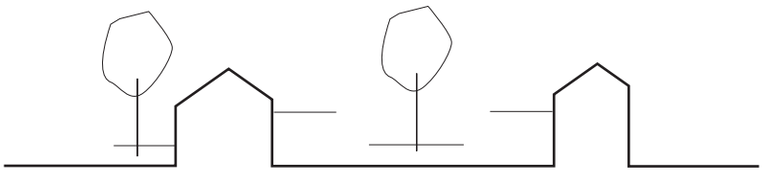
Conversation

Beijing old city regeneration

Yuchen Liu



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Abstract

In the development of Beijing's old town: When the outdated housing facilities conflict with the needs of contemporary life, people use rude methods: Demolish the local traditional houses and rebuild the buildings to solve this problem. The replacement of traditional housing also means the disappearance of local culture.

How old houses can be changed to meet the needs of contemporary people? How old houses can retain and develop their own characteristics while meeting contemporary needs?

What to restore, what to change, what to develop are key issues in the regeneration of Beijing's old city.

I take these three issues as the starting point, taking a shared courtyard house in Beijing's old city as an example, to explore the combination of historical value and modern needs.

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Background

This project is located in the old city of Beijing, China. Beijing is a city with more than 3,000 years of history as a city and more than 860 years of history as a capital. With the changing of times, the city continues to develop, but there is an area where you can now vaguely see what it looked like a thousand years ago. This is the old city of Beijing. The precipitation of time has made it a unique regional culture.

However, in the process of urbanization, the protection of cultural heritage such as traditional houses and neighborhoods always seems to be in conflict with urban renewal. The old Beijing courtyard houses (Siheyuan) were mostly detached houses. With historical changes, one household in the courtyard house became several households, and the courtyard house gradually became a "different courtyard." The facilities and space that serve the family have become insufficient. Everyone takes up as much space as possible, adding kitchens, warehouses, etc. In the alley, bicycles, and sundries gradually accumulate, and the public space becomes narrower and narrower. Resident Deliang Hai, who lives in Dashilan Hutong, Qianmen, Beijing, said bluntly, "There is no bathroom, kitchen, bathing, and cooking. Residents' life is extremely inconvenient." In the entire Dashilan area, many narrow hutongs and old courtyards are basically the same.

Nowadays, as people's needs for a better life are increasing, residents who have lived in large courtyards for a long time have gradually reduced their recognition of the living environment. "If the residents who have lived here for a long time lose their feelings for the courtyard house, then the courtyard house, which carries rich historical information, will really become "bad" and "excessive"." Xiaowei Ma, a designer dedicated to the transformation of Hutong Speaking of this mentality, "many people will choose to demolish it." With the development of urbanization, Beijing's old city was occupied by a large number of new buildings, new businesses, and new landmarks. Hutongs within The Second Ring Road are less and less distributed. [1]

Alley became narrower because of adding warehouses and taking up by bicycles

"In the past period of time, the infrastructure in some old towns and neighborhoods was relatively dilapidated. Our country's top-down demolition and reconstruction were more numerous and large in scale. However, once a block or a district is rebuilt at a time, it is easy to appear "one thousand cities are similar, one thousand villages are similar." After a few years, people gradually realized that such planned destruction and constructive destruction have greatly harmed tradition, memory, and homesickness." said Yue Zhang, a professor at the School of Architecture of Tsinghua University. [2]

On September 29, 2017, the " Beijing City Master Plan 2016-2035《北京城市总体规划（2016年—2035年）》" was publicly released, pointing out the direction of Beijing's development in the next 20 years, which not only mentioned the need to strengthen the protection of historical and cultural cities but also mentioned the need to develop" "Livable City" concept. [3] In order to inherit and protect traditions, and to meet the needs of the future, can this expectation be realized?

"Finding a reasonable utilization model and using it is the best protection," said Hongling Qin, a professor at Beijing University Of Civil Engineering And Architecture. [4]

Research

Make the residents reuse old houses in Beijing's old city, which can be simply defined as three issues: What to restore, what to change, what to develop.

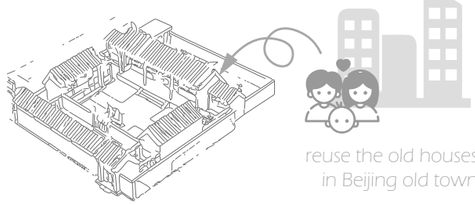
In order to clarify the whole thinking process, I use a mind map to connect the whole research part with one goal and three issues.

In my research, I explore answers in 2 parts:

PART1 Old housing inside
PART2 Old housing surrounding (courtyard+hutong)

Regeneration
Beijing old town

make the residents



reuse the old houses
in Beijing old town

Restore

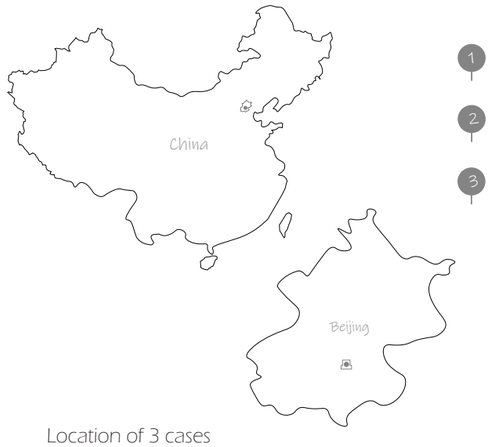
Change

Develop

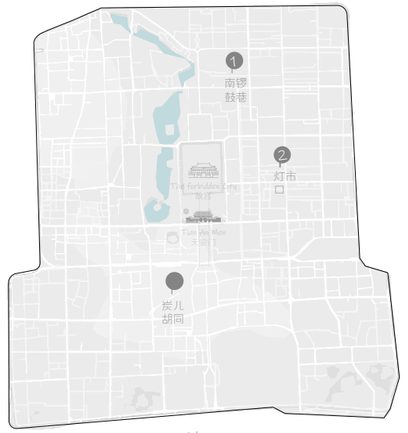
PART1 Old housing inside

By watching the YouTube videos of 3 architect's transformation cases in Beijing old town[5].

(In this part, all materials and pictures are based on YouTube videos and Gooood.cn website.)



Location of 3 cases



Old town

Case 1 南锣古巷 Nan Luo Gu Xiang[1]

Population and housing functions:
Living needs: Father and Mother
School needs: One grandchild
Caring needs: Daughter and Son-in-law
(The homeowner and his wife are used as a residence, the grandchild for going to school nearby, and the daughter and son-in-law for taking care of the child)
Housing area:
About 35 ㎡ (5 ppl), 7 ㎡ per person

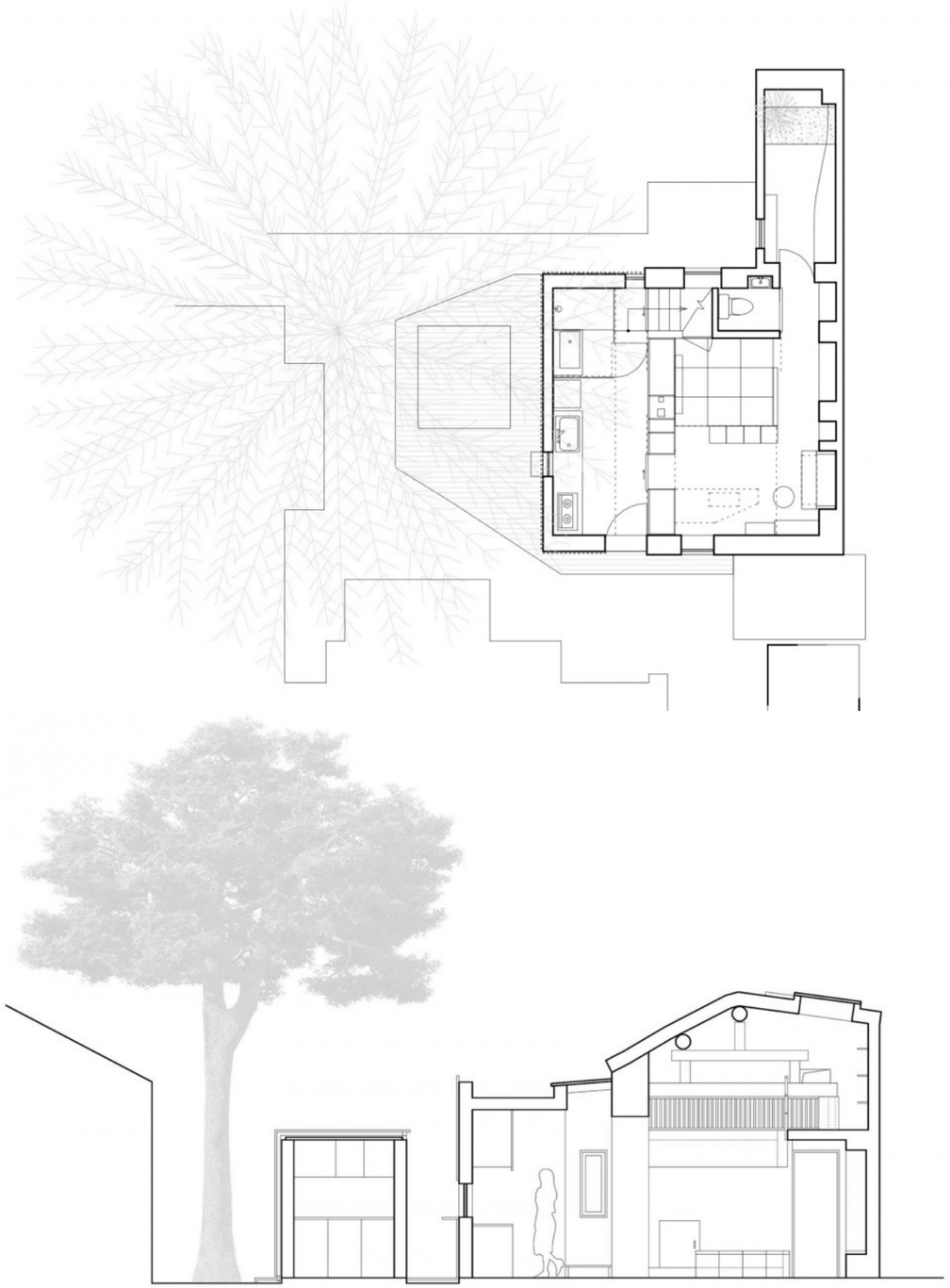
Case 2 灯市口 Deng Shi Kou[2]

Population and housing functions:
Living needs: Father and Mother
School needs: Two grandchildren
caring needs: Daughter and Son-in-law
(The homeowner and his wife are used as a residence, the grandchildren for going to school nearby, and the daughter and son-in-law for taking care of the children)
Housing area:
About 40 ㎡ (6 ppl), 6.6 ㎡ per person

Case 3 炭儿胡同 Tan Er Hutong[3]

Population and housing functions:
Living needs: An 89-year-old grandmother's
Housing area:
About 45 ㎡ (1 person)

1 南锣鼓巷
Nan Luo Gu Xiang



PROBLEMS

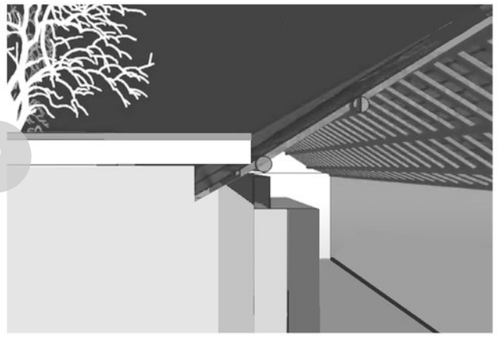
1

There is **no** relatively **independent privacy space**
(The child doesn't have independent sleeping and study space)
More people but less housing area.

2

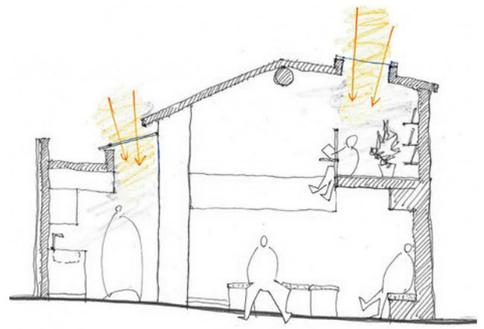
Structural hazards
Disrepair for a long time, part of wood part in pillars and the roof are **decayed.**

3

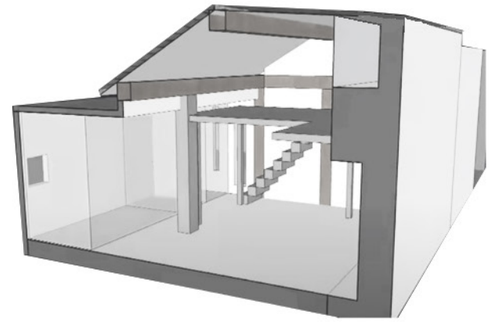


Walls are **moldy** and **damp** in summer
Sharing the eaves roof with neighbors does not completely form a closed house.

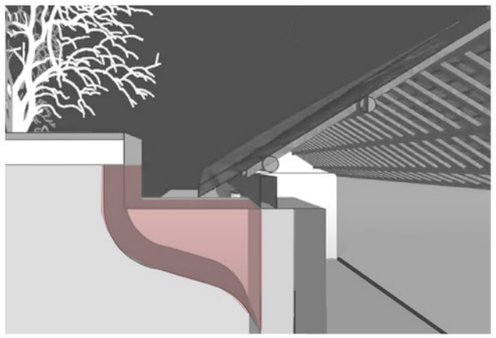
SOLUTIONS



Remove the ceiling, use the height of the old house structure to increase the **LOFT space**, and the furniture takes into account the functions and storage.



Remove part of the decayed wooden structure, and use **steel structure** for **auxiliary support**



Use **gypsum** to **seal** the house

Use a **waterproof painting** to increase the **weather resistance** and **waterproofness** of the wall and roof

PROBLEMS

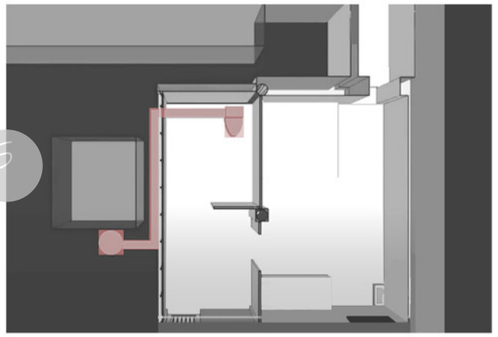
4

The house is ***dark*** *and the smell of oily smoke fills the whole house when cooking*
Poor ventilation and daylighting.

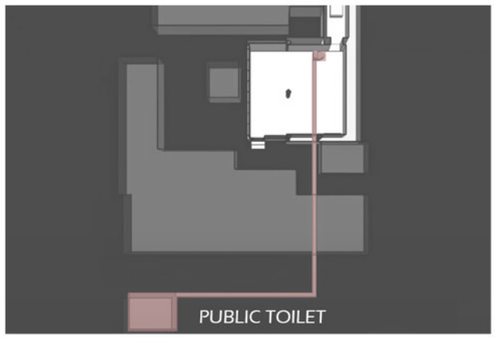
SOLUTIONS

Introduce ***windows*** *and* ***skylights*** *to increase daylighting and ventilation*

5



The ***toilet*** *is* ***off-flavored***
The sewer sewage treatment is not standardized, and the toilet sewage pipe is connected to the rainwater outlet.



Reconnect *the* ***sewage pipe*** *of the toilet to the public toilet in the alley*

CONLUTIONS

PROBLEMS & SOLUTIONS

Daylight Introducing
windows + skylights

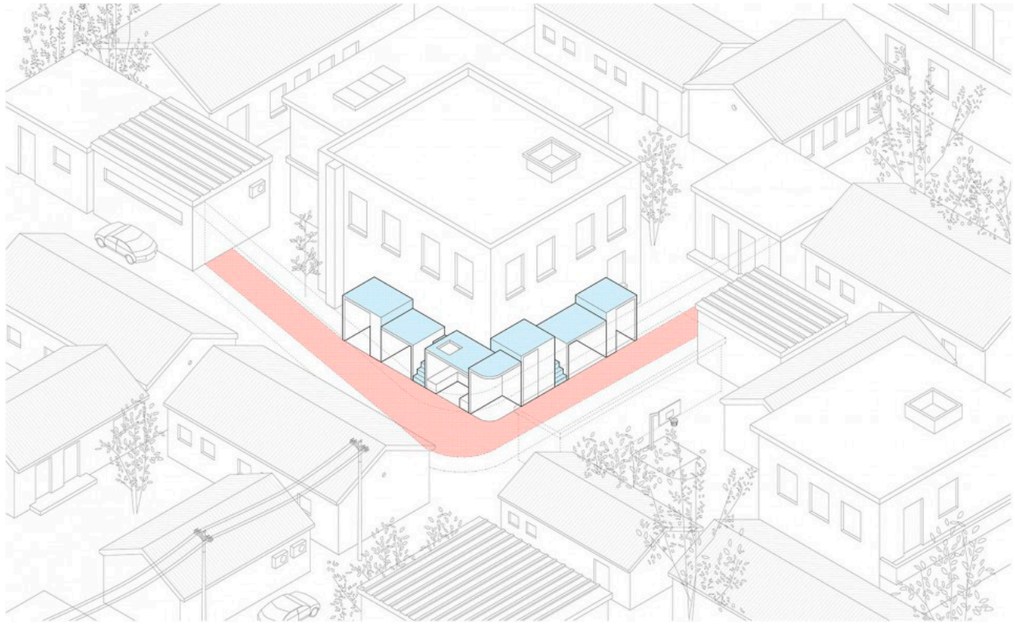
Structural reinforcement
steel structure assist wood structure

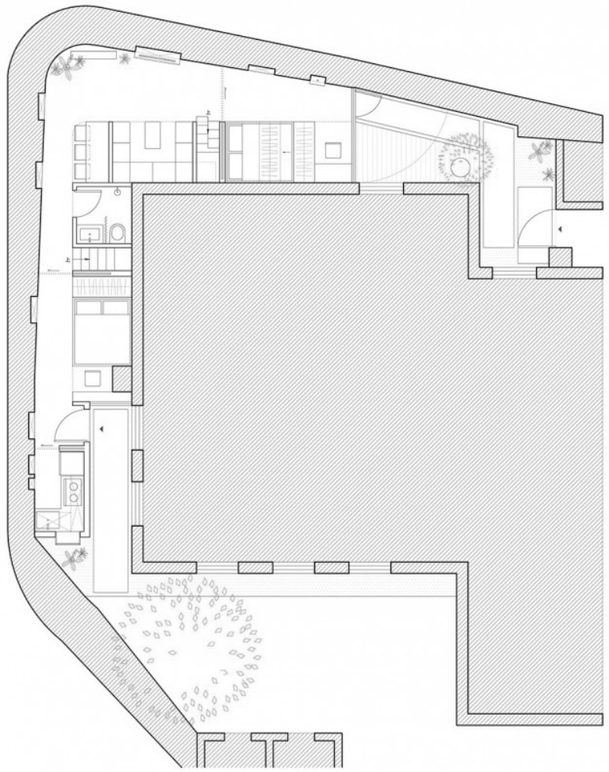
Space division
LOFT increases space

Anti-corrosion and moisture
seal space + water-proof painting

Off-flavored toilet
Reconnect the sewage pipe to public toilet

2 灯市口
Deng Shi Kou





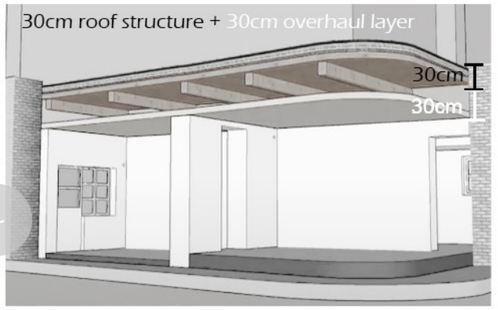
PROBLEMS

1

Wall collapse hazards

The soil that glues the wall bricks has been **loosened** after years of weathering and rain washing.

2

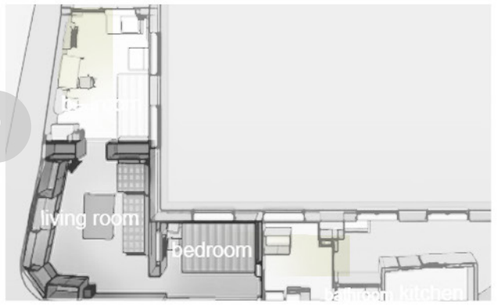


Roof safety hazards

The traditional **brick-wood concrete structure** is **unstable**, **heavy** and **taking up space**, and part of the wooden structure is deformed and decayed.

(The roof structure is made of wood structue, wood board, cement board, brick layer, and waterproof layer. The roof structure is not strong enough, so an overhaul layer of 30 cm is added, so the roof is heavy, and separate pillar support is installed in the house)

3



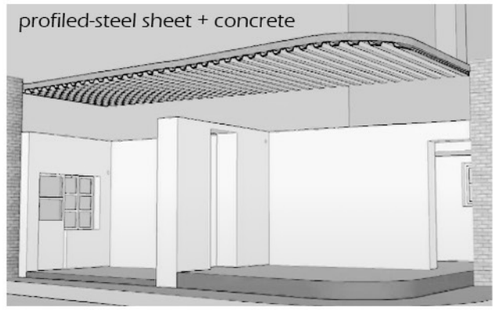
The **room** is **dark**

Insufficient indoor daylighting

(Because the layout of the whole house is L-shaped, only the two rooms close to the outside have daylight. The light in the living room and parents' bedroom must be turned on 24 hours a day.)

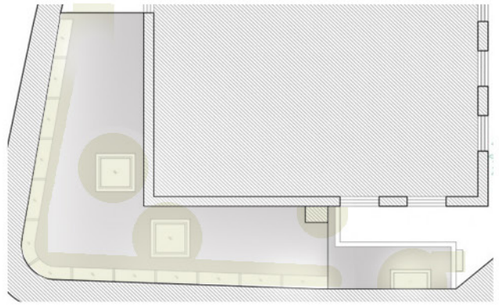
SOLUTIONS

Reinforce the entire wall with **steel column** structure and **brick concrete wall**



All demolished and converted to a **steel structure** with concrete

(The structure of profiled steel plate and concrete is **lighter**, and at the same time, compared with the previous brick-wood concrete, the thickness is reduced 30 cm, and the **thickness** of the 30 cm maintenance layer is **saved** as well so that without changing the original building height, Increased the height of 60 cm, the story height changed from the original 2.7m to the current 3.3m)



Introduce a large number of **windows** and **skylights**

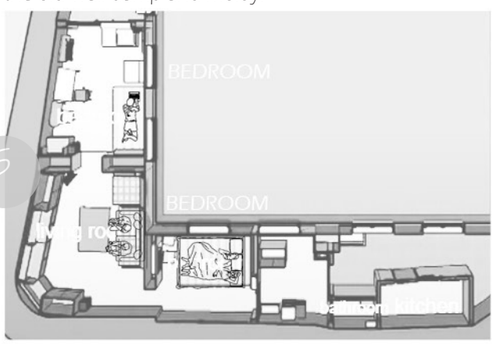
PROBLEMS

4

The **house** is **cold** and **humid**

The ***joints*** of the old wall and roof is **cracked**, and the water leaks on rainy days. The rainwater ingress makes the old wall damp and moldy.

5



There is **no** relatively **independent privacy space** (Children do not have independent sleeping and study space)

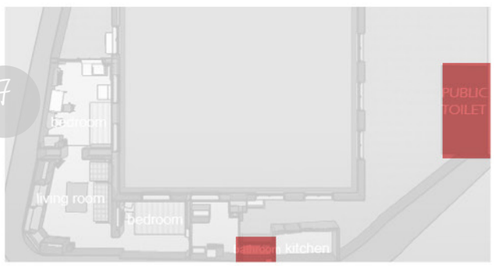
More but less housing area.

6

Unreasonable function division causes inconvenience in life

The **kitchen and bathroom** are **separated from the house.**

7

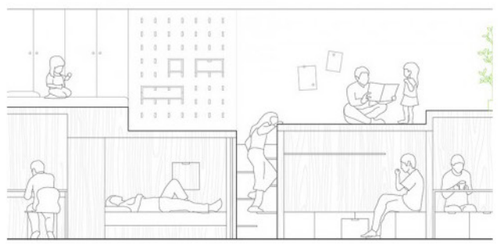


No private toilets in the house

There is **no toilet sewage pipe**.

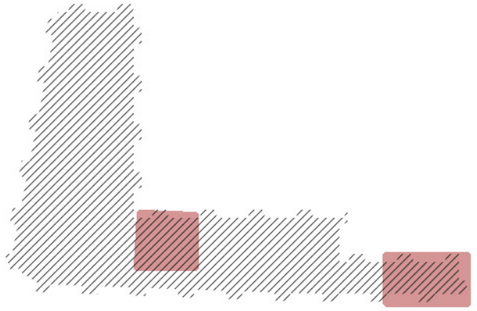
SOLUTIONS

Roof, **wall** and **roof wall joints** are **covered** with **waterproof material**



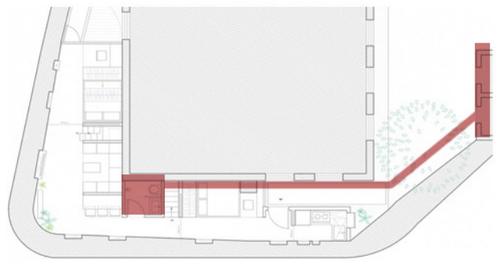
Accurately plan the size of the human dimensions

Increase the **LOFT space** within the limited height, and the furniture takes into account the functions and storage



Rationalze function division

integrate the **bathroom and kitchen** into the room



Add about 30m **sewage pipe** and **connect** it with the **sewage pipe of public toile**t in the alley

CONLUTIONS

PROBLEMS & SOLUTIONS

Roof and wall reinforcement
steel structure assist wood structure + rebuild the old concrete brick wall

Daylight Introducing
windows + skylights

Thermal and moisture insulation
seal space + cover with waterproof material

Space division
reasonable space division + LOFT to increase space

Private toilet
set up a private sewage pipe to connect to the public toilet

3 炭儿胡同
Tan Er Hutong

PROBLEM 1

The house originated from the Ming Dynasty(1403–1644)[6], and the structure of the house was restored from the perspective of cultural heritage.

[1] tibia: A building material. It is composed of lime, clay (or broken bricks, gravel) and fine sand. The longer the time, the stronger it becomes. Effective for thermal and sound insulation

A THE PROBLEM in restoring roof

The roof rafters were partially **decayed**

nail wooden rafters

cover boards

cover waterproof oil felt

cover 15cm thickness tibia and place the tiles

SOLUTIONS of roof restoration

The undecayed wooden rafters were kept. The **decayed rafters** were **replaced** by **new wooden rafters**, nailed again, and reinforced to form the basic structure of the roof. Then the structure is covered by boards, waterproof oil felt and a 15cm thickness tibia(1), which makes the roof durable and increases the waterproof and thermal insulation of the entire roof. Finally, place the tiles. The tibia layer increases the thermal insulation of the entire roof and the strength of the roof slope, thus freeing up the top thermal insulation part of the room inside the house.

B THE PROBLEM in restoring shared wall

Bad sound insulation

SOLUTIONS of the shared wall restoration

The shared wall is **thickened**, and **sound insulation cotton** is added to obtain a better sound insulation effect.

C PROBLEMS in restoring windows

Bad thermal and sound insulation

SOLUTIONS of windows restoration

Under the premise of **keeping the wooden windows frame**, the original single-layer glass is replaced by the **insulating glass** to increase the sound and thermal insulation effect of the house.

D PROBLEMS in restoring beam & column

Decayed

polishing and cleaning

painting (for anti-corrosion and fire prevention)

fix

reinforce

SOLUTIONS of Beam and column restoration

Partially **strengthen** the rotten parts of the wooden structure. After polishing, cleaning, and painting (for anti-corrosion and fire prevention), fix the incomplete places and use steel bars to reinforce.

E PROBLEMS in waste material

SOLUTIONS of material secondary use

The **leftover bricks** are **polished** by workers and **reused** in the **small gardens**.
The **leftover wood** from the demolished house is **processed** by the **furniture factory** for secondary processing and reused in **windows**.

PROBLEM 2

There are **no barrier-free facilities,** and the elderly need to walk up the steps and **cross the threshold** entering the house.

SOLUTIONS

The **threshold** in traditional buildings is **removed**.
The **height difference** caused by the original steps **is designed into wheelchair accessible** and outdoor small gardens.

PROBLEMS & SOLUTIONS

Ancient building restoration

	Structure reinforcement	Thermal and sound insulation
Roof	nail wooden rafters	cover wooden boards & waterproof oil felt & 5cm thickness tibia[1]+ place the tiles
Wall	thicken the wall	add sound insulation cotton
Window		single-layer glass is replaced by the insulating glass
Beam & Column	polishing + cleaning + painting (for anti-corrosion and fire prevention) + fix + reinforce	

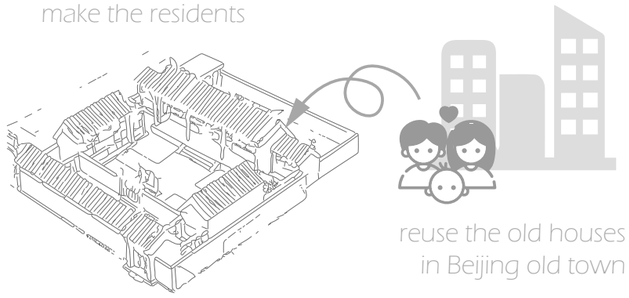
waste material
Secondary use

Accessibility
Remove the threshold + step into a ramp

Summarizing the transformation cases of three architects, what I found is what can be restored and what can be changed. So here I complete the first two parts of the mind map.

Regeneration
Beijing old town

make the residents



reuse the old houses
in Beijing old town

Restore

Ancient building

Roof
nail wooden rafters
+ cover wooden boards
& waterproof oil felt
& 5cm thickness tibia
+ place the tiles

Wall
thicken
+ sound insulation cotton

Window:
insulating glass

Beam & Column
polishing
+ cleaning
+ painting
+ fix
+ reinforce

Material
secondary use

Change

Infrastructure

Structure
steel structure
+ wood structure
+ rebuild the old wall

Daylight Introducing
windows
+ skylights

Thermal insulation & moisture insulation
seal space
+ cover with waterproof material/painting

Space division
reasonable division
+ LOFT

Toilet
Private sewage pipe
connect to
the public

Develop

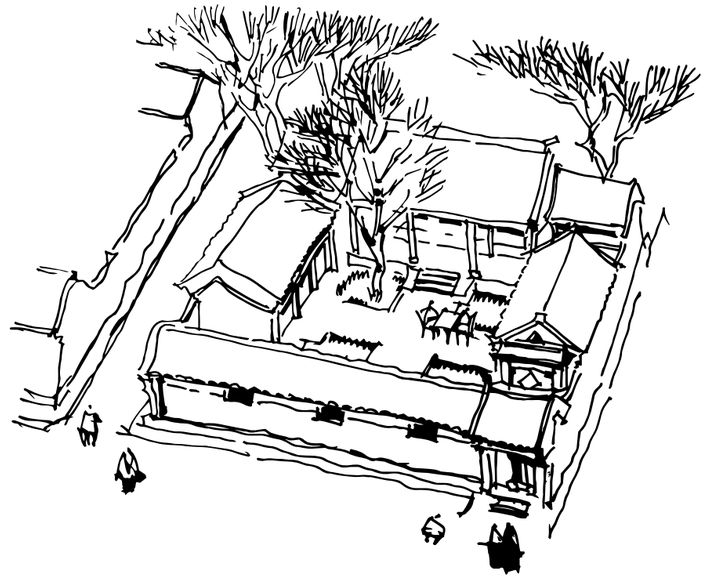
PART2 Old housing surroundings

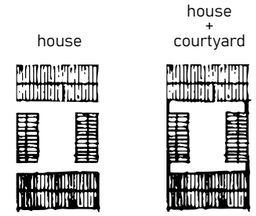
(courtyard+hutong)

By combining my experience, architect Shuhei Aoyama's viewpoint[7] and the book "City Senses --- Hidden Dimensions of Urban Places".[8]

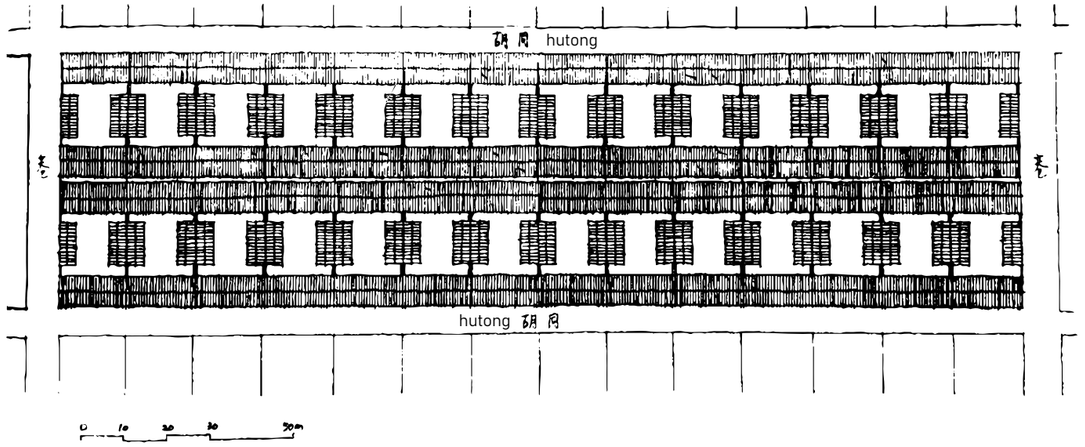
(In this part, all the pictures are from Instagram and the Internet, and the diagrams are from or based on the book "City Senses — Hidden Dimensions of Urban Places" and "China's Old Dwellings")

If we only look at the plan, the boundary between private (house + courtyard) and public (alley) is very clear. The private area is introverted and closed, and the public area only assumes the function of the corridor, and there is no interaction between these two.



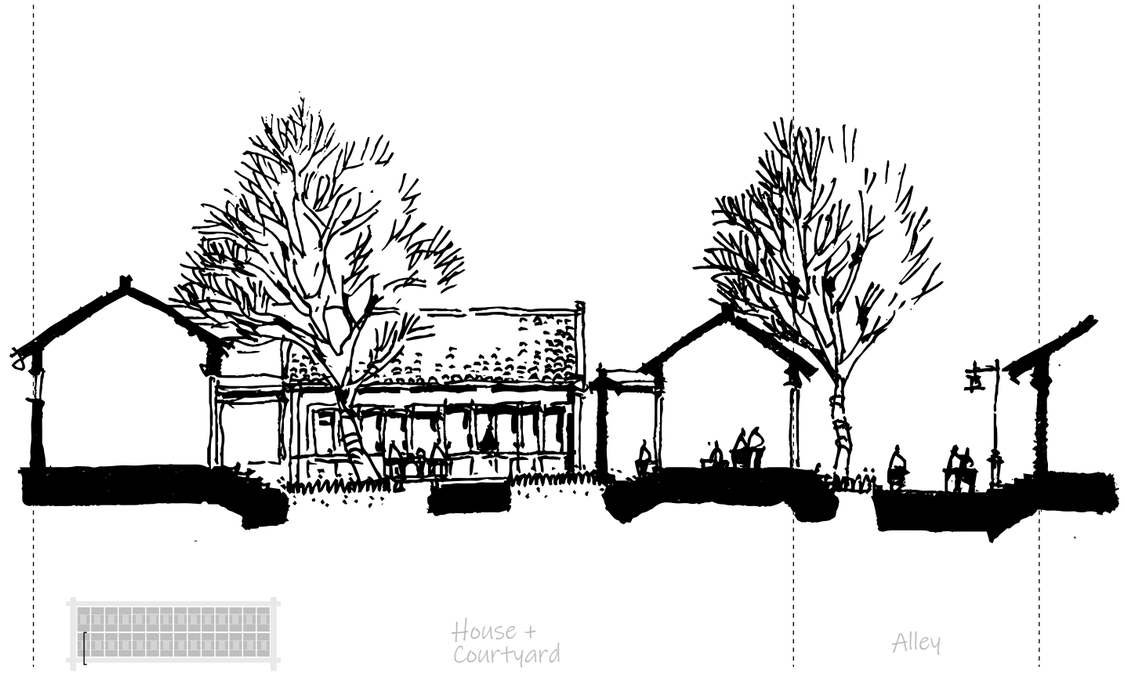


house + courtyard + hutong (alley)

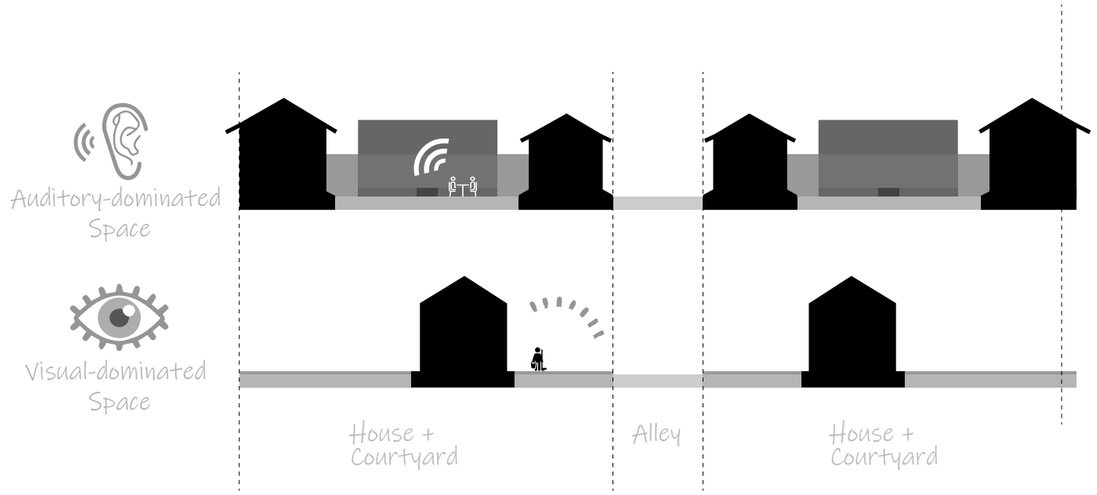


"City Senses — Hidden Dimensions of Urban Places"

But if we look at it from the section and comparison between auditory and visual perception-dominated space, we will find that, different from the visual-dominated spaces, Beijing's traditional residential neighborhoods are auditory-dominated spaces.And the auditory-dominated space is an interactive space.



comparison between auditory and visual perception-dominated space



"City Senses —
Hidden Dimensions
of Urban Places"

WHY auditory-dominated space is interactive ?

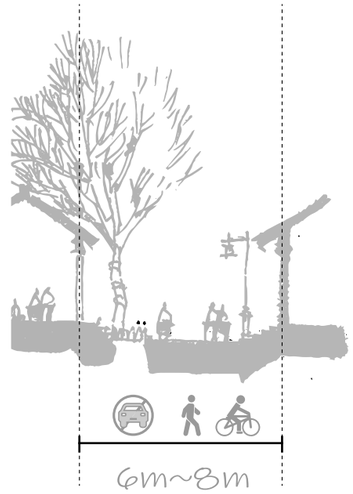
The distance of 6~8m alley:

Restricting the entry of cars, traffic relies on walking and bicycles, creating a quiet perception environment

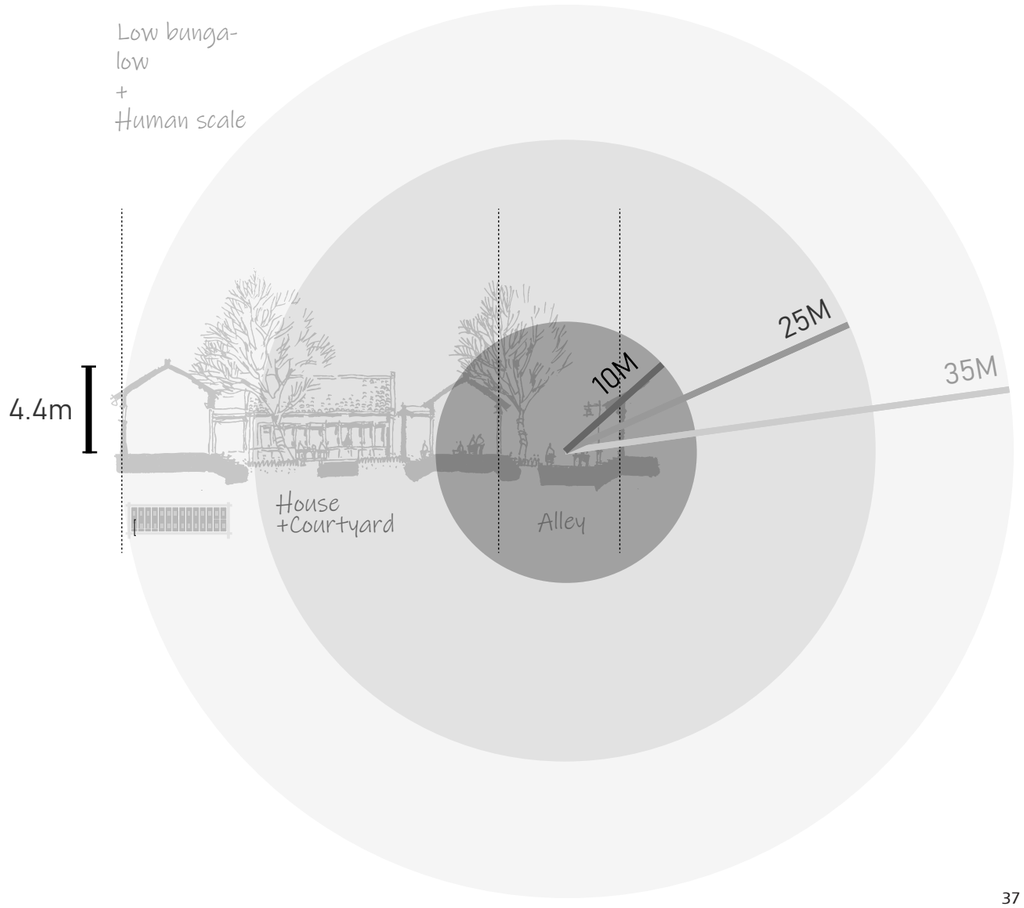
Low-rise bungalows + human scale:

Close to the floor, help to perceive public environment

Distance in Hutong

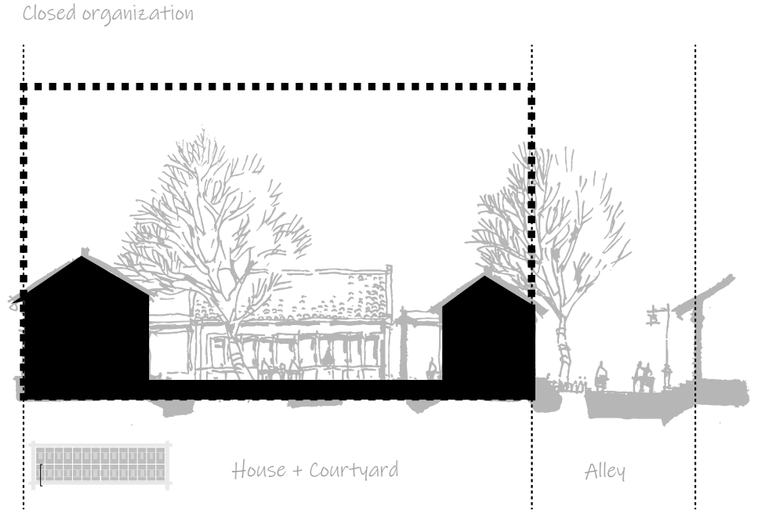


Low bunga-
low
+
Human scale



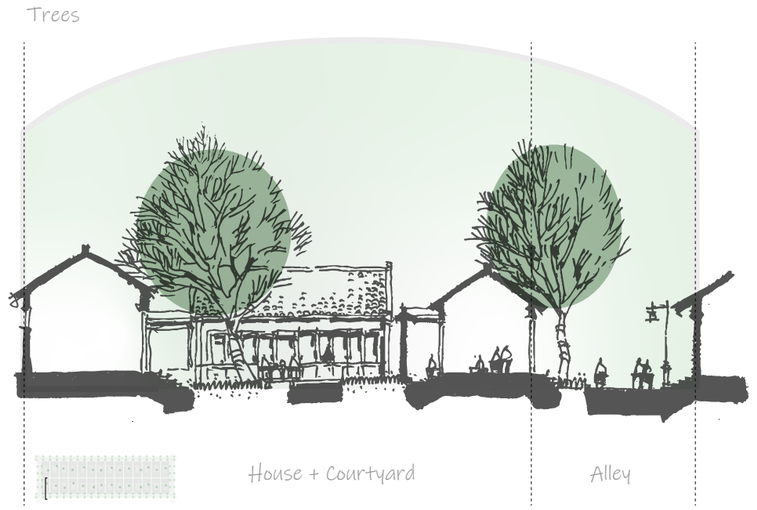
Closed organization:

Closed vision makes perception more sensitive



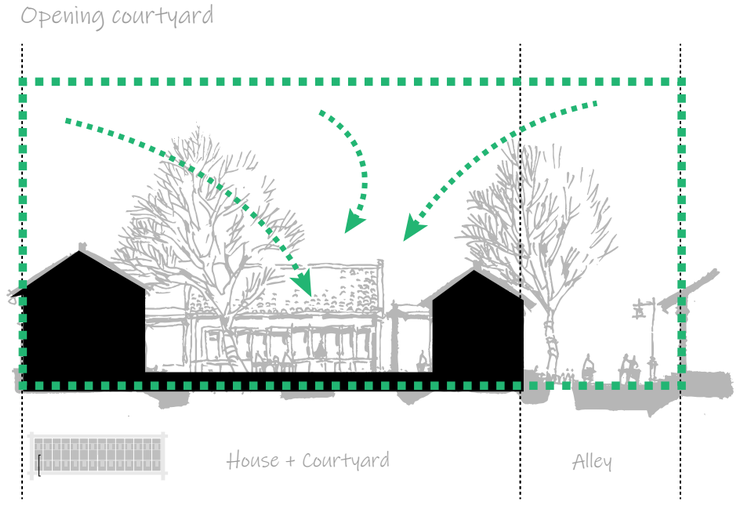
Trees are planted in alleys and courtyards at the same time:

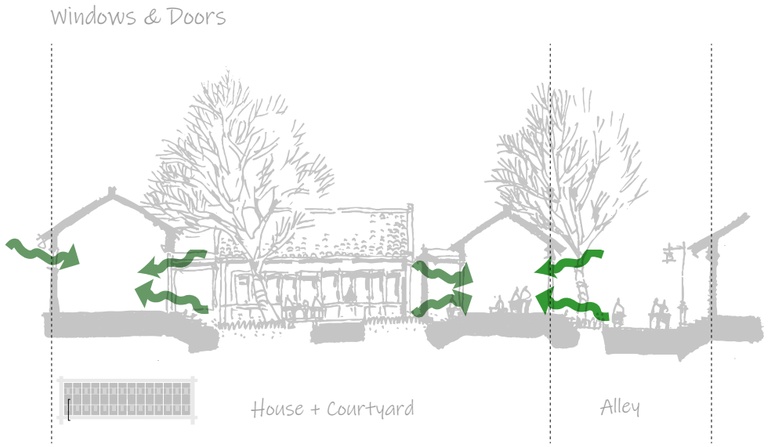
Creating a similar perception environment between the home and alley



Opening courtyard
+
windows & doors:

Helpful to bringing in public perception

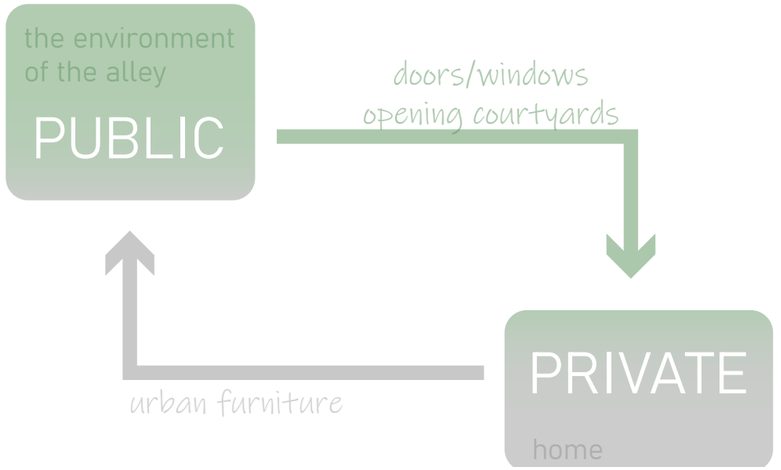


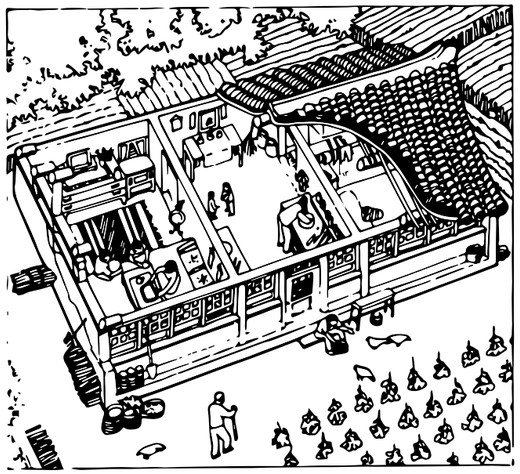


Thus, the environment of alley is brought into the home

While the alley environment is brought into the home

The function of home is also brought to the alley





HOME

COURTYARD

FRIDGE KITCHEN · DINING ROOM · BALCONY · LIVING ROOM · STUDY · LAUNDRY · COURTYARD

BALCONY chairs · LAUNDRY hooks · DINING ROOM chairs

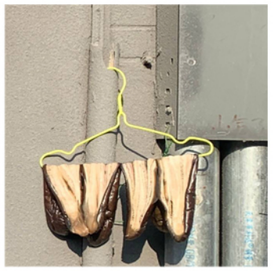
ALLEY

With tables, chairs, flower pots, hooks, etc. urban furniture, the functions of the home spread and gradually extend from the home to the courtyard, and then to the alleys.

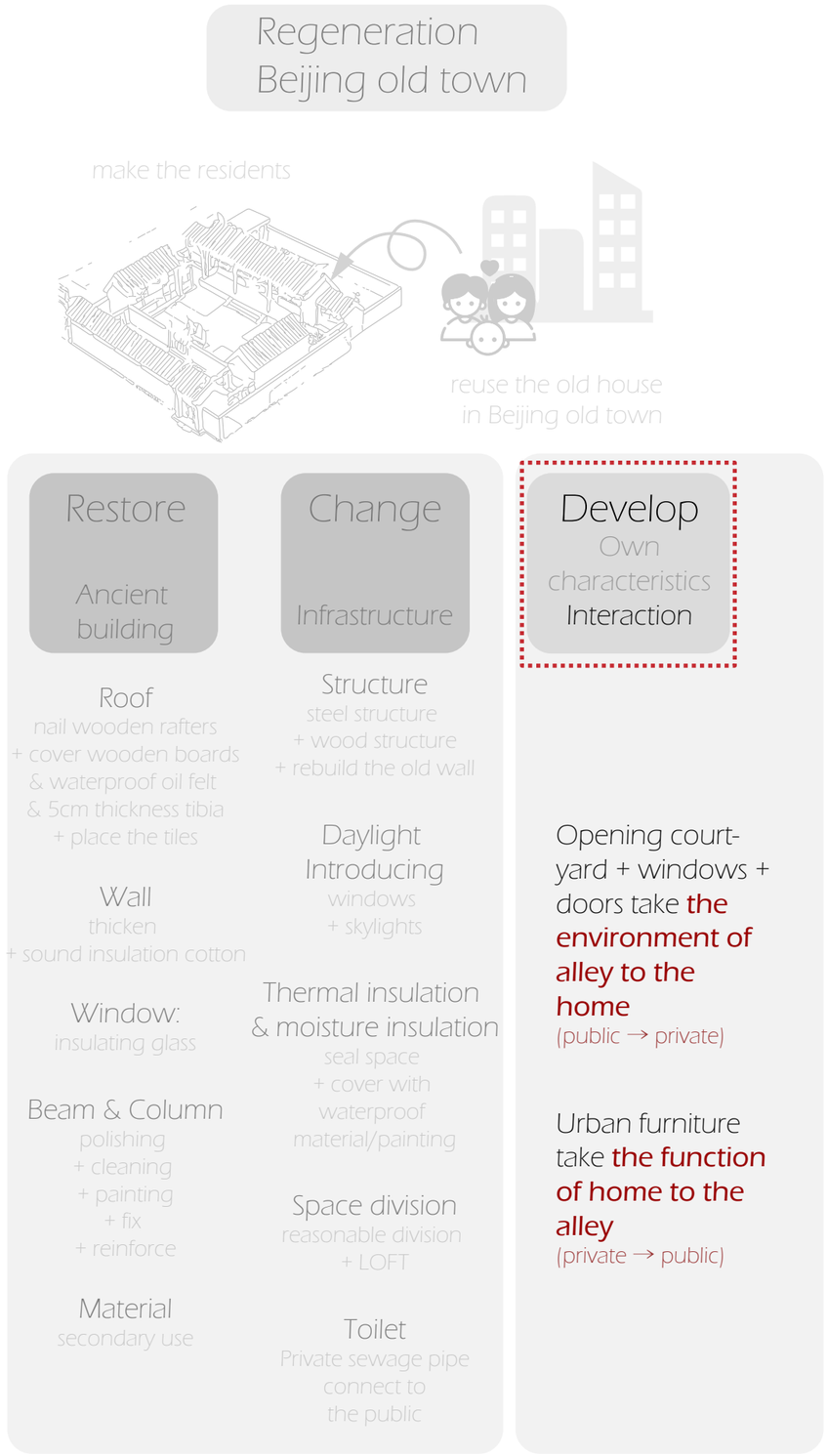
FRIDGE KITCHEN tables chairs hooks

DINING ROOM chairs · BALCONY chairs · LIVING ROOM chairs

STUDY paper chairs · LAUNDRY hooks · GARDEN play-ground flower pots



Summarizing my experience, architect Shuhei Aoyama's viewpoint and the book "City Senses — Hidden Dimensions of Urban Places", what I found is what can be developed, which is characteristics in Beijing old town: Interaction between private and public---alley environment is brought into the home, and the function of a home is brought into the alley. Then, I complete the last part of my mind map. From this, I got the answers to the three issues.



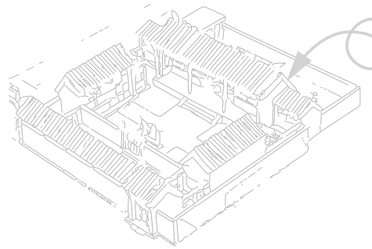
Concept

Based on answers to the three issues I got in research, I determined my concept—Conversation.

Cause what I found from what to restore and change is the conversation between history and modern, and what I found from what to develop is the conversation between private and public.

Regeneration
Beijing old town

make the residents



reuse the old house
in Beijing old town

Restore

Ancient building

Change

Infrastructure

Develop

Own characteristics
Interaction

Roof
nail wooden rafters
+ cover wooden boards
& waterproof oil felt
& 5cm thickness tibia
+ place the tiles

Wall
thicken
+ sound insulation cotton

Window:
insulating glass

Beam & Column
polishing
+ cleaning
+ painting
+ fix
+ reinforce

Material
secondary use

Structure
steel structure
+ wood structure
+ rebuild the old wall

Daylight
Introducing
windows
+ skylights

Thermal insulation
& moisture insulation
seal space
+ cover with
waterproof
material/painting

Space division
reasonable division
+ LOFT

Toilet
Private sewage pipe
connect to
the public

Opening court-yard + windows + doors take the environment of alley to the home
(public → private)

Urban furniture take function of home to alley
(private → public)

Conversation
History — Morden

Conversation
Space

Strategy

Based on the concept and the thinking of solving the three issues in research, I determined my strategy. The conversation between History---Modern uses ancient structures with modern infrastructure; the conversation between the private and the public uses two lines: the green line and the social line. The green line is to bring the alley environment to the home, and the social line is to bring the function of a home to the alley, respectively representing from the public to the private, and the private to public, thus completing the space conversation.

Strategy

Conversation History——Morden

Ancient structure with modern infrastructure

Conversation Space

Green line (Alley → Courtyard → Home/Public → Private)

Bring the alley environment to the home

Social line (Home → Courtyard → Alley/Private → Public)

Bring the function of a home to the alley

Inspiration

Then I searched for some inspiration projects and referred to their "Ancient structure with modern infrastructure", "green line" and "social line".

Conversation History——Morden

Ancient structure with modern infrastructure

material use

——wood + bricks + concrete

https://www.gooood.cn/

Conversation Space

Green line (Alley → Courtyard → Home/Public → Private)

Bring the alley environment to the home

Doors, windows, skylights bring the urban light and shadow in home

https://www.gooood.cn/

Conversation Space

Green line (Alley → Courtyard → Home/Public → Private)

Bring the alley environment to the home

The greenery corridor brings green views, plant aromas, and birdsong in courtyard

Seats on the roof bring home into the city

RSAA/ 庄子玉工作室
souce: Weibo

Conversation Space

Social line (Home → Courtyard → Alley/Private→ Public)

Bring the function of a home to the alley

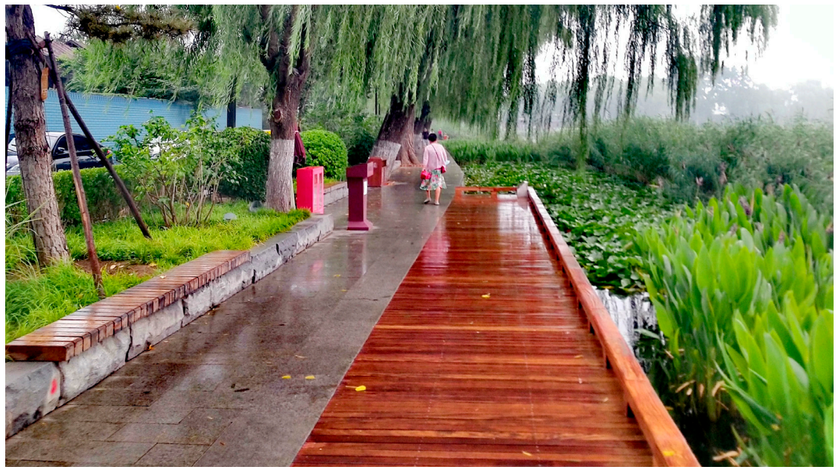
Tables and corridors in the courtyard bring the home into the courtyard

Conversation Space

Social line (Home → Courtyard → Alley/Private→ Public)

Bring the function of a home to the alley

Stairs and seats in the courtyard bring the home into the courtyard



Seats and platforms in the alley bring home into the alley

souce: Weibo

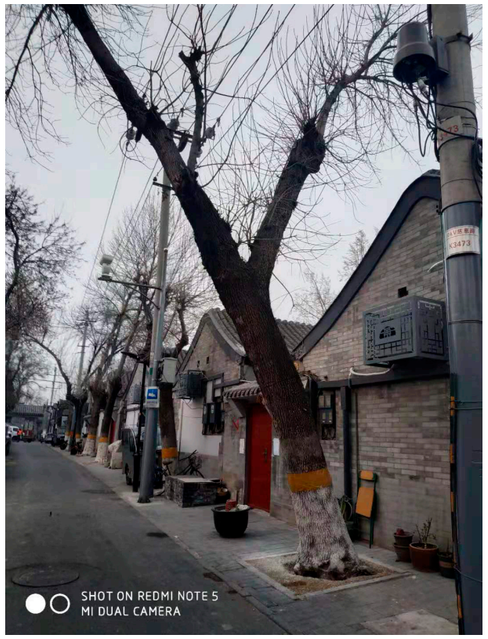
Project

The Site

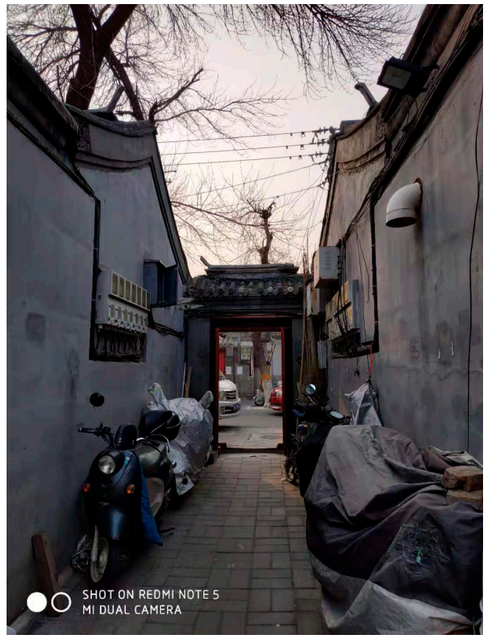
Site location

The project is located in a sharing courtyard in the old town of Beijing.

Site situation



alley



alley to courtyard

courtyard

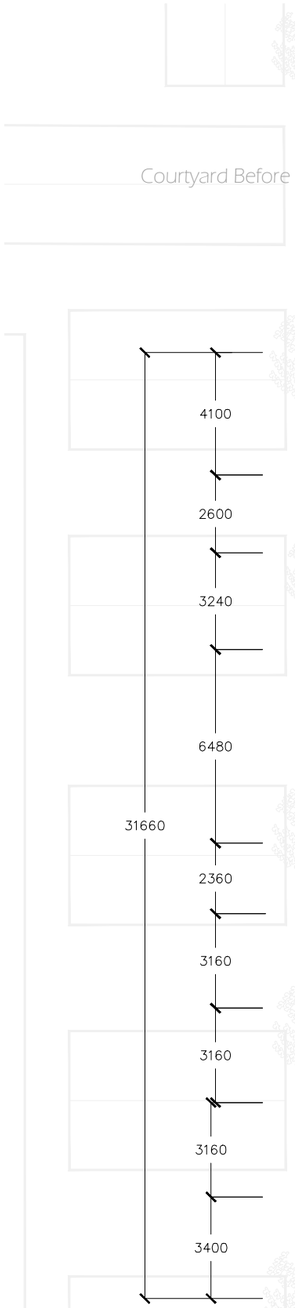
room inside

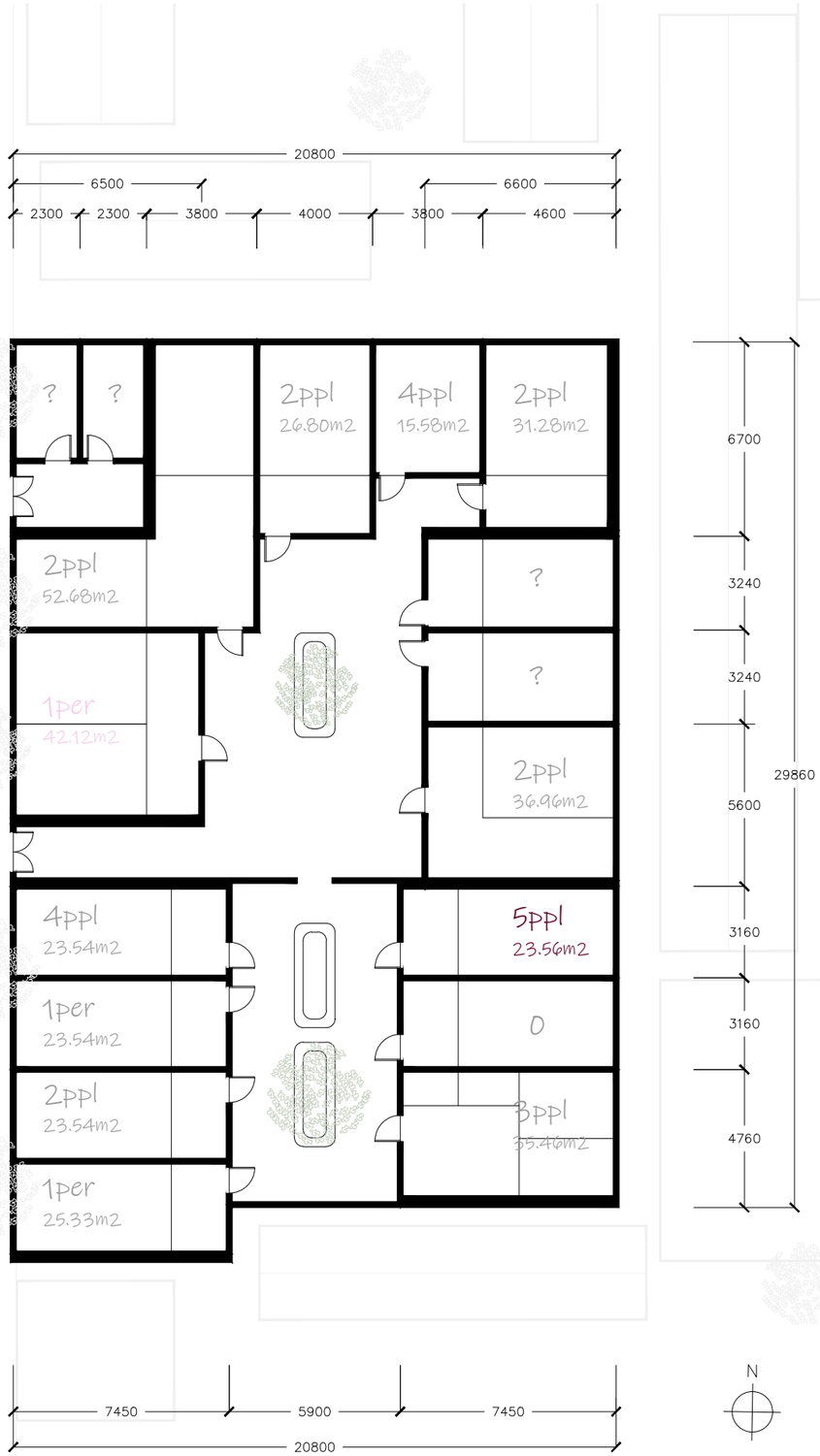
Based on my strategy, I divided my project into 3 parts: ancient structure & modern infrastructure, social line, and green line.

Ancient structure
& modern
infrastructure

Before the transformation, I tried to know some information about the population distribution of the original courtyard.

From the perspective of modern living, the problem is the unreasonable distribution of space. There is a situation of 20 square meters for 5 people and 40 square meters for 1 person.





17 households

? ppl: 4
9.43m2 + 9.43m2
21.38m2 + 21.38m2

0 ppl: 1
23.54m2

1 per: 3
25.33m2 + 23.54m2 + 42.12m2

2 ppl: 5
23.54m2 + 36.96m2 + 31.28m2
26.80m2 + 52.68m2

3 ppl: 1
35.46m2

4 ppl: 2
23.54m2 + 15.58m2

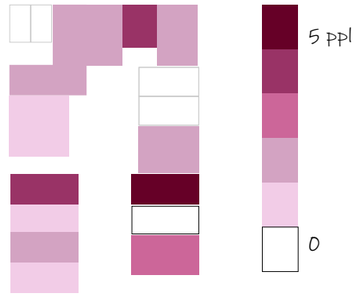
5 ppl: 1
23.54m2

Using different blocks of color to represent the population in the relative area, the unreasonable distribution of space can be seen more clearly.

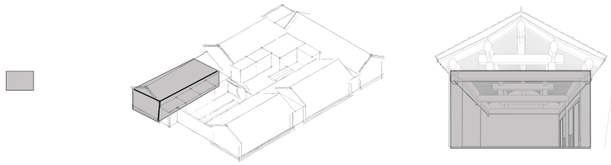
In addition, the waste of historical value and space is also an important problem. The shape of using ancient houses is rectangular because people use the method of adding ceilings under the sloping roof to insulate and prevent moisture. This rude method wastes the space in the house and hides the wooden beam structure with historical value.

At last, illegally built houses occupy the area of the courtyard.

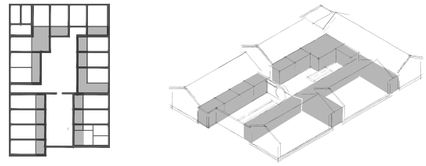
Population and area



Waste of space & historical value



Illegal additional construction



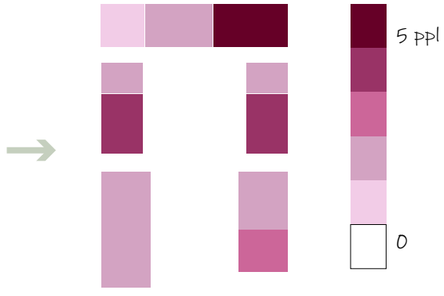
So the overall idea of the ancient structure & modern infrastructure part is:

1 Rationalize population distribution
Which could balance the use area of each person.

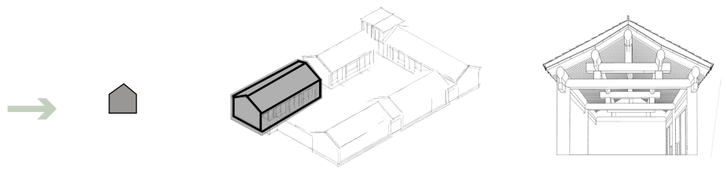
2 Remove the ceiling
This can show the historical value of ancient buildings hidden behind, and free up more space inside the house. The task of heat insulation and moisture prevention can be solved by adding heat insulation materials on the roof restoration

3 tear down illegal additional buildings.
Release more space in the courtyard.

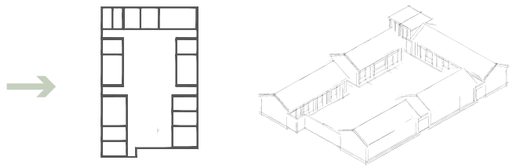
Rationalize population area distribution



Remove the ceiling

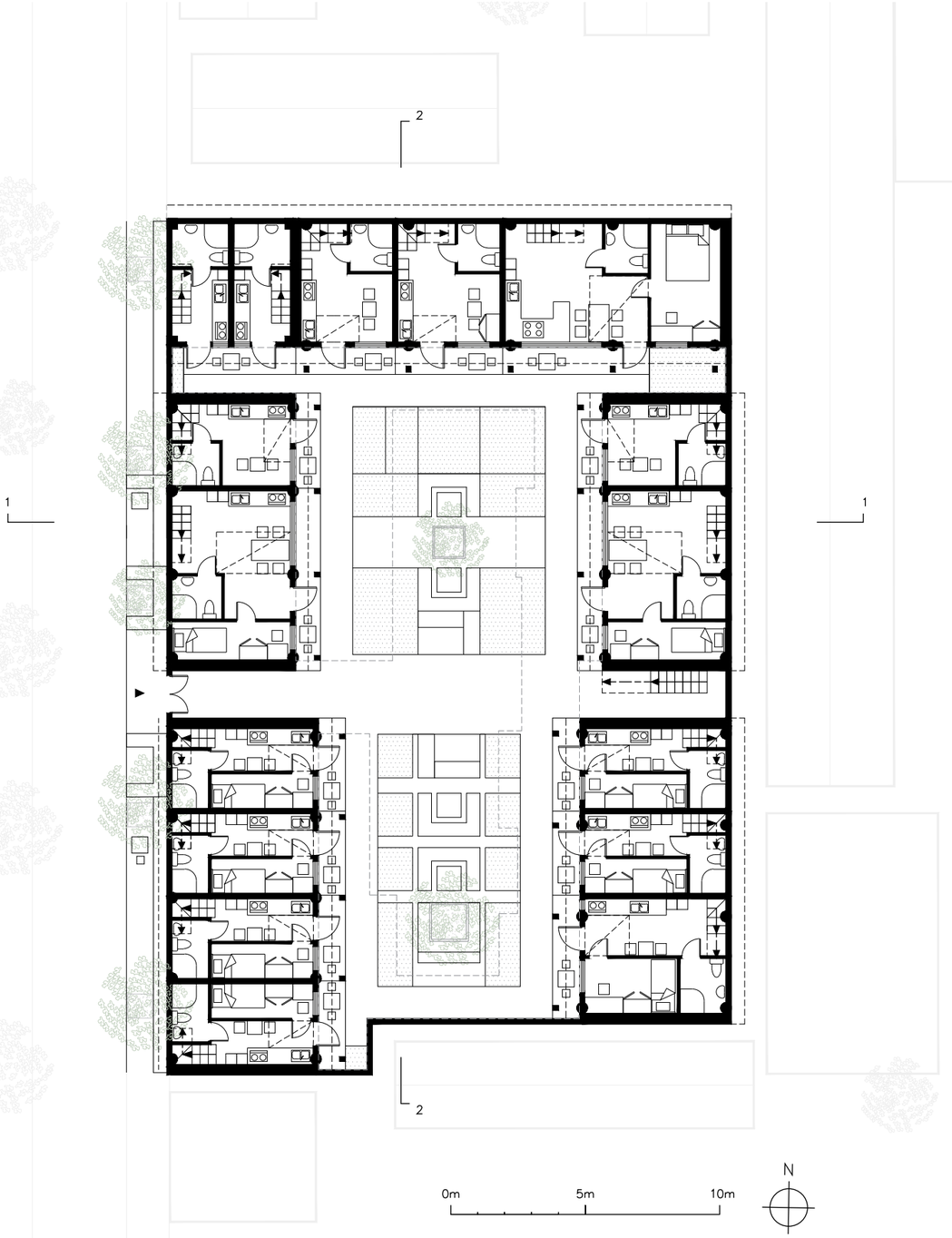


Tear down illegal additional buildings



The 1st floor plan

The first floor is mainly used as a kitchen, dining rooms, and bathrooms.

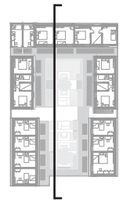


The 1st floor 1:200

The 2nd floor plan

The second floor is mainly used as bedrooms.

The 2nd floor 1:200



0m 5m 10m

Section 2-2 1:100

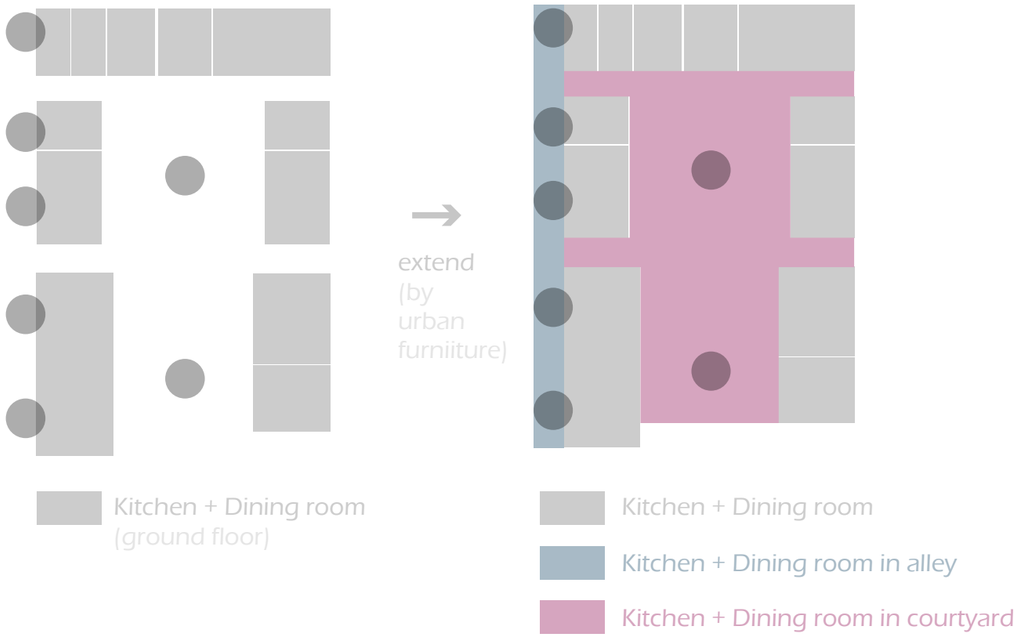
LOFT space makes use of the "triangular space" --- makes it have more space and historical value.

Social line

Bring the function of a home to the alley

The overall idea of Social line:
Extended Kitchen and Dining Room

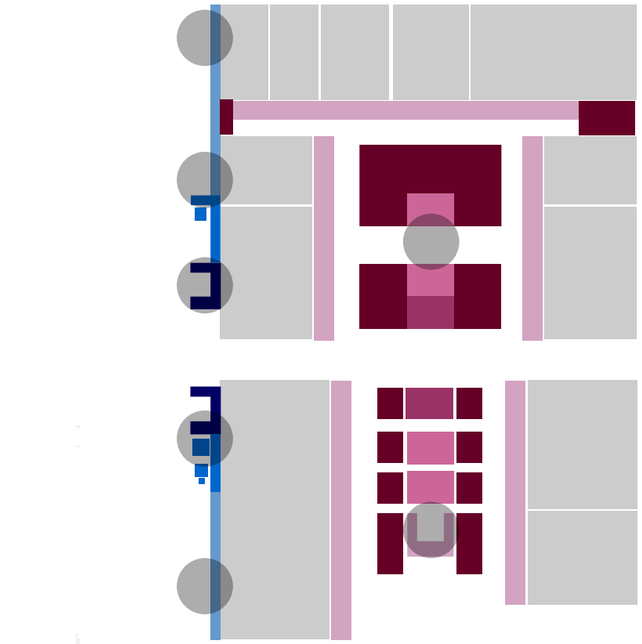
Tools: Urban Furniture

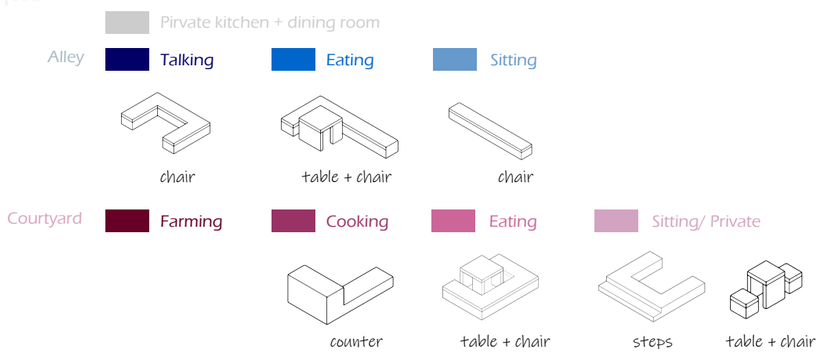


For the first floor is mainly the kitchen and the dining room.

Setting the urban furniture with kitchen and dining room functions in the courtyard and alley, could turn the function of courtyard and alley into an extended kitchen and dining room, increasing the interaction between indoor and outdoor.

Thus, the extended kitchen and dining room bring the functions of the home to the alley.

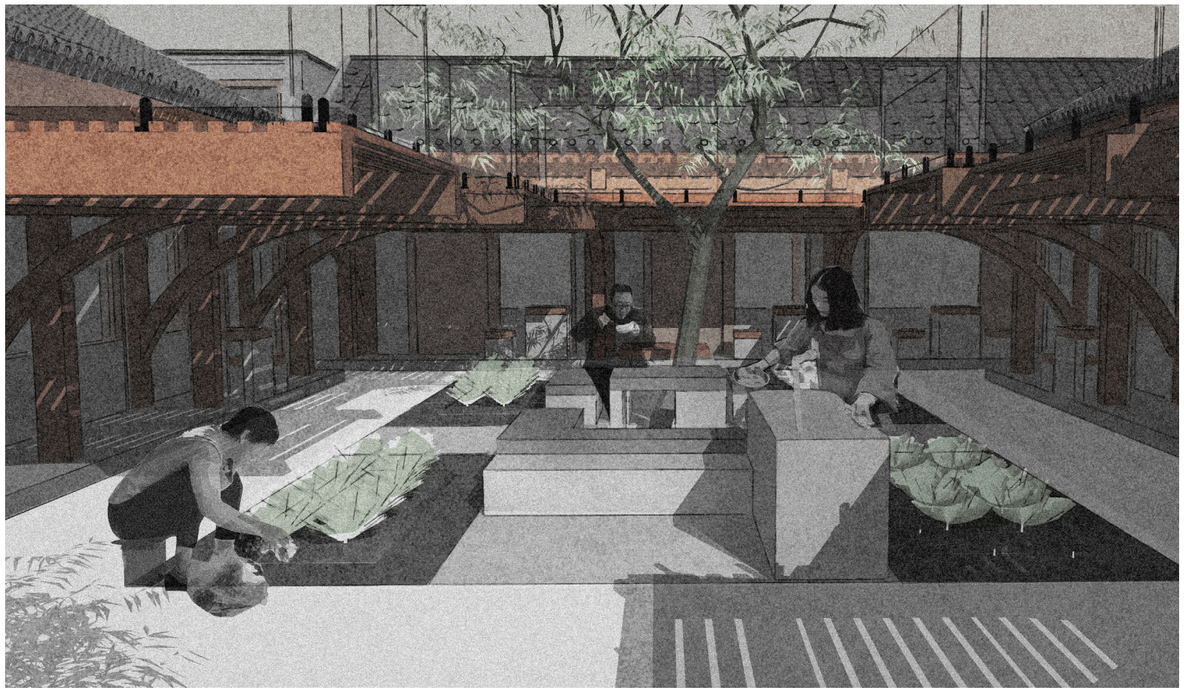


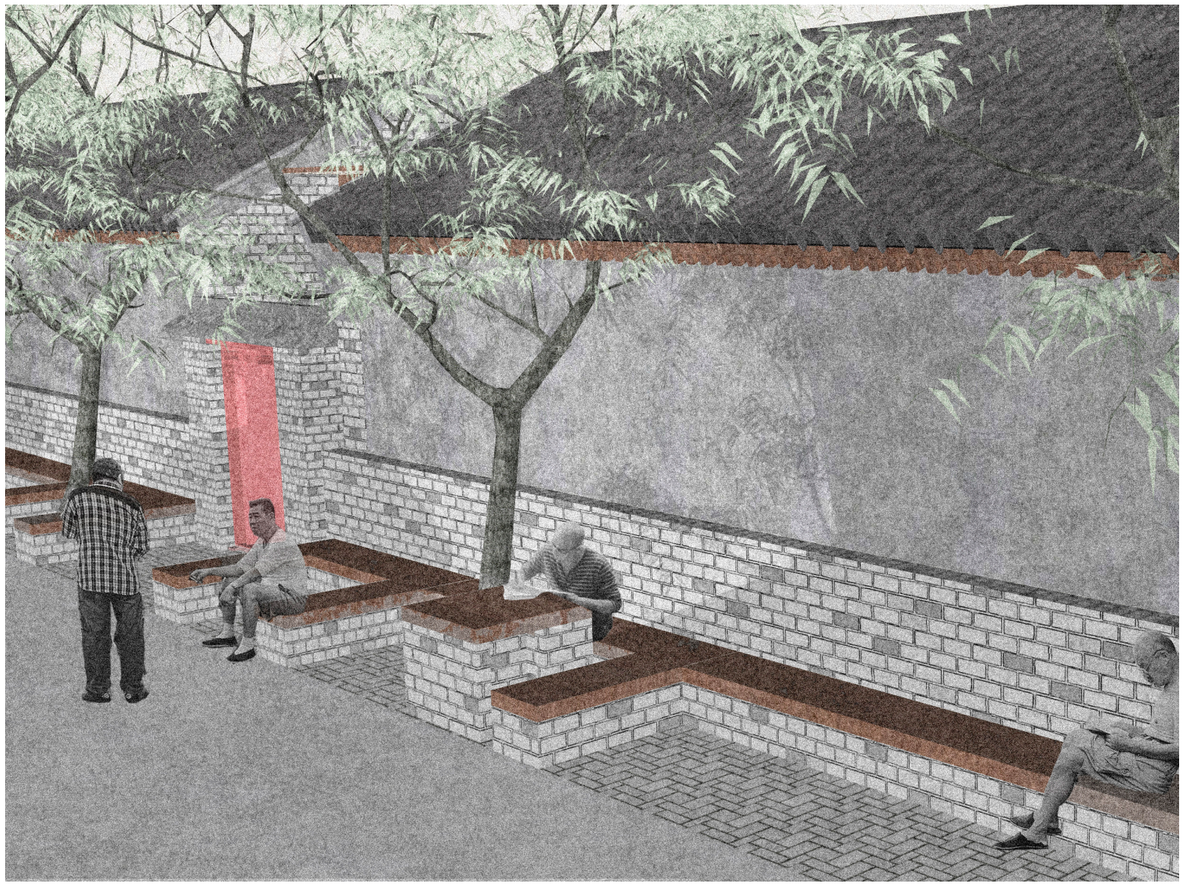


Here is the function division of extension kitchen & dining room and its urban furniture.

All kinds of urban furniture include urban farming, tables, chairs, and steps, which are set both in the alley and courtyard. Here, people can finish a series of life activities such as farming, picking vegetables, washing vegetables, cooking, and eating.

In this way, each family's kitchen dining room is connected to the public one. The functions of the home are brought into the alley.





Perspective of extended kitchen & dining room in the courtyard

Perspective of dining room in the alley

Green line

Bring the alley environment to the home

The overall idea of Green line:

Extended balcony

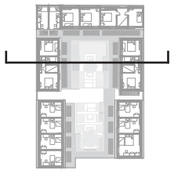
Tools: skylights and wood supports

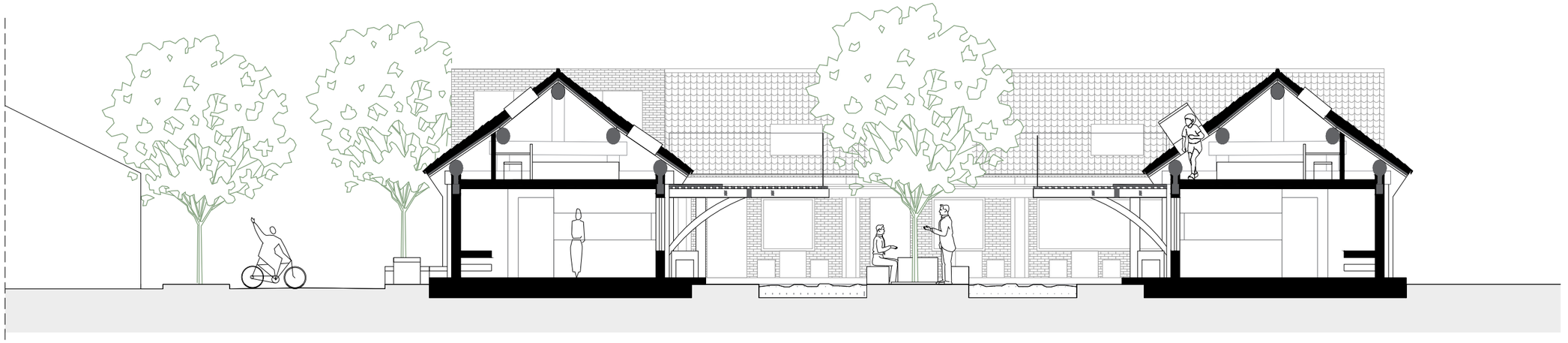
For the second floor is mainly the bedrooms.

Setting wood supports in the courtyard, and skylights on the sloped roof make people can go directly from the bedroom to the outdoors.

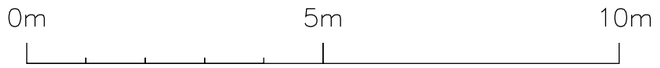
So the courtyard becomes an extended balcony.

In this way, the extended balcony brings the alley environment into the home.





Section 1-1　1:100

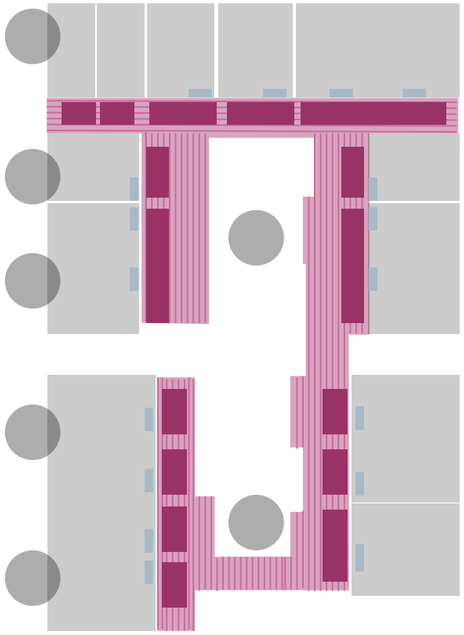


Here is the Section.

The skylights on the sloping roof are similar to the door, and people can directly step into the extended balcony through it, which is the transition from the indoor to the outdoor.

And wood supports created an extended platform. This extended platform borrows the outdoor environment of the alley and turns it into a part of the home, in other words, a private balcony. The alley environment was brought into the home.

Function division of extended balcony



Bedrooms

Skylights

Wood supports

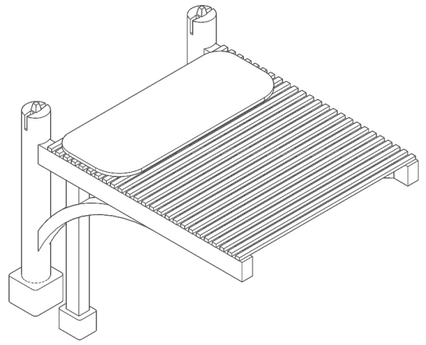
wood slats (transportation) + wood boards (privte space)

Here is the function division of extended balcony

The wood support structure is nailed with wooden slats and boards.

wooden slats area is used for circulation, and the wooden board area is a private area.

Structure analysis of wood platform

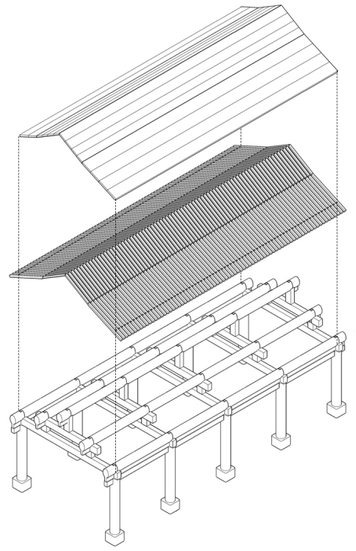


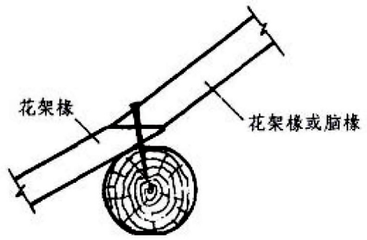
Structure analysis of wood platform

The outdoor platform is composed of wood support and wooden slats and boards.

The construction of the platform uses the same way as the wood structure of ancient buildings, with two joint methods: wood and nails, and wood and wood.

Structure analysis of ancient buildings and its detail connection

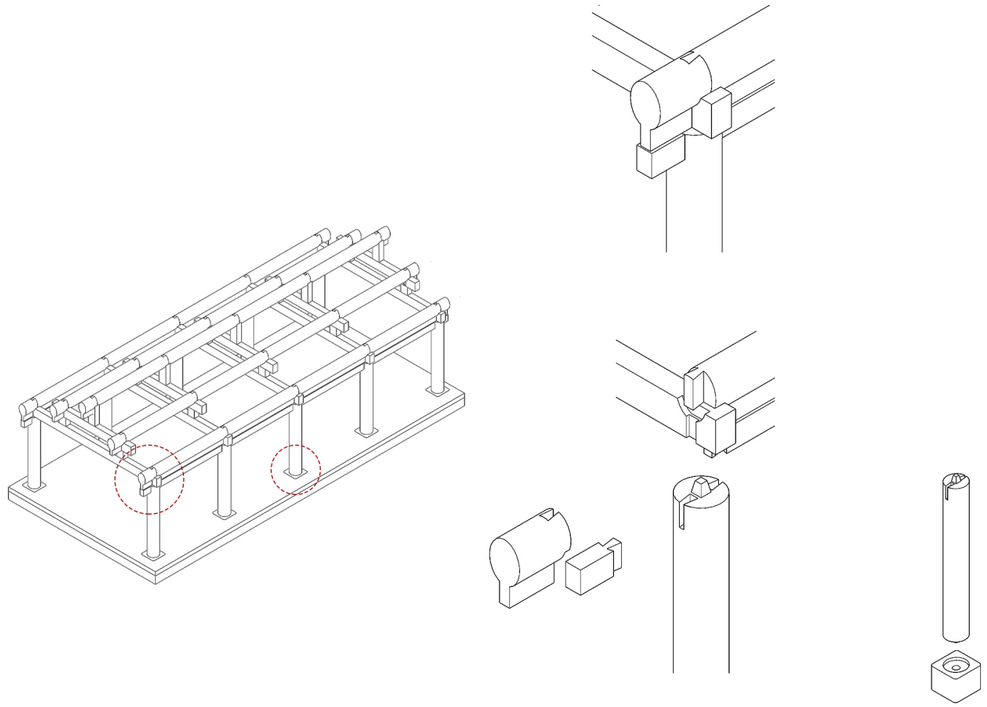




椽子压掌做法

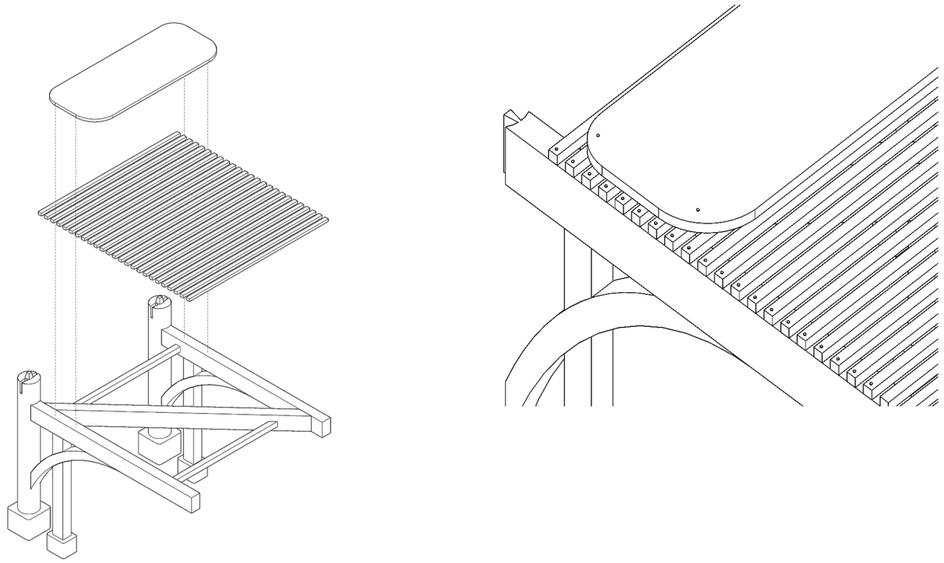
In ancient buildings, boards and rafters were nailed to the supporting.

Ancient buildings detail connection



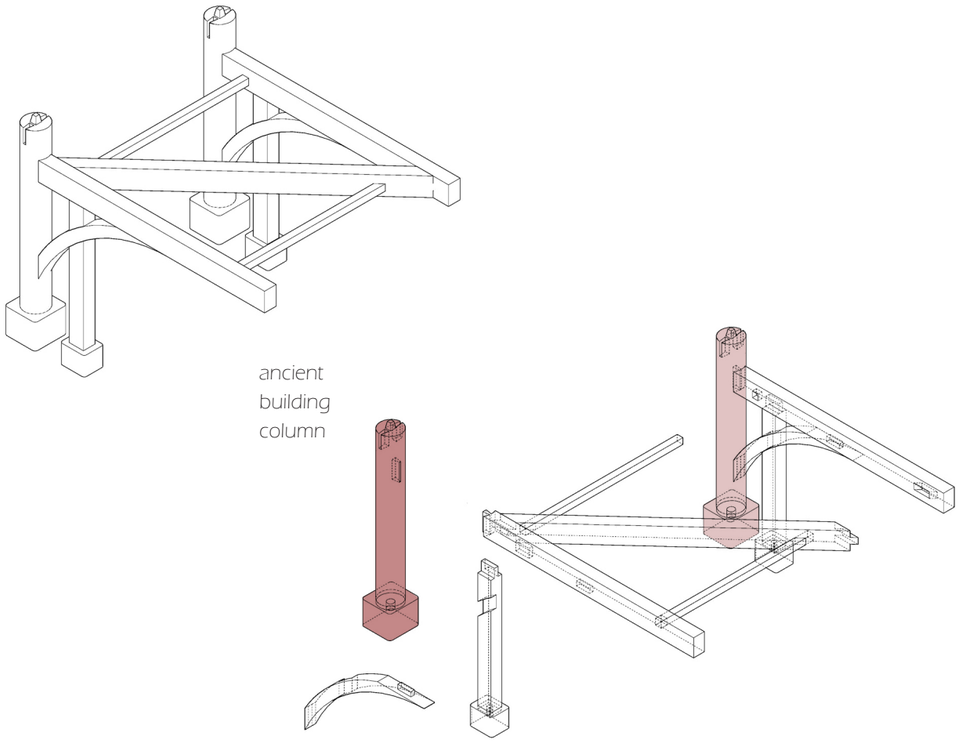
In ancient buildings, the supporting structure was connected by wood and wood(mortise and tenon).

wood platform detial connection



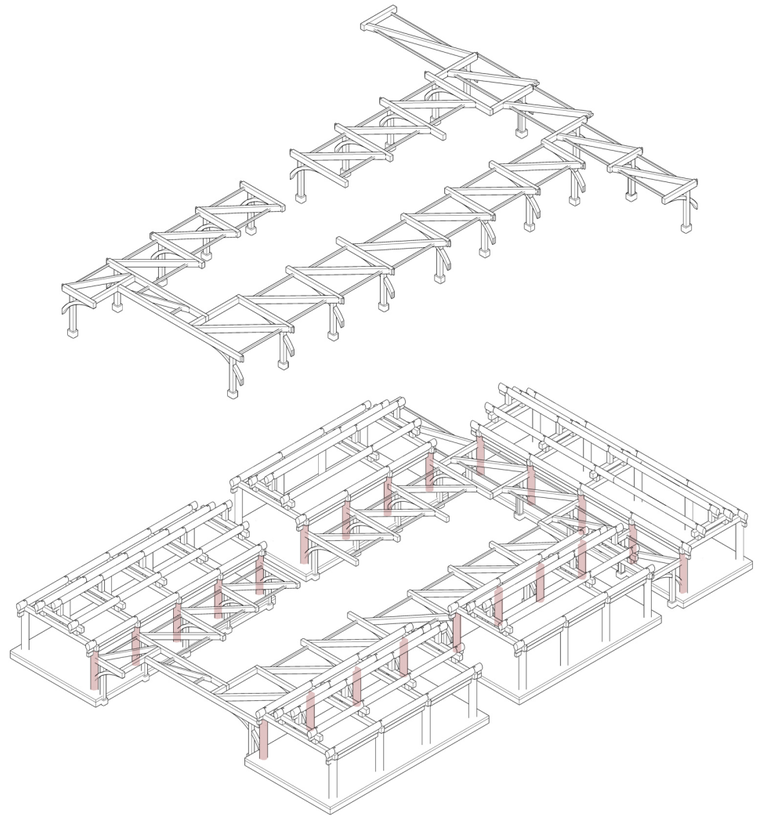
In the platform, boards and slats are nailed to the supporting as well.

Joints of wood platform and ancient buildings



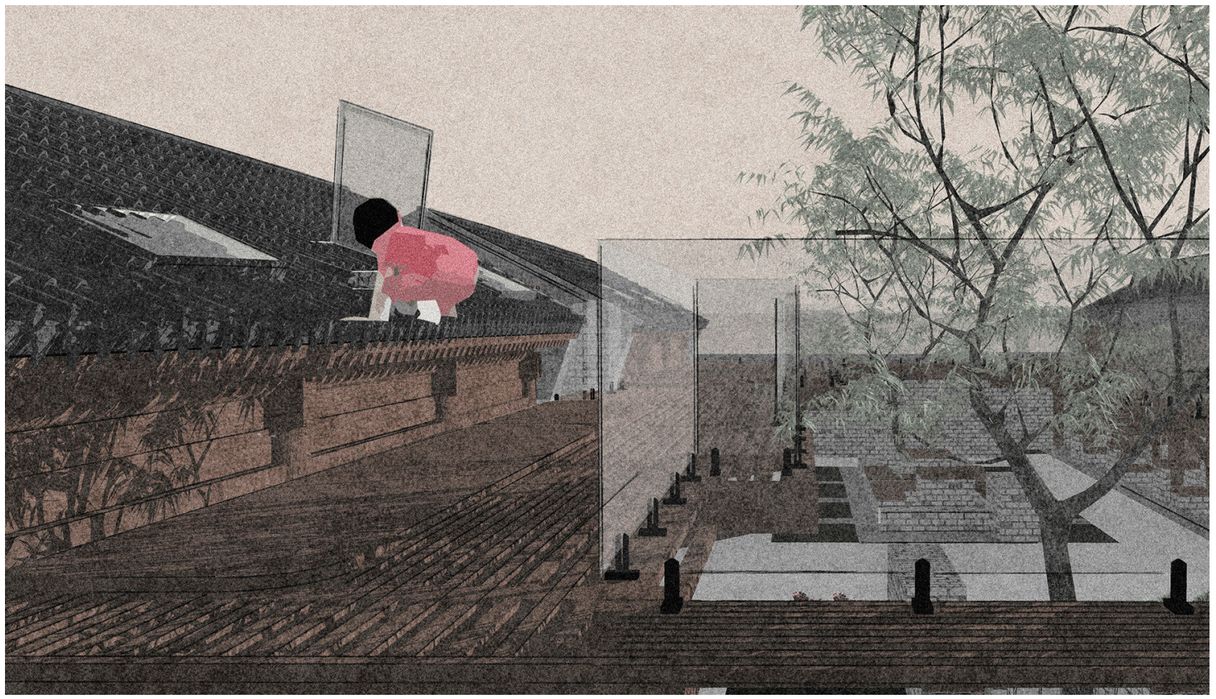
The supporting structure of the platform is connected by wood and wood(mortise and tenon) as well.

Also use this method to connect this platform and ancient building together with the column of the ancient building as the carrier.

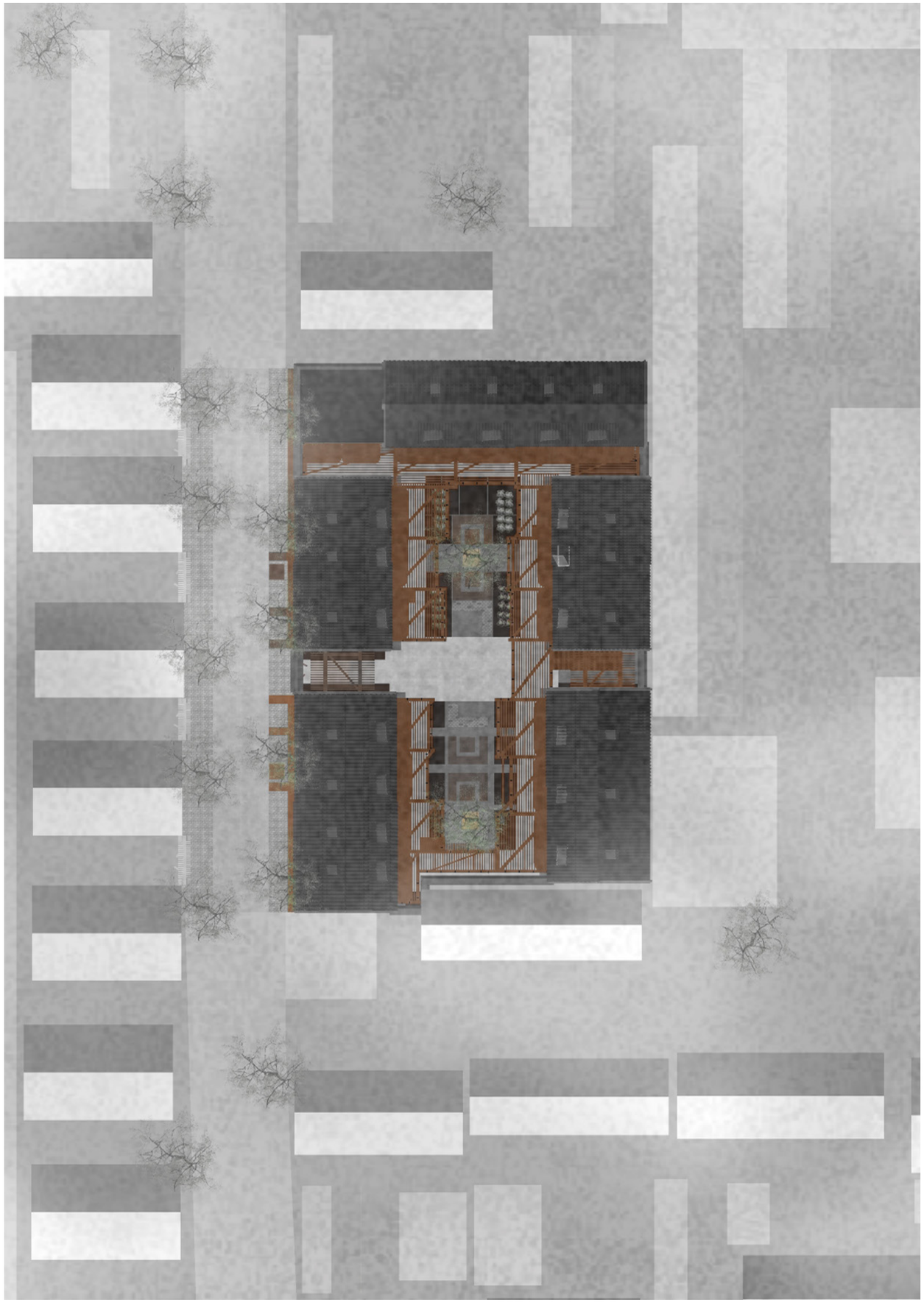


The wood support became an extension of the structure of the ancient building, all the supporting structures used the mortise and tenon method.

Perspective of extended balcony

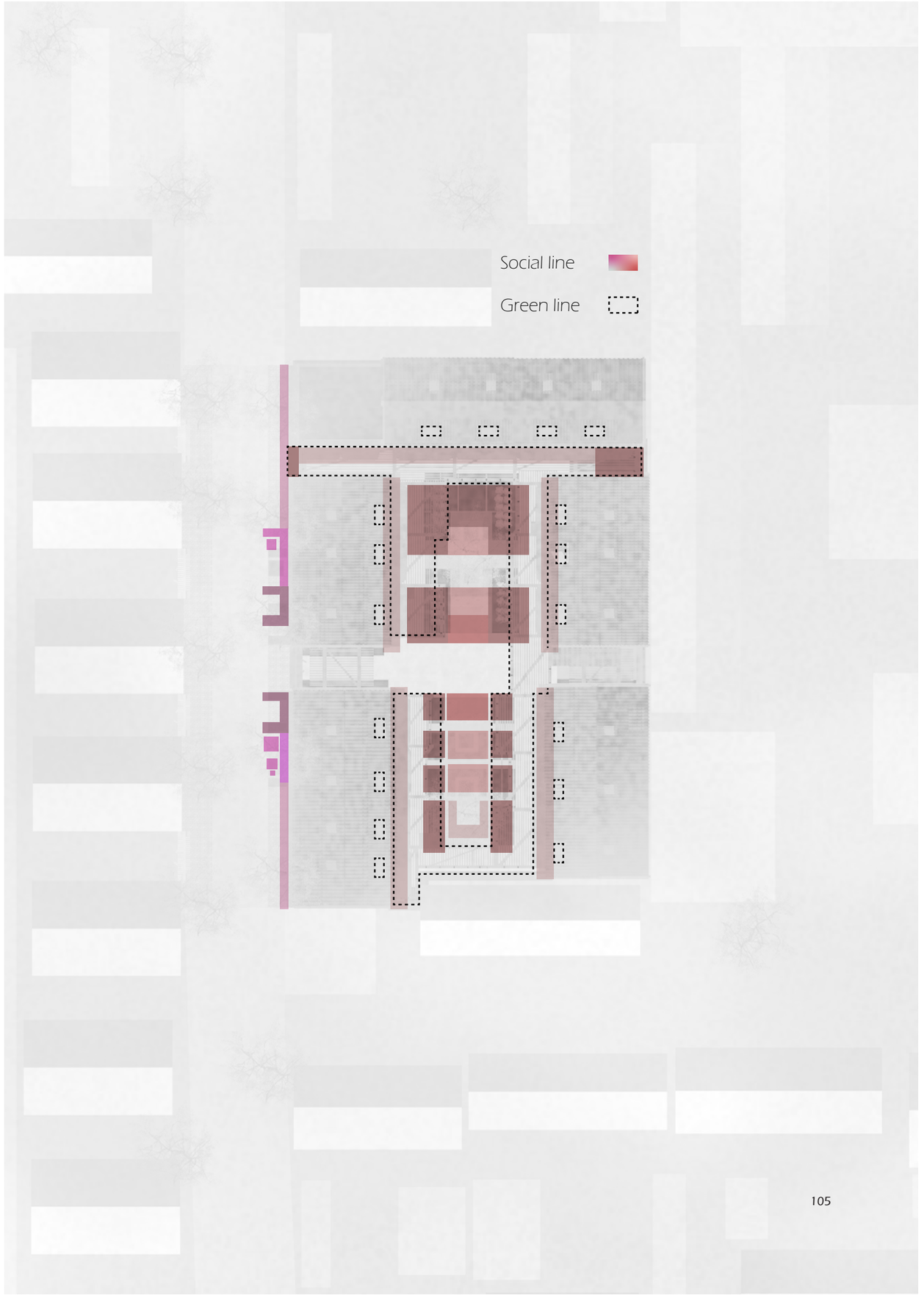


Master plan 1:500



Here you can see the combination of social line and green line.

The social line is mainly on the first floor, and the green line is mainly on the second floor.



Aerial view

Reflection

In the" Beijing City Master Plan 2016-2035《北京城市总体规划（2016 年—2035 年）》" issued by the government, it is mentioned that Beijing's future development direction is the political center and cultural center, not the financial center. My understanding of this document is that the government is aware of the destruction of Beijing's old town formed by large-scale commercial development in recent years and the importance of protecting its historical value, so it has issued relevant policies to support it.

Talking about the preservation of historical value, the regeneration of Beijing's old town is an important part. And my thesis is based on this specific cultural background.

There is a phenomenon in Beijing's old town, residents, even if they have relatively spacious and bright apartments in the suburbs of Beijing, they are still willing to crowd in this dilapidated and small house. Why? I attribute it to a sense of cultural belonging.

When we talk about the regeneration of the old city and the preservation of historical values, it is easy to overlook, apart from the architectural structure, the local culture is also a very important part.

Specific to this project is people's sense of belonging to the Hutong culture.
And how to create the sense of belonging of Hutong culture?
I think the key point one is to retain the density of the old city.
Cause the people is the carrier of culture. Therefore, my transformation of this courtyard is not to transform the original courtyard into a fancy courtyard, this will sacrifice a certain amount of population. Instead, the original "units" are reused.

And the key point two is to let the city customize itself.
In my project, the two lines, the social line—bringing the function of the home into the alley through urban furniture, and the green line—bringing the alley environment into the home through skylights, are abstract summarized by the local hutong culture that has formed over the years, the conversation between the public and private.

Each country has its own unique history and culture, and cultural destruction is irreversible, and culture is an important point that is easily overlooked in urban renewal.

I hope my project can be used as an inspiration when we carry out the transformation of the old city, what should be paid attention to, and how to start.

Thank to constructive suggestions in my project from Teresa Arana Aristi, Peter Sjöström, Christer Malmström, Gunilla Kronvall and Andreas Olsson.

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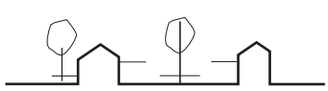
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