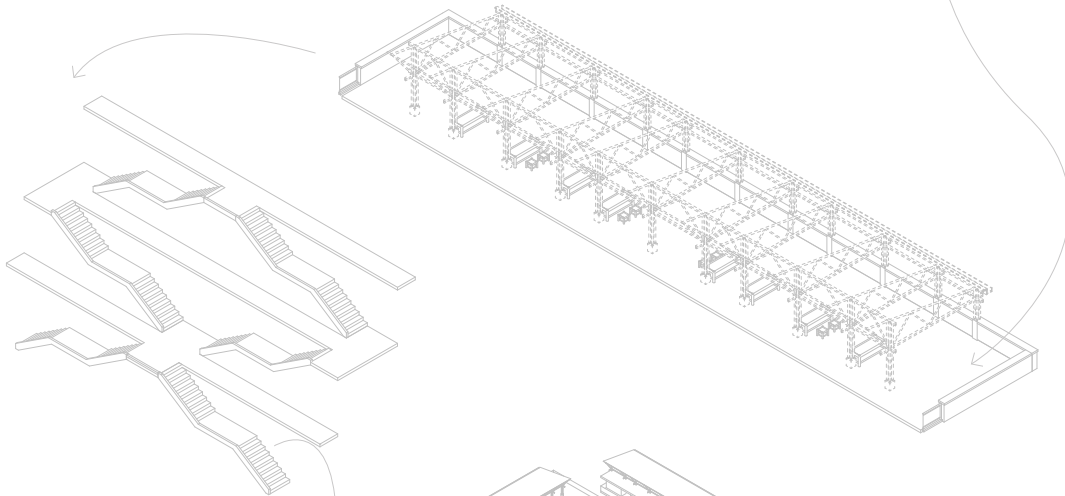
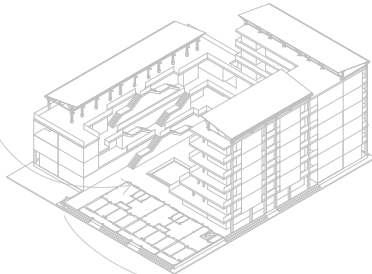


Back To The Ground Life

Reconsidering the shift of living conditions for urban poor during the chawl redevelopment in Mumbai



RESEARCH
BOOKLET



Mixing Mumbai
Global Housing Studio

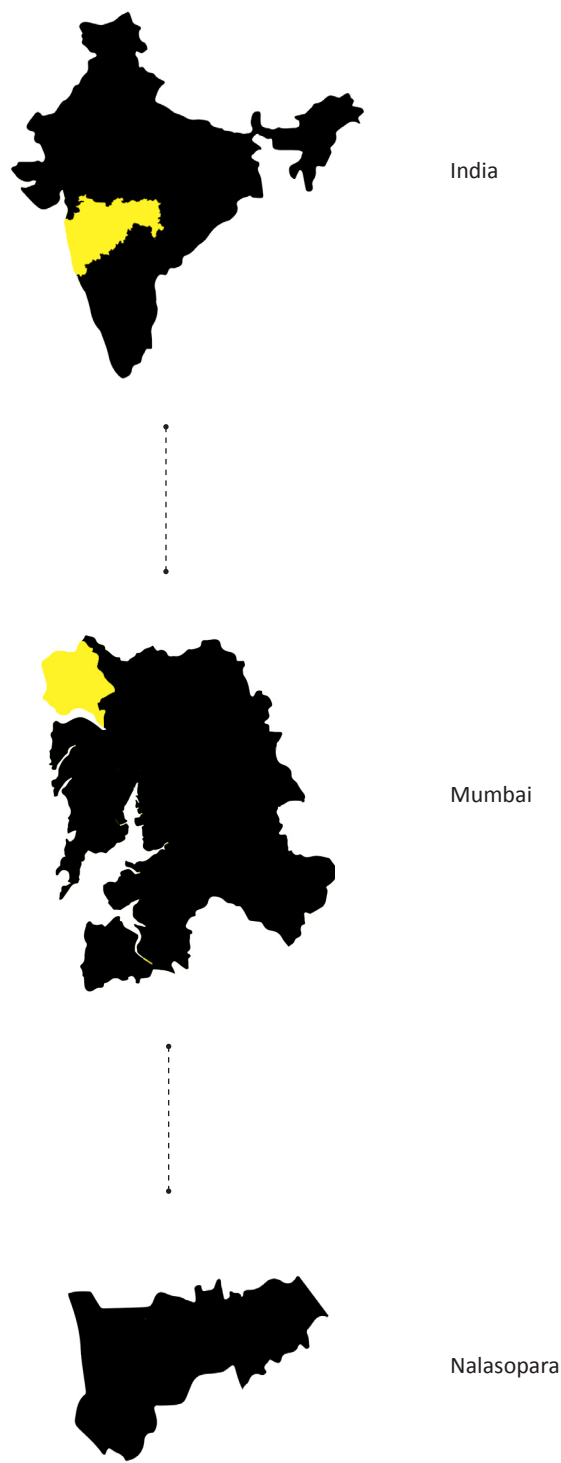
4729129
Sijia Wang

Context

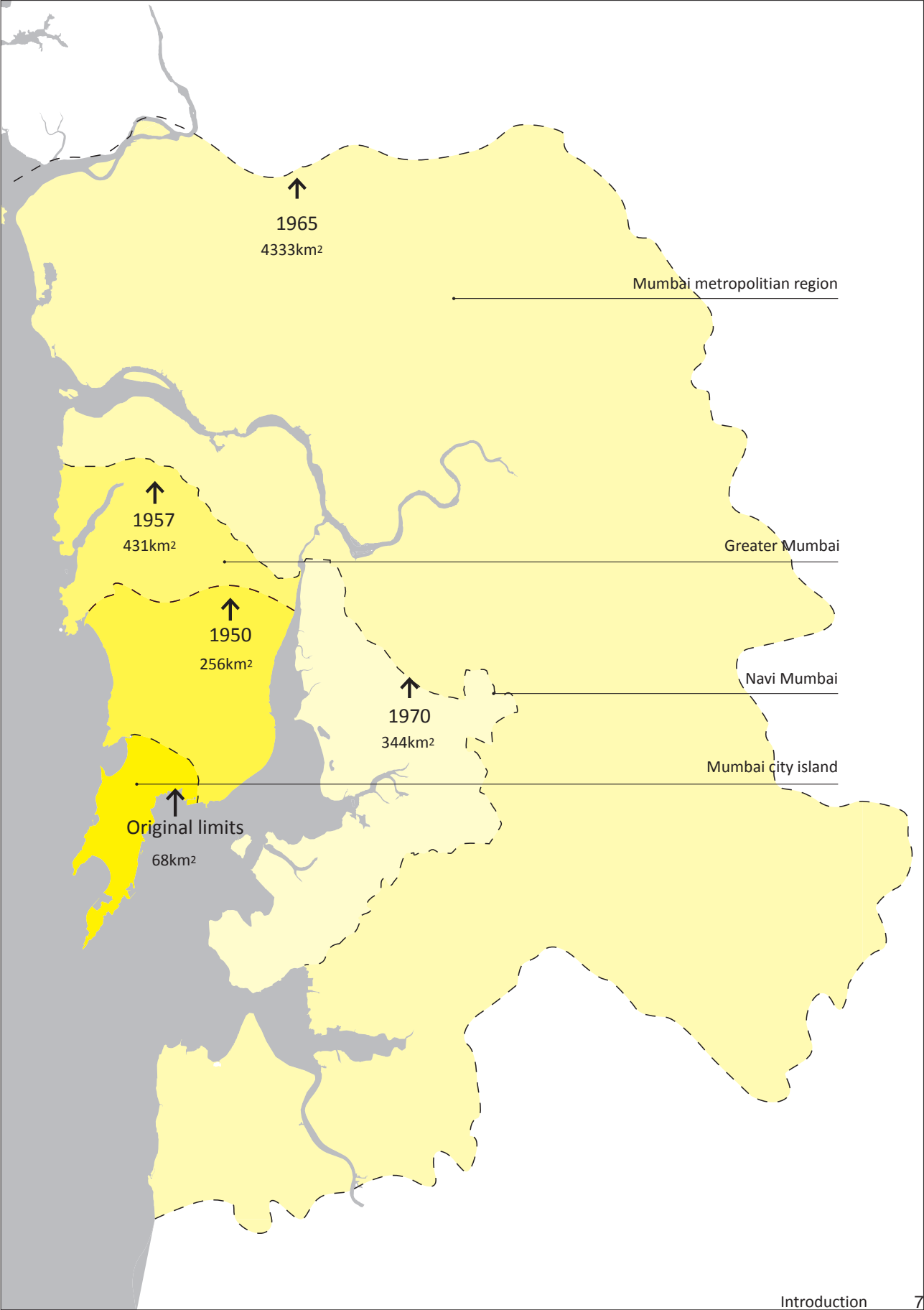
1. Introduction	005
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4. Research	037
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5.1 Urban Strategy	
5.2 Cluster level	
5.3 Architecture level	
5.4 Dwelling units level	
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1. Introduction

Location



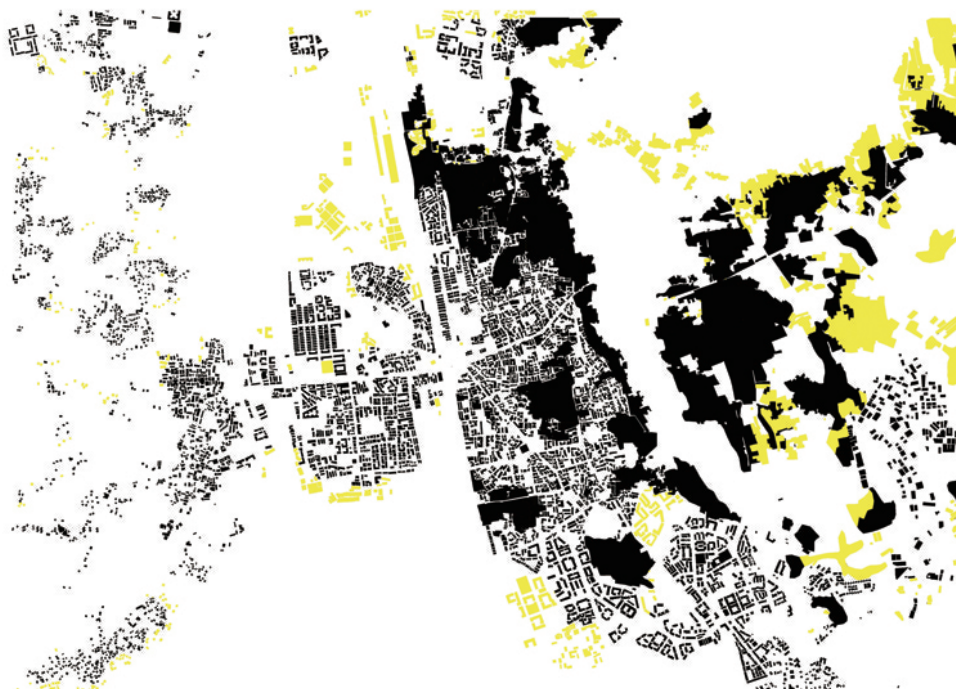
Expansion of Mumbai in the history



Development in Nalasopara



2005

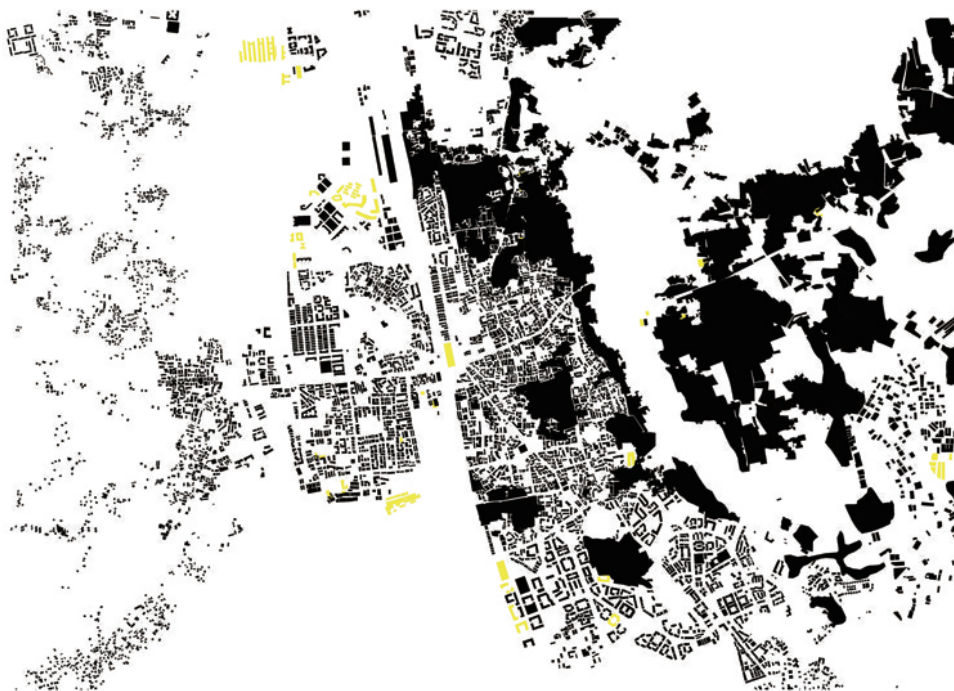


2013

Existing buildings&slums
New buildings&slums

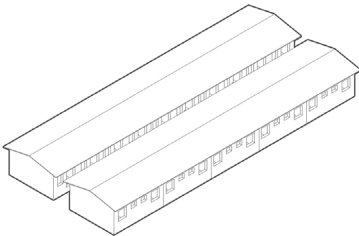


2009

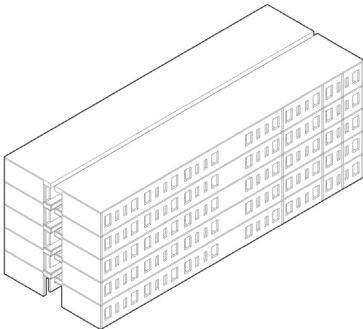


2017

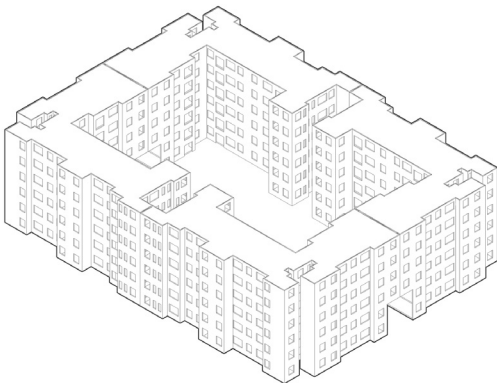
Different housing types in Nalasopara



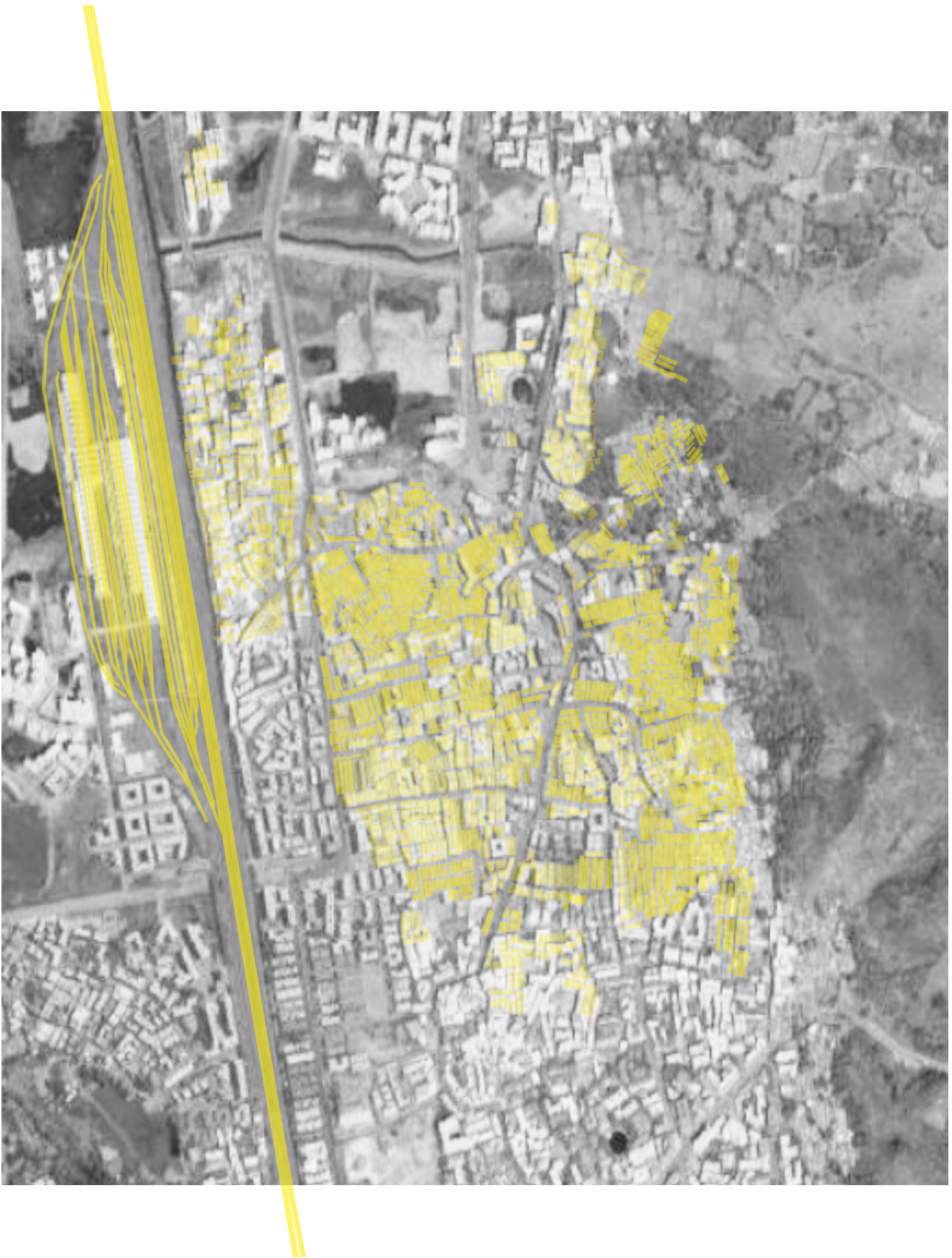
Baithi Chawl



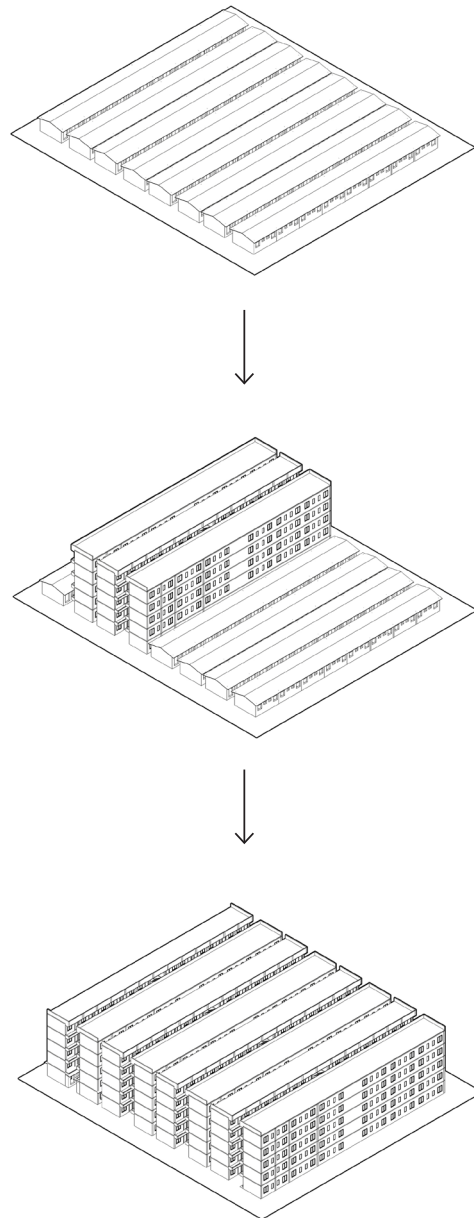
Mid-rise Chawl



Apartment



Current chawl redevelopment



A large amount of Baithi chawls were and are being replaced by mid-rise chawls by illegal developers, with 70% agreement from residents. However, by replacing chawls with five-story buildings, private developers ignore the traditional living patterns of people, segregate them from their social relations.



Typical street view of the mid-rise chawls

2.Problem Statement

Problem statement

Mumbai has seen the rapid urbanization in recent years. A large influx of migrants look for business and employee opportunities in the city, which led to the issue of over-population. The UN Habitat data in 2013 shows that the Mumbai is the second most crowded city with the population density of 31,700 people per square kilometer, just after Dhaka, the capital of Bangladesh. It is estimated that there is a population of more than 21 million in Mumbai in 2018, while over 40 percent of people live in the informal settlements in extremely poor conditions.

Meanwhile, construction activities have been carried out by both government and private developers to provide more affordable housing for the urban poor. However, there is a tendency that what a megapolis should look like is judged mainly by its form rather than the process, which gives chance to the real estate construction industry. High-rise and mid-rise towers have been built for slum dwellers, mainly migrants, which completely ignores their existing living habits and economical features. The 'modern' life differs from original rural life of migrants, leading to the social isolation as well.

Collage of the first impression

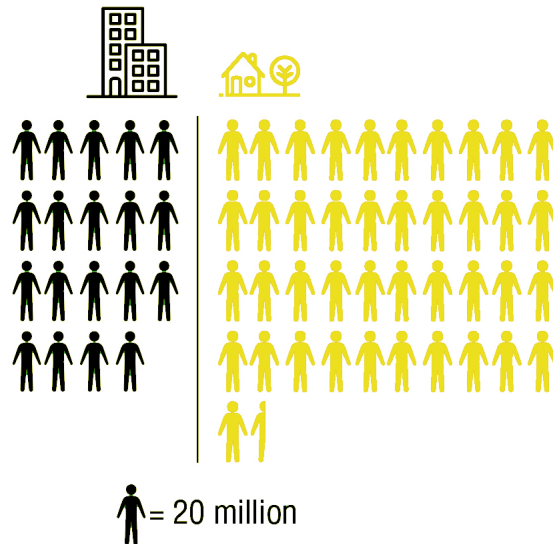


Thinking in a larger scale,
looking at residents in these cramped mid-rise chawls, or high-rise apartments, most of them are rural imigrants outside Mumbai. What is the dilemma they are facing right now?

Comparison of rural and urban population

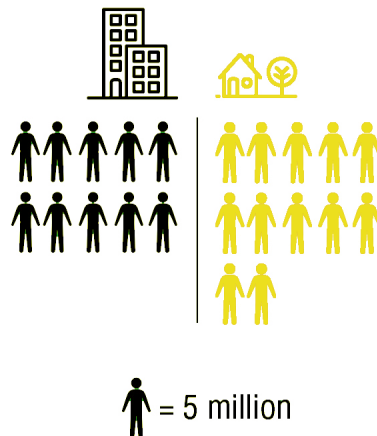
India

Urban **3:7** Rural



Maharashtra

Urban **5:6** Rural



According to the latest census, India has approximately 70 percent rural population. The urban and rural population is 3 to 7.

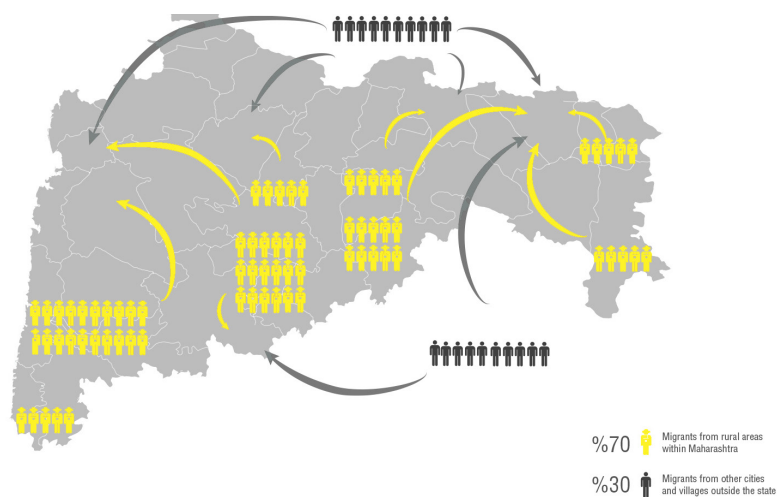
While in Maharashtra state, it is almost 1 to 1, which means Maharashtra has a high level of urbanization, lots of migrants influx into the city in recent years.

Rural migration in India and Maharashtra



Migration within India

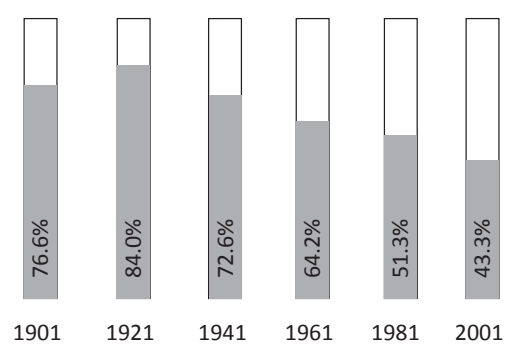
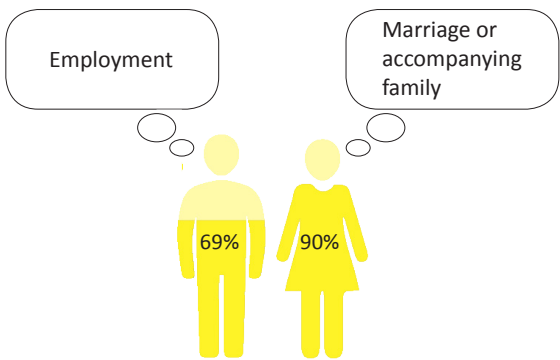
The southern states including Maharashtra are major destinations for rural migrants from the less affluent north in India.



Migration within and into Maharashtra

70% migrants are from rural area within Maharashtra, and Mumbai is the most popular destination for them.

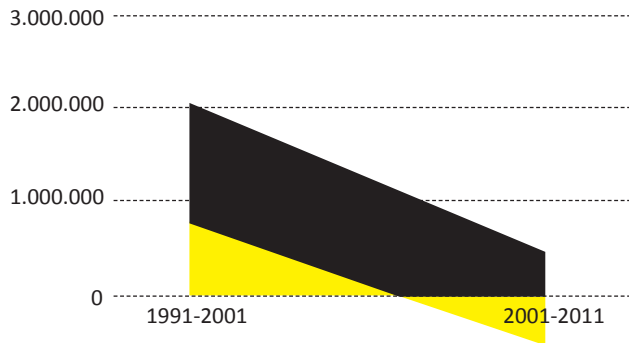
Migrantion in Mumbai



Migrants are defined based on place of birth
Percentage of Migrants in Mumbai UA

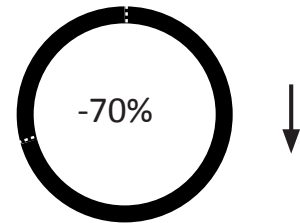
When looking at Mumbai, the largest city in India, it has seen the rapid urbanization in recent years, and It is one of arrival cities for migrants in the world. Around 80 percent of the population born outside Mumbai at the beginning of the 20th century. These migrants tend to look for better jobs in the city, and they often bring their families into the city once they settle down.

Outmigration within Mumbai

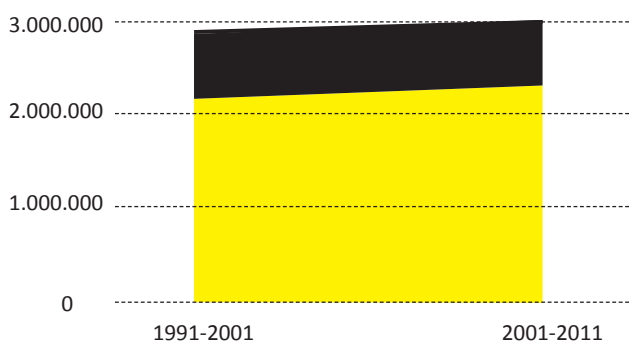


Size of immigrant population increase

Mumbai island

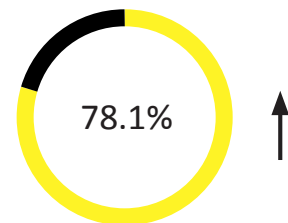


Contribution of migration in whole population increase



Size of immigrant population increase

Mumbai suburb



Contribution of migration in whole population increase

Whole population increase 
Migrant population increase 

In the 21st century, the trend of outmigration happened later, the number of migration increase starts to decline in Mumbai island, while the number of migration increase in Mumbai suburb keeps growing in recent 20 years.

Because of the expensive housing prices and lack of resources, the urban poor begin to move to the periphery of Mumbai to look for affordable housing.

Living conditons of migrants

Population in
formal settlements



Population in
informal settlements



 = 5 million

Population in different living conditions in the Greater Mumbai

First and second generation migrants, mostly from Maharashtra.



The economical resaon for migration, to find a job.



Most are wages workers in small factories or are daily wage workers, many face job insecurity.



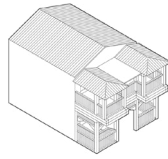
About 85% of households report that they 'own' their dwelling even though many do not hold a title.



Research about people living in informal settlements in Mumbai

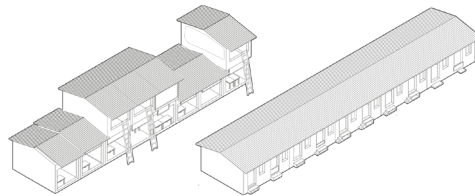


Change of living conditons for migrants



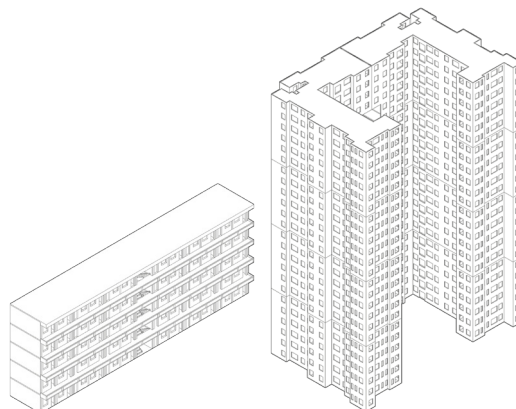
Bungalow

Village



Chawls, slums or homeless

Informal settlement

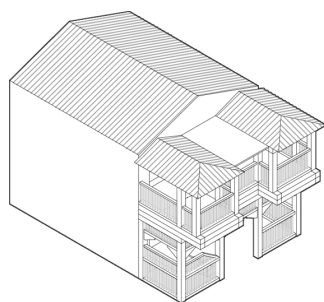


Mid-rise chawl or high-rise apartment

Future ?



Village Life



Bungalow



Strong social network



Less income



Accessible to street and
all public space



Front door space,
large indoor space,
with courtyard

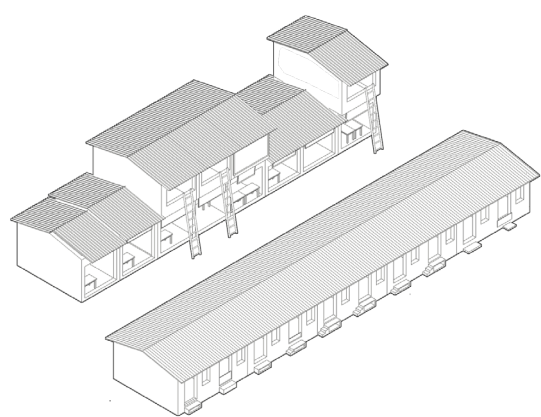


Self-built housing,
free for extension



Village in Nalasopara

Urban Life



Slum or Baithi chawl



Strong social network



Housing is easier to be used to generate income



Accessible to street and all public space



Front door space, large indoor space, with courtyard

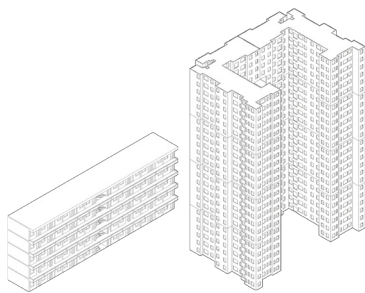


Self-built housing, free for extension



Baithi Chawl in Nalasopara

Future Life



Handshake Chawl or
high-rise apartment



Social segregation



High maintenance
fee for tax, lights,
water,sanitation



Accessible to street
and all public space



Limited and fixed space



No place for extension

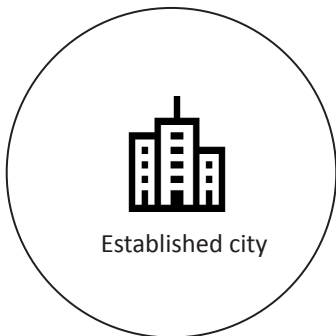
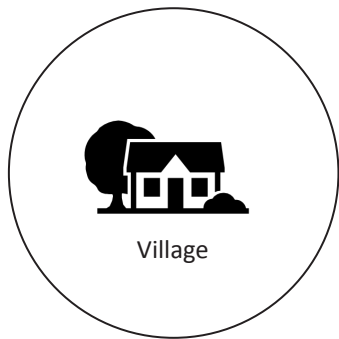


Handshake chawl

The situation is still continuing,

In Mumbai Metropolitan Regional Plan 2016-2036, it is stated that from 2011 to 2021, there will be about **50,300 units** built by public developers, among which the remaining **41,670 units** are replacement units by SRA and MMRDA.

In an extent context



Support local and regional governments, in establishing frameworks that in establishing frameworks that enable the positive contribution of migrants to cities and **strengthened urban–rural linkages.**

--UN, New Urban Agenda (NUA)

"The first arrival-city function is the creation and maintenance of a network: **a web of human relationships connecting village to arrival city to established city.**"

--Doug Saunders, Arrival City

It is necessary to accept those informal settlements as part of the city and to improve the living conditions of migrants according to their demands and living habits. The identity of those informal settlements needs an alternative housing approach, instead of homogenous high-rise towers with extremely high density, to make Mumbai not just for the less, but for all.

Research question

How can a multi-story housing complex with a reasonable density, establish **a stronger connection** to the **ground life**, to improve the local living conditions of urban poor, and simulate new possibilities for **social interaction** and **income generation**?

Sub-questions

Urban level

1. What is the characteristic of **ground life**, and how to shape it?

Architecture level

2. How to establish **strong connections** between the upper floors and the ground?

Domestic level

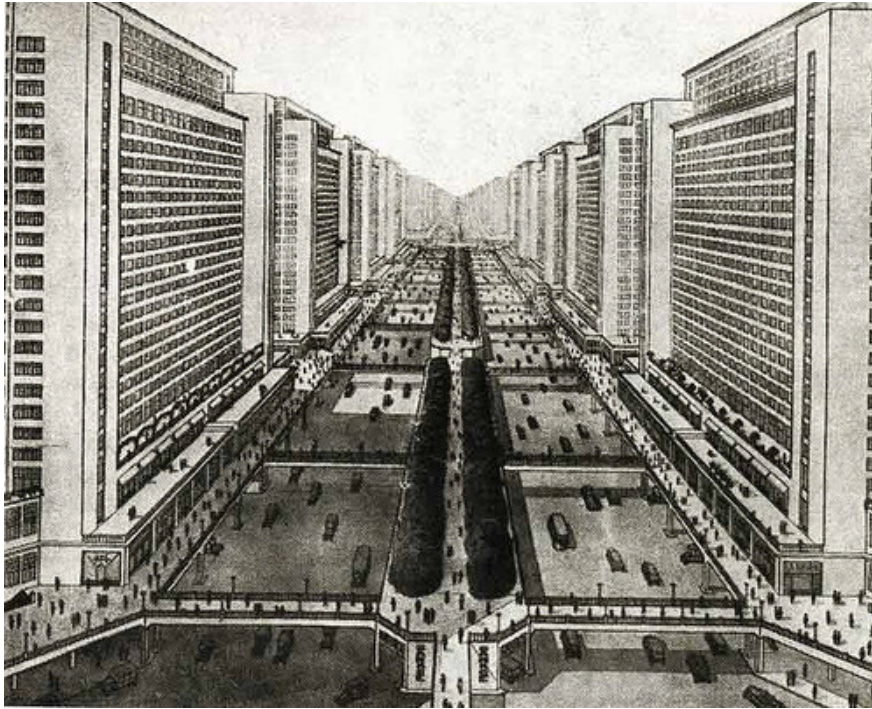
3. How to leave more space within dwelling units?

Other questions

4. Except for extremely dense high-rise or mid-rise buildings, what is **a reasonable density** of affordable housing in Nalasopara?
5. Who will be the **stakeholders** and what is the **ownership** behind?

3.Research

1. What is a good ground life?



Plan Voisin

“You are under the shade of trees, vast lawns spread all round you. The air is clear and pure; there is hardly any noise ... For only 5-10 per cent of the surface area of its business centre is built over. That is why you find yourselves walking among spacious parks remote from the busy hum of the autostrada.”

-- Le Corbusier, plan for Paris in the mid 1920's

Phenomenon: the open way of life



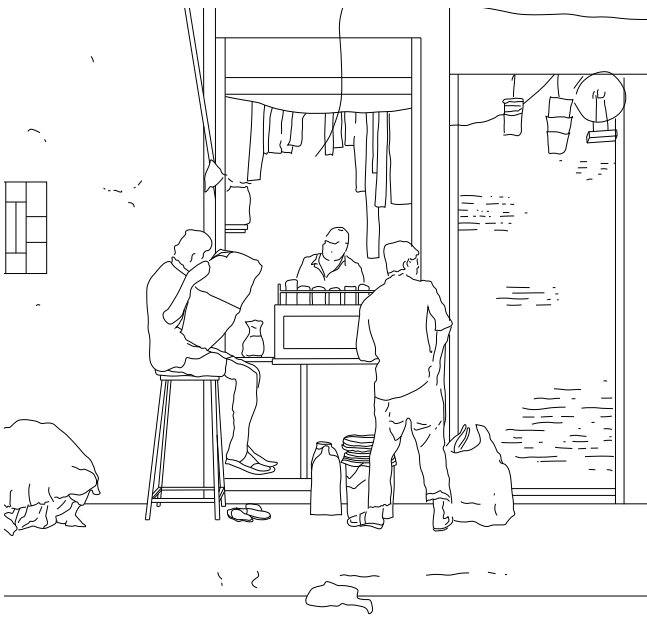
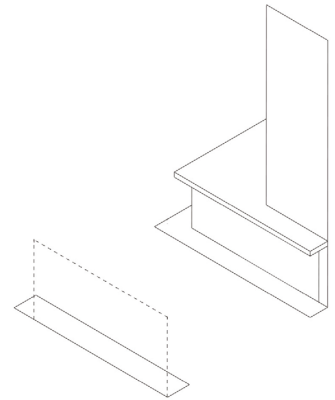
Nehru Place

“People mingle casually on this plateau... a very good food stand, for instance, is located outside the offices of a firm that has pulled off an IPO. Rather than lunch in an upmarket place, the sharp young men still hang out around this stand, eating off paper plates, gossiping with the stand’s half-blind, motherly proprietor.”

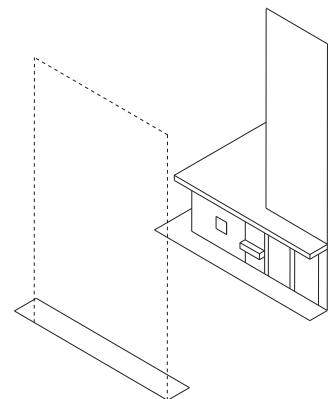
-- Richard Sennett, *Building and Dwelling*



Activity: bargain in the market

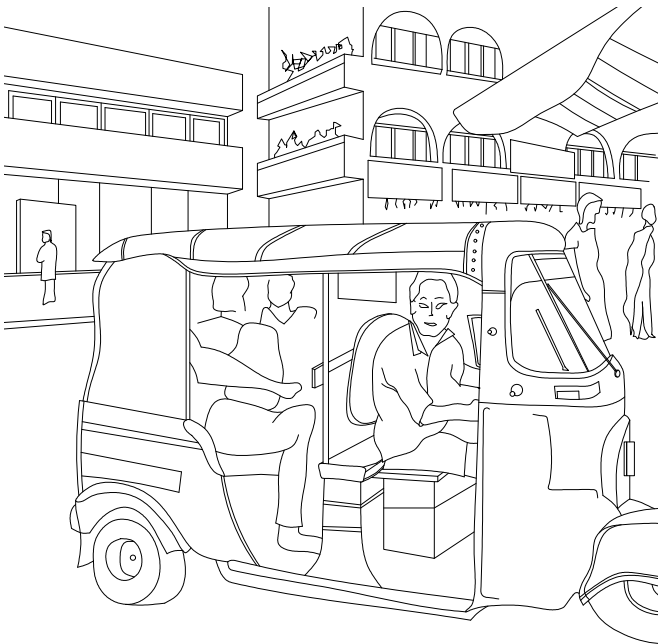
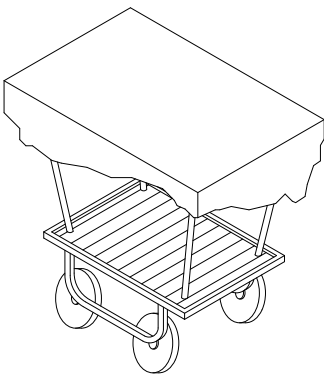


Activity: window chat

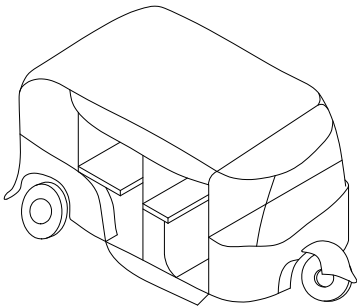


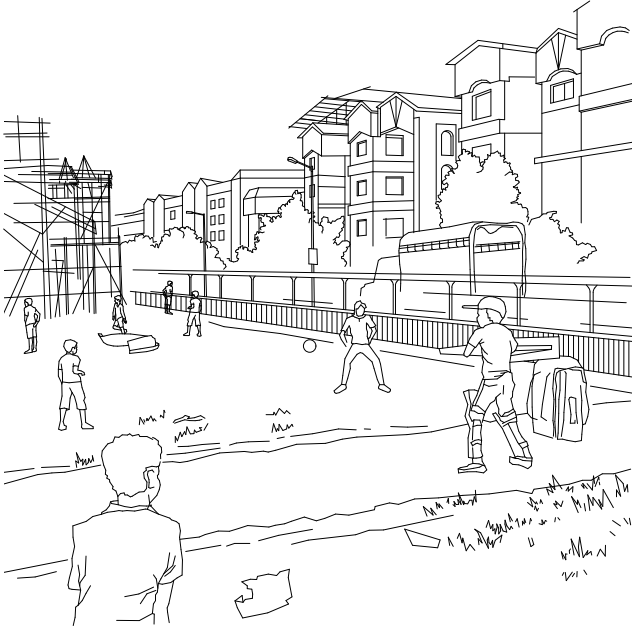


Activity: lunch in the shade

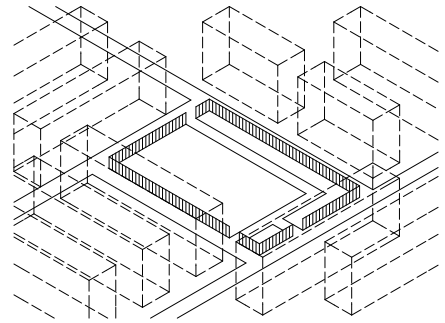


Activity: socialize on the go

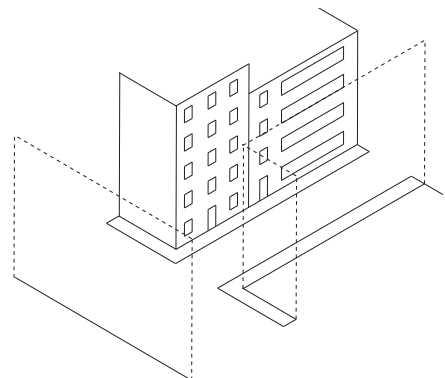




Activity: gully cricket



Activity: gully football

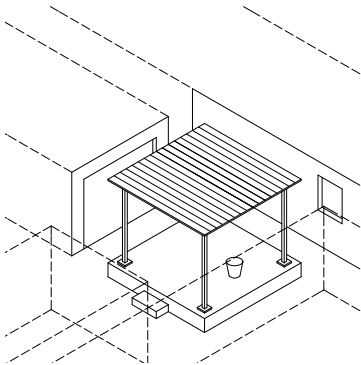


Patterns of social space

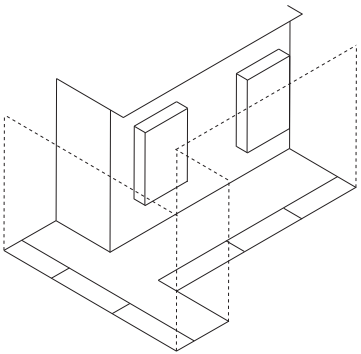


Activity: work in the multipurpose altar

Communal space

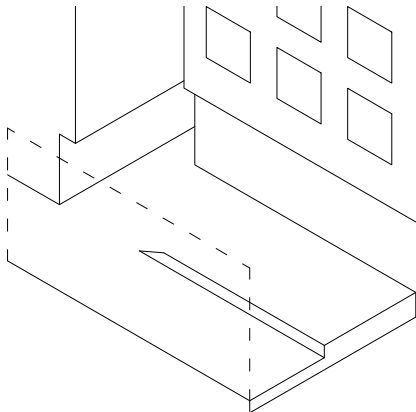


Activity: productive intersection

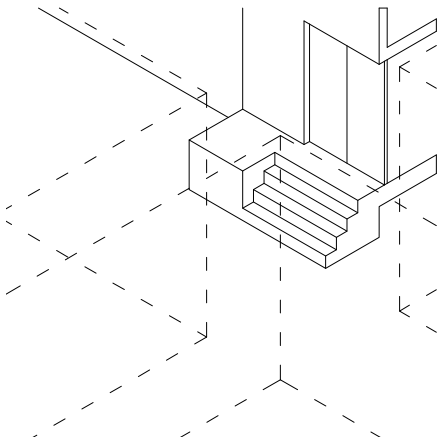




Activity: play in the exposive stroop



Activity: gossip at the corner

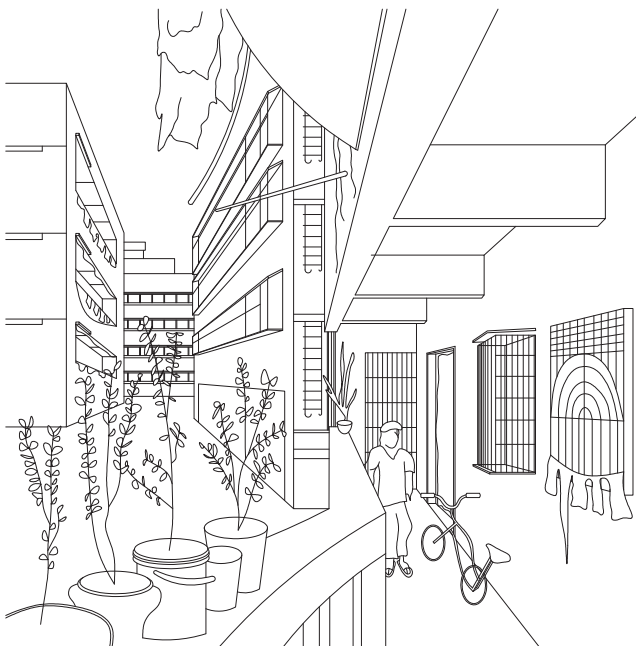
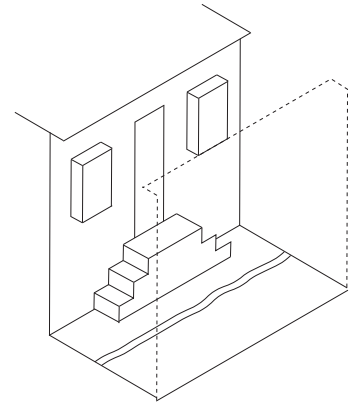


Patterns of social space

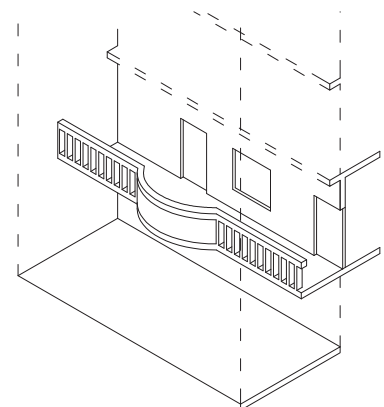
Entrance to the dwelling units



Activity: chatting in the alley

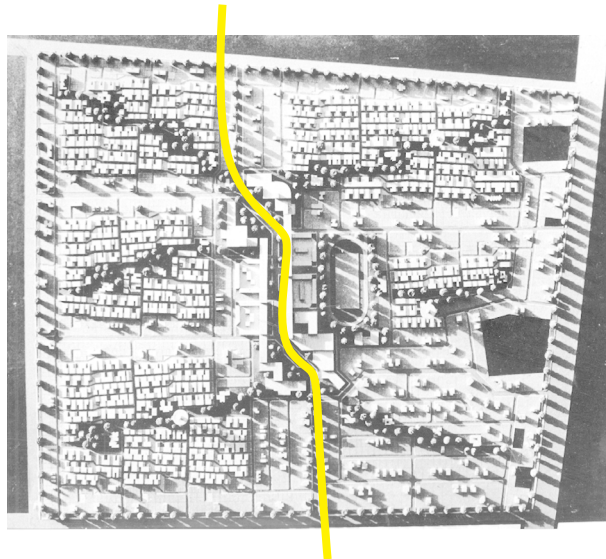


Activity: socialize in the corridor



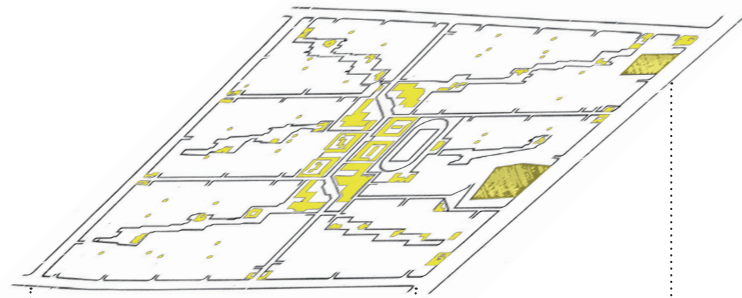
1. How to shape the ground life in the urban scale?

Case study 1

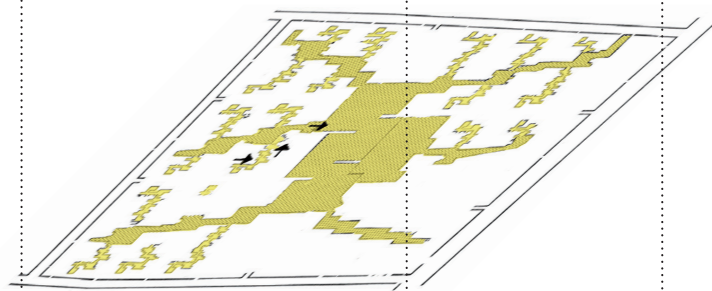


Aranya Group Housing

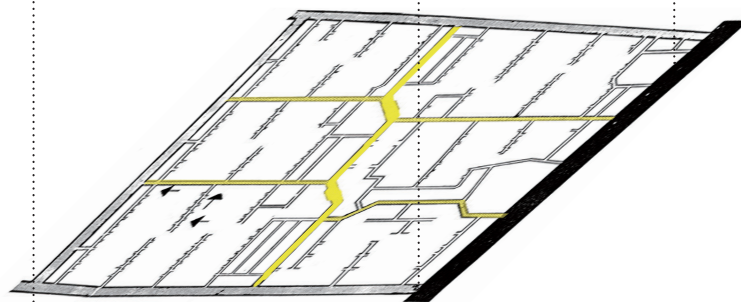
Year	1989
Floor	1-2
Site area	85 HA
No.of dwellings	6500 plots/6 sector
Population	60,000
Units/HA	141



Amenities



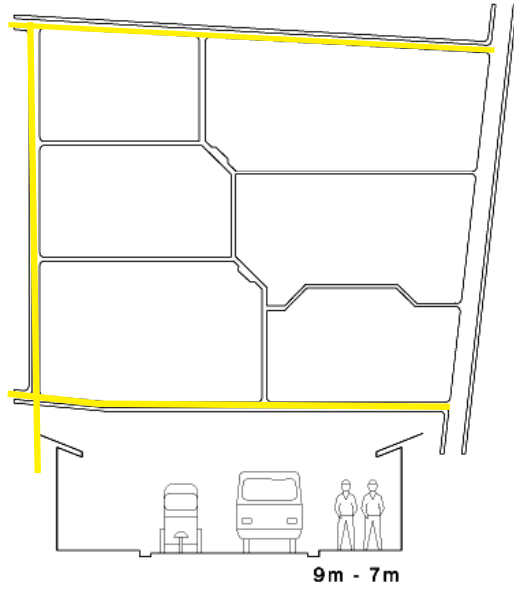
open space
& pedestrian road



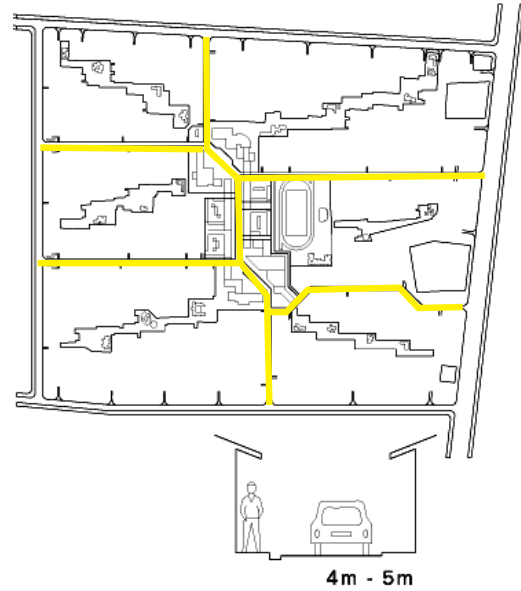
Hierarchy of roads

2. How to shape the ground life in the urban scale?

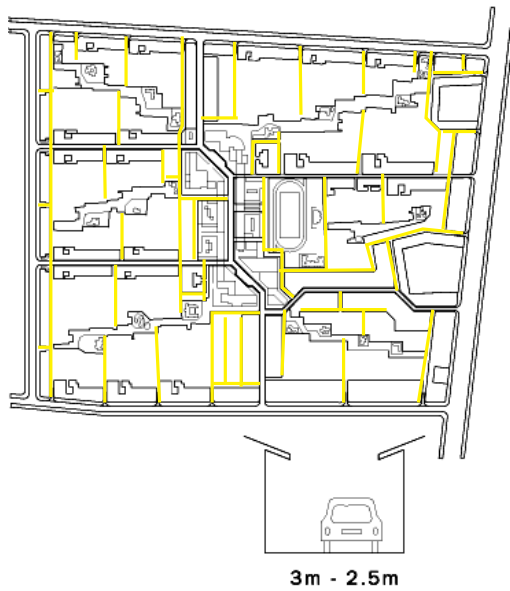
Case study 1



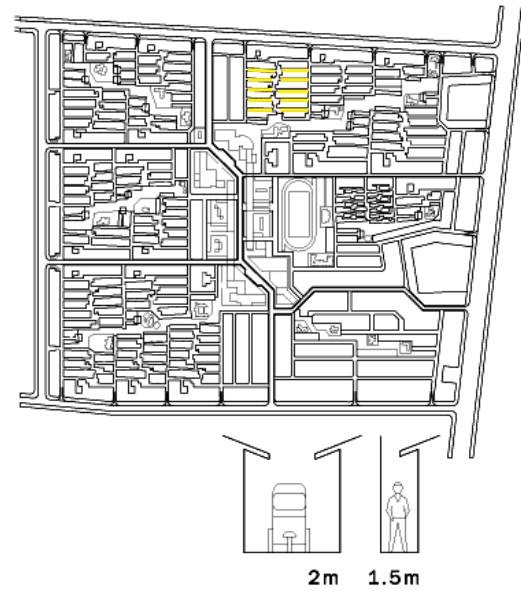
Outer streets



Main streets



Narrow streets



Narrow alleys between plots

Hierachial road System



Open space



Narrow alleys between plots



Back green alley

2. How to shape the ground life in the communal scale?

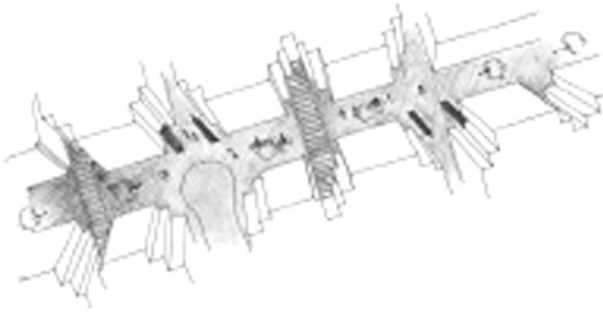
Case study 2



Sangharsh Nagar

Year	2002-now
Floor	8
Site area	34 HA
No.of dwellings	
Population	100,000
Units/HA	735

Different forms of open space



Pedestrian road



Street with self-built shops



Entrance



Commercialized entrance



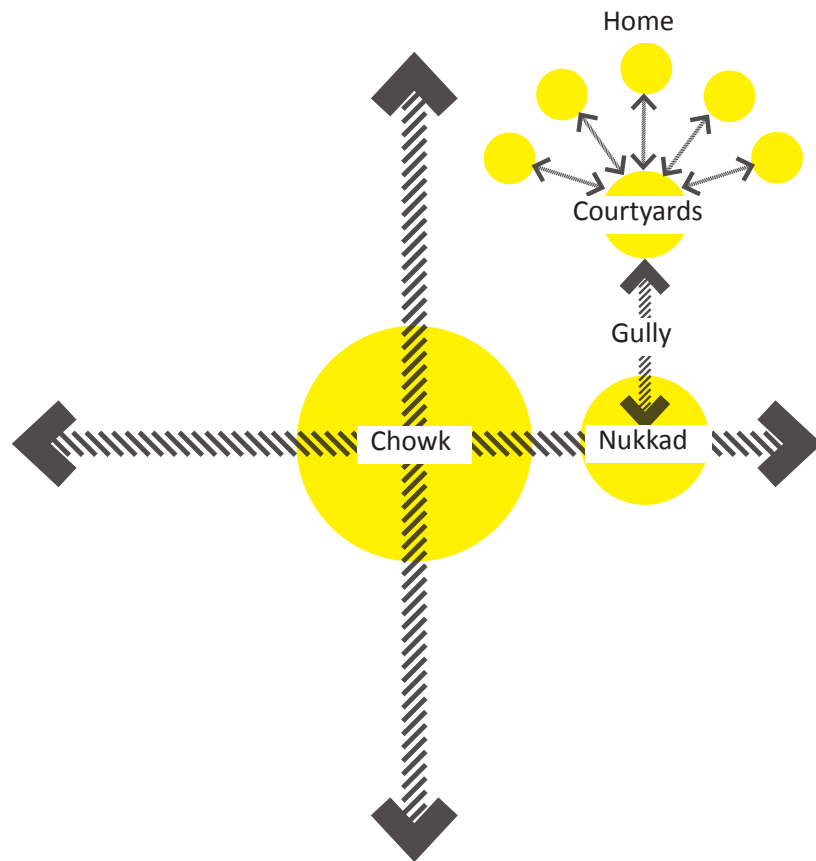
Interlocked courtyard



Courtyard

“Under Indian conditions, there appears the need of four major elements: ... second, areas of **intimate contact**, such as the front doorstep where children play and adults chat with their neighbors; third, **neighborhood meeting places**, such as the city water tap or village well, where people interact and become part of the community; and fourth, **the principal urban area**, such as the maidan (ground), used by the whole city.”

— Charles Correa,
New Landscape



Courtyards: playground/ work space/parking



Gully: shops/laundies/ flour-mills



Nukkad: tea-stall/ newspaper stand/ sitout space



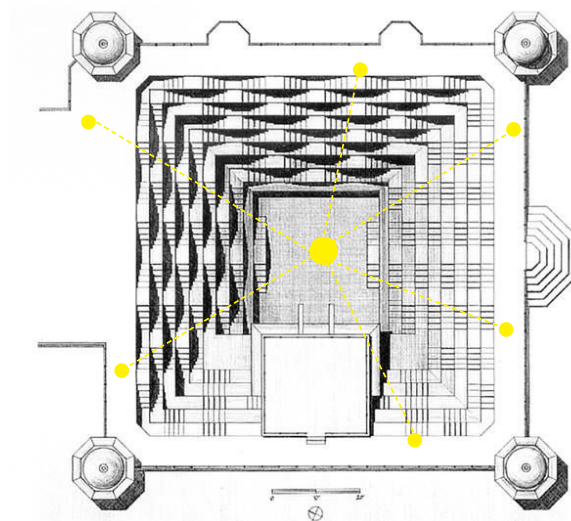
Chowk: post office/ community center/ clinics

2. How to establish connections between the upper floors and ground?

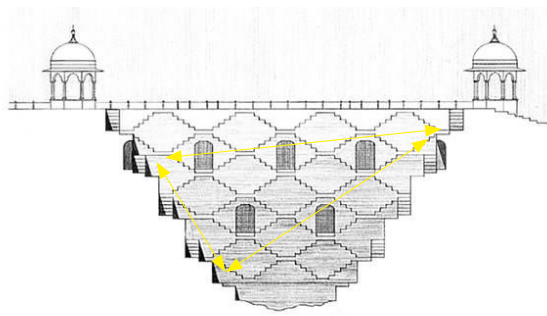
Case study3



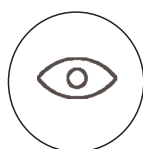
Chand Baori – Jaipur, India



Accessible from all direction



Multi-levels of looking



Visual



Sound



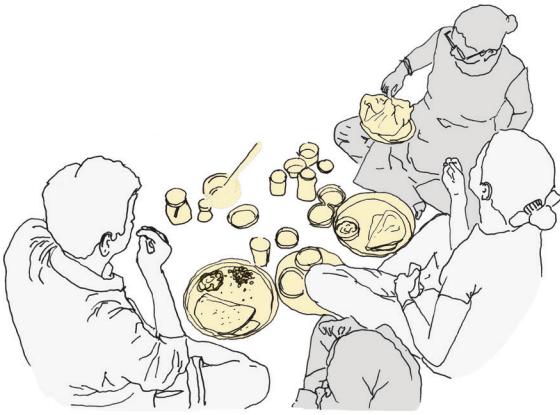
Smell



stairs

3. How to create ground life within dwelling units?

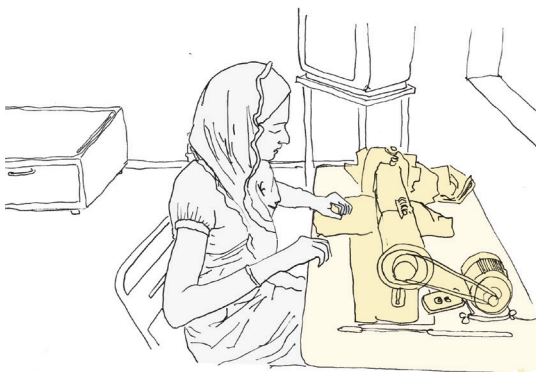
Multi-funtional space
--living room



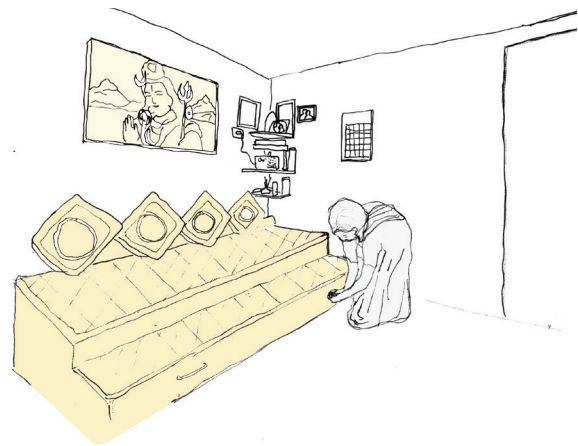
Eating together



Watching TV



Working at home



Sleeping at night

From Global housing research seminar
Book of pattern in Nalasopara

Patterns of domestic space

Multi-funtional space --front door alley



Socializing



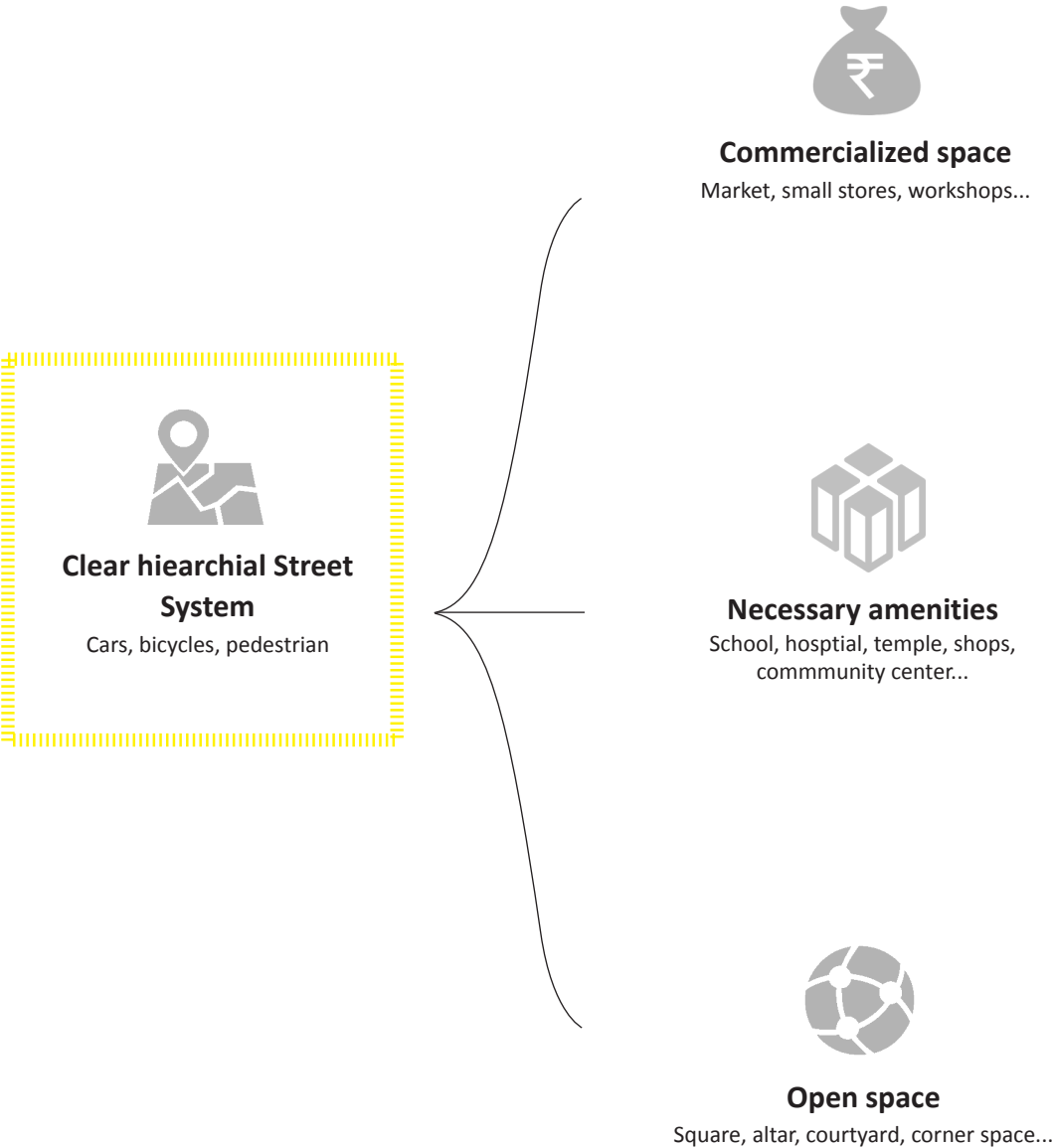
Preparing food



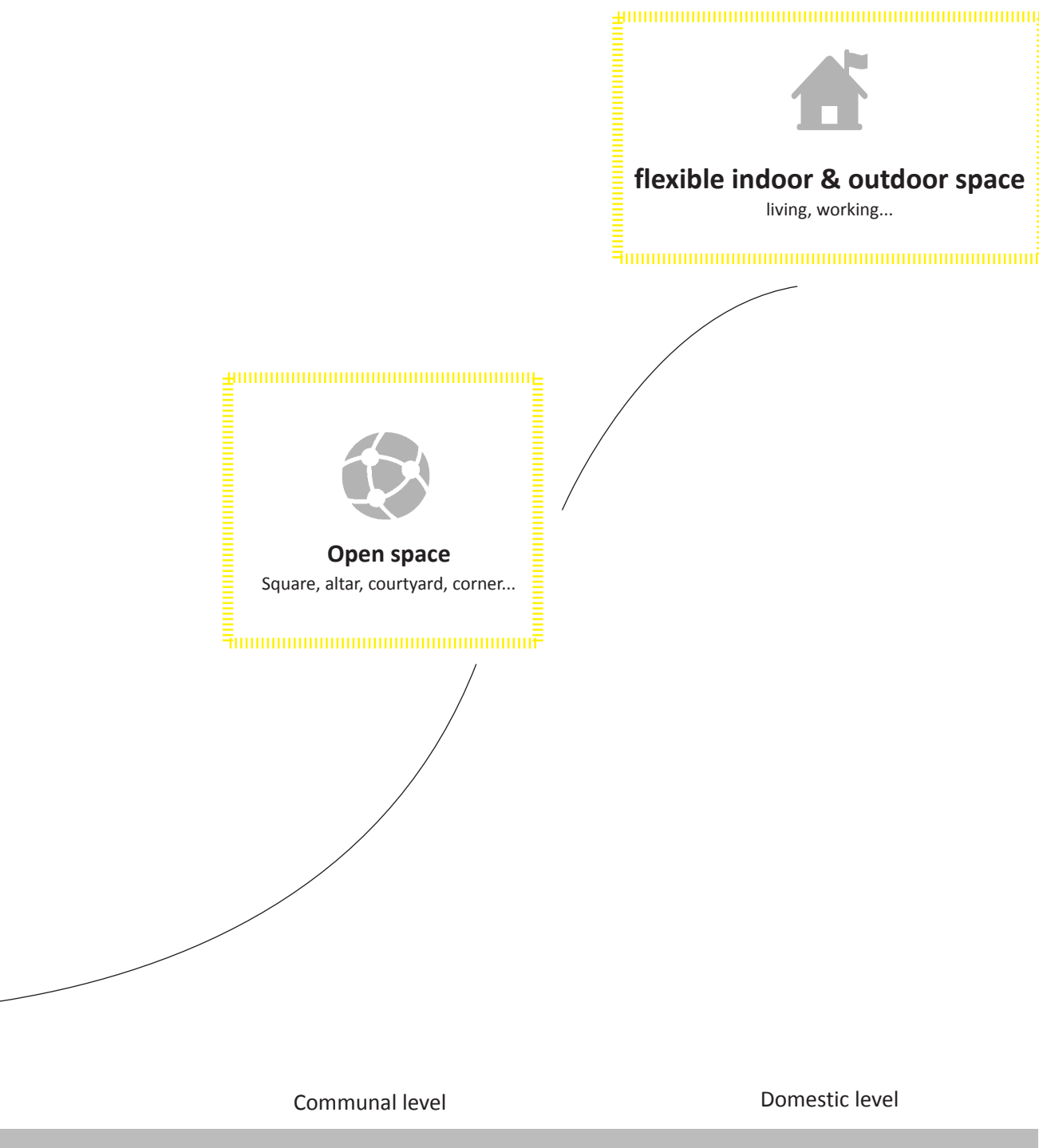
Dry washing



Storage

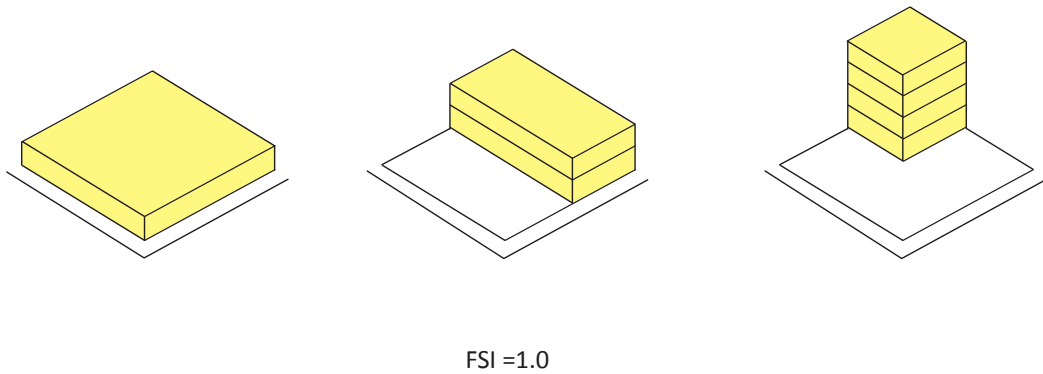


Urban level



Density Study

$$\text{floor space index FSI} = \frac{\text{Built-up Area}}{\text{Plot Area}}$$



FSI allowed in Mumbai

	FSI
Mumbai island	1.33
Mumbai suburb	2.5
Redevelopment	4

FSI in Nalasopara East

	FSI	Floors
Baithi chawl	0.6	1-2
Mid-rise chawl	3	5
MHADA Colony	3-4	24



	Aranya Group Housing	CIDCO Housing	Sangharsh Nagar
Year	1989	1985-1996	2002-now
Floor	1-2	2-4	8
Site area	85 HA	9.5 HA	34 HA
No.of dwellings	6500 plots/6 sector	1048 plots	
Population	60,000	6,455	100,000
Units/HA	141	136	735

"...opposes increasing the **FSI** for slum redevelopment beyond **3**,
...limit density to a maximum of **550 tenements per hectare**."

--PK. Das, Chasing for an affordable dream

Consequence of high FSI

1. poor life quality
2. high density pockets
3. poor physical and social infrastructure

Conclusion

FSI = < 3,
Density < 550 units/HA
Floors = 4-8

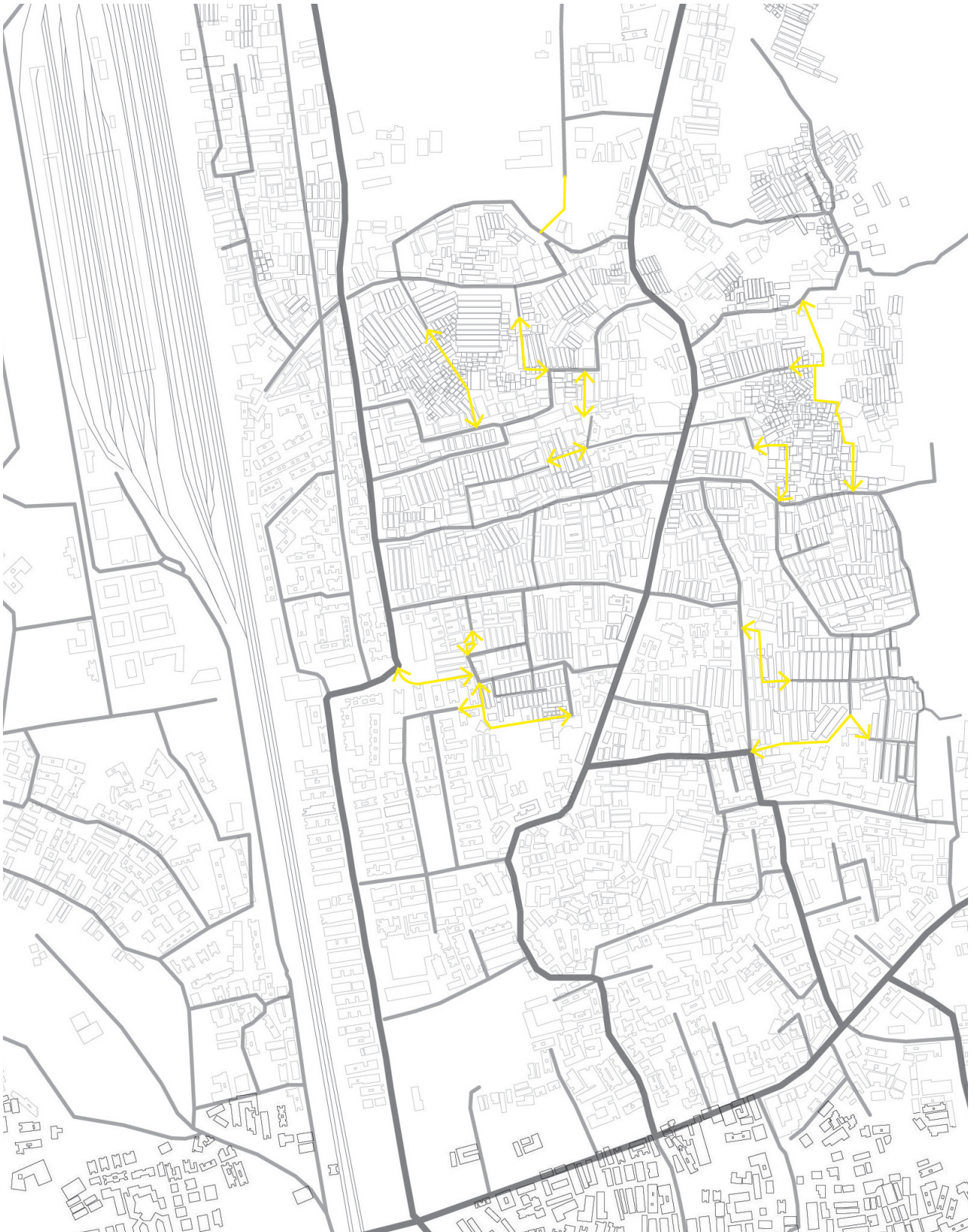
5. Design

5.1. Urban Strategy



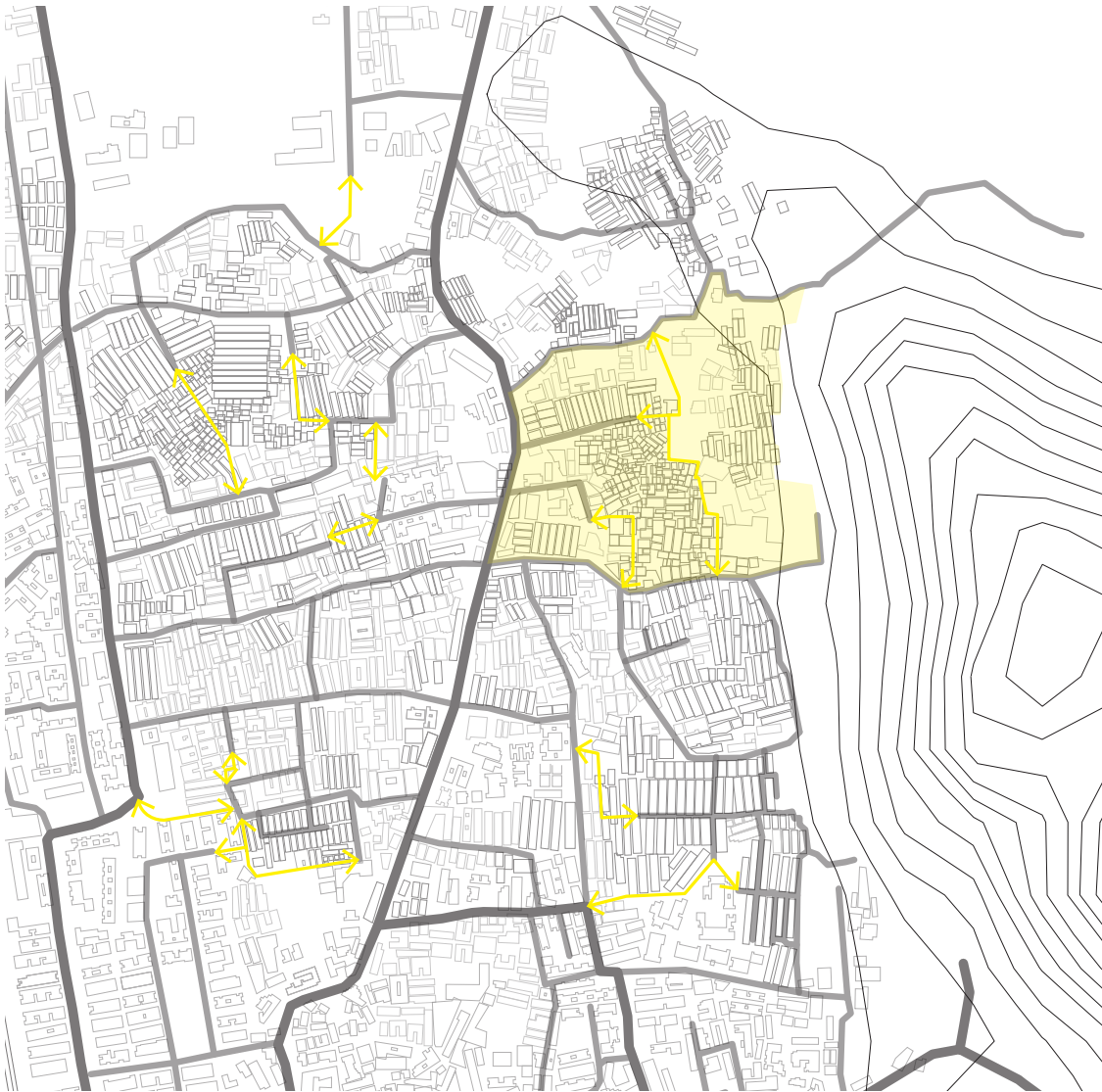
Problem: Dead ends in tertiary roads

Urban Scale

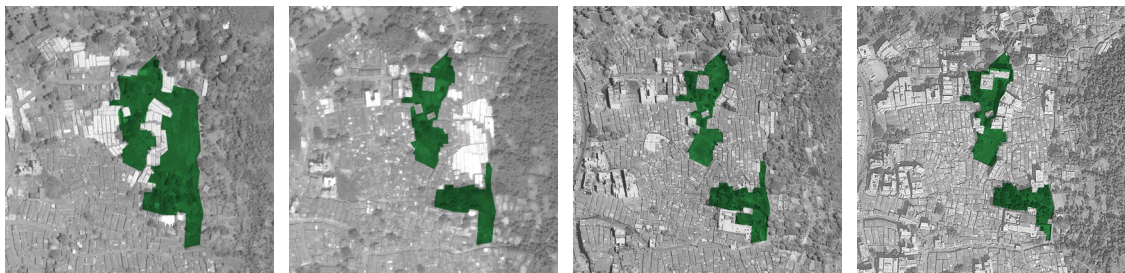


Urban strategy: connect dead ends in tertiary roads

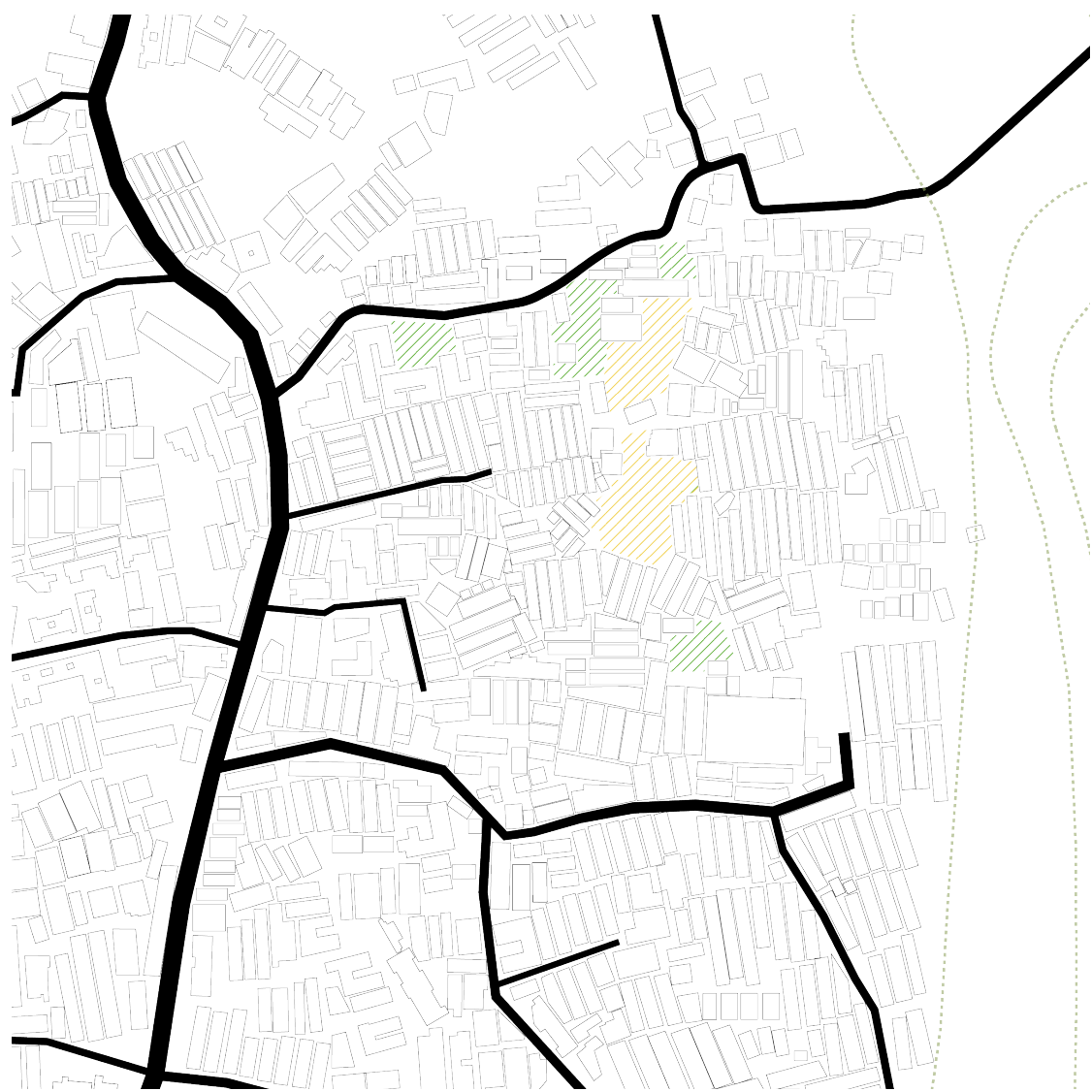
Site Selection



Area near the mountain with some left over spaces



Existing Situation



Existing dead end roads with unused space

Existing Situation



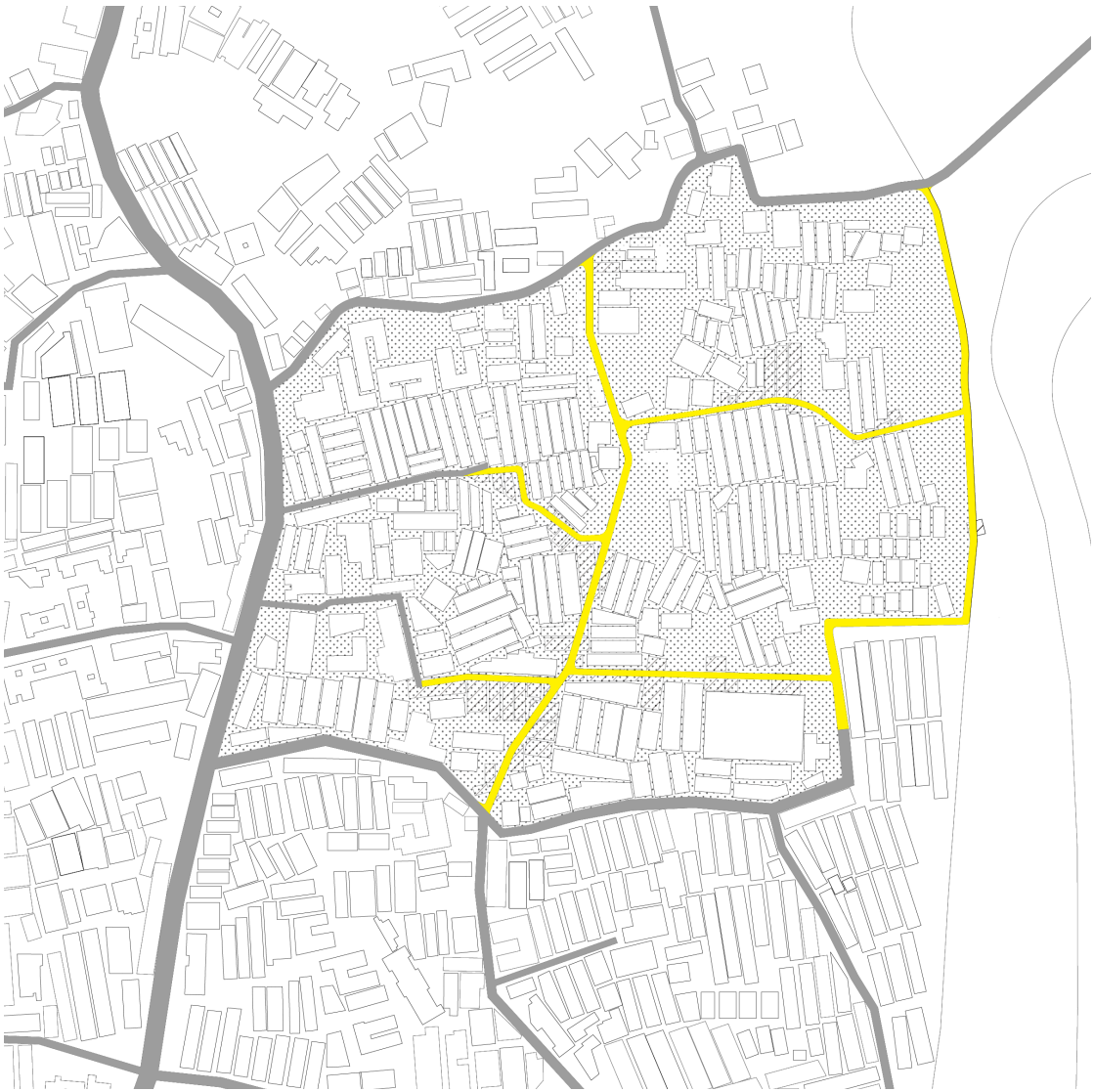
Baithi chawls and mid-rise chawls, possible for redevelopment

Existing Situation



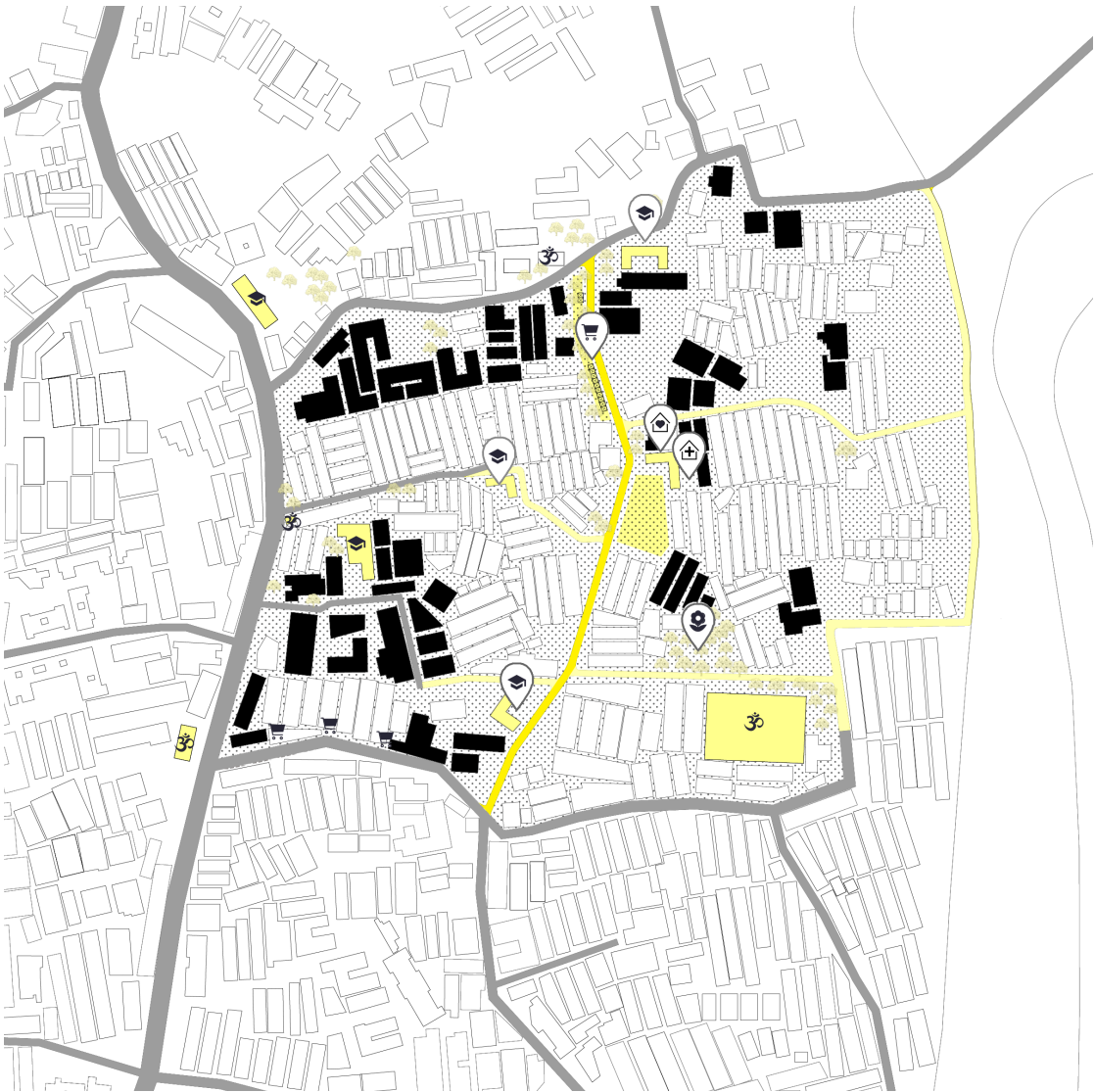
Lack of amenities

Intervention to the site



1.Connect tertiary roads, divide the site into six sectors

Invervention to the site

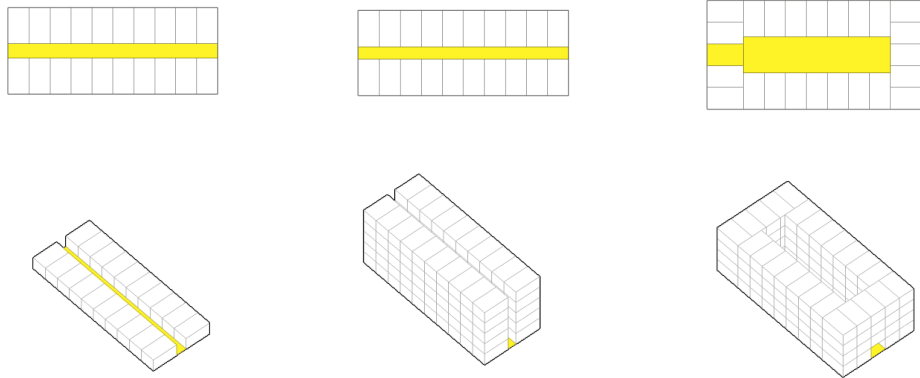


2. Add communal facilities, market space & open space

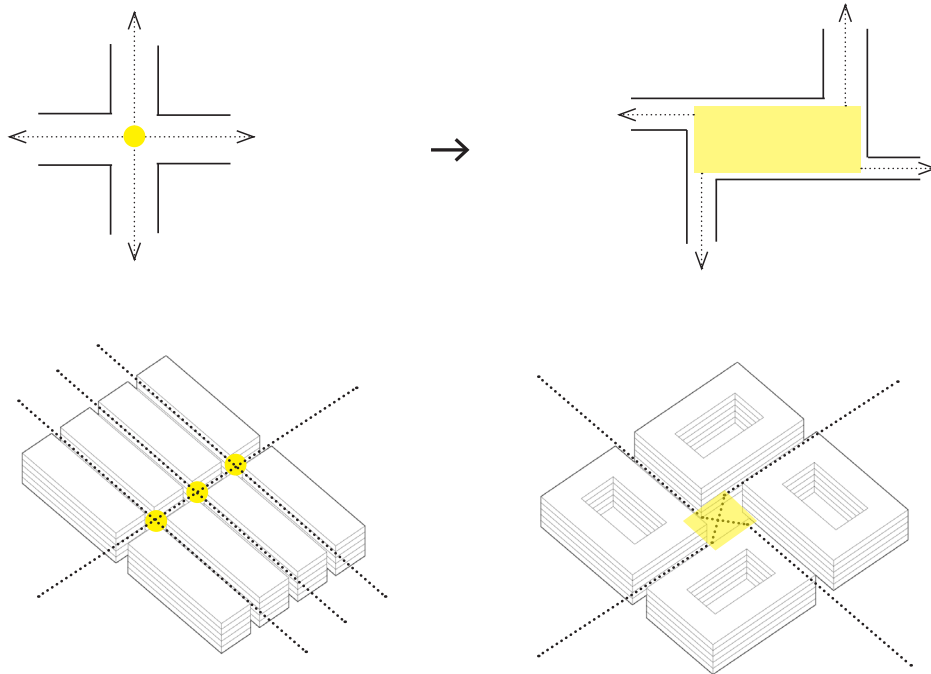
5. Design

5.2 Cluster level

Massing study

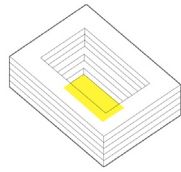


Comparison of different types of courtyards

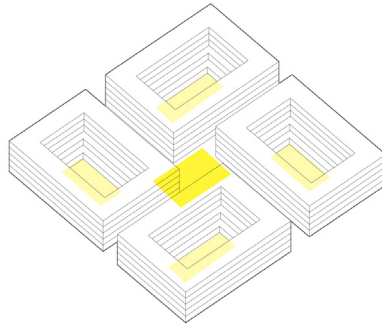


Proposed open space

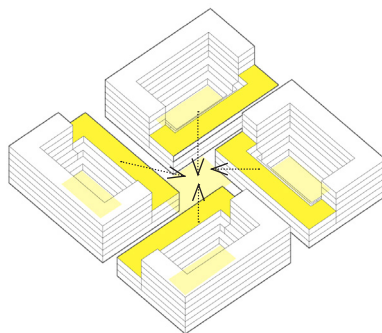
Massing operation



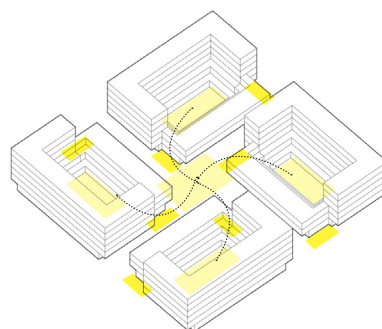
1. One block with inner courtyard



2. Four blocks together form more public open space

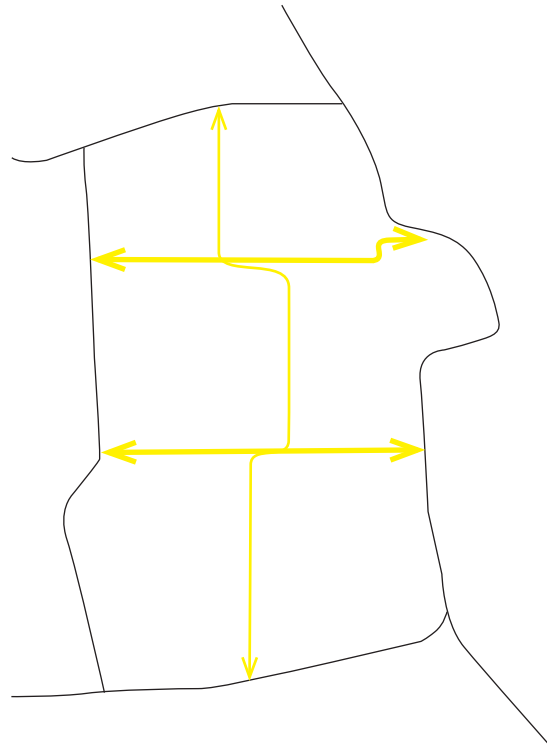


3. Break the block into lower and higher parts, connect the single block to the central open space

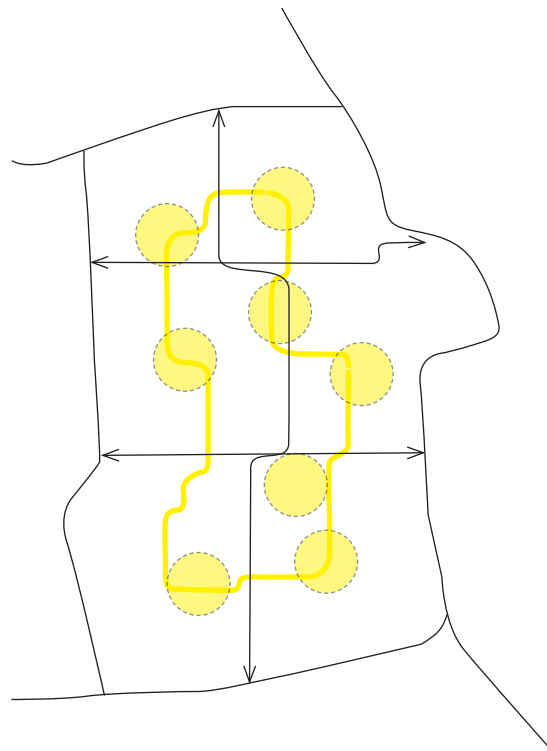


4. leave space for the entrance on the ground floor, create extra space for the pedestrian street.





Street hierarchy



Connected open spaces



Ground floor plan

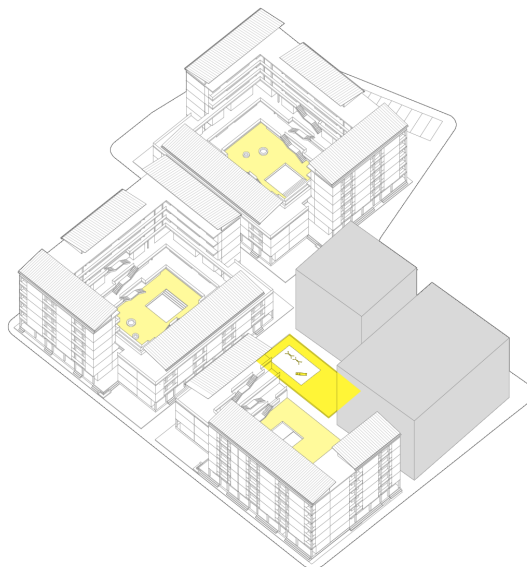
Open space formed by new blocks





Ground floor plan

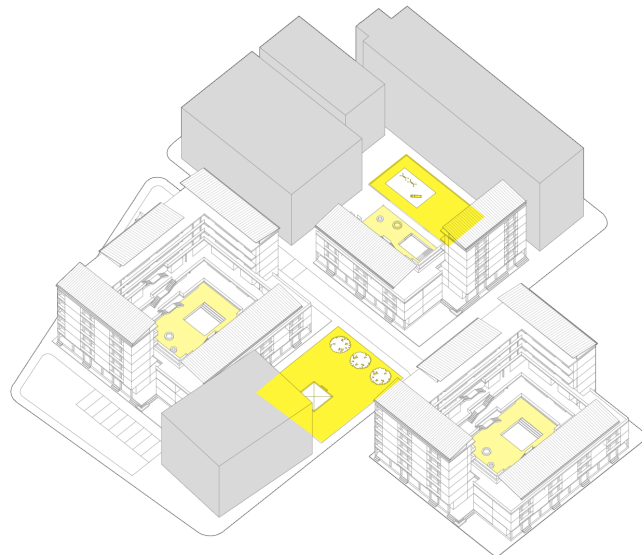
Open space formed by new blocks and existing apartments





Ground floor plan

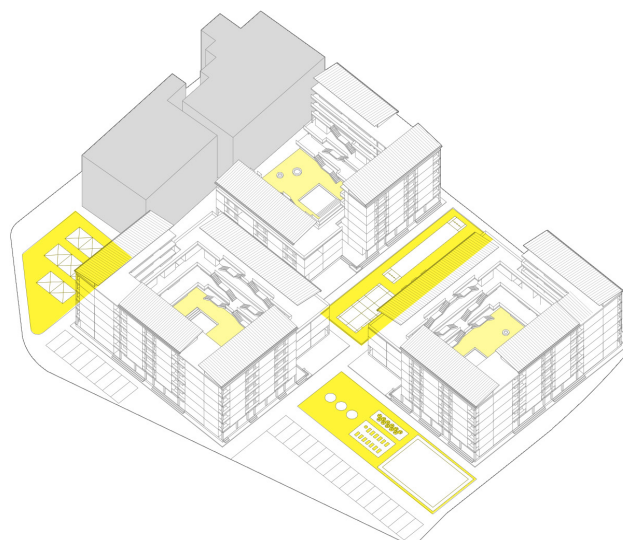
Open space formed by new blocks and existing apartments





Ground floor plan

Open space formed by new blocks and existing apartments



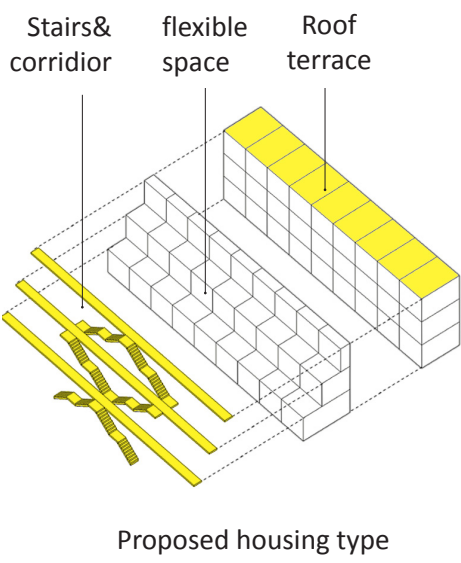
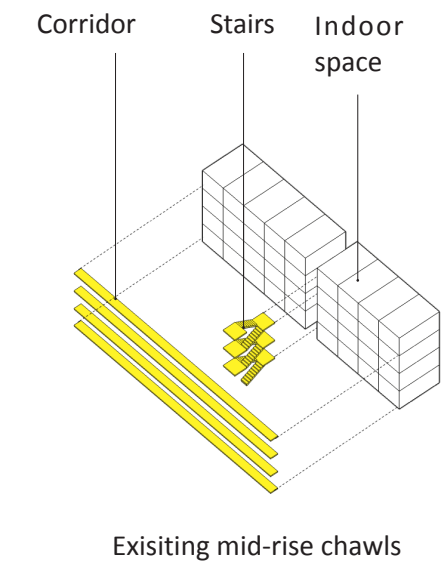


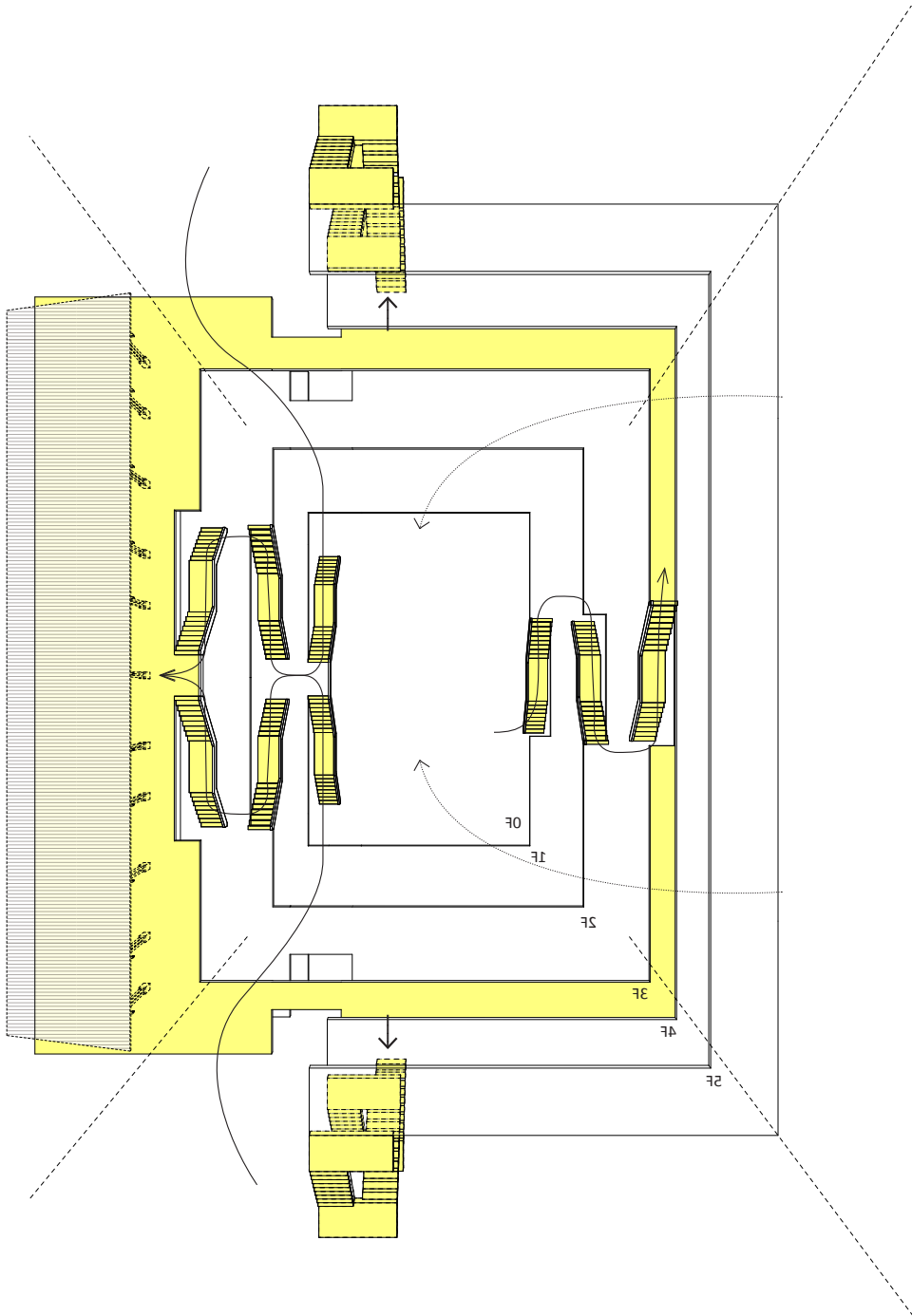


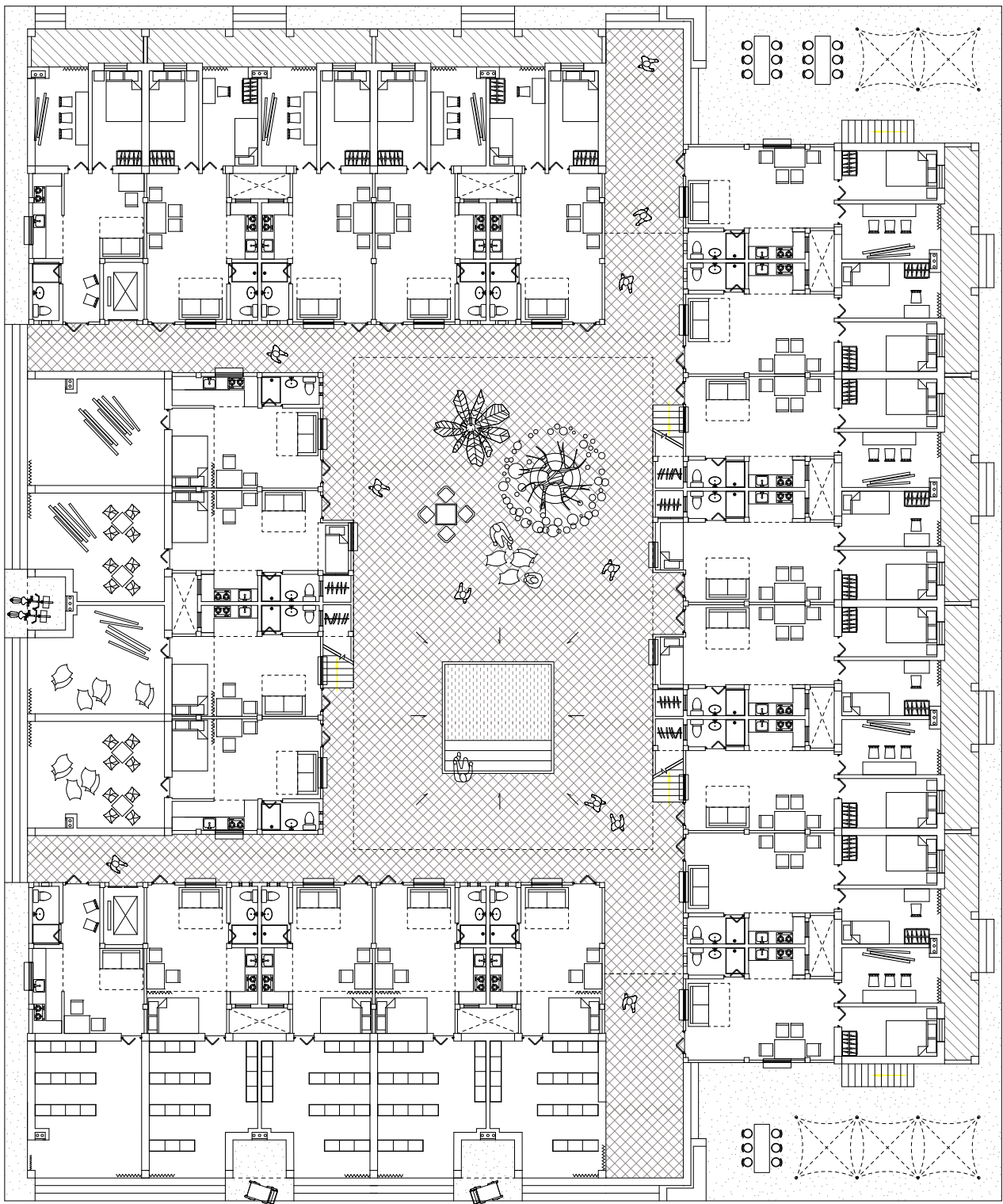
5. Design

5.3 Architecture level

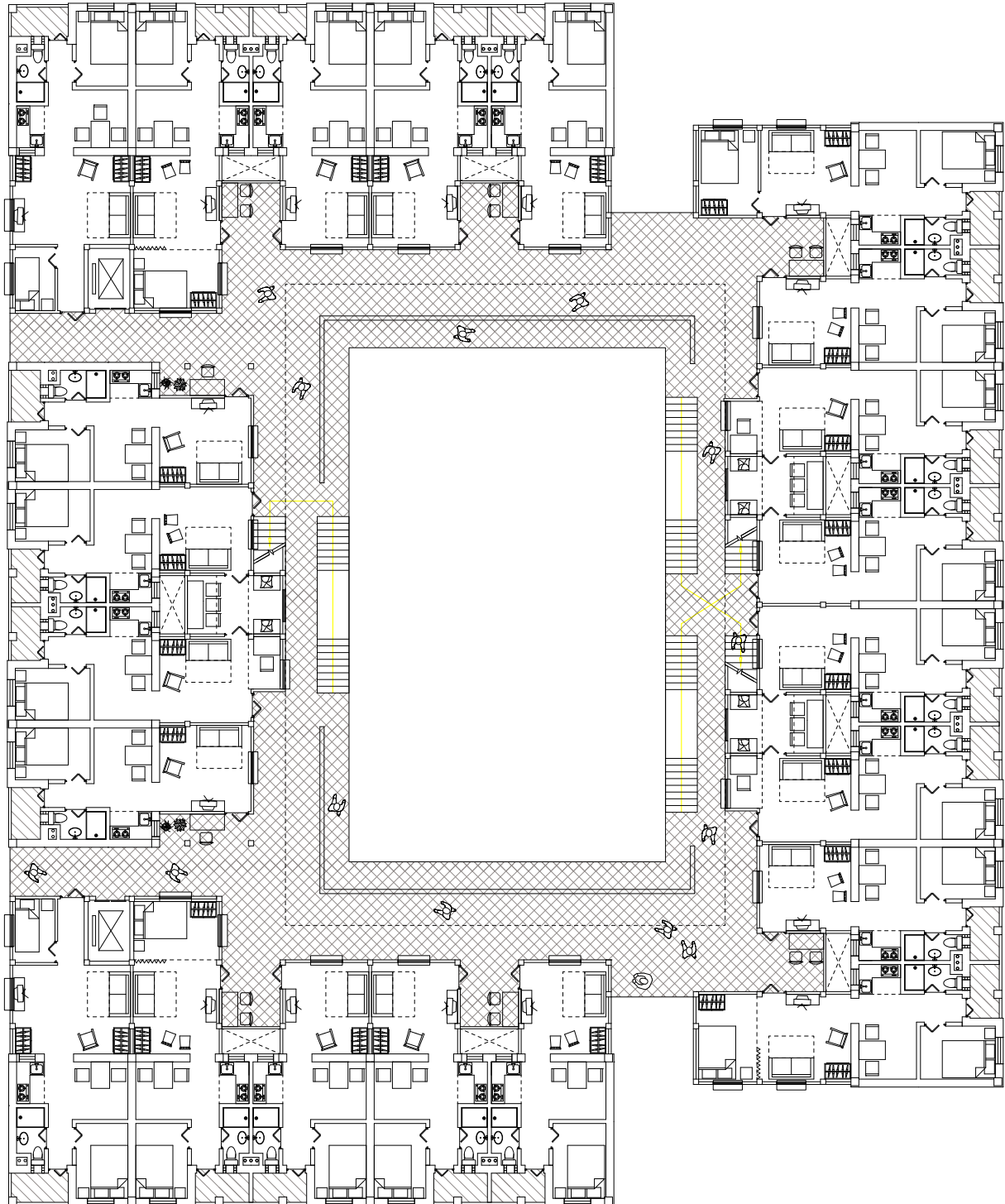
Building concept



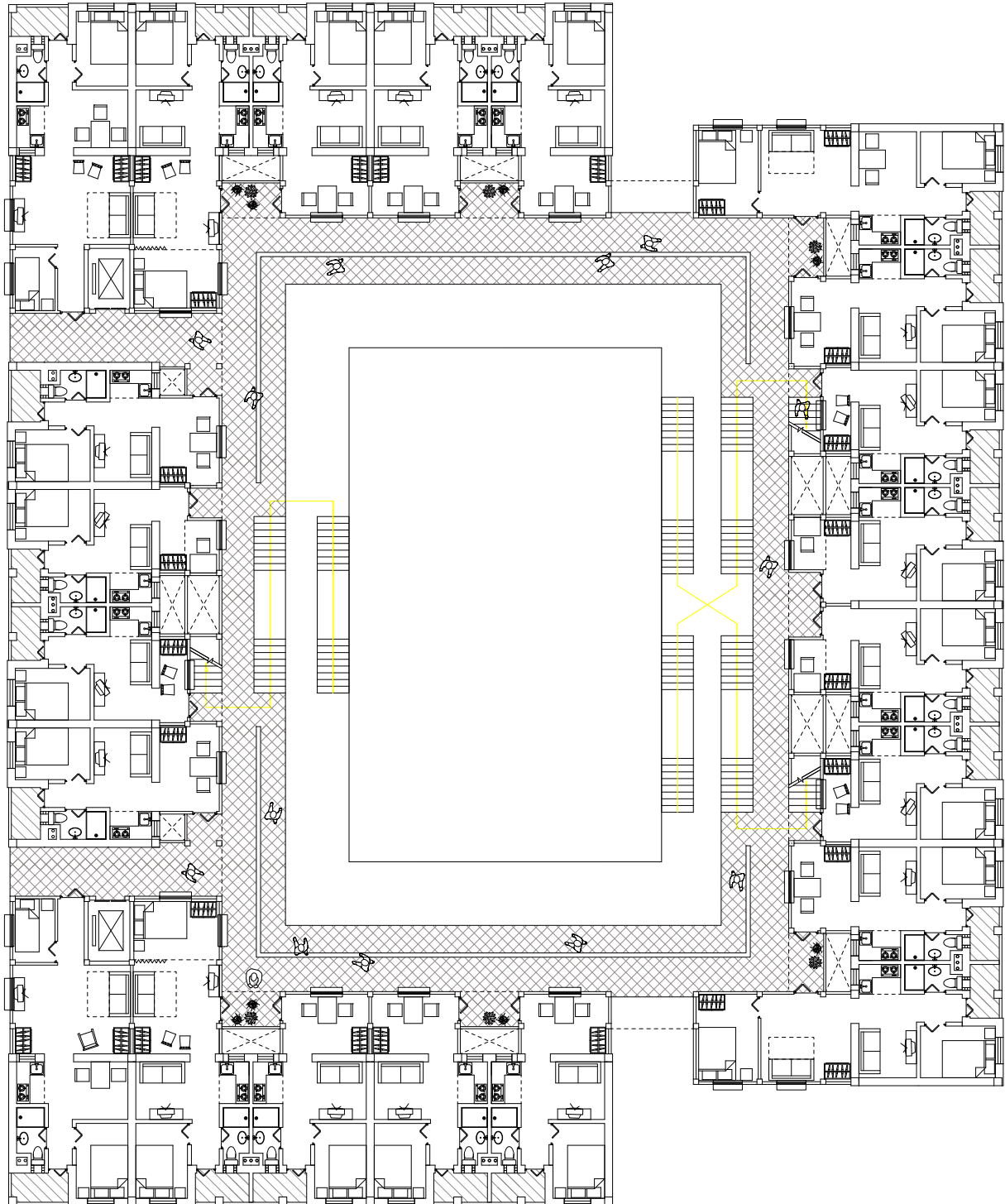




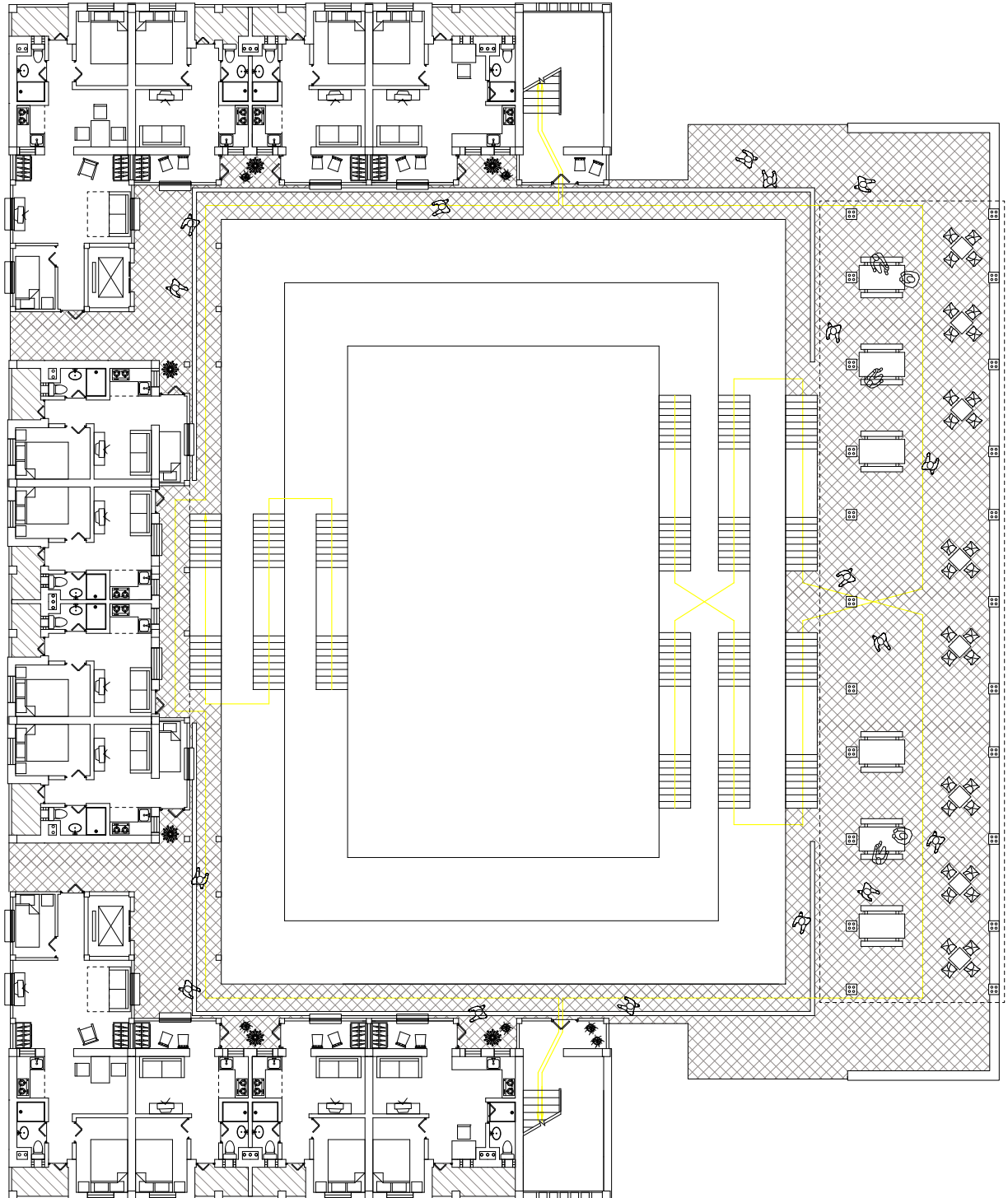
GF plan



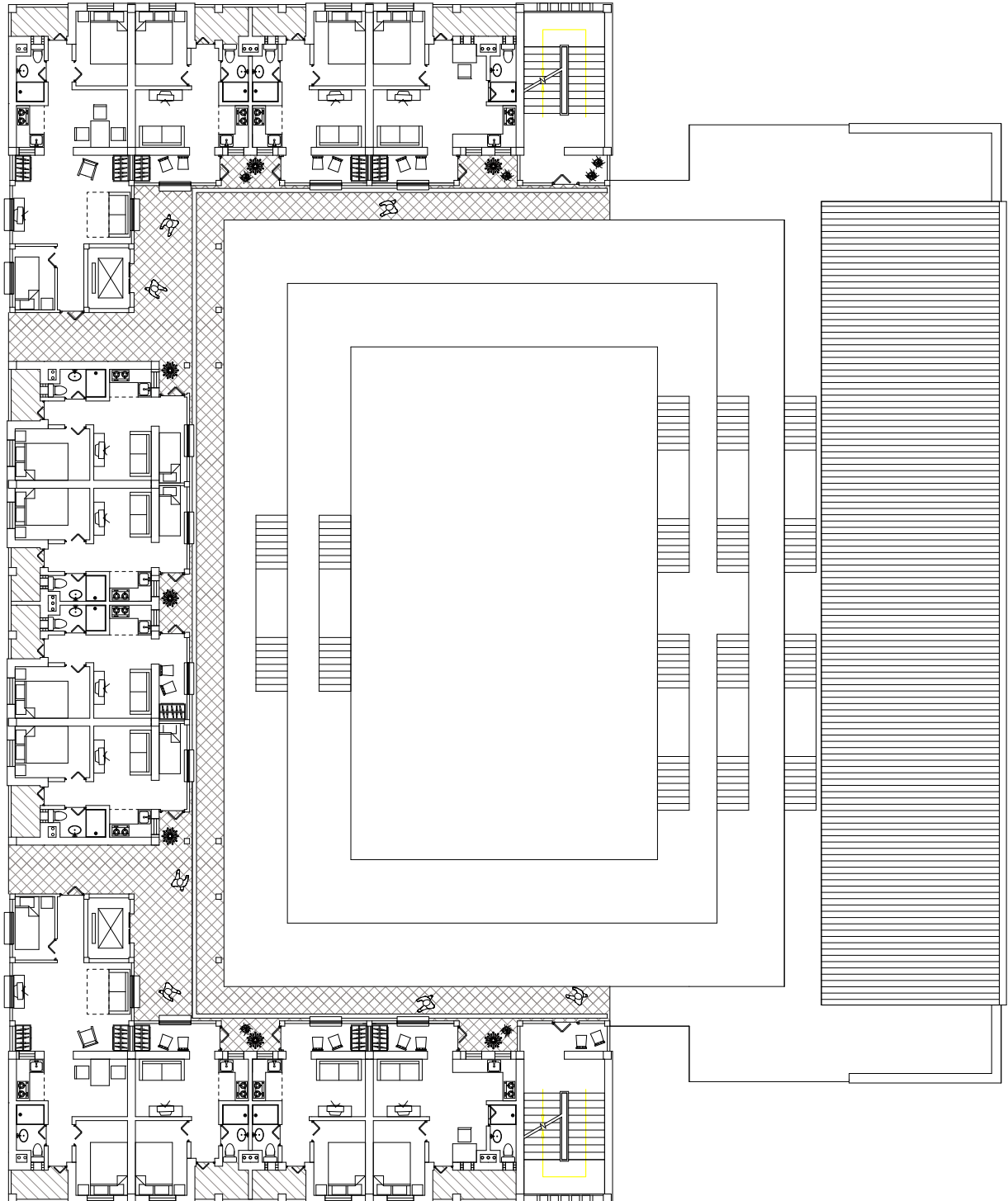
1F plan



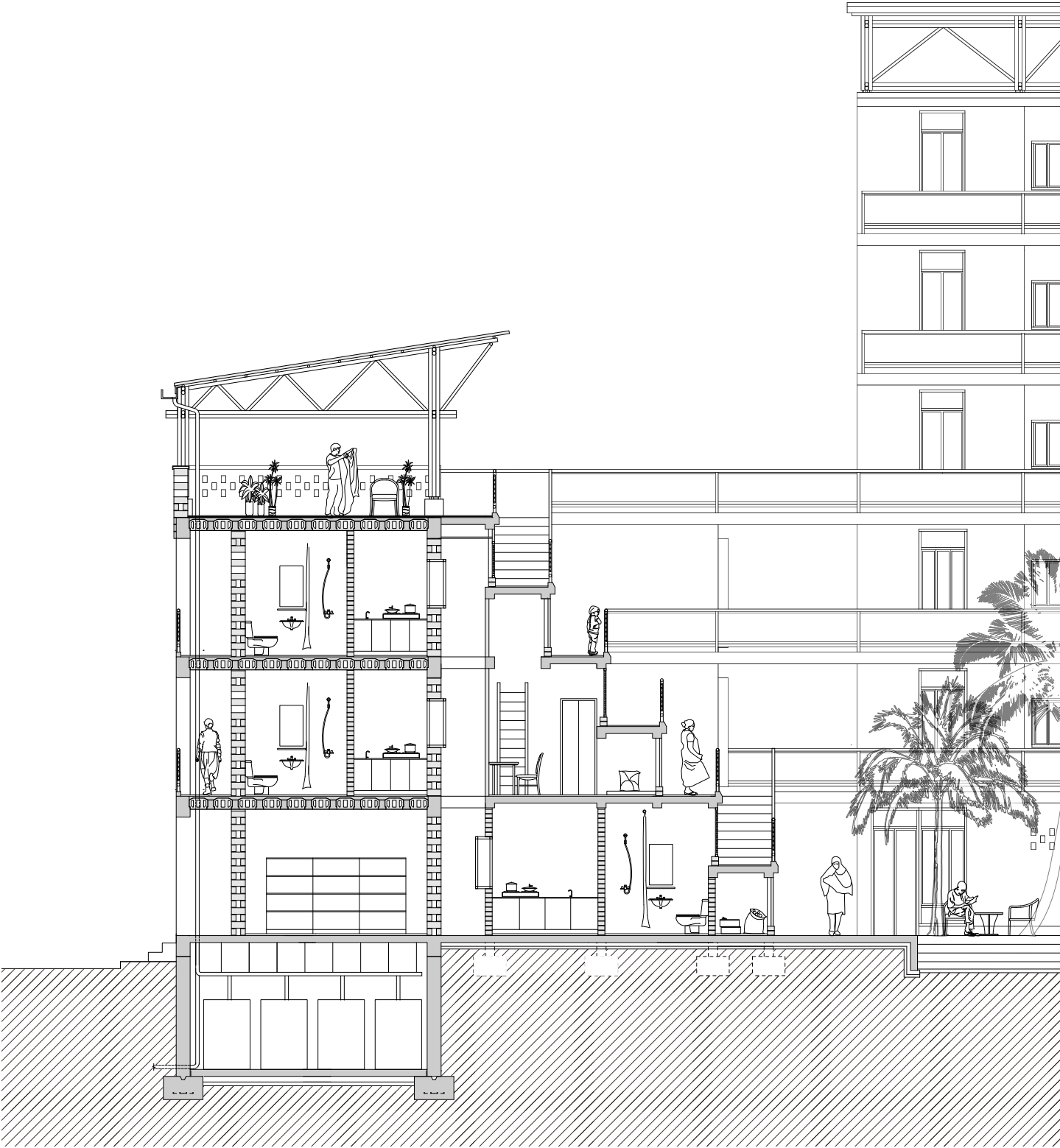
2F plan

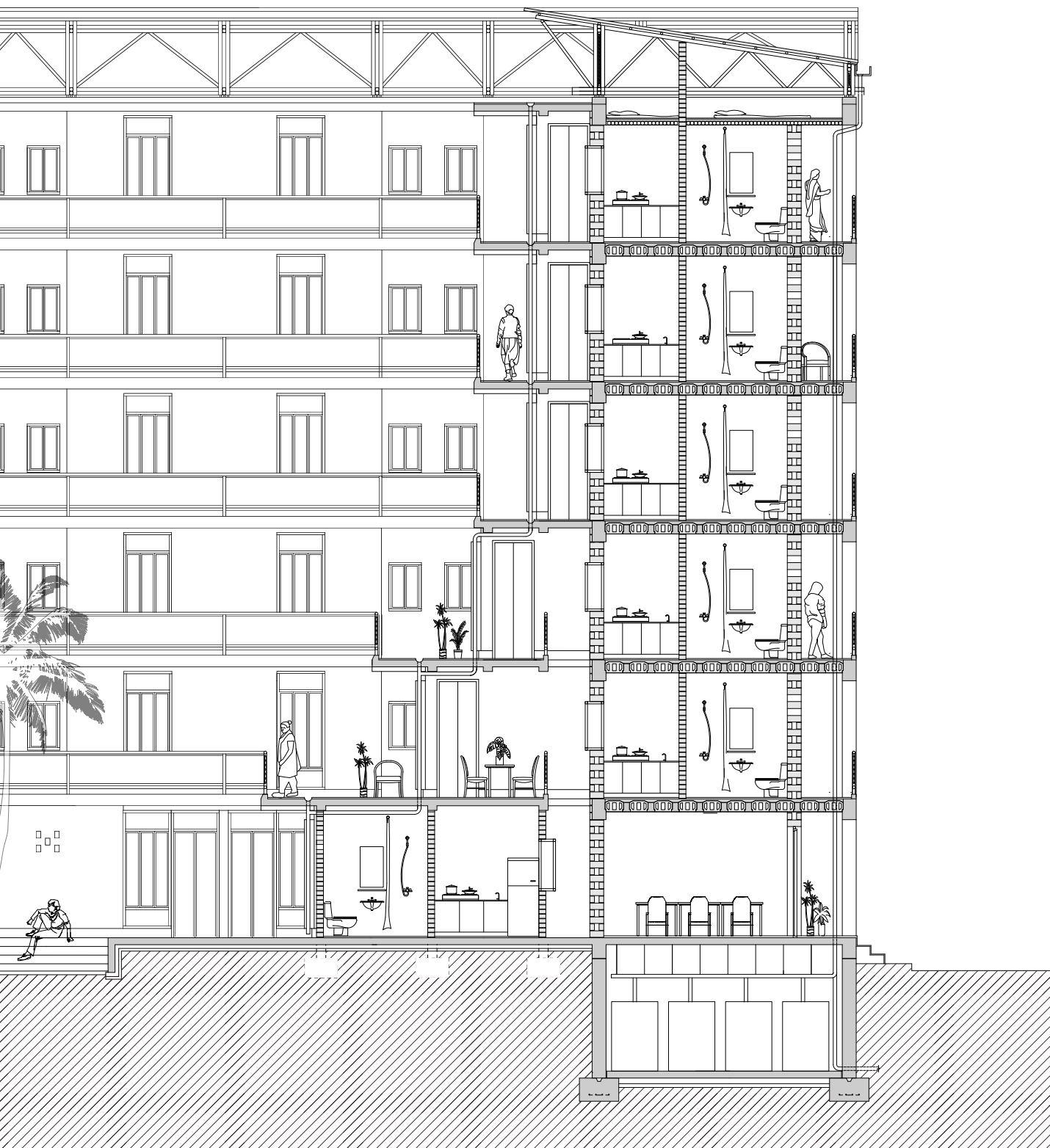


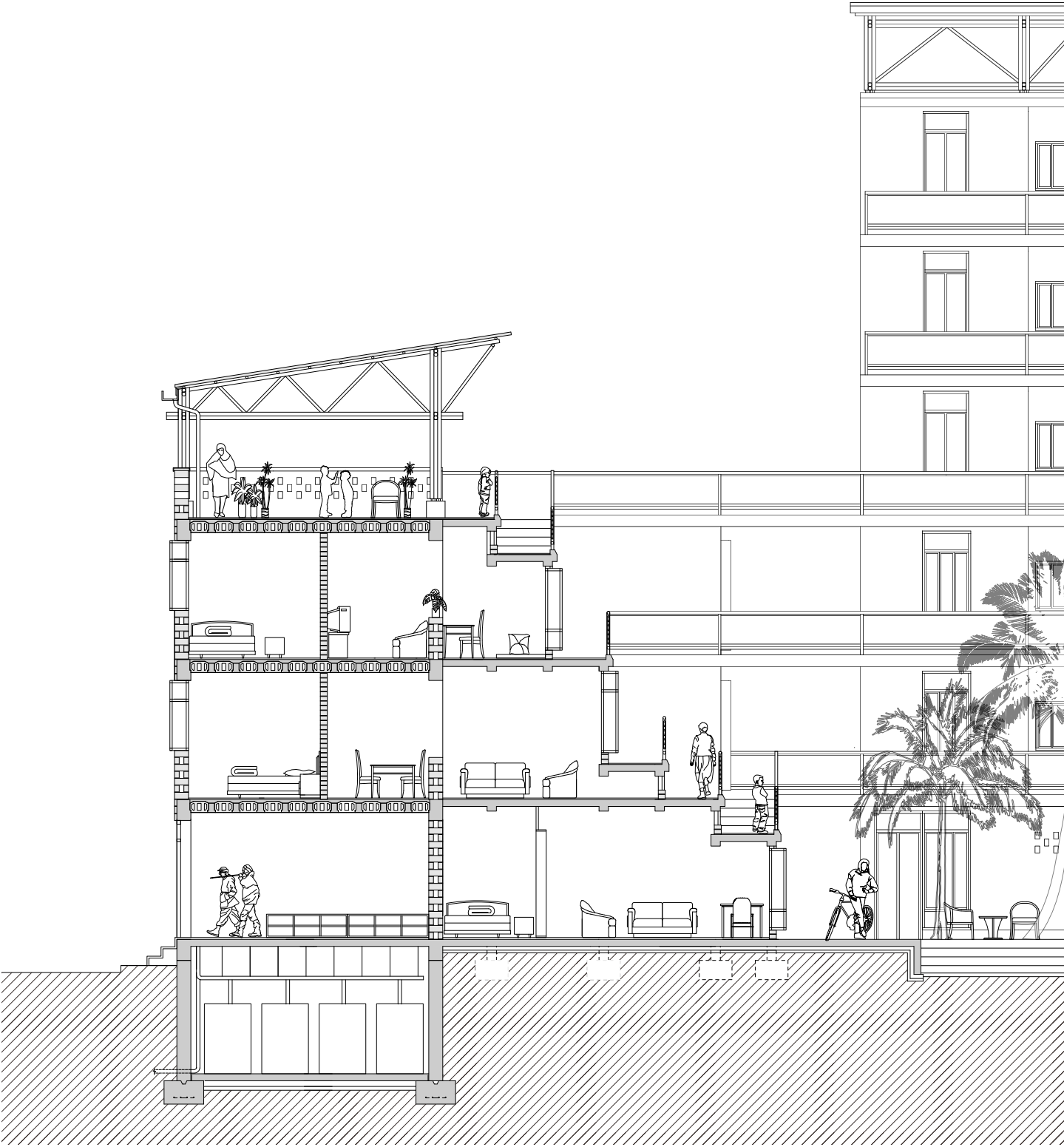
3F plan

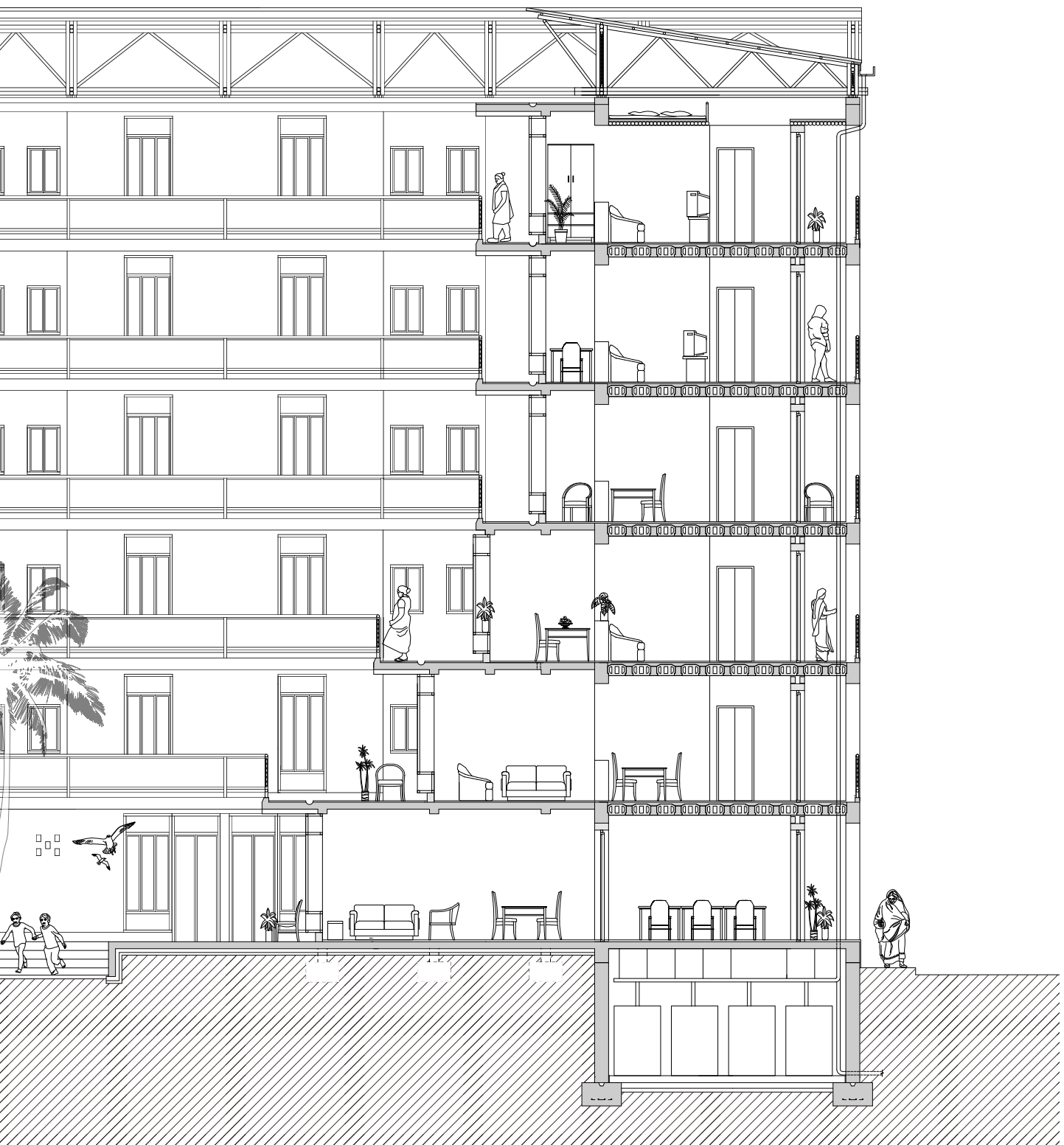


4F plan





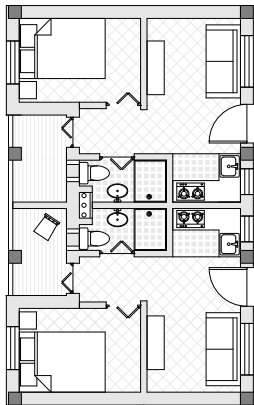




5. Design

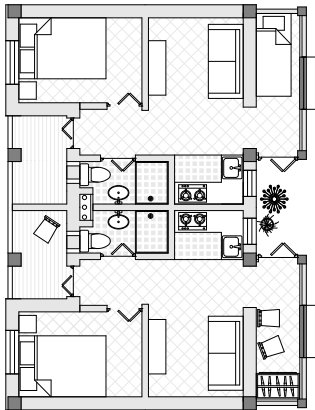
5.4 Dwelling unit level

Unit typology

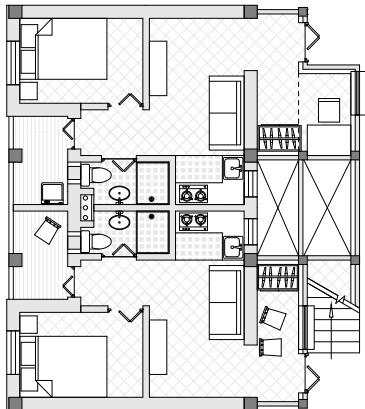


Basic Units

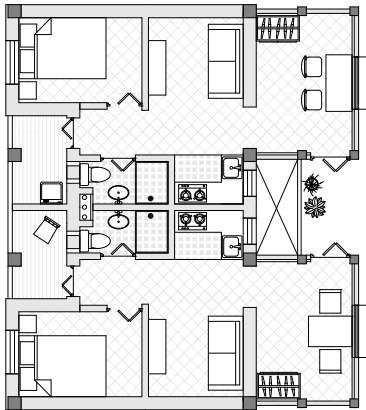
$5.4 \times 4.5 = 24.3\text{m}^2$



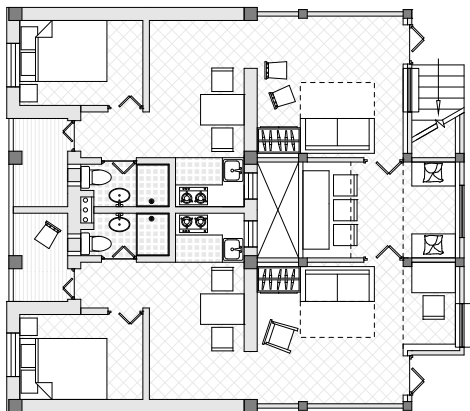
3-5F units



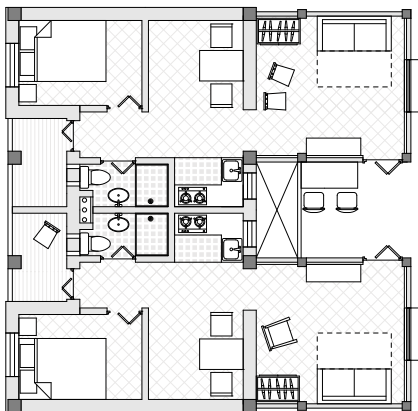
Stair type



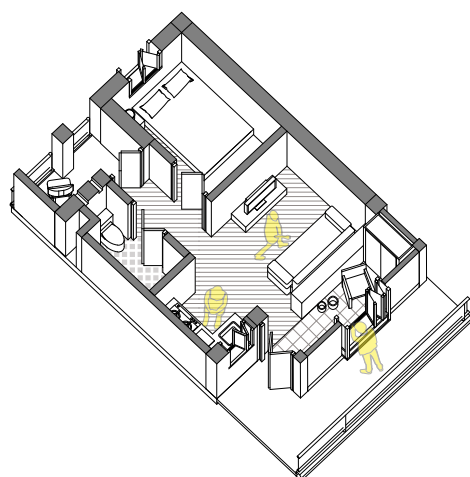
2F units



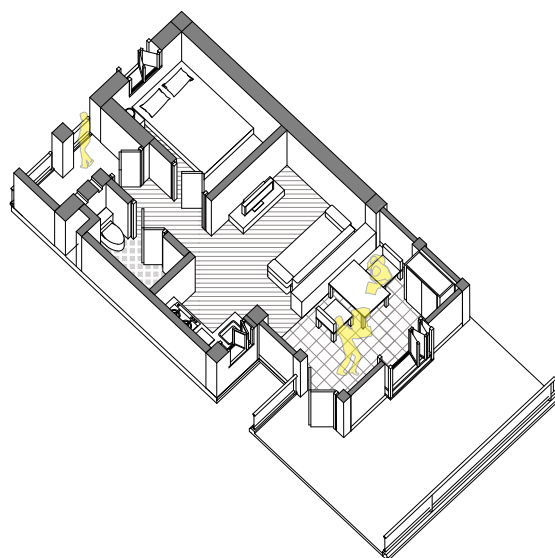
Stair type



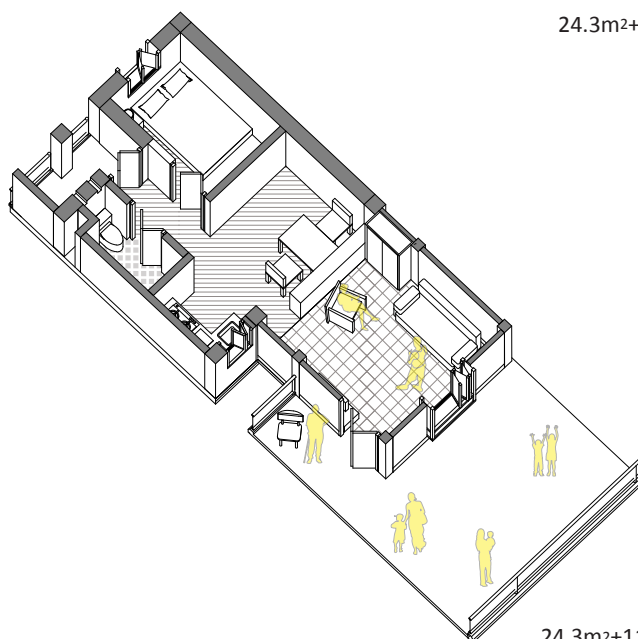
1F units



3-5F unit
 $24.3\text{m}^2 + 3.96\text{m}^2 = 28.26\text{m}^2$

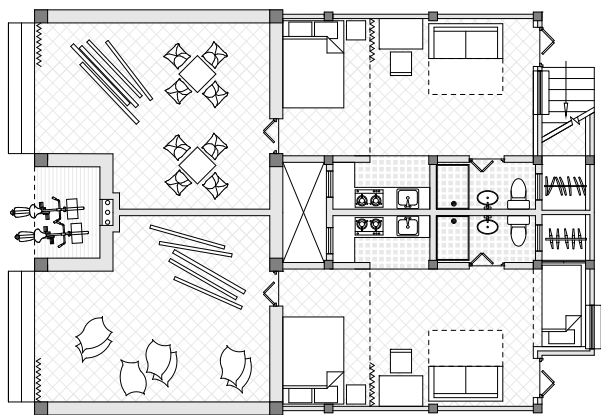


2F unit
 $24.3\text{m}^2 + 7.92\text{m}^2 = 32.22\text{m}^2$

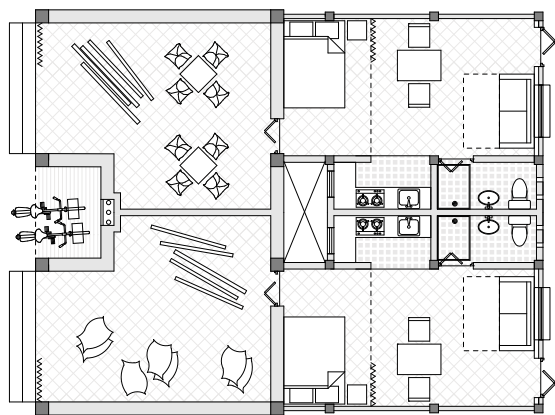


1F unit
 $24.3\text{m}^2 + 11.88\text{m}^2 = 36.18\text{m}^2$

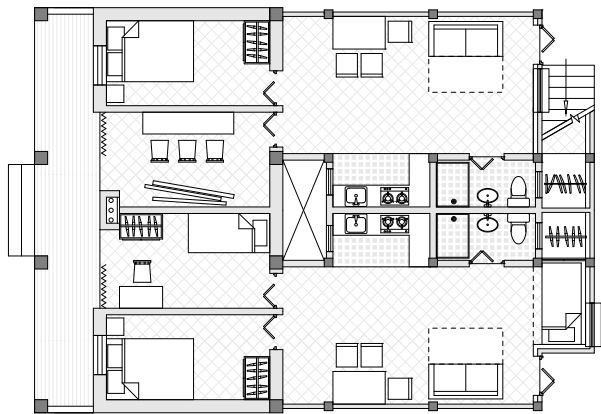
Unit typology



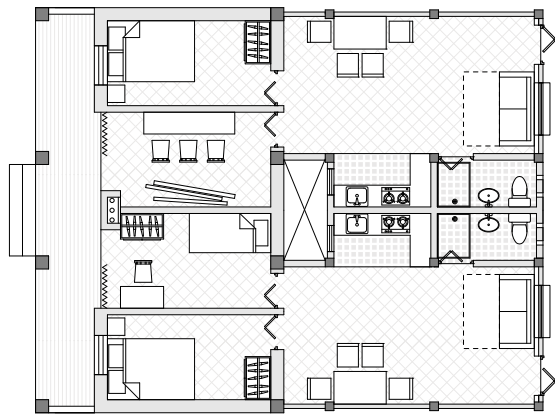
Stair type



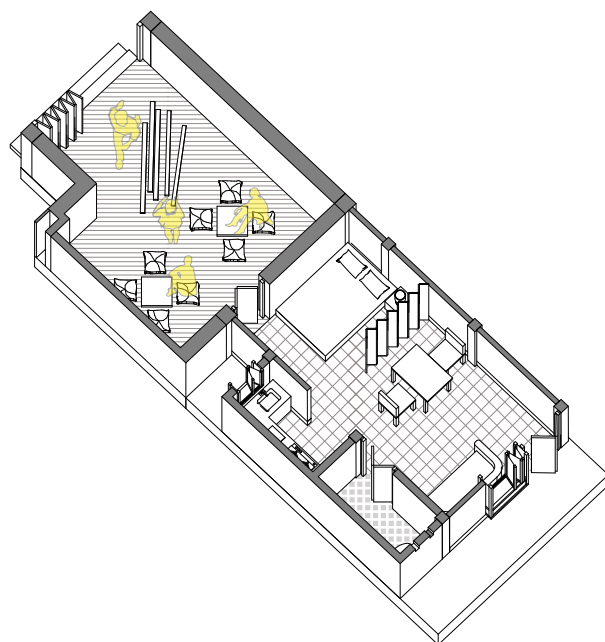
Ground floor units with shops



Stair type

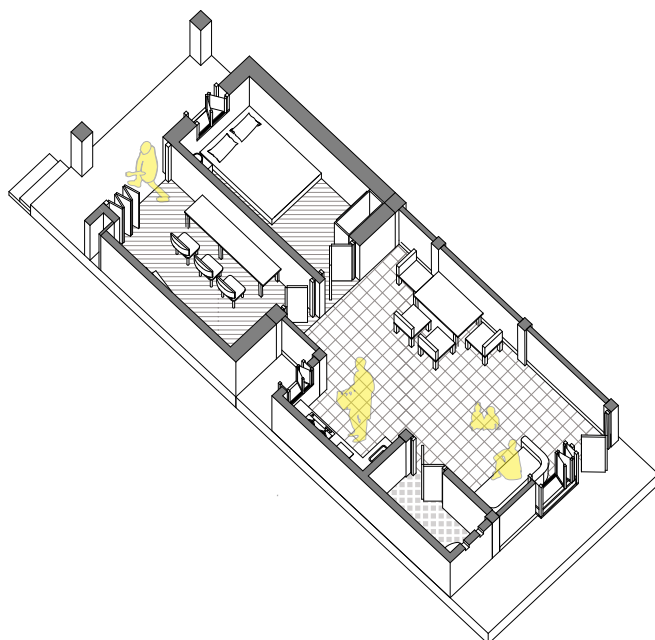


Ground floor units



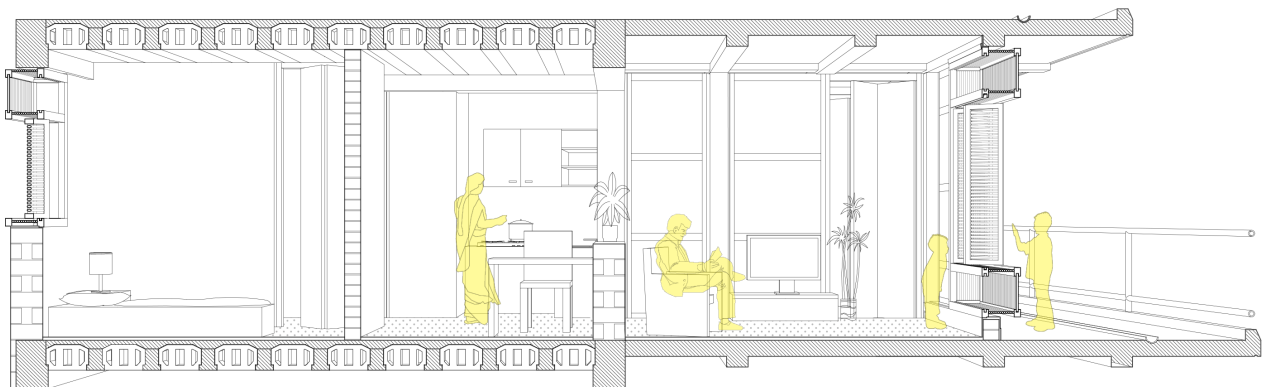
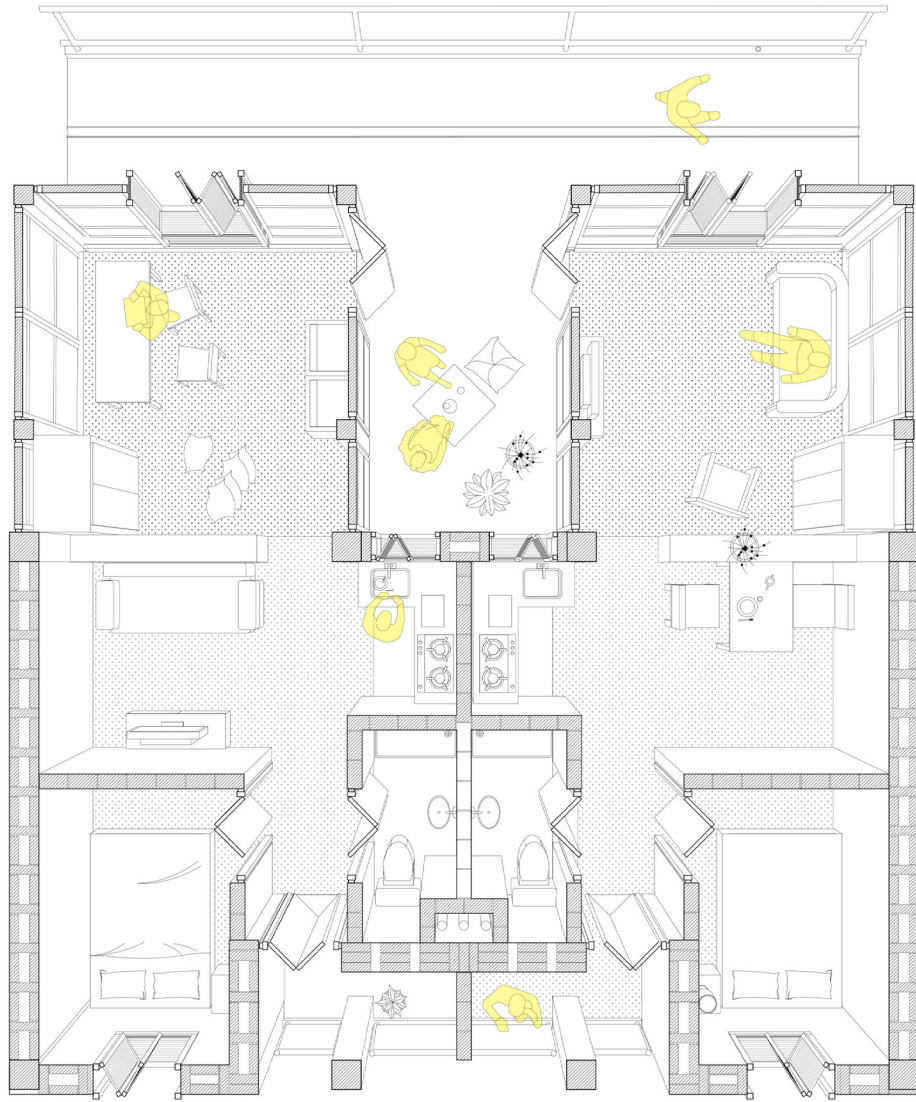
Ground floor unit with shop

$$24.3\text{m}^2 + 19.8\text{m}^2 = 44.1\text{m}^2$$



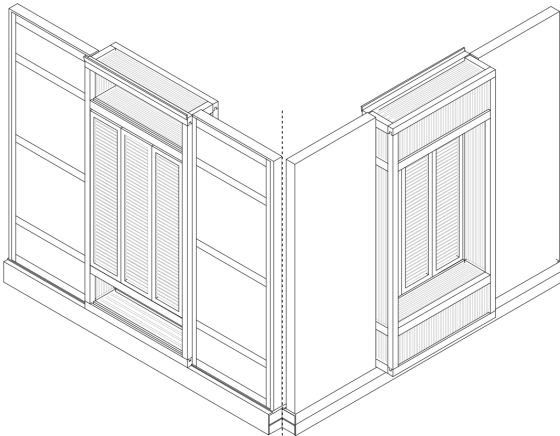
Ground floor unit

$$17.55\text{m}^2 + 19.8\text{m}^2 = 37.35\text{m}^2$$



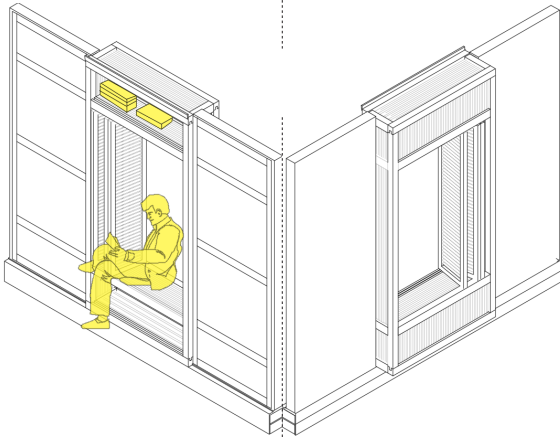
Window fragment

Close-interior



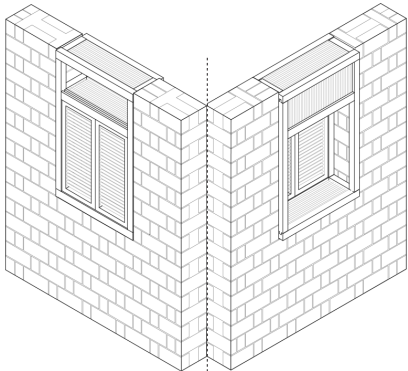
Close-exterior

Open-interior



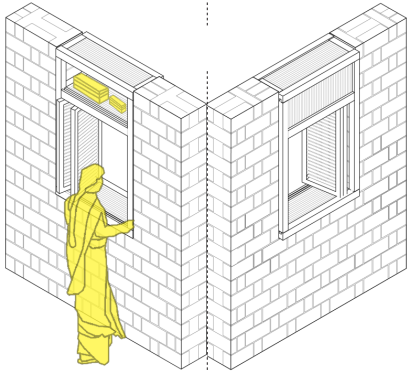
Open-exterior

Closed-interior



Closed-exterior

Open-interior



Open-exterior

Window towards courtyard



Defined dinning and living space

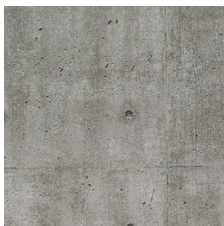
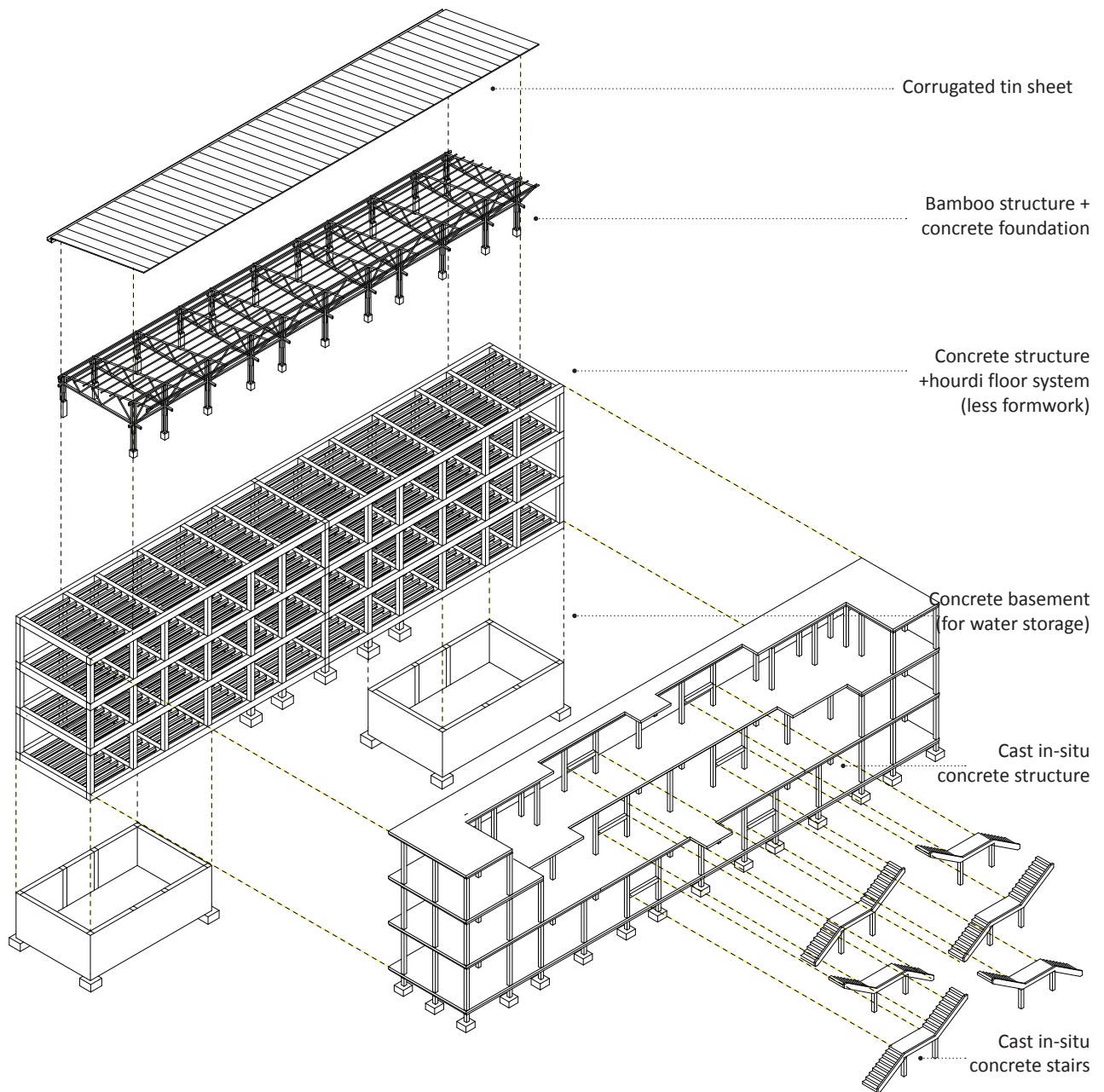


Defined living and working space

6. Building Technology

6.1 Structure and materialization

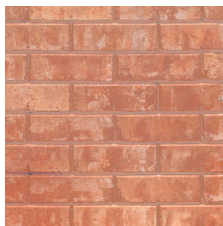
Structure and materialization



Concrete structure



Hourdi floor system



Compressed stabillzed earth block (CSEB)

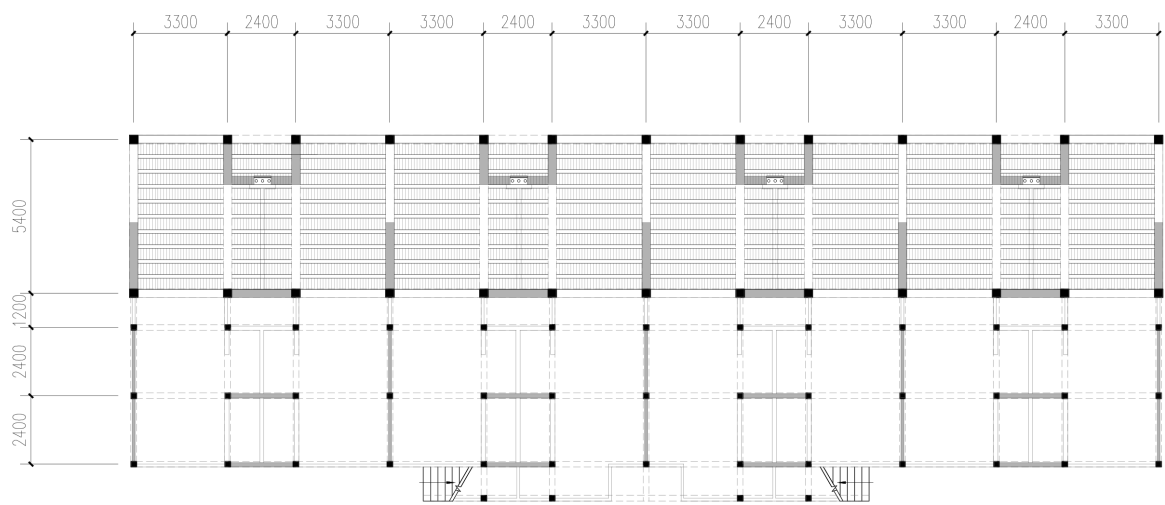


Bamboo roof structure

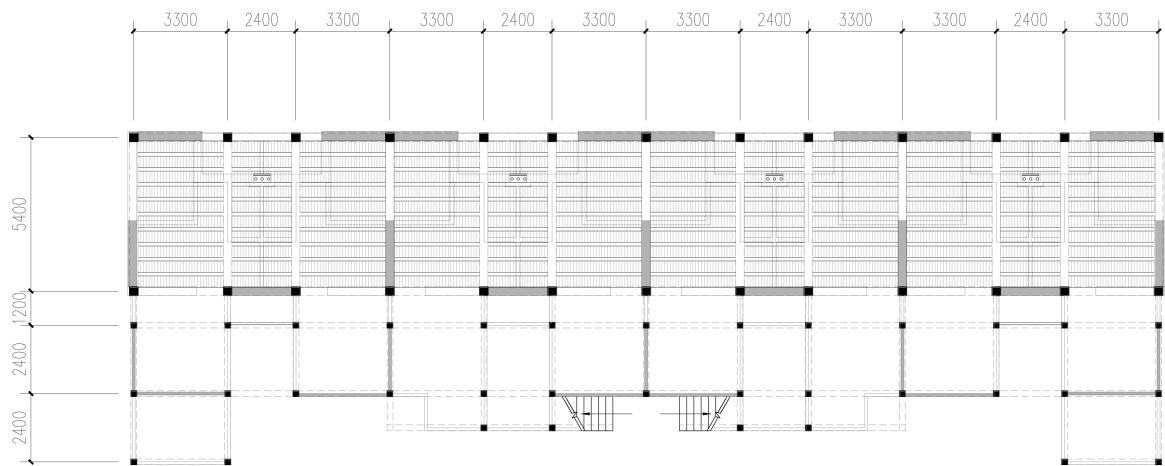


Corrugated tin sheet

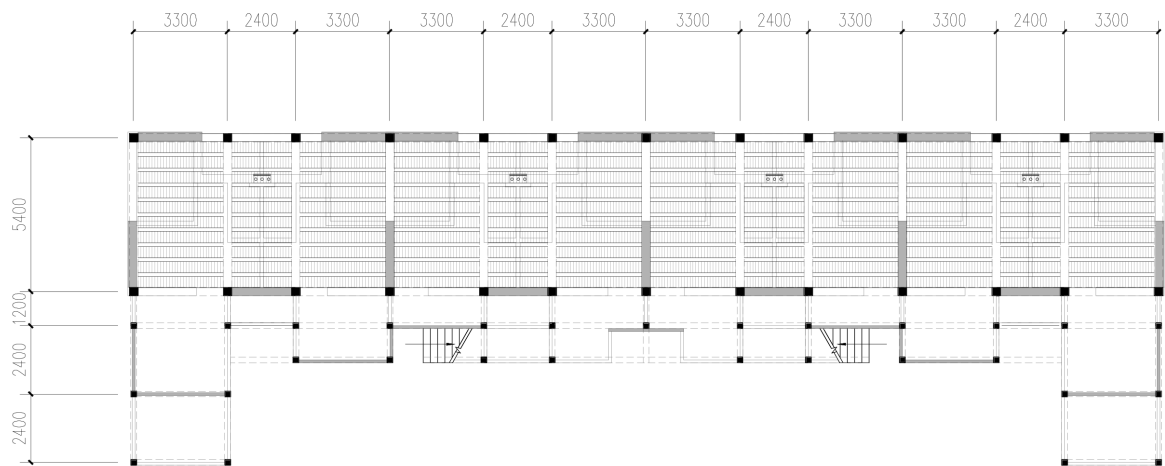
Structural plans



GF plan

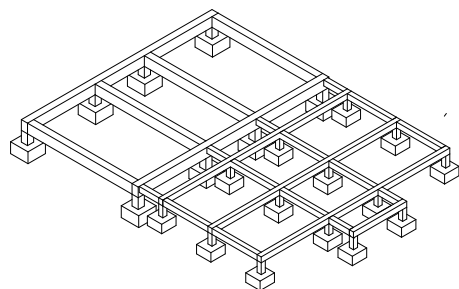


1F plan

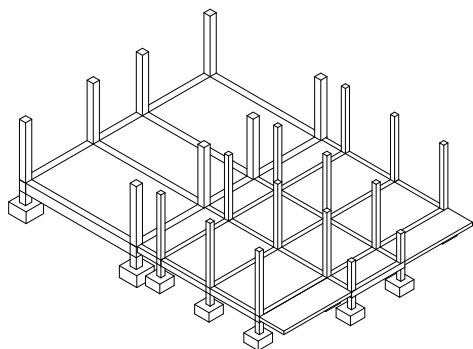


2F plan

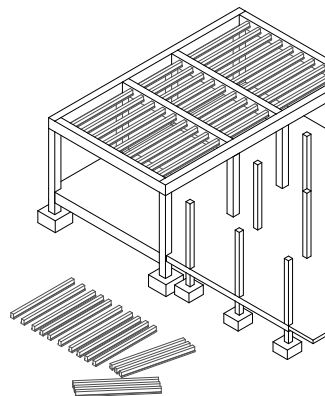
Construction Process



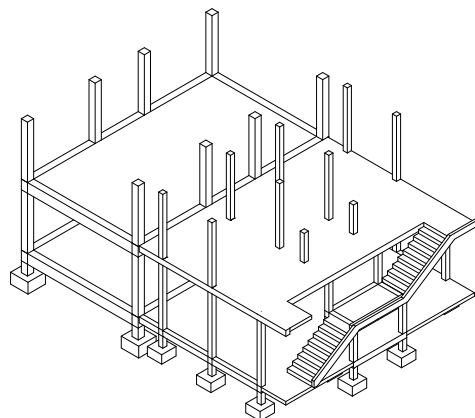
1.Concrete foundation



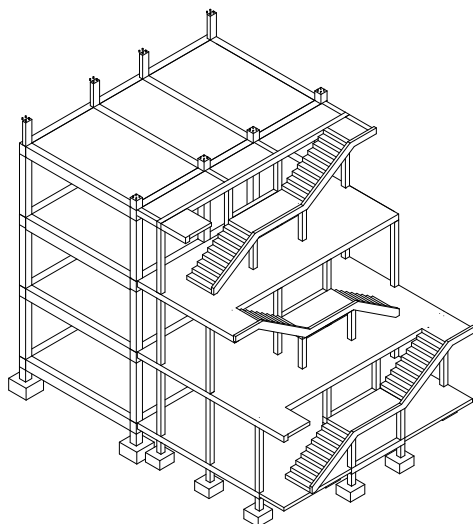
2.Concrete floor+cast in-situ columns



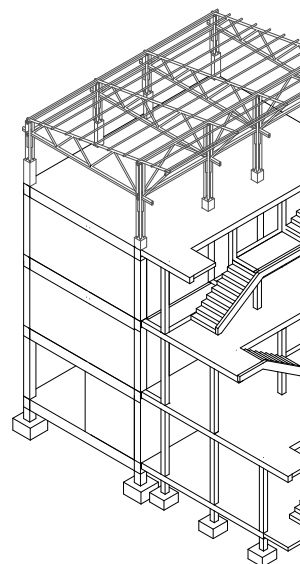
3.Prefabricated b



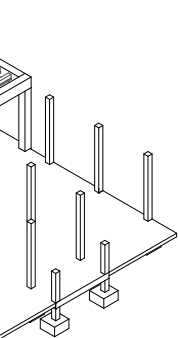
6.Continue the first floor



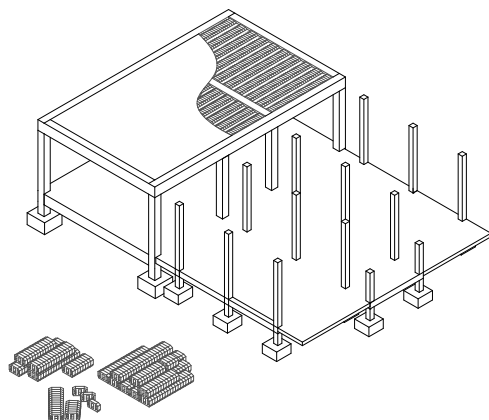
7. Repeat for third level



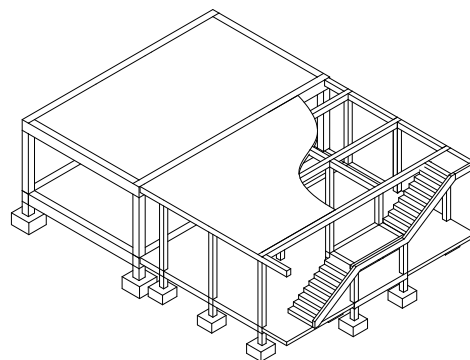
8. Bamboo roof + CESB infi
facade



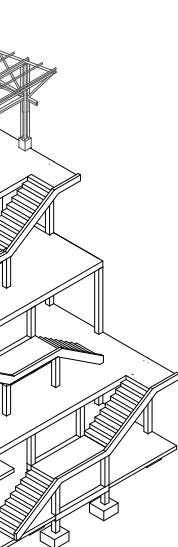
Reinforcement bars



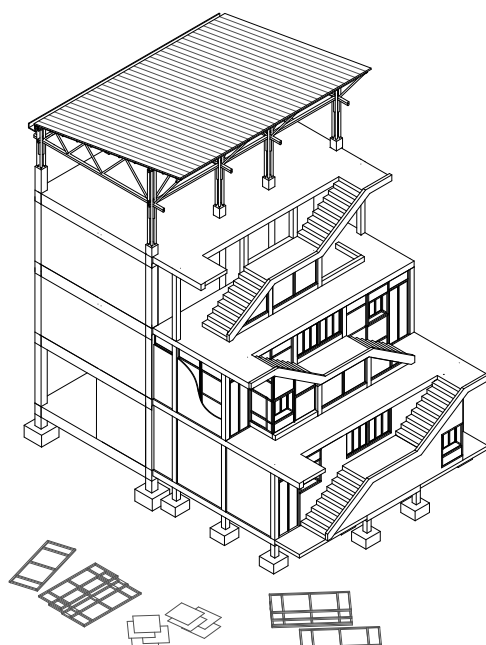
4.Hourdi blocks(CSEB) + a layer of concrete



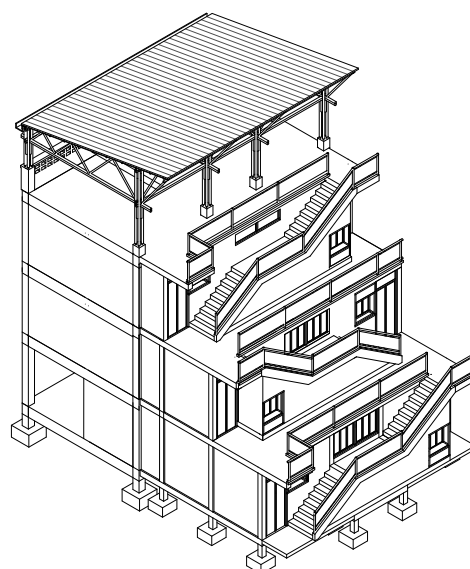
5.Cast in-situ floor and stair



Panel for outer



9. Finish bamboo roof + Bamboo panel and window for inner facade(build by dwellers themselves)

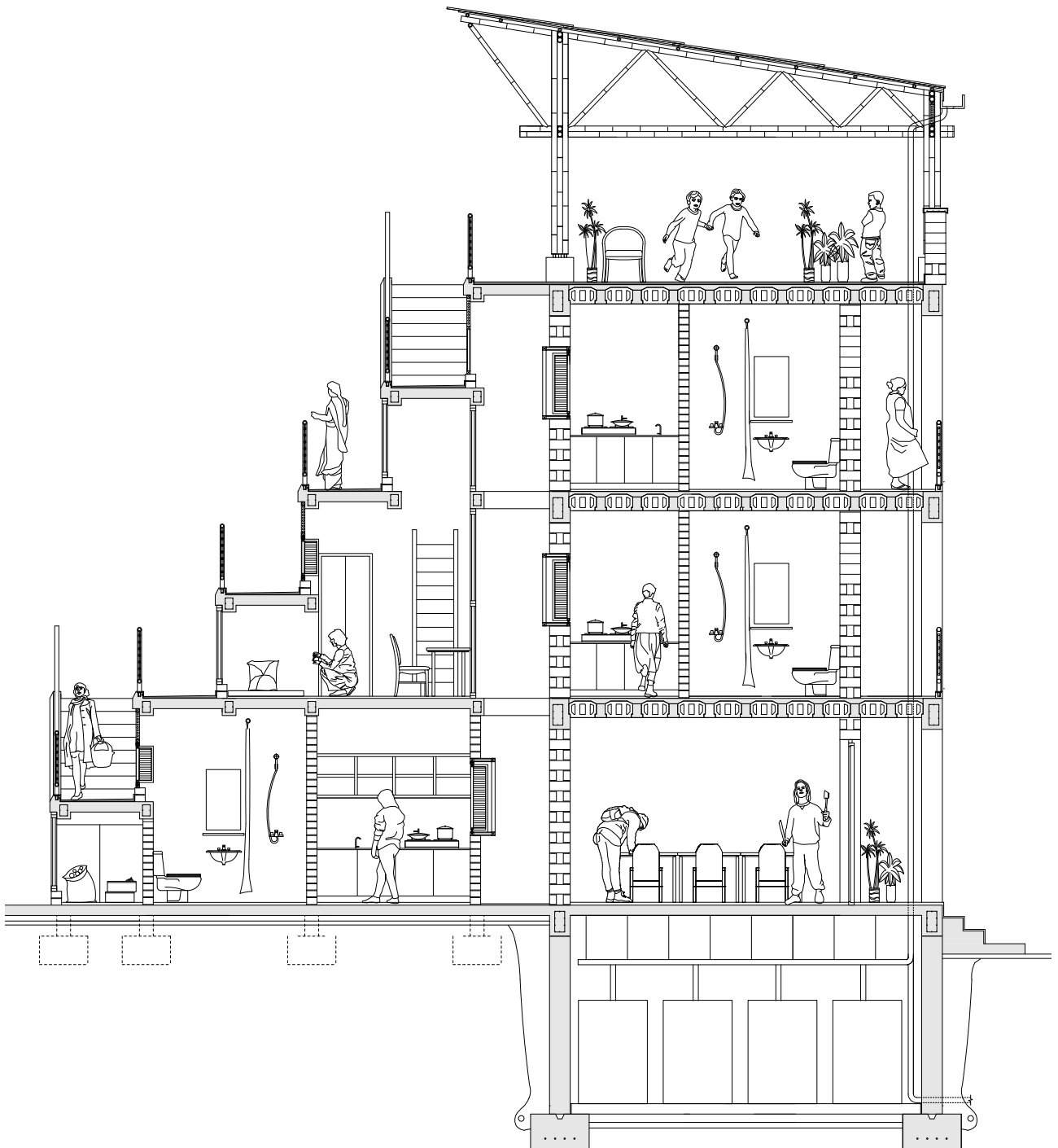


10. Plaster the inner facade + add bamboo handrails

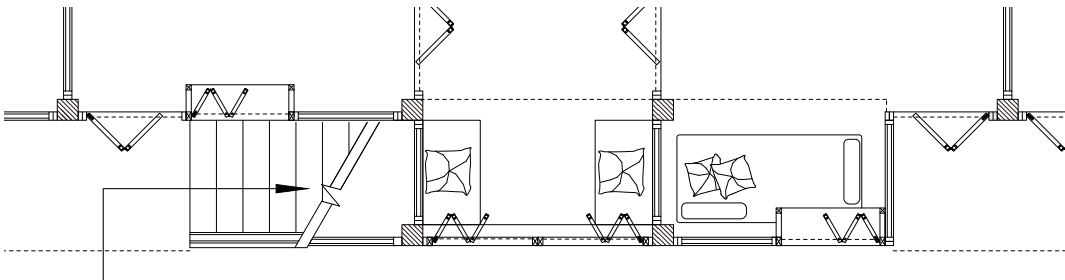
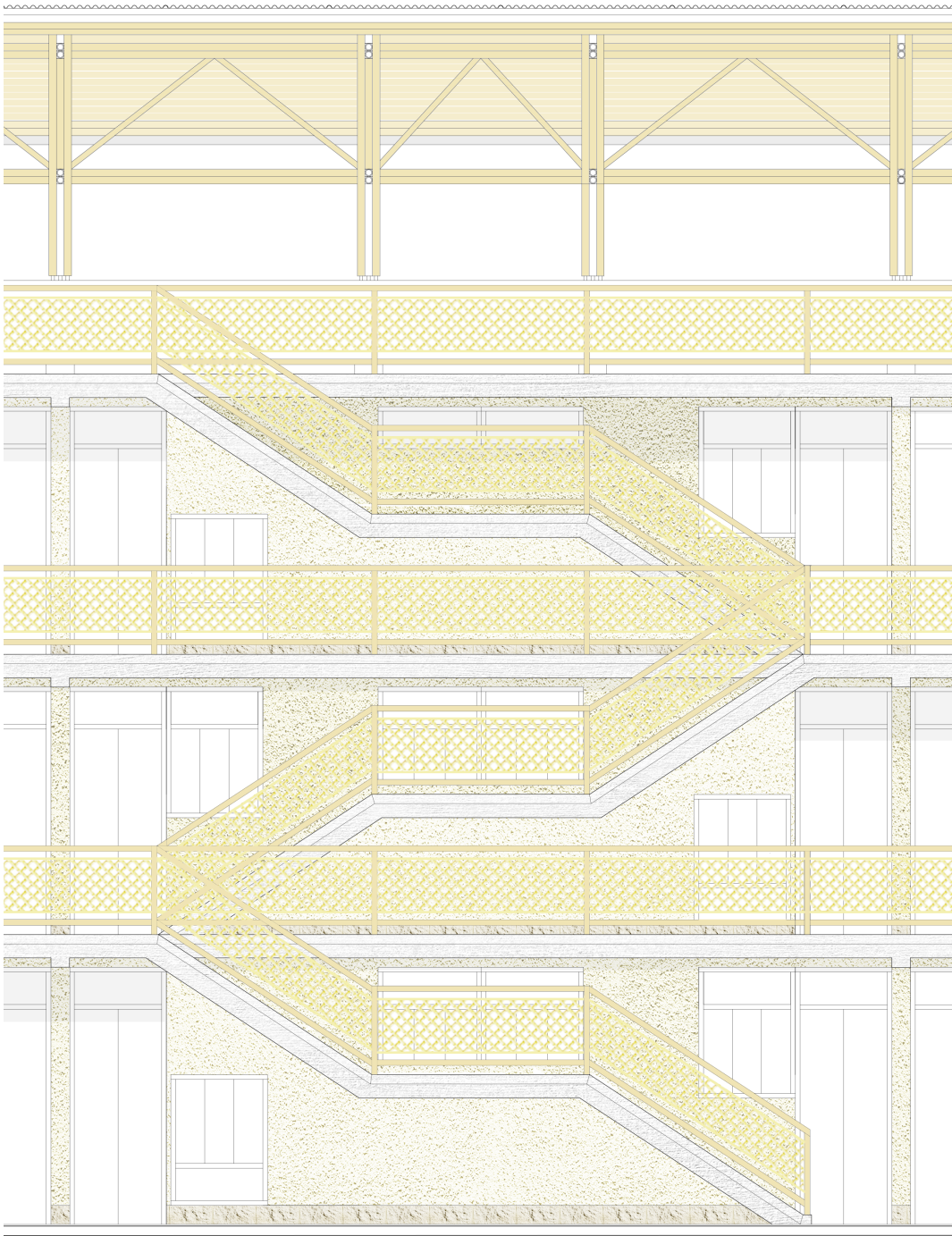
6. Building Technology

6.2 Facade Details

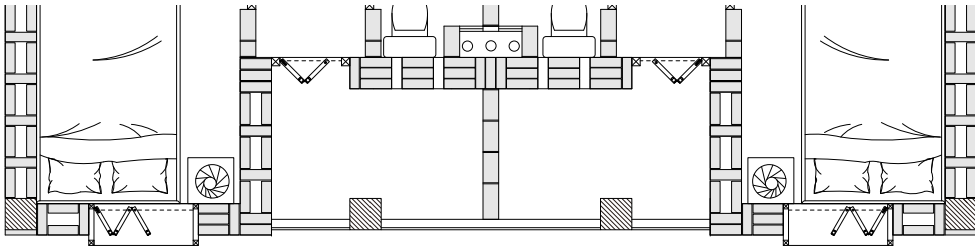
Section- -Lower block



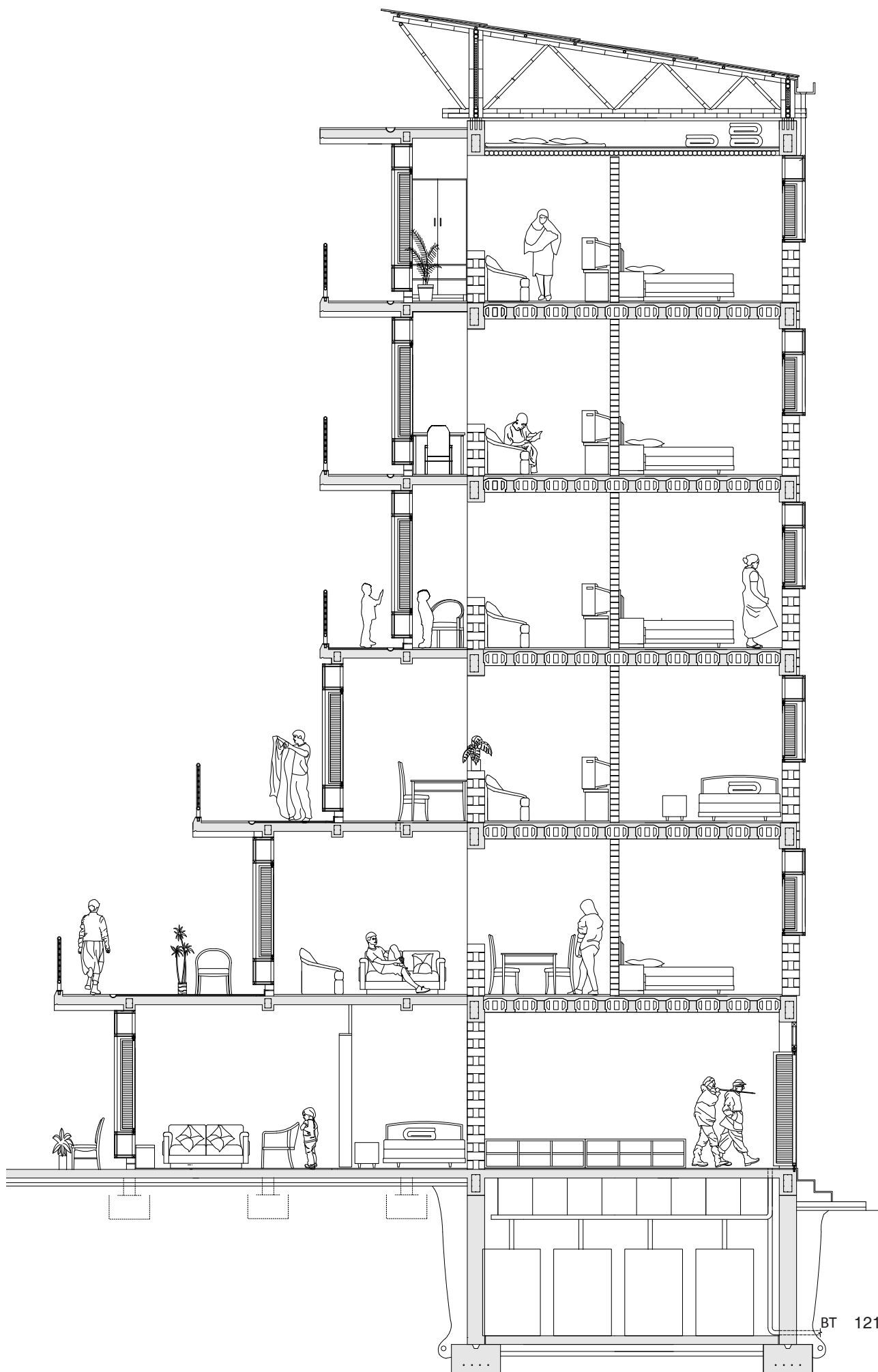
Outer facade- -Lower block



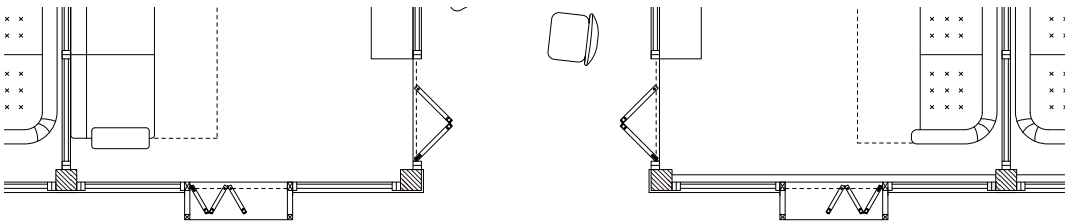
Inner facade- -Lower block



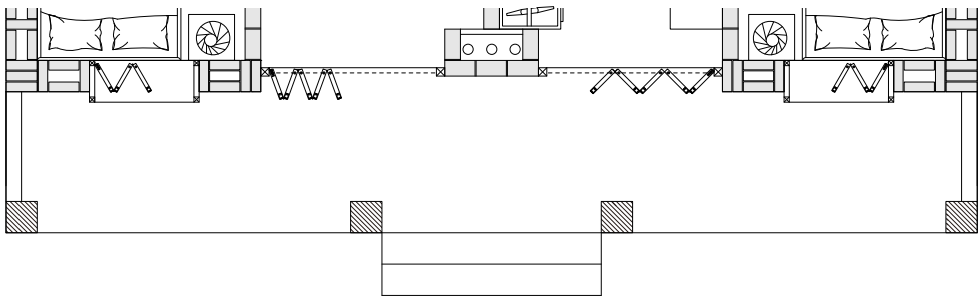
Section- -Higher block

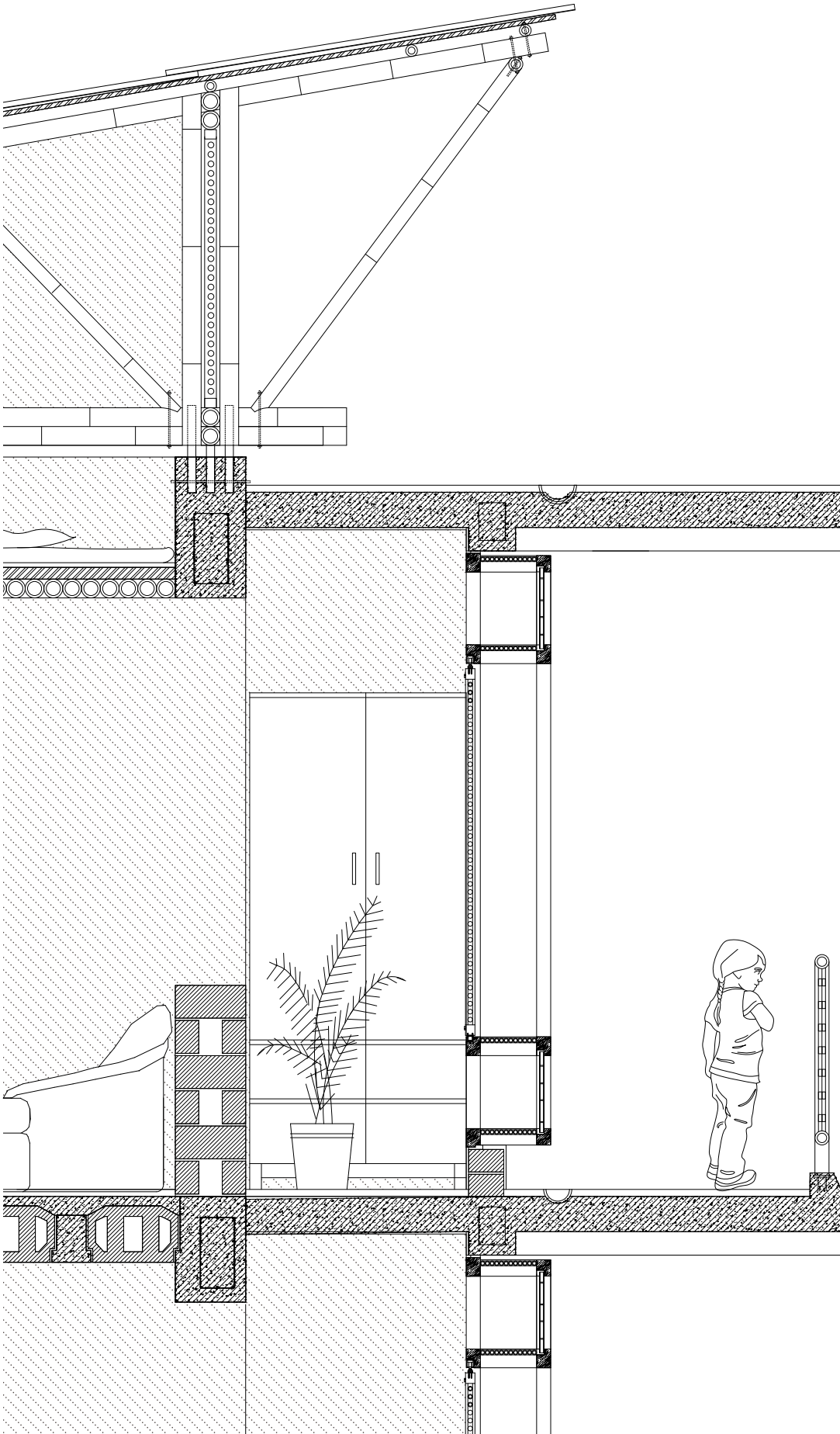


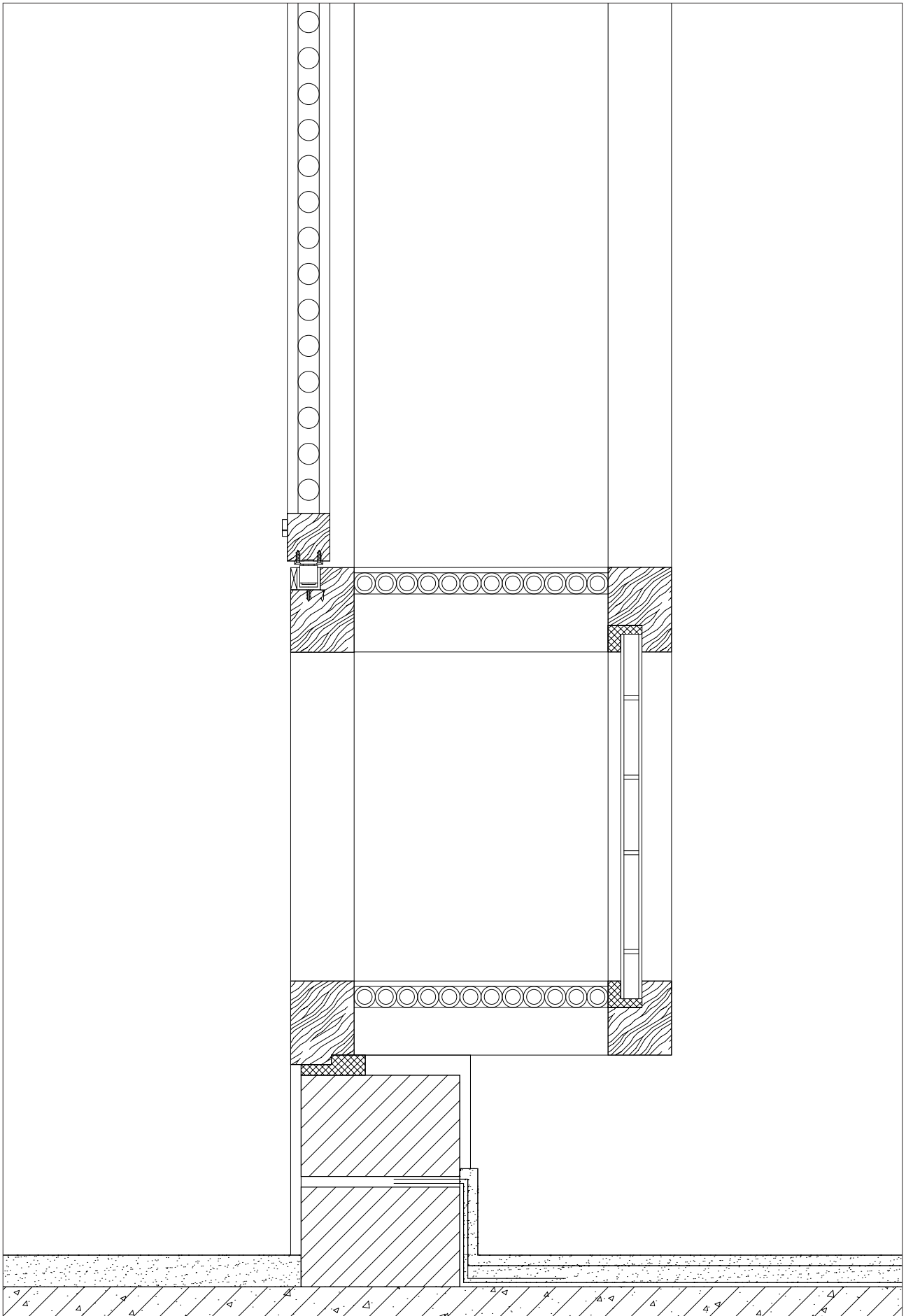
Inner facade- -Higher block



Outer facade- -Higher block

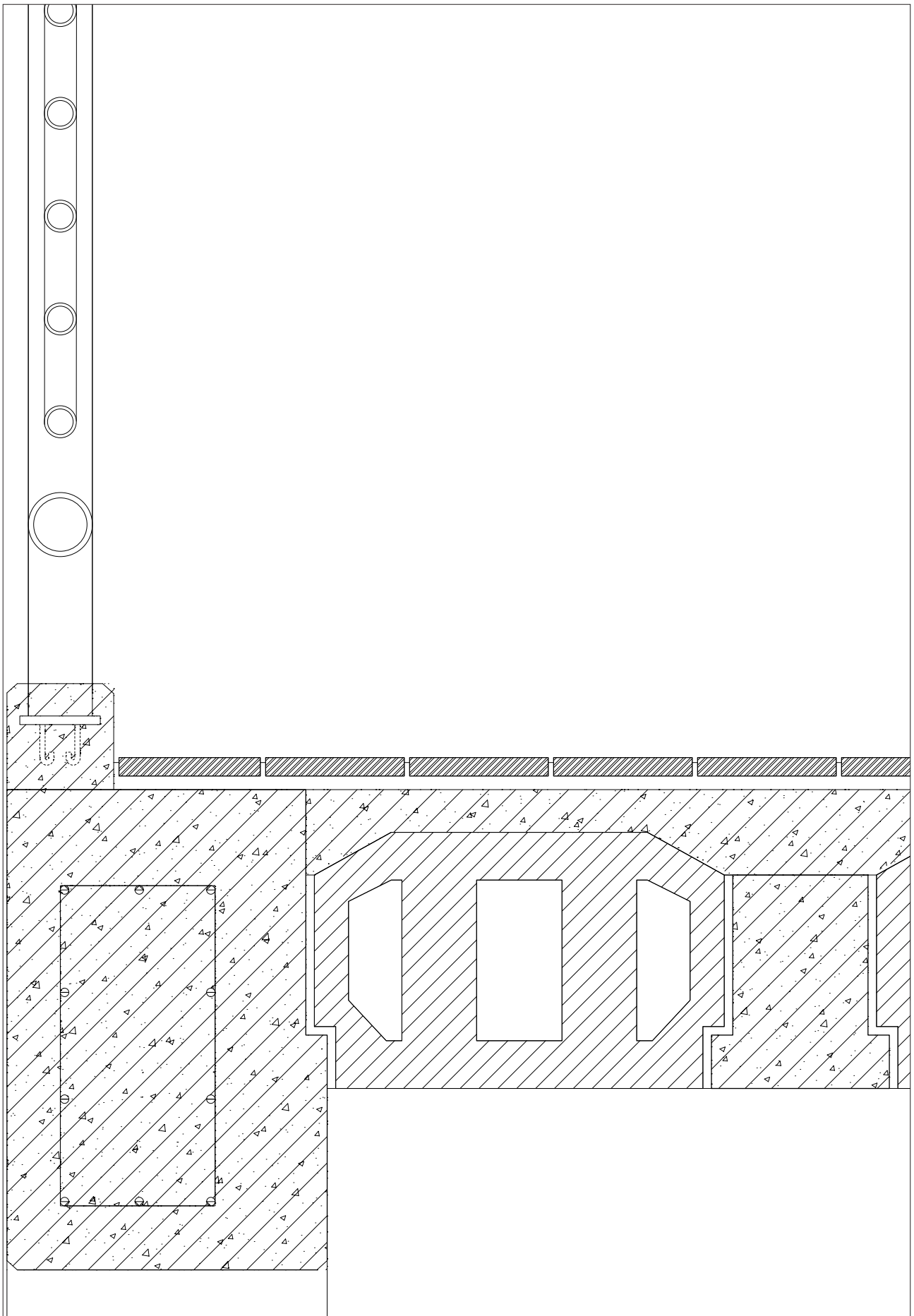


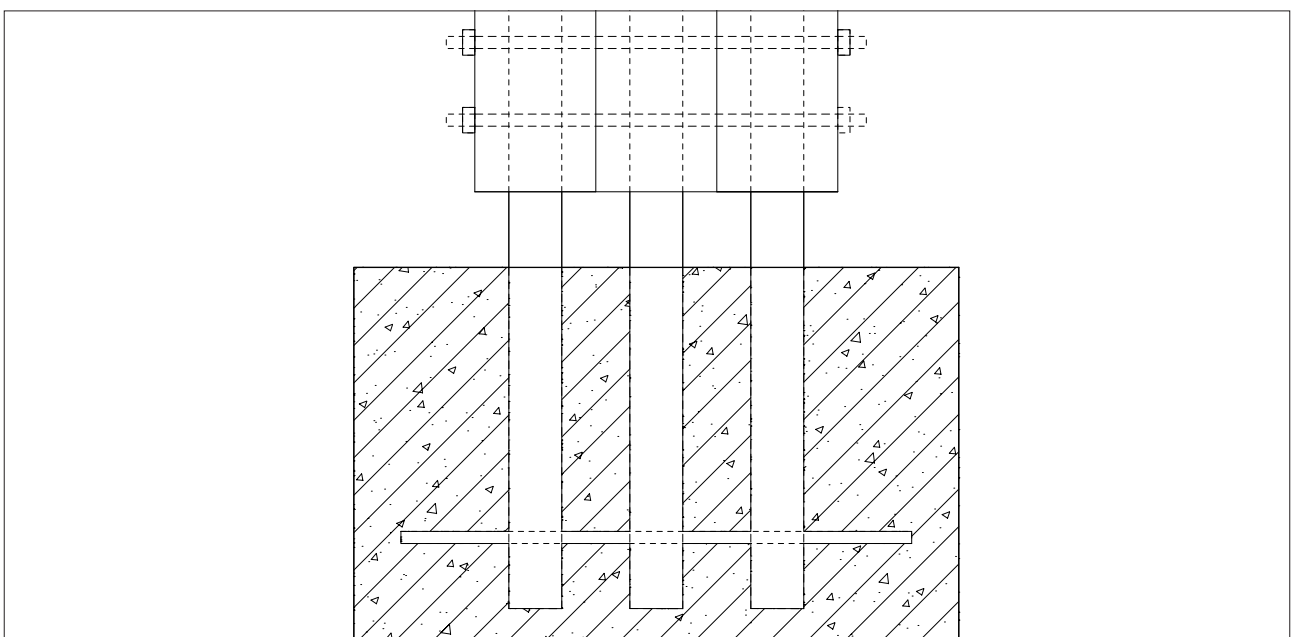
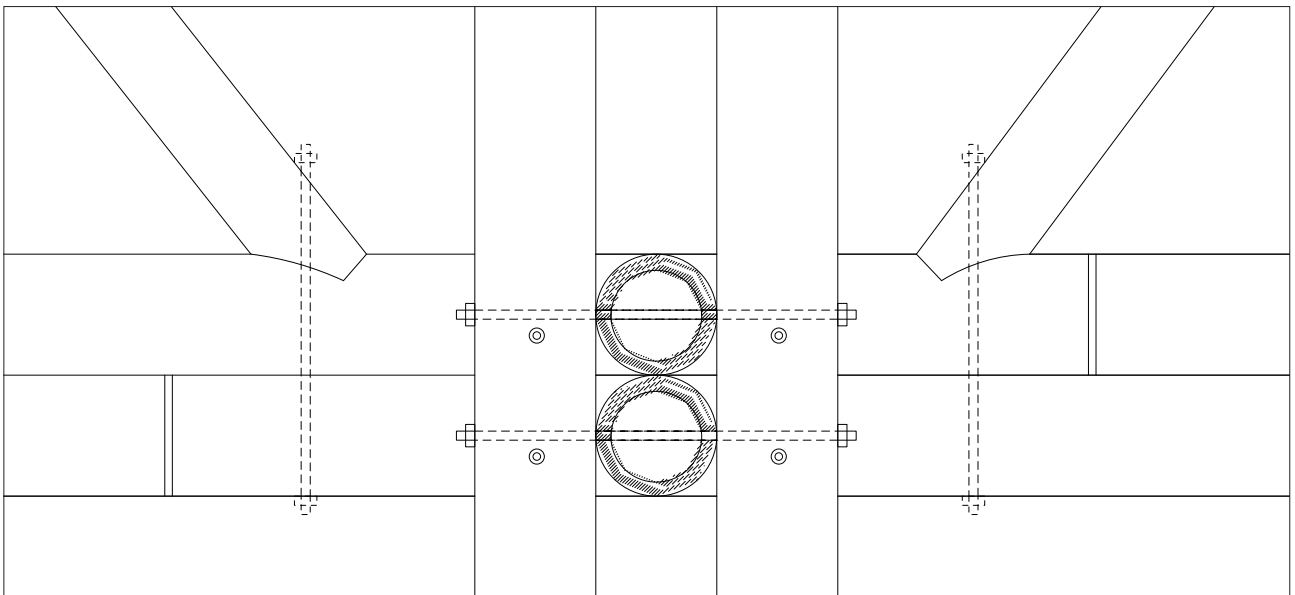
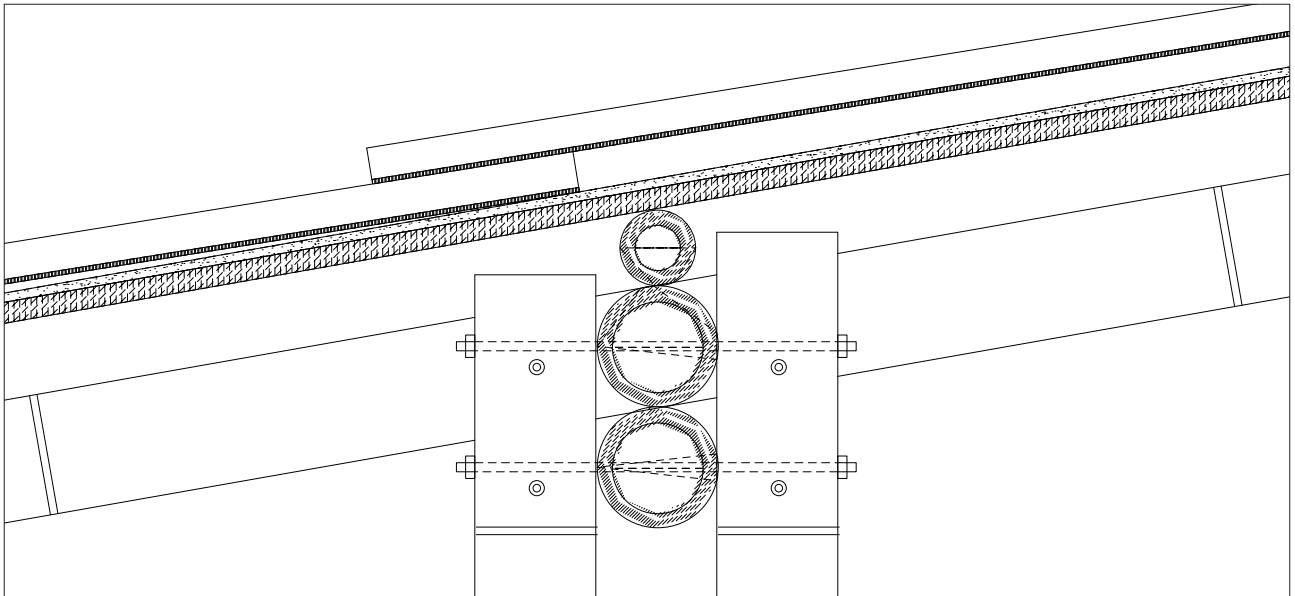




Window Detail 1:5

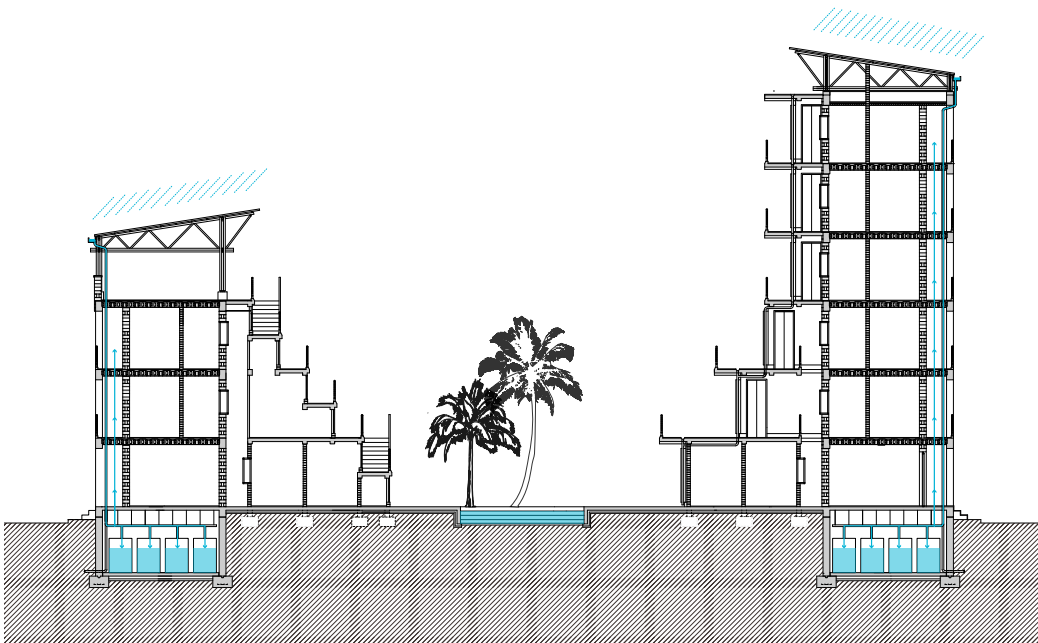
Bamboo sheets with wood window frames



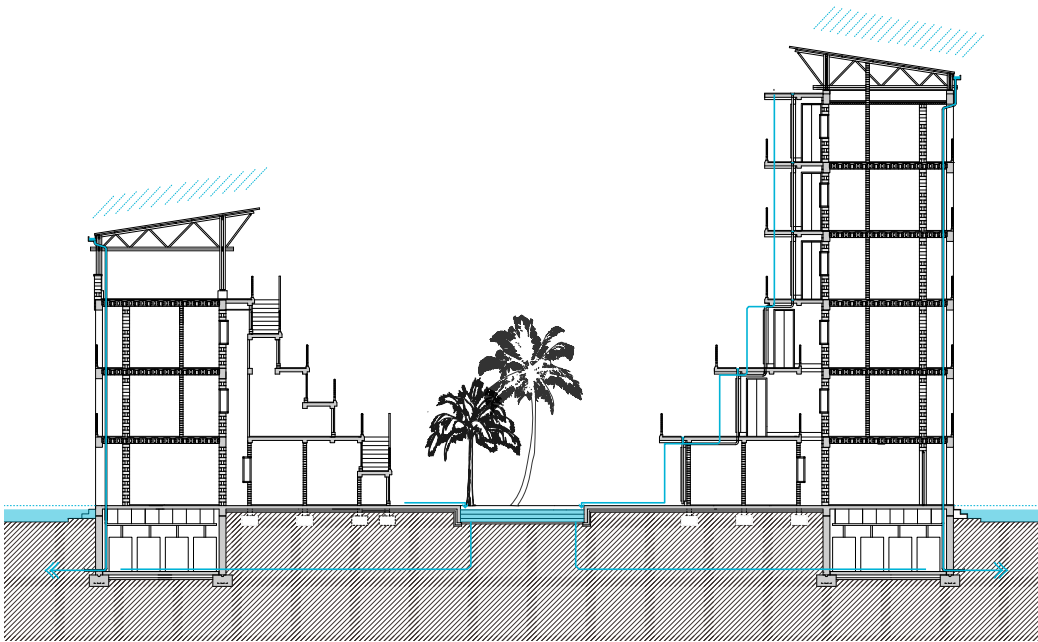


6. Building Technology

6.3 Climate design

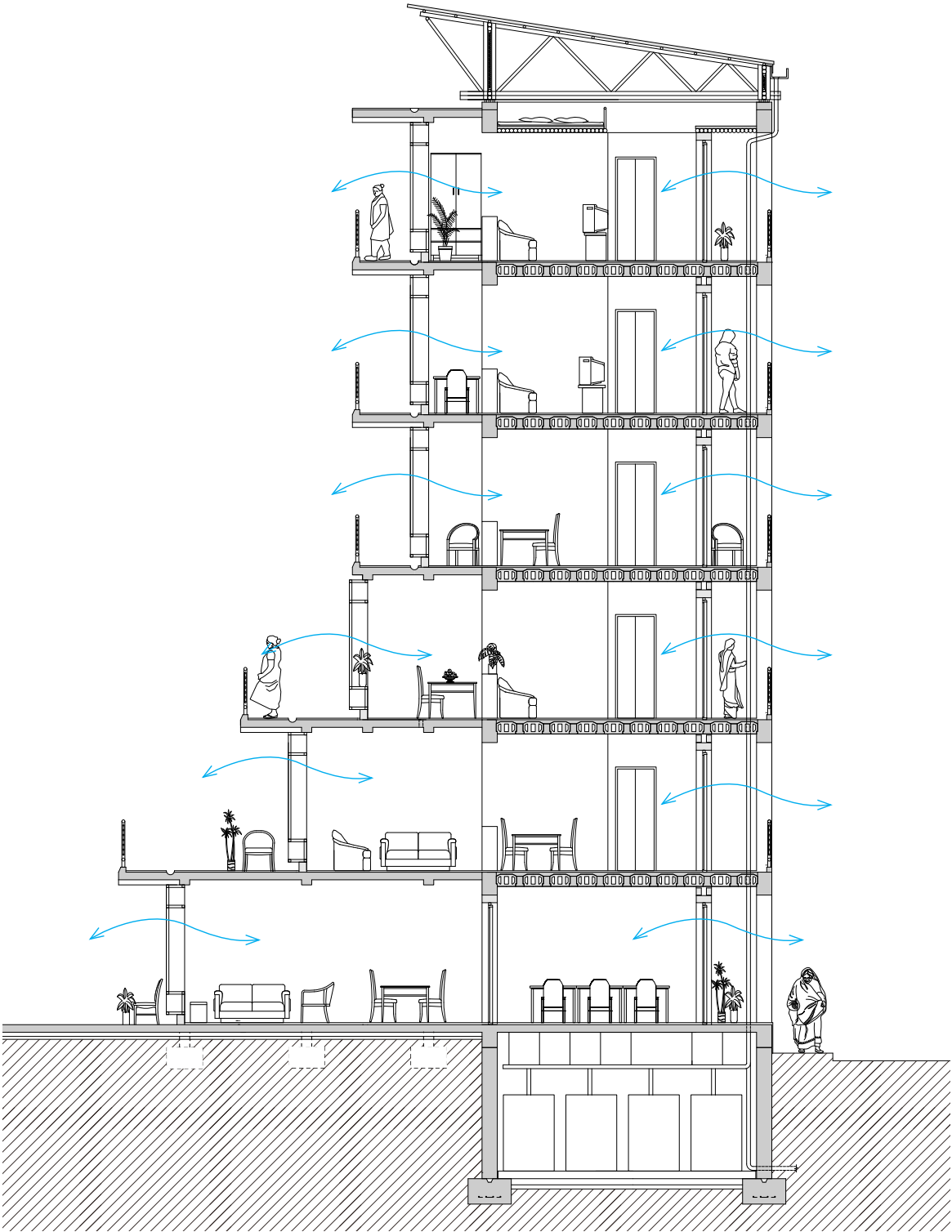


Rainwater collection and reuse

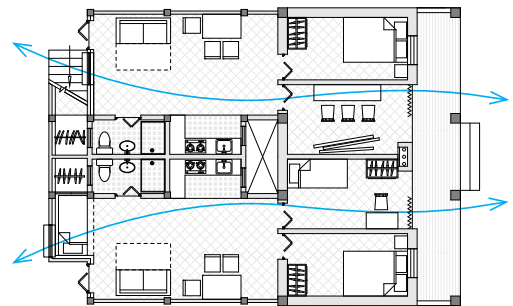
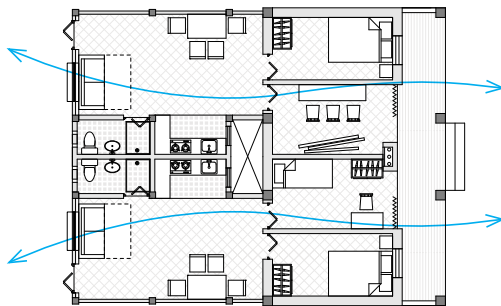
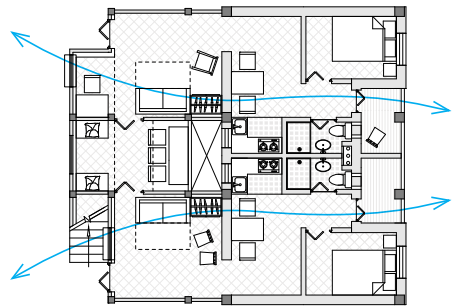
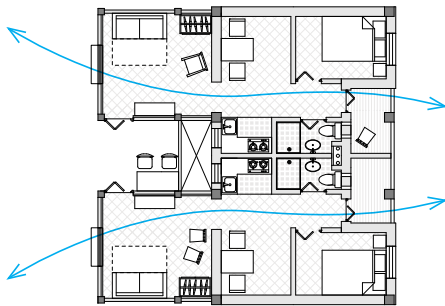
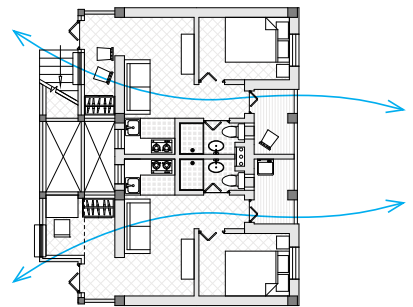
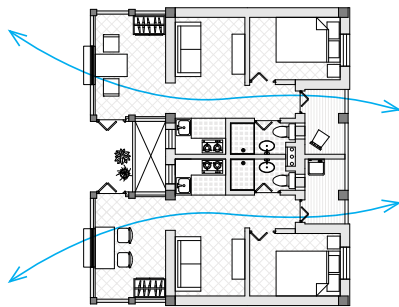
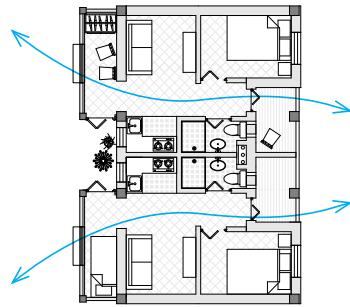


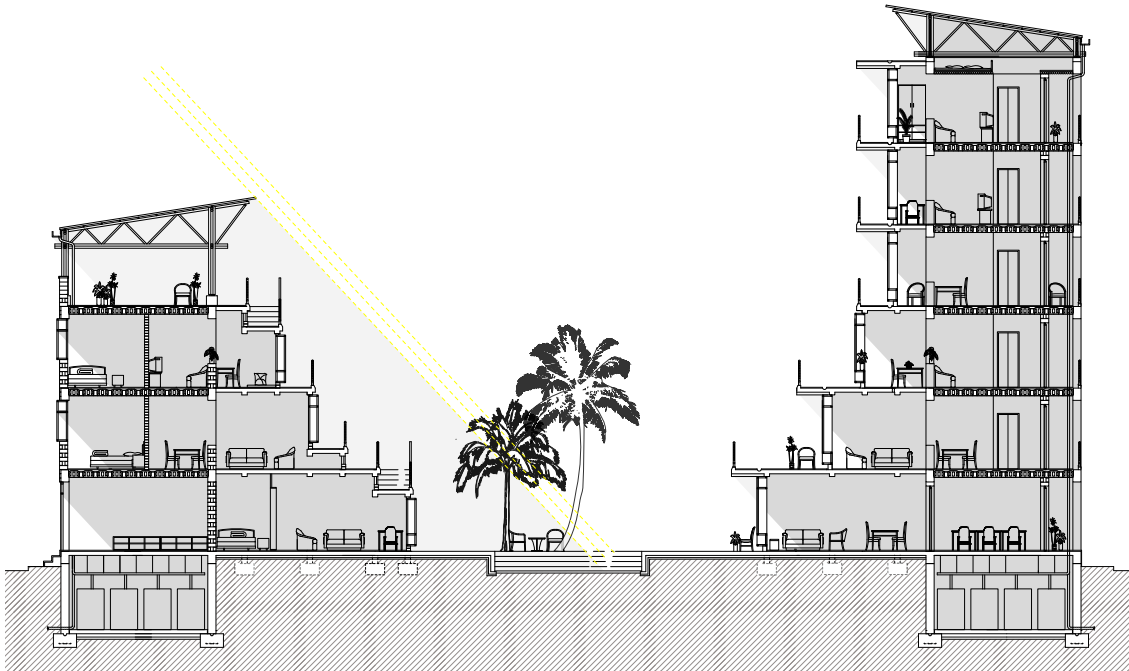
In case of heavy rain





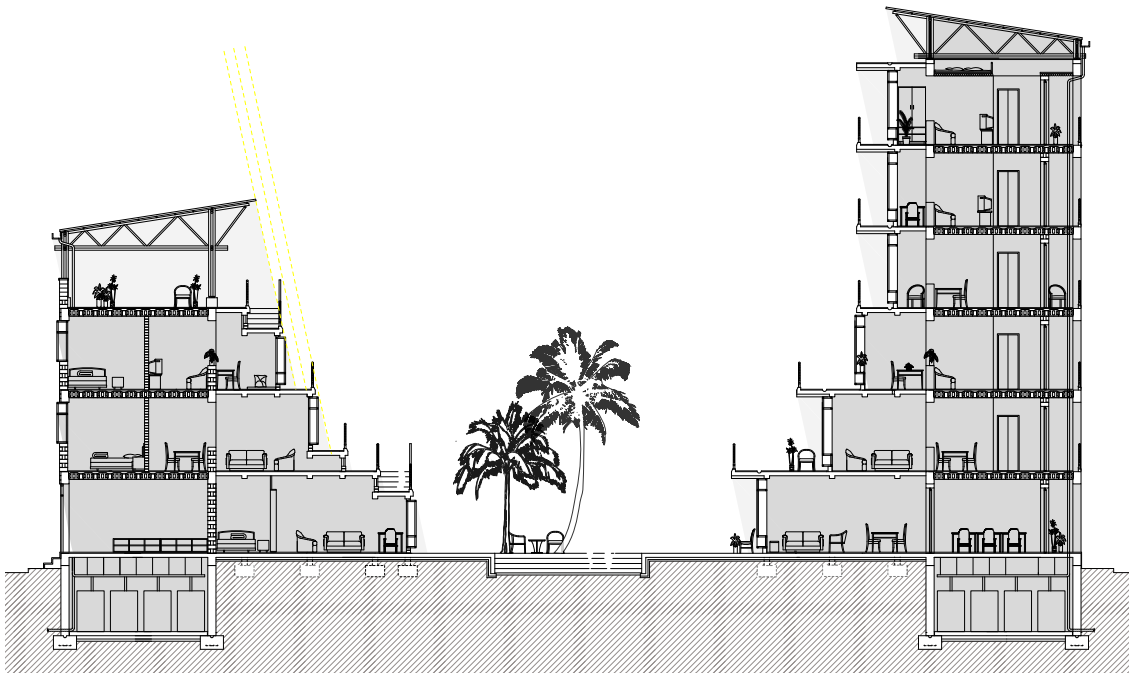
Cross-ventilation





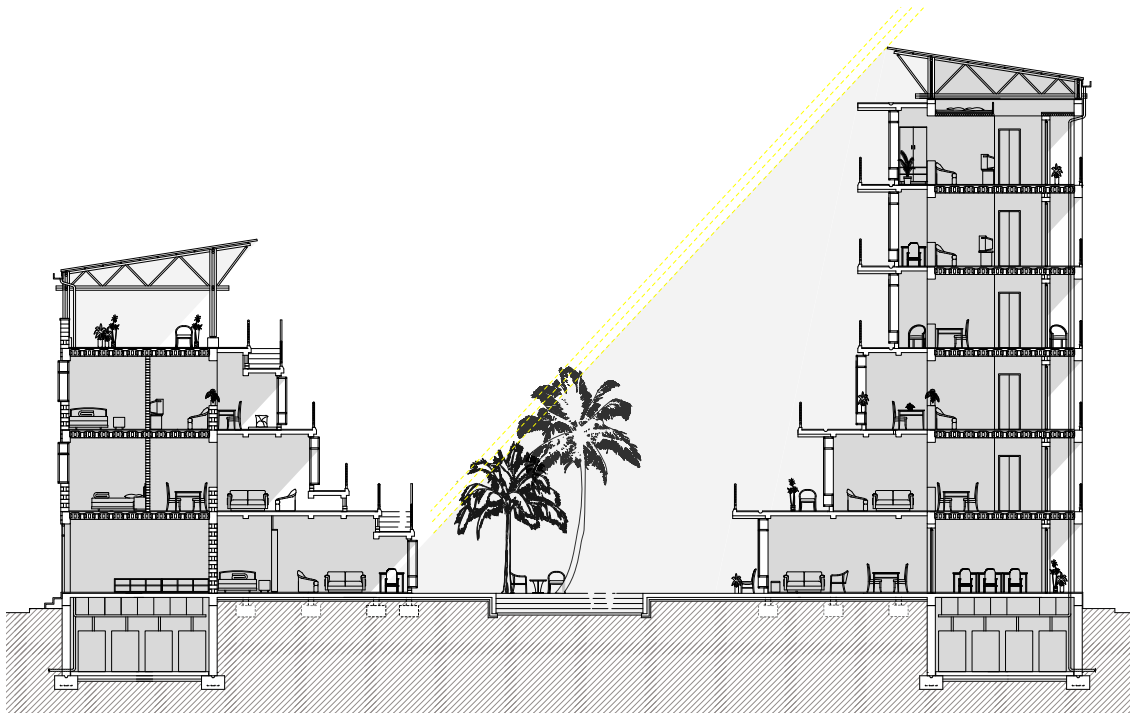
December 21st 47° at noon

Shadow in winter



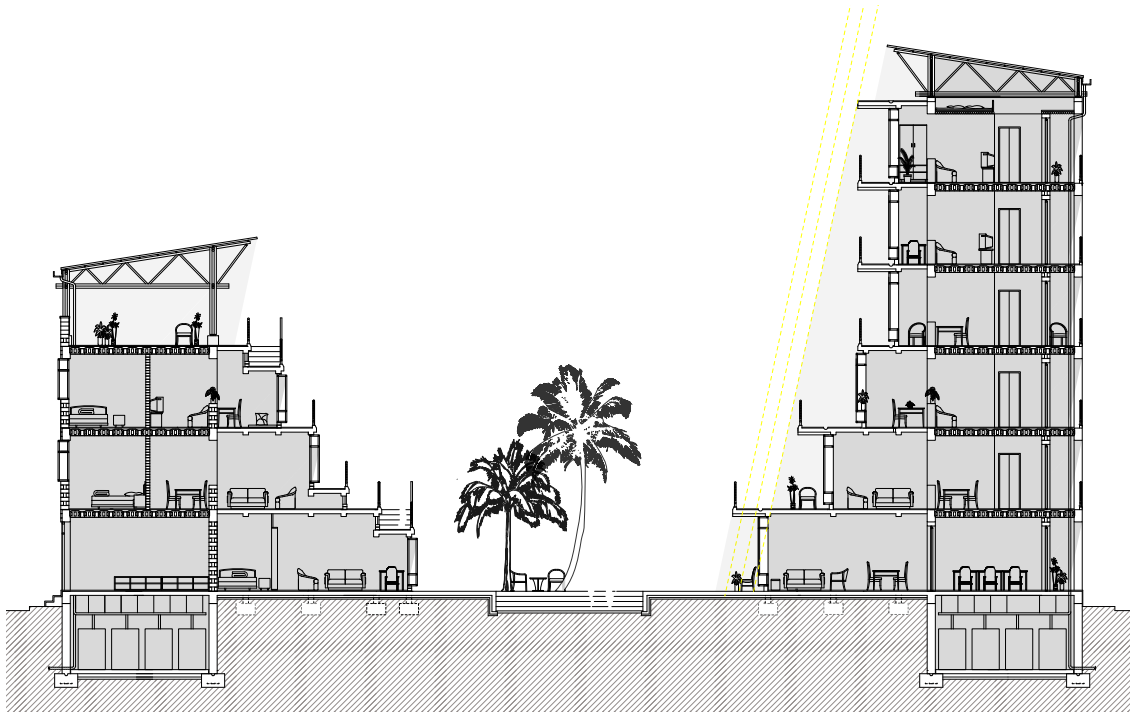
June 21st 78° at noon

Shadow in summer



December 21st 47° at noon

Shadow in winter



June 21st 78° at noon

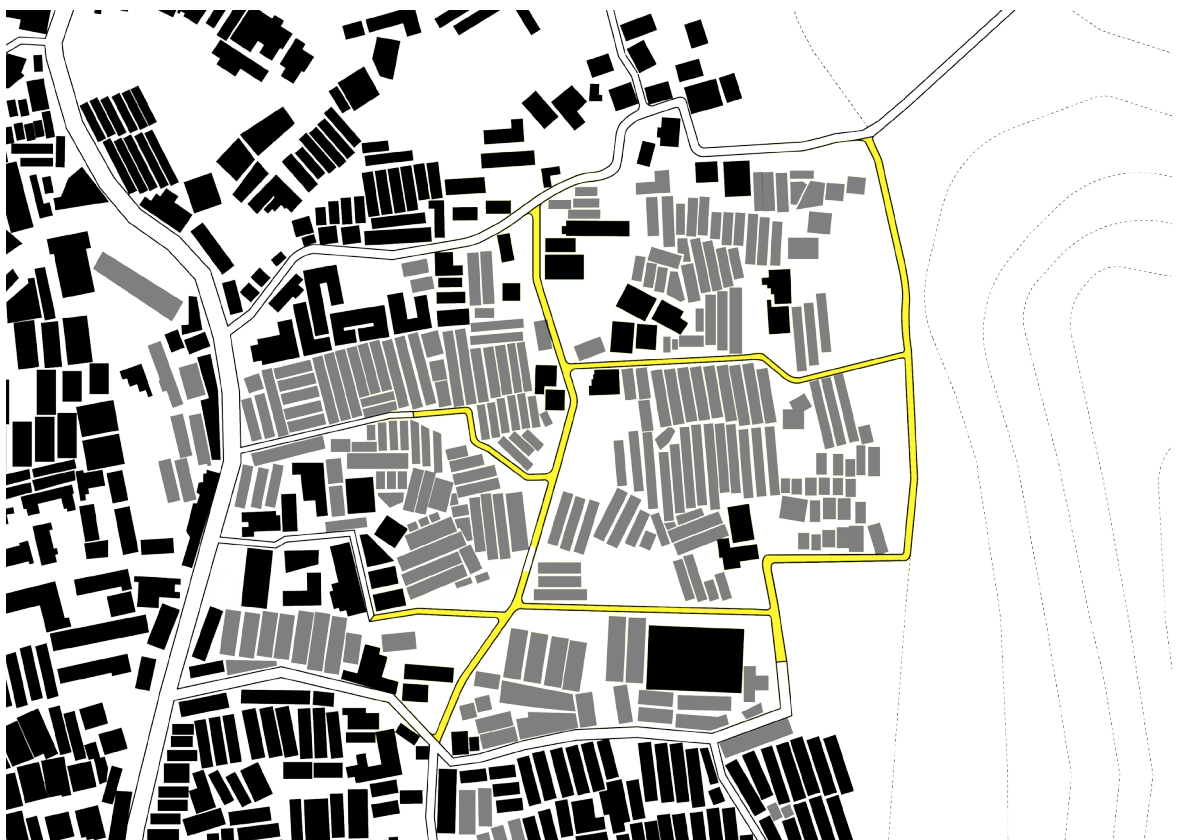
Shadow in summer

7. Redevelopment process

Development process



Existing condition



Step 1: connect dead ends road

Development process



Step 2: add public facilities



Step 3: build in empty land

Development process



Step 4 move existing residents into finished blocks, sell the rest units, and start building new blocks



Step 5 move existing residents into finished blocks, sell the rest units, and start building new blocks

Development process



Step 6 move existing residents into finished blocks, sell the rest units, and start building new blocks



Step 7 design the green space and communal facilities



Existing Units in Baithi chawls: 784

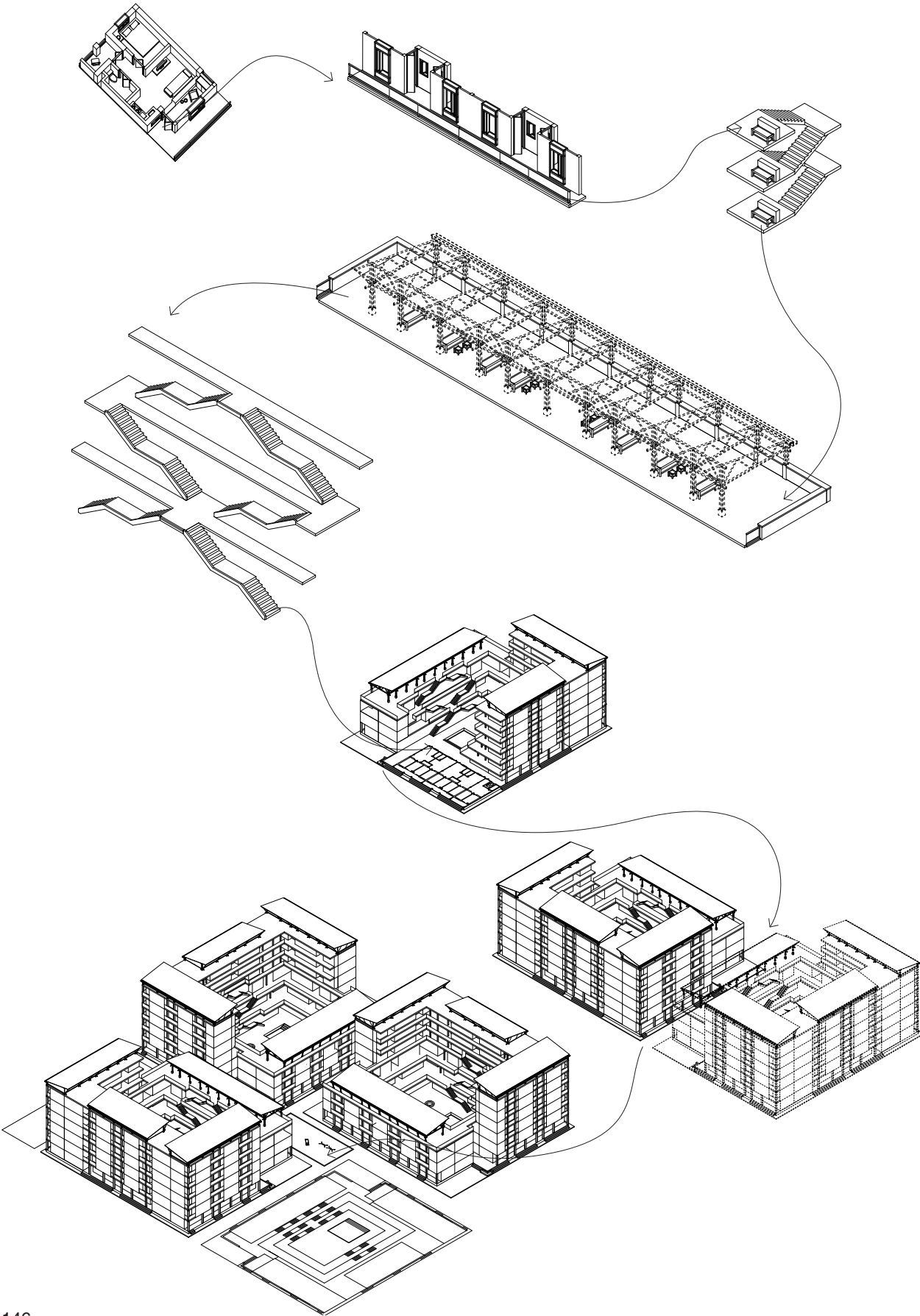


New units: 1485
Add: 89.4%

FSI:2.3
Density: 413 unit/hectare

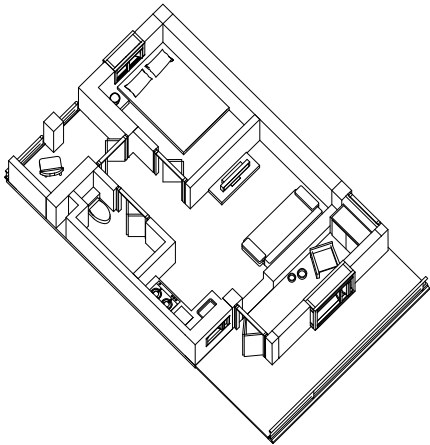
7. Spatial Atmosphere

Spatial sequence





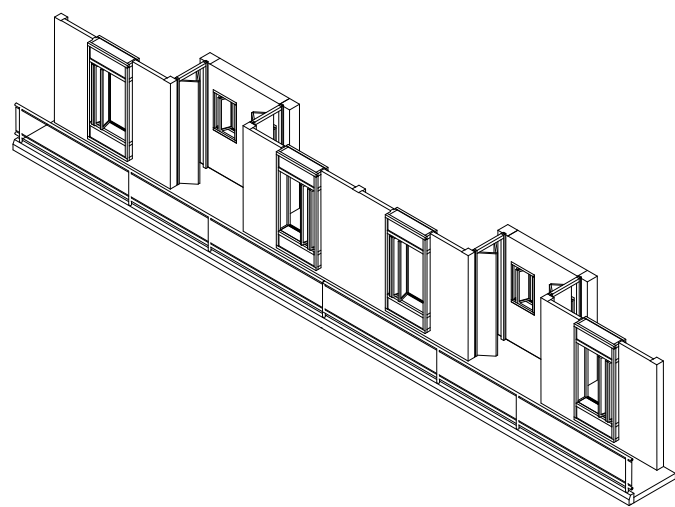
Domestic space



Spatial atmosphere



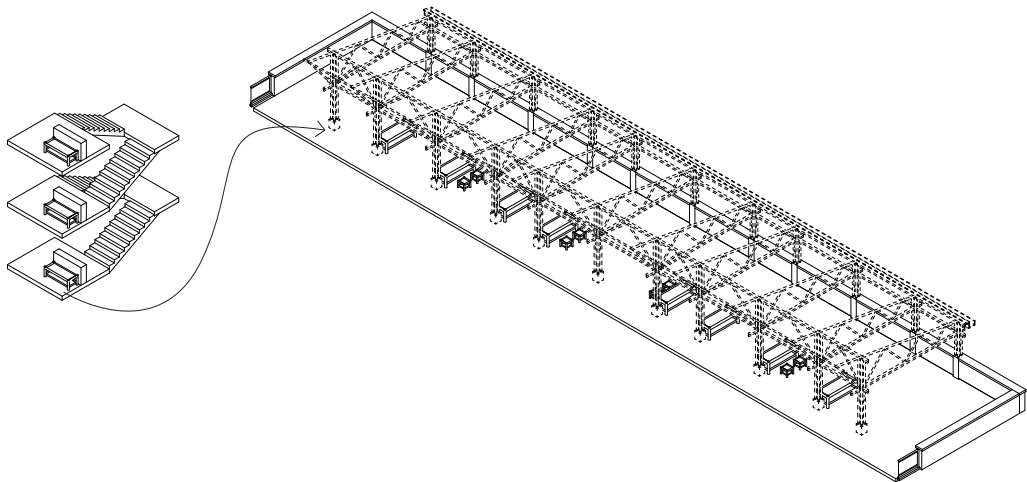
Corridor



Spatial atmosphere



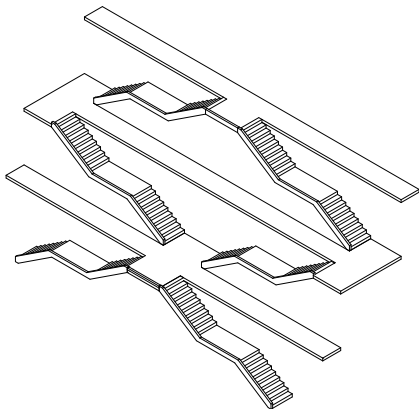
Roof terrace



Spatial atmosphere

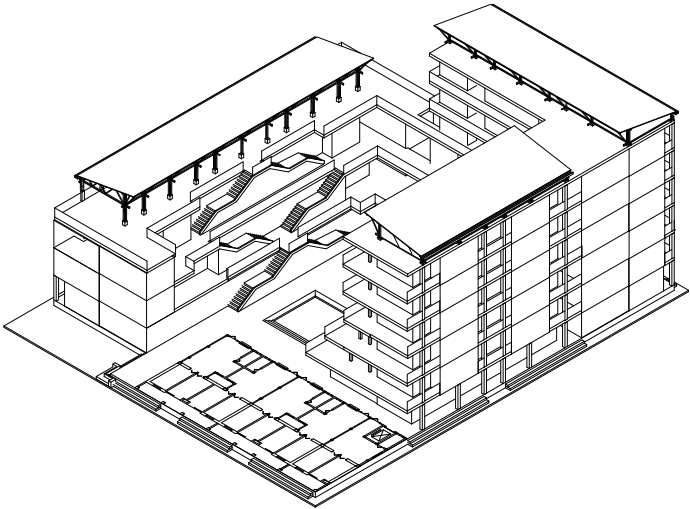


Stairs towards roof terrace





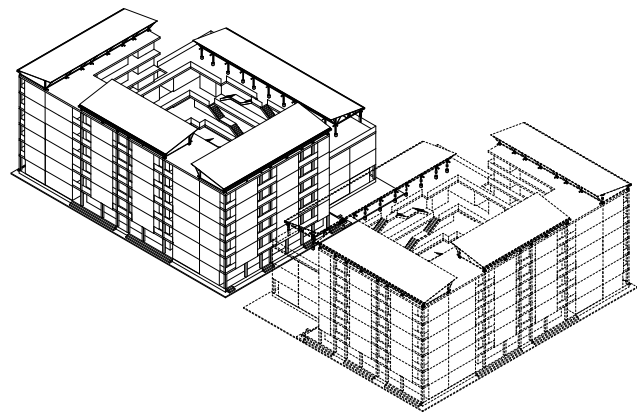
Inner courtyard with stairs



Spatial atmosphere



Commerical corner at the entrance of the block





Open space in the pedestrian street

