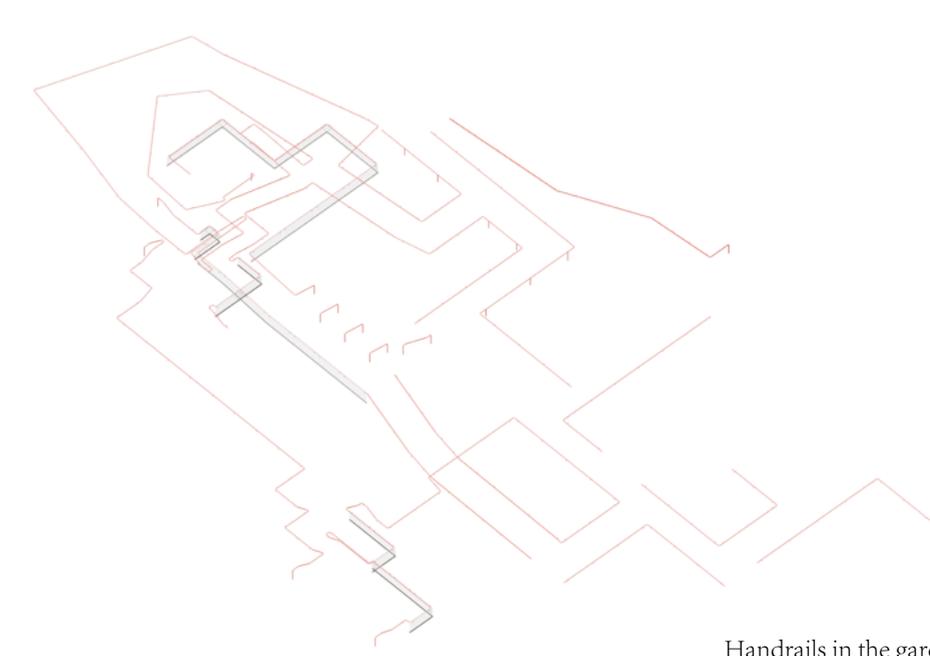
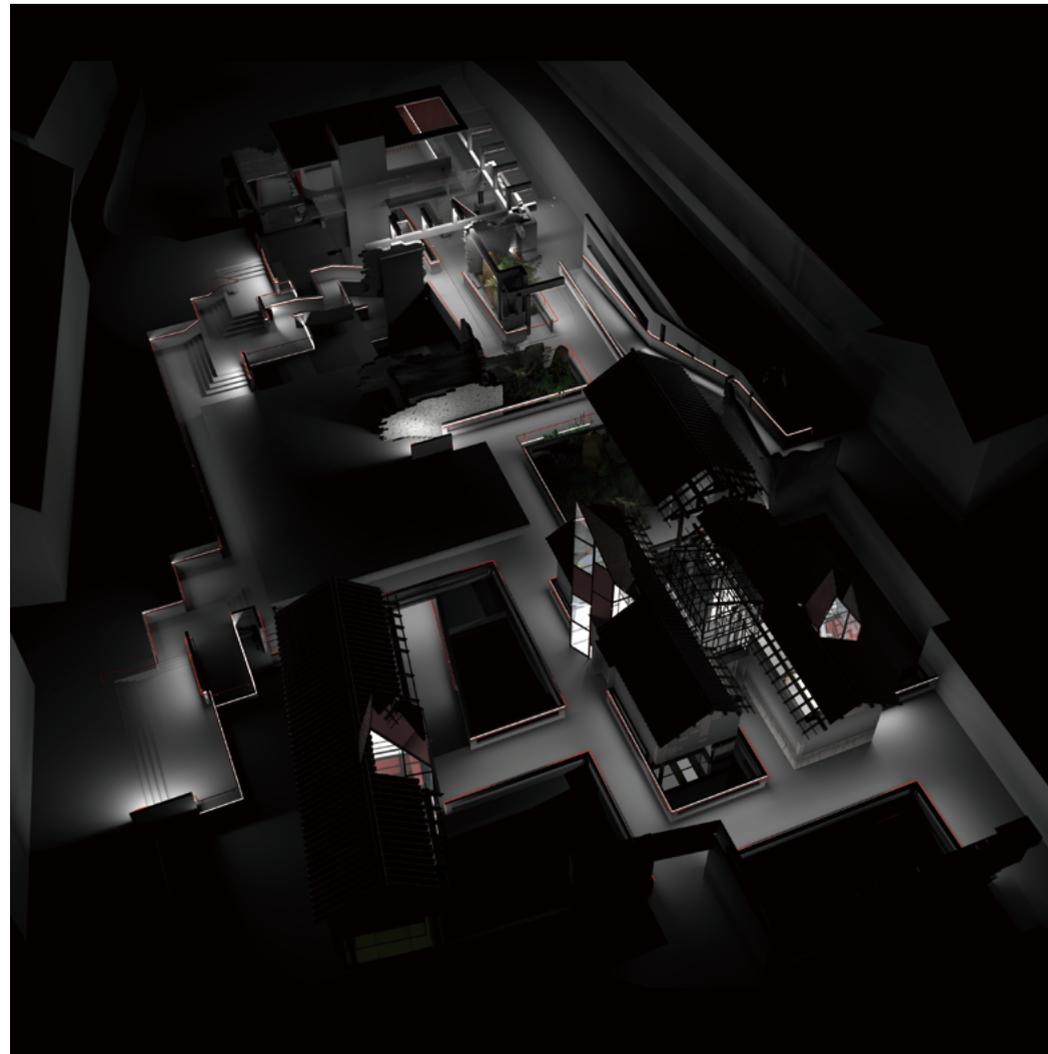


House B



House A

Light condition analysis and compare between summer solstice and winter solstice. Mostly, people would like to stay in thses hosues between 1pm and 4pm, so I choose these two points in time to analyse.



Handrails in the garden

This drawing shows the night view of the garden. In the daytime, the glass light boxes are used to introduce the sunlight into the house to light the house. But, at night, the light boxes can also be lit by the artificial light in the houses which make them become the landmarks of the village.

The handrail system crossing all over the garden can serve as a guide which can lead people walking through this area in the daytime. At night, the LED located near the handrail joins the handrail system to help the aged people walk safely.

Diagram about the OLD & NEW and Question



Existing stone walls

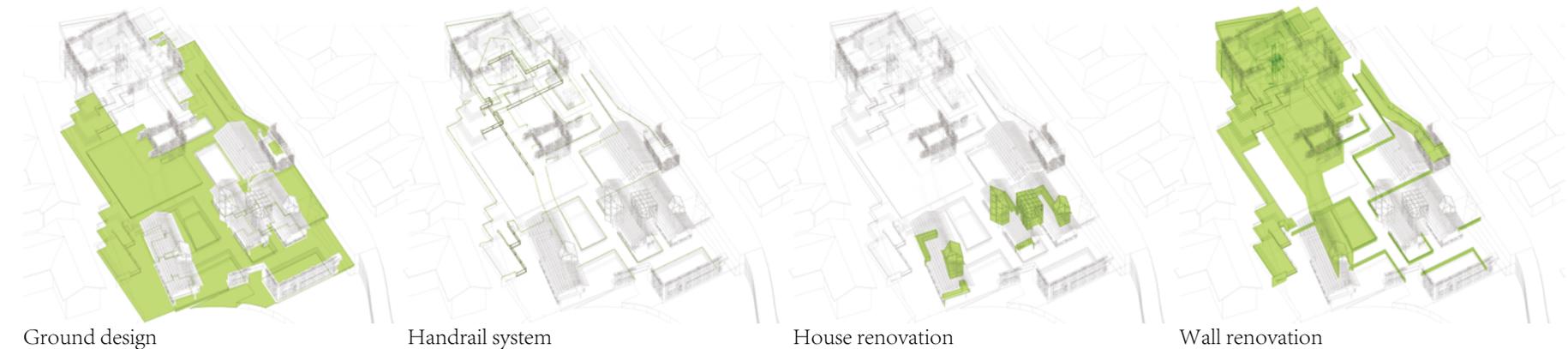
Existing old houses

Reuse the existing materials

This diagram is used to distinguish the existing old houses and the new constructions that are designed into the site. The yellow represents the old elements which include the existing stone walls and the old houses, the green part is the new design which includes wall renovation, house renovation, handrail system, ground design and existing materials reuse.

Question

This may be the end of my MRP, but this project can be continued. There are still some problems remaining. The biggest one is will the villagers be satisfied with this design, because there are too many modern elements which may break the harmony of this village added into this old ancient place.



Ground design

Handrail system

House renovation

Wall renovation

Master’s research project is a great experience for me to develop myself a lot. From the very first stage, I do a lot of case studies about how the architects reusing different kinds of materials in their projects. From them, I do know some new ways about dealing with the old materials, given them new lives in new projects. Also, what interested me most is the adaptive reuse architecture, The architects transform the old constructions or existing ruins into a totally new project which is very fascinating, Like the The Dovecote Studio designed by The Dovecote Studio, the view of a architect is very significant. As a architect, he can see the potential of the existing ruins and give them a new lives just by insert a simaple space. I think as a architecture student, I should have this kind of ability which may be helpful in my future career.

In most situation, the object that an architecture is severing is the people. Try to figure out the need of the people is the priority when architects begin a design. In my project, the aged people the very crucial. All the designs that I have done are based on the needs and activities of this group. I design the handrail system because aged people always need to hold something when they are walking. The garden in my project derives from activity that the elderly living in a village would like to take a walk after dinner. Also, the study of site is necessary. According the research of the site, I find the materials and old houses that I can reuse in my project. This is an ancient village, by the study of the history of this place, I can know which is important to the local people, so I can reserve them in my design. The material that I focus a lot is the stone from the ruins, these stones have existed for a long time which have some memoirs to the villagers especially the elderly. So these stones are the footprints that I keep for the villagers.

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