

A right to an inclusive open community

Making Kolfe an inclusive living space of symbiosis by stimulating family/neighbourhood based economics

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Architecture & Dwelling: Global Housing Studio

Master's Thesis

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Urban poverty a sign of strength?

It's not that the people in slums are poor, it's that cities attract people who want to stop being poor.

--Edward L. Glaeser



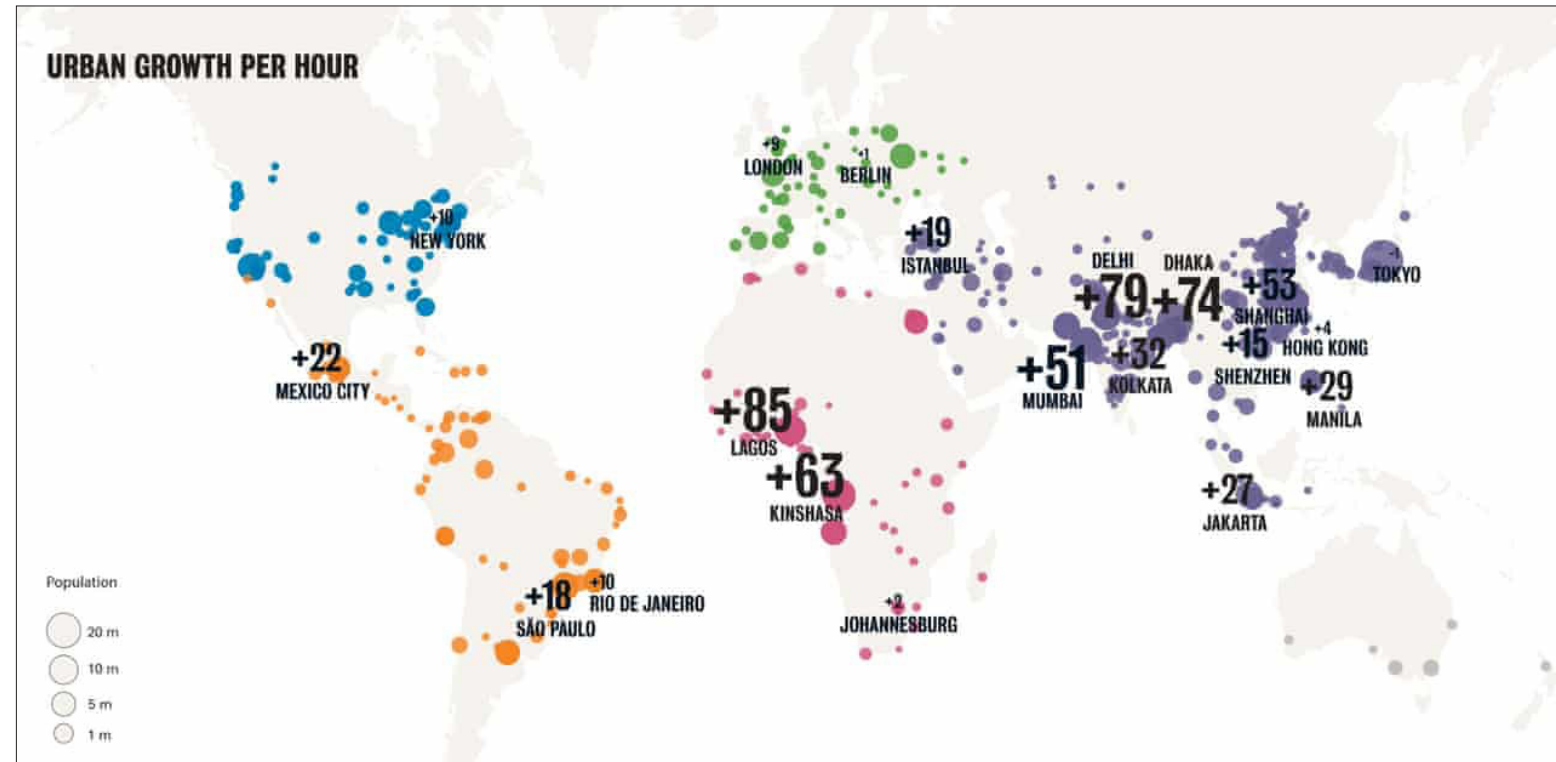


01.Background

01. Background

The global awareness

The second wave of urbanism



In the 21st century, the urban population will reach 7 to 8 billion, exceeding the current global population, and these new increase will mainly come from poor areas in developing countries in global south.

A right to an inclusive open community

01. Background

Global awareness

The polarization and social isolation



City center of Addis Ababa



"Slums" in Addis Ababa

General Question

How architecture/housing can be an instrument to resist the polarization that is occurring in our society?
How housing/community can accommodate the most fragile groups in the city and help them to get the right to the city?

01. Background

Why Ethiopia? Why Addis Ababa?

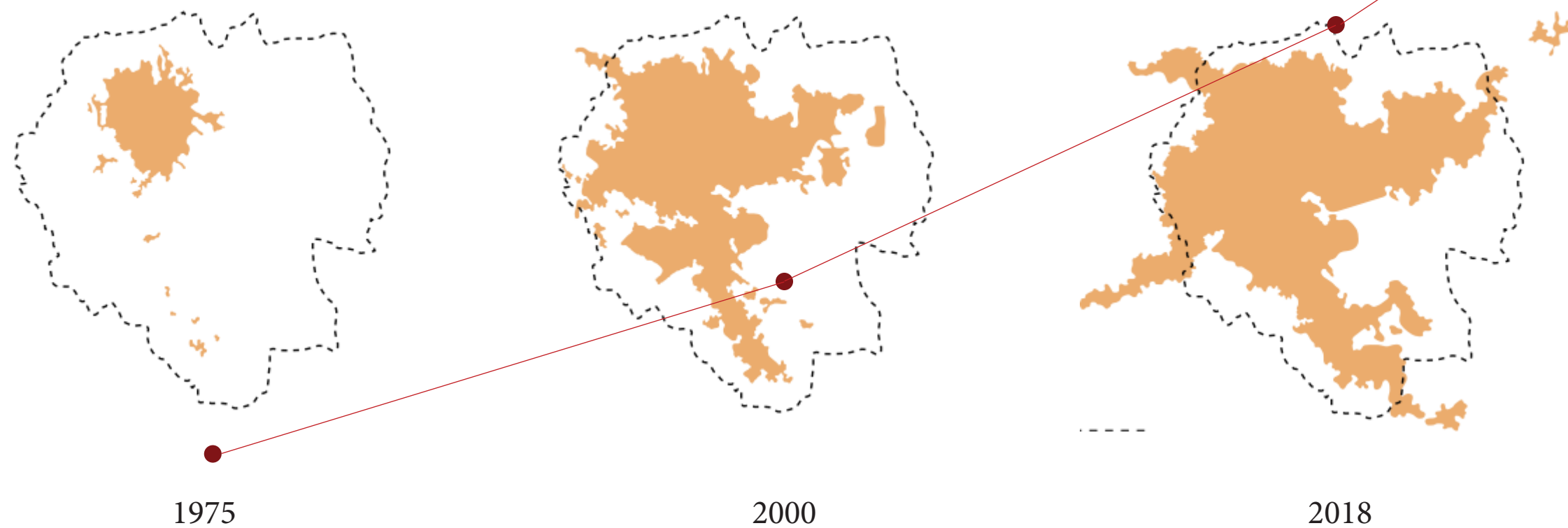


The country is populated by almost 110 million inhabitants and only 20% of the whole population is living in the cities, leaving another 80% to live in the rural areas.

01. Background

Rapic urbanism of the city Addis Ababa

As one of the fastest growing city in the world, Addis Ababa's rapid urban expansion doubles in size every decade.



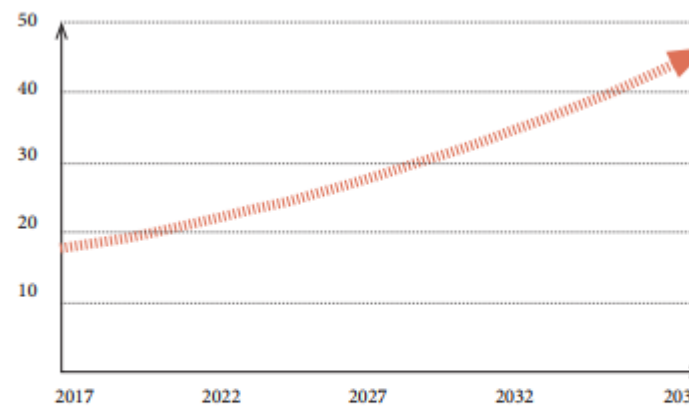
According to the IMF, Ethiopia is forecast to be the fastest growing economy in SubSaharan Africa as well, with 10% growth.

01. Background

Rapic urbanism of the city Addis Ababa

Demographic explosion

35% urban population increased in last 15 years
The rate is expected to increase 5% annully



17 million in 2017 → 50 million in 2037

01. Background

Problems caused by rapid urbanism

The city suffers from a high amount of **homelessness, urban decay**, a high degree of **unemployment** and a **shortage of infrastructure and basic services**.

(UN-HABITAT, 2010)

Housing deficiency

+300.000 housing units deficit
80% of the urban population lives in “slum”

Close to **80%** of Addis Ababa's inhabitants lived in houses
which can be structurally classified as a slum

(UN-HABITAT, 2010)

High rate unemployment

20% of the people are unemployed,
leading to safety hazards.

People come from rural to the city for self-development opportunities,
but cannot get a formal job in the city.

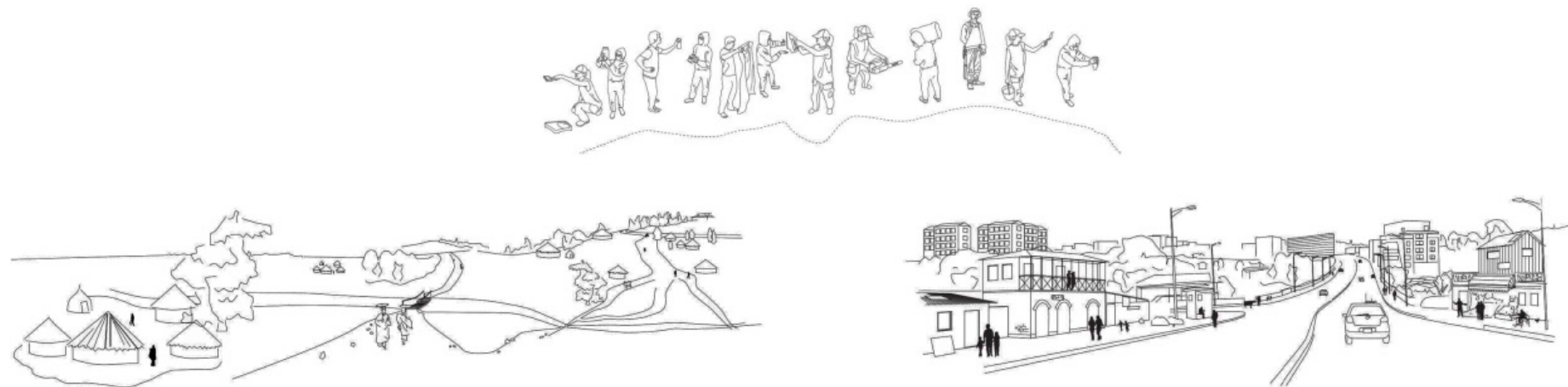


Shortage of infrastructure and basic services



People move to the city in order to obtain economic resources, in order to make money, in order to facilitate city life, for personal development...

However, the capitalists who have owned the surplus value continue to crowd out the most fragile residents of the cities from the city center to the edge of the city, to the shanty towns....



What did the government do?

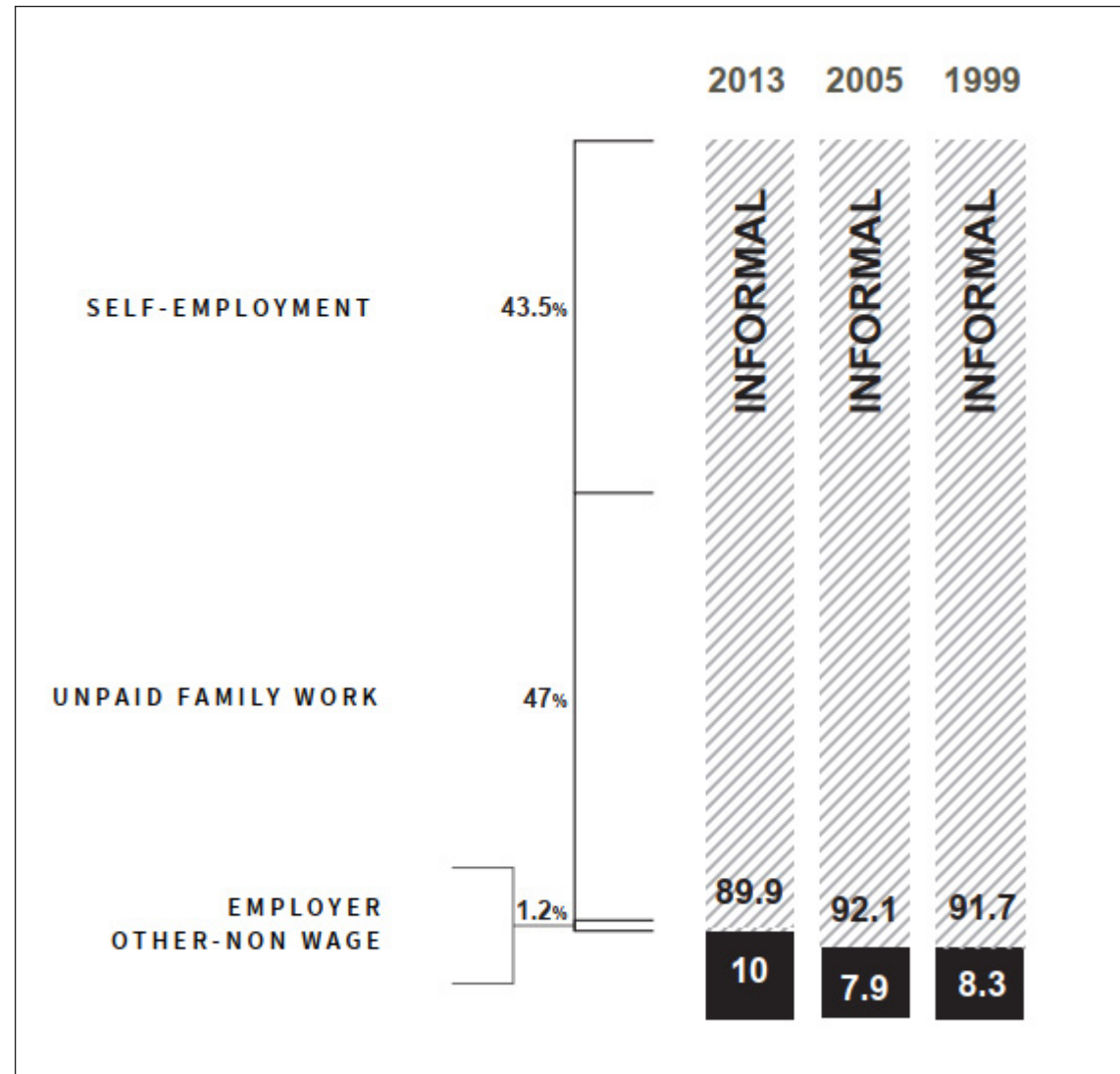
Integrated Housing Development Program (IHDP)
in 2020

This initiative, the Integrated Housing Development Programme (IHDP), aims to build at least 400,000 housing units and create 200,000 new jobs, and support up to 10,000 micro and small enterprises to enhance the capacity of the construction industry. But the repeated condos built with the help of other countries leads to a lot of empty rooms since they are not affordable and show no respect of the traditional living patterns of those target groups.

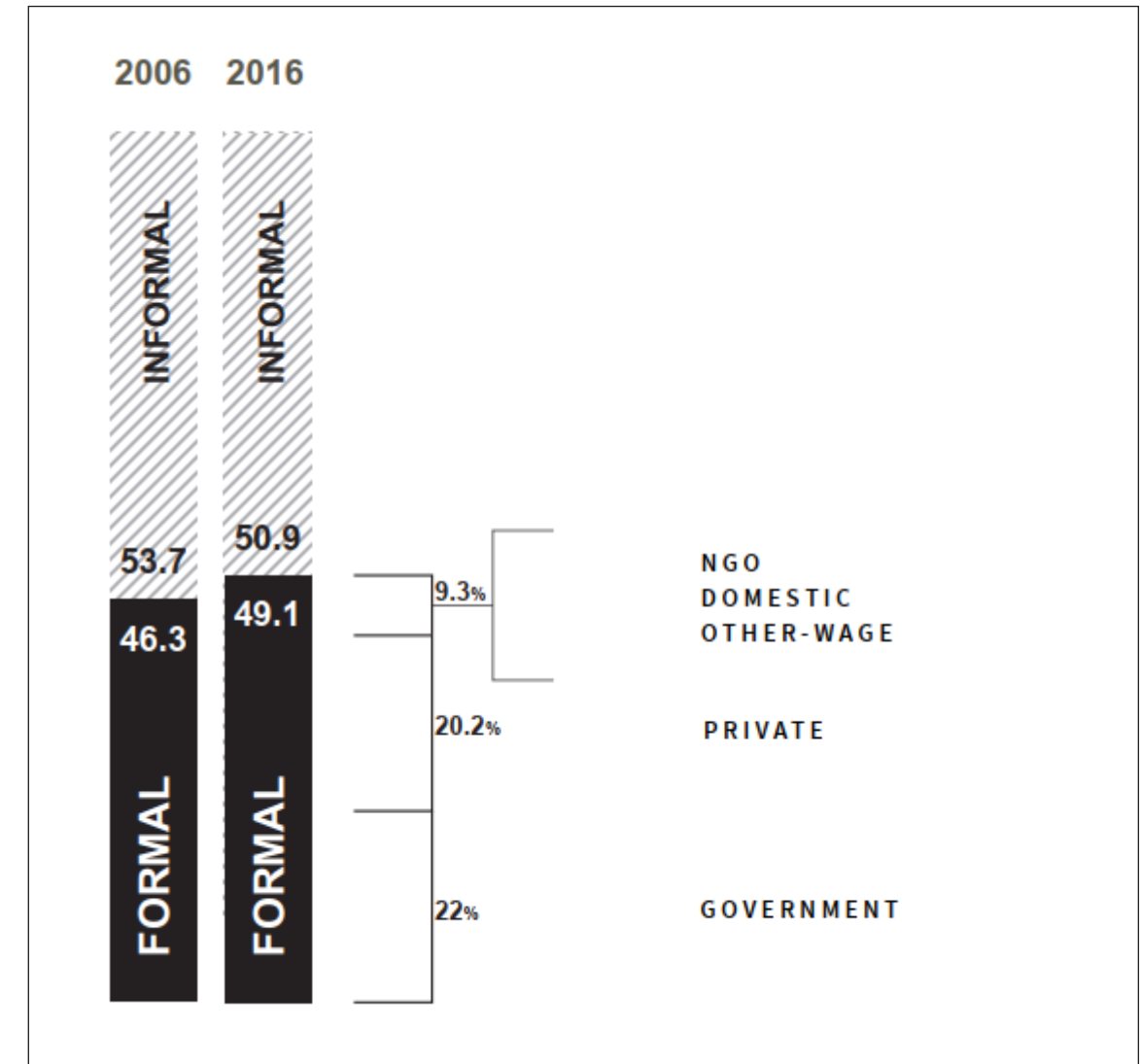


01. Background

Formal/Informal economy



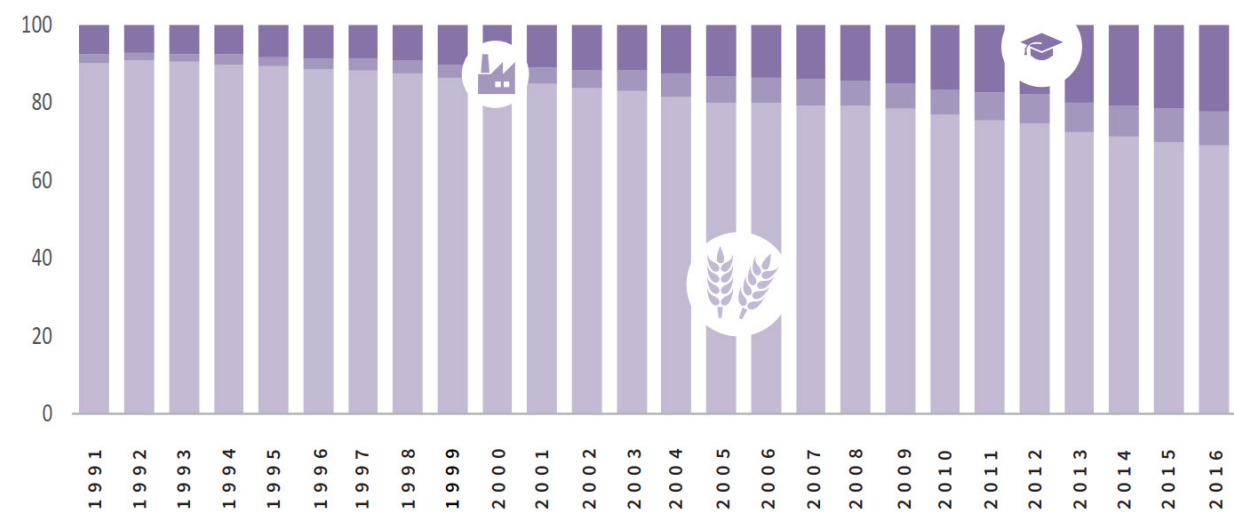
Rural



Urban

01. Background

Industrial structure



World Bank, 2019d



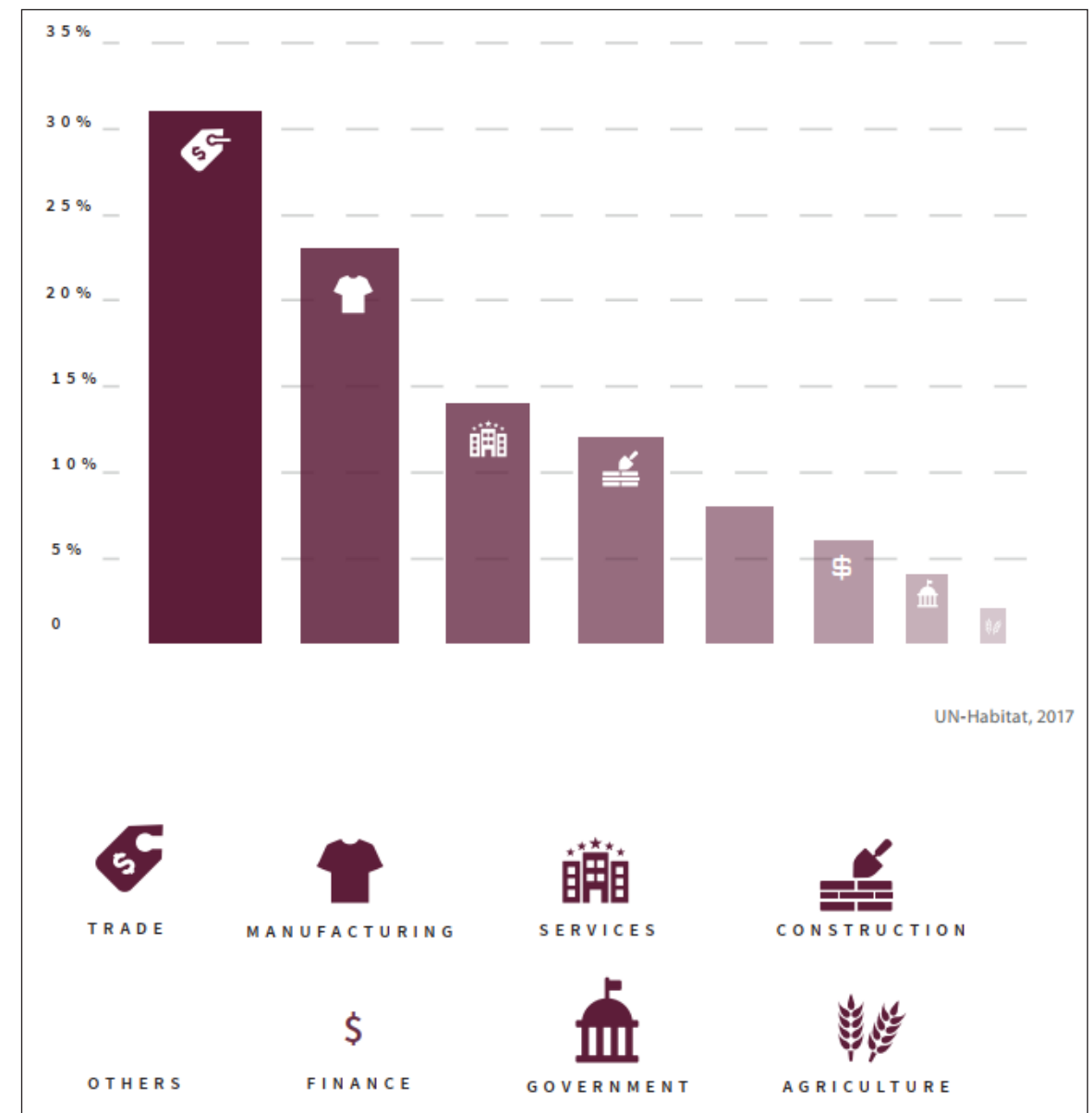
AGRICULTURE



INDUSTRY



SERVICES



UN-Habitat, 2017



TRADE



MANUFACTURING



SERVICES



CONSTRUCTION



OTHERS



FINANCE



GOVERNMENT



AGRICULTURE

A

ity

When we fly around the clock, don't forget to feel the weight of the body.

--Der Himmel über Berlin

What can the architecture do?

The city right: Cities are permanent works of residents.
---David Harvey

How to make people who want to seek self-development or family development opportunities in the city, to participate in urban development at the same time, own the city right to use, occupy, affect the urban space, and enjoy city life?

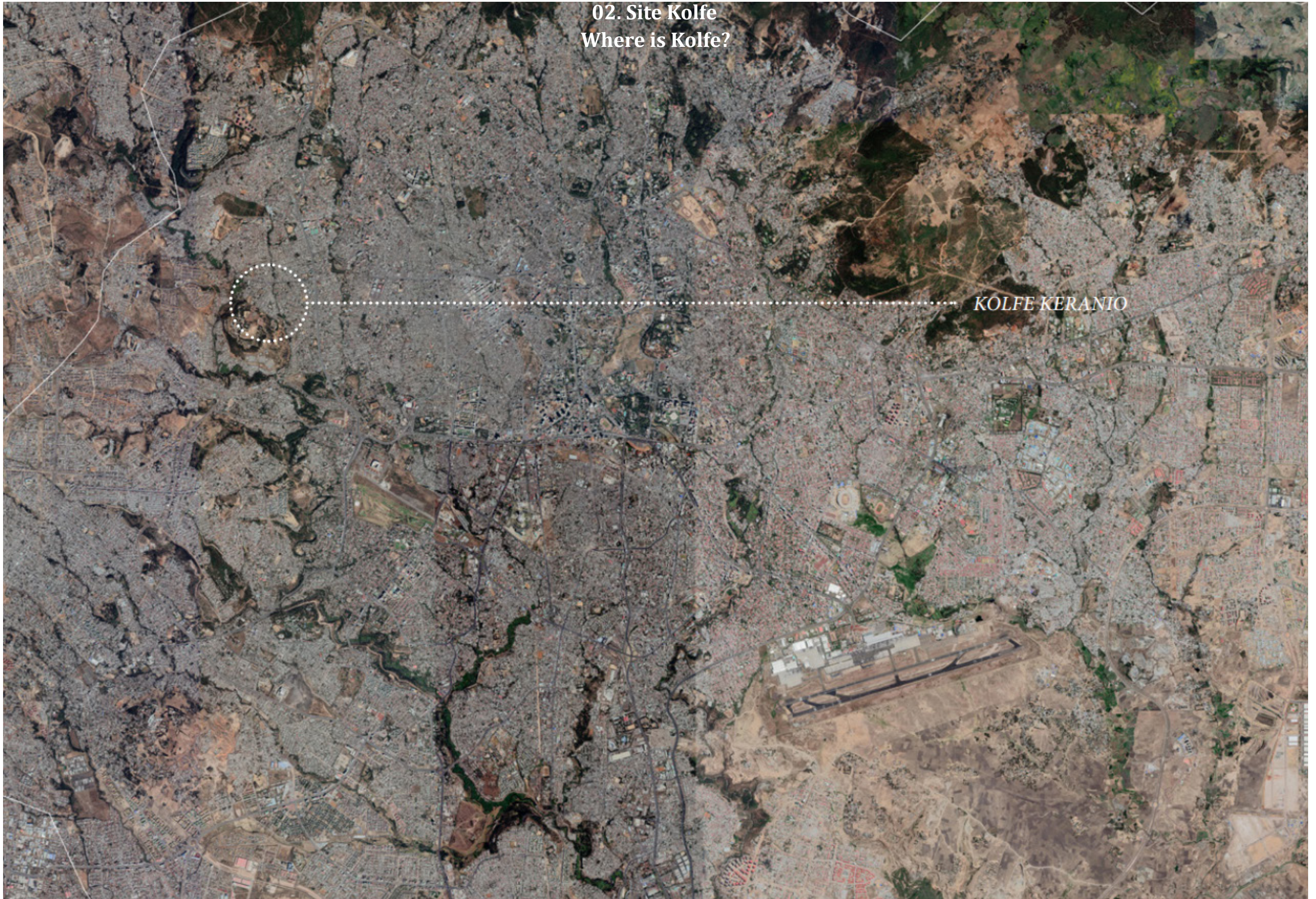


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Who owns the city? Who lives there?

02.Site Kolfe

02. Site Kolfe Where is Kolfe?



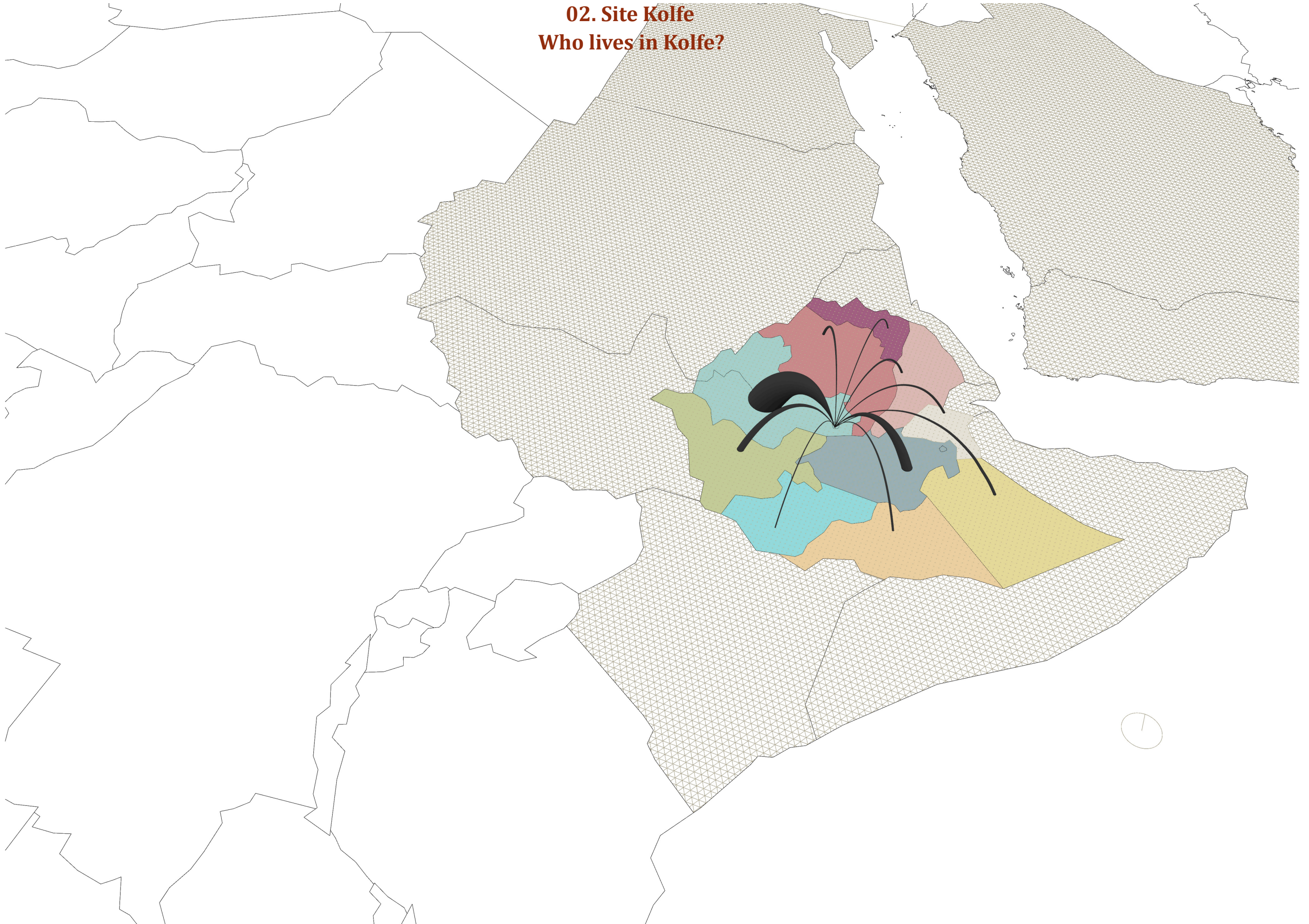
02. Site Kolfe

Who lives in Kolfe?



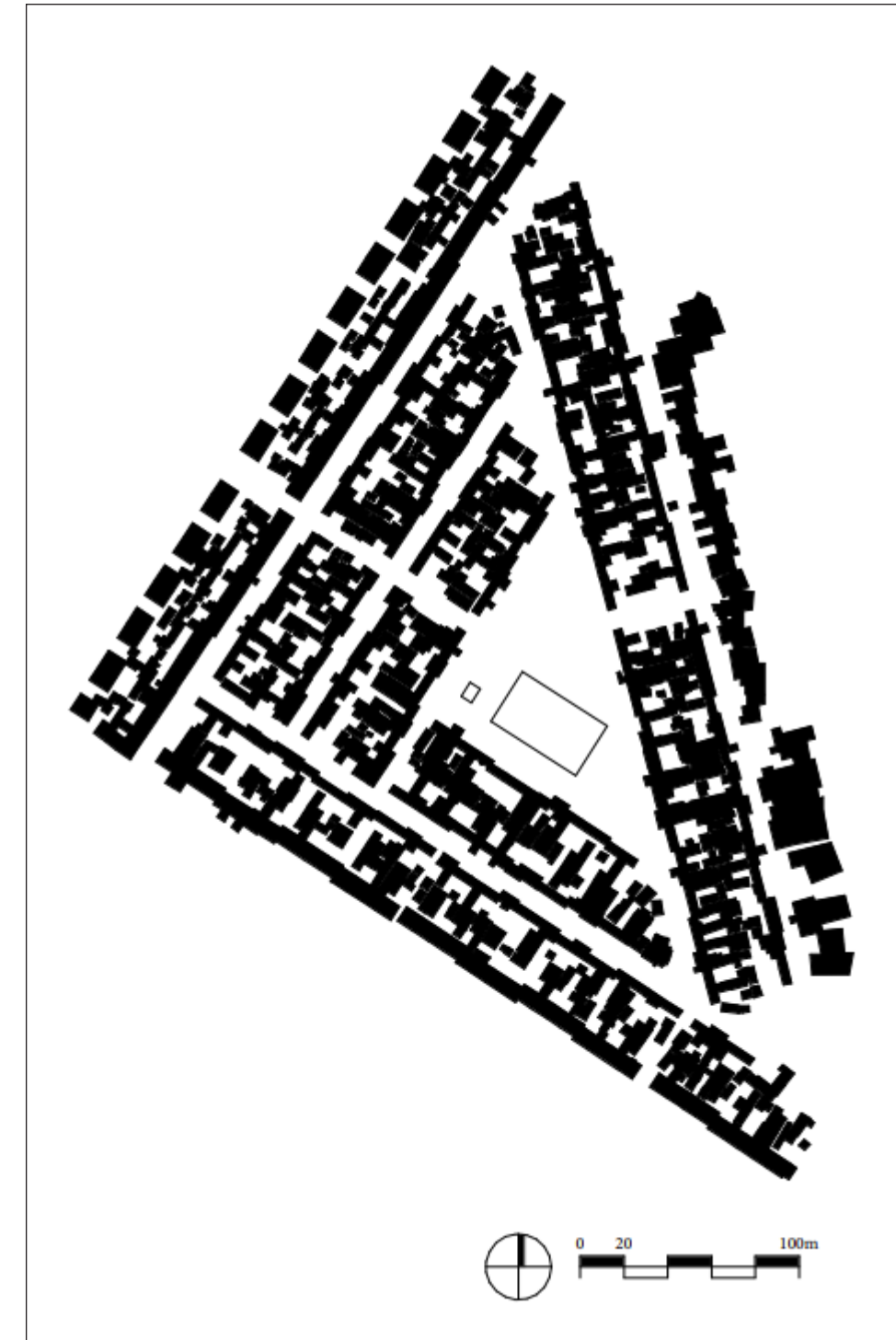
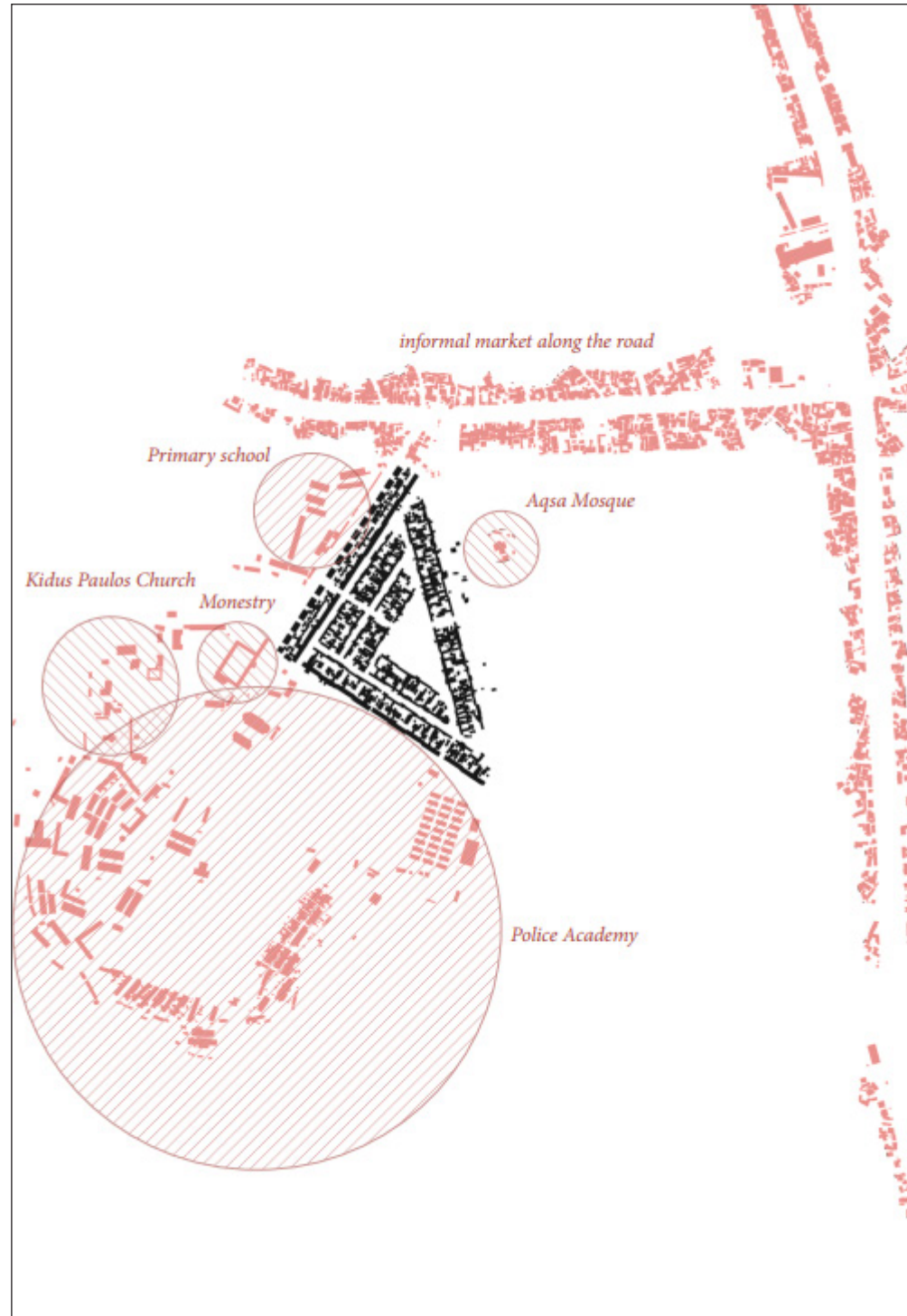
02. Site Kolfe

Who lives in Kolfe?



02. Site Kolfe

Kolfe zoom in



02. Site Kolfe

Informal extensions since 1960s



Why people would rather sacrifice living comfort for informal expansions?

Dilapidated constructions made of easily available cheap materials, people sacrificed sunlight and courtyards for this.



02. Site Kolfe

Who lives in Kolfe?-----Interviews



Interviewee 1, Marina
Income-generation Activity: Laundry
Place: Doortyard

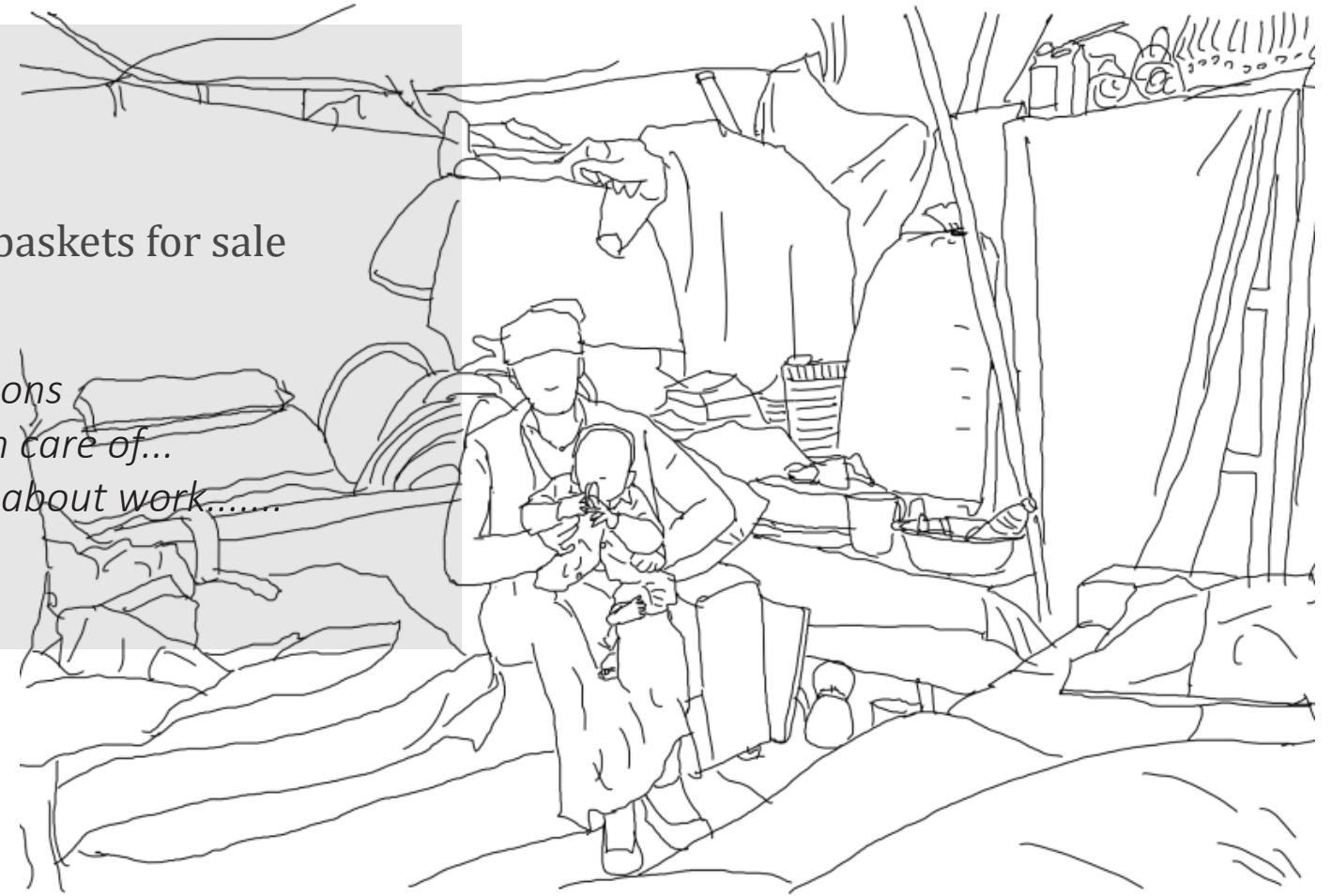
*I never get enough money to extend my house, although the materials are rough, but still too expensive for me.....
I do work hard, but I do not have skills.
I do the laundry for people from the "outside".*

02. Site Kolfe

Who lives in Kolfe?-----Interviews

Interviewee 2, Dirk's mom
Income-generation Activity: Make Habesha baskets for sale
Place: Bedroom/Living room

*I have big family, I have two grandsons
They are too young, they need to be taken care of...
I cannot go out for working and I know nothing about work.....*



Interviewee 3, Hawi
Income-generation Activity: Make Ijera for sale
Place: Kitchen

*My family is planning to get another extension at the end of this
year,
it will take up the courtyard a bit but we need more rooms.*



02. Site Kolfe

Who lives in Kolfe?-----Interviews

Interviewee 4, Mary's family

Income-generation Activity: Rent rooms to workers

Place: Self-build Extensions

After decades, we have these extensions, and we can earn money by renting them to workers.

We can work hard, we are poor, but we like living in the city since we can earn money here. I like our city and I like my house.....



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02. Site Kolfe

Informal income-generation activities



Income generation based on community

Place: public areas



02. Site Kolfe

Informal income-generation activities



Income generation based on neighbourhood

Place: streets



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02. Site Kolfe

Common activities in Kolfe



Internal courtyard of the compound: women washing clothes and taking care of their children together in Kolfe



Informal market in Kolfe



Football table in the street for communal activities in Tallian



Men resting in the only green space in the area, Addis Ababa



Lunch in the shade in Kechene



Football field for children in Kolfe

02. Site Kolfe

What is the most appealing characteristics of Kolfe?

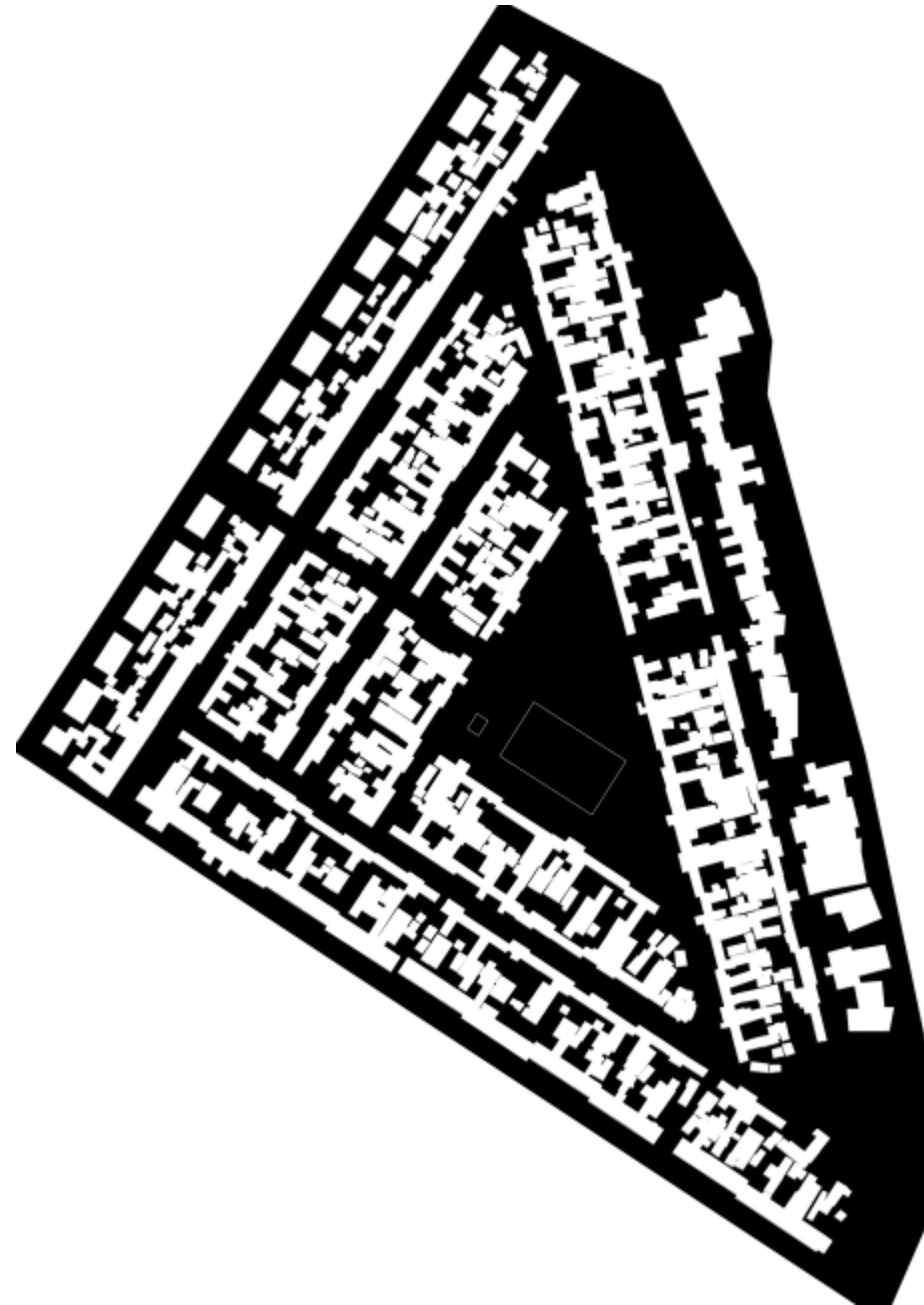
What makes Kolfe unique?

"Informal"

02. Site Kolfe

Specific Problems

1. No oppotunities for densification



02. Site Kolfe

Specific Problems

1. No oppotunities for densification
- 2. Poor infrastructure & living conditions**



02. Site Kolfe

Specific Problems

1. No oppotunities for densification
 2. Poor infrastructure & living conditions
- 3. Housing properties----owned by FHC (Federal Housing Corporation)**
- Monthly rental: $330 \times 12 \text{ months} \times 60 \text{ years} = 237,600$

40/60 condominium prices as per Addis Ababa Saving Houses Development Enterprise (ASHDE) 2017 price changes is **4,918 birr per square meter**.

Condominium Type	Current Total Price	Square Meter	Initial Price	Monthly Payment
One bedroom			162,000	1,033 birr
Two bedroom	609,800 birr	124	250,000 Birr	1,575 birr
Three bedroom	737,700 birr	150	386,000 Br	2,453 birr
Four bedroom	826,200 birr	168	Was not available during the initial registration	Was not available during the initial registration

02. Site Kolfe

Specific Problems

1. No oppotunities for densification
2. Poor infrastructure & living conditions
3. Housing properties----owned by FHC (Federal Housing Corporation)
Monthly rental: $330 \times 12 \text{ months} \times 60 \text{ years} = 237,600$

4. Lack of proper spaces

--currently informal, not well stimulated---

02. Site Kolfe

Specific Problems

1. No oppotunities for densification
2. Poor infrastructure & living conditions
3. Housing properties-----owned by FHC (Federal Housing Corporation)
Monthly rental: $330 \times 12 \text{ months} \times 60 \text{ years} = 237,600$
4. Lack of proper spaces

5. Disconnected from the city



Research Question

How to create an open/inclusive community with different types/scales of common spaces, which can encourage diverse urban formal/informal activities and provide opportunities for income-generation, self-development, and the opportunities to own the city right, to enjoy the city life?

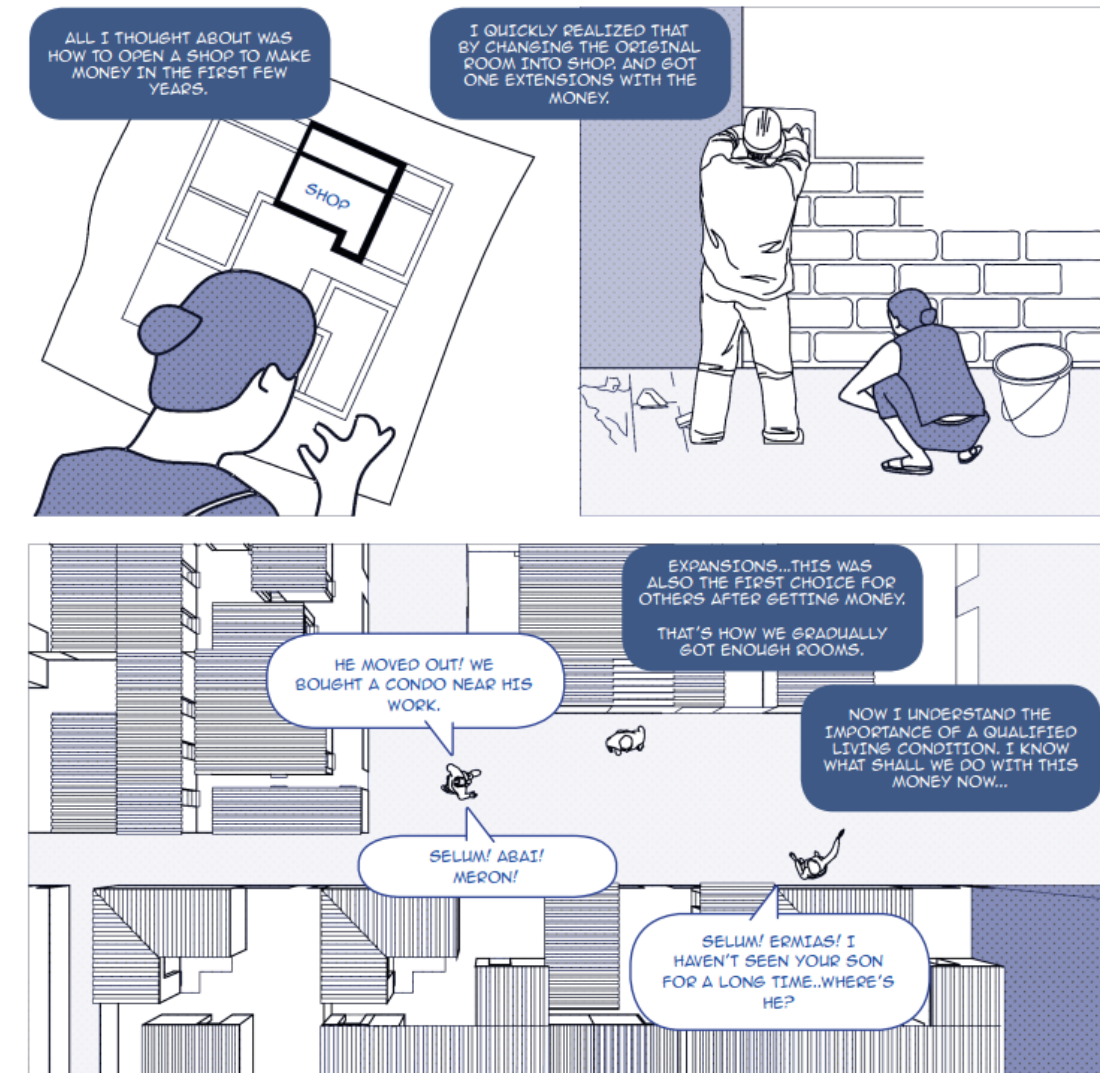
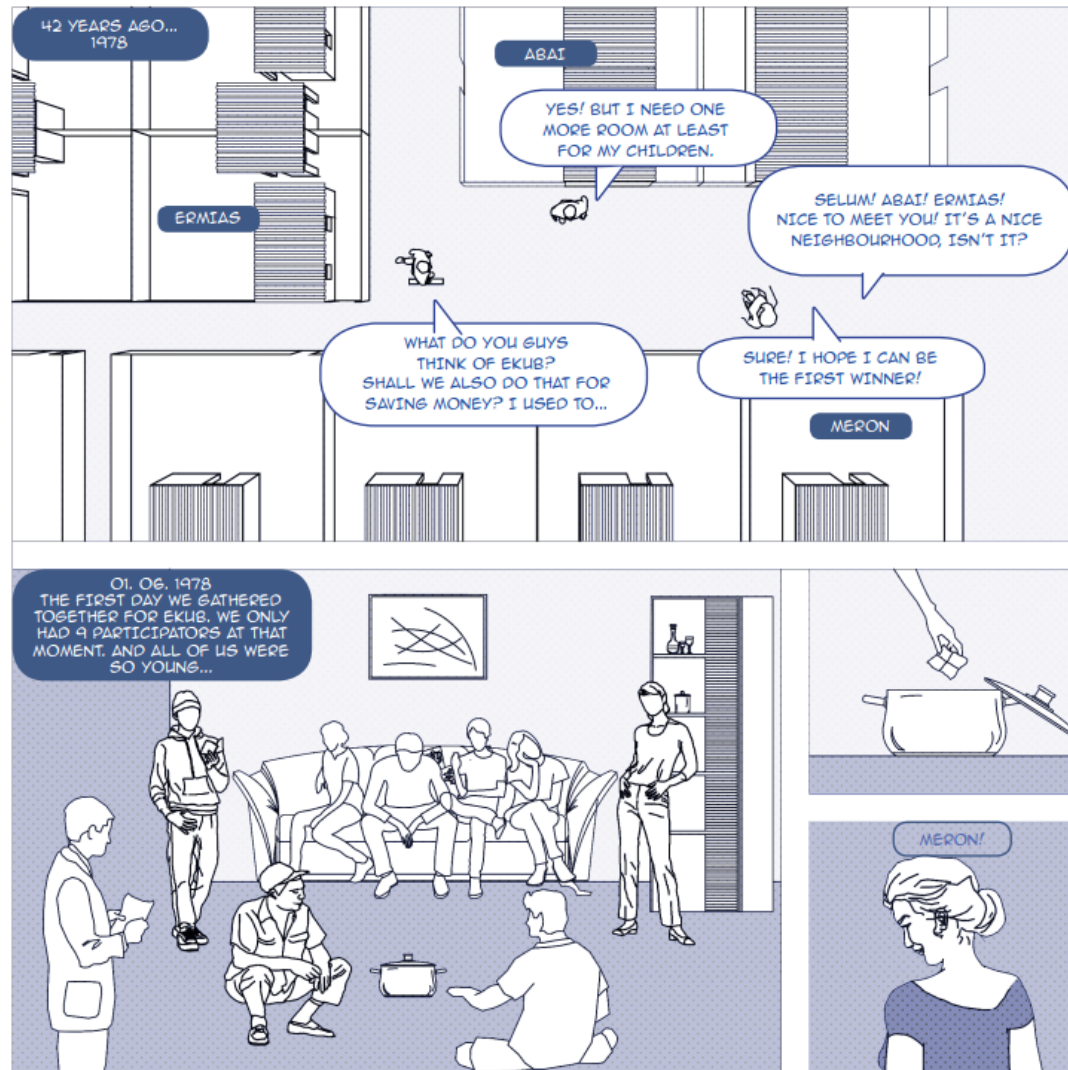
03.Design research

Research is the process by which you understand the world in a verifiable and consistent manner. That is not to say that research is not contested, but a transparency about the way that you conduct your research will strengthen your proposition.

--Luca, Research methods

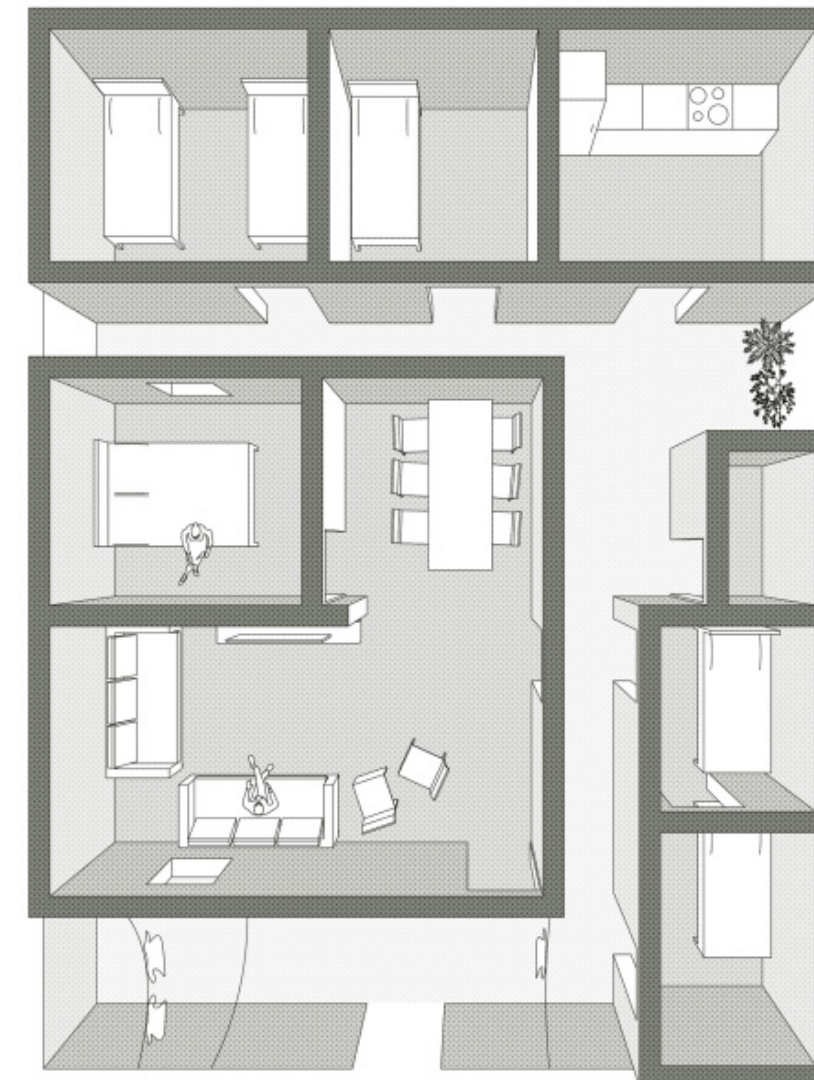
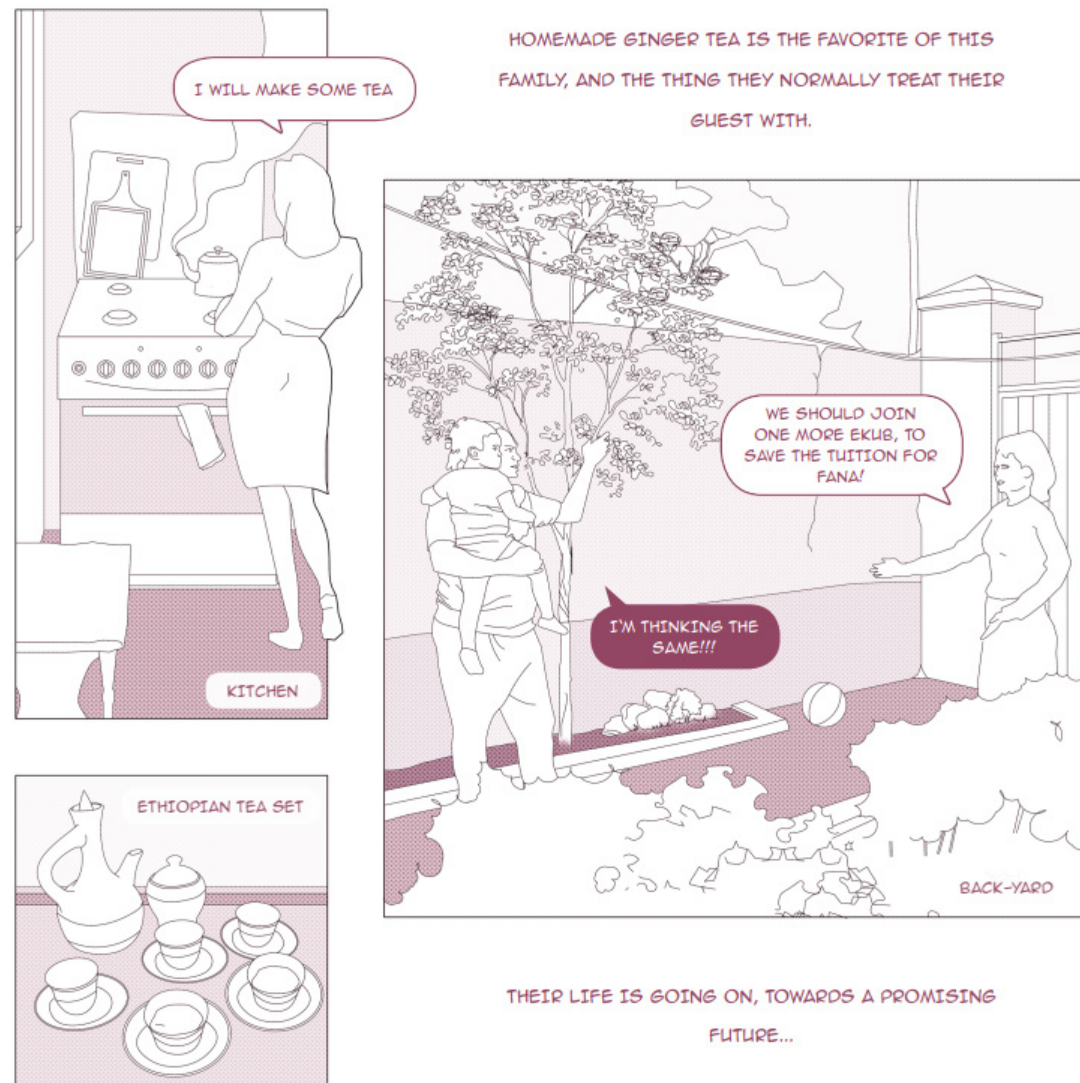
03. Research

Ethnography drawings



03. Research

Ethnography drawings



ERMIAS HAS CHANGED THE SEWING WORKSHOP BACK INTO A LIVING ROOM, AND ADDED IN A NEW MASTER BEDROOM AND DINING AREA.


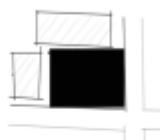

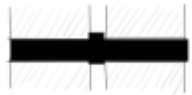





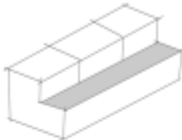



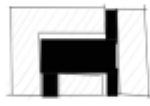




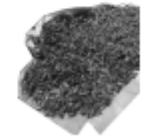

MORE SLEEP UNITS ARE ADDED FOR TIGISTI AND ERMIAS' CHILD AND ALSO OTHER DISTANT RELATIVES.

THE TRADITIONAL OUTDOOR KITCHEN IS REPLACED BY A MODERN ONE.

IT APPEAR THAT TIGISTI AND ERMIAS ARE IN A BETTER LIFE NOW. ONLY SOMETIMES TIGISTI STILL THINK ABOUT THE LARGE COURTYARD THAT THEY USE TO HAVE.

03. Research

Daily practises & space

			Scattered	Street	Courtyard	Plaza		
								Shoes Shiners 
								Informal Market Attendees 
								Street Store Owners 
Gallery	Platform	Balcony						
								Craftsman 
								Injera Makers 
								Crop Producers 

03. Research

Case study



Plaza Mayor, Madrid, Spain
Gómez de Mora, Juan, 1586-1648



Piazza Giotto, Vicchio, Italy

03. Research

Case study

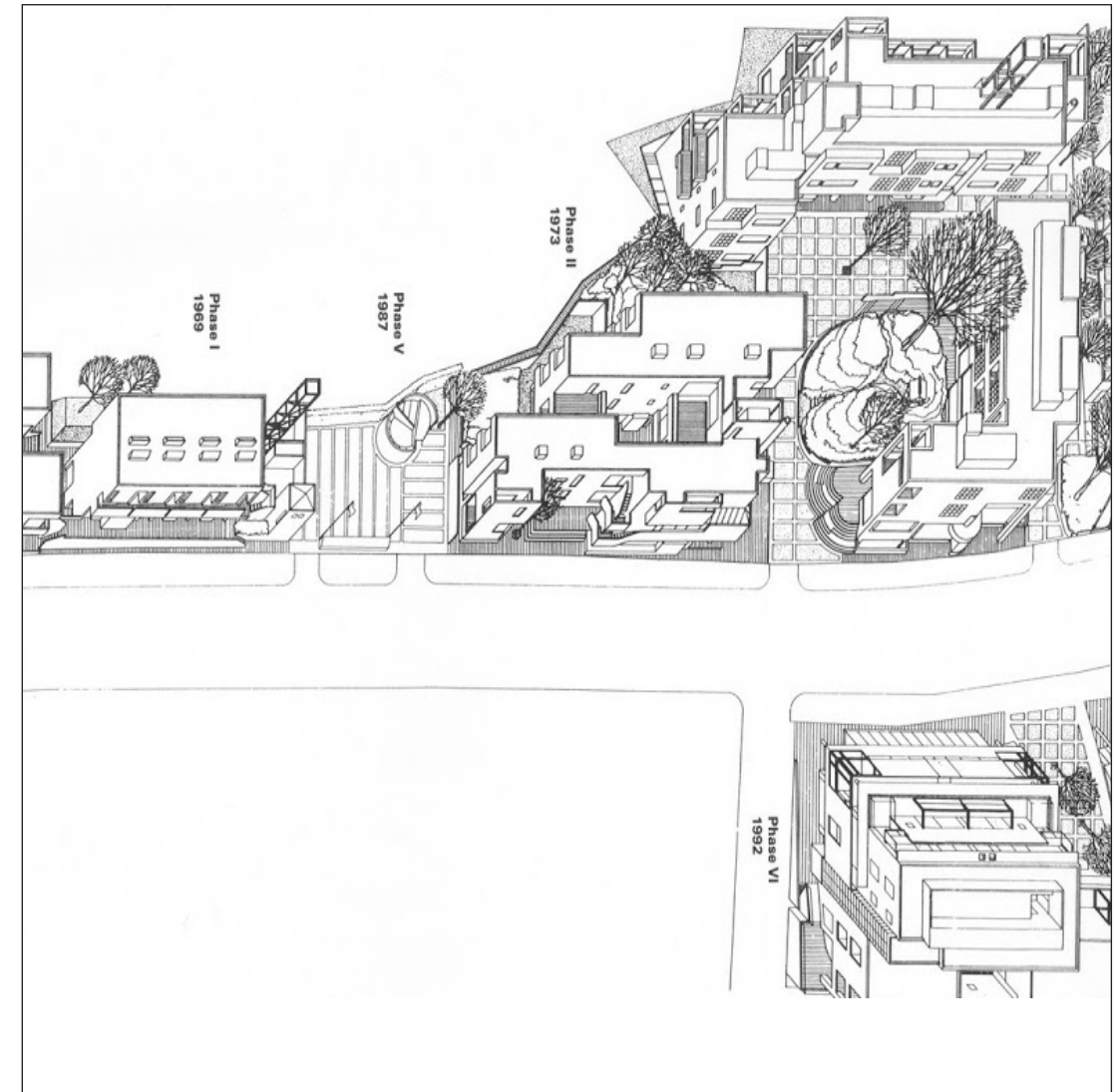
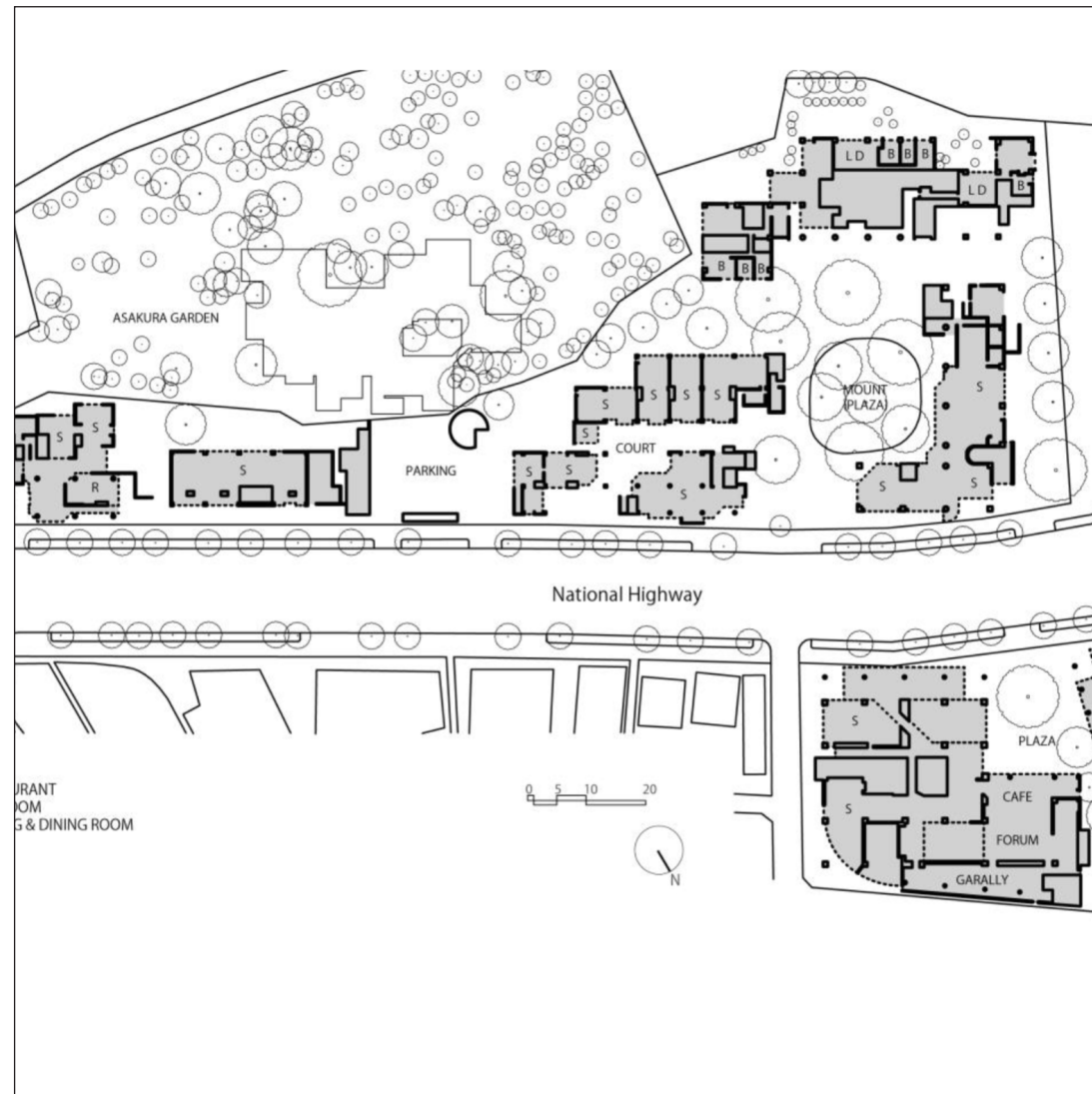


Street market and hawkers on the street
Cairo, Egypt



Traditional street market
Hongkong, China

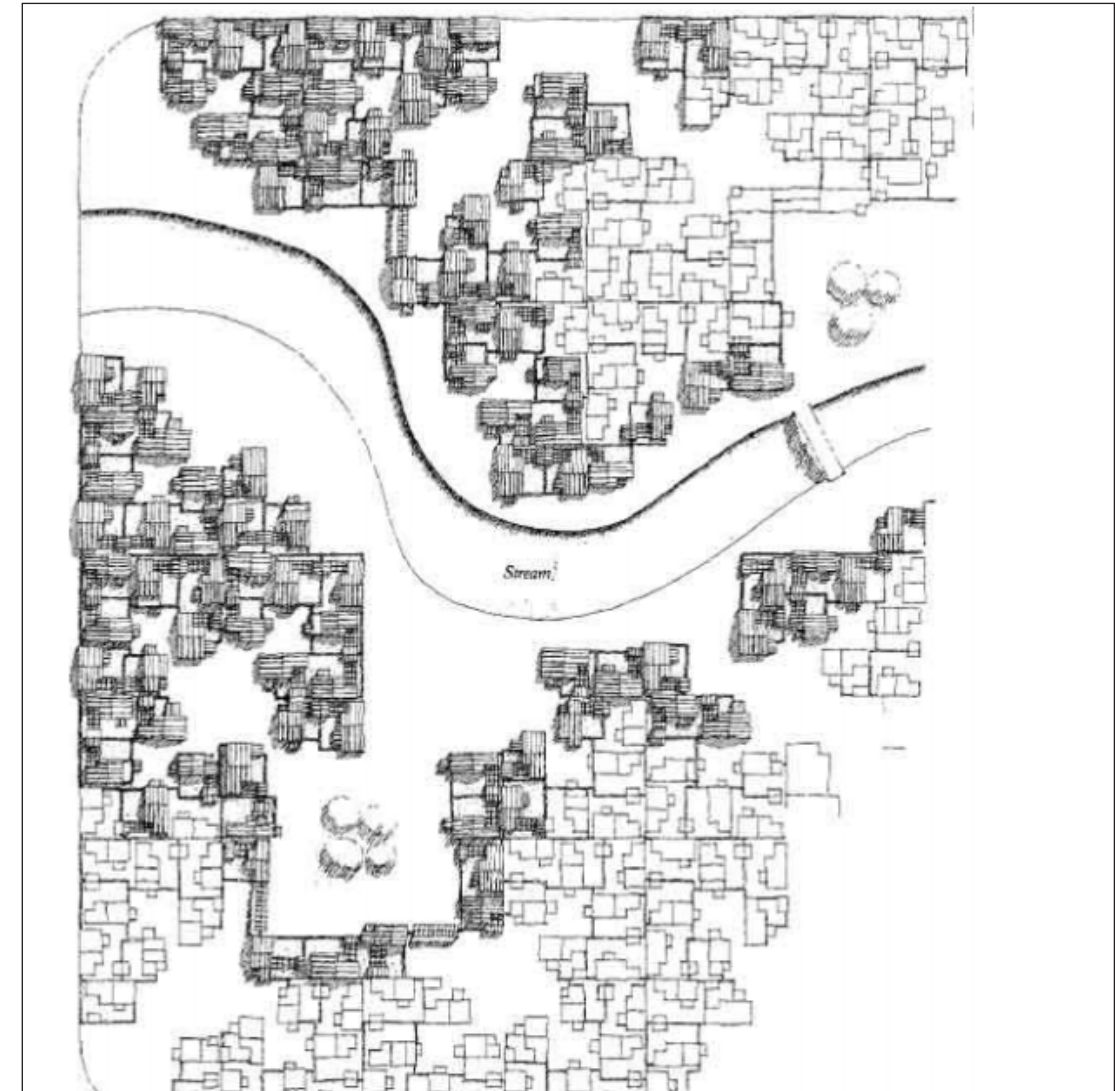
03. Research Case study



Daikanyama hillside terrace, Tokyo, Japan
Fumihiko Maki, 1967-1992

03. Research

Case study

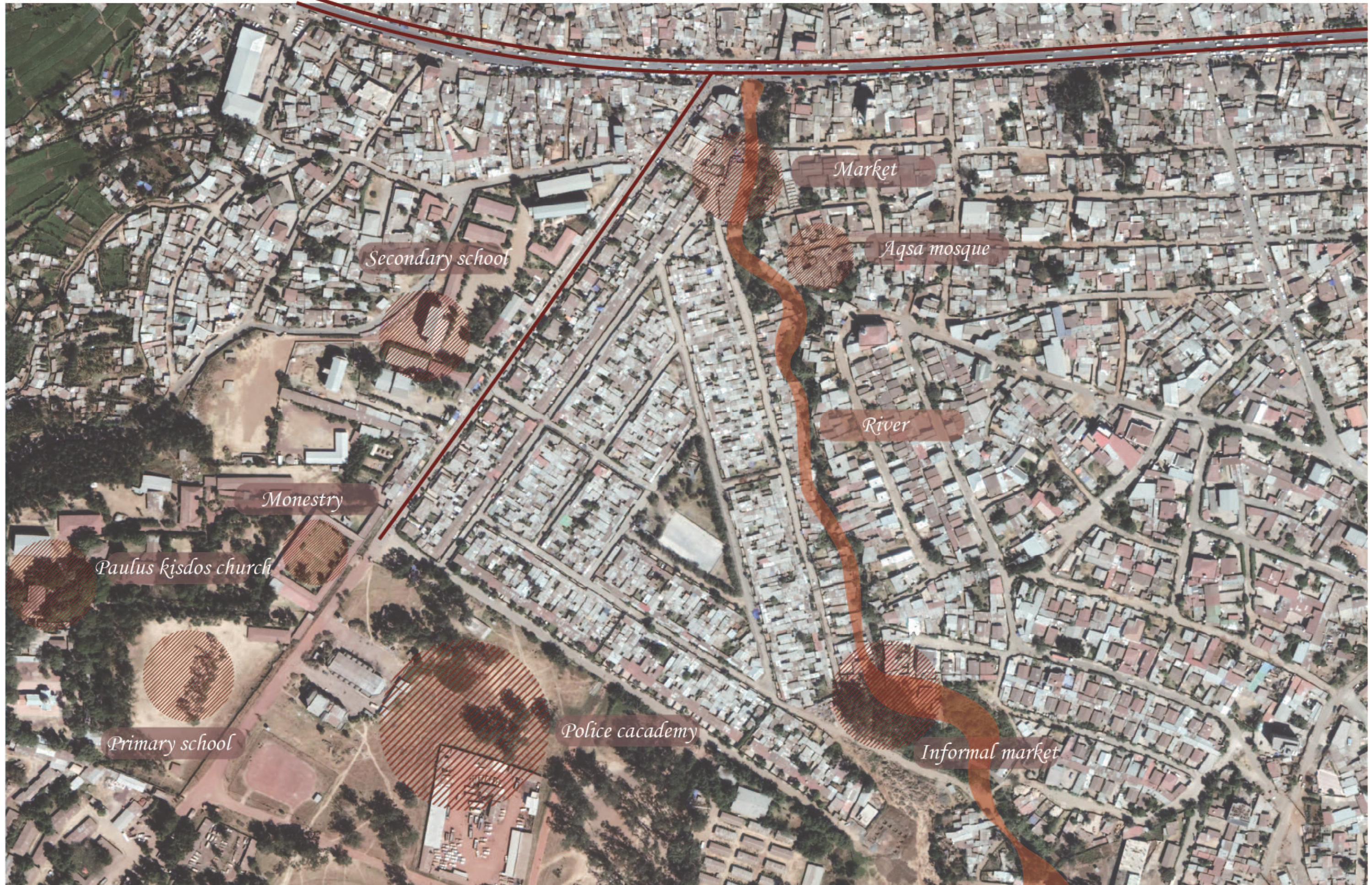


Belapur Housing, Navi Mumbai, India
Charles Correa, 1980s

04. Design

04. Design ---Urban strategy

Urban value



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04. Design ---Urban strategy

Design decision

Goal: Link rever side to the main road

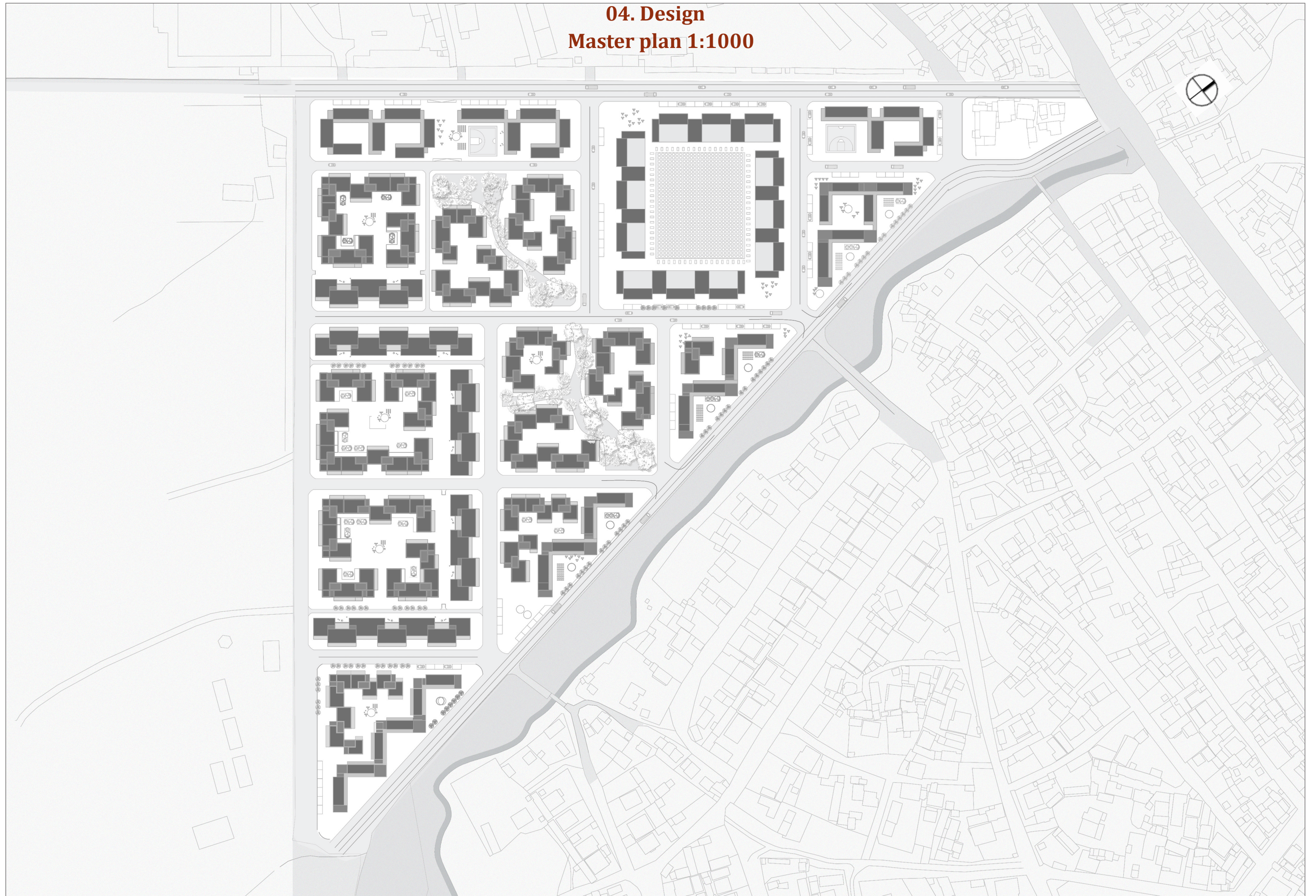
Make the site more open

Attract more people(come from urban/other side)come into the site

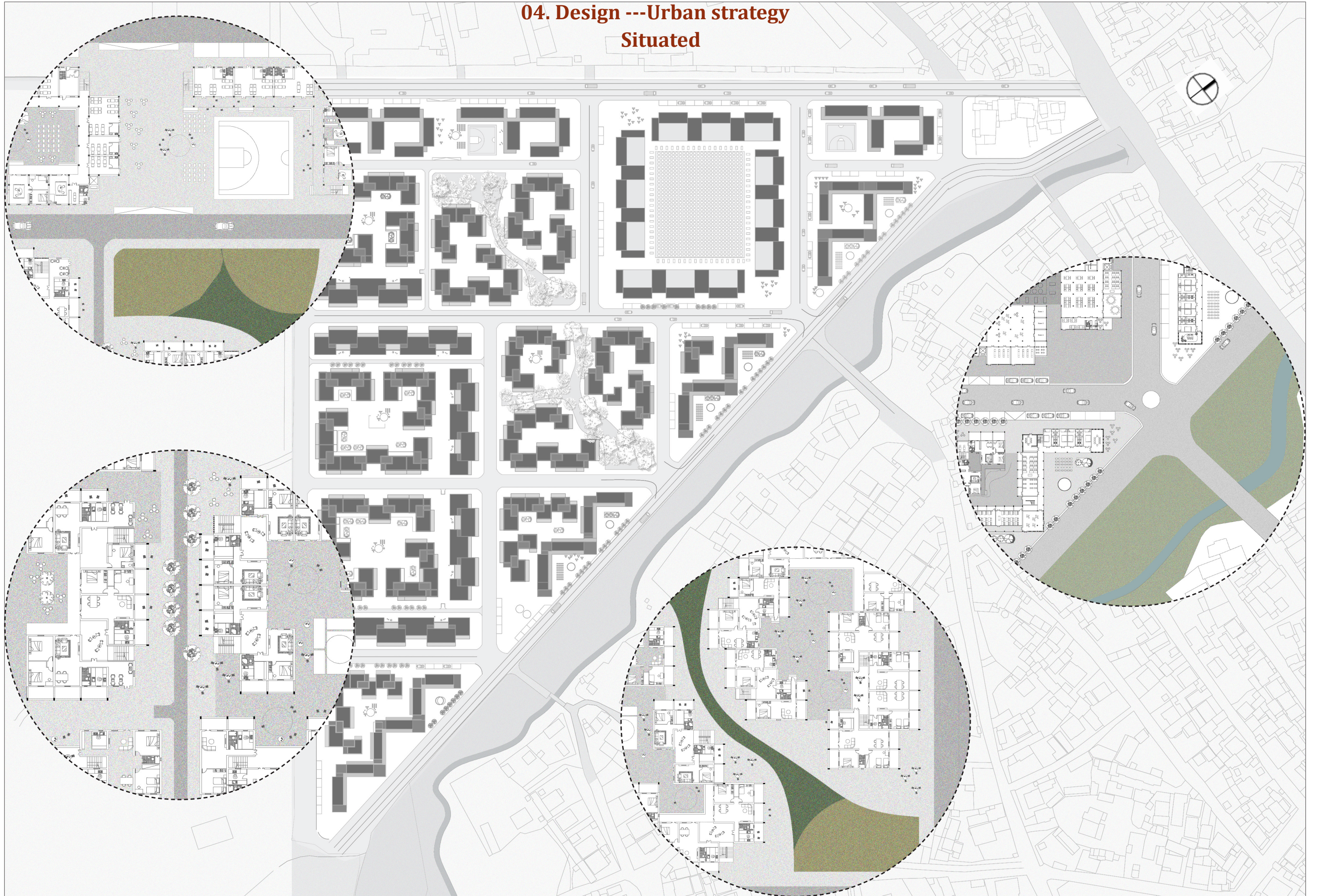


04. Design

Master plan 1:1000



04. Design ---Urban strategy Situated



04. Design --- Dwelling Strategy Typologies

Co-living type

Shared facilities
Target people: workers/craftmen
Floors: 4~5
Property: Rent
FSI: 1.6



Family contained type

Families
Target people: current/new families
Floors: 4~5
Property: Rent to buy
FSI: 1.5



Market type

Dwelling on the market
Target people: people work outside Kolfe
Floors: 3
Property: Rent/Buy
FSI: /



Condo type

Modern/High floor/ Elevator
Target people: people work outside Kolfe
Floors: 7~8
Property: Buy
FSI: 2.3





Co-living type

Shared facilities

Target people: workers/craftmen

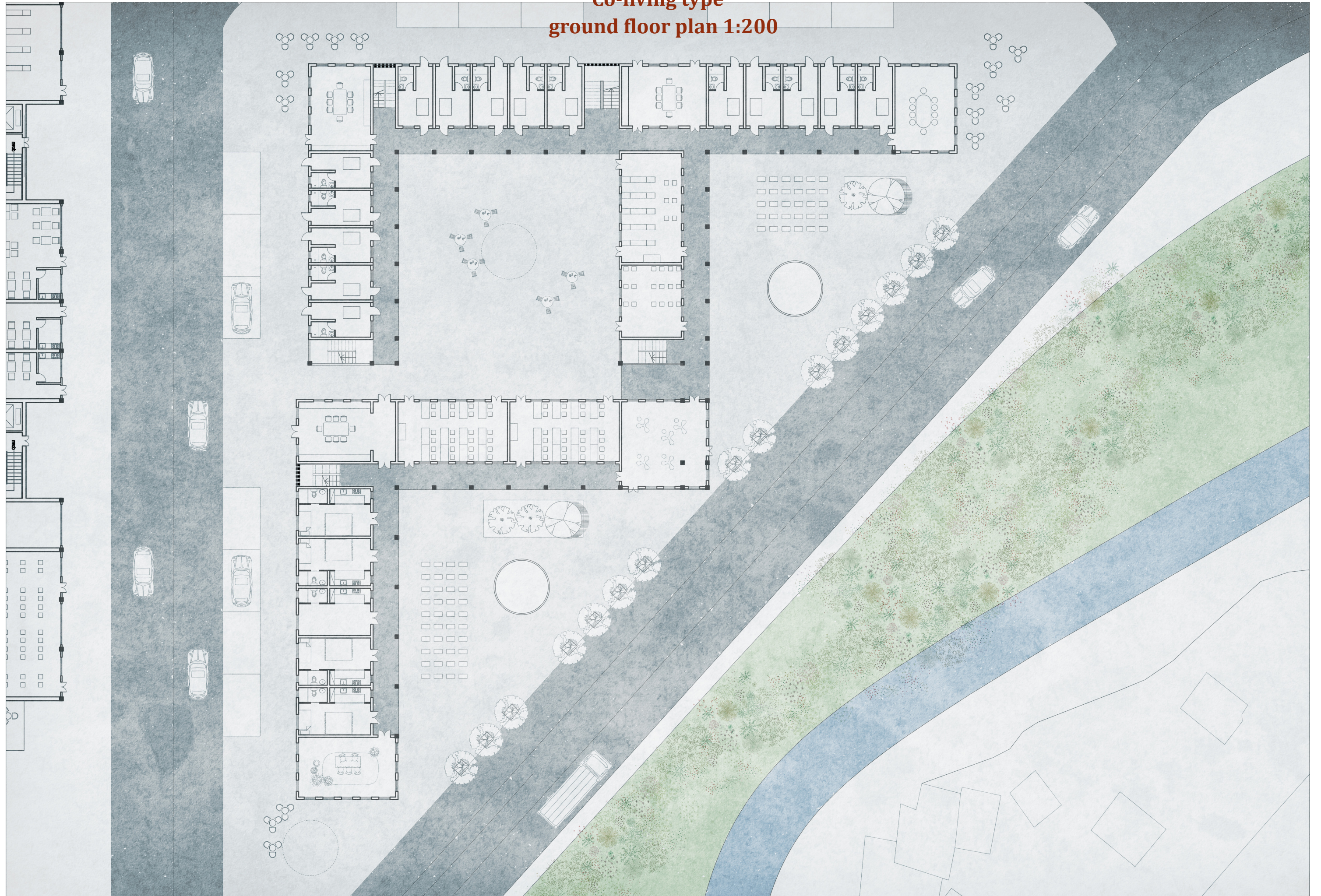
Floors: 4~5

Property: Rent

FSI: 1.6

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Co-living type
ground floor plan 1:200



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Co-living type Perspectives



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Co-living type Cross section



A right to an inclusive open community

Co-living type
ground floor plan 1:200



A right to an inclusive open community

Co-living type Cross section



A right to an inclusive open community

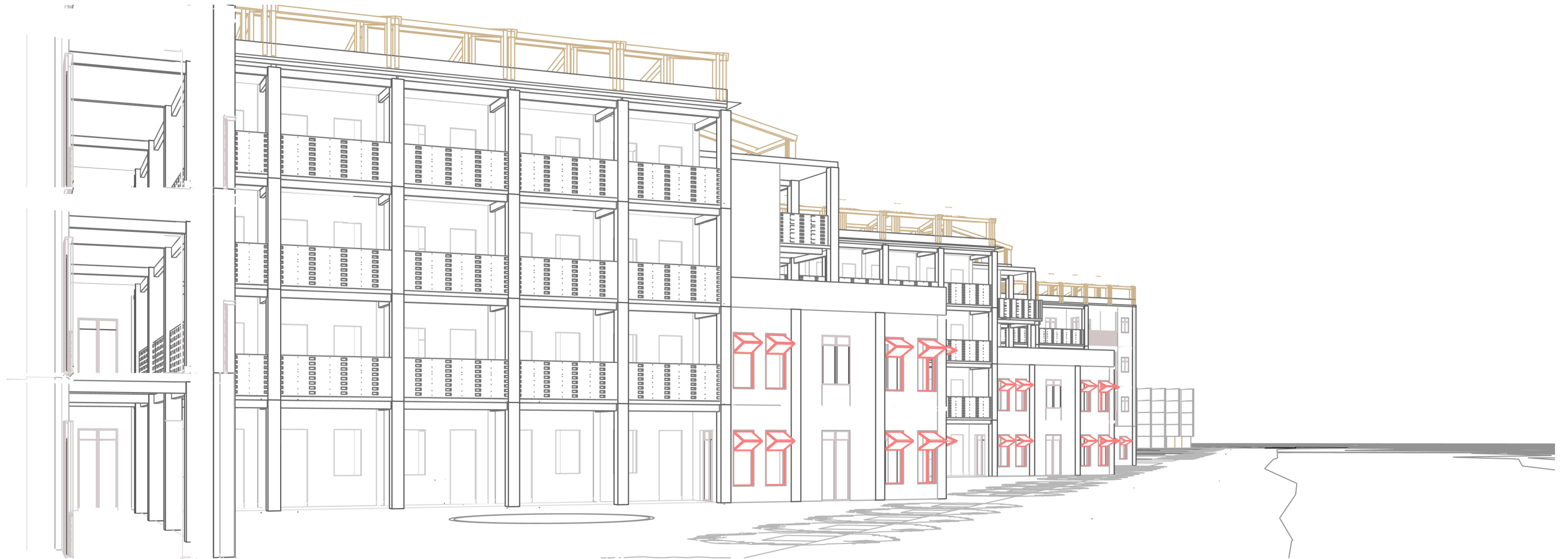
Co-living type Elevation



A right to an inclusive open community

Co-living type

Perspective alongside the river





Family-contained Type/Cluster Type

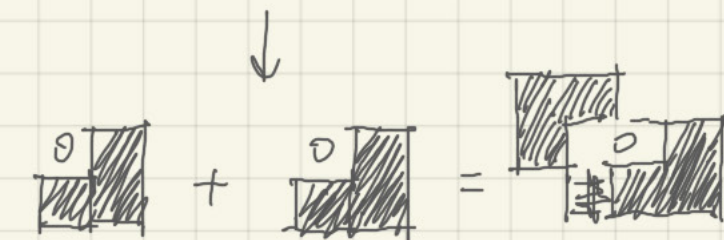
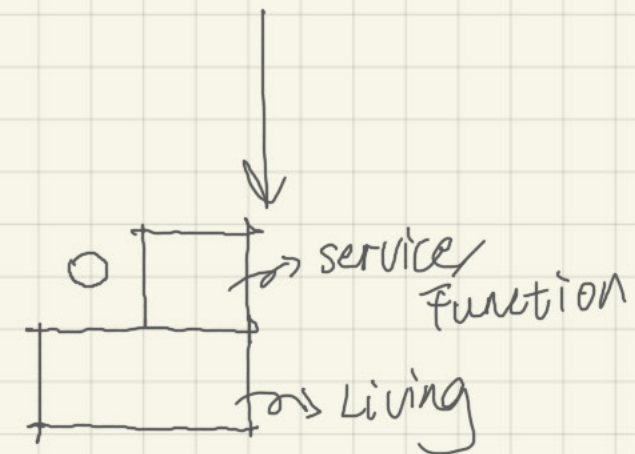
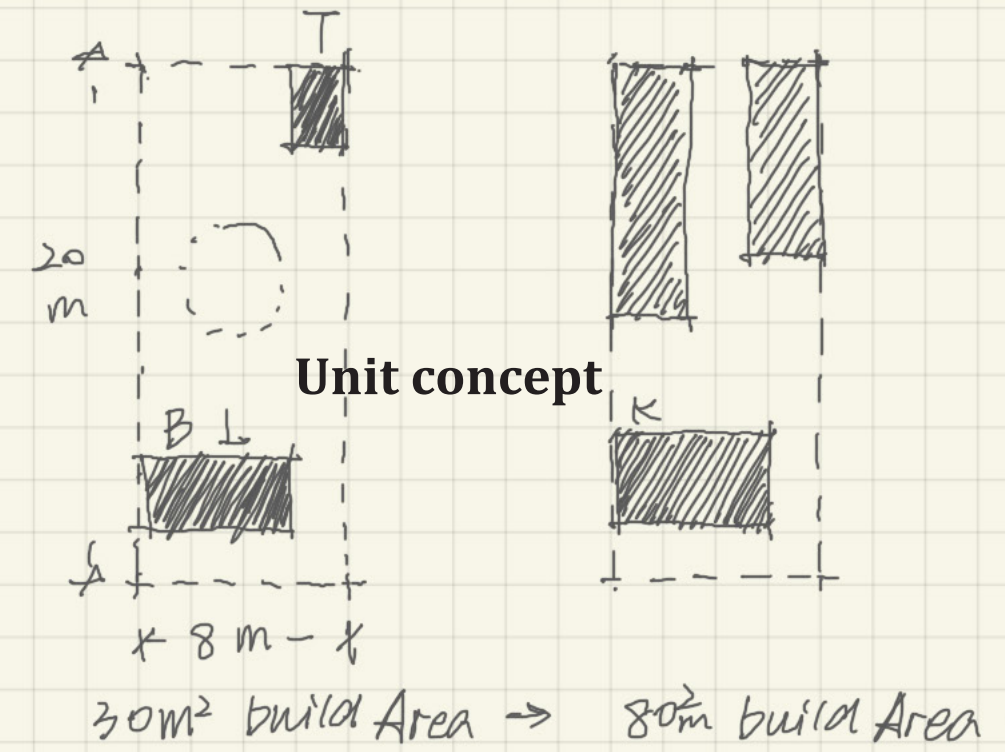
Target people: Current families in Kolfe/New families

Floors: 3-4-5

Number: Original: 330 Families, Now: ~671 Families

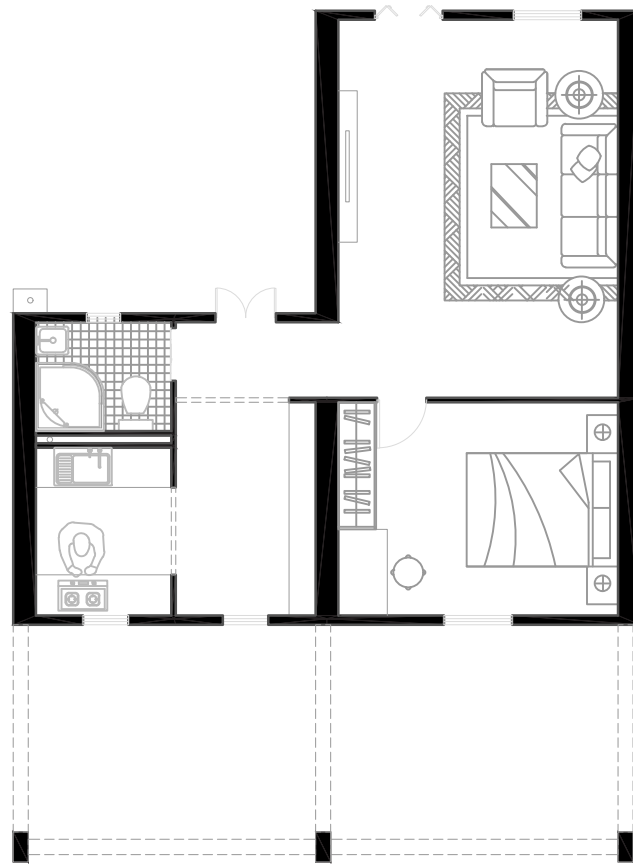
Fsi: Original: 0.55; Now: ~1.94

Typologies



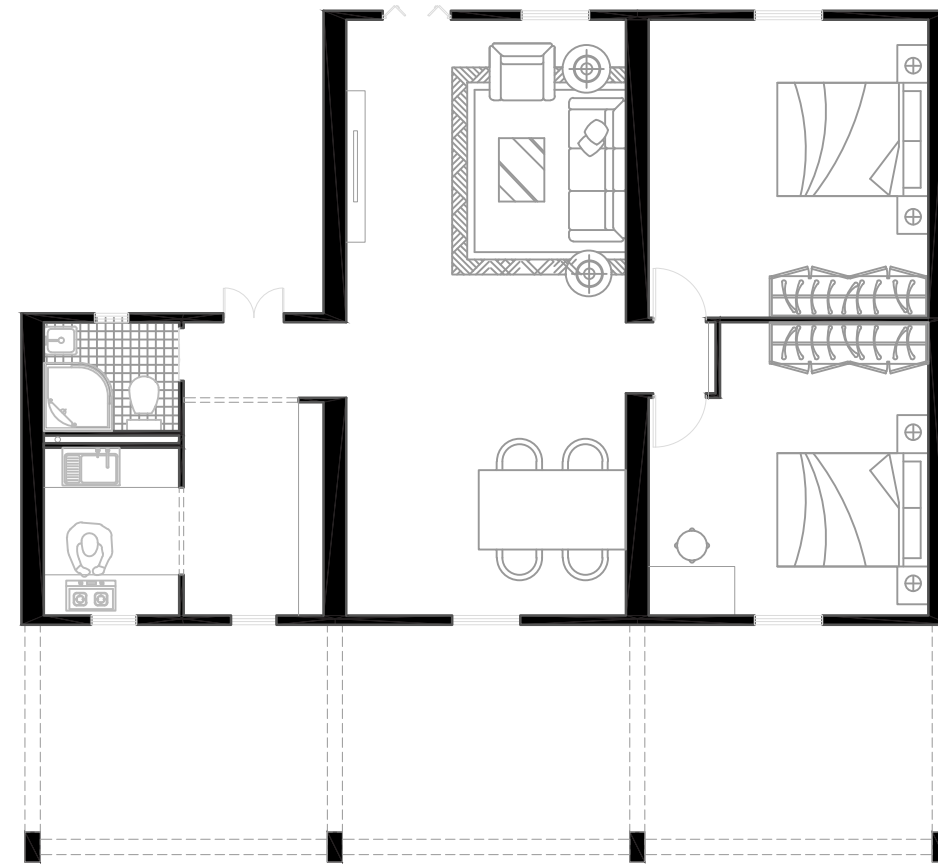
Family contained type

Basic unit type 1:50



One bedroom type

$4*4+4*8=48$ sqm
+ $8*3=24$ sqm possible extension



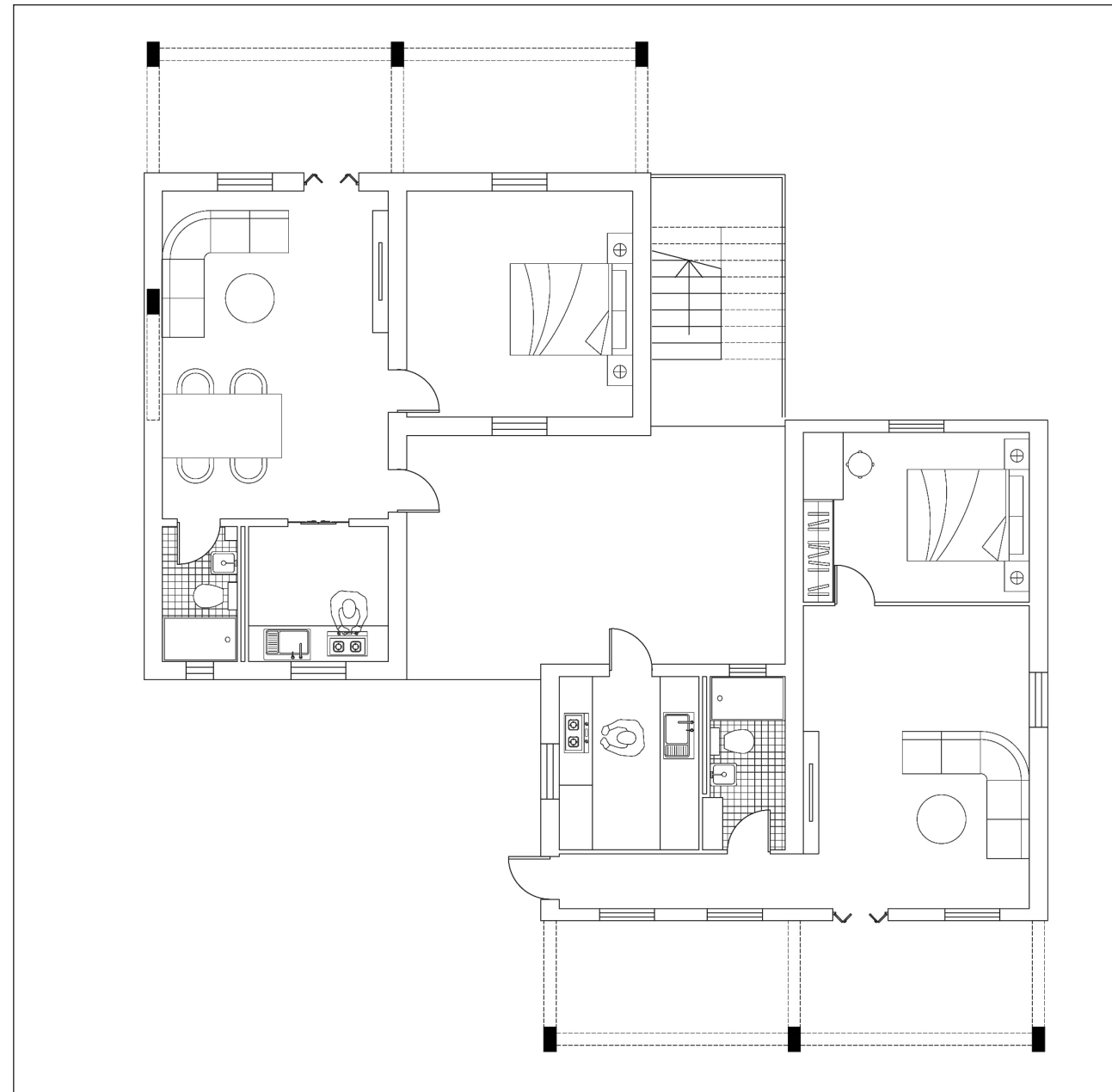
Two bedrooms type

$4*4+4*8+4*8=80$ sqm
+ $12*3=36$ sqm possible extension

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Family contained type

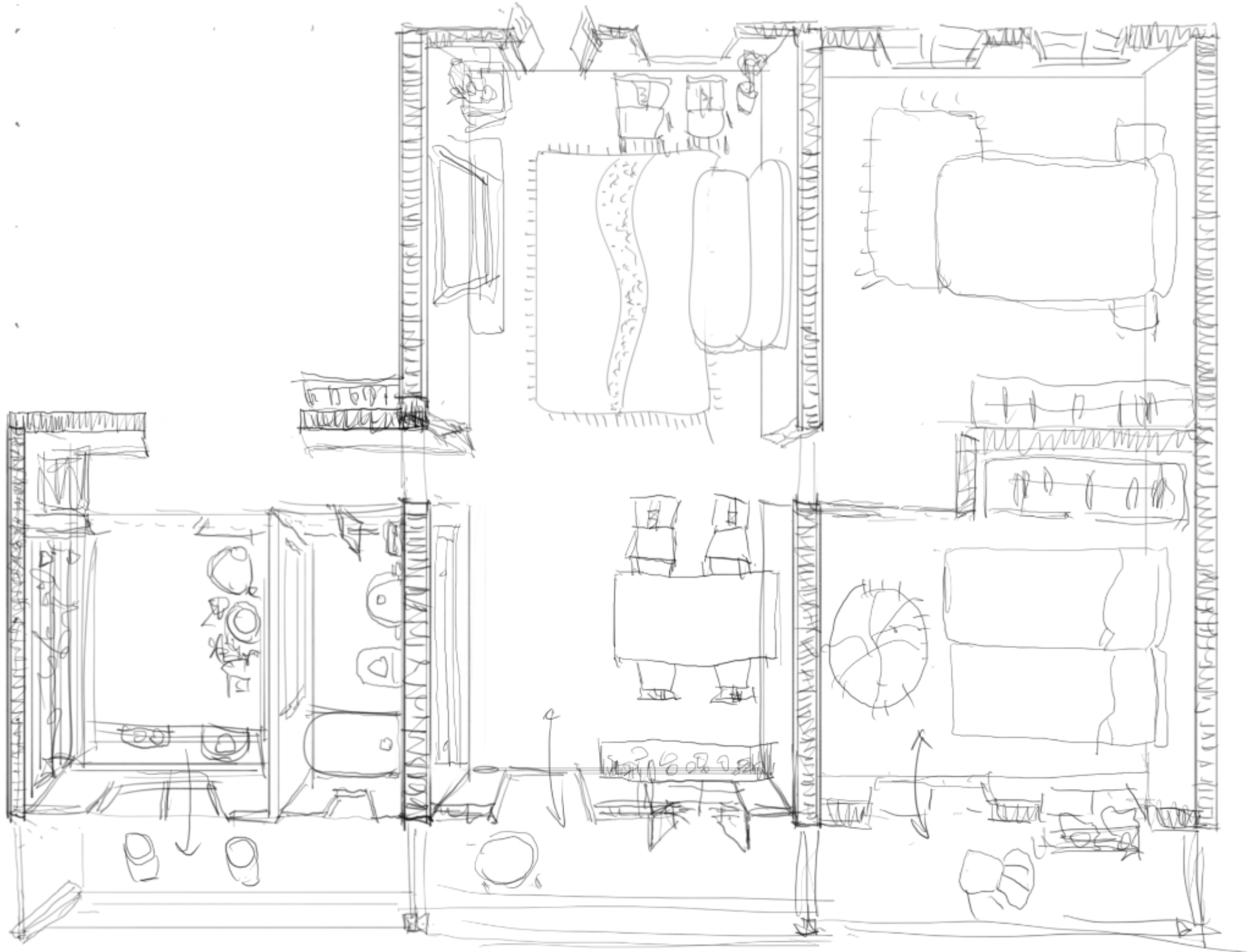
Basic combine platform



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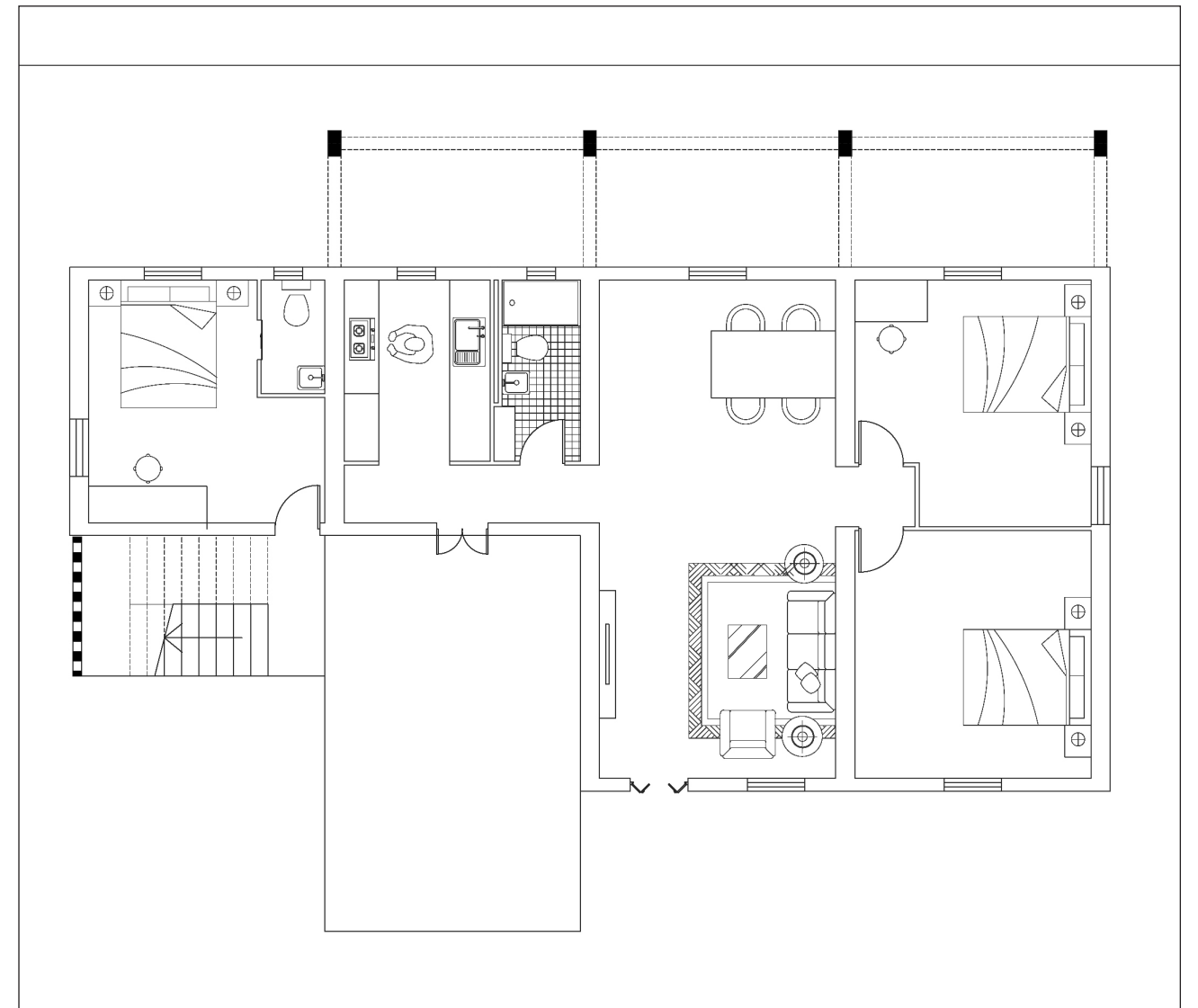
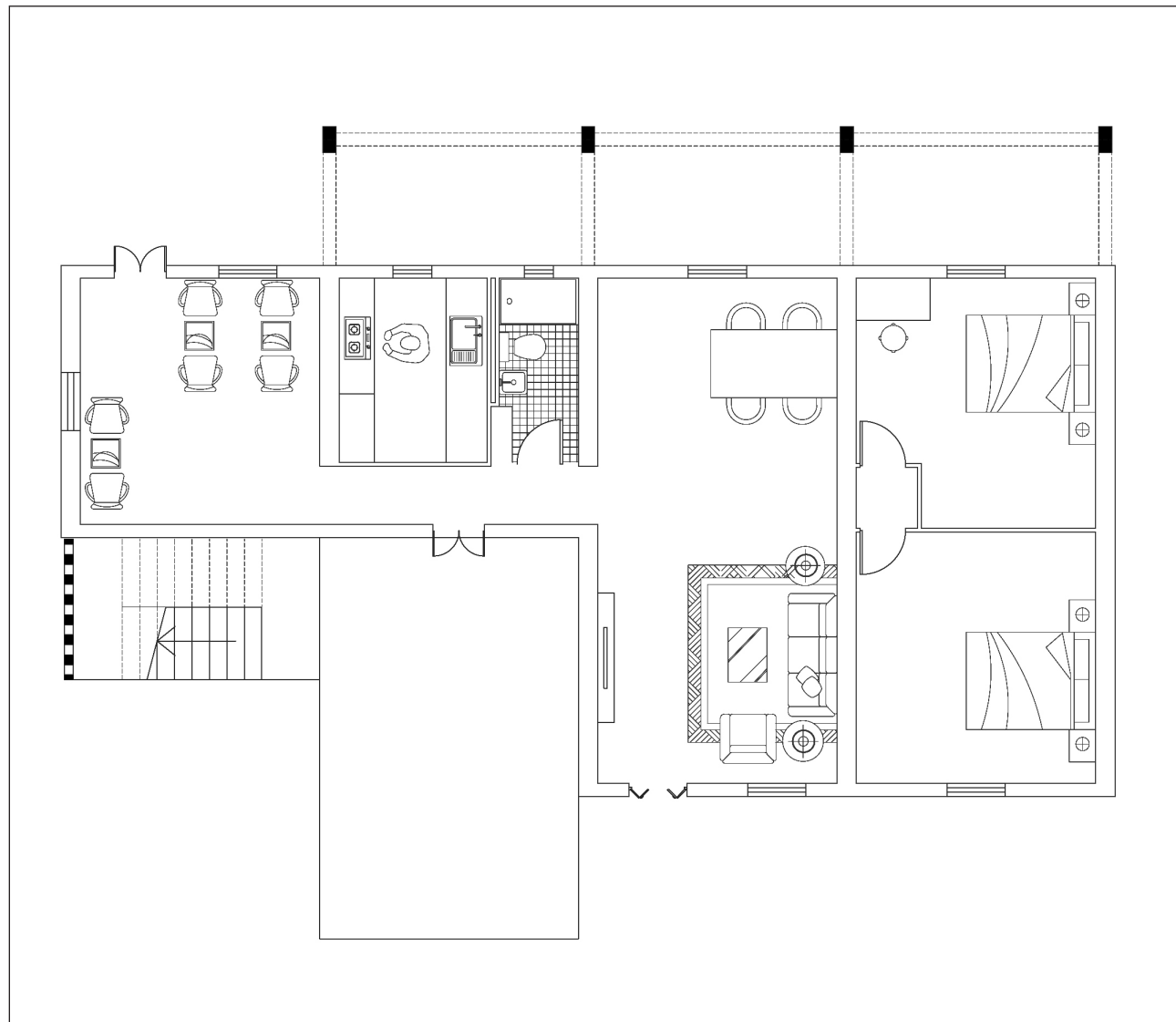
Family contained type

After living



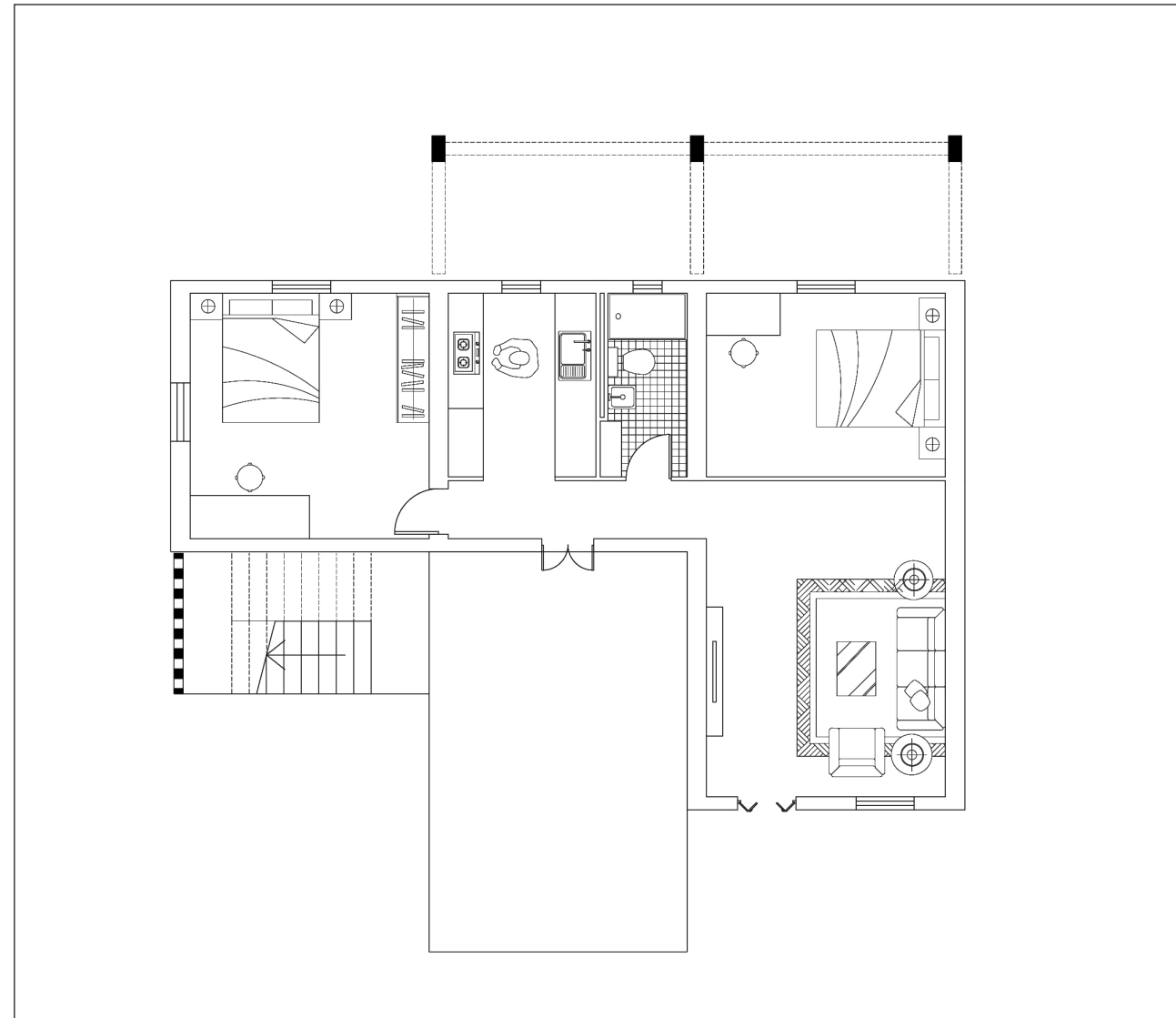
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Family contained type Variations



A right to an inclusive open community

Family contained type Variations



A right to an inclusive open community

Family contained type
Cluster ground floor plan 1:300

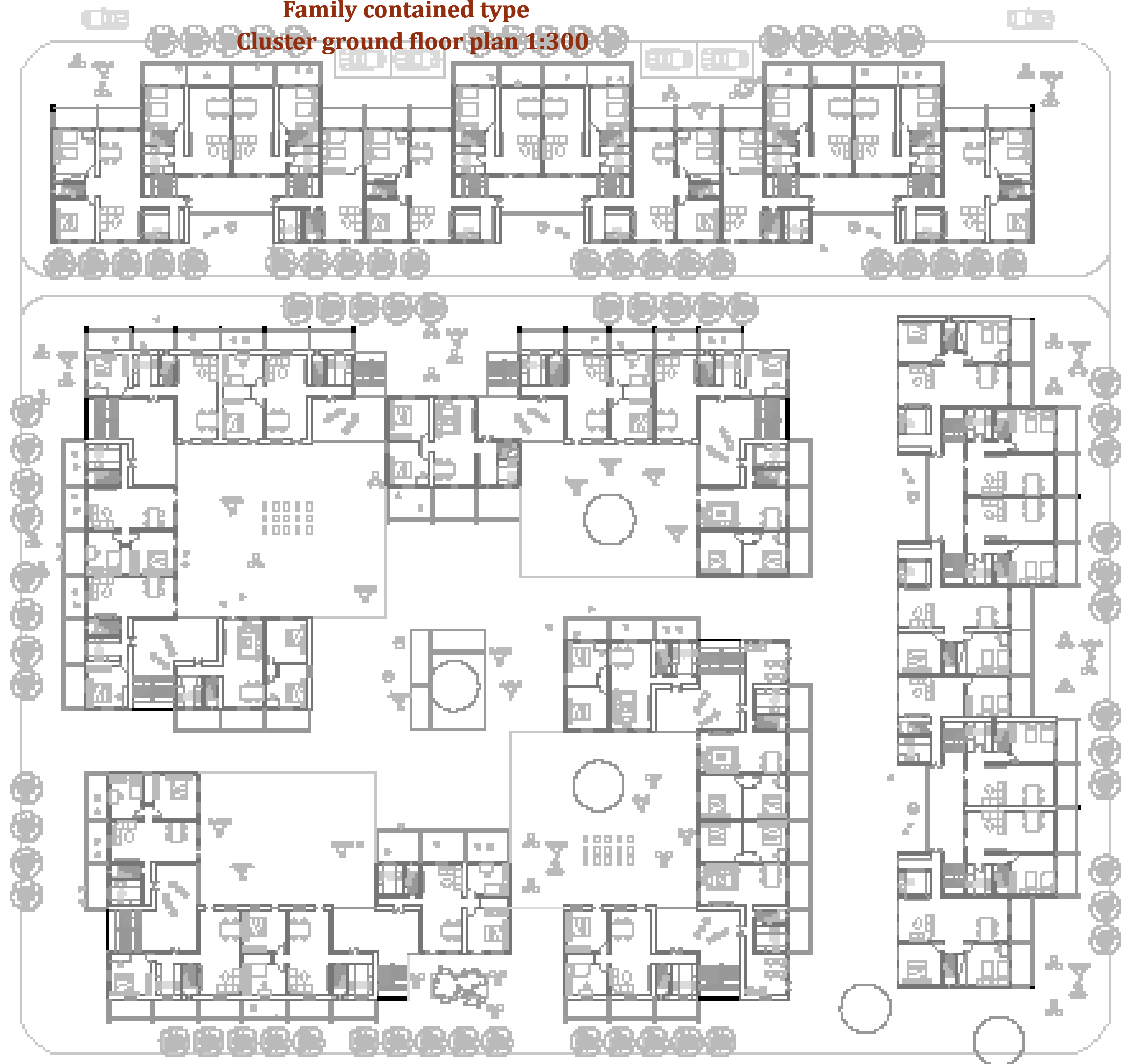


A right to an inclusive open community

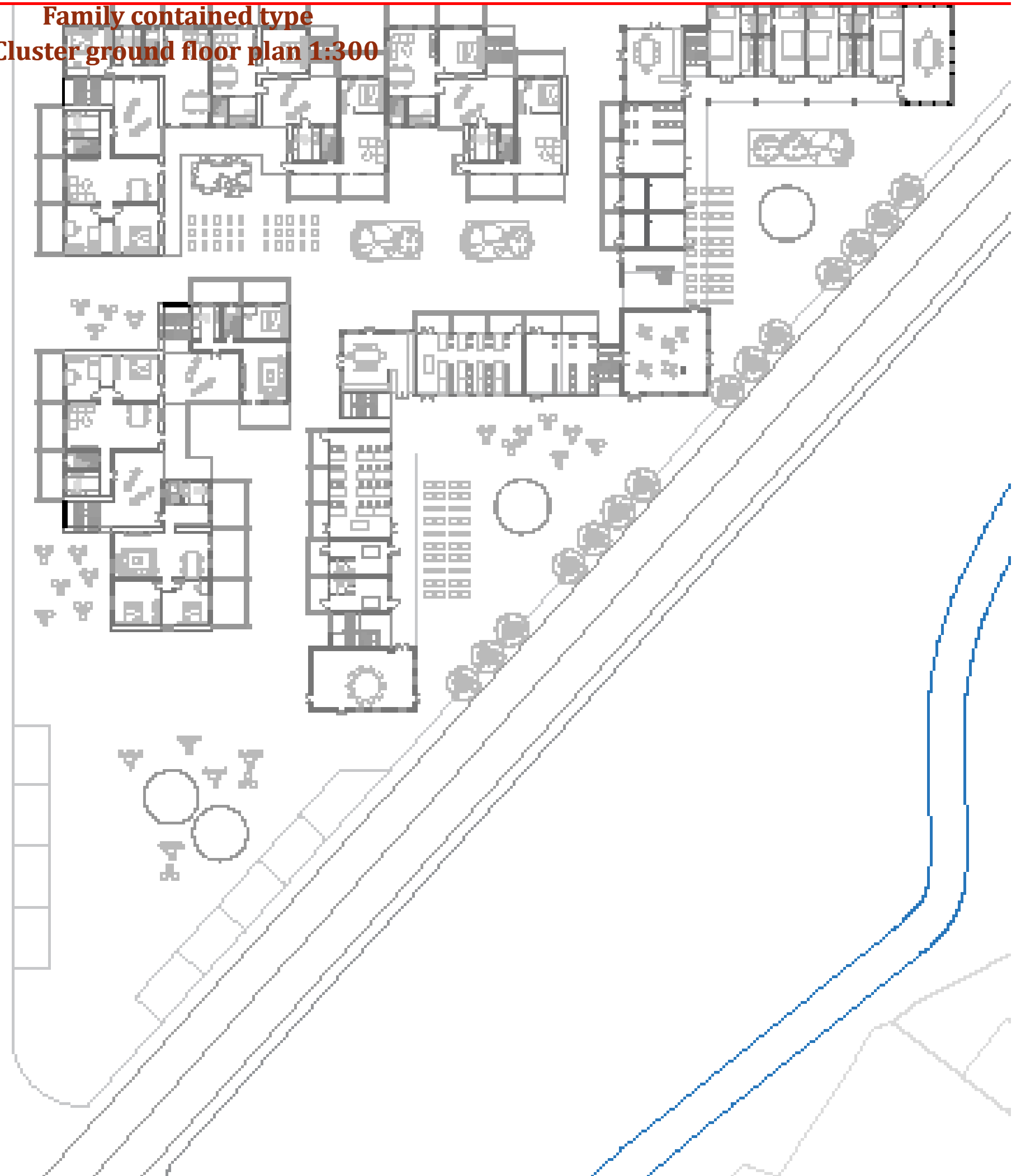
Family contained type
Cluster ground floor plan 1:300



Family contained type
Cluster ground floor plan 1:300



Family contained type
Cluster ground floor plan 1:300



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Family contained type Elevation



A right to an inclusive open community

Family contained type cross section







Market type

Dwelling on the market

Target people: people work outside Kolfe

Floors: 3

Property: Rent/Buy

FSI: /

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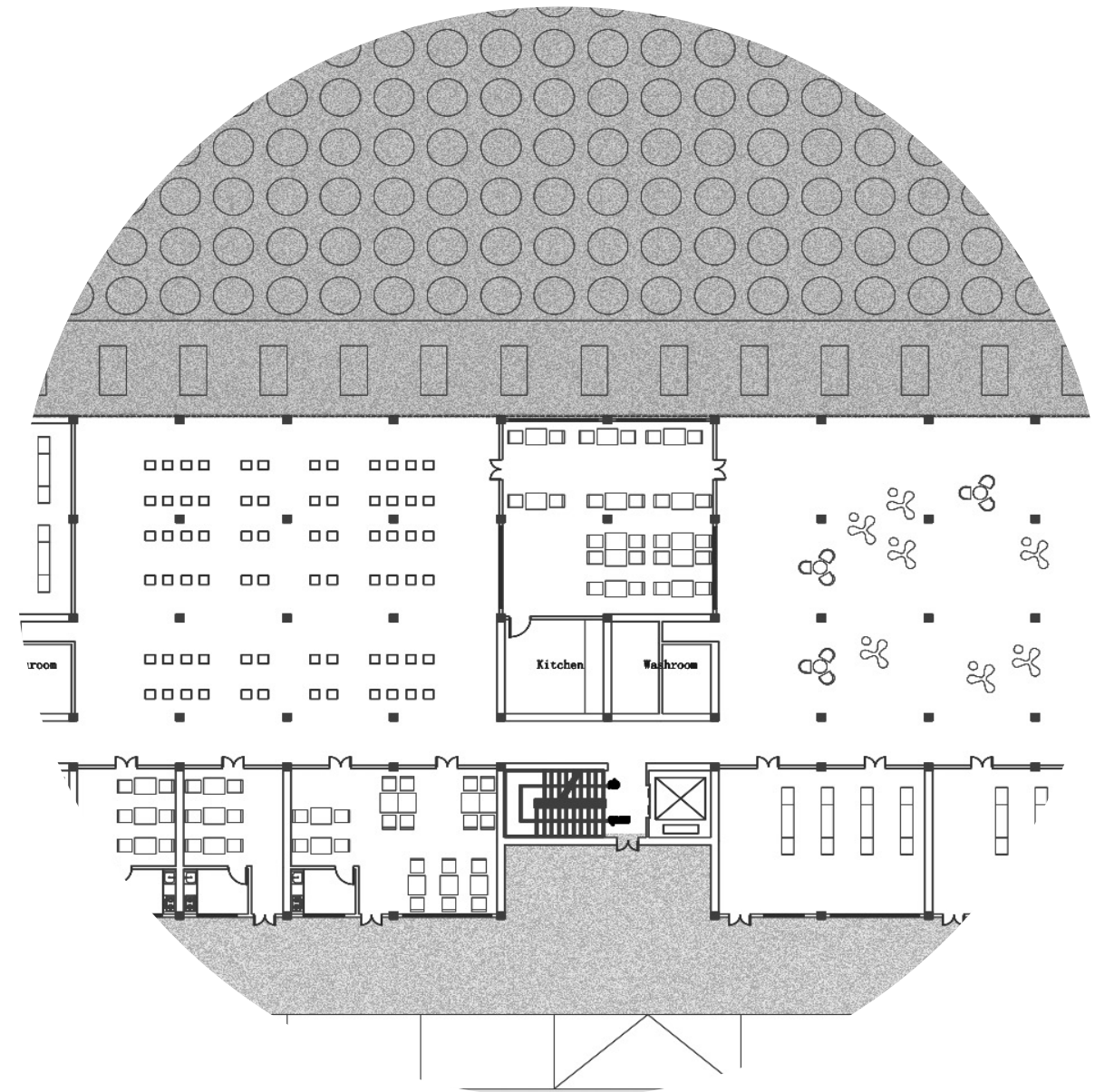
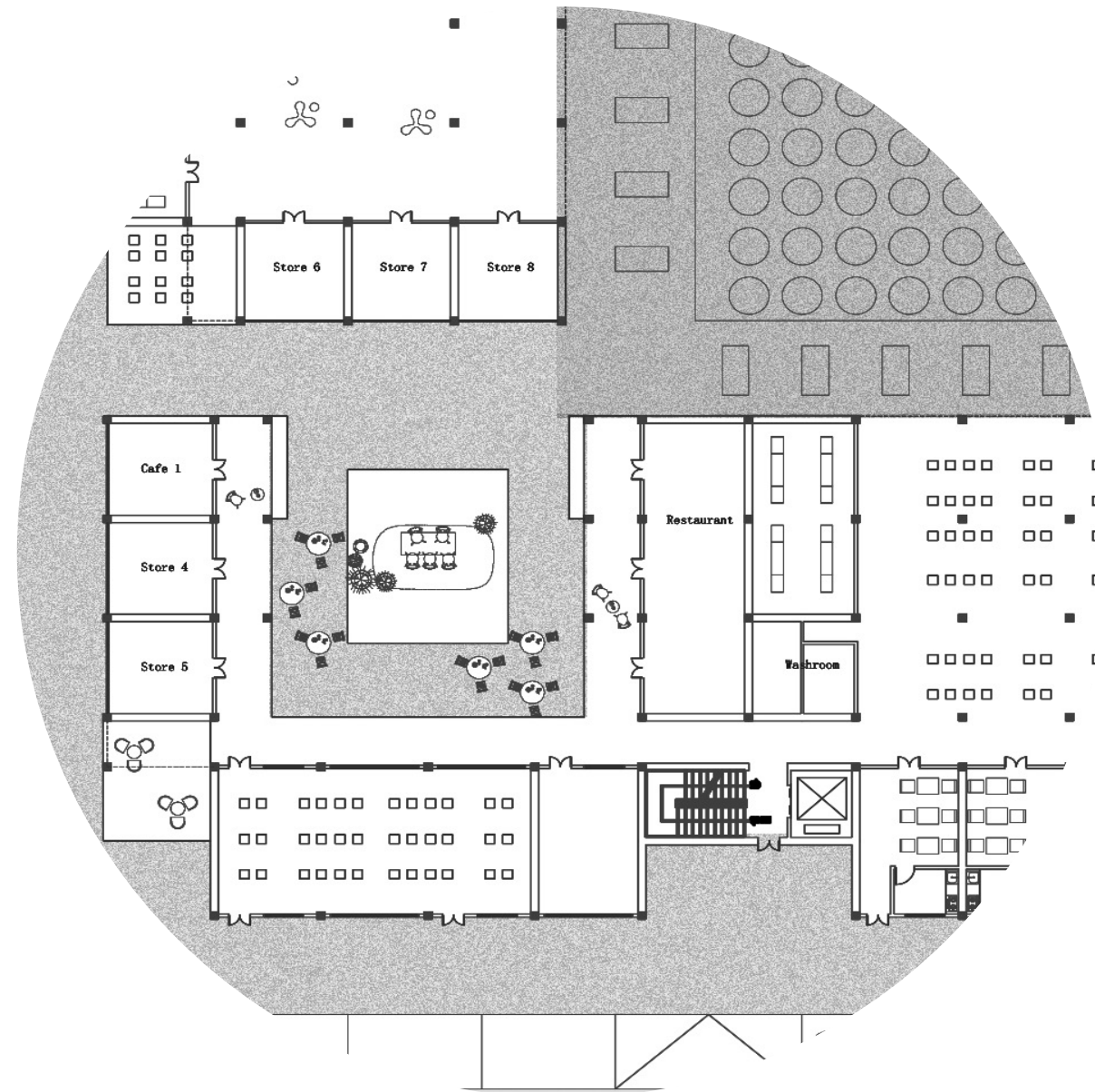
Market type

Floor Plan---Ground Floor 1:500



Market type

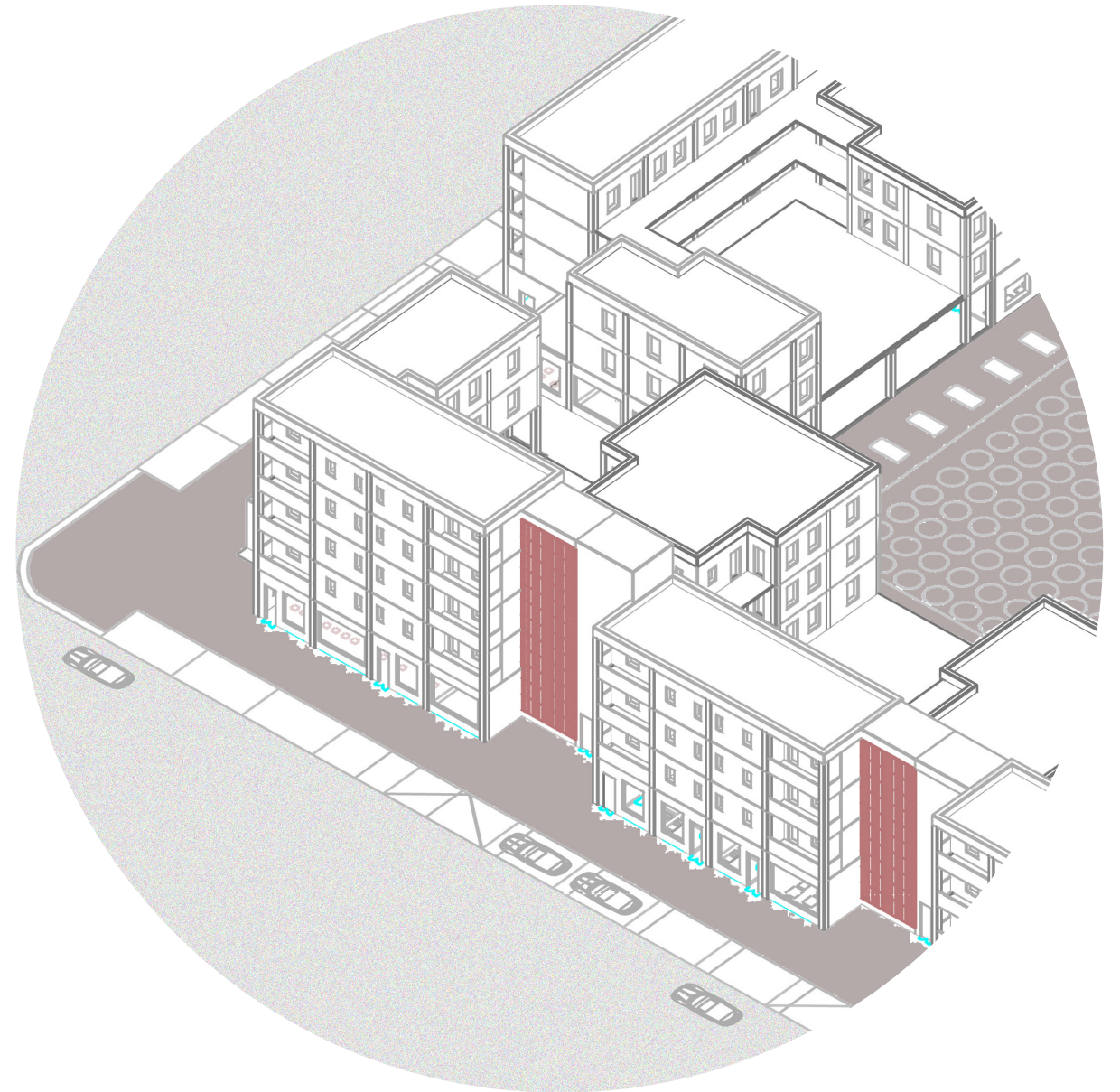
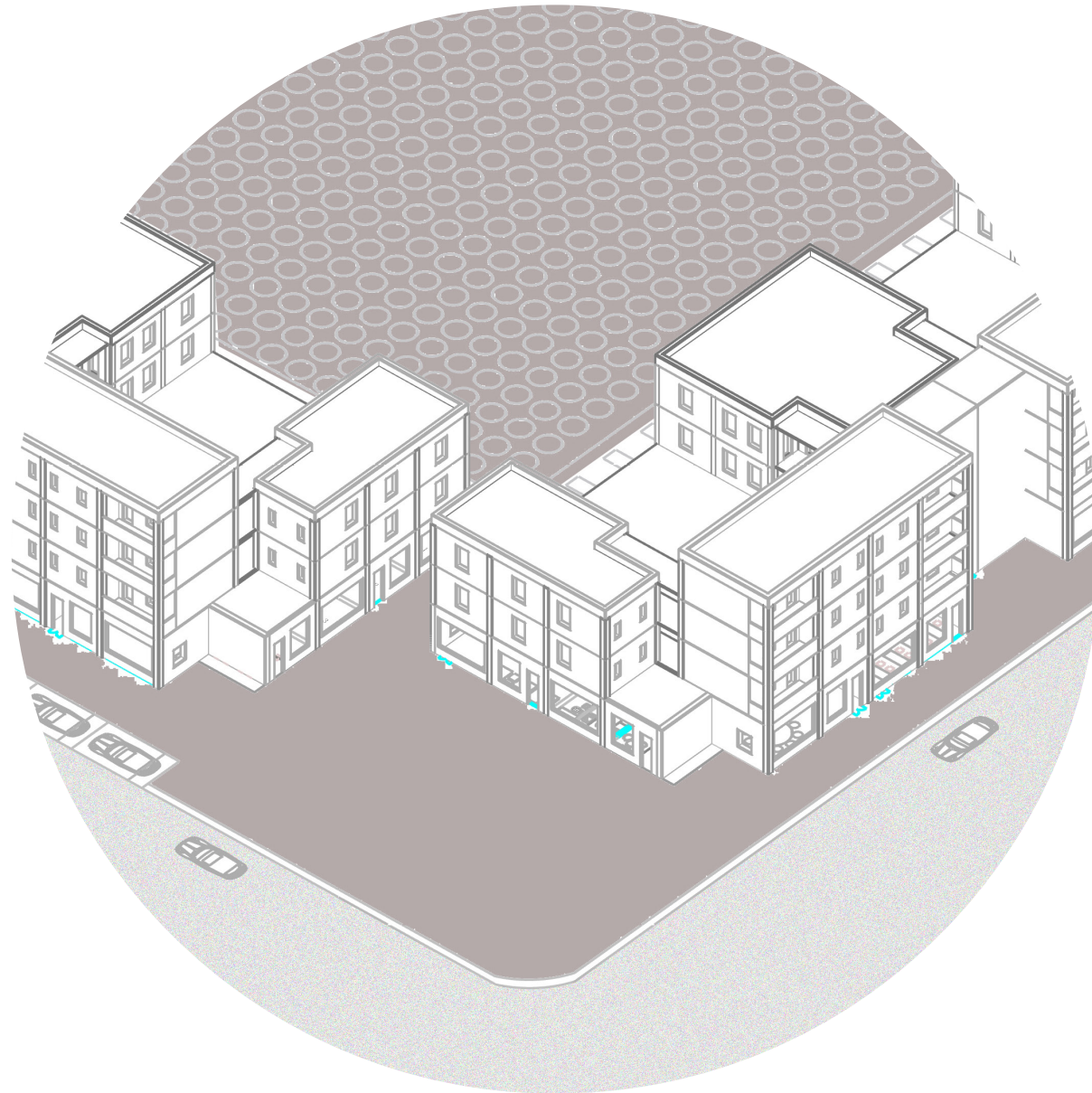
Floor Plan---Ground Floor 1:200



A right to an inclusive open community

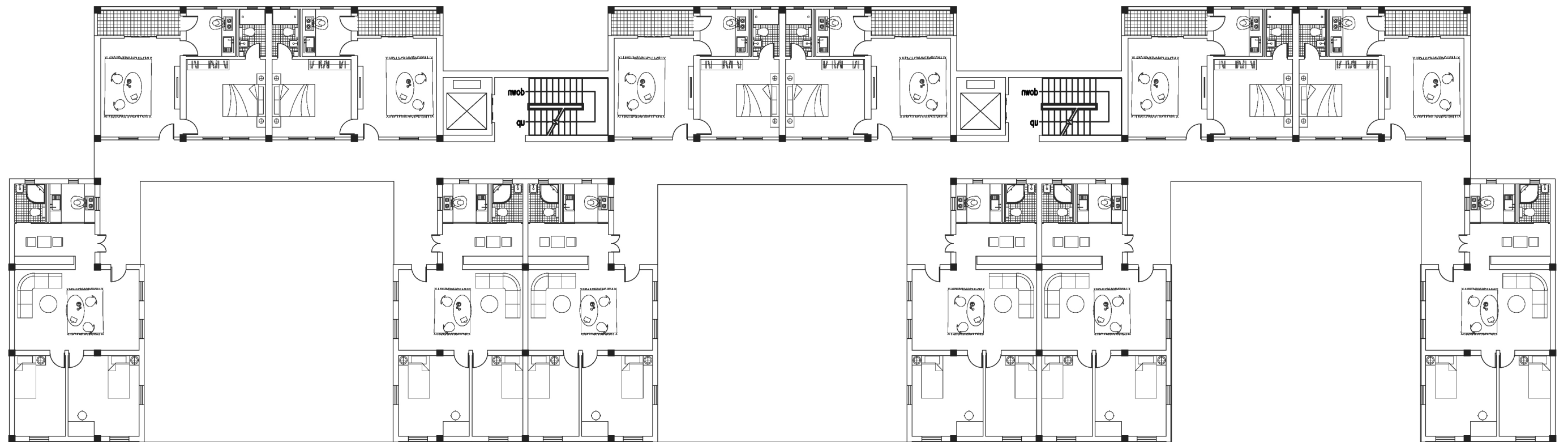
04. Design---Building type

Dwelling on the market



04. Design---Building type

Dwelling on the market---Floor Plan---1:200 upper floor



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04. Design---Building type

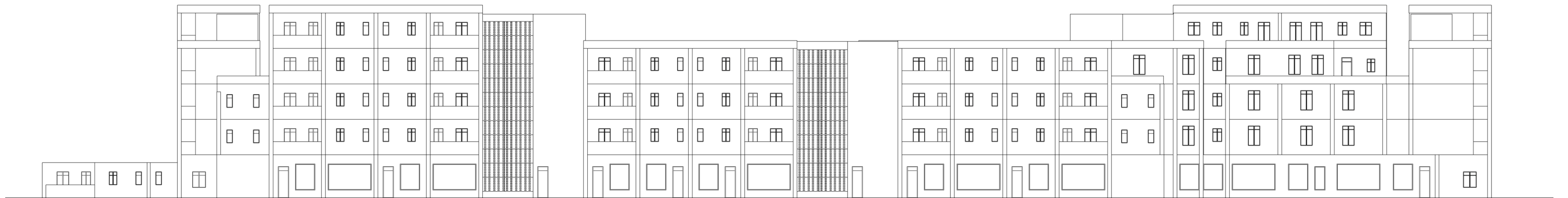
Dwelling on the market---Perspective from the square



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04. Design---Building type

Dwelling on the market---Elevation from the main road





Condo Type

Target people: Young blue-collar or white-collar workers, interested in tradition

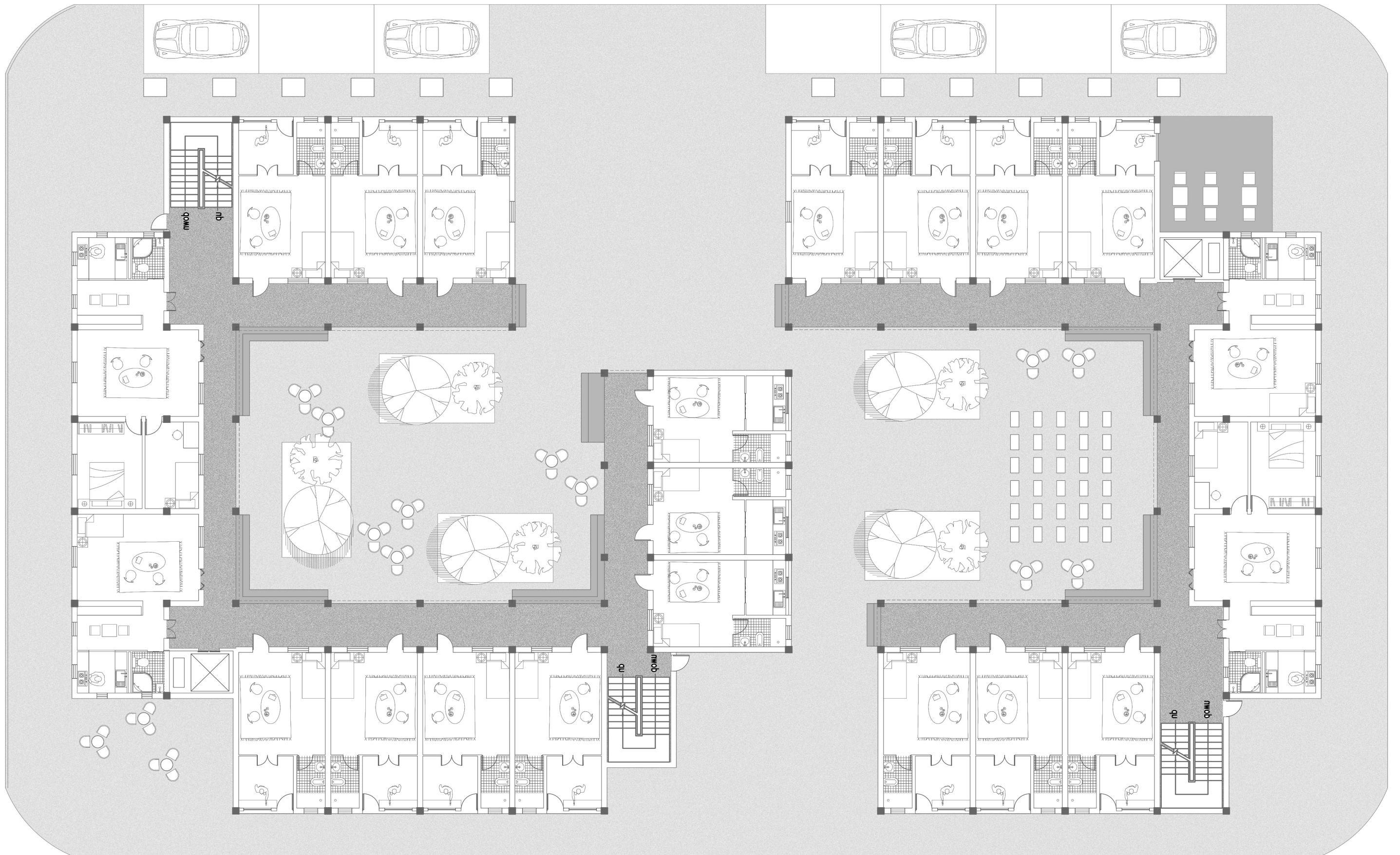
Floors: 6-7

Number: 80 Units

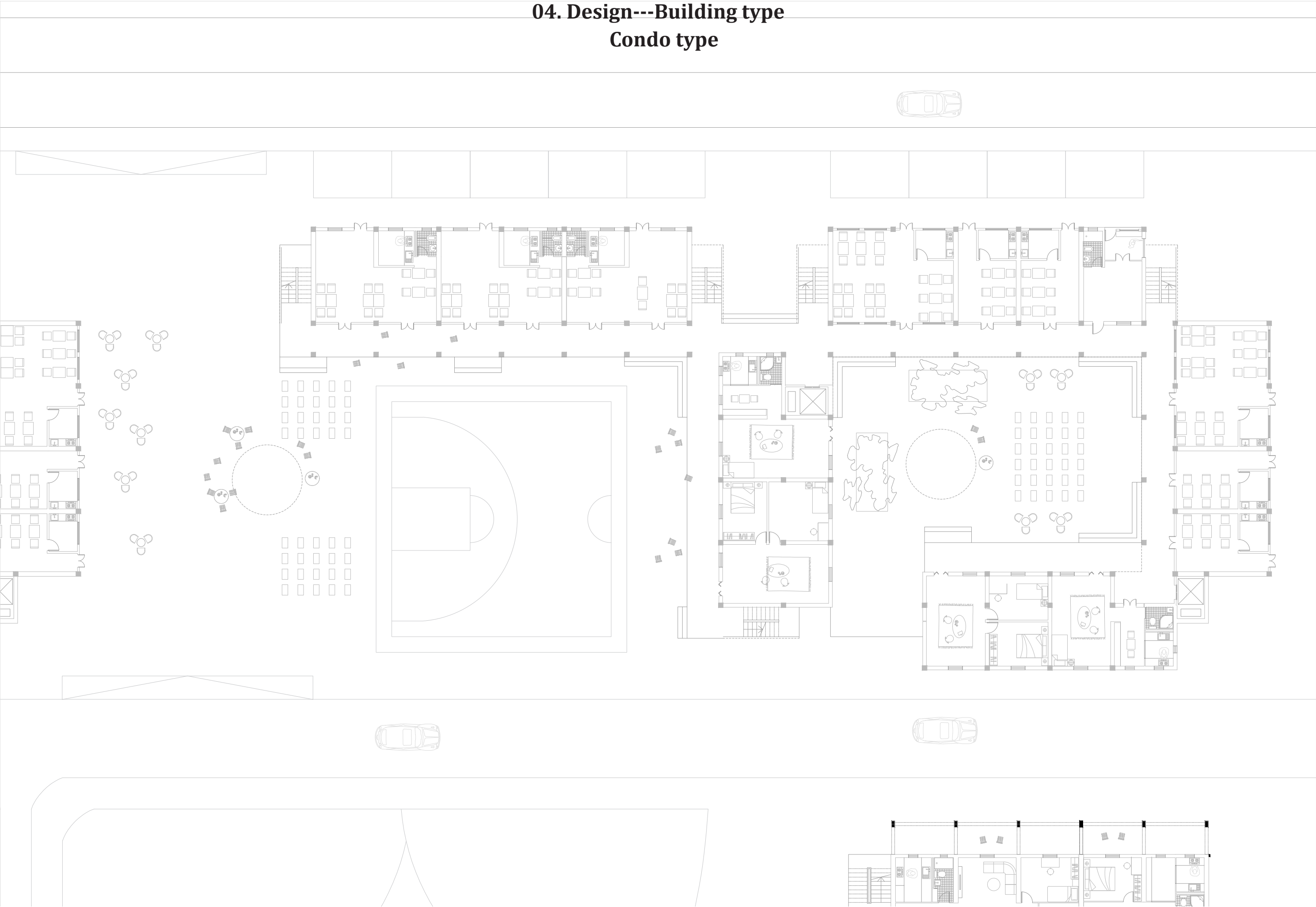
Fsi: Original: 0.55; Now: ~2.0

04. Design---Building type

Condo type---Floor plan 1:200



04. Design---Building type
Condo type



05.Building Technology

Main wish: Towards a healthier housing construction system

1. Affordable/Cost-effective

2. Sustainable

3. Vernacular

Main challenge: Temperature differences during the day

Store water during floods during the rainy season and provide water for the dry season

Find local & sustainable materials, use the low-level construction techniques

1. Materials

Pro & Con

Load-bearing wall



Rammed earth

Pro	Con	Price
low carbon footprint; high compressive strength (with possible added cement); fireproof, large thermal mass, low cost, can be mechanically produced	large demand for manual labour, no factory standard; material production subjected to weather conditions on site; need of overhang roof	low cost in low labour cost area



Compressed earth block

Pro	Con	Price
low carbon footprint; high compressive strength (with possible added cement); fireproof, large thermal mass, low cost, can be mechanically produced; factory standard	large demand for manual labour, need of bond beam; need of overhang roof	low cost in low labour cost area



Cast in situ concrete

Pro	Con	Price
high compressive strength; factory standard	high carbon footprint; scarce base material imported	expensive



Concrete hollow block

Pro	Con	Price
high compressive strength; factory standard; mass produced; low material usage	high embodied energy	mid



Fired bricks

Pro	Con	Price
high compressive strength (with possible added cement); fireproof, can be mechanically produced; factory standard; variations in brickwork	high embodied energy; labour intensive; foreign imported	high

Light partition



Corrugated iron sheets

Pro	Con	Price
high strength; renewable; affordable	low load bearing strength; no factory standard	low cost



Woven Palm leaves panels

Pro	Con	Price
high tensile strength; renewable; affordable	low load bearing strength; no factory standard	low cost

Others



bamboo

Pro	Con	Price
high tensile strength; renewable; affordable	low load bearing strength; no factory standard	low cost



Wood

Pro	Con	Price
low carbon footprint; abundant; climate friendly	low load bearing strength; no factory standard	low cost

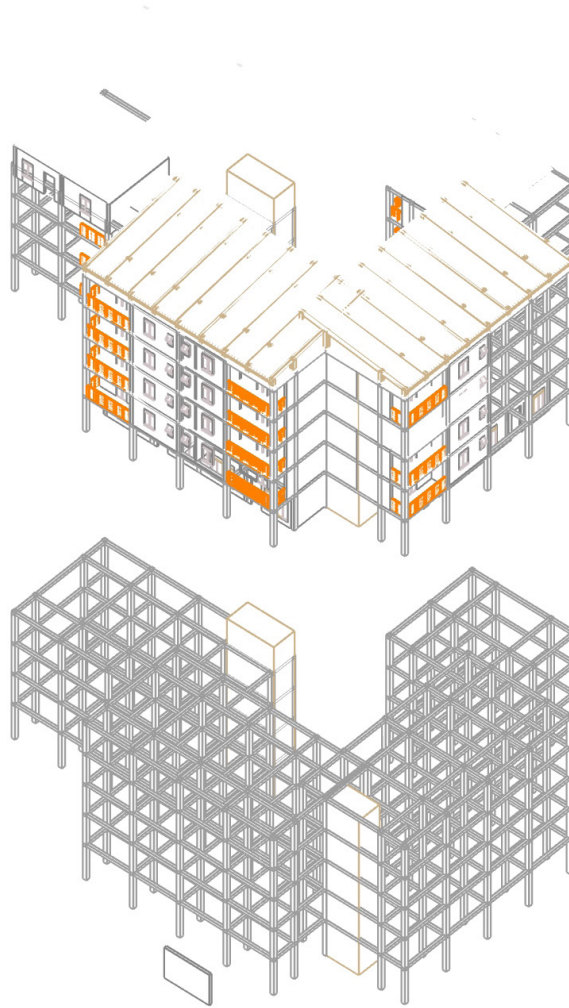


steel

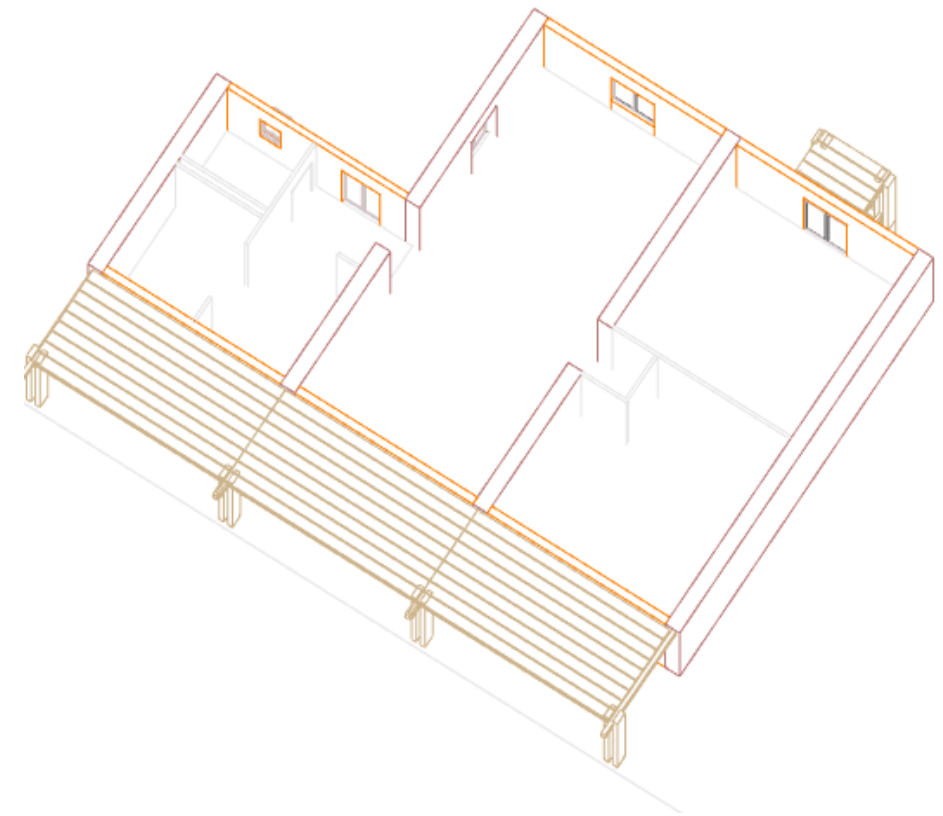
Pro	Con	Price
high tensile strength; factory standard; mechanically produced	high embodied energy; expensive; foreign imported	high

2. Struceture

Two different structure



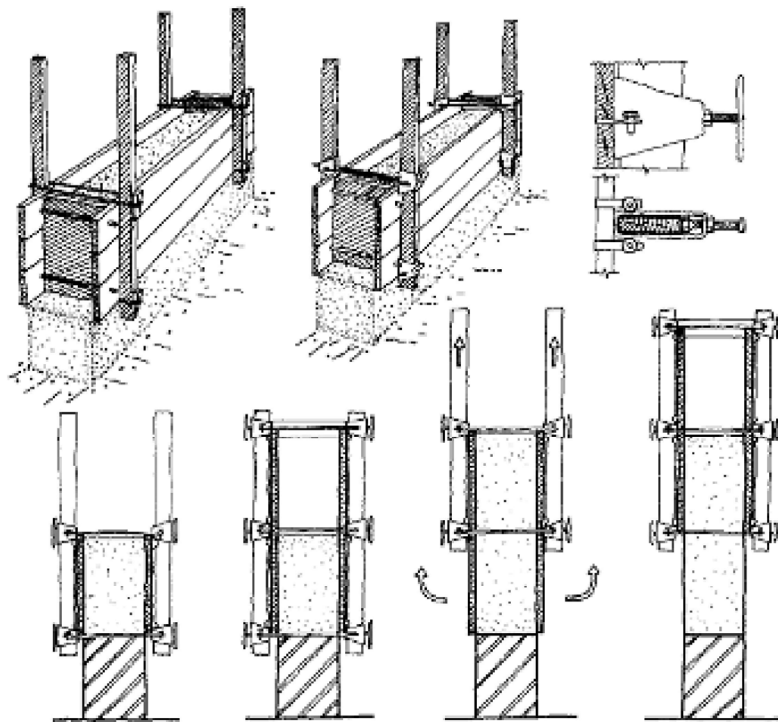
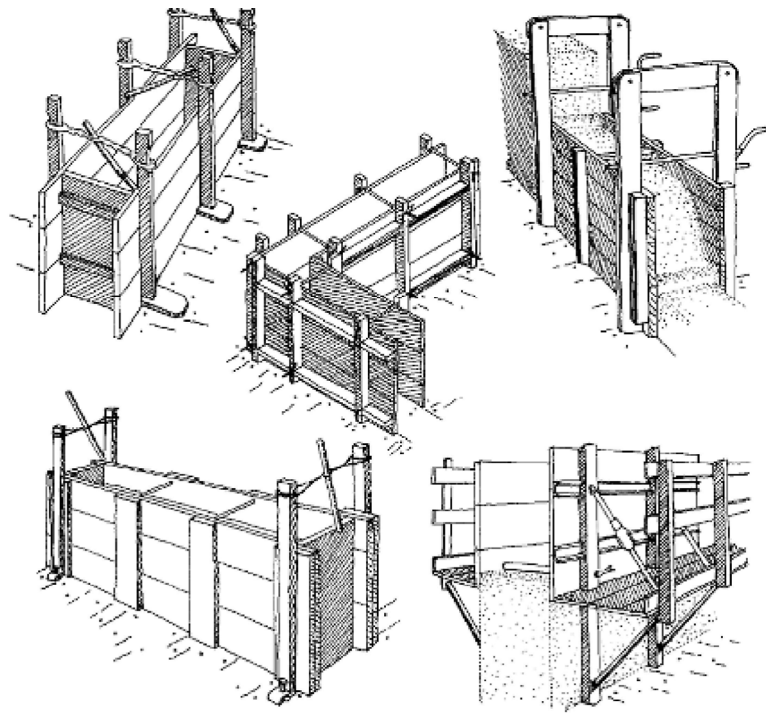
**Column Structure
Condo Type**



**Shear wall structure
Cluster type**

2. Structure & Material

Rammed earth for family-contained unit

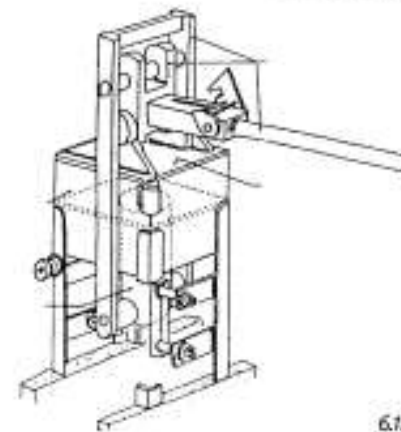
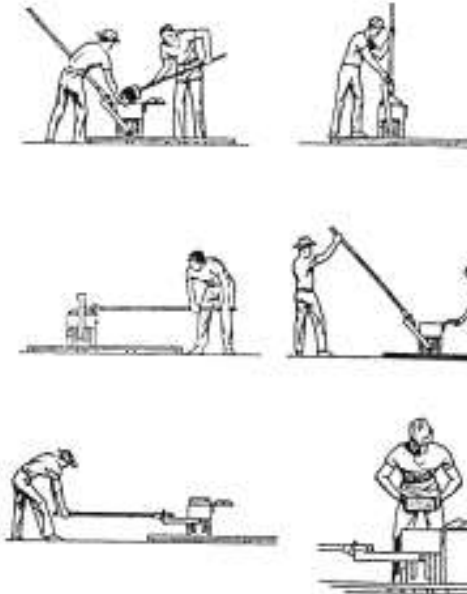


2. Structure & Material

Compressed earth block for cooperation unit/condo unit



6.7 to 6.9 Making adobes in Ecuador
6.10 Making adobes on a work table
6.11 Metal mould with handles
6.12 CINVA Ram, Columbia



6.12



6.10



6.11



6.7



6.8



6.9

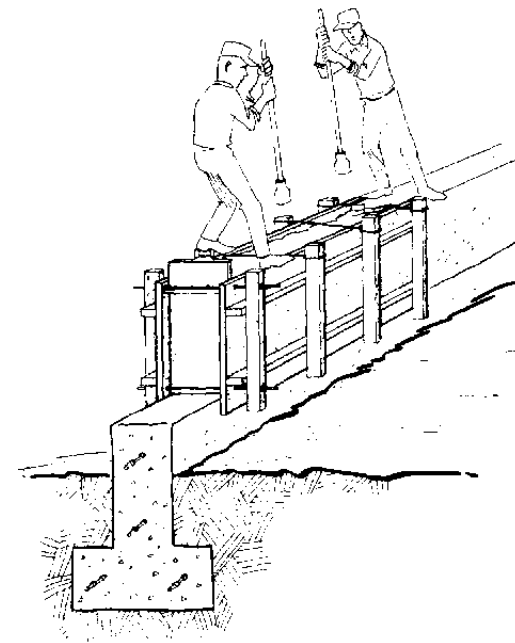
portation and stacking). In India, one person can produce as many as 500 blocks per day using a double mould designed for a smaller brick. In order to facilitate work, bricks can be moulded on a table, as was traditionally the case in Germany (6.10). Another easy method uses moulds with handles 80 cm in length, which enables workers to manufacture bricks while standing (6.11). Techniques for producing compressed soil blocks were known in Europe in the 18th century. In 1789, the French architect François Cointreaux developed a manually operated soil block press. Since then, numerous

manually operated presses have been devised. The best-known press worldwide is the CINVA Ram, developed in Colombia by the Chilean engineer Ramirez (6.12). Illustration 6.13 shows the CETA Ram in operation. It is similar to the CINVA Ram, and was developed in Paraguay. It permits simultaneous production of three blocks. Manually operated presses of this type produce pressures up to 5 to 25 kg/cm², and require three to five persons for optimum operation. Despite mechanised production of soil blocks using presses, the output per person per day is only 150 to 200 blocks, considerably less than that of the primitive method involving throwing loam into moulds.

The advantage of these mechanised presses, however, is that loams with lower water contents can be used. This makes it possible to stack blocks immediately after production.

2. Structure & Material

Construction with rammed earth



In-site constructing process

Basic tools

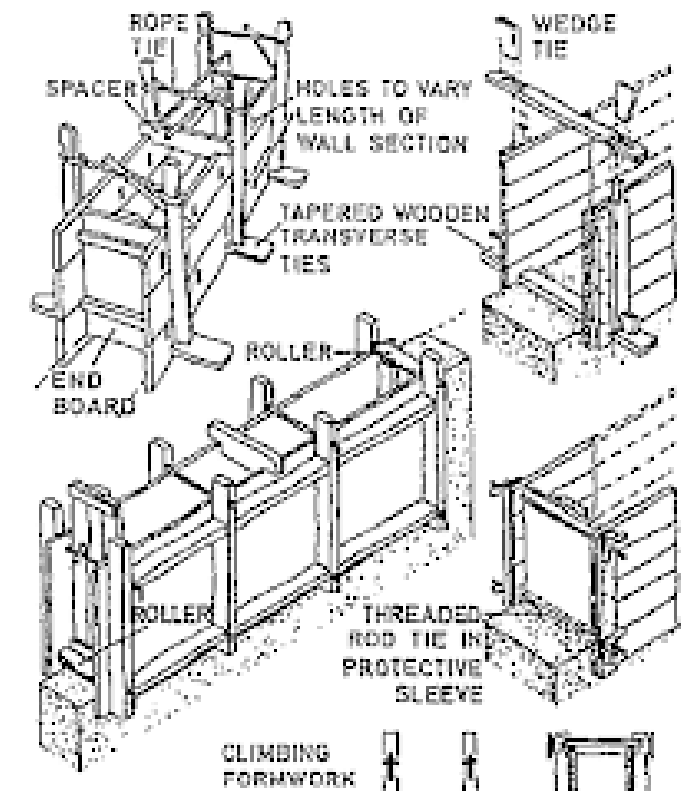
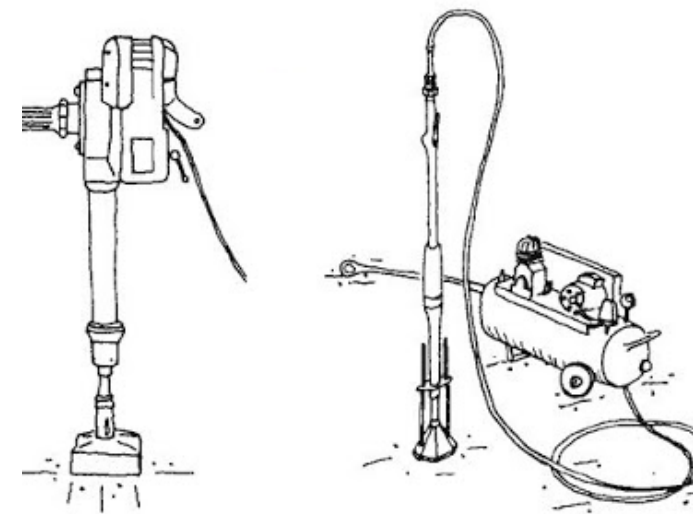
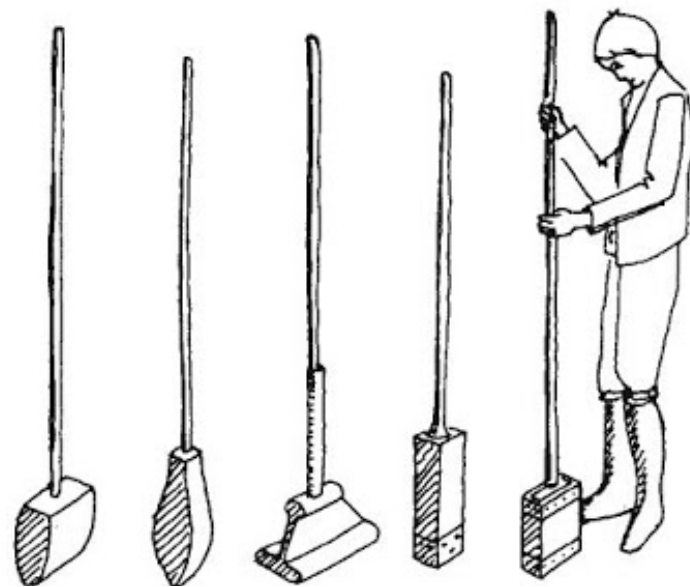
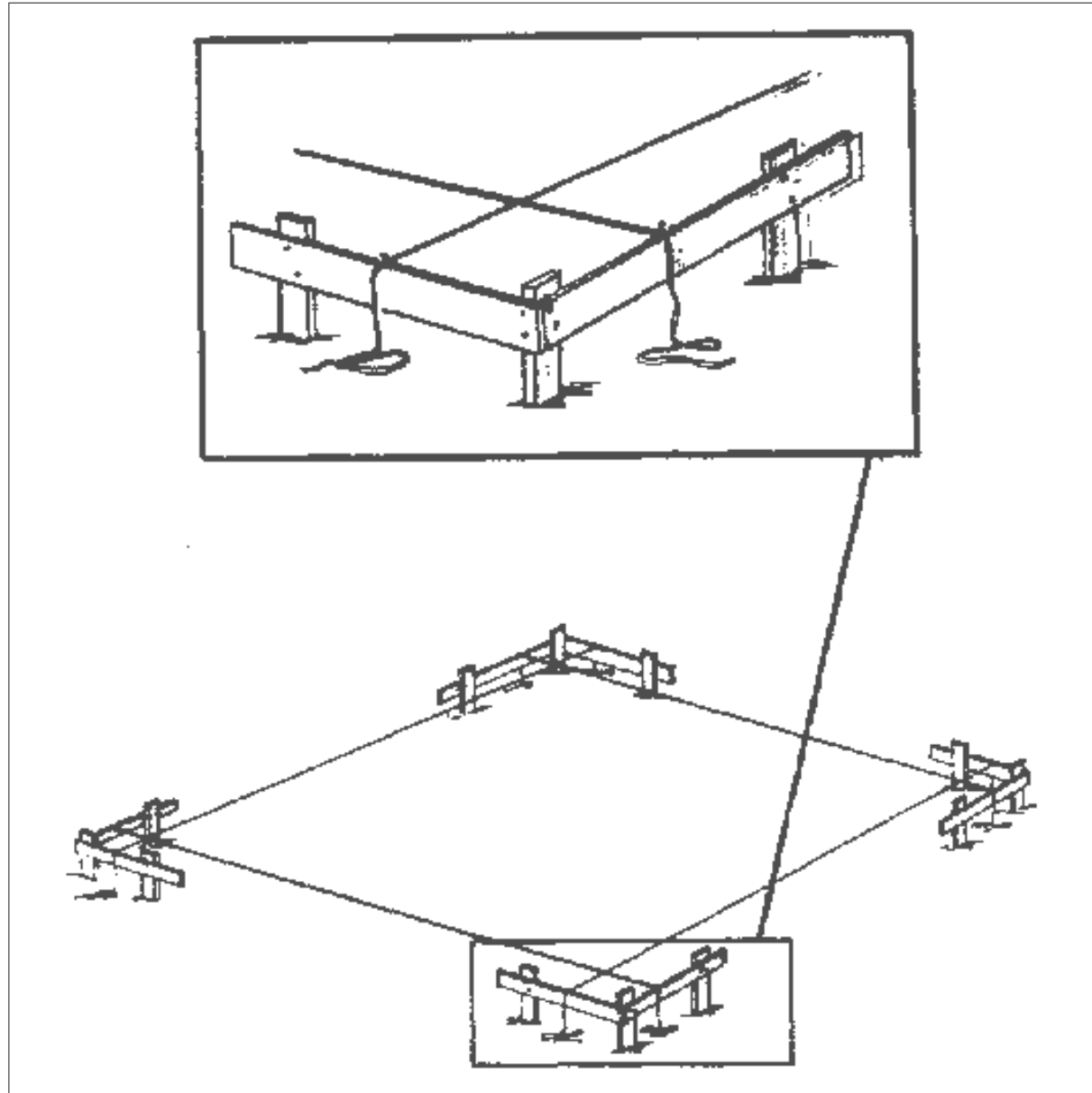


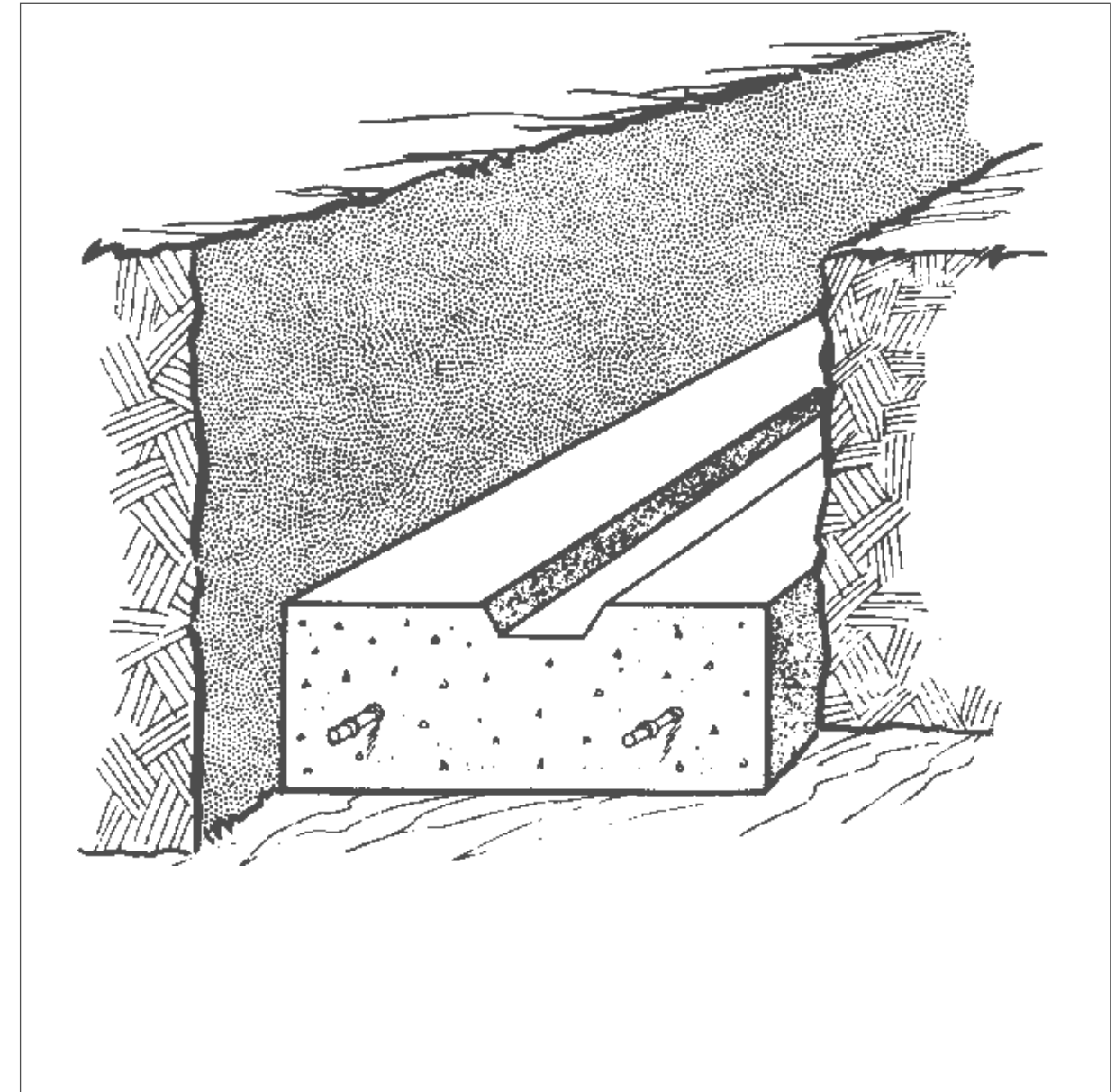
Image resource: Google photo

2. Structure & Material

Constrution with rammed earth



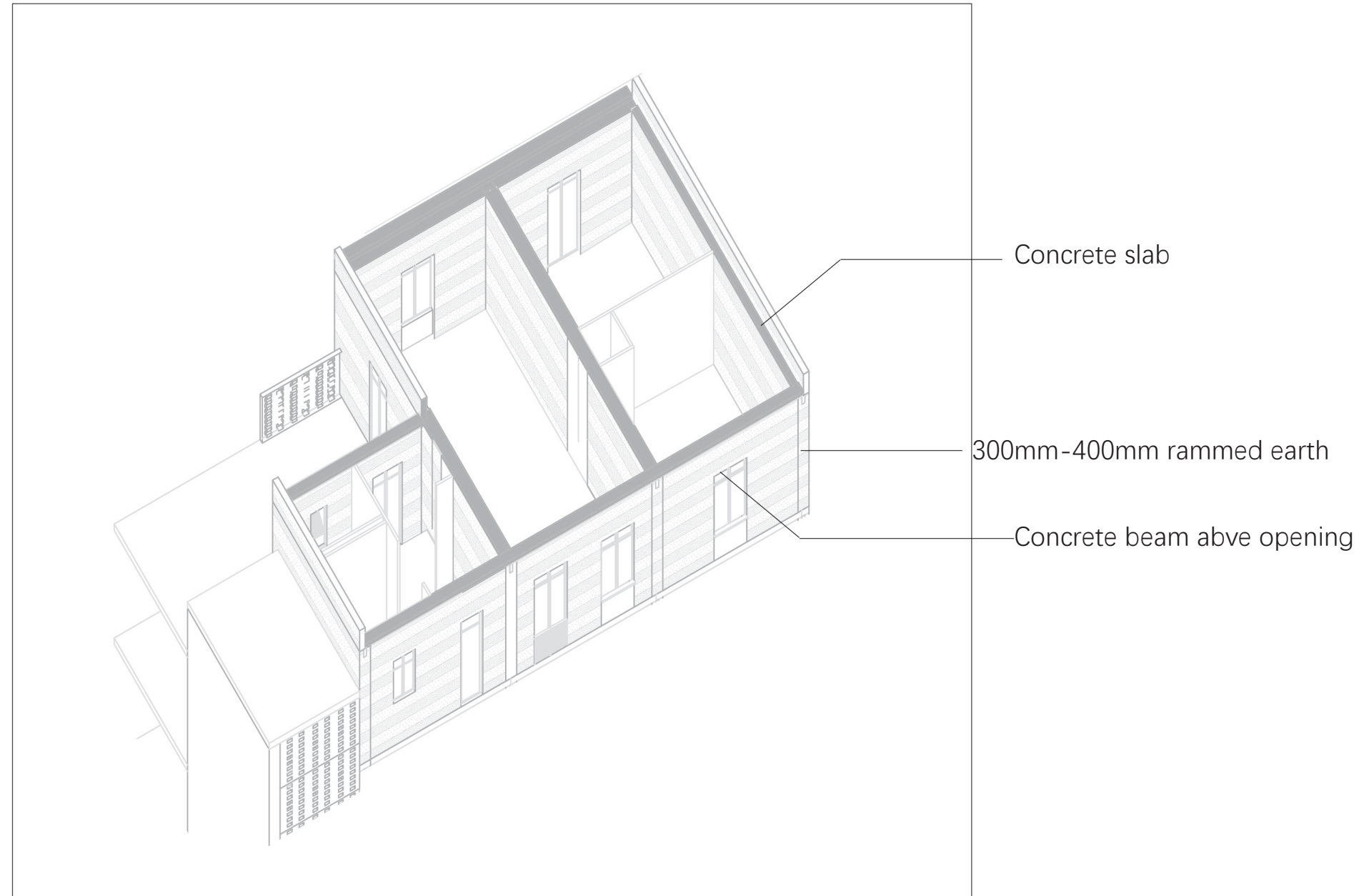
Always start from the corner



Always with a concrete foundation

2. Structure & Material

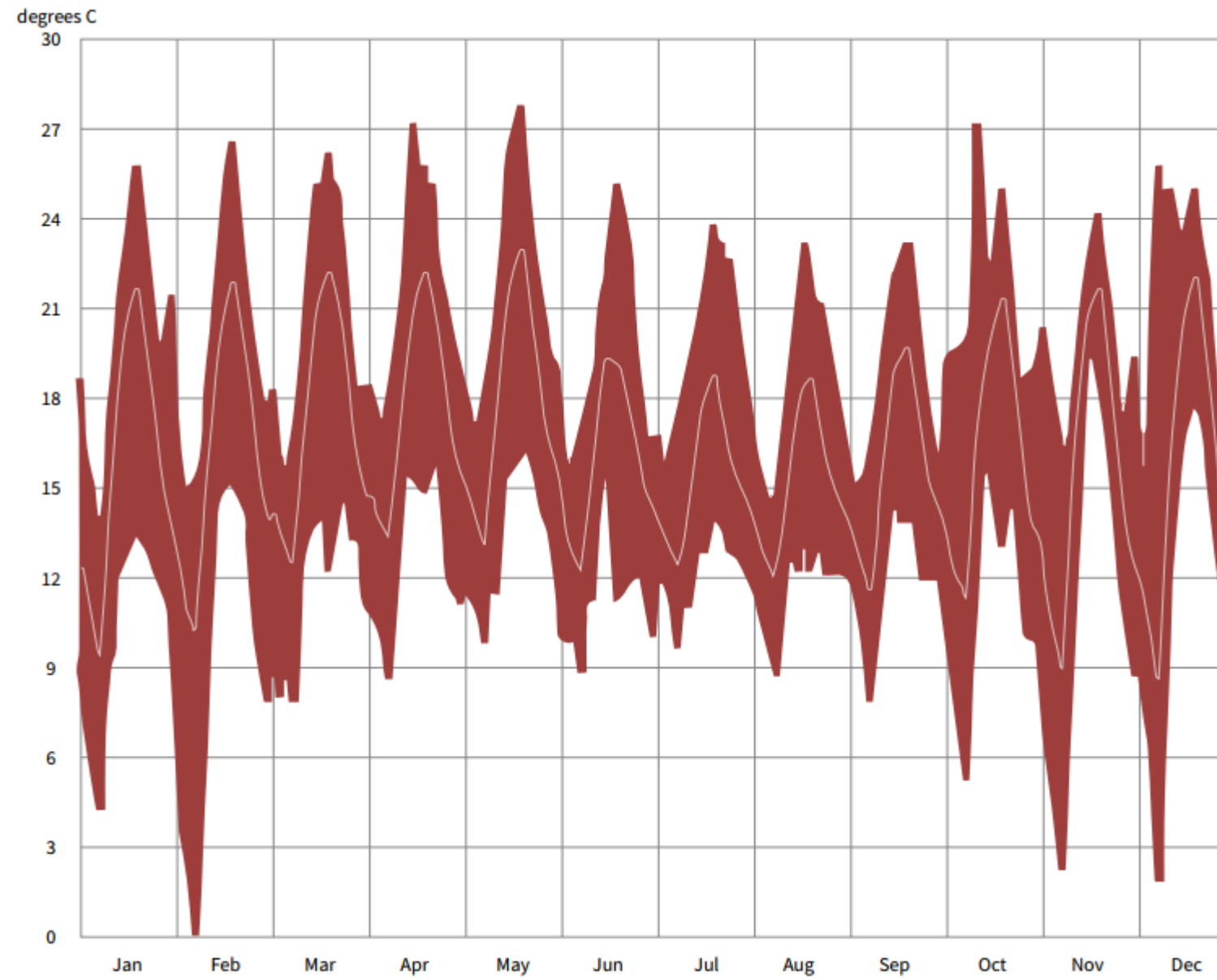
Constrution with rammed earth



3. Climate & Material

Rammed earth as a thermal mass

The average temperature of 16 degrees celsius doesn't change so much during the year, the differences during the day is 8 degrees in average.



Temperature range of Addis Ababa

3. Climate & Material

Rammed earth as a thermal mass

Thermal performance of rammed earth

Rammed Earth Thickness (mm)	R value of Rammed Earth (W/m ²)
100	1.53
150	1.84
200	2.51

Minimum R-value for building elements (Not accurate)

Roofs	R2.9	R4.6–5.1 ³	R4.1–5.1 ³
Walls	R1.9	R2.8	R2.8
Floors	R1.3	R2.25 (for suspended floors only)	R1.0 (for suspended floors only)

Thermal Mass or Thermal Capacity.

	U-Value* (W/m ² .K)	Solar Absorptivity**	Time Lag* (hrs)	Decrement Factor*
Rammed earth 110 mm	4.26	0.5	2.81	0.714
Rammed earth 220 mm	3.089	0.5	6.16	0.374
Rammed earth 330 mm	2.411	0.5	9.30	0.189
Reverse-masonry veneer (1): Harditex cladding, Air gap, R2 insulation, Rammed earth bricks 110 mm	0.377	0.3	4.3	0.638

* = Calculated based on assumed density, conductivity (k), and specific heat.

Rammed earth: density 1540 kg/m³; conductivity 1.25 W/m.K; specific heat 1260 J/kg.K.

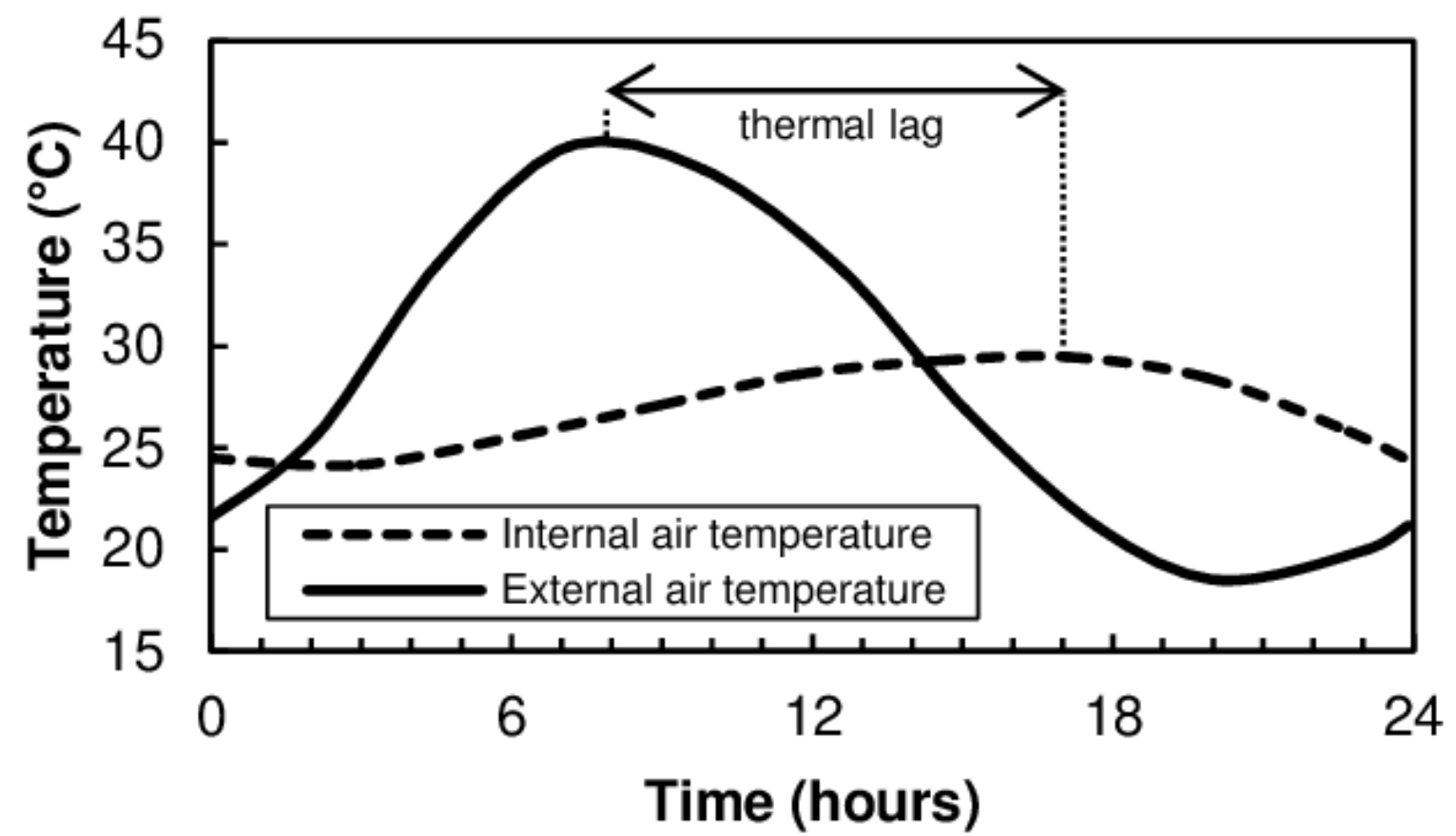
** = Estimated based on the surface colour.

Thermal properties of wall materials of mud buildings. (Source: Soebarto, 2009)

3. Climate & Material

Rammed earth as a thermal mass

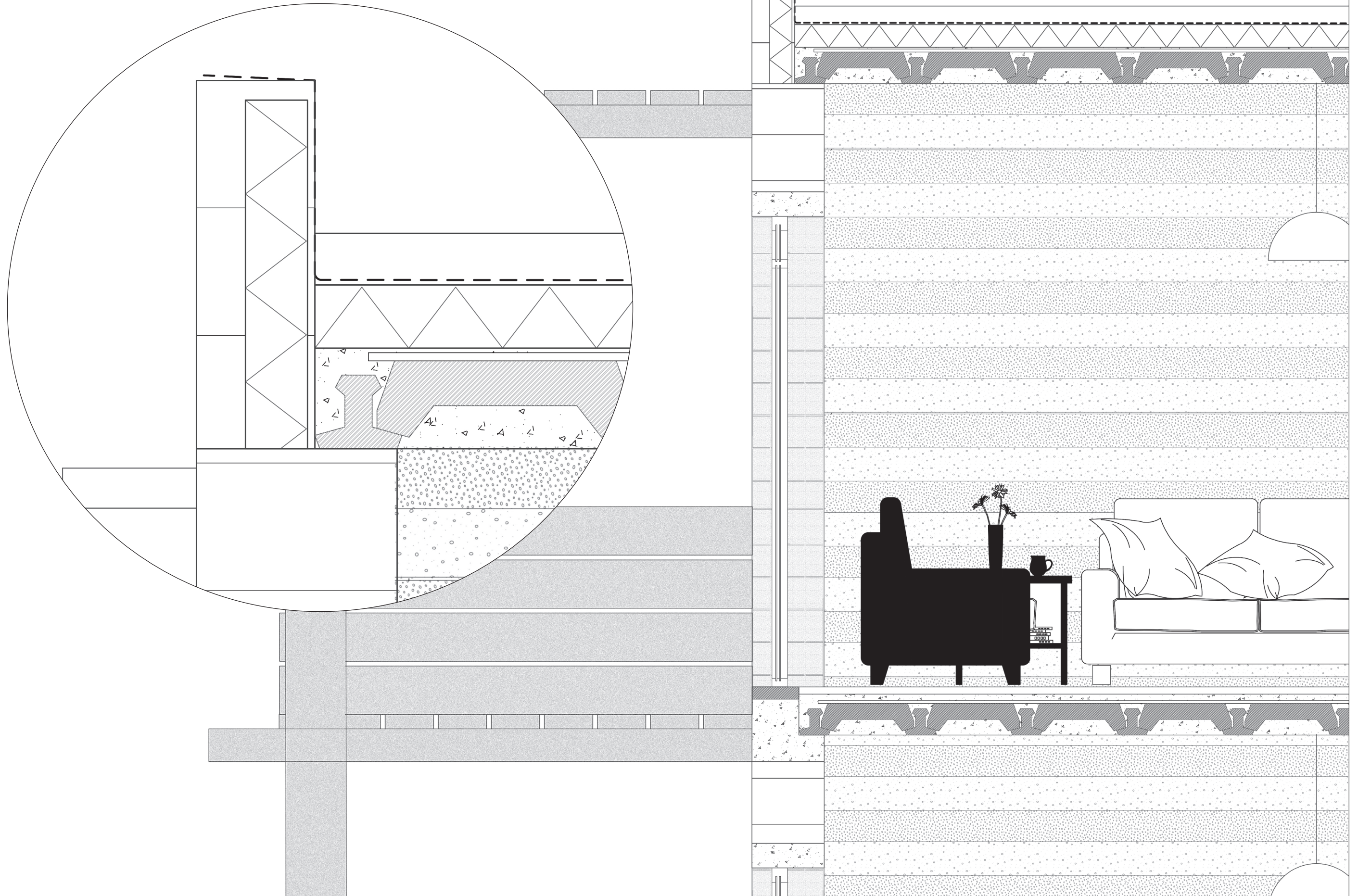
Thermal conductivity & thermal capacity performance of rammed earth 300mm



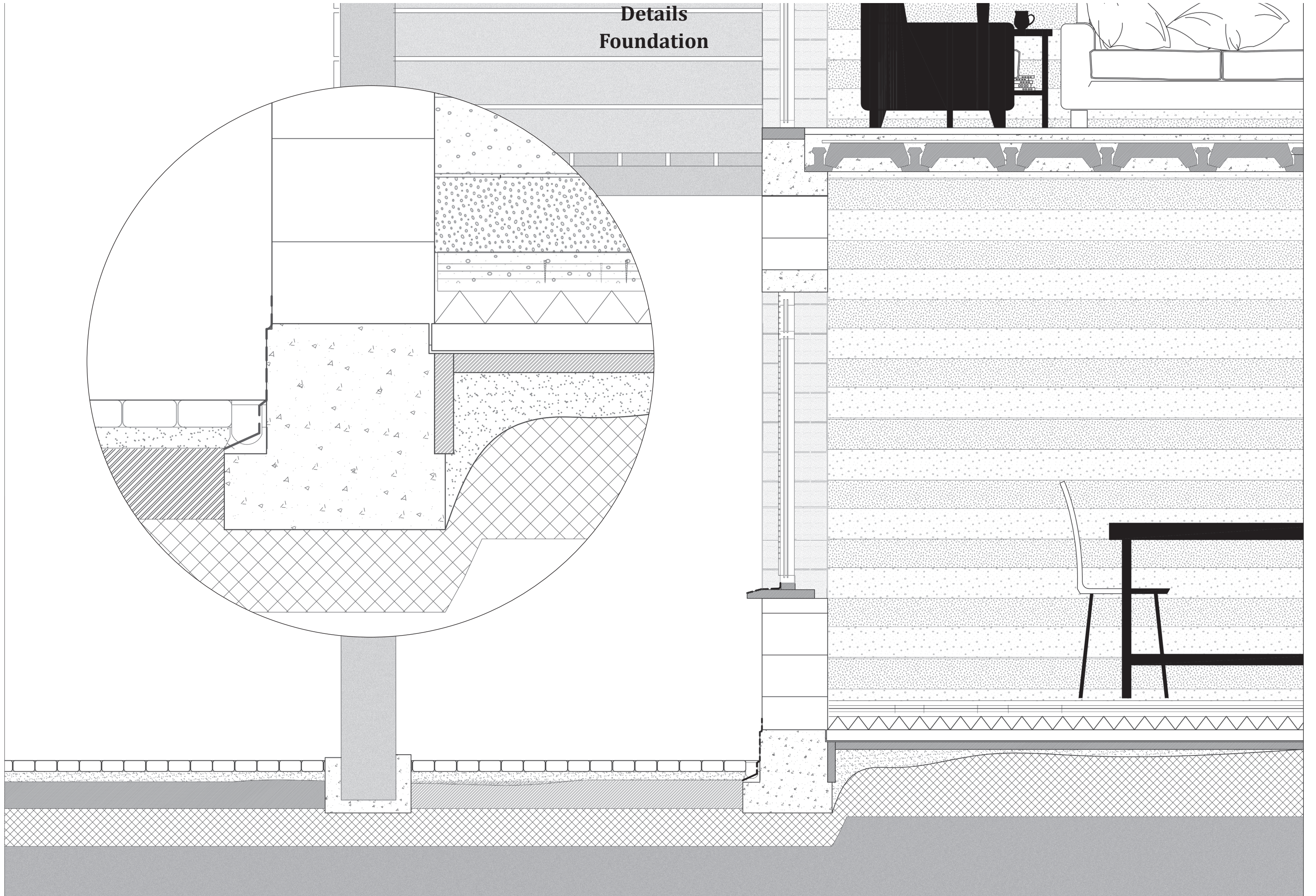
A right to an inclusive open community

Details

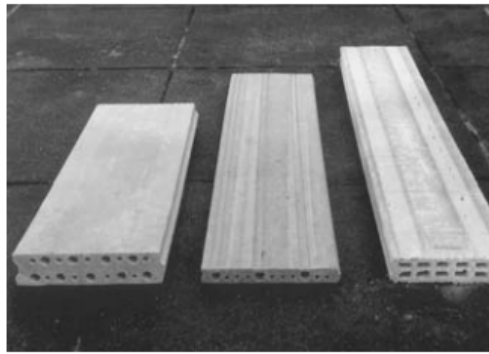
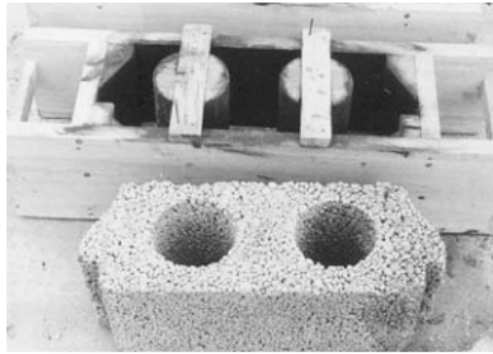
Roof



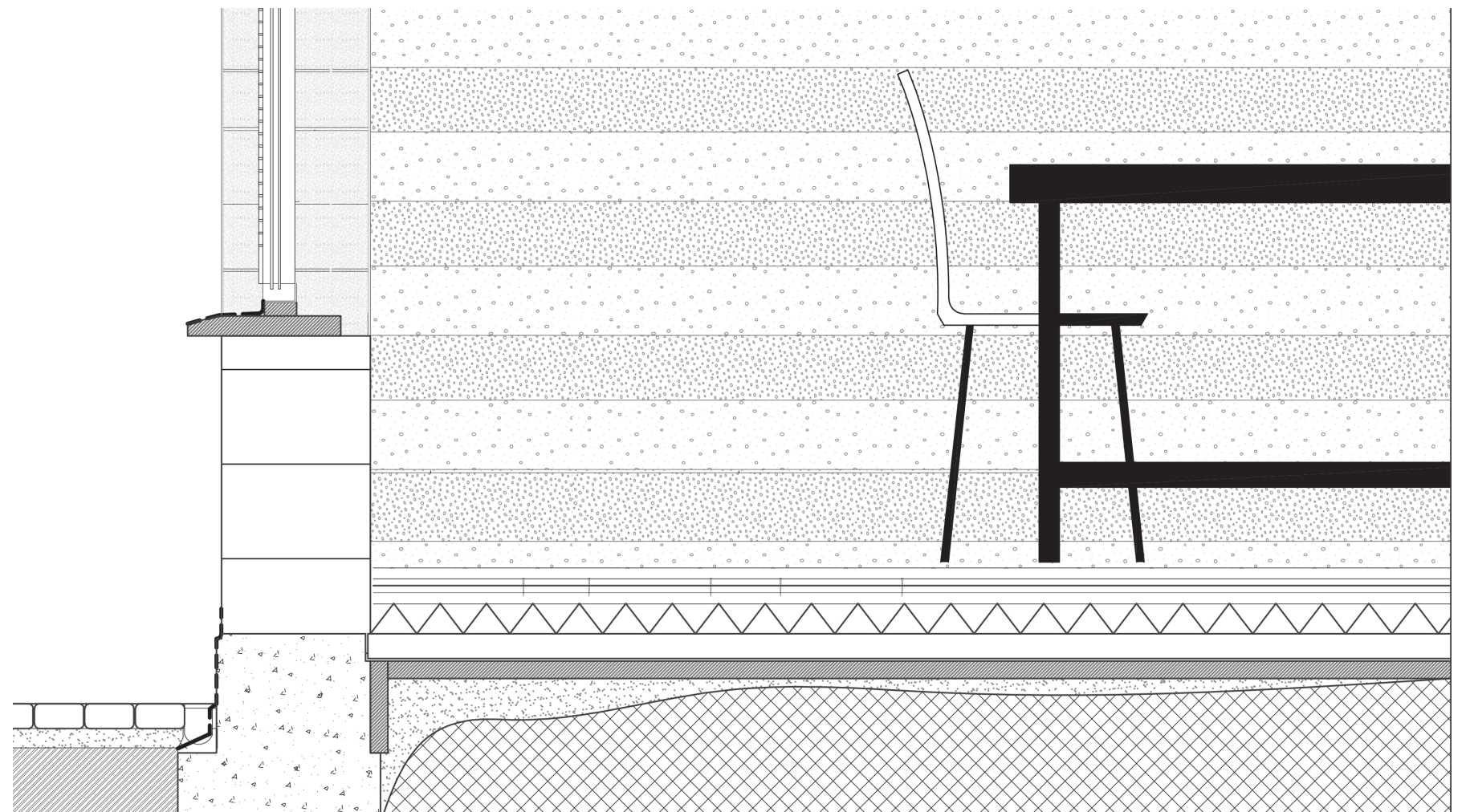
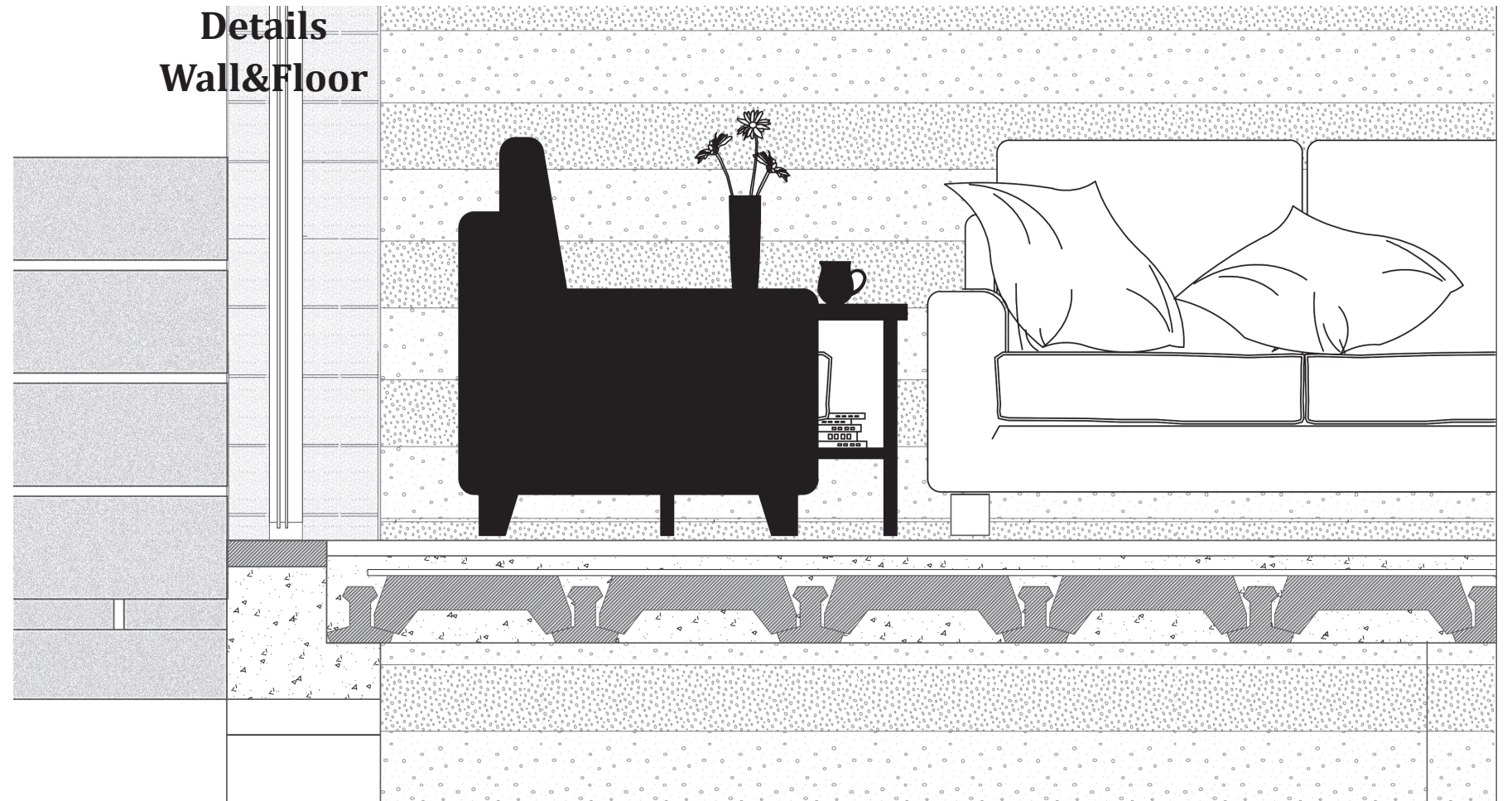
Details Foundation



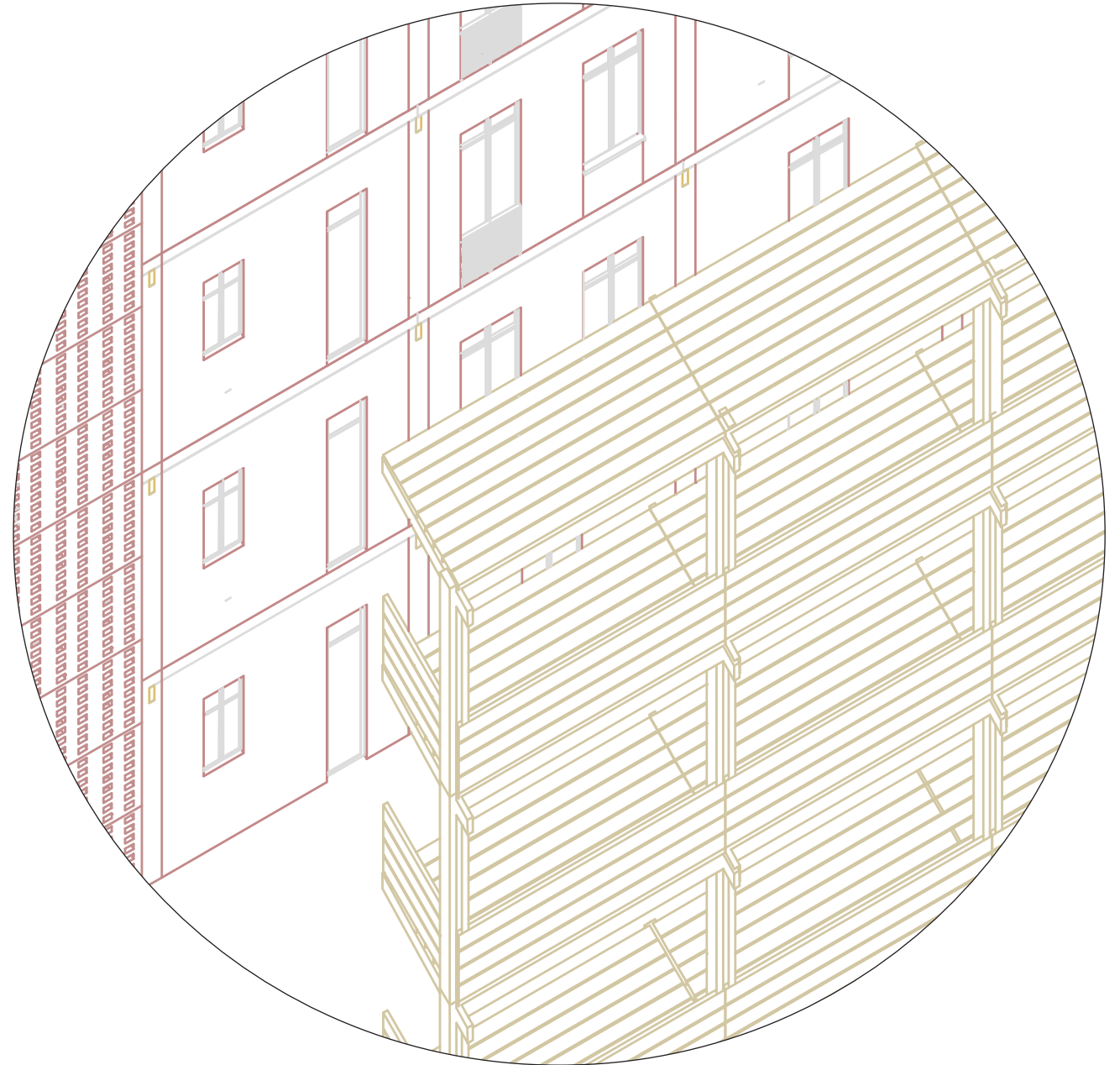
Details Wall&Floor



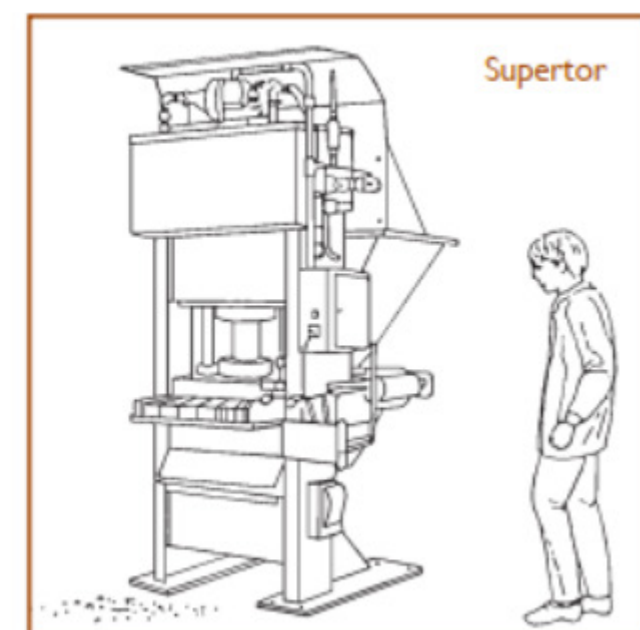
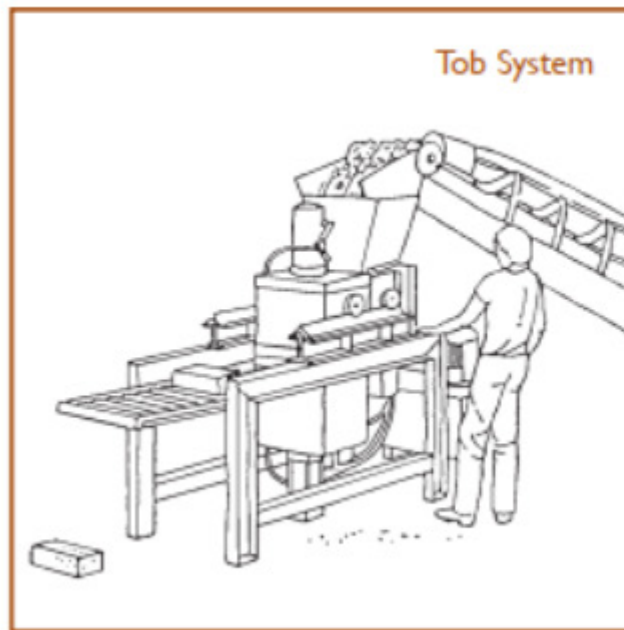
Floor-cement slab filles with concrete



Wooden veranda

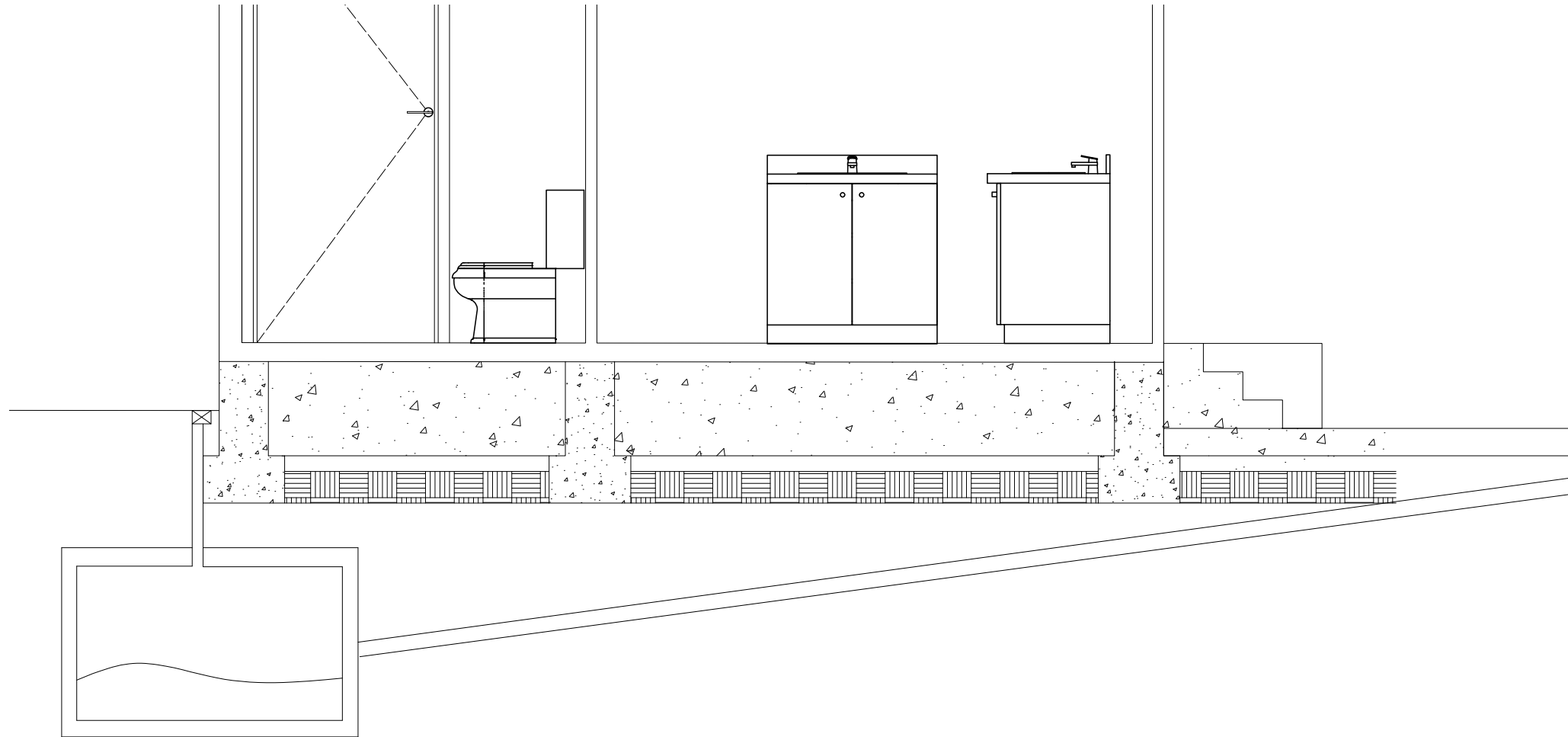


Compressed earth block for cooperation unit/condo unit



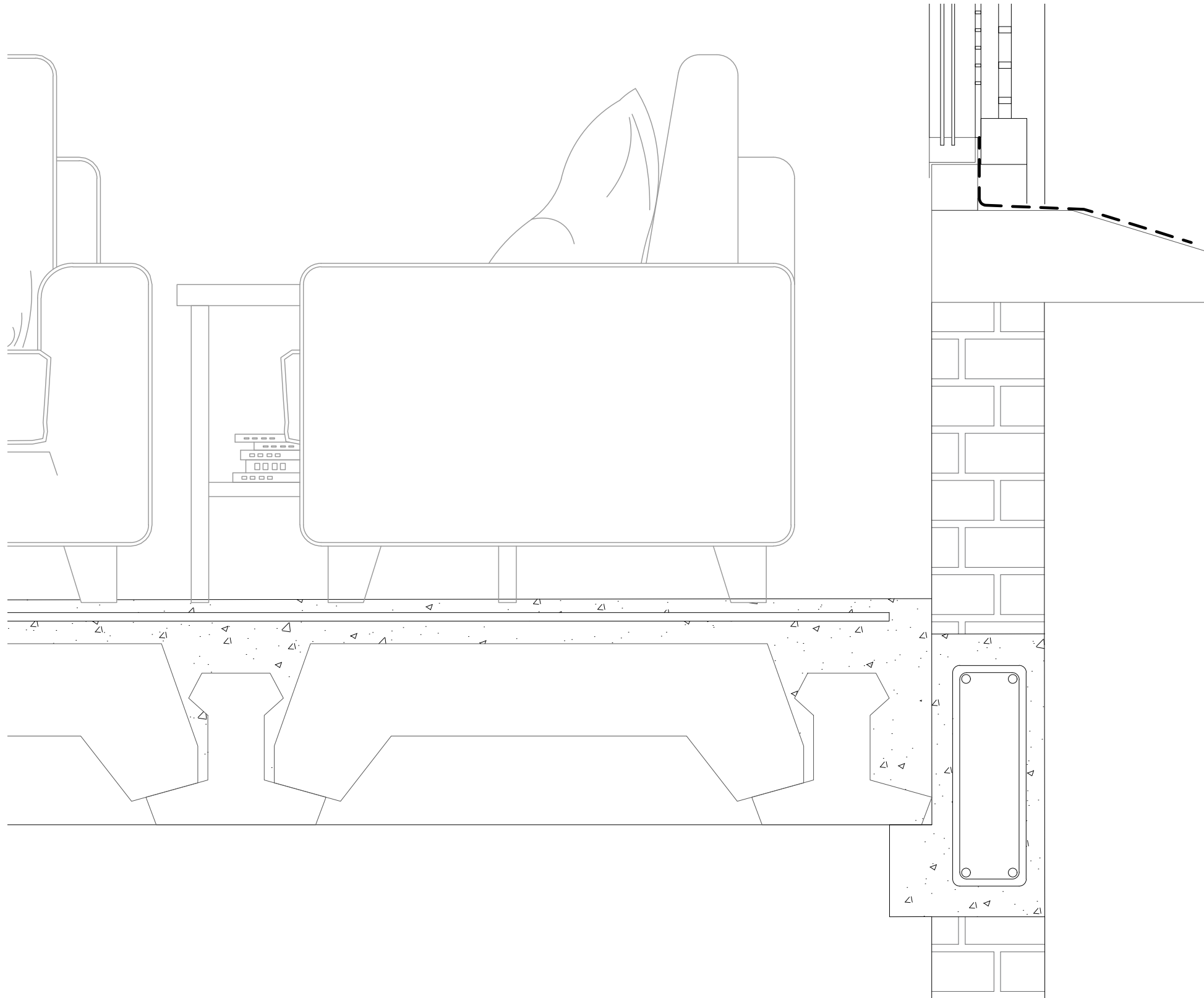
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Foundation Detail For Co-living Type



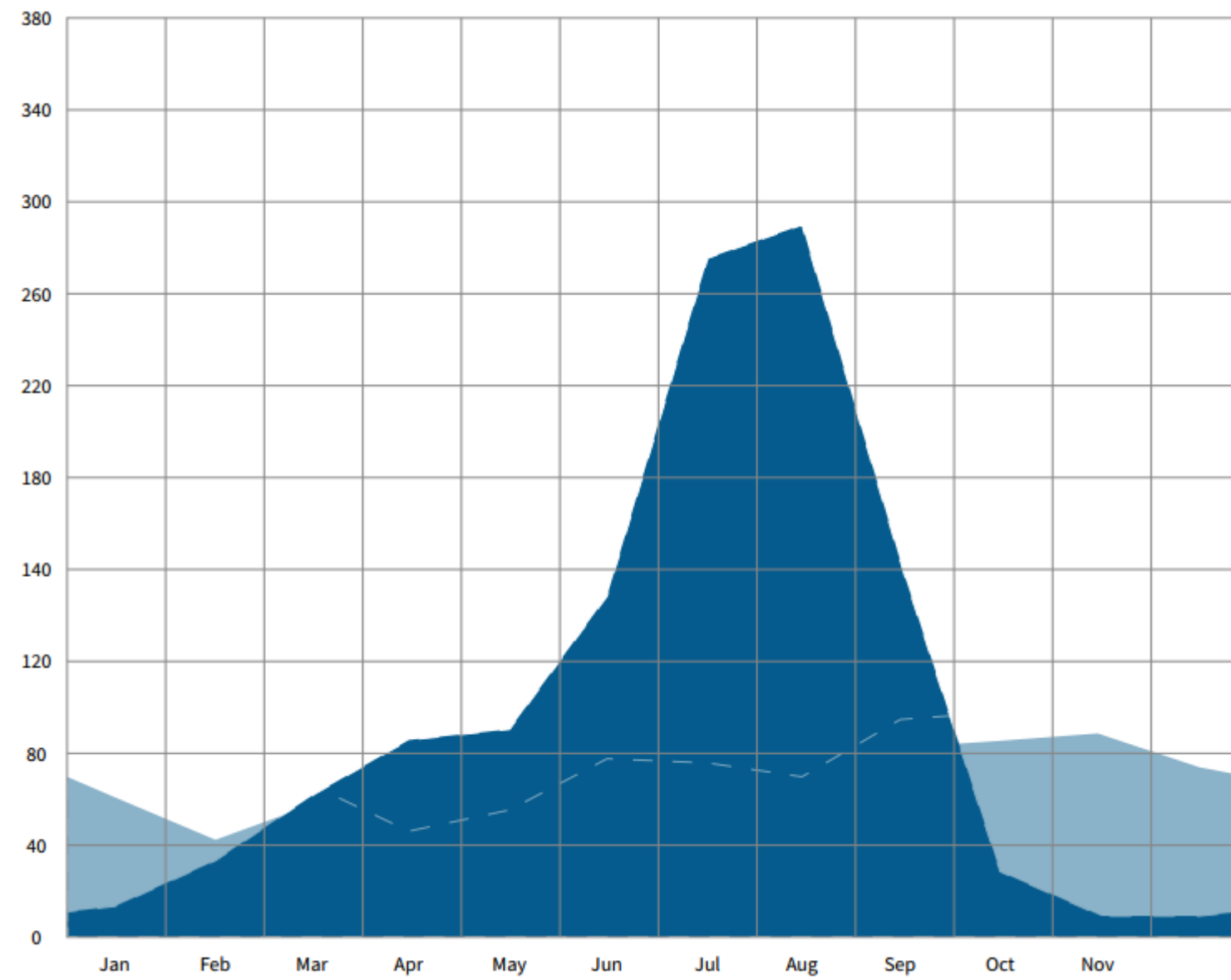
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Wall & floor detail



Water management

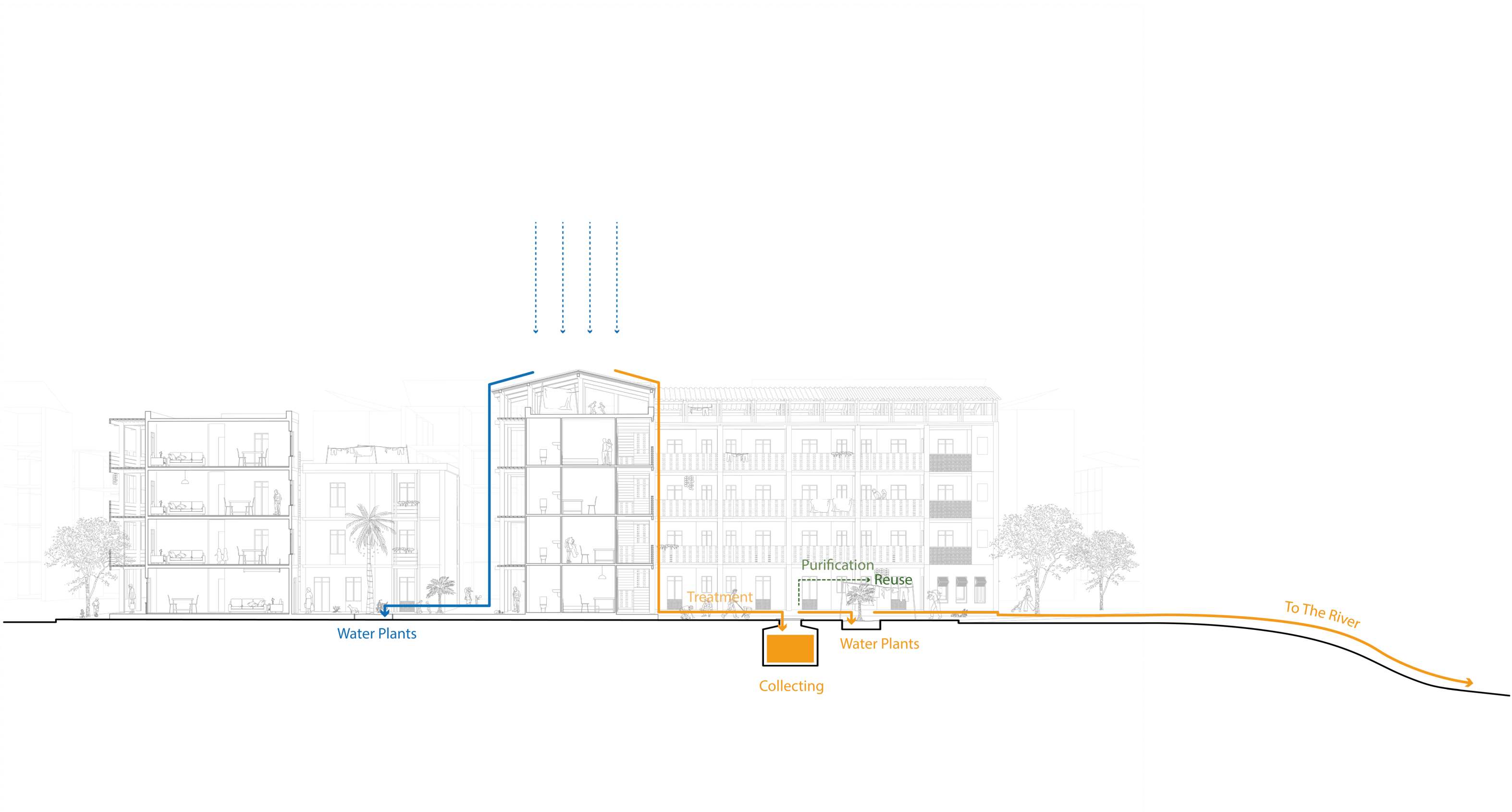
Wet summer & dry winter



Monthly precipitation in Addis Aba

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Water management

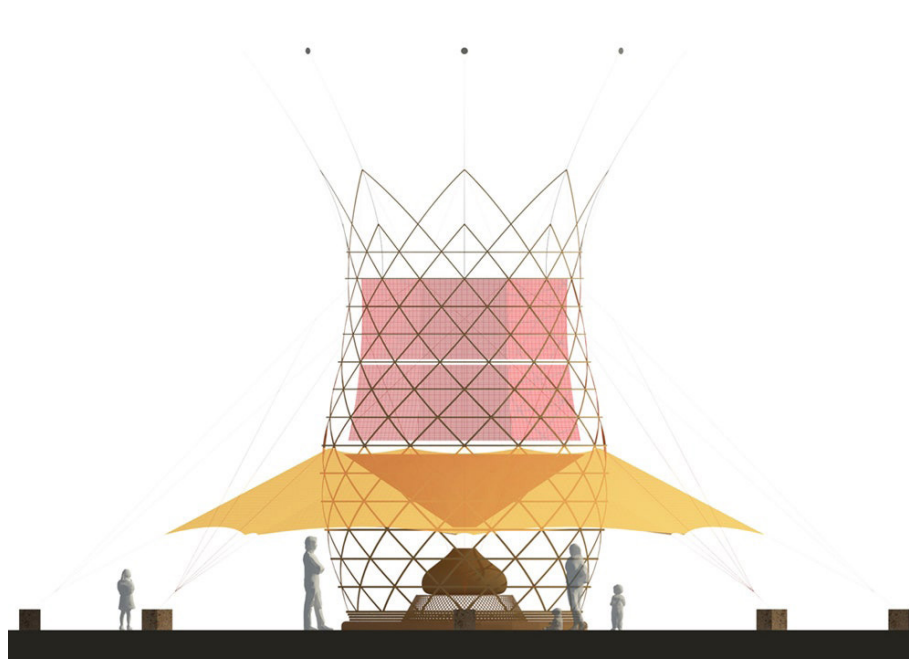
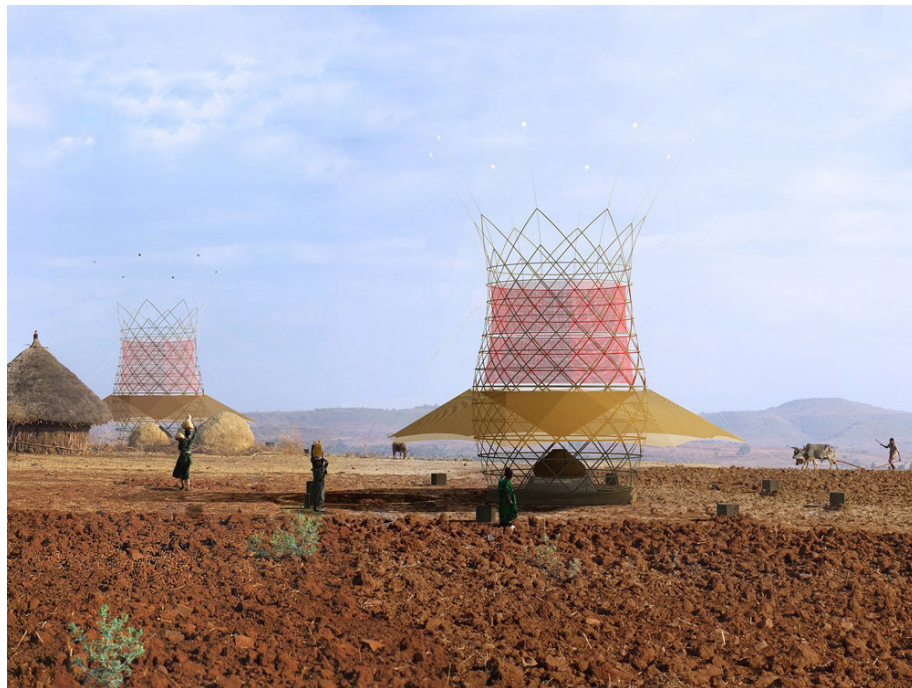


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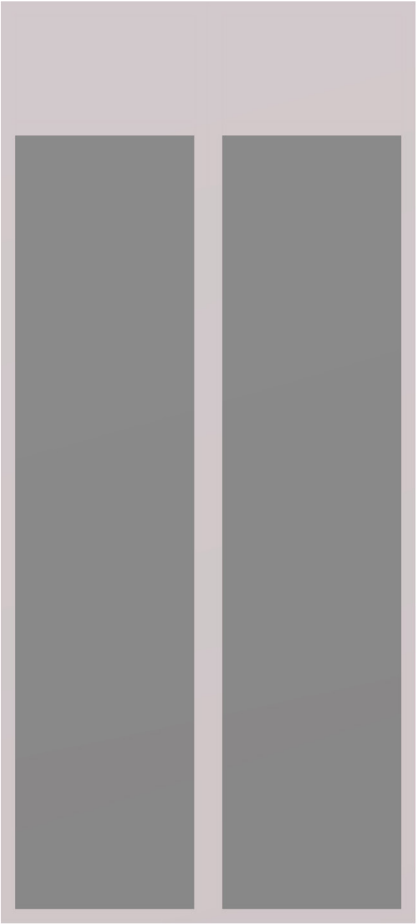
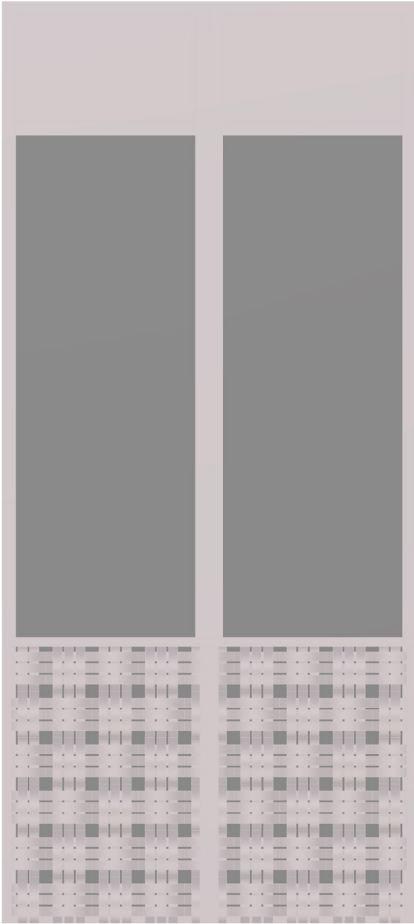
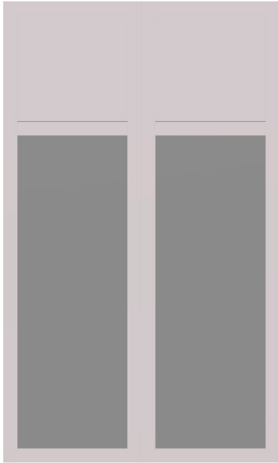
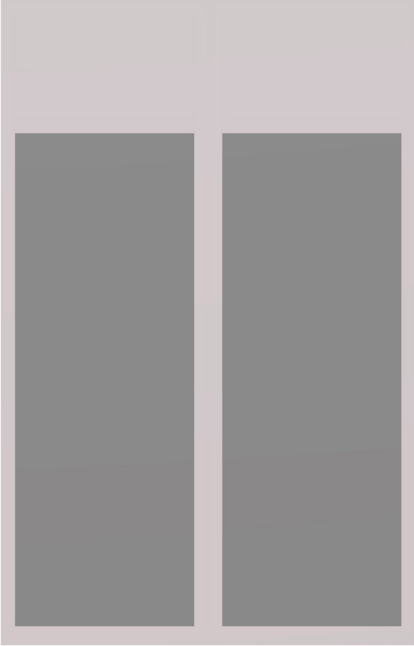
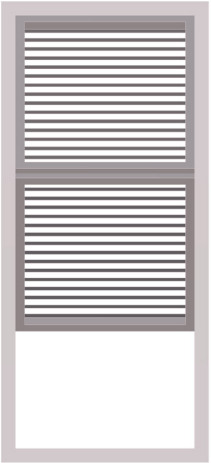
Water management

A Bamboo Tower That Produces Water From Air

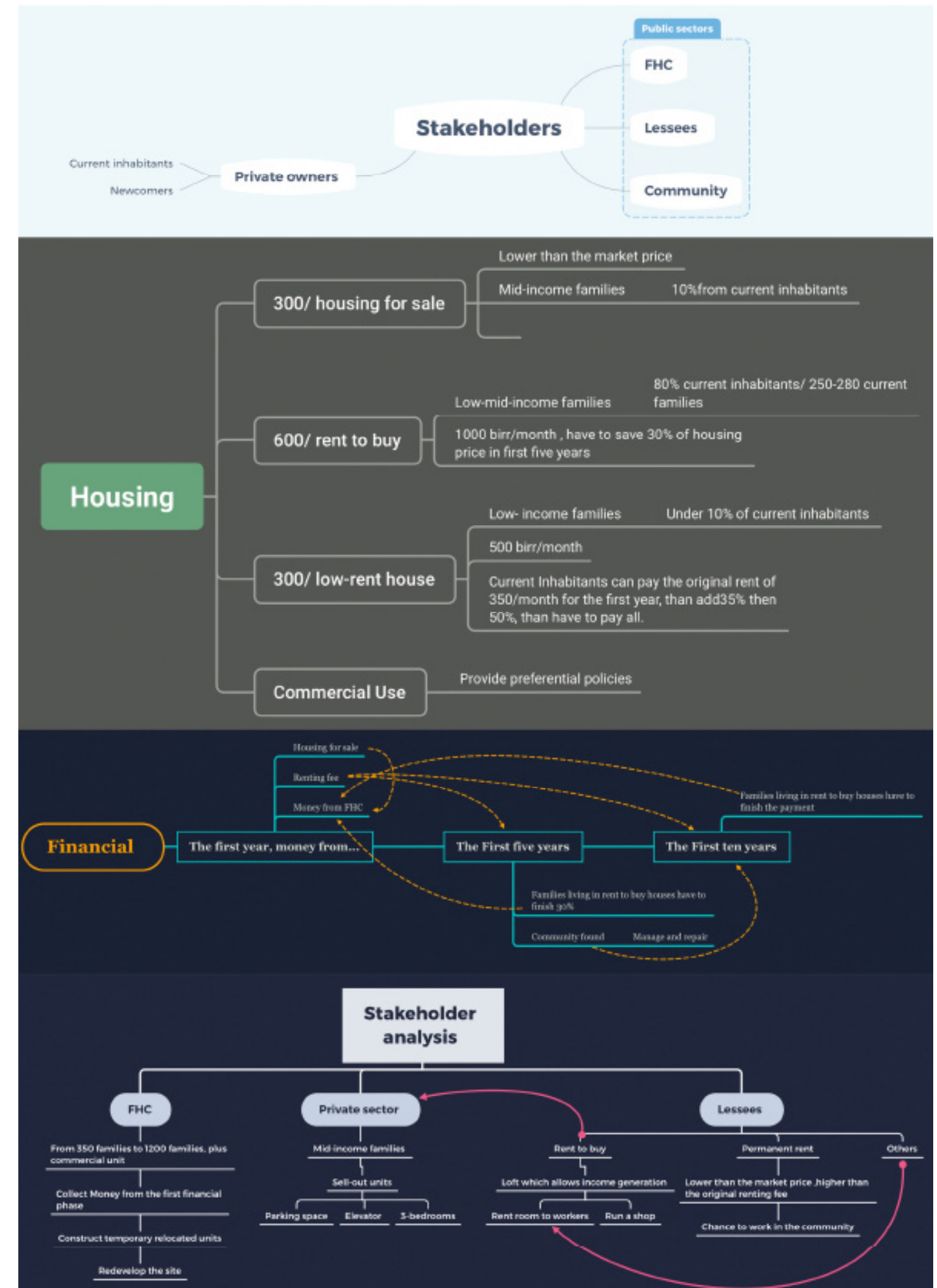
The structure is designed to wring water out of thin air, providing a sustainable source of H₂O for developing countries.



Window type



06.Management



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To be continued...