

Gerji Co-habitable Densification: Urbanization & Nostalgia
_ Towards the collective welfare between original and new residents

*Global Housing Graduation Studio
_ Addis Ababa Living Lab*

September, 2019- July, 2020

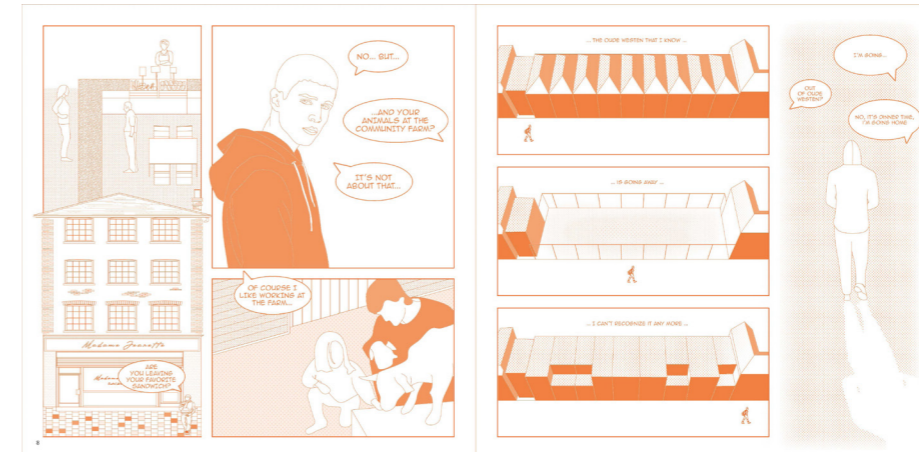
Yuerong Zhou | 周越融

Research
+
Design
+
Feasibility
+
Conclusion

ARCHITECTURAL ETHNOGRAPHY

_ Graphic Novel _ Rotterdam & Addis Ababa

Oude Westen _ Rotterdam



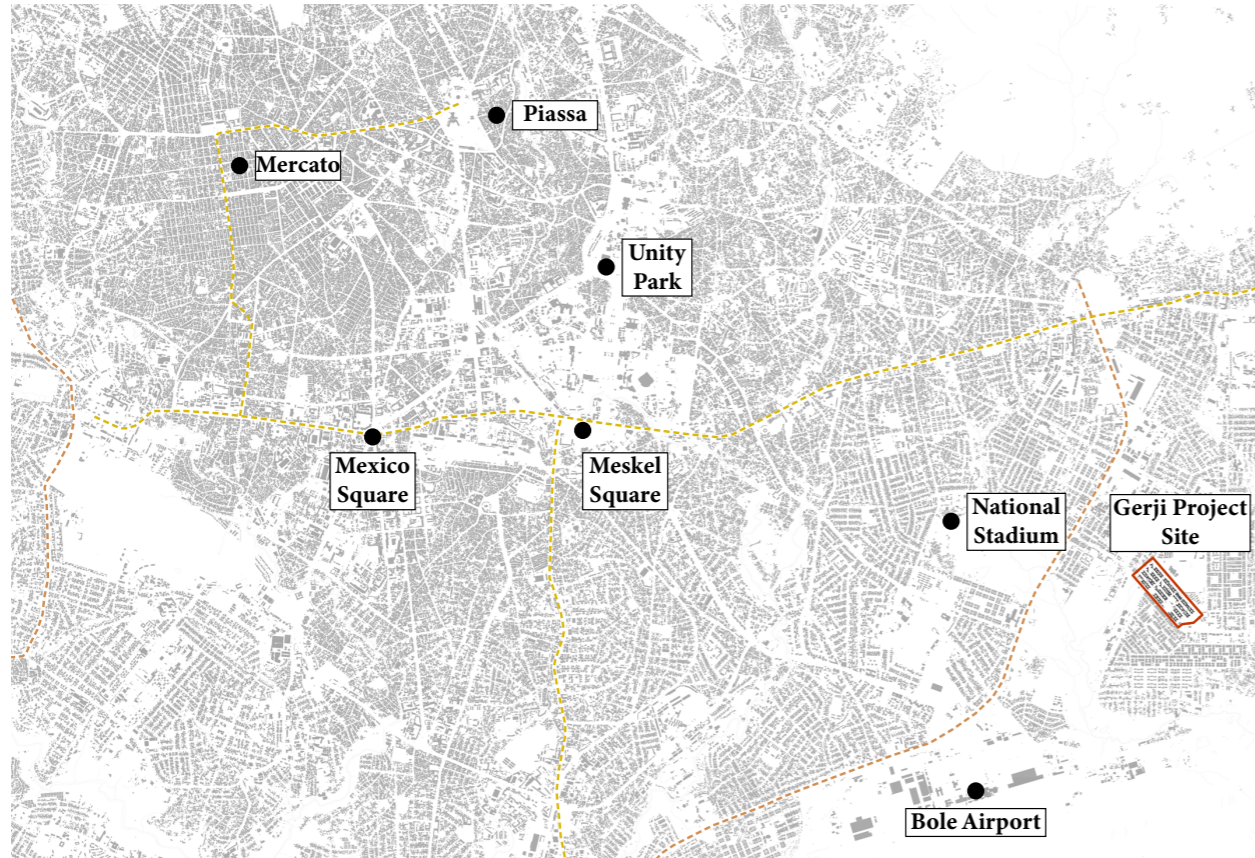
Kolfe Low-cost Housing Site _ Addis Ababa



RESEARCH

SITE STUDY

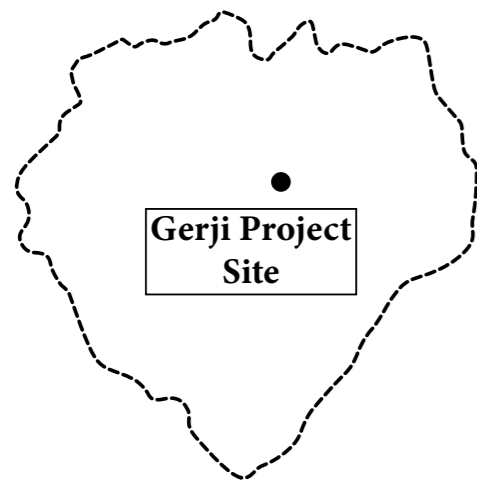
_ Location & Basic Information



Address: Bole sub city woreda 14, Addis Ababa, Ethiopia

Client: Federal Housing Corporation

Year: 1980s



Site area: **126,000 m² / 12.6 ha**
 Site area (plots): 74,745 m²
 FAR (est.): **0.43**

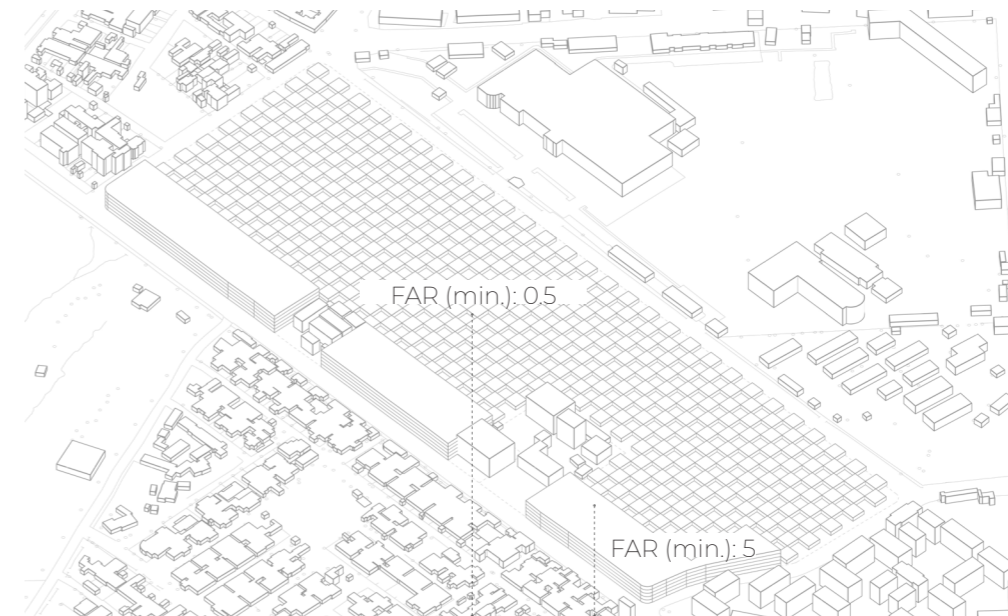
Plots: 318
 Household size (est.): 6
 Population (est.): **1900**
 Density: **143 p/ha**

Built area: 32,142.5 m²
 Green space: 43,400 m²
 % Green area: 34.5% (public + private)

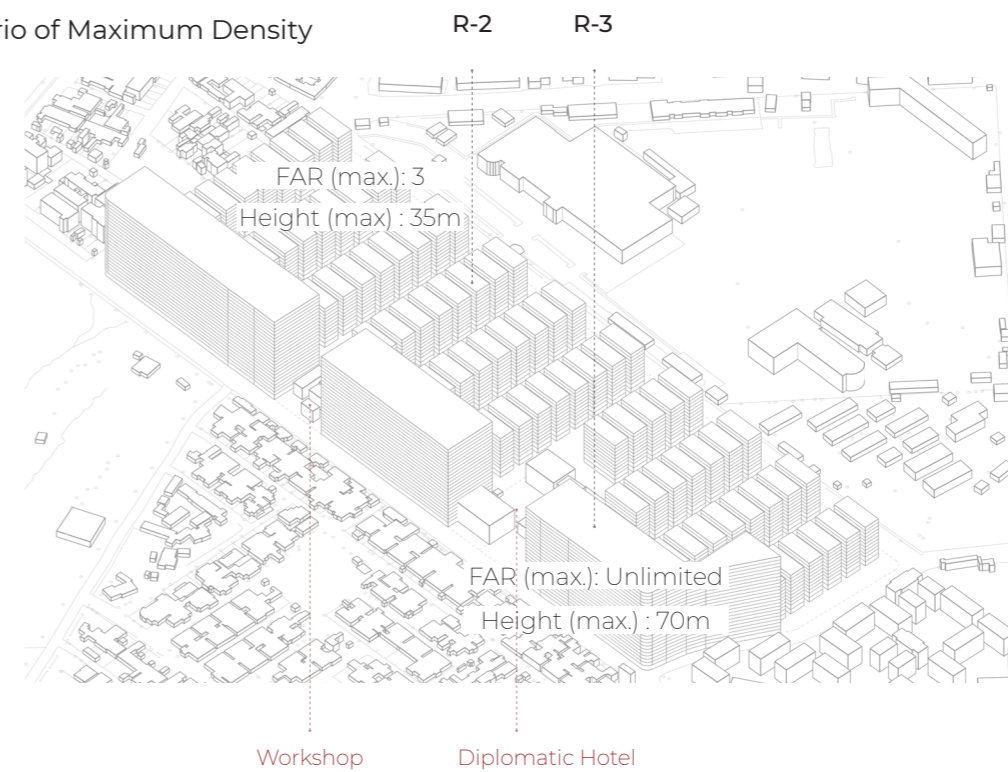
_ Master Plan Addis Ababa _ 2017

High-density mixed residence (R-3) & medium density mixed residence (R-2)

Scenario of Minimum Density



Scenario of Maximum Density



_ External Streets



Street on South



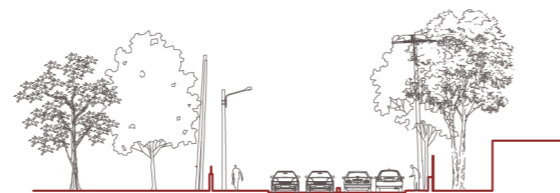
Section A-A'



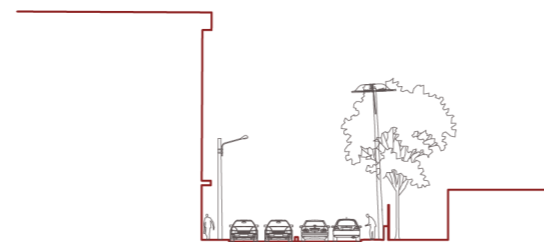
Section B-B'



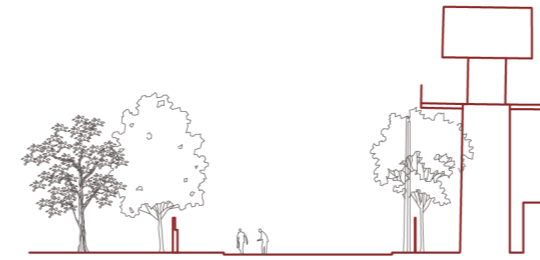
Section C-C'



Section D-D'



Section E-E'



Section F-F'



Section G-G'



Section H-H'



Street on North



Street on West



Street on East

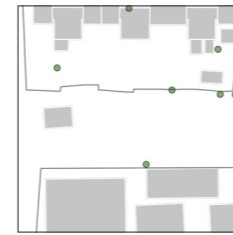
_ Internal Streets

Pathway between fences.



_ Public Space

As the site is mainly occupied by streets and private plots, there is a general lack of public space in gerji. The only two there includes an undefined open space on front of the diplomatic hotel and a small triangular park on the street side.



Undefined open space



Small park where one can enjoy a cup of coffee

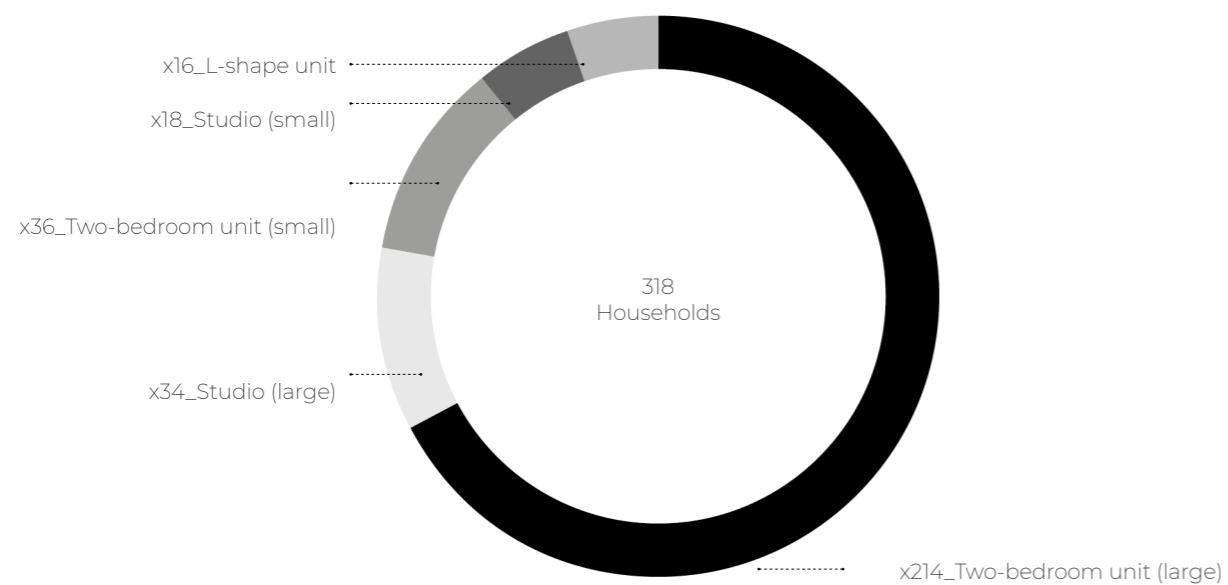
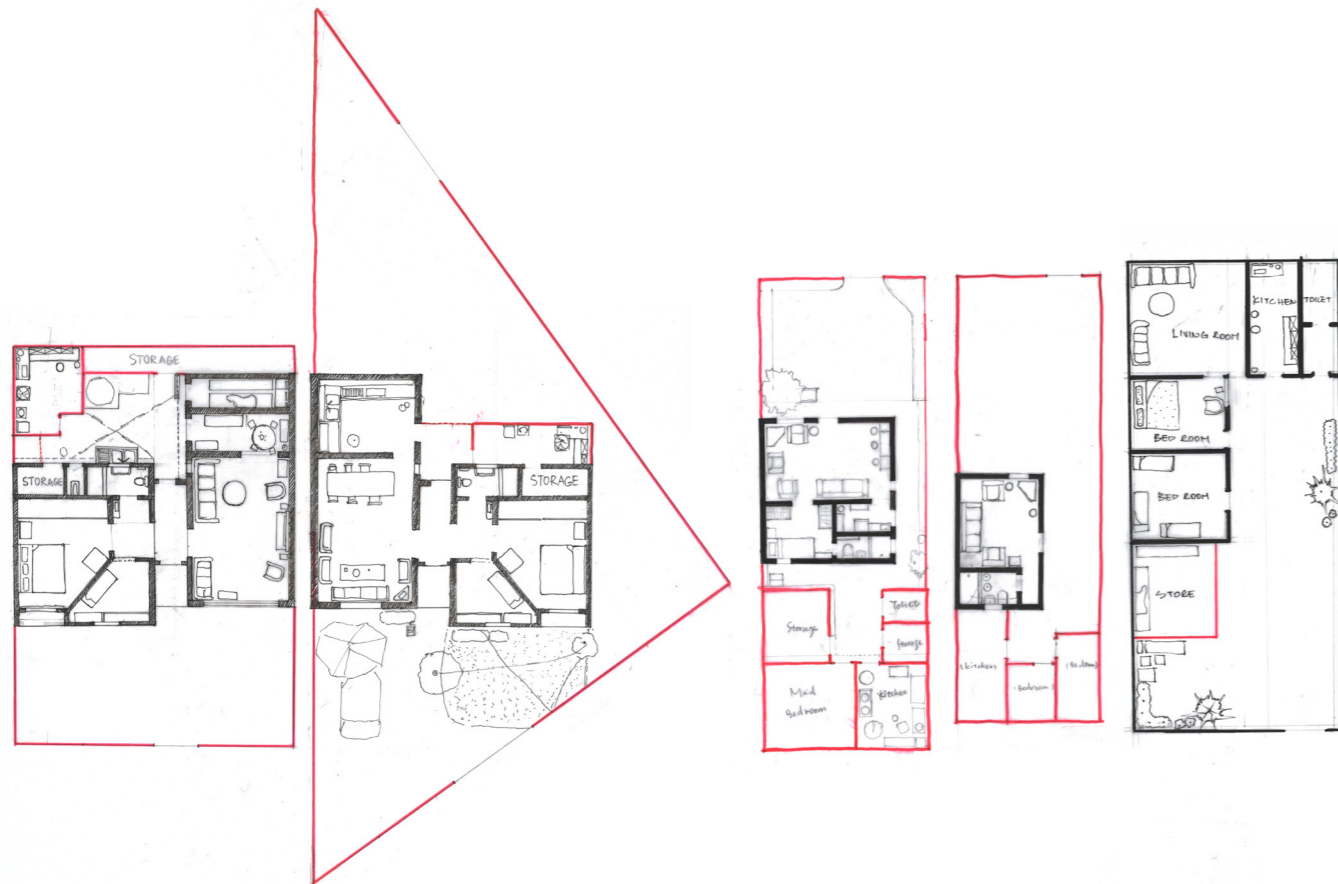


The remarkable water tower



_ Overview of Formal and Informal Construction

The single floor houses on the site were built by the Federal Housing Corporation in 1980s. They ARE 318 in total consist of five typologies, along with common construction of "informal" expansions.



_ Overview of Formal and Informal Construction



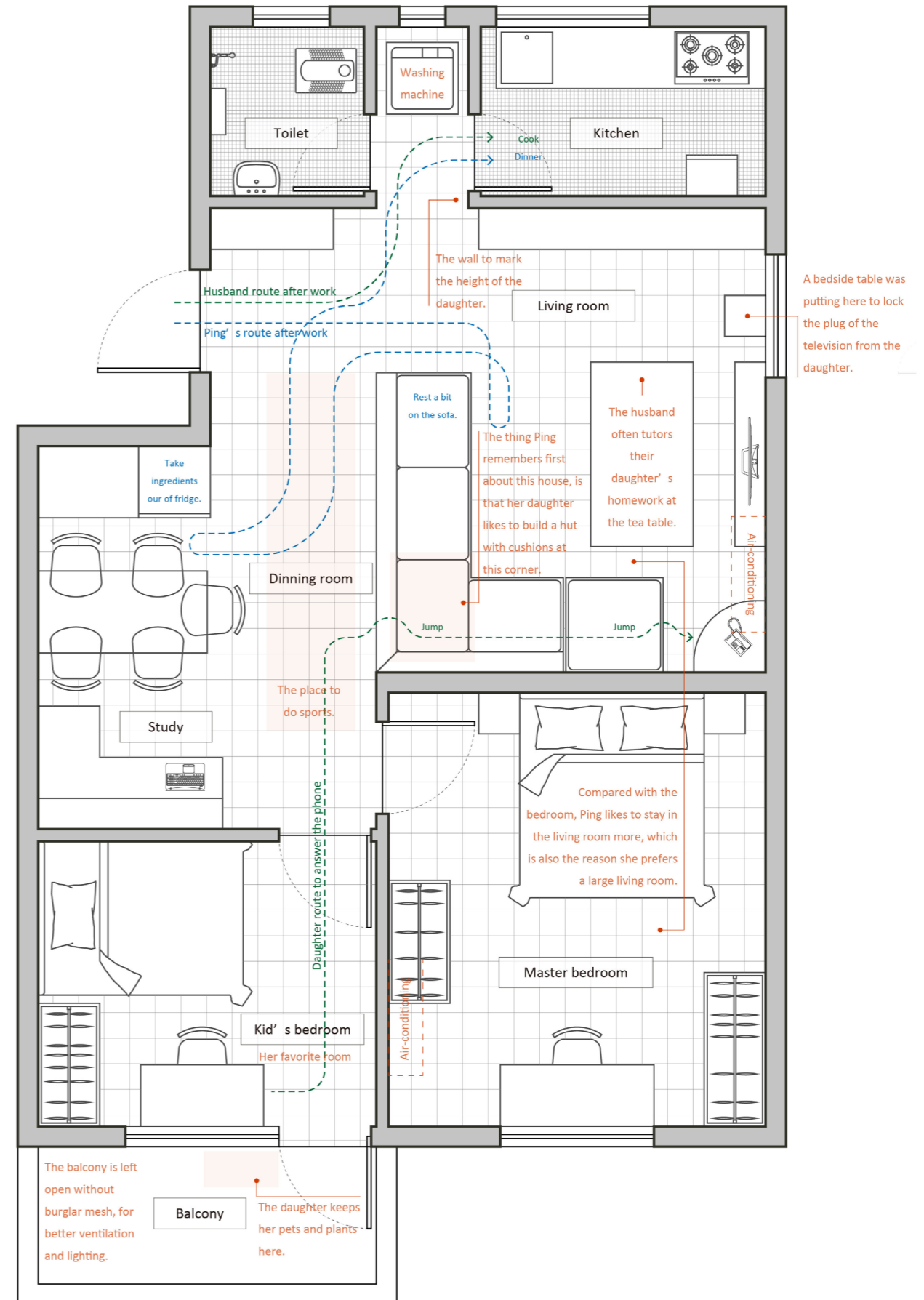
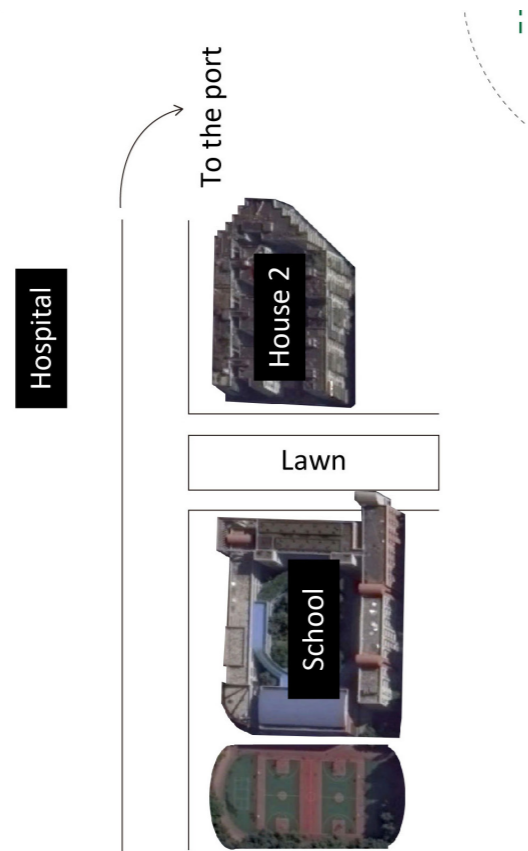
Formal construction
 Informal construction
 Possible overcrowded households x19

Plots: **318**
 Typologies: **5**
 Plot size (range): **135 - 505 m²**
 Plot size (median): **215 m²**

% Original homes: **76%**
 % Extensions: **24%**
 Average extension: **25 m²**

HOME LIFE DIARY

_Lv Yuan Residence



URBAN STRATEGY

_Adjustment of Urban Fabric

↴

From to

Original Street Pattern



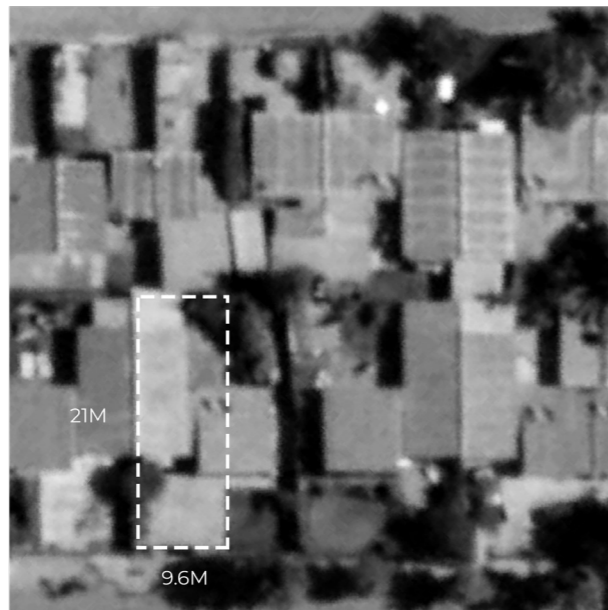
New Street Pattern



DESIGN

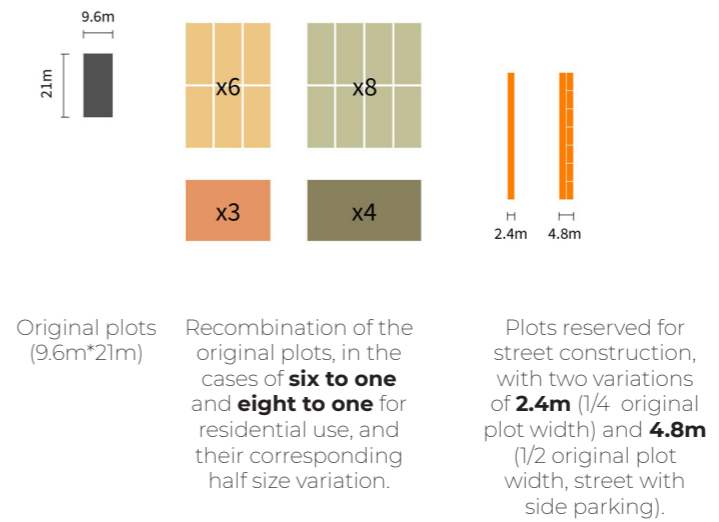
THE PLOTS

_ A Basic FHC Plot

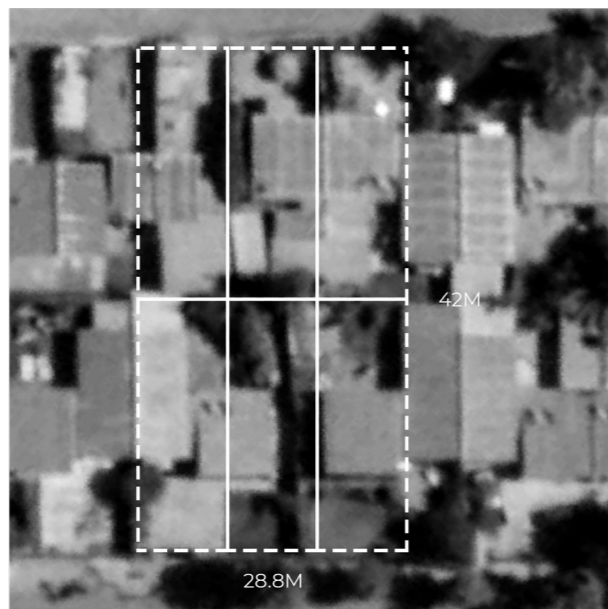


_ Plot Rearrangement for FHC Site

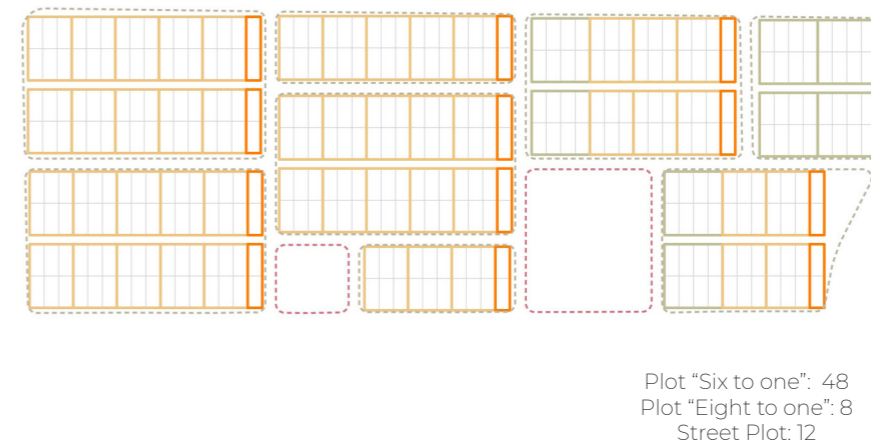
The construction of a new plot system



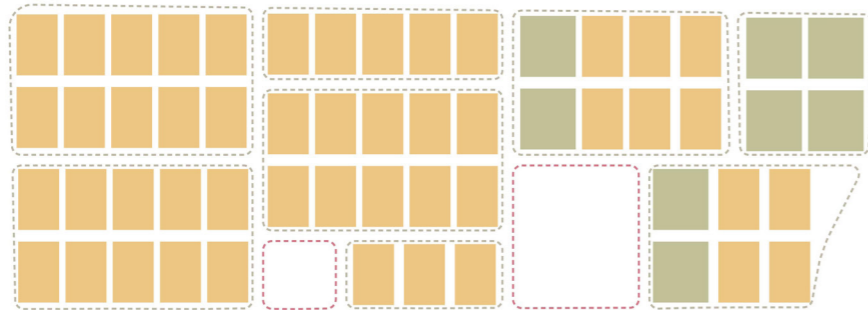
_ Plot Combination



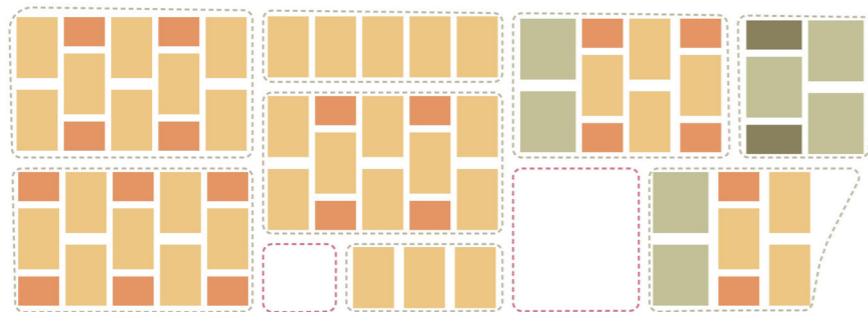
Application of the plot system to Gerji



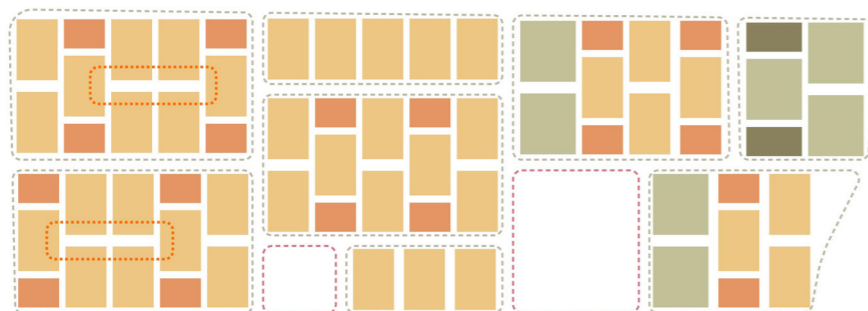
Adjustment of the Plot Rearrangement



Distributing the streets in-between the plots for residential use. Generating the hierarchy from outer street, to primary inner street, secondary inner street and backside pedestrian street.

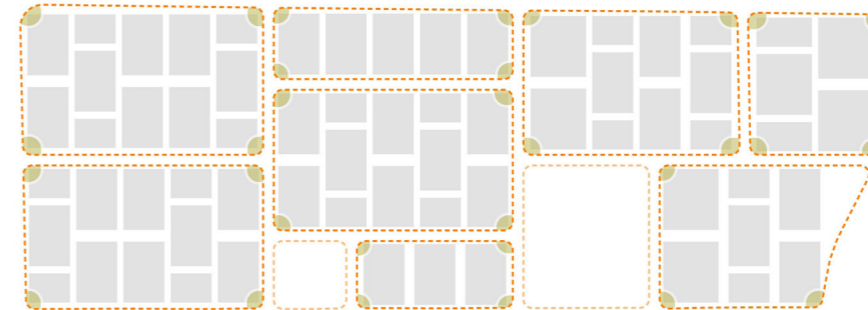


Introducing half size variations to allow stagger placements of the residential plots, thereby breaking the consistency of the pedestrian street.



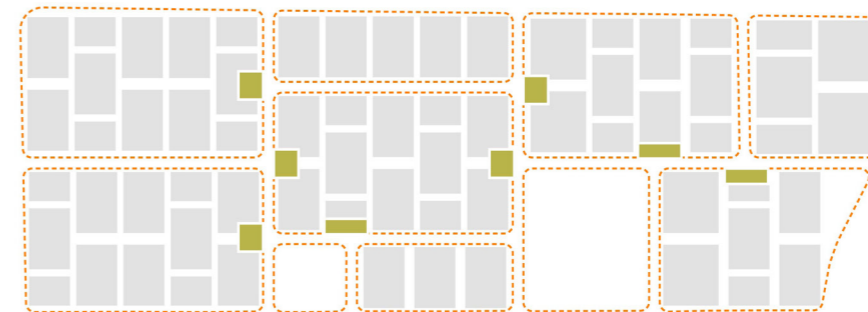
Minor adjustment.

Generation of Public Space



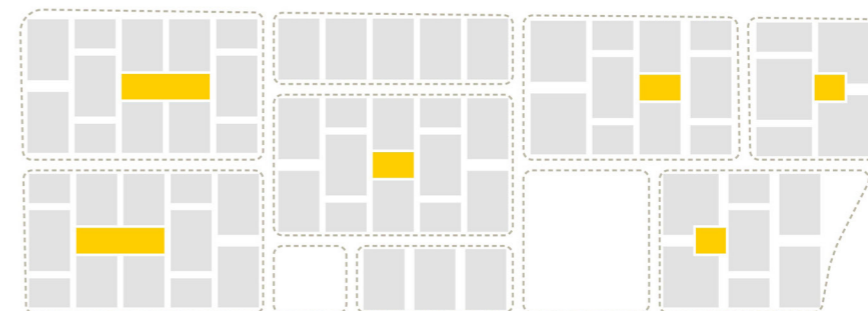
Corner.

+



Street end.

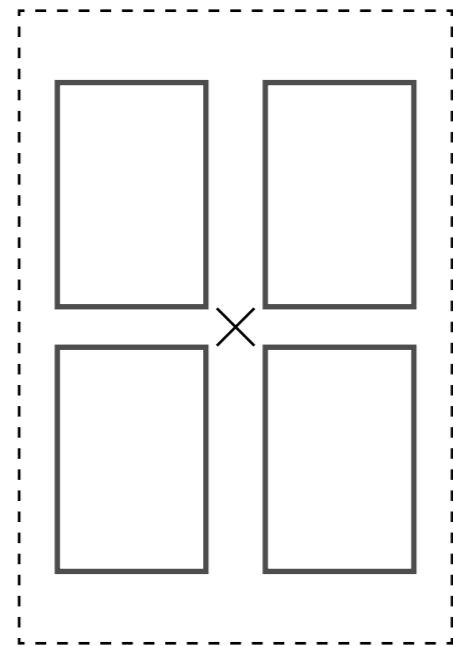
+



Inside.

WITHIN A NEW PLOT

_ The Cluster Prototype



Building Cluster

Circulation System = Communal space

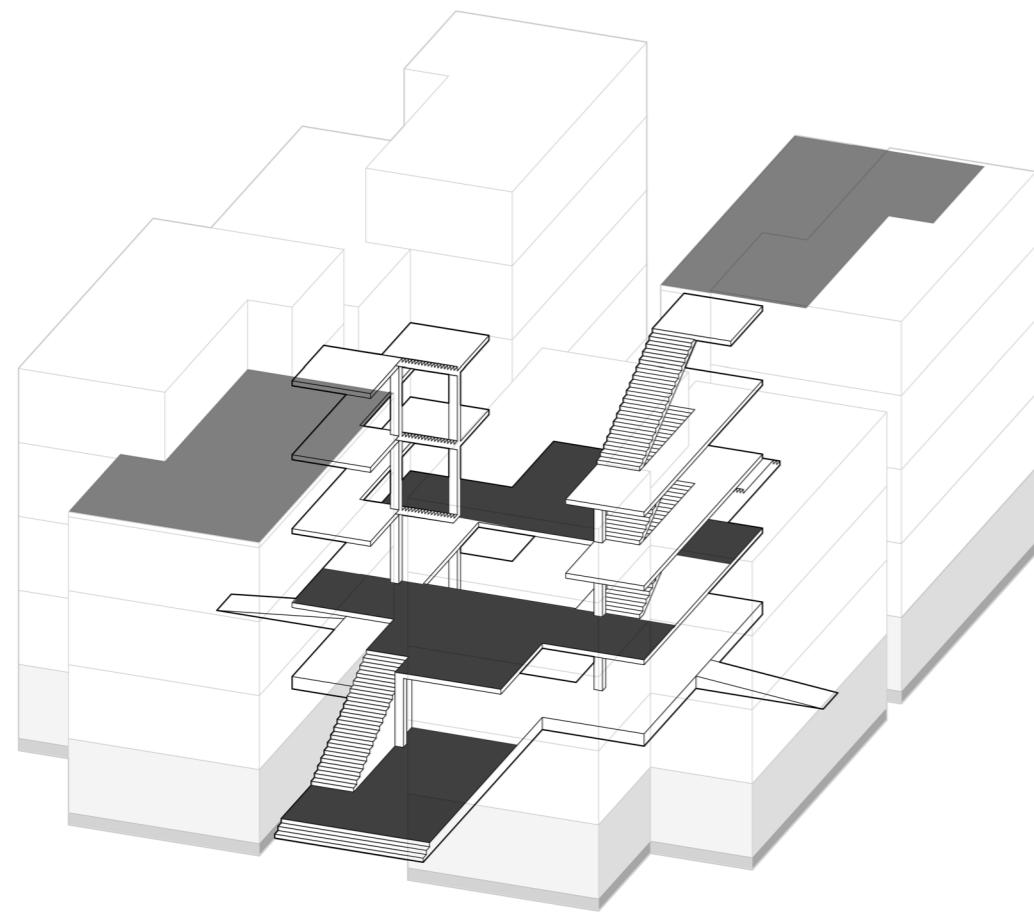


Dwelling Blocks

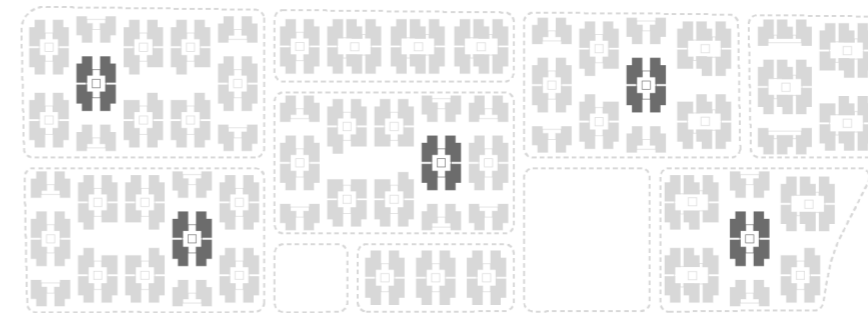


_Variations of The Cluster Prototype

_“6 to 1” Plot



X Type - Typical _ 1:250



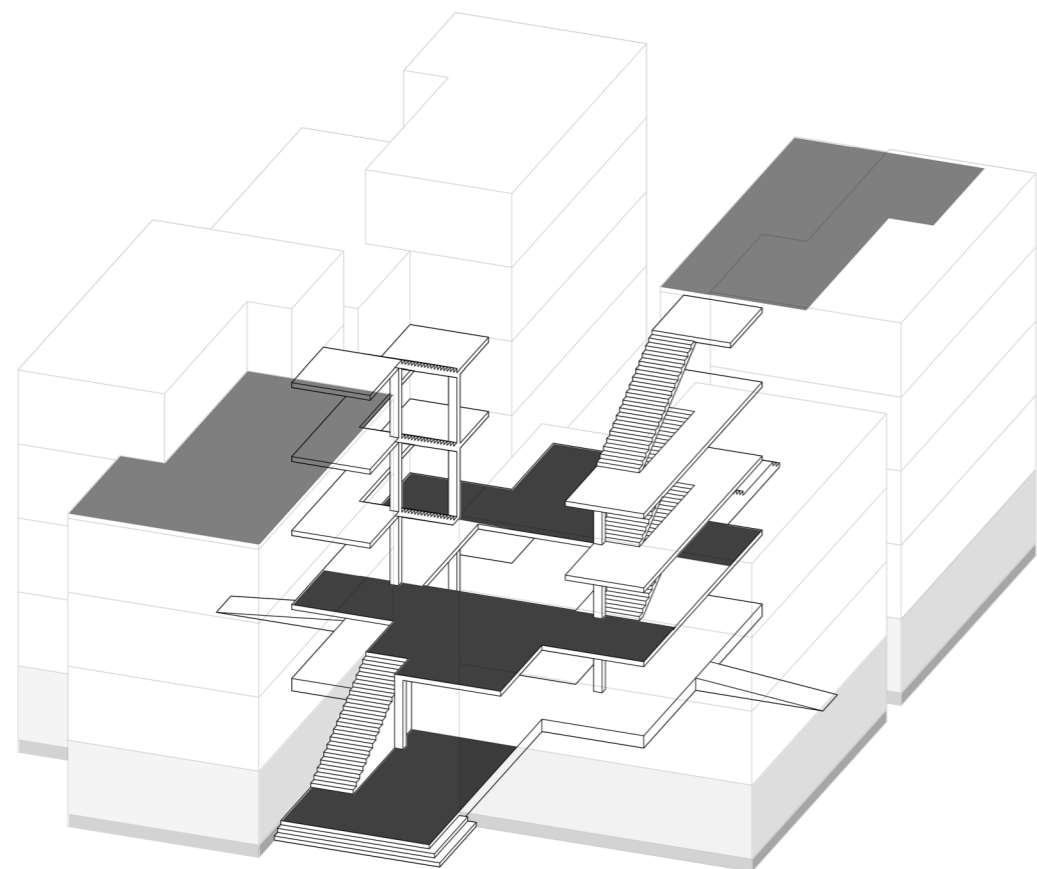
The prototype.

Upper levels offer: total **1844.64 m²** living area for **22** households

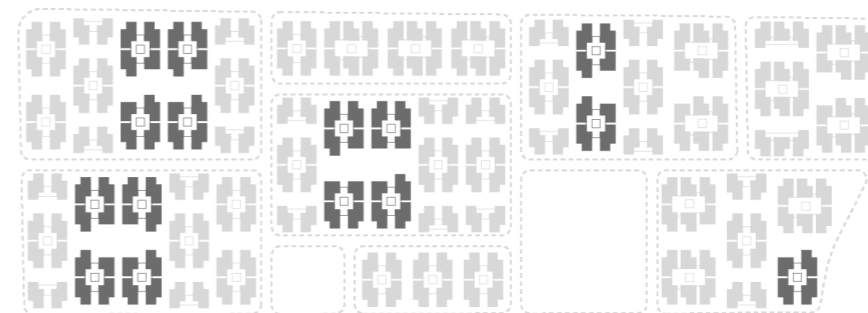
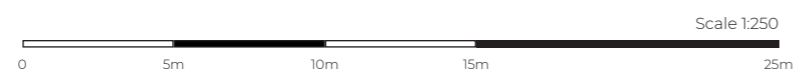
Original dweller accommodated: **6** households / **790.56 m²**

New dweller accommodated: **16** households / **1054.08 m²**

Ground floor space offered: **527.04 m²** with **2.7m** floor height



X Type - Corner _ 1:250



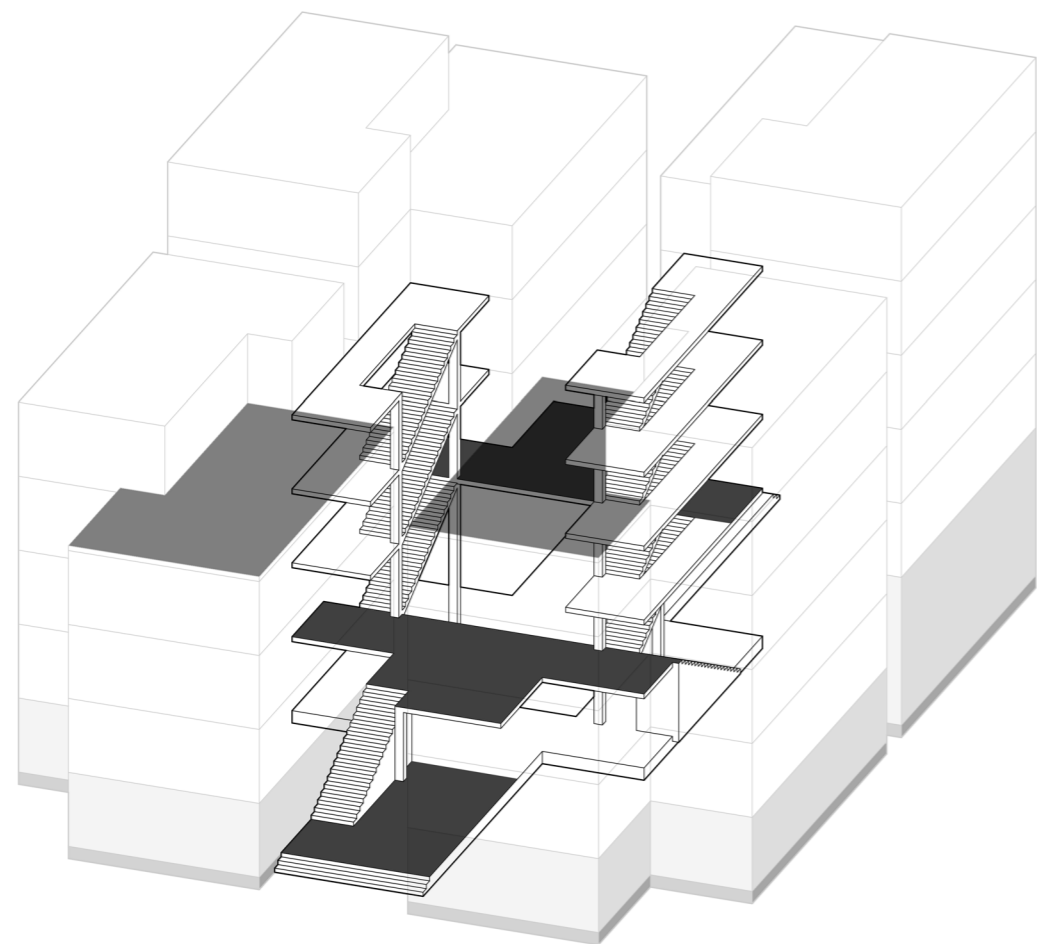
The corner type clusters are the corners of the public space. They are also the most common case in the Gerji site.

Upper levels offer: total **1675.45 m²** living area for **20** households

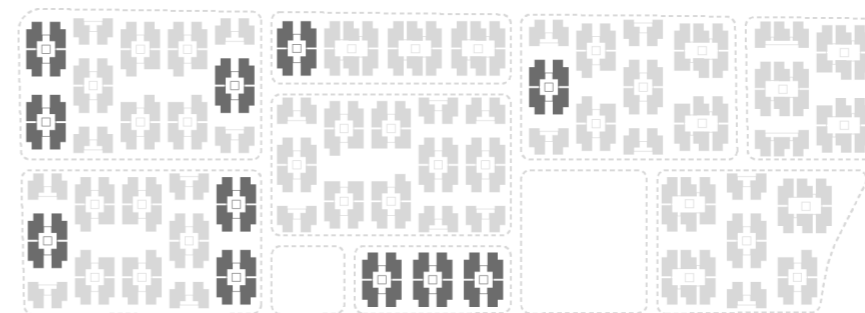
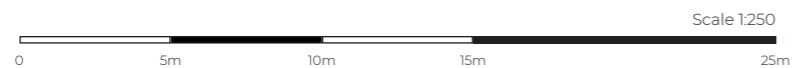
Original dweller accommodated: **6** households / **790.56 m²**

New dweller accommodated: **14** households / **884.89 m²**

Ground floor space offered: **527.04 m²** with **2.7m** floor height



X Type - Commerce _ 1:250



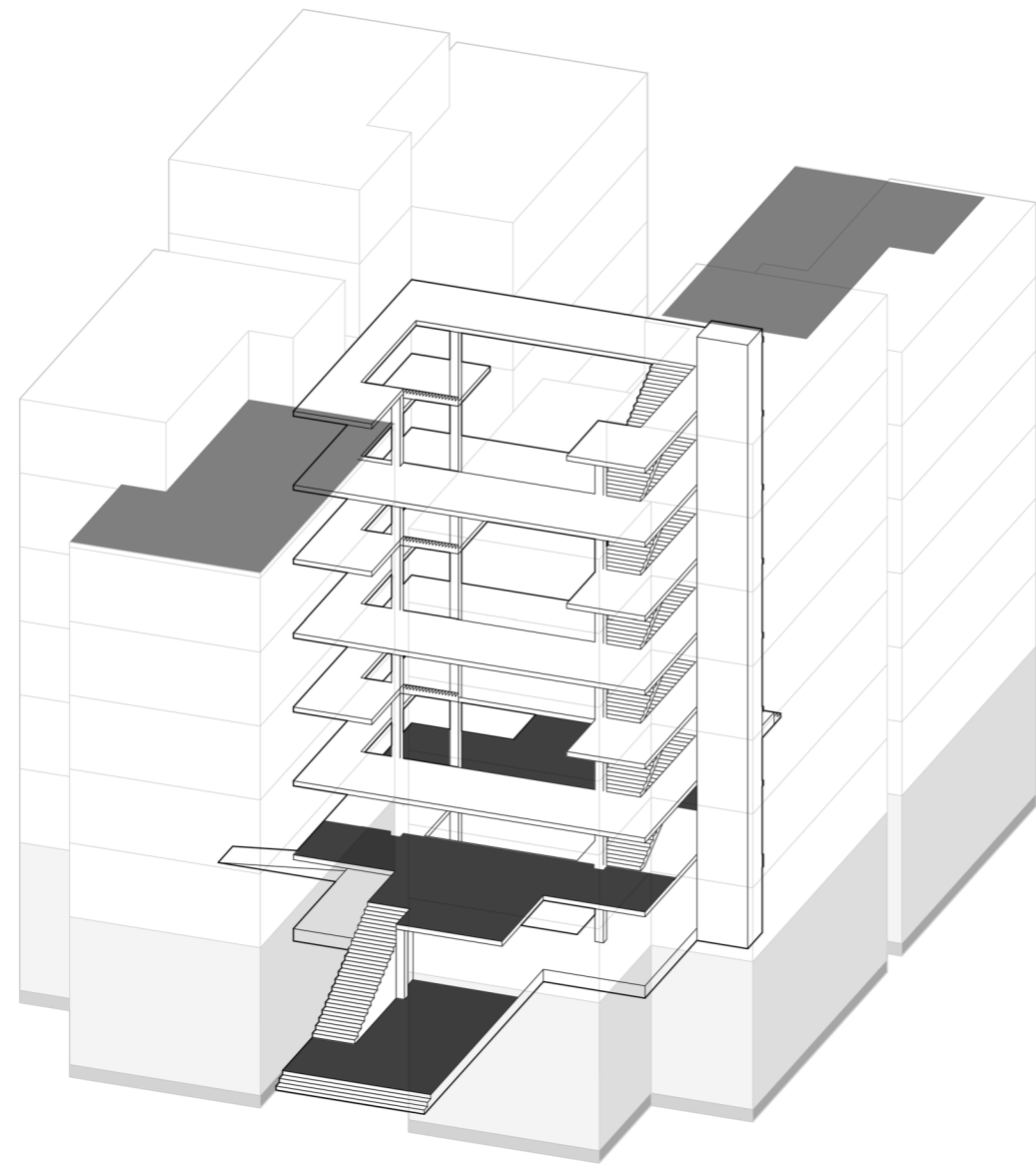
Close to main external commercial streets.

Upper levels offer: total **2108.16 m²** living area for **26** households

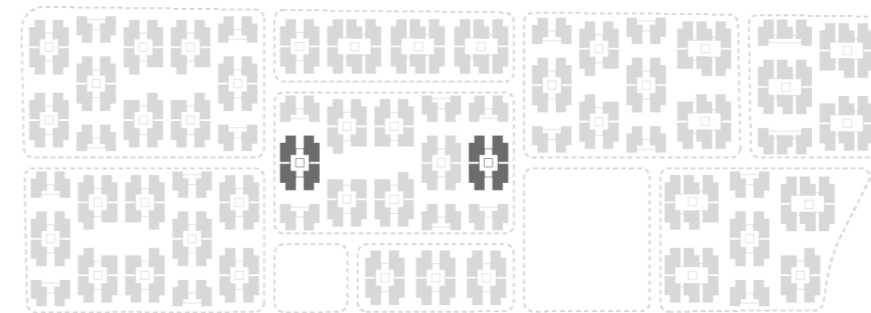
Original dweller accommodated: **6** households / **790.56 m²**

New dweller accommodated: **20** households / **1317.6 m²**

Ground floor space offered: **263.52 m²** with **2.7m** floor height
& **263.52 m²** with **5.4m** floor height



X Type - Tower _ 1:250



On the centre of the site.

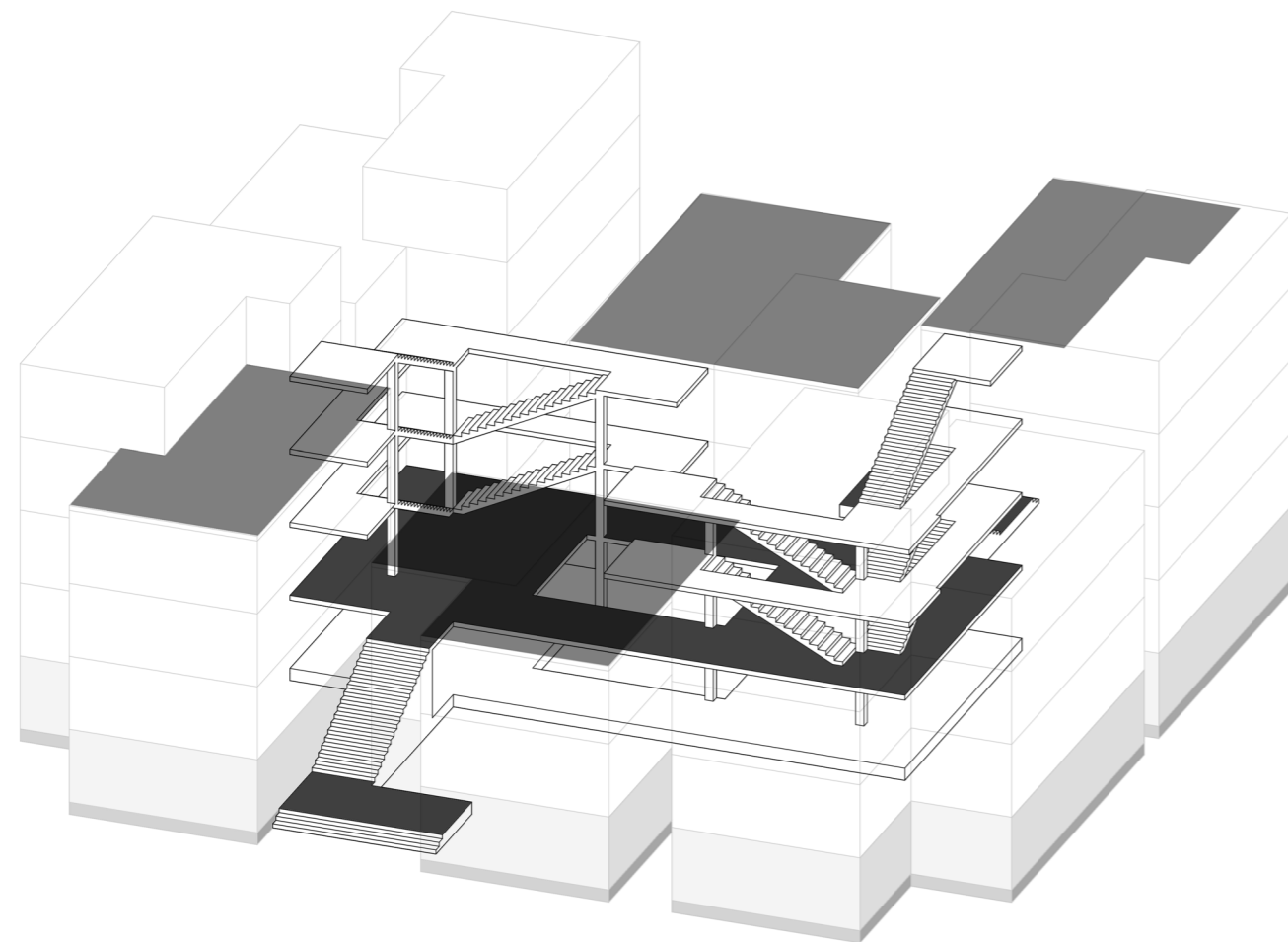
Upper levels offer: total **3162.24 m²** living area for **42** households

Original dweller accommodated: **6** households / **790.56 m²**

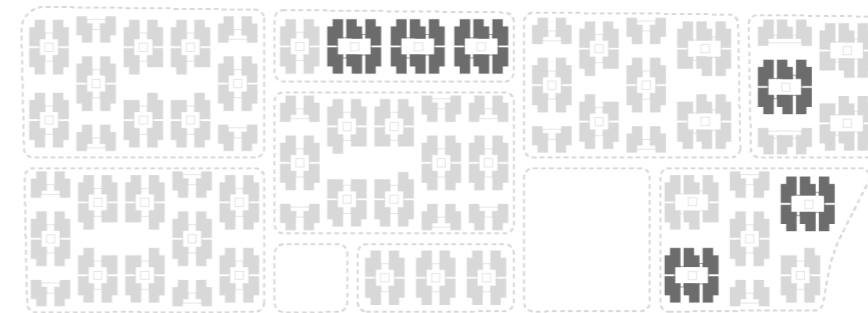
New dweller accommodated: **36** households / **2371.68 m²**

Ground floor space offered: **527.04 m²** with **5.4m** floor height

_ "8 to 1" Plot



H Type - Typical _ 1:250



On the plots that are combined from 8 plots each.

Upper levels offer: total **2712.08 m²** living area for **28** households

Original dweller accommodated: **8** households / **1054.08 m²**

New dweller accommodated: **20** households / **1658 m²**

Ground floor space offered: **799.02 m²** with **2.7m** floor height

MASTER PLAN

Master Plan 1:2000

Plot "6 to1":

X Type _ Typical : x9

X Type _ Corner: x15

X Type _ Commerce: x7

X Type _ Tower: x2

U Type: x20

Plot "8 to1":

X' Type _ Typical : x6

X' Type _ Corner: x5

U' Type: 2

Households: from 318 to **1679**

FAR: from 0.43 to **1.417**

Population (est.) : from 1900 to **8000**

Density: from 143 to **666** p/ha (**133** households/pa)

Scale 1:2000

0 20m 60m 100m 200m





_ Phasing

From outer to Inner, dynamic to static, public to private.

Current Site Condition

Scale 1:2000

0 20m 60m 100m 200m











Phase 5 Construction

Scale 1:2000

0 20m 60m 100m 200m



Phase 6 Construction

Scale 1:2000

0 20m 60m 100m 200m



NEIGHBOURHOOD

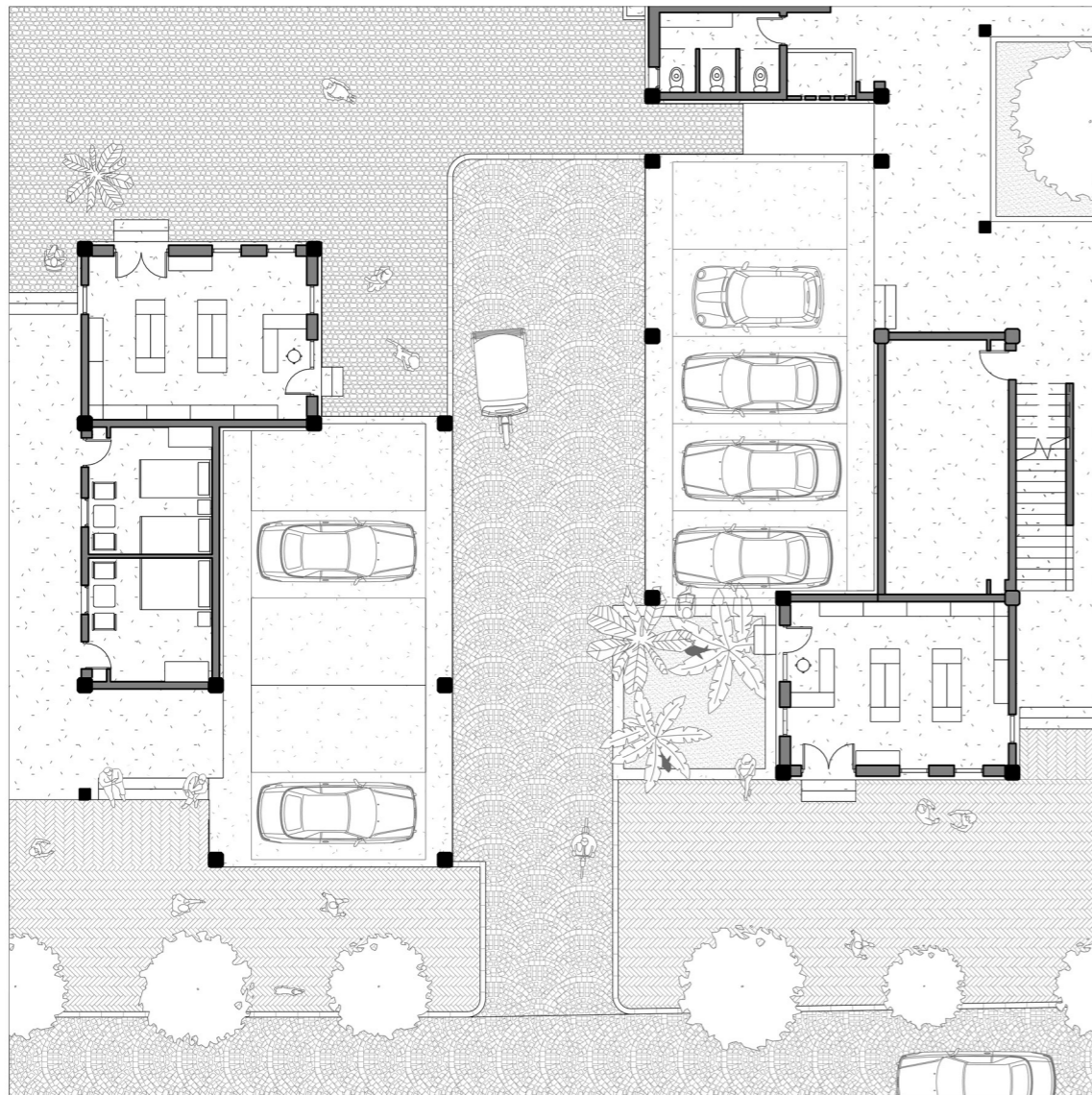
Zoom in: Phase 1 Construction GF-Plan 1:500

Scale 1:500

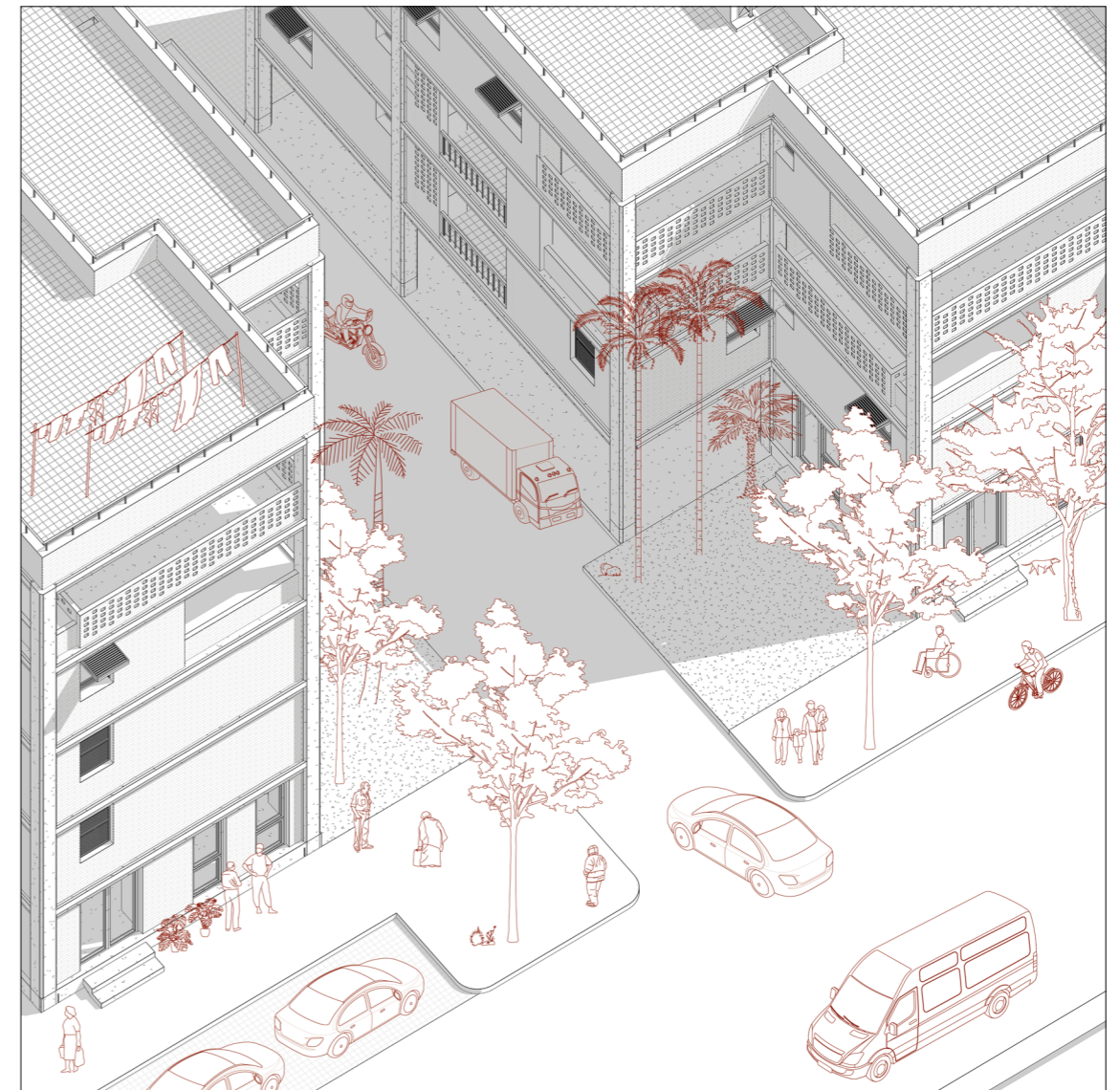
0 5m 15m 25m 50m



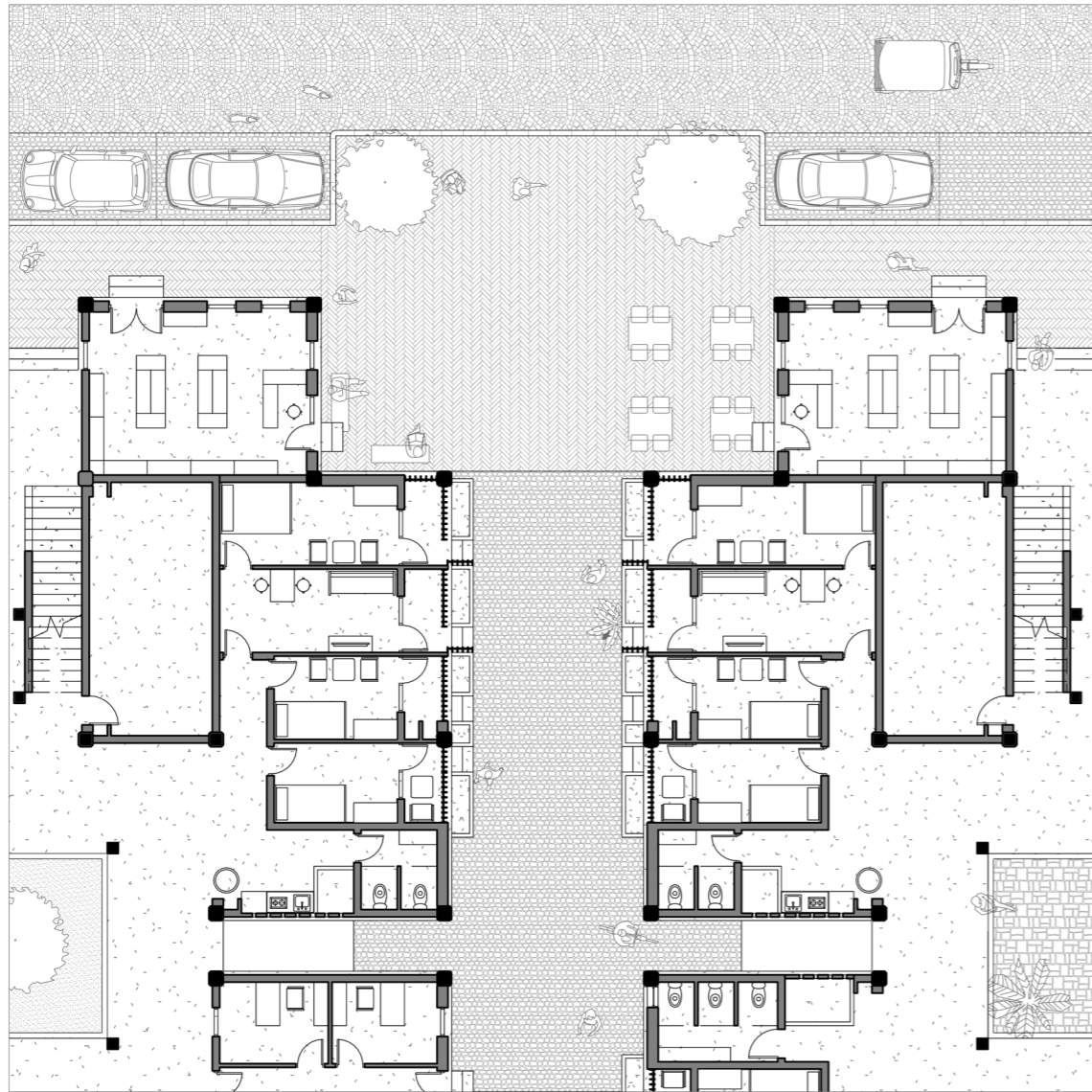
_Public Exterior Explained



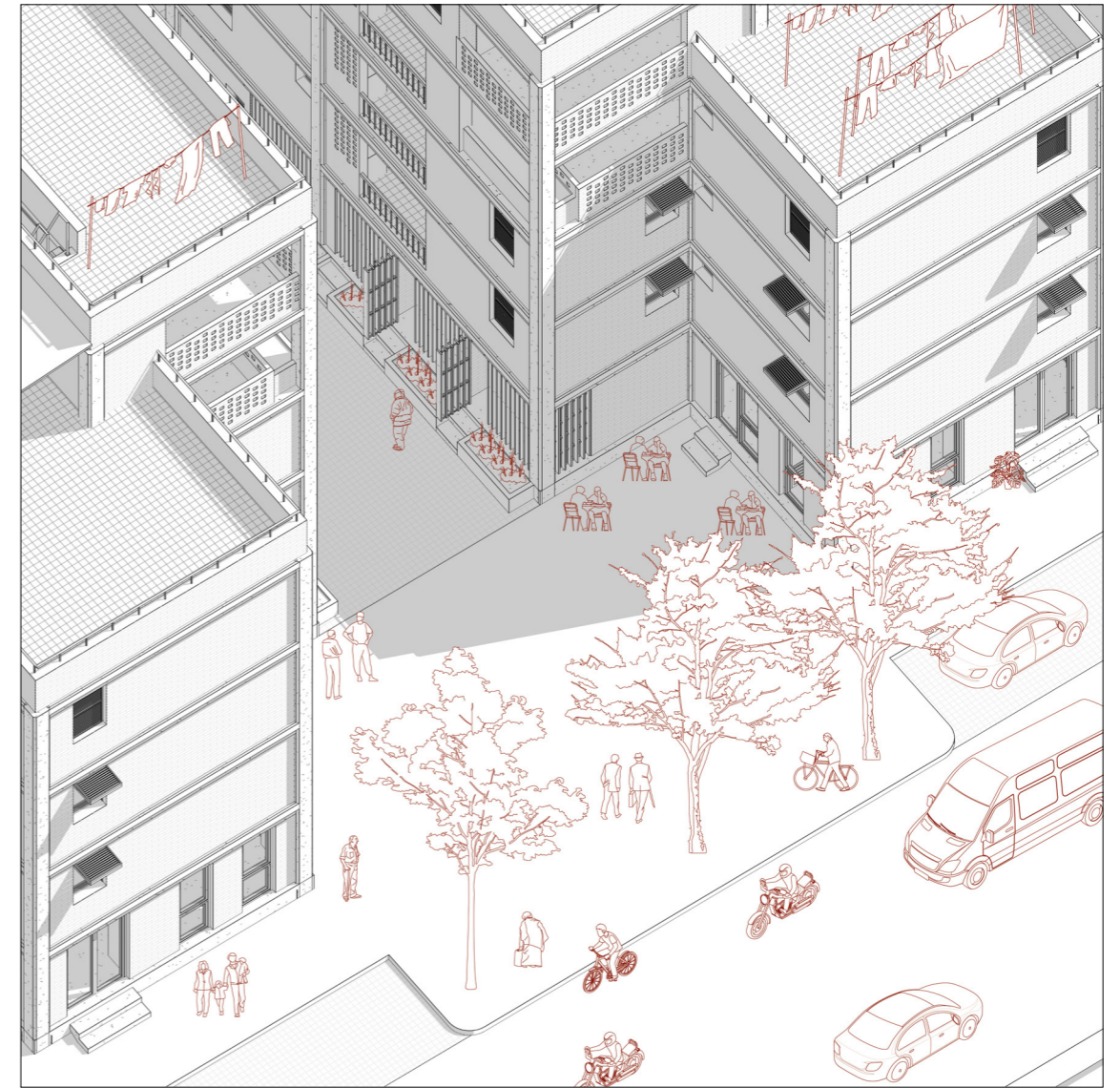
Vehicle Pocket _ 1:200



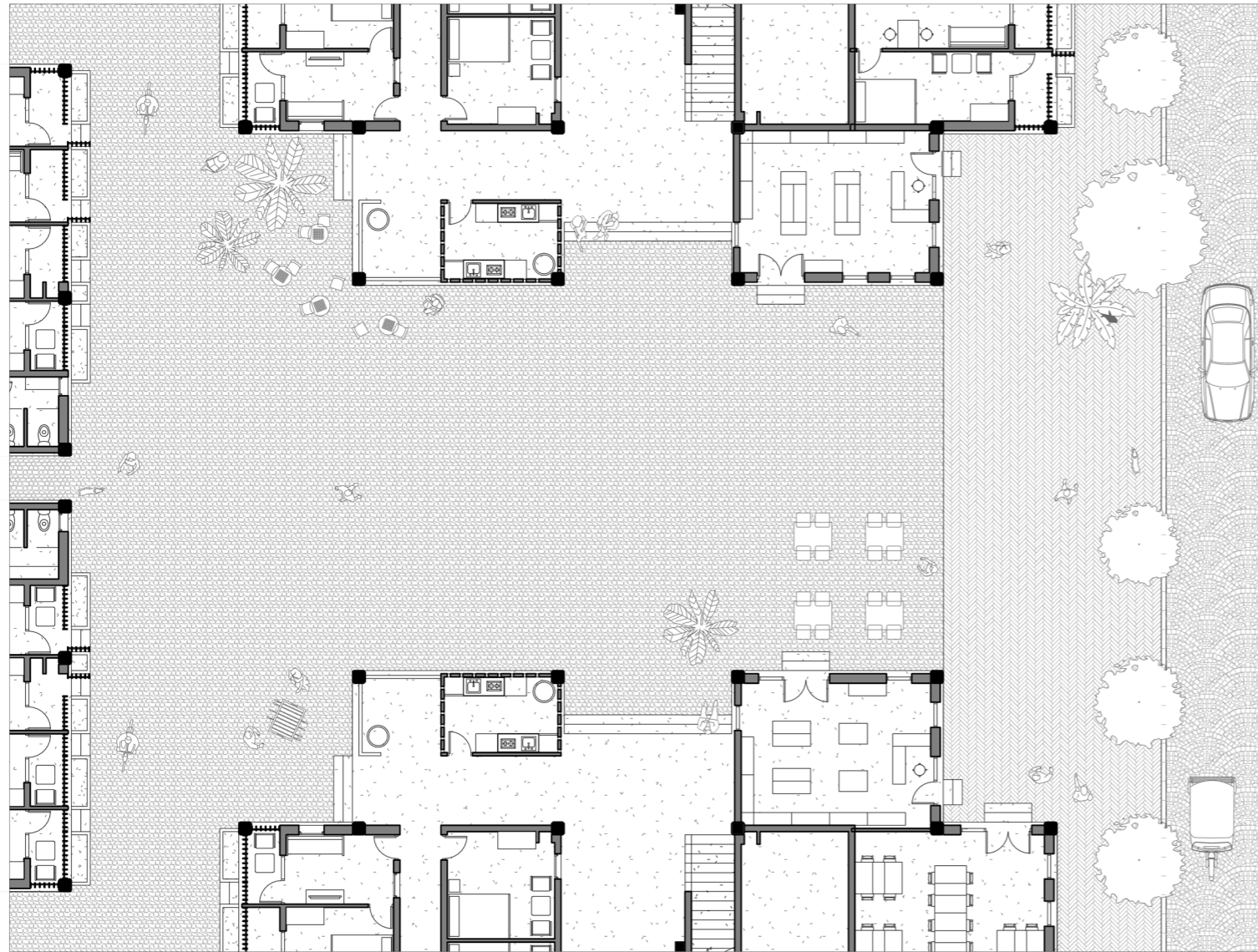
Vehicle Pocket _ Isometric View



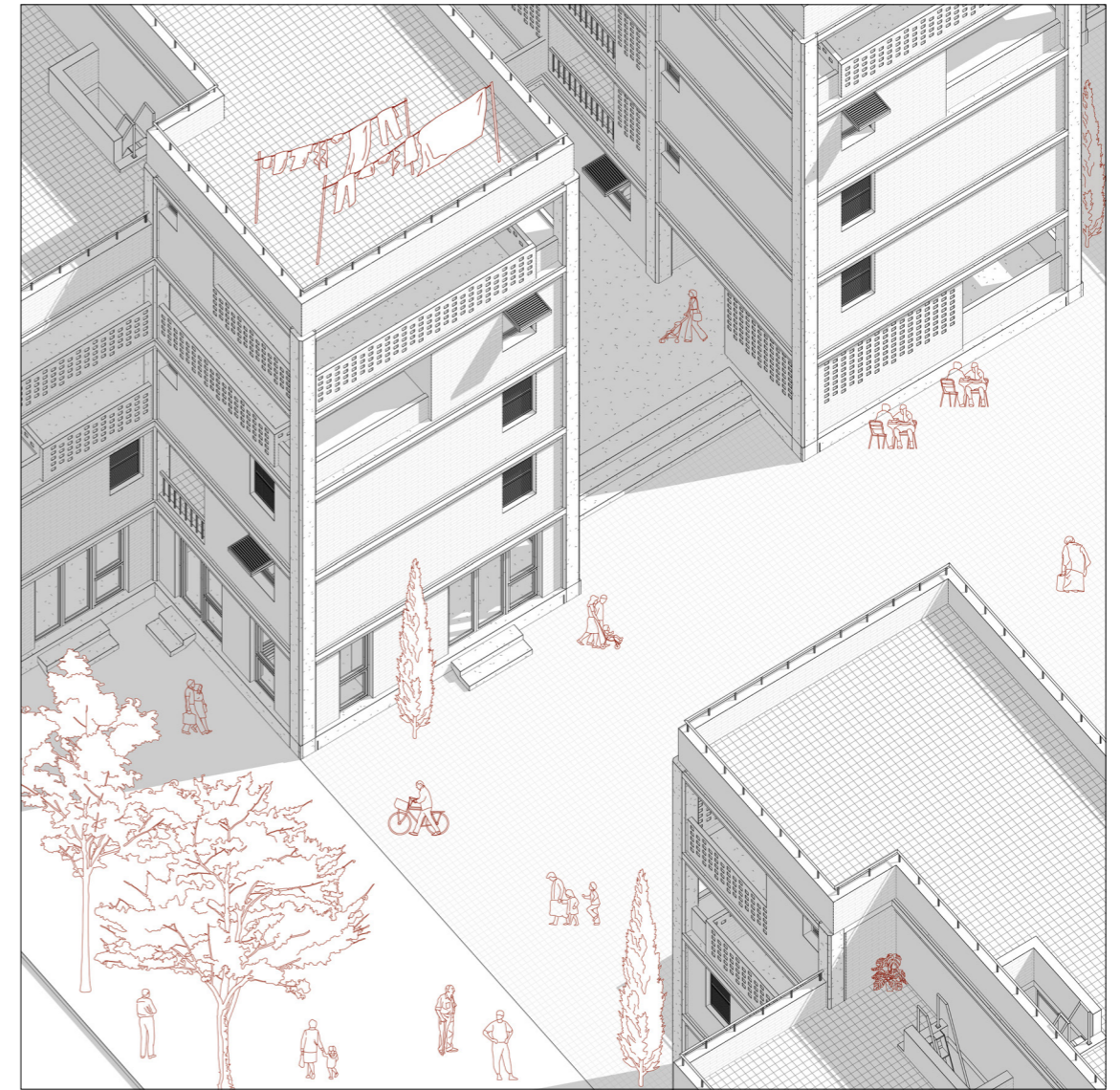
Pedestrian Pocket _ 1:200



Pedestrian Pocket _ Isometric View



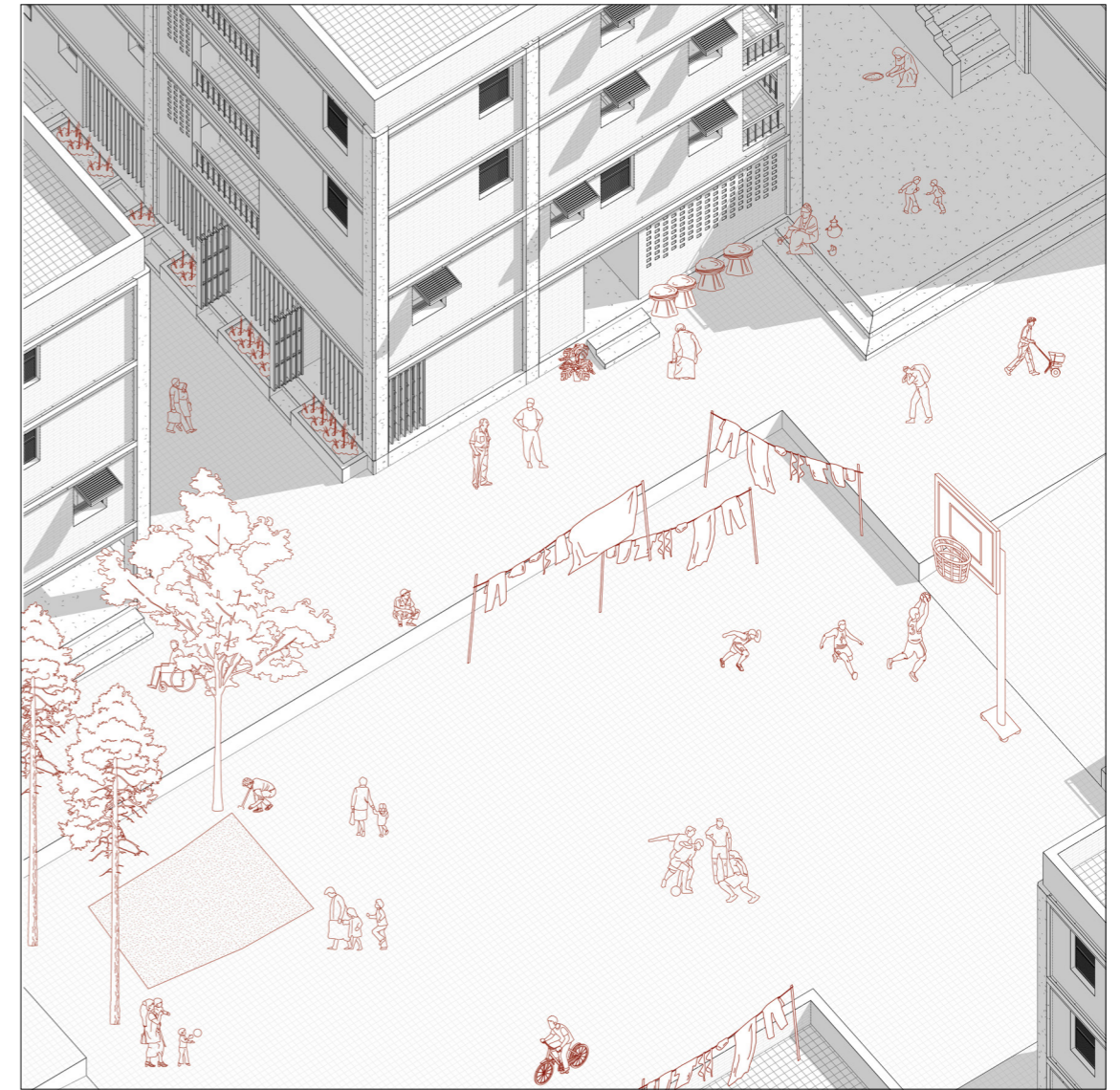
Public Space In-between Building Clusters _ 1:200



Public Space In-between Building Clusters _ Isometric View

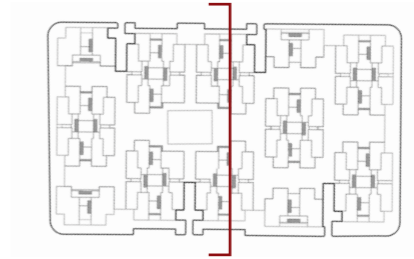


Enlarged Centre Public Space _ 1:200



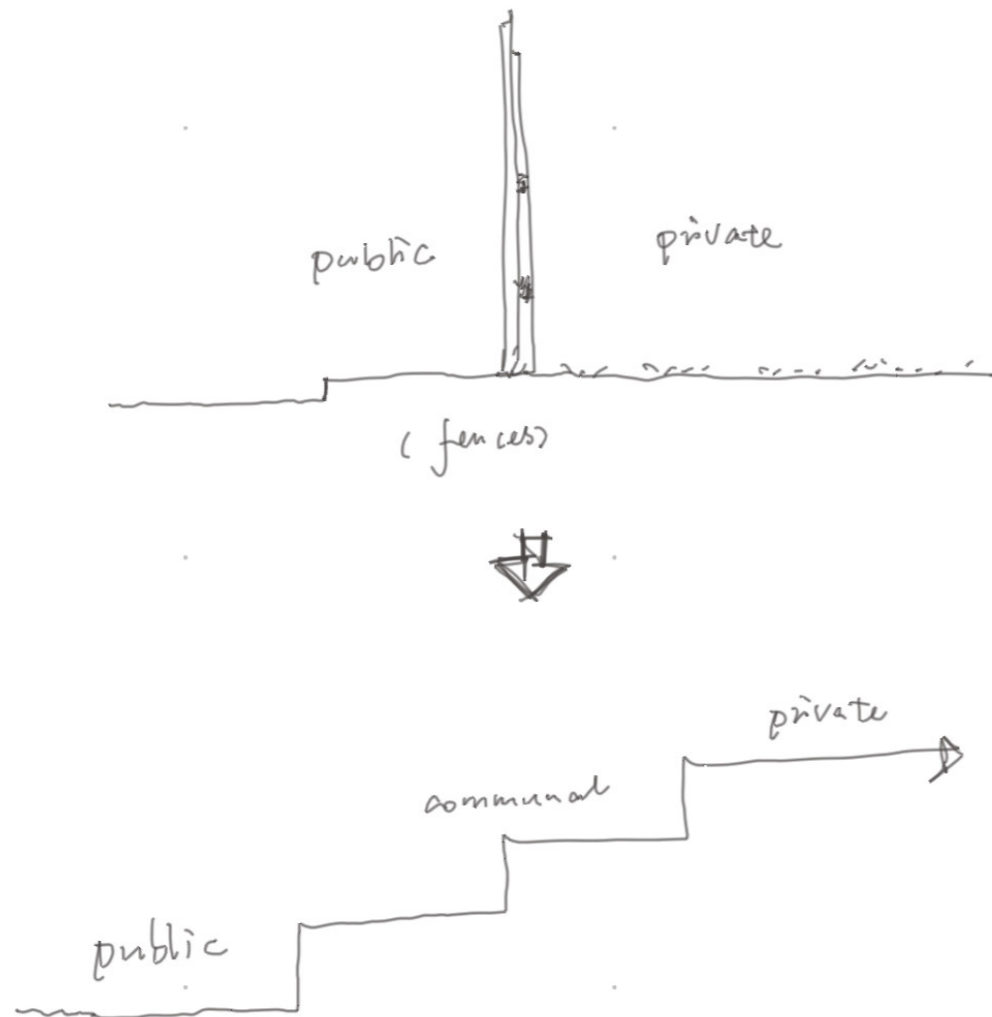
Public Space In-between Building Clusters _ Isometric View

_Section Through Neighbourhood _ S3



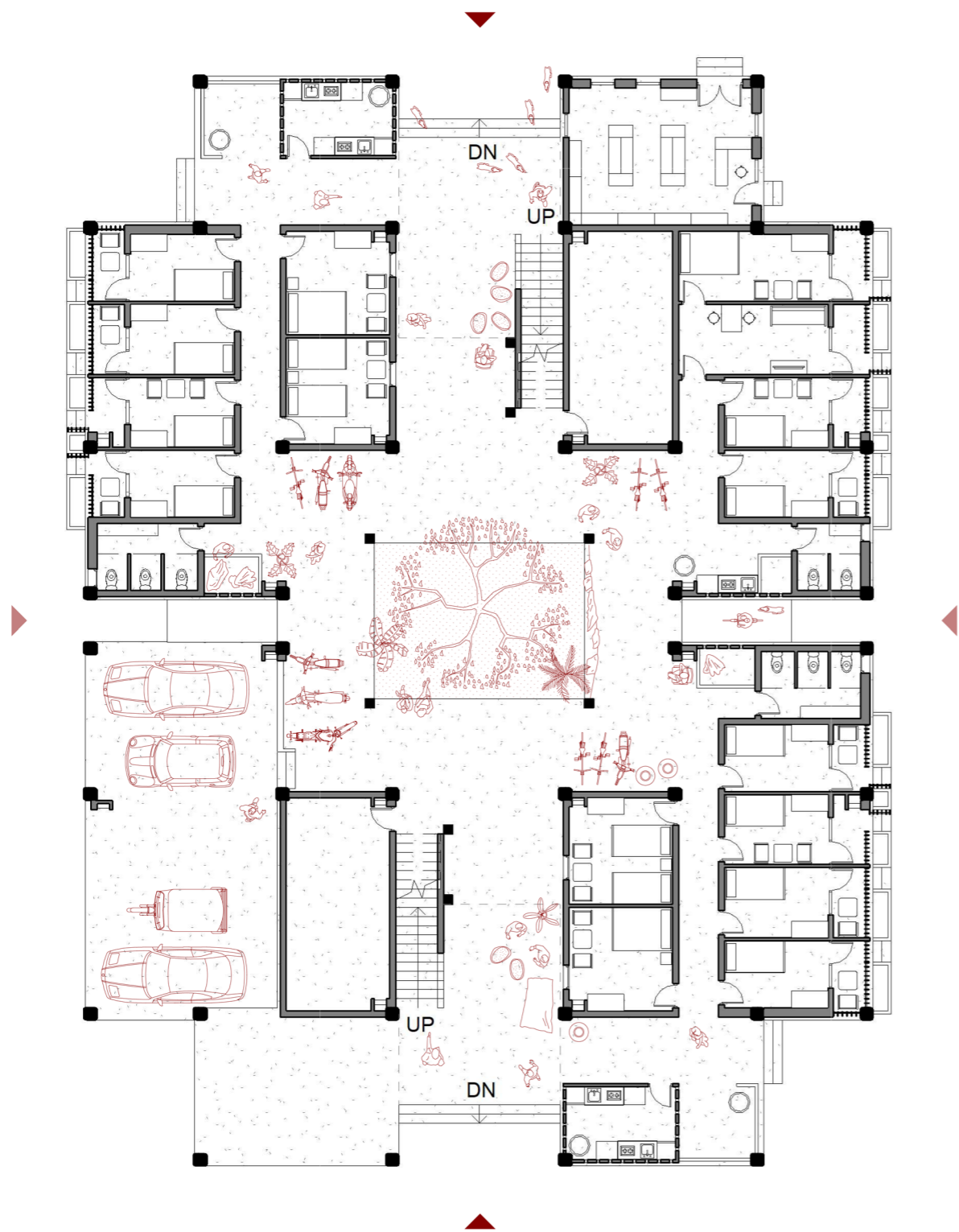
X Type Corner + X Type Corner _ 1:300



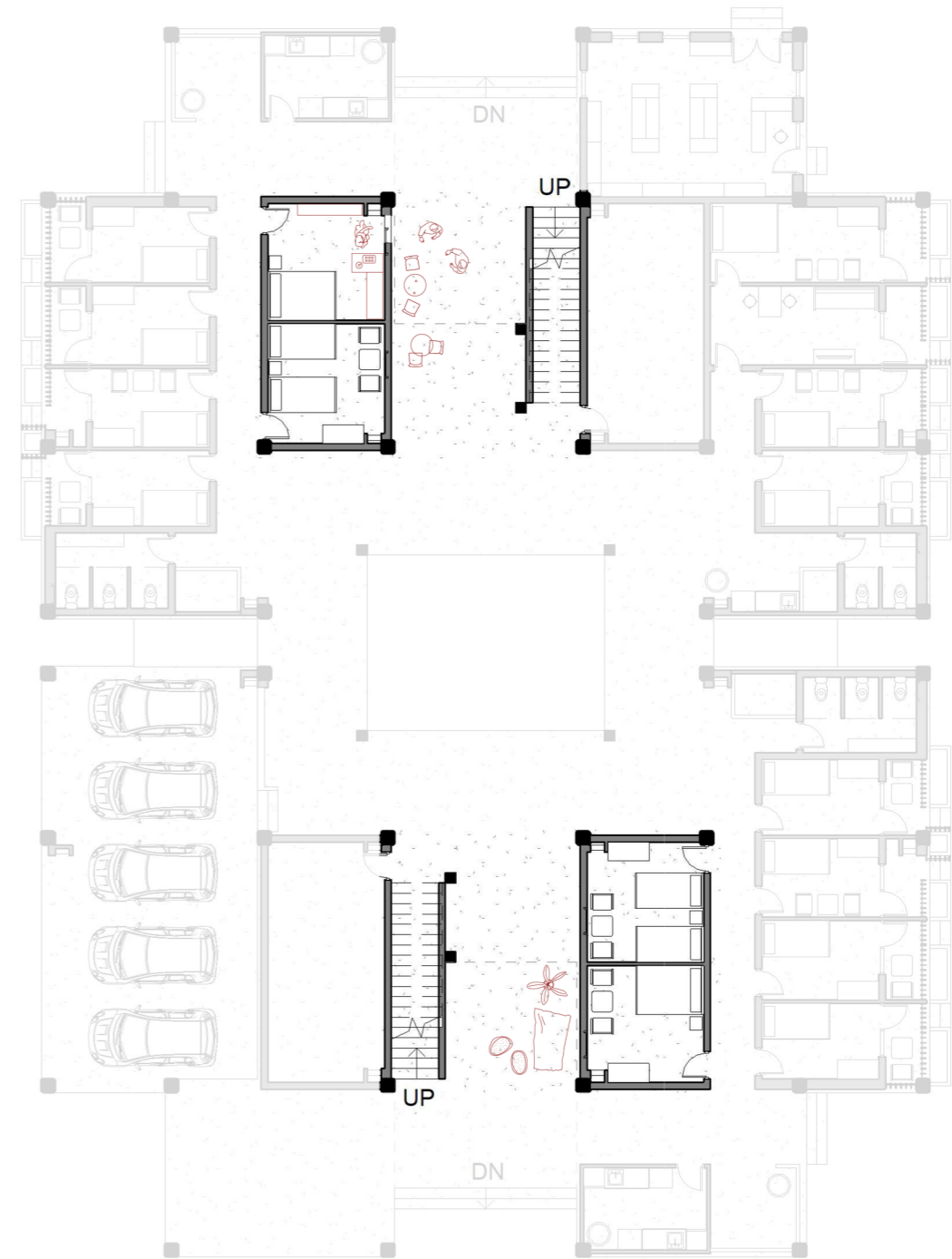


THE CIRCULATION SYSTEM INTEGRATED WITH COMMUNAL SPACE

_X Type - Typical _ Ground Floor Plan: Transition Between Public & Communal

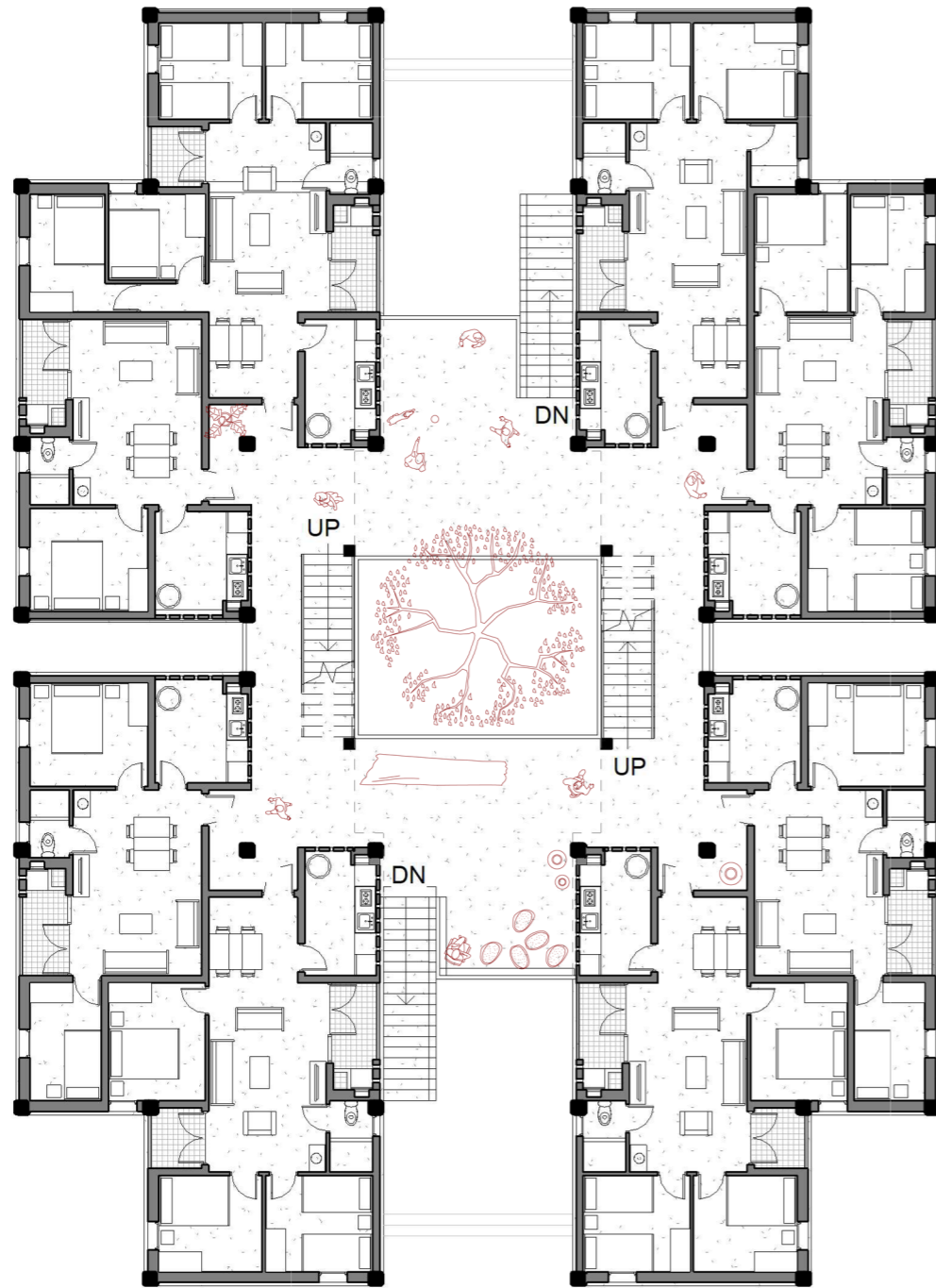


Ground Floor Plan _ 1:200



Appropriation

_X Type - Typical _ 1st Floor Plan: The Lifted Street Level

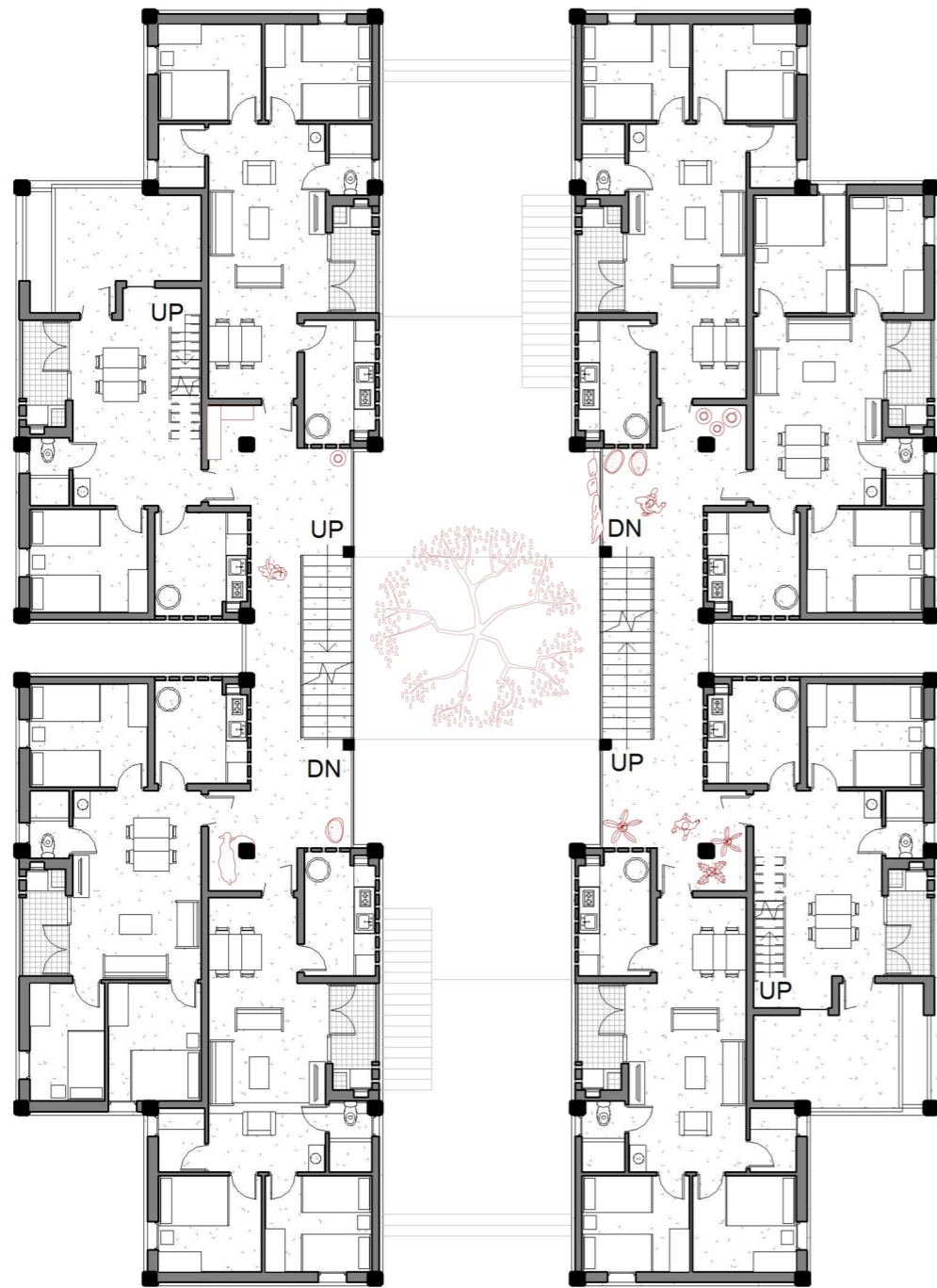


First Floor Plan _ 1:200

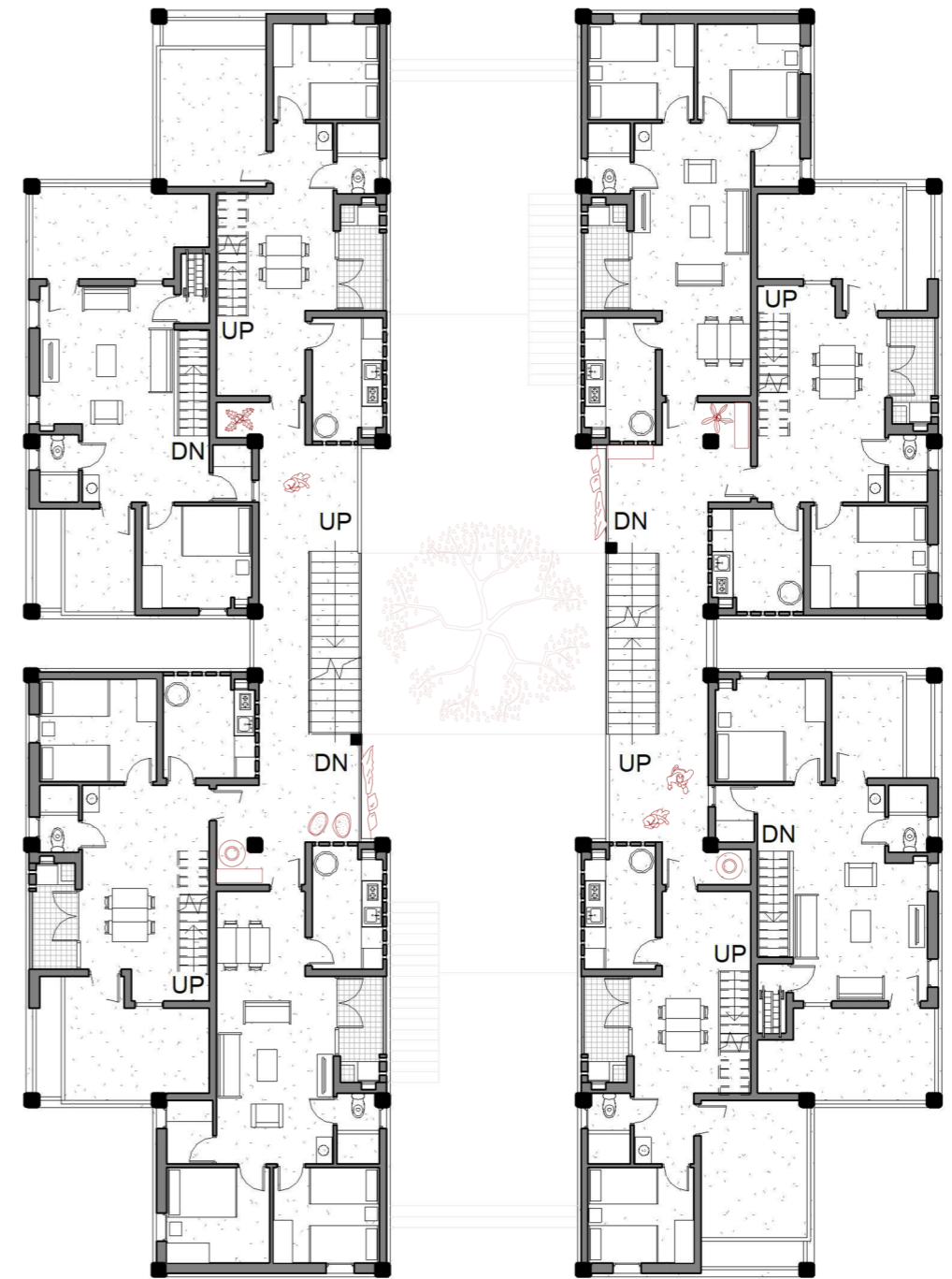


Appropriation

_X Type - Typical _ 2nd & 3rd Floor Plan: Threshold of Private Realm



Second Floor Plan _ 1:200



Third Floor Plan _ 1:200



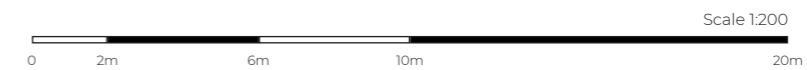
_X Type - Typical _ 4th & 5th Floor Plan: Communal & Private Roof Terrace



Forth Floor Plan _ 1:200

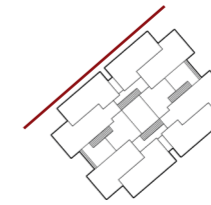


Fifth Floor Plan _ 1:200



_X Type - Typical _ Elevation: A Free Combination

Northwest Elevation _ 1:100



5th Floor
13950

Duplex B

4th Floor
11250

Duplex B +
2 BR

3rd Floor
8550

2BR + 2BR

2nd Floor
5850

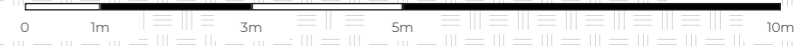
3BR + 2BR

1st Floor
3150

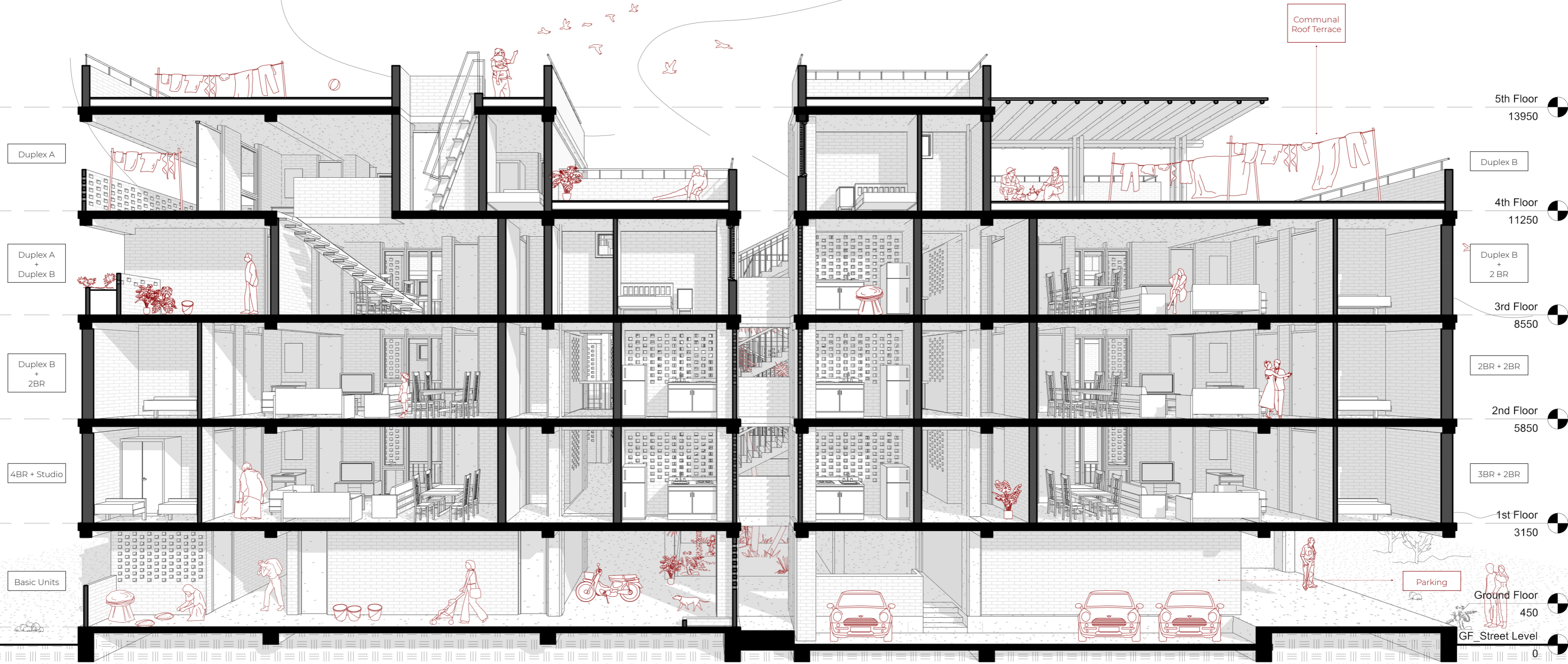
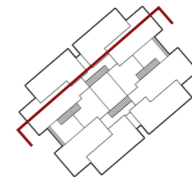
Parking
Ground Floor
450

GF_Street Level

Scale 1:100



_X Type - Typical _ Section Through Units



Communal
Roof Terrace

5th Floor
13950

4th Floor
11250

3rd Floor
8550

2nd Floor
5850

1st Floor
3150

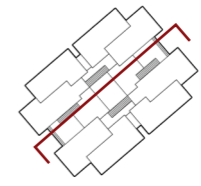
Ground Floor
450

GF_Street Level
0

Scale 1:100



_X Type - Typical _ Section Through Communal Space



Communal
Roof Terrace

Communal
1F Terrace

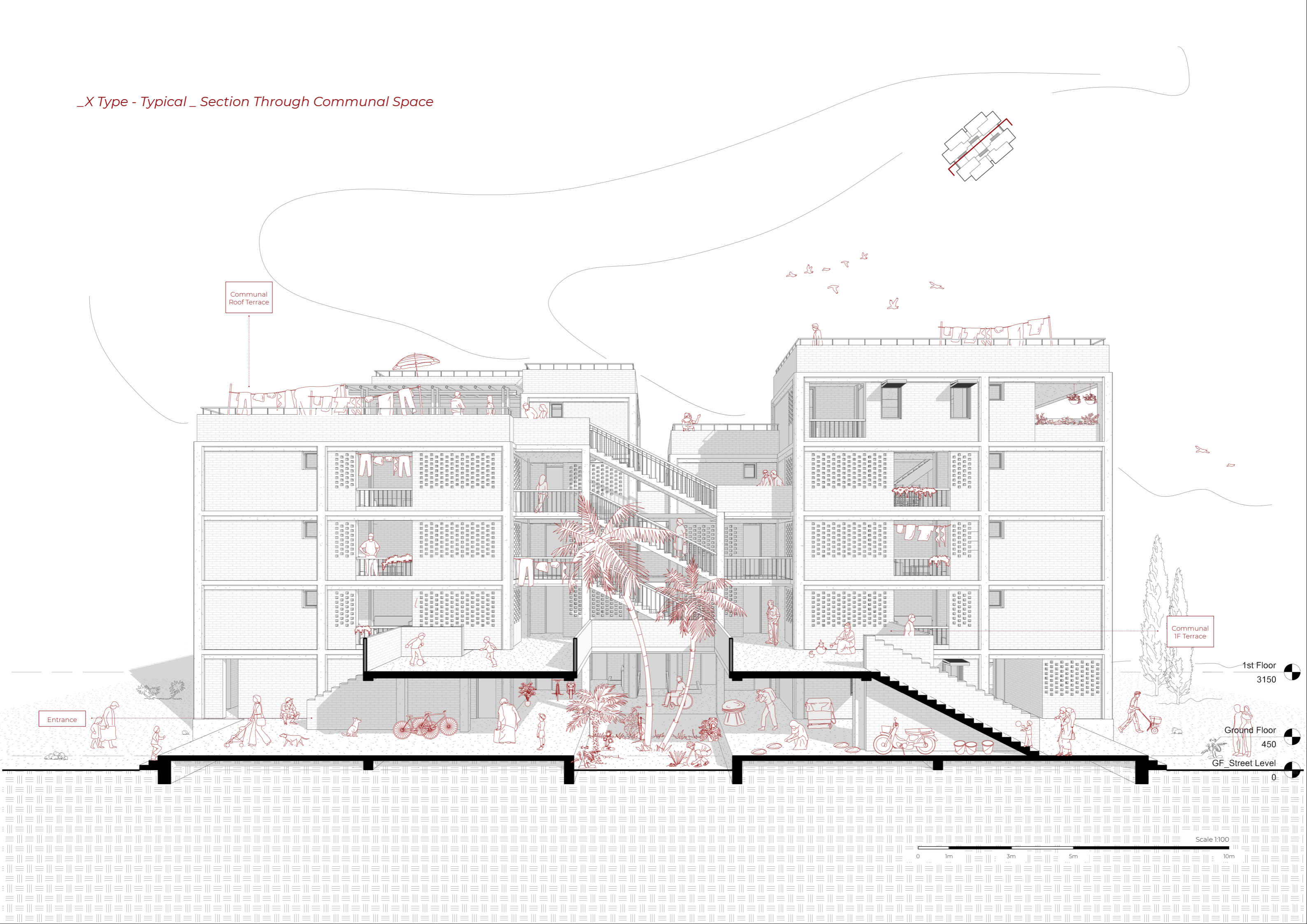
Entrance

1st Floor
3150

Ground Floor
450

GF_Street Level
0

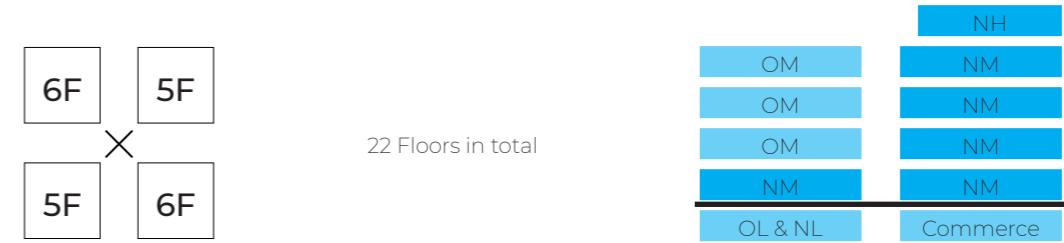
Scale 1:100



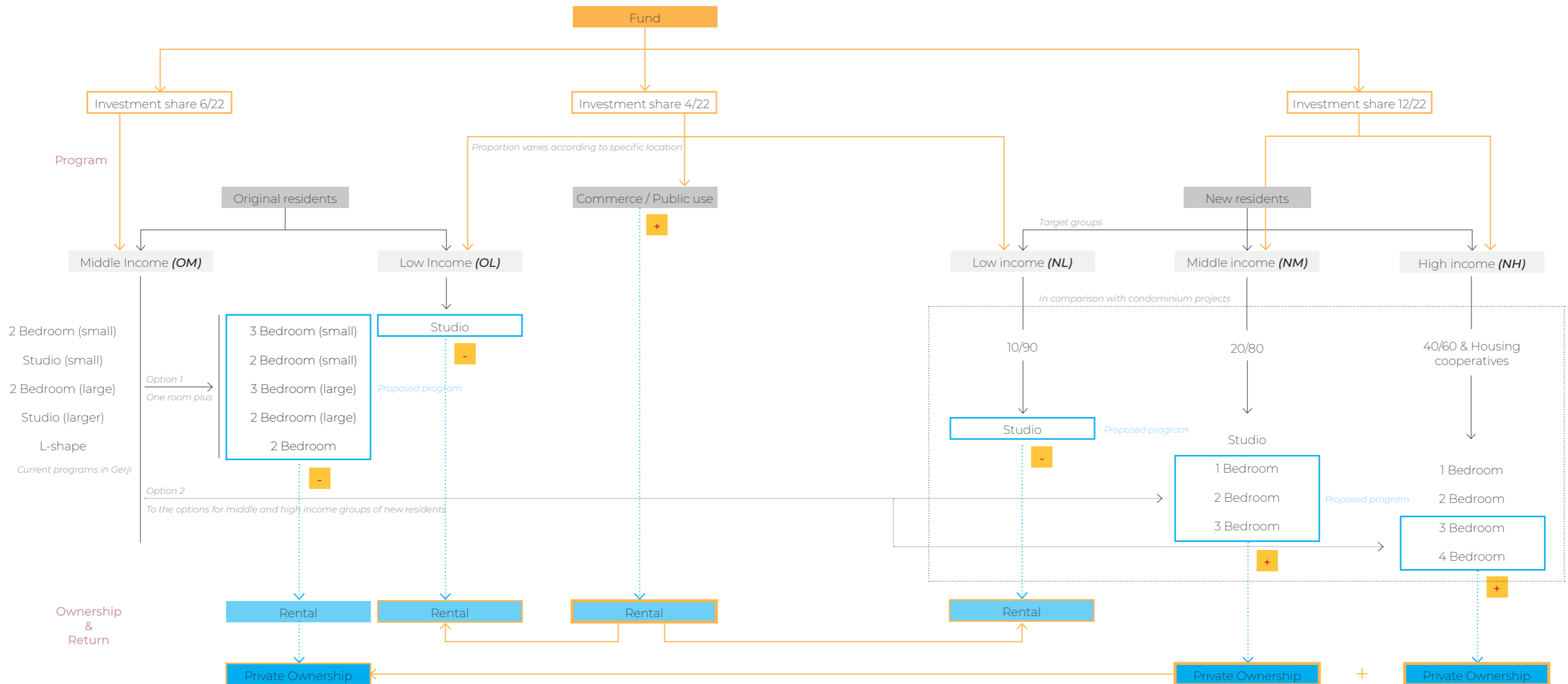
MANAGERIAL STRATEGY

_ Financing Scheme of A Typical Building Cluster

In the case of "six to one" plot...



Investment



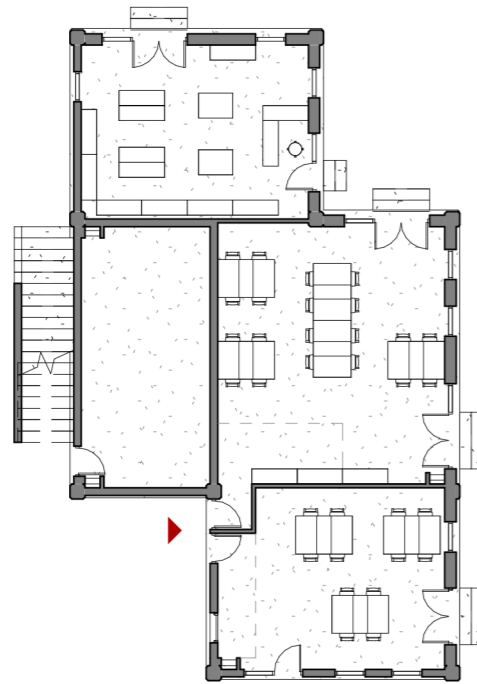


THE DWELLING BLOCKS

UNITS

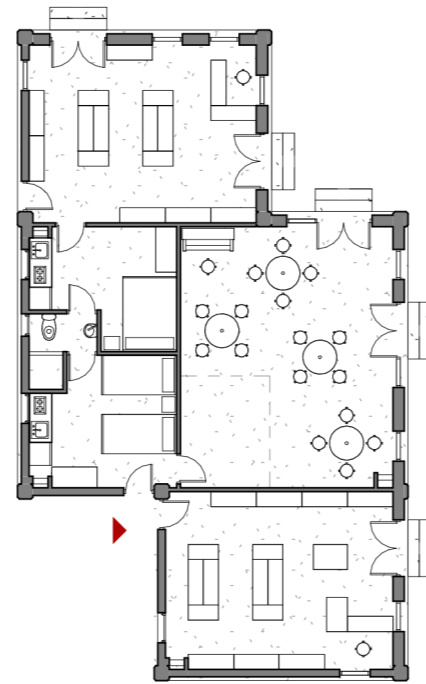
_ Ground Floor Space: For Public / Commercial / Residential Use

Periphery



Rain Water Collection + Commerce

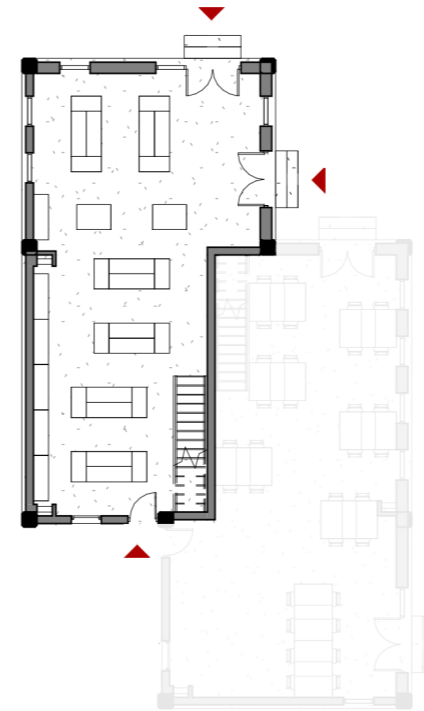
Commercial use: 108m²



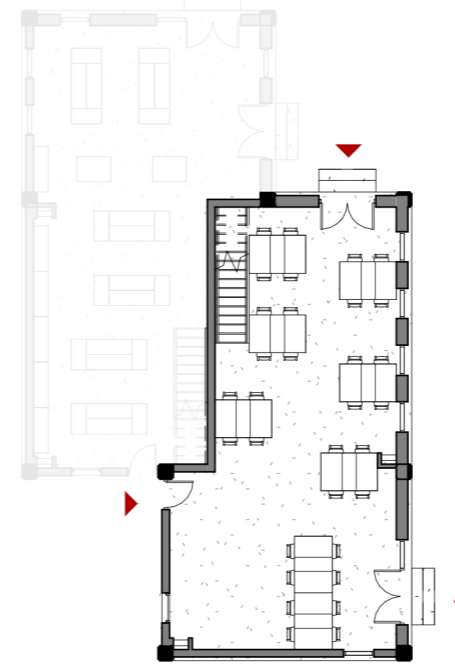
Commerce + Residence (Single floor)

Unit attached to the shop _ C: 14m²

Commercial use: 103m²



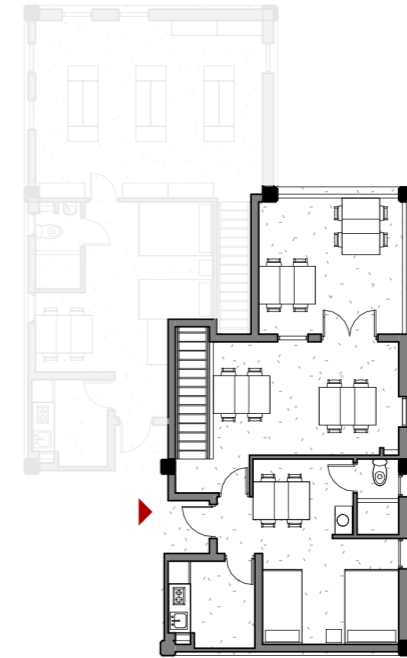
Ground Floor



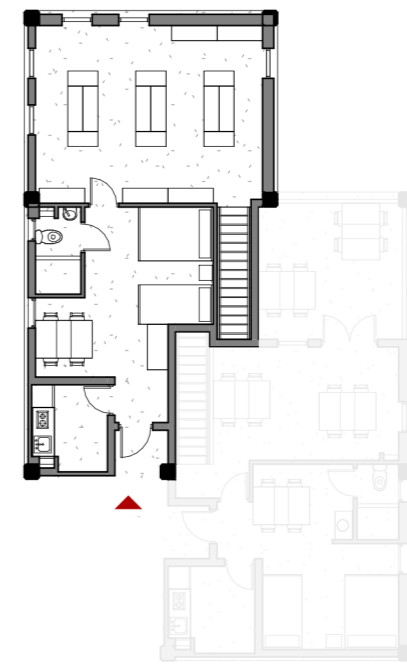
Commerce + Residence (Duplex A)

Unit attached to the shop _ A: 28m²

Commercial use: 104m²



1st Floor



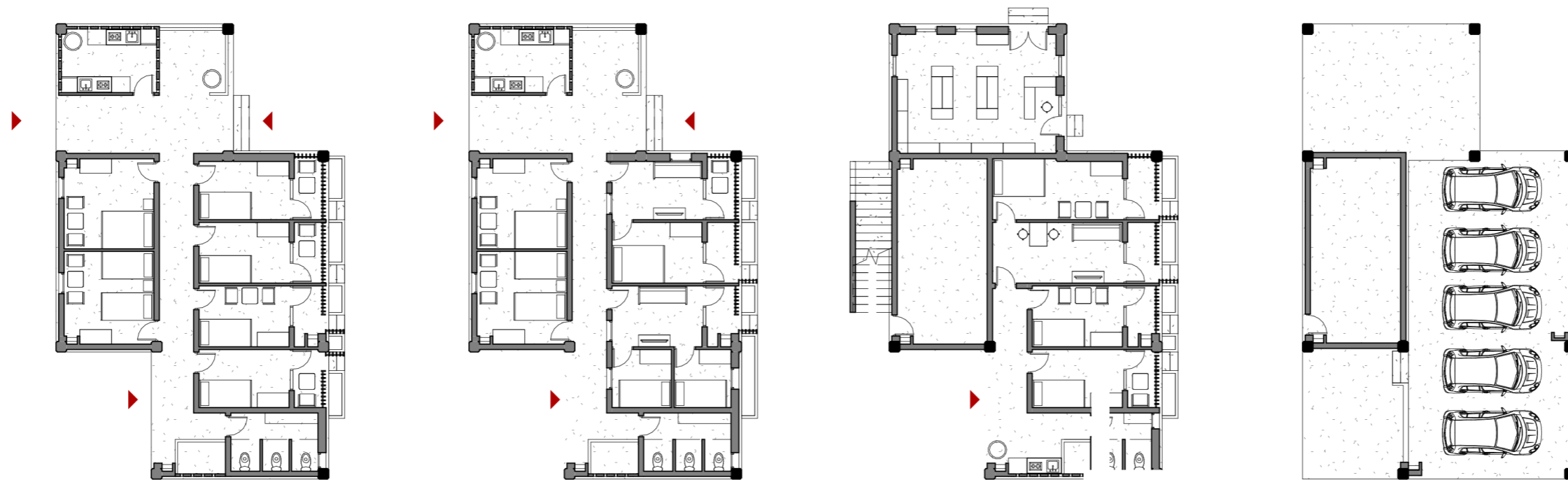
Commerce + Residence (Duplex B)

Unit attached to the shop _ B: 28m²

Commercial use: 100m²



Inside A Neighbourhood



Basic Rental Units
(Small)

R1: 12m² / Each Unit
(9m² indoor & 3m² loggia)

R2: 13m² / Each Unit

Basic Rental Units
(Large)

R1 Combined: 24m² / Each Unit
(18m² indoor & 6m² loggia)

R2: 13m² / Each Unit

Rain Water Collection
+ Basic Units + Commerce

R1: 12m² / Each Unit
(9m² indoor & 3m² loggia)

Commercial use: 30m²

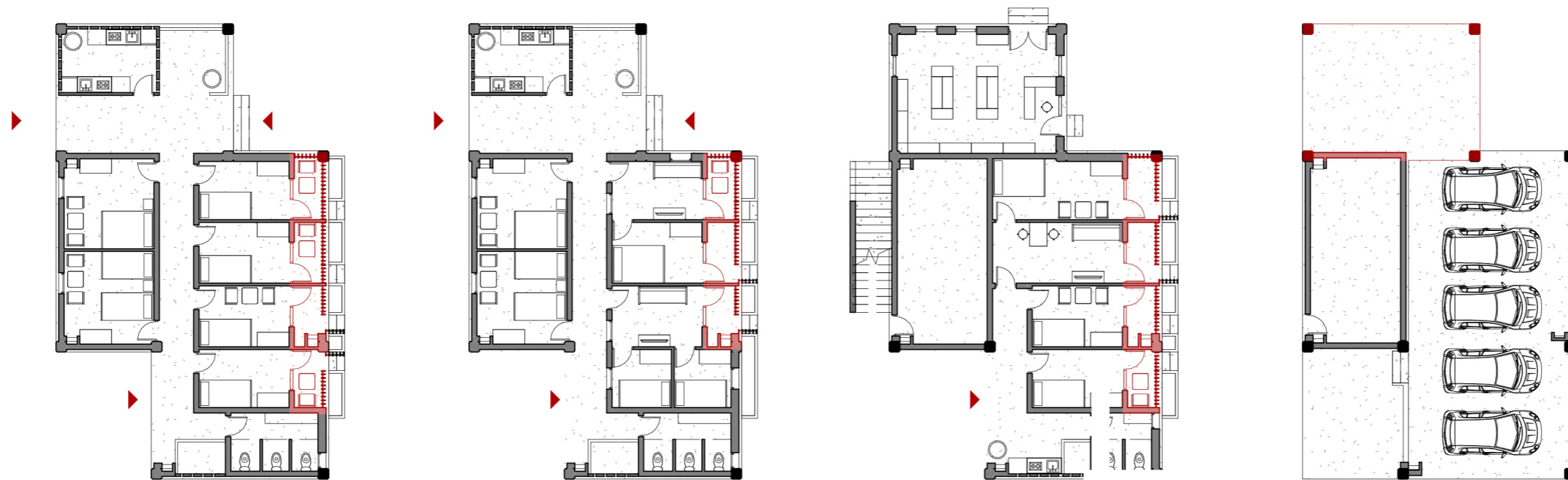
Rain Water Collection
+ Parking + Empty

Parking: 78 m²

Area left empty: 30m²



Appropriation



3m² from the loggia

3m² from the loggia

3m² from the loggia

30m² reserved for future use

_New Dwellers

Different unit types are offered to the new dwellers, with floor area varying from 47m² to 80 m² (including the balconies).

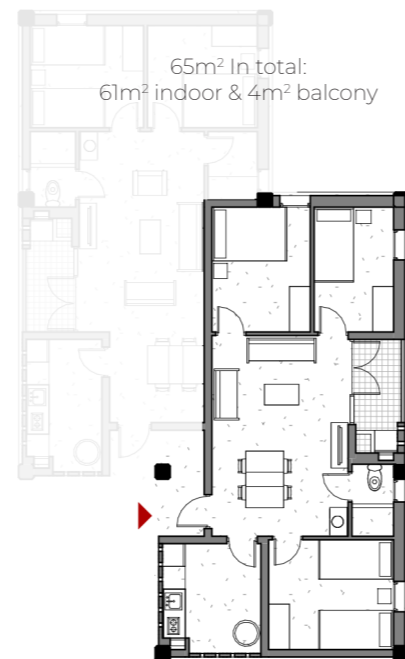
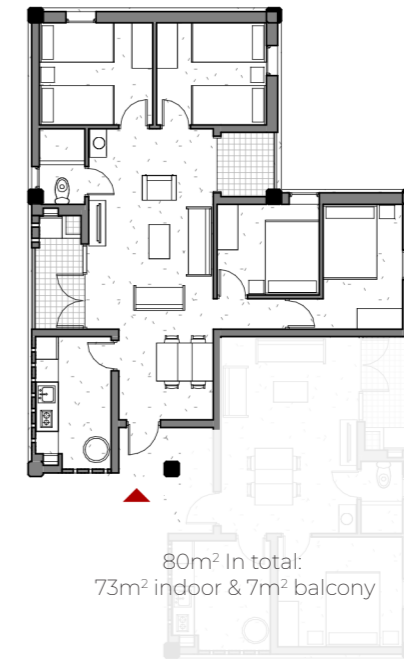
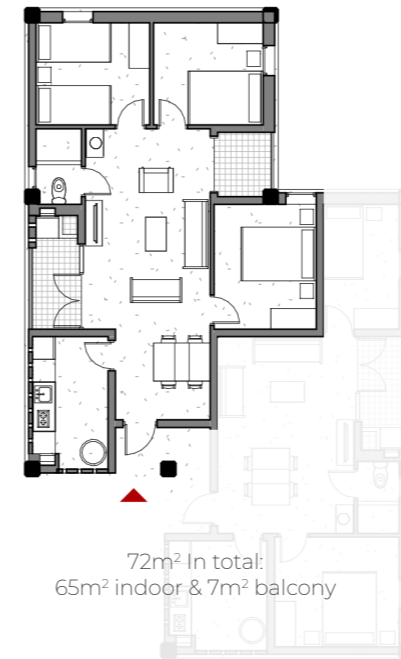
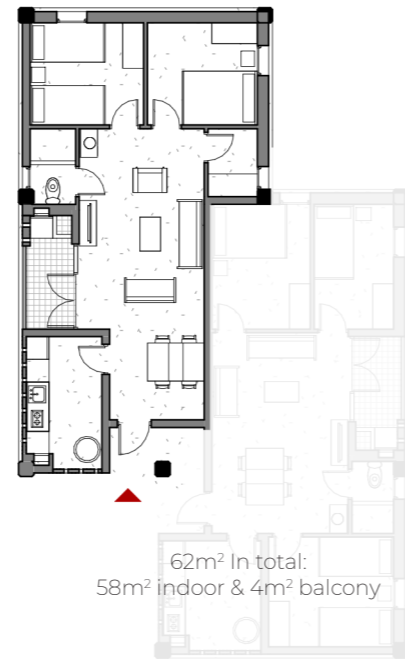
The options are listed below:

Studio: 47m²

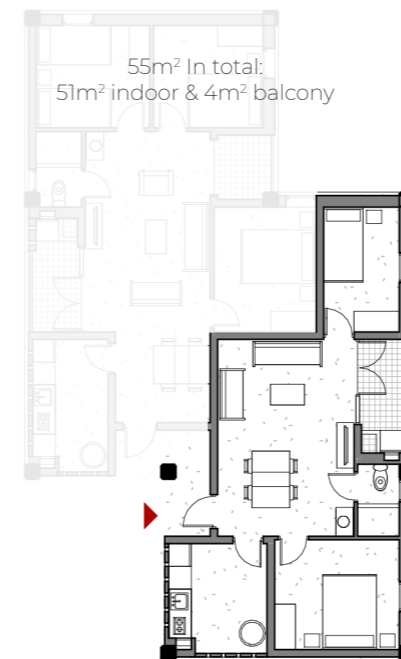
2 Bedroom Unit: 55m² / 65m²

3 Bedroom Unit: 65m² / 72m²

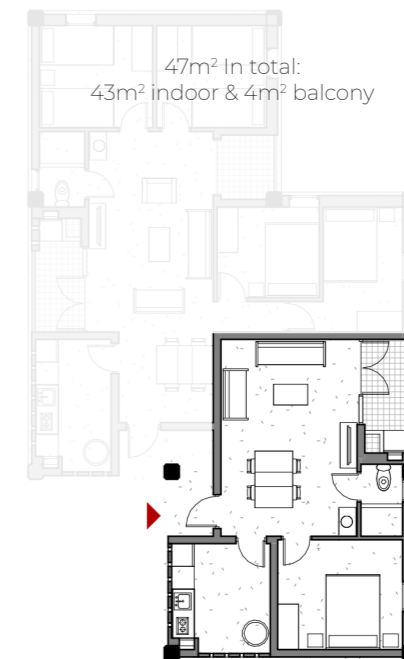
4 Bedroom Unit: 80m²



2BR Unit + 3BR Unit
A



2BR Unit + 3BR Unit
B



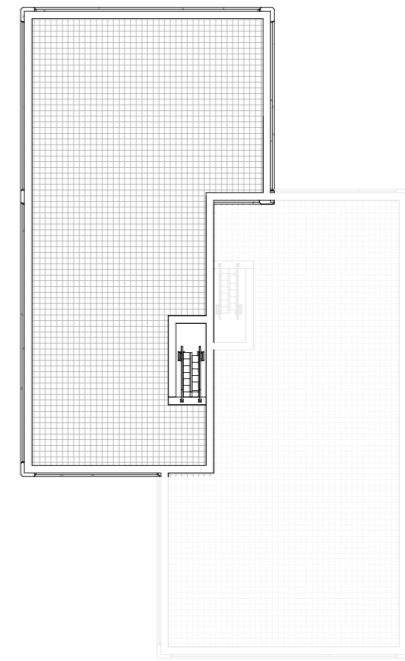
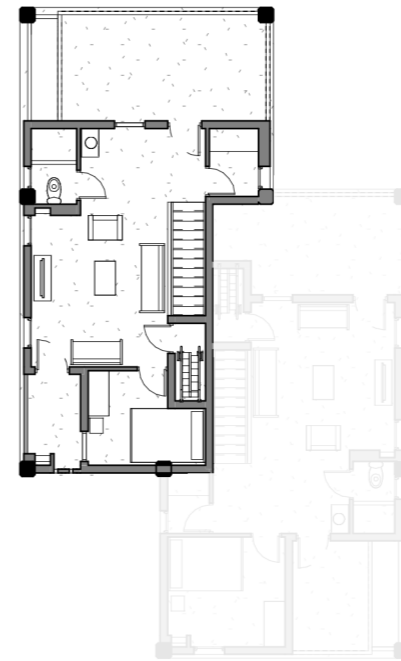
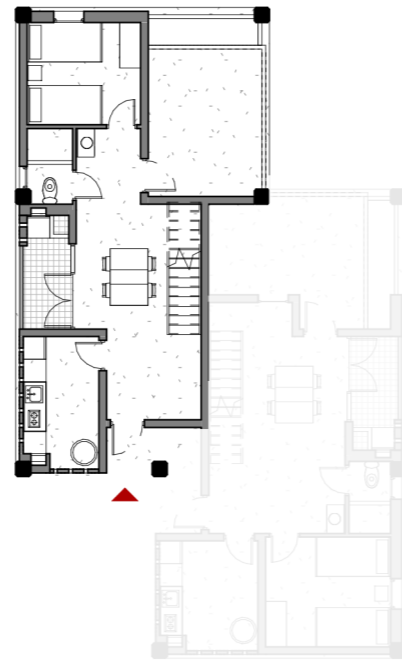
Studio + 4BR Unit



_Original Dwellers

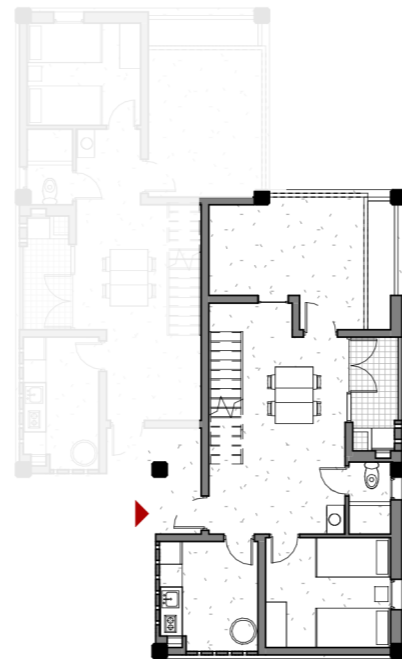
Duplex A

127m² In total:
89m² indoor & 38m² outdoor

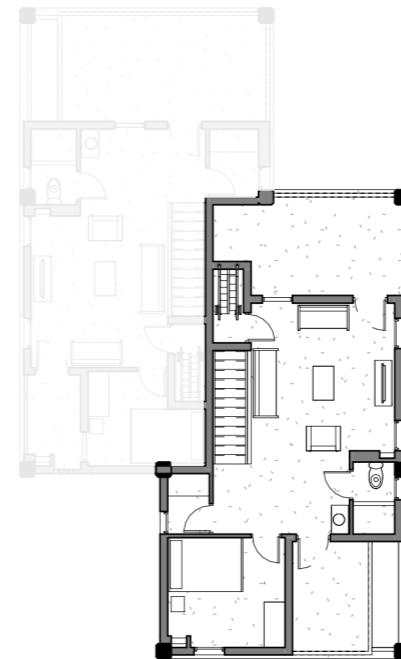


Duplex B

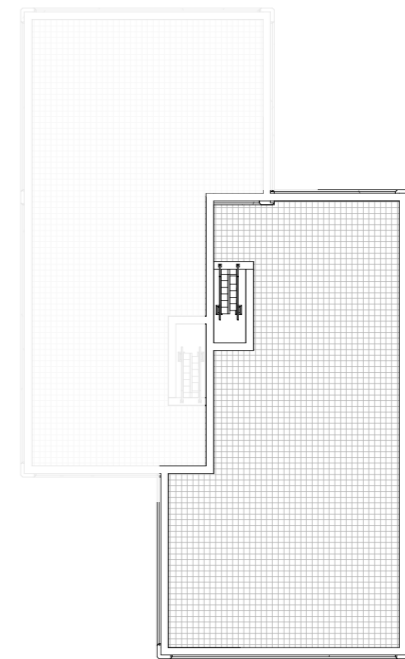
131m² In total:
89m² indoor & 42m² outdoor



Lower Level



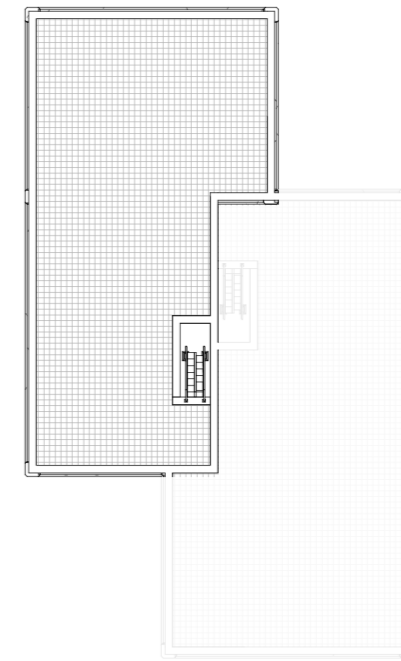
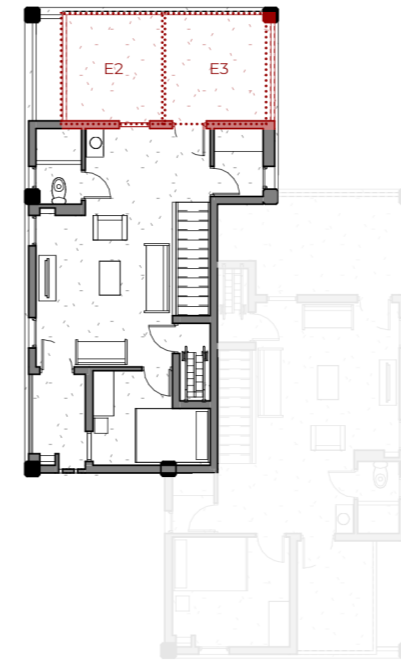
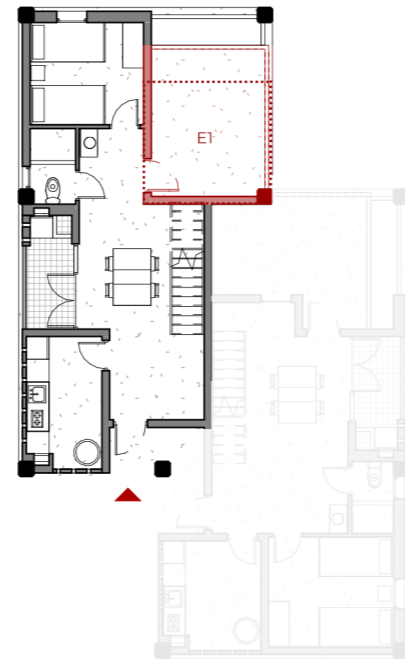
Upper Level



Private Roof Terrace

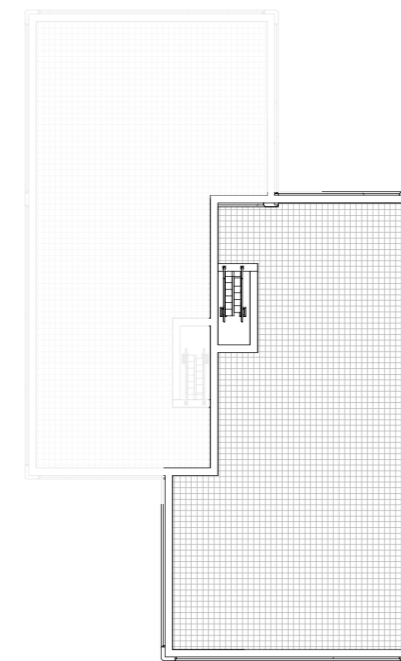
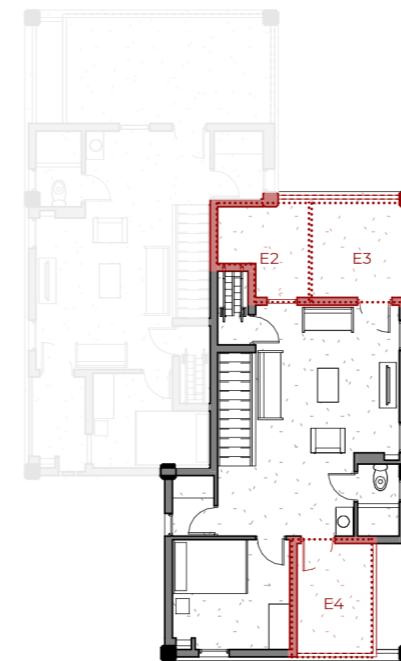
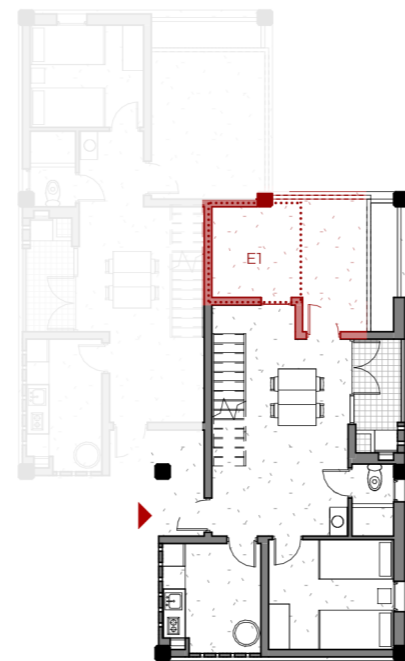


Possibilities of having 3 extra bedroom (38m²).

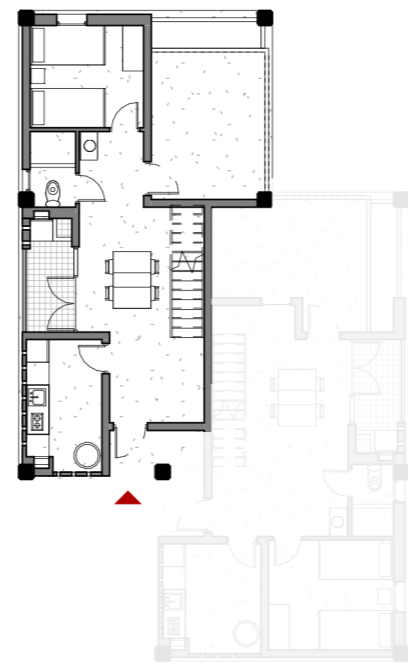


Appropriation

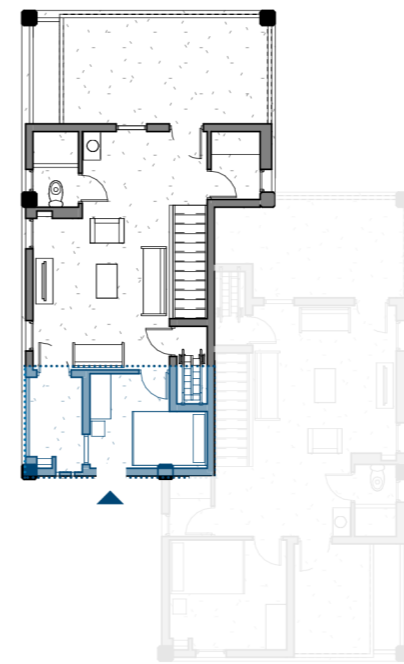
Possibilities of having 4 extra bedroom (42m²).



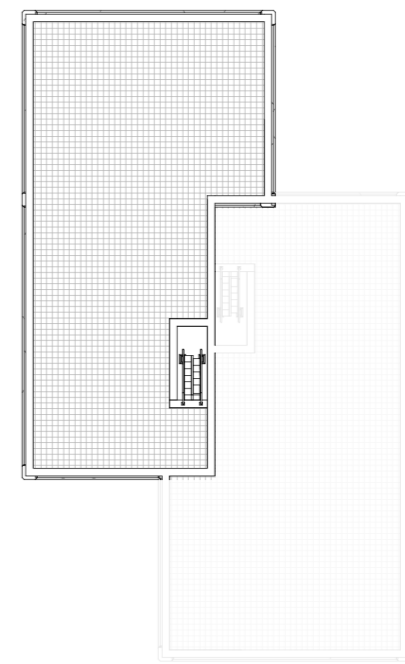
Possibility of Subletting



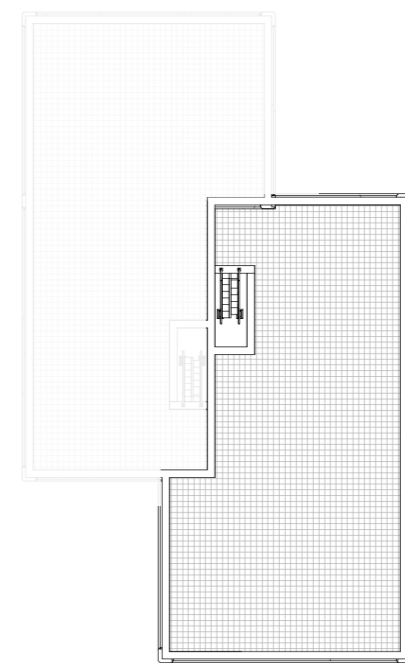
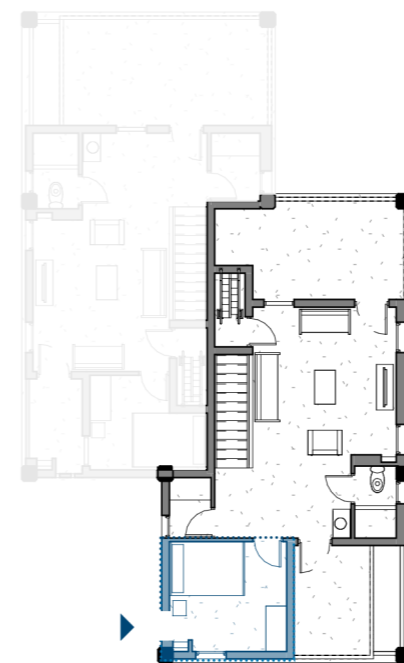
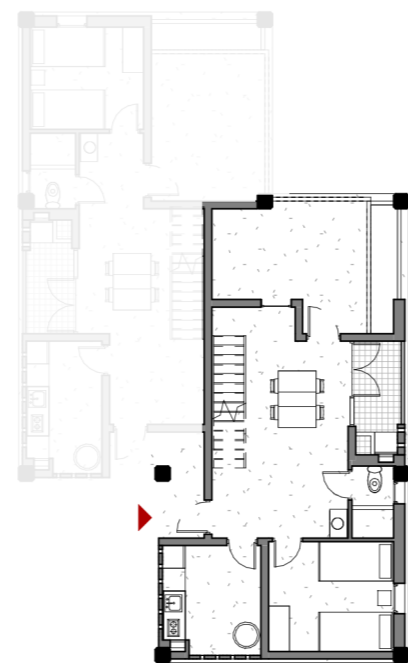
+



+



+

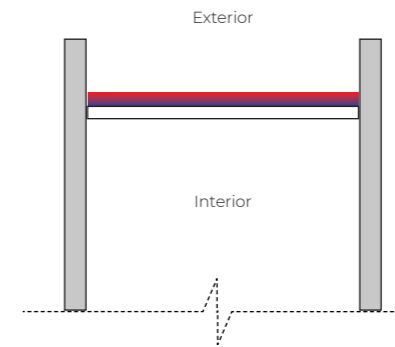


FEASIBILITY

CLIMATE

_Thermal Solution

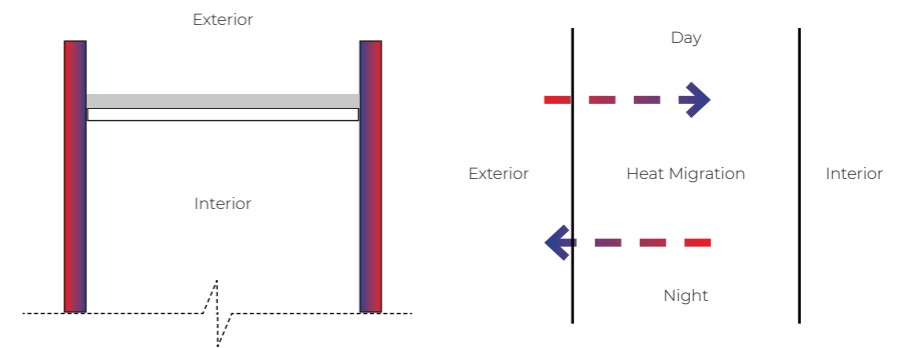
Roof Insulation



+

Roof is insulated to ensure the thermal comfort of the unit underneath.

Thermal Mass



Stabilised Compressed Earth Block Wall
* 300mm for external walls facing the street

Sun Shading

Open Staircase

+

Balcony

+

Window Shutter

+

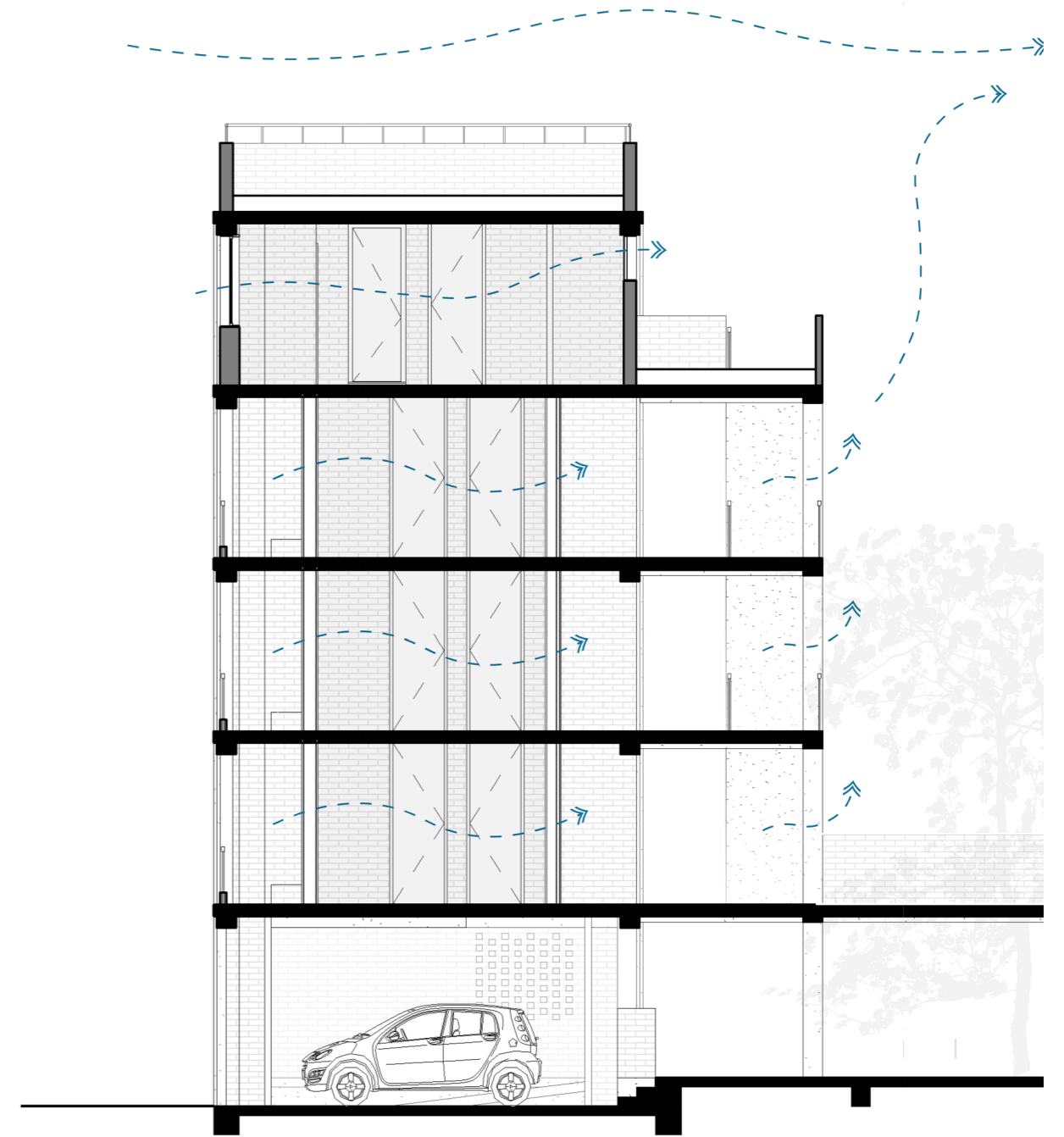
Cross Ventilation

Unit → Cluster → Neighbourhood → Site

_ Wind

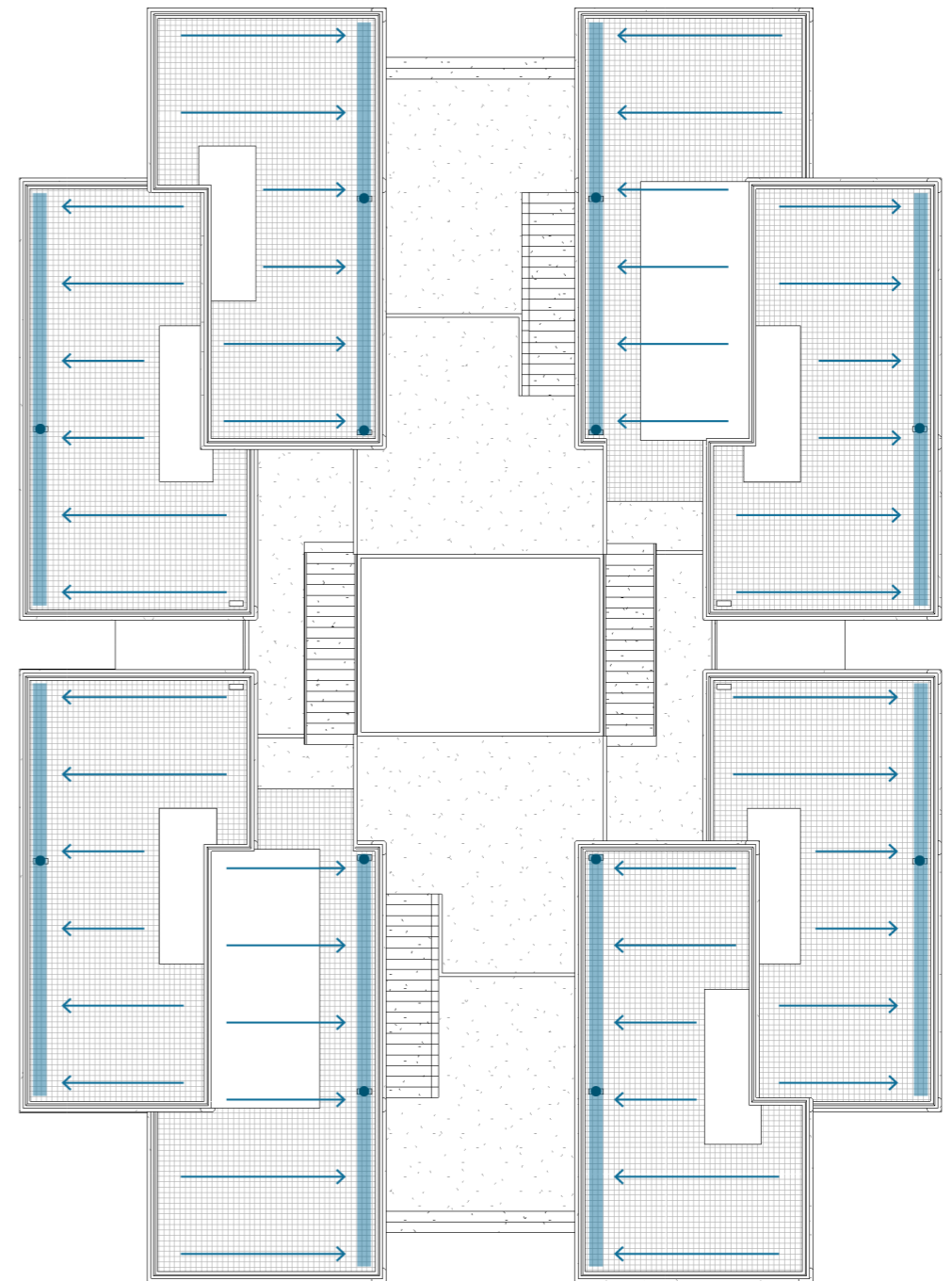
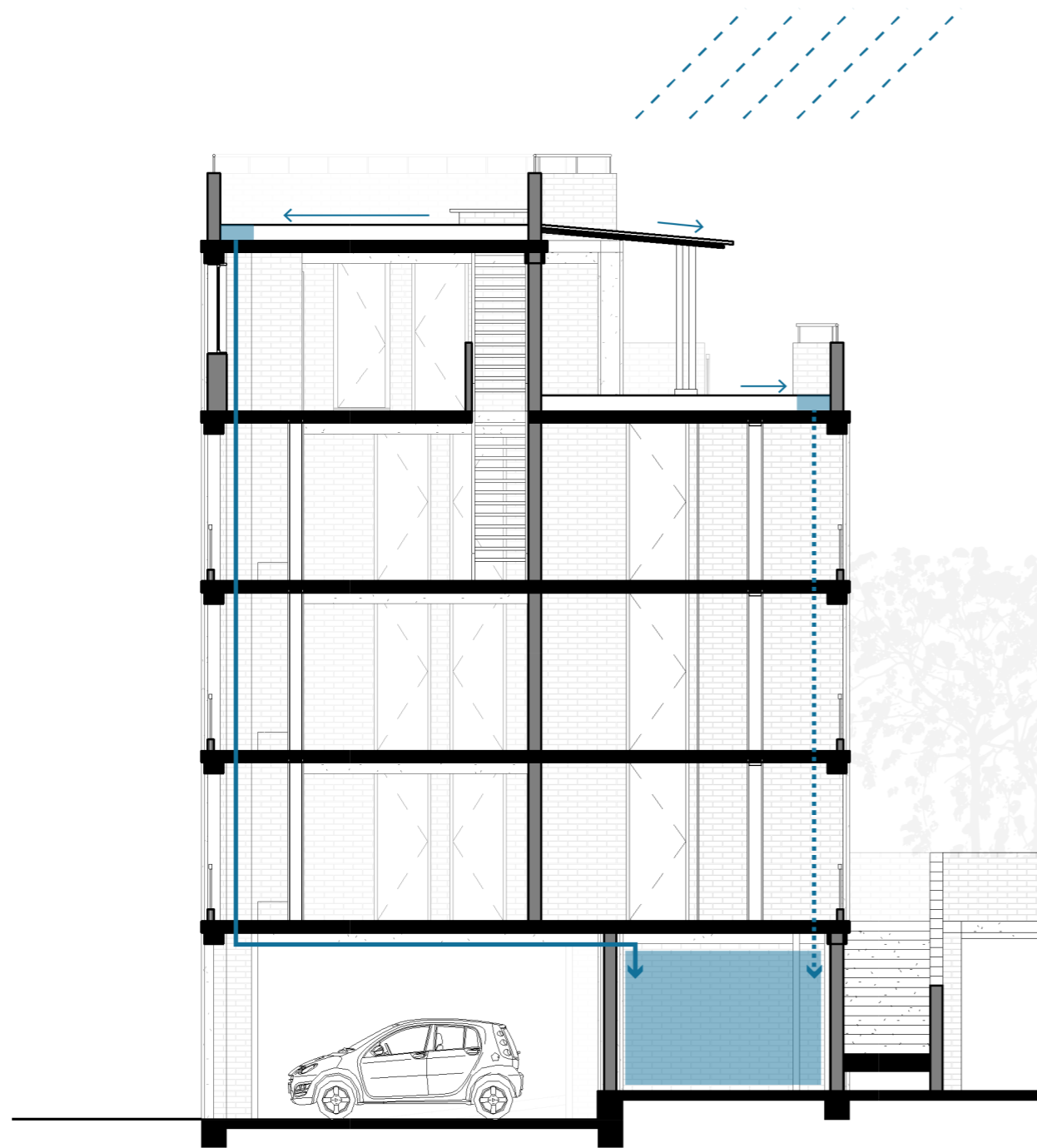


Ventilation Scheme in Neighbourhood Scale: The Formation of Wind Path



Ventilation Scheme in Cluster Scale

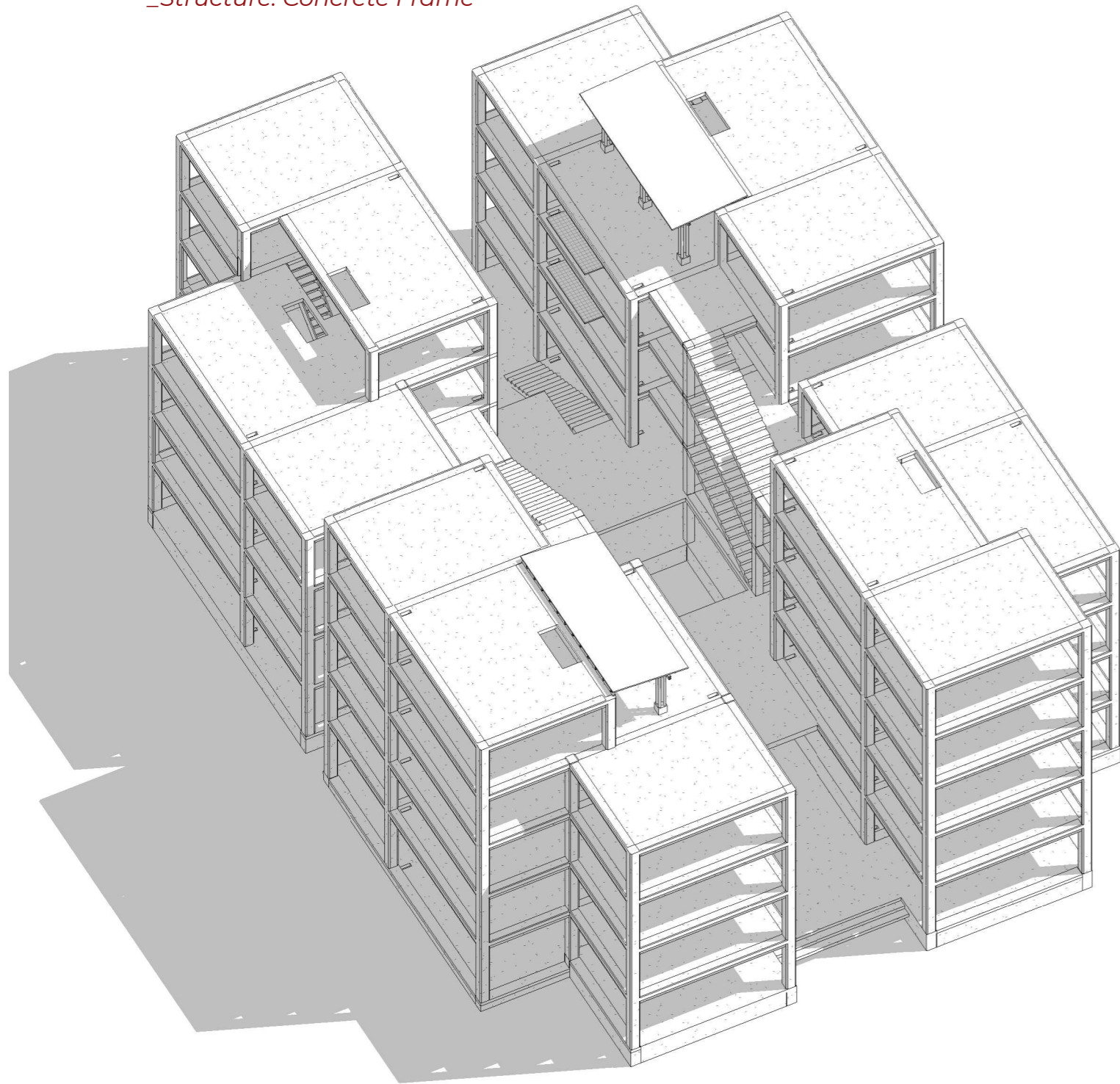
_ Rainwater Collection



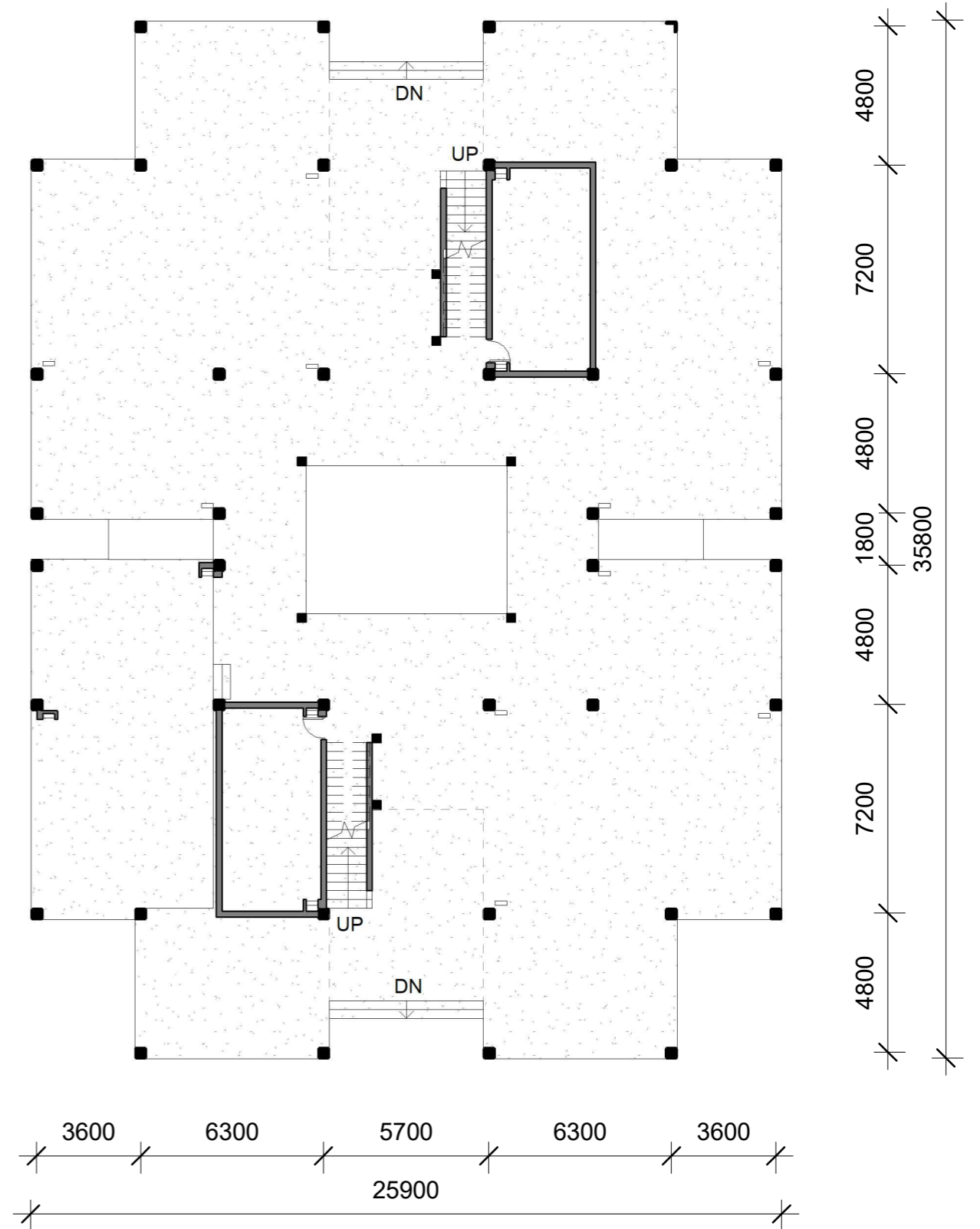
Rainwater Collection Scheme in Cluster Scale

THE FORMAL CONSTRUCTION

_Structure: Concrete Frame



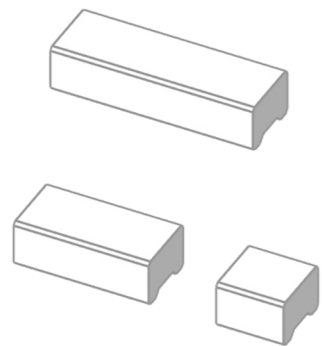
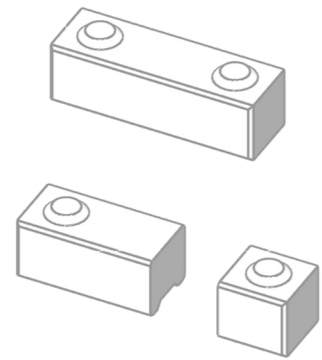
Isometric Drawing of The Frame Structure _ 1:200



_Infill: Interlocking Stabilised Compressed Earth Block

Common Block: 100*300*90

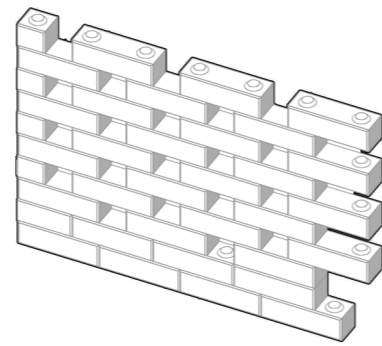
Cut: 200 / 100



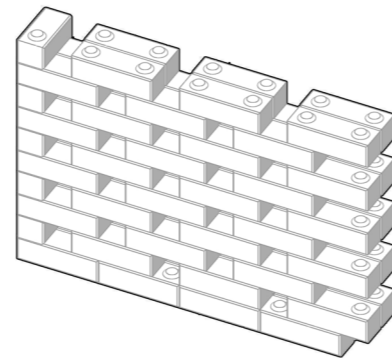
Cap Block: 100*300*70

Cut: 200 / 100

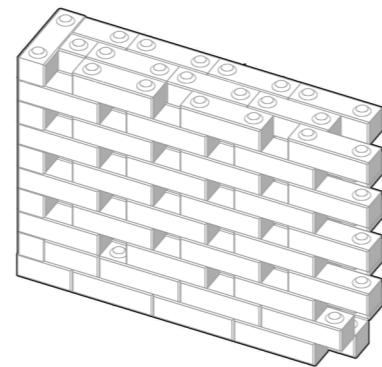
100mm



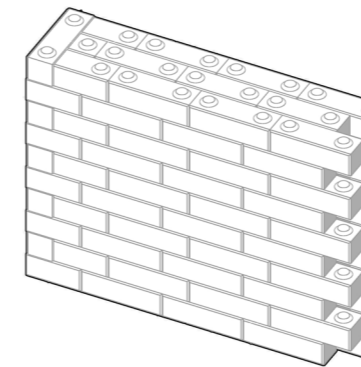
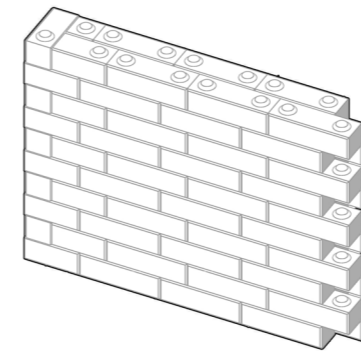
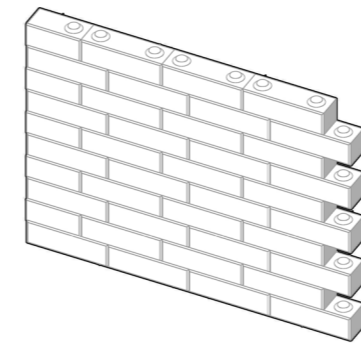
200mm



300mm



Perforated

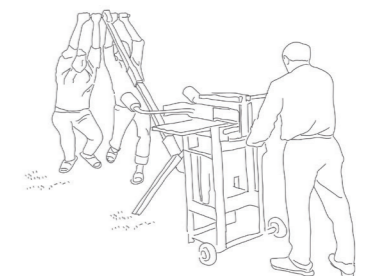
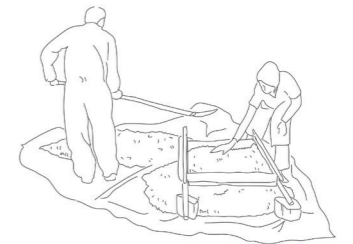
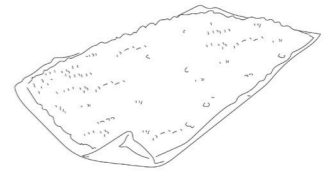
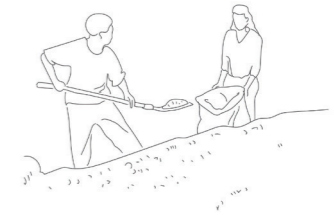


Solid

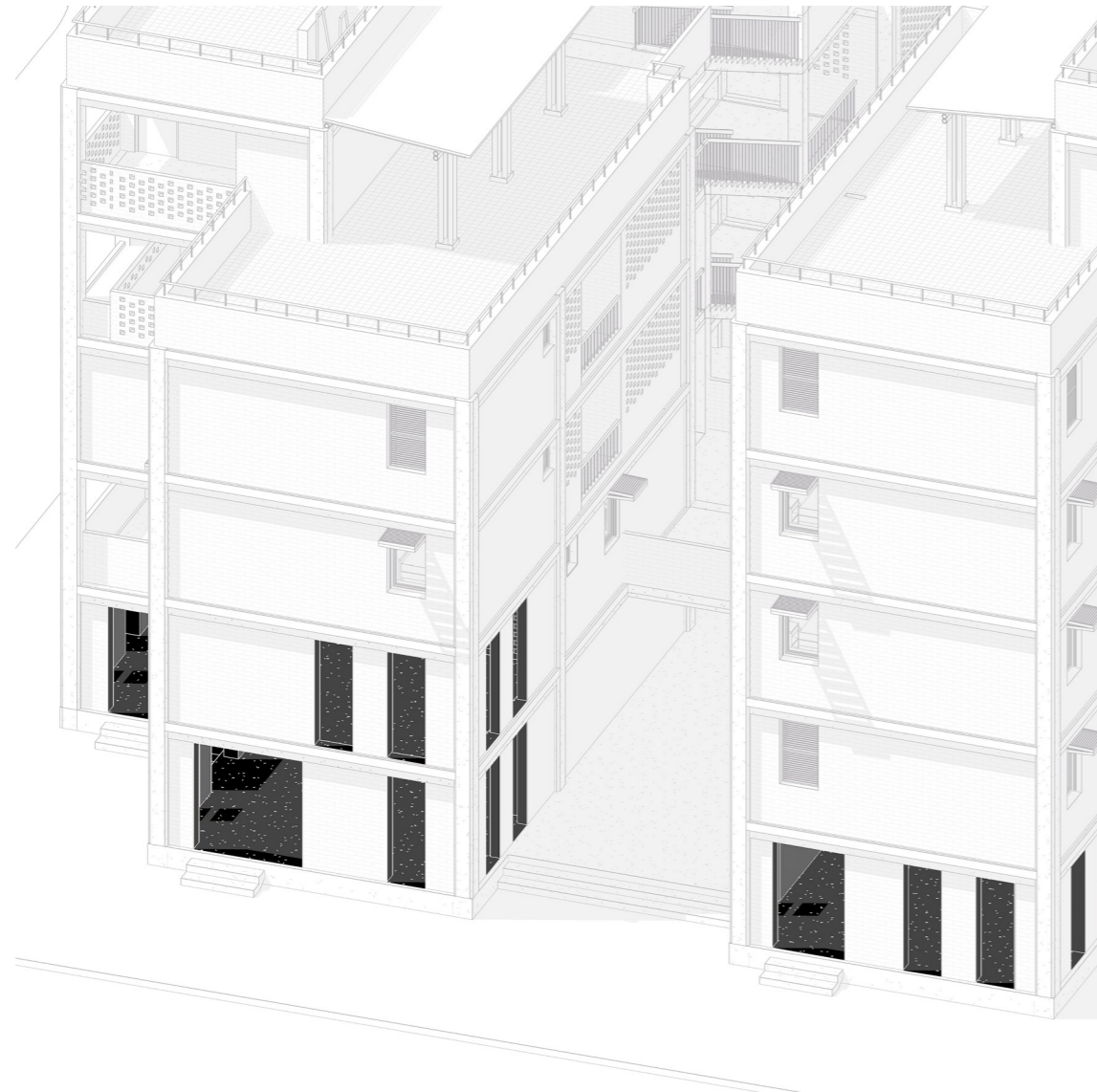
Indoor partition wall

External wall /
Partition wall
between units

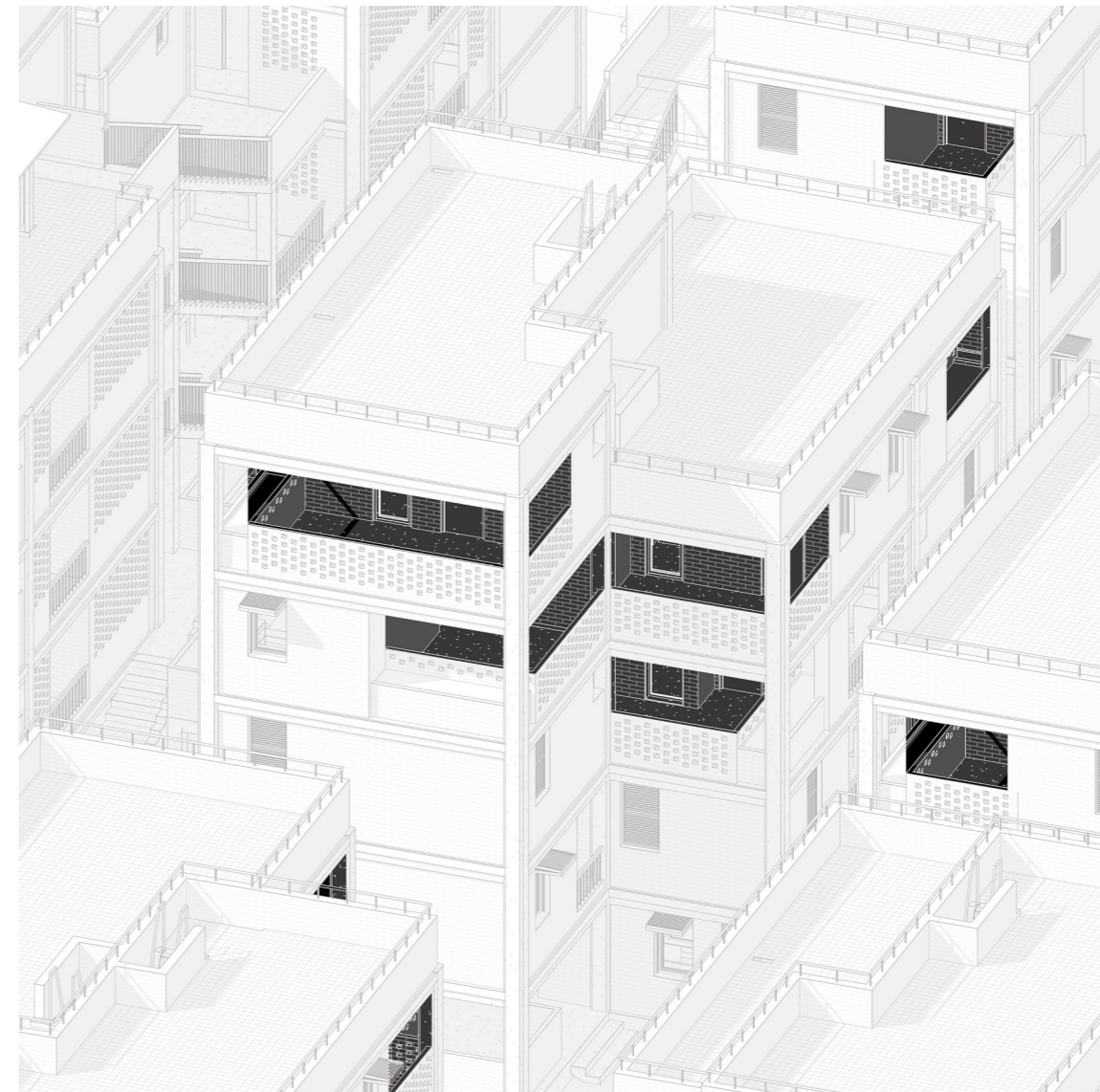
External wall on West
Facade



THE INFORMAL CONSTRUCTION

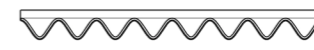
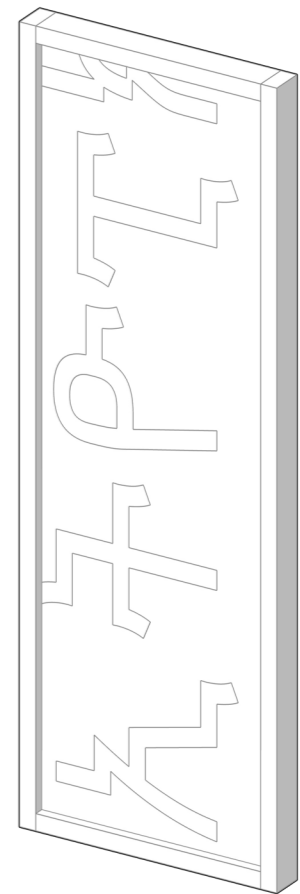
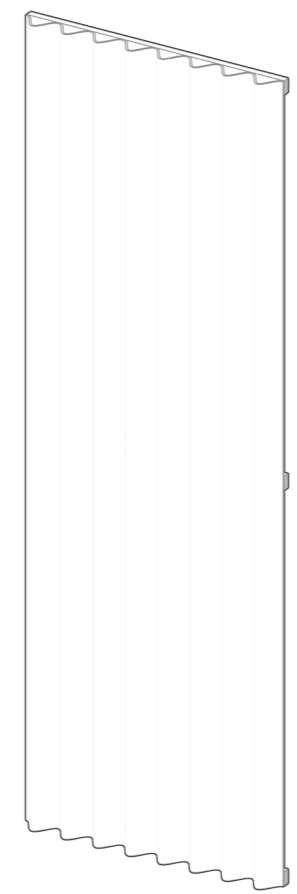
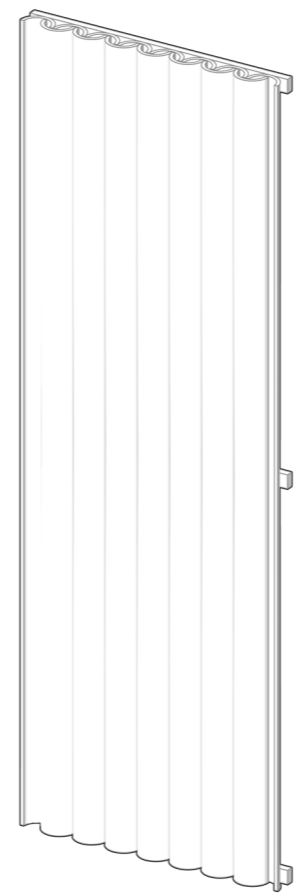
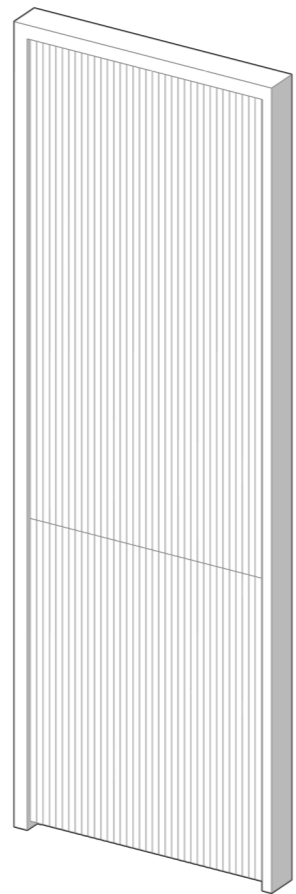
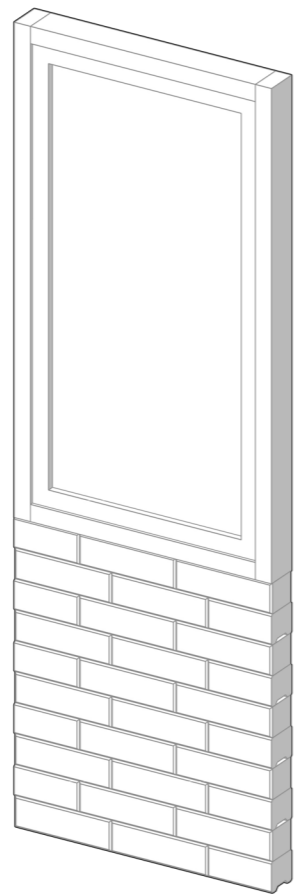
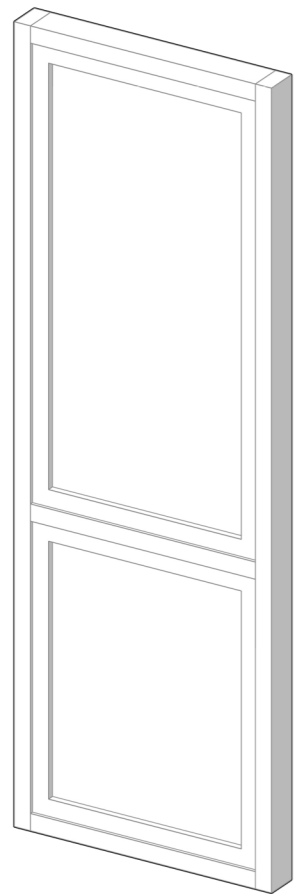


Ground Floor Openings _ Typically 800mm in width



Self Constructed Walls _ Typically for original dwellers

_ Examples of (Light-weight) Infill on the Ground Floor



Full Window / Door

Window + SCEB

Bamboo Strip

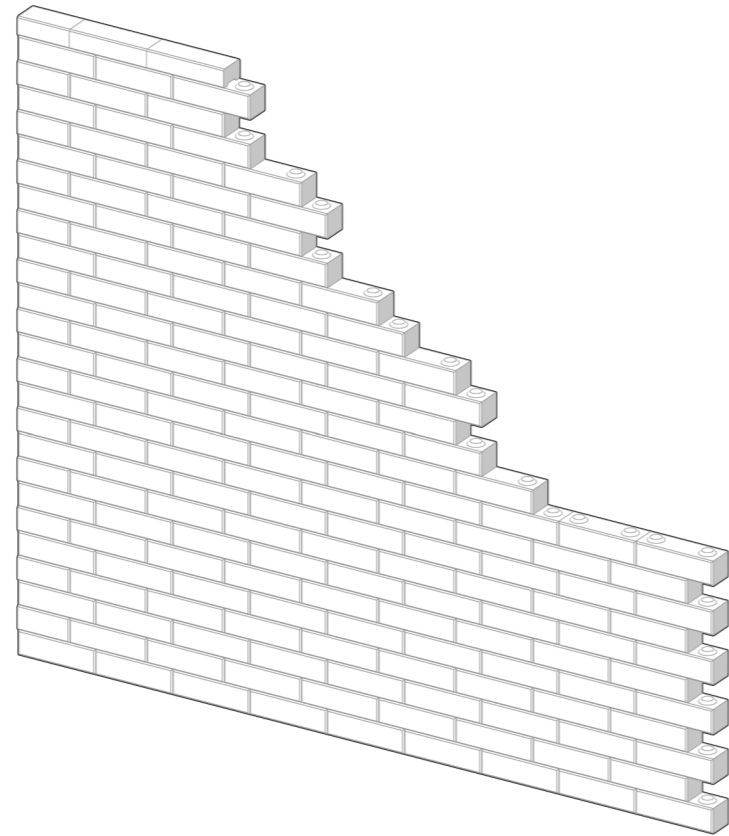
Halved Bamboo

Corrugated Metal Sheet

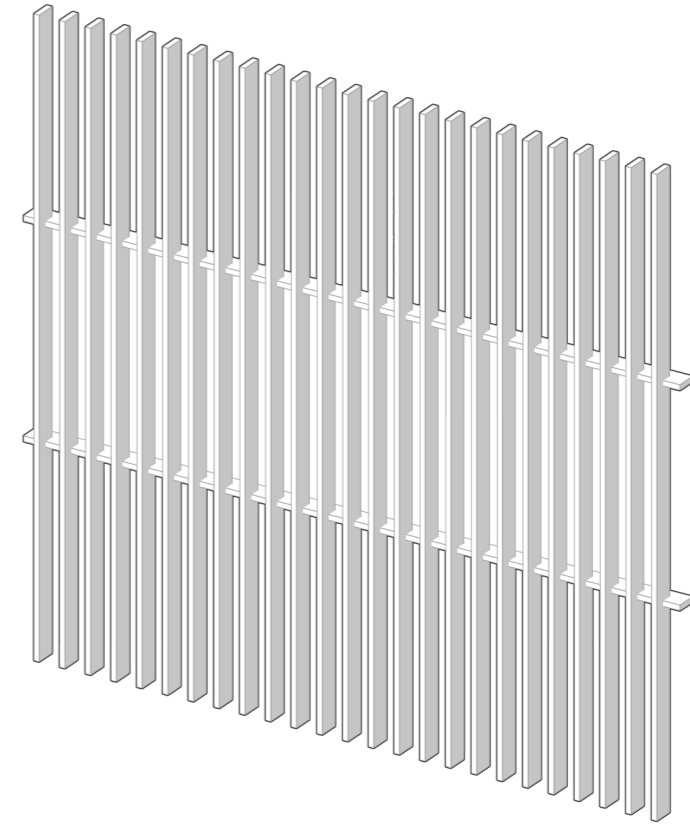
Advertising Signboard

_ Examples of Self-constructed Wall

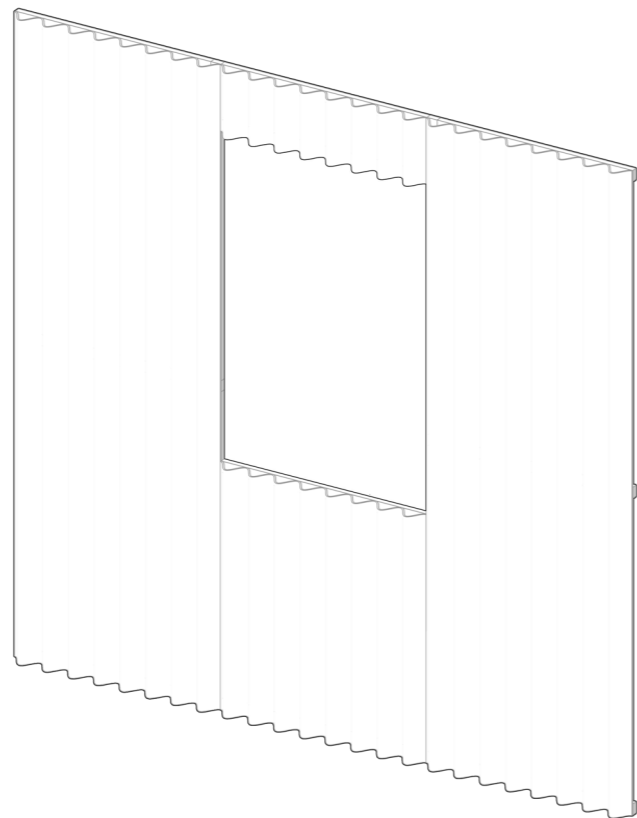
SCEB Wall



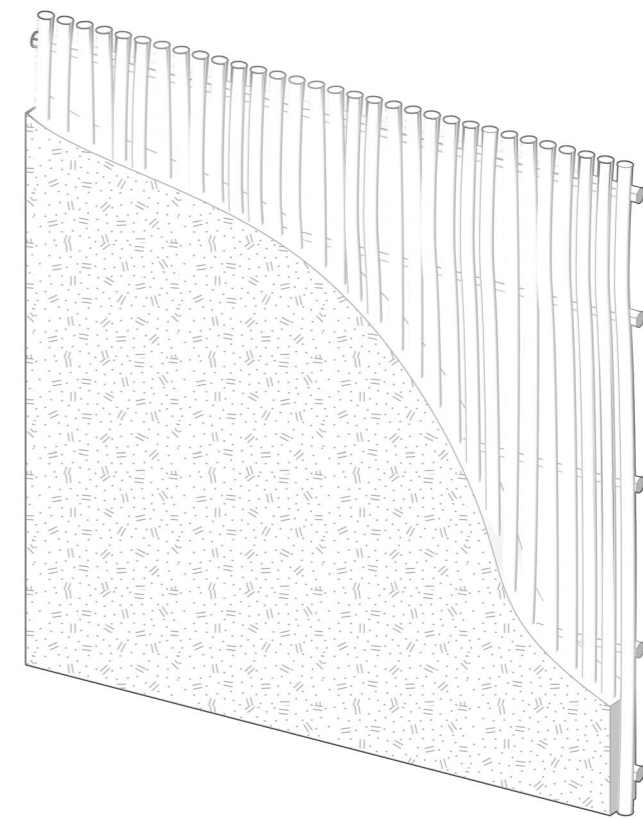
Bamboo Shutter



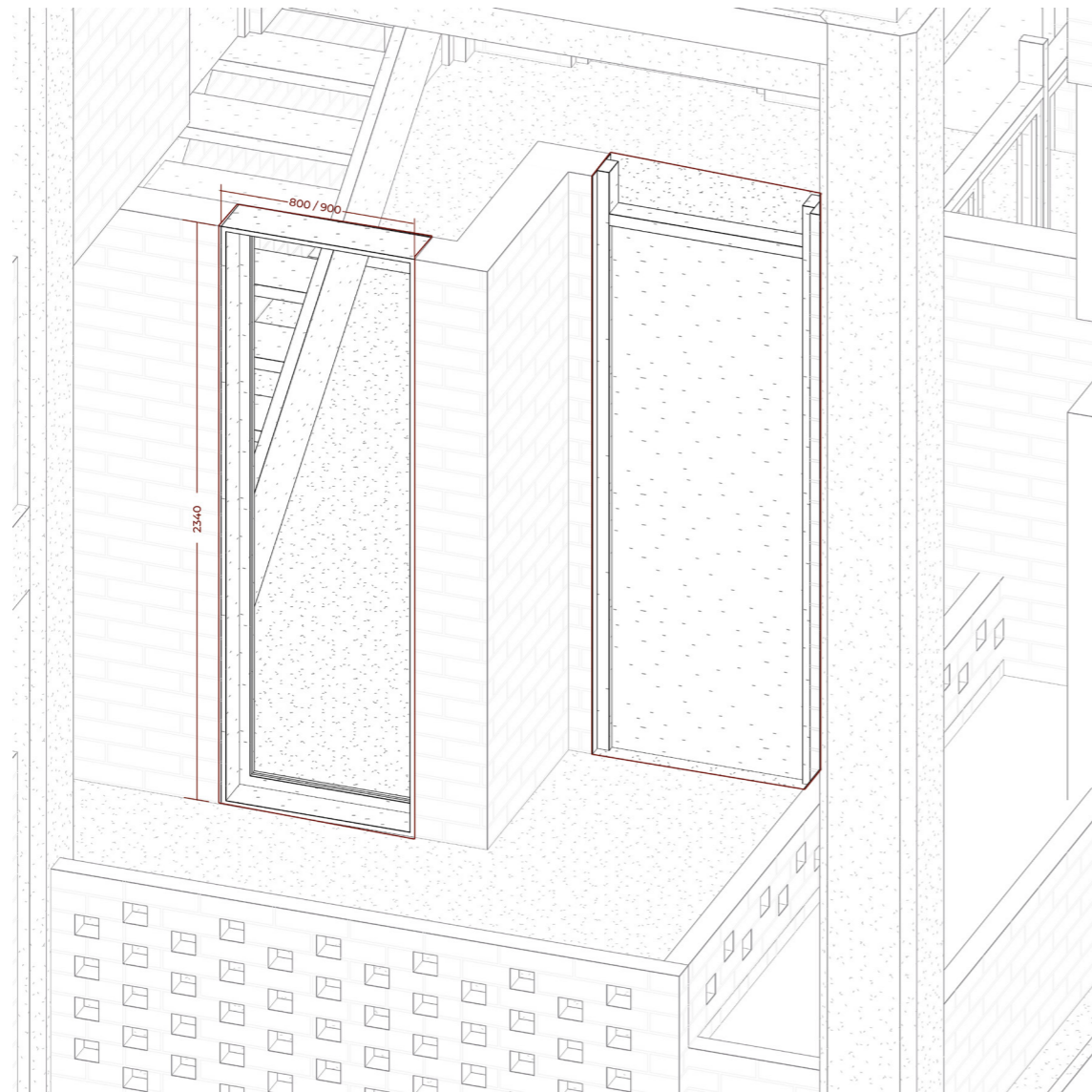
Corrugated Metal Sheet



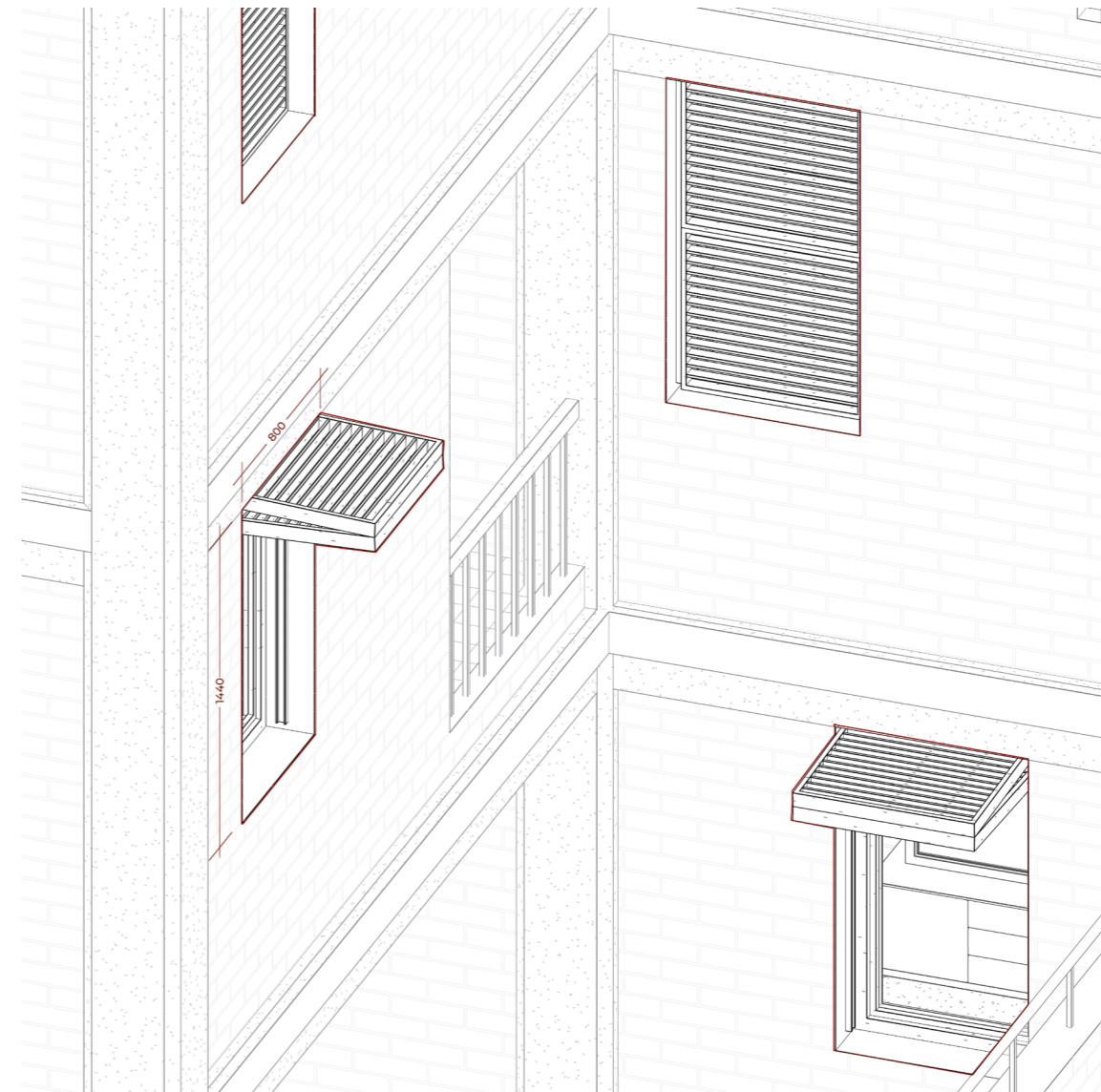
Chika



_ Standardized Door And Window

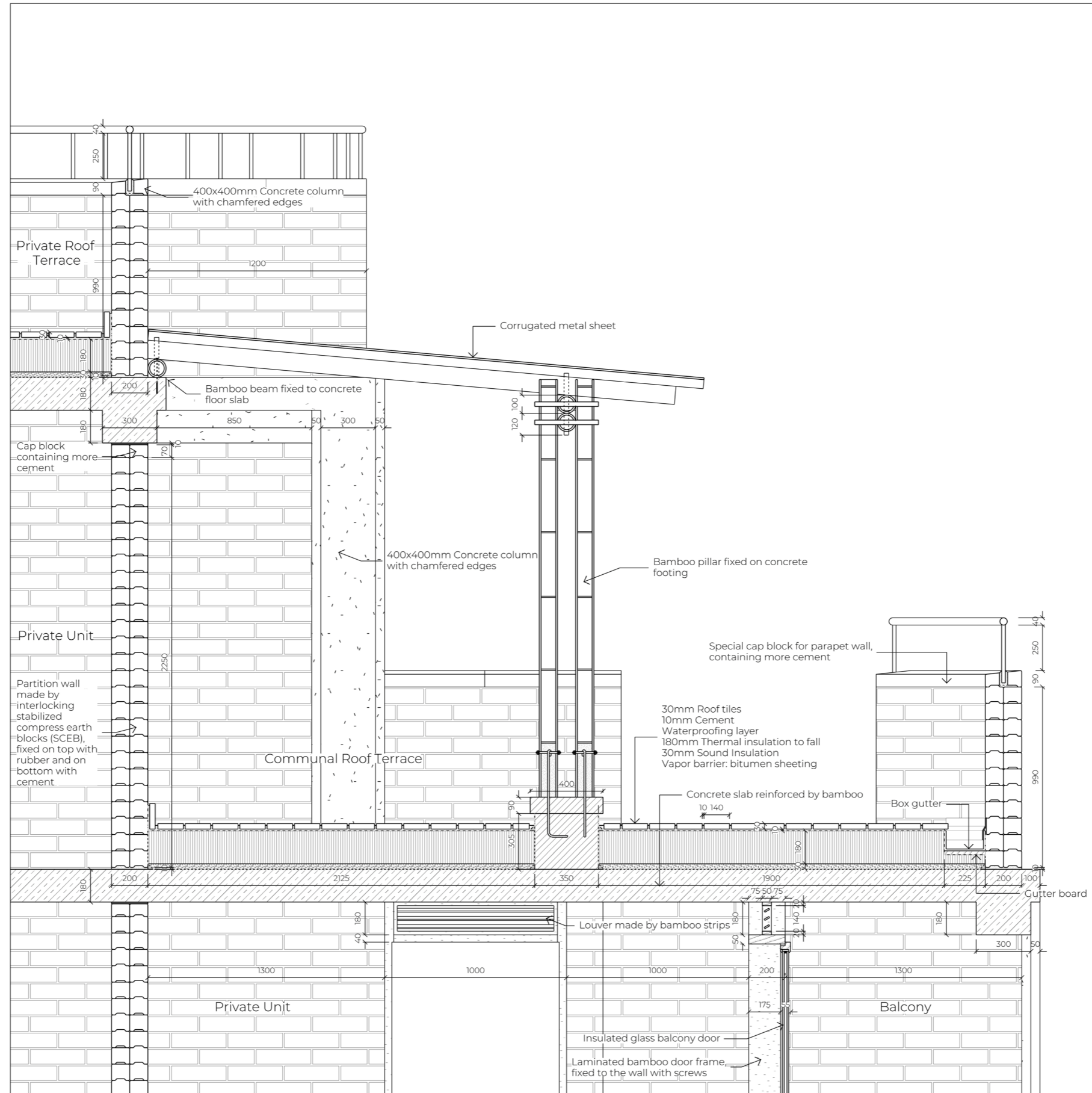


A Typical Door of 800mm*2340 mm



A Typical Window of 800mm*1440mm

DETAILS

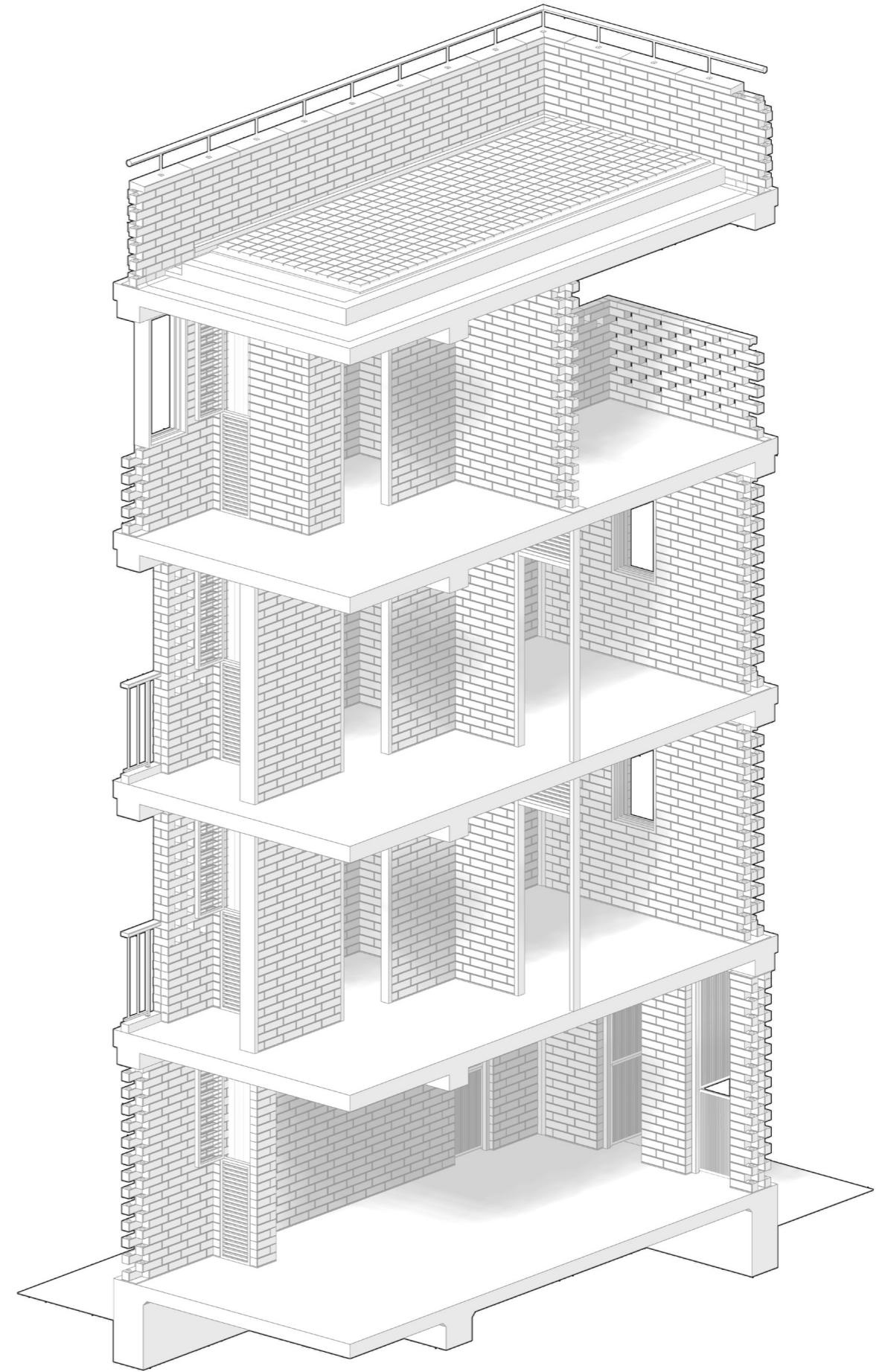
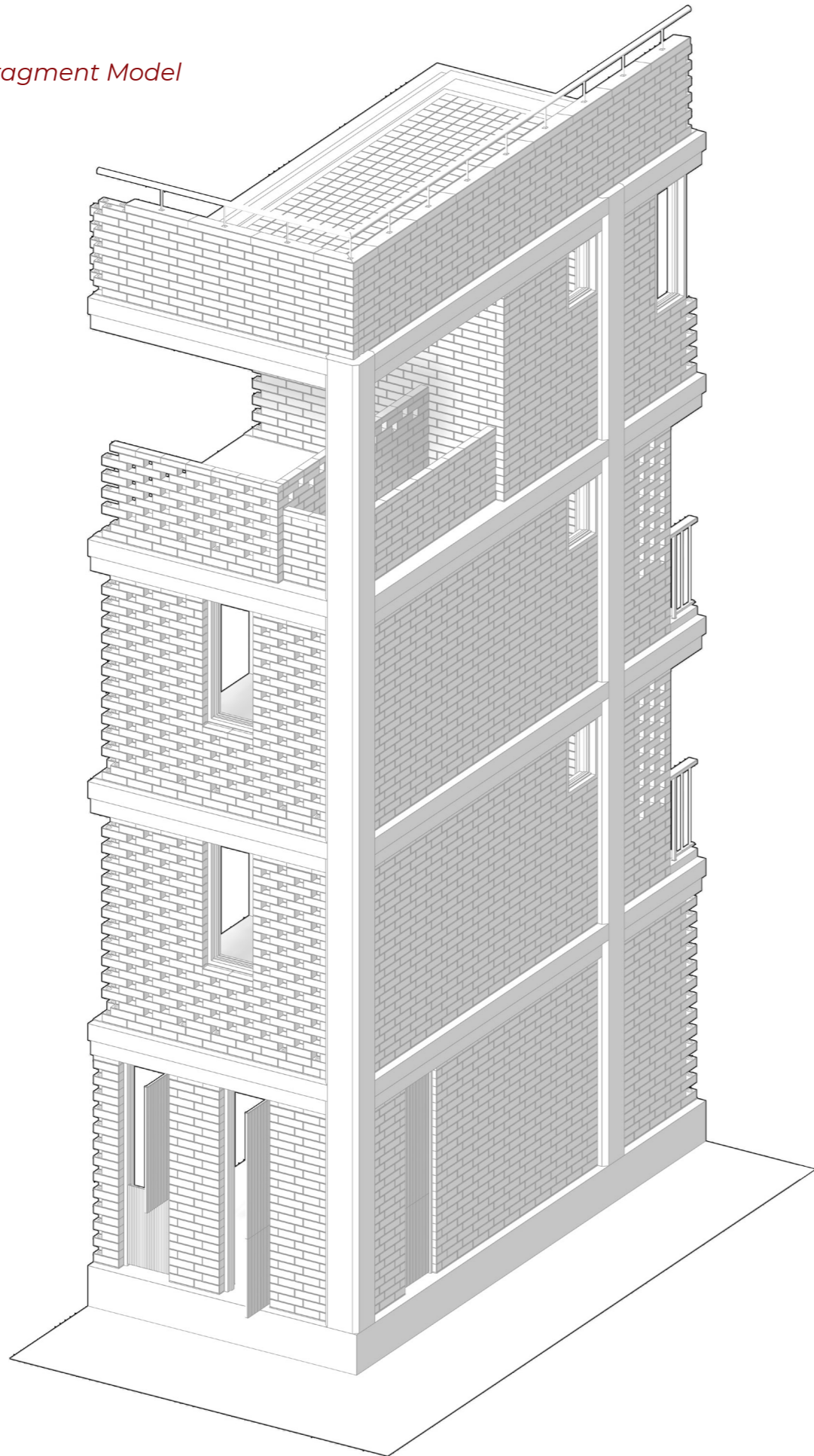


Detail 2 _ Cross Section of Roof and Bamboo Awning _ 1:25

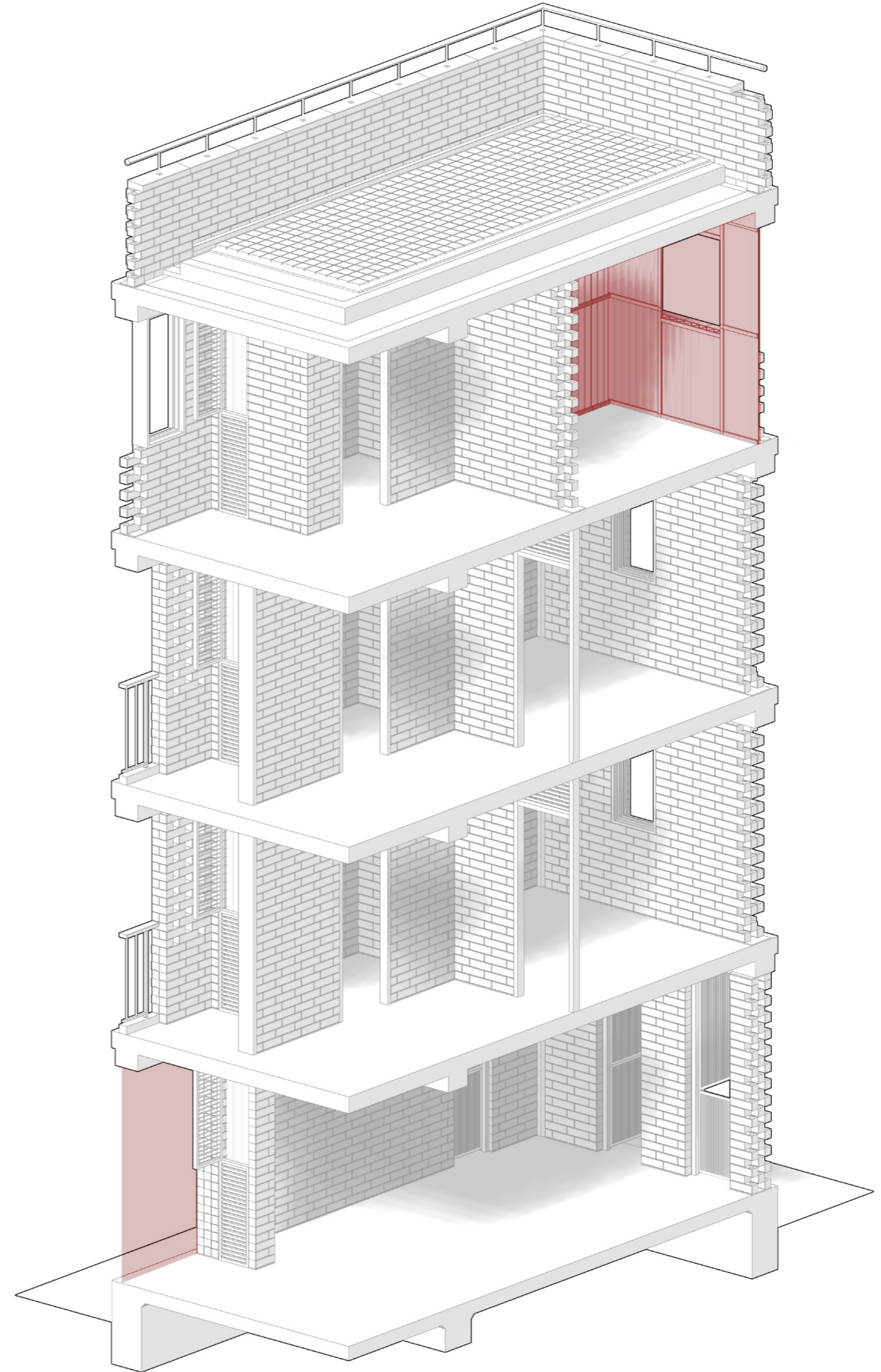
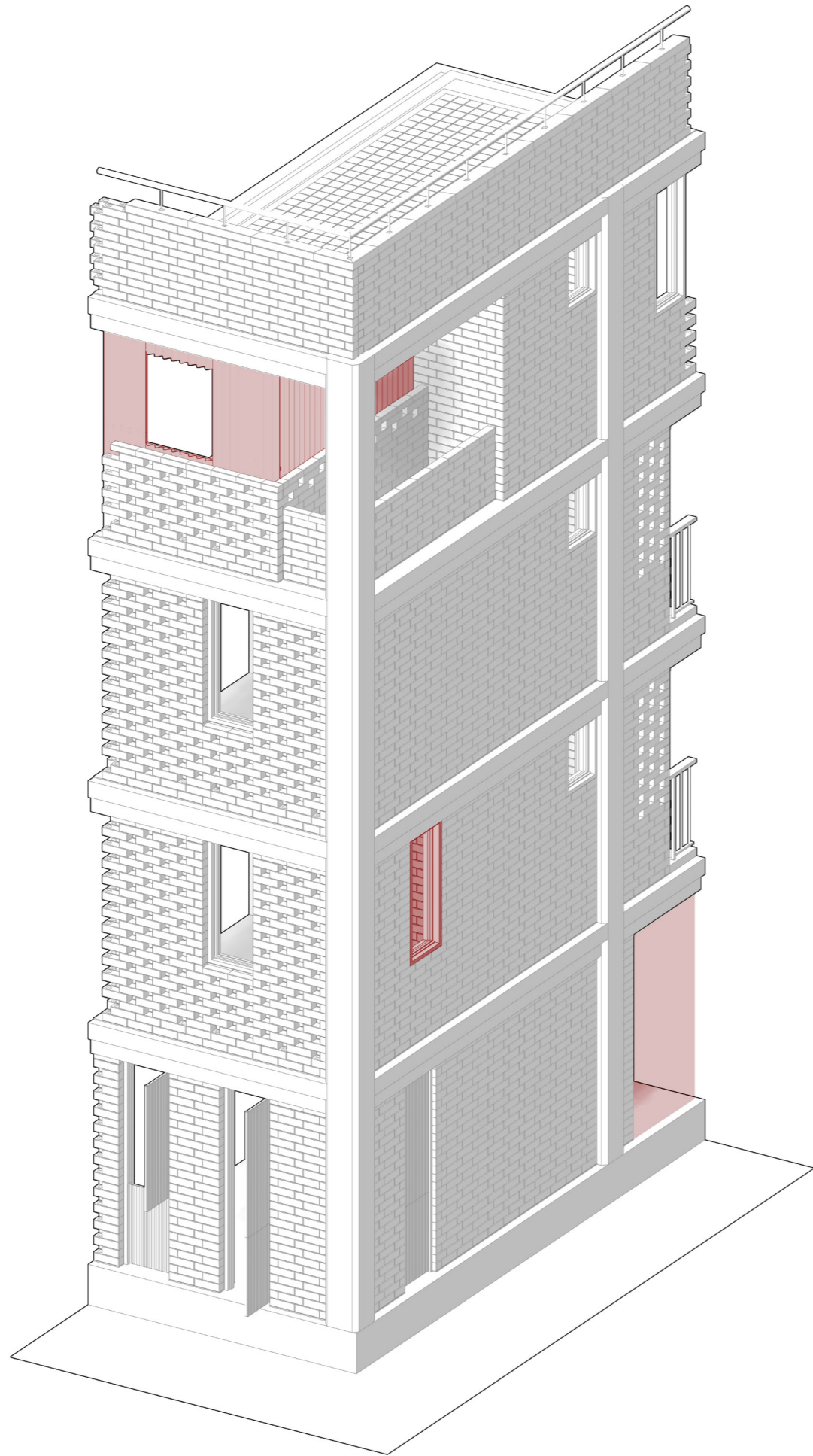
Scale 1:25



_Detailed 3D Fragment Model



_Flexibility



CONCLUSION

Research Question

The general research question is how to achieve collective welfare between the locals and new inhabitants, by creating a co-habitable community under the context of urban densification and sufficient infrastructure?

Sub questions:

1. What are the common and conflicting concerns of original and new dwellers?

The architectural ethnography study has shown that in Rotterdam and Addis, regardless of the differences in all aspects, when it comes to housing, people are all looking for something that is meeting the essential living needs, and further to feel safe with and get attach to. The gentrification happening in Oude Westen is excluding away its original inhabitants. In the case of Kolf Low-cost Housing site, the appropriations happen to the houses could be seen as the connections of people and the physical environment that they are living in.

But to achieve this goal, a conflict would emerge between the original and new residents of Gerji, as the land is taken away from the original residents to build the houses for the new residents. Meanwhile, they have different standard towards housing. The original residents have settled in Gerji since 1980s, they built and improved their life there overtime. This results their higher exception and standards for housing. More often, they tend not to leave their old houses.

In this project, the needs from both side should be meet and the tension between them should be eased.

2. To what extent the site should be densified?

The need of densification is urgent in the city scale. If we take a look at the current condominium solutions, 20/80 and 40/60 are giving out two different approaches. The 40/60 scheme is applied in larger scales, tend to be mid-rise but densely distributed. 20/80, However, is a high-rise scheme, leaving large ground floor area empty. A large amount of 20/80 buildings are left empty, lack of livelihood. It seems that it's not fitting into the context of Addis.

In the specific site of Gerji, seeing its role in the city that is in the new city centre, but in a broader sense, I tend not to go an extreme path. The main reasoning would be the restrictions posted from the city side. The frequency of electricity blackout wouldn't be ideal for the buildings with lift. That's why the site would be densified in a gentler way, mainly keeping up to pedestrian friendly 5 to 6 floors. As a compensation, the scheme is strongly adaptable to other areas of Addis (especially FHC sites).

To conclude, Gerji as a single site not necessarily need to reach its largest densification capacity, but it could be an example to densify the city gently as a whole.

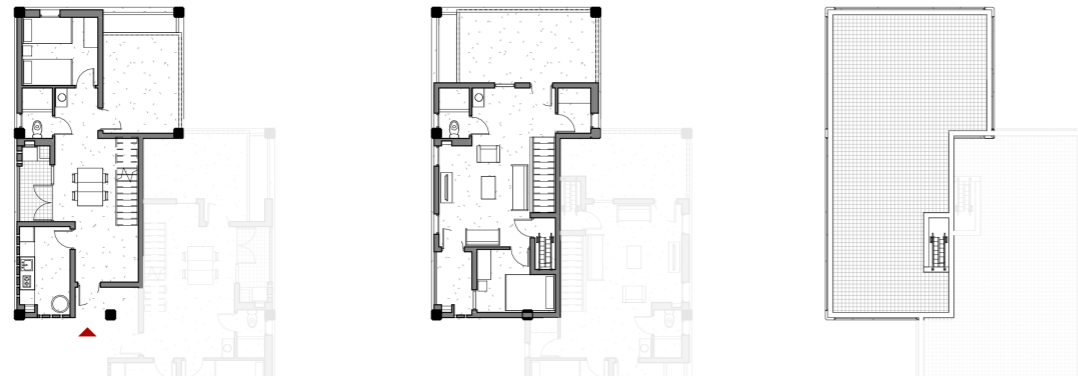
3. What are the essential infrastructures that are needed for a good quality of life, and how to build them?

The infrastructures for the good quality of life could be the ones that assist with basic living activities, as for water, electricity supply, but moreover the ones that heading for a higher goal of improving the living experience in the neighbourhood. The former one could be solved technically, with the help of reusing some of the old infrastructures of Gerji. As for the later one, in the scheme of "Gerji Co-habitable Densification", the actions are taking in different scales, encouraging the social interaction and helping with the generation of a new community.

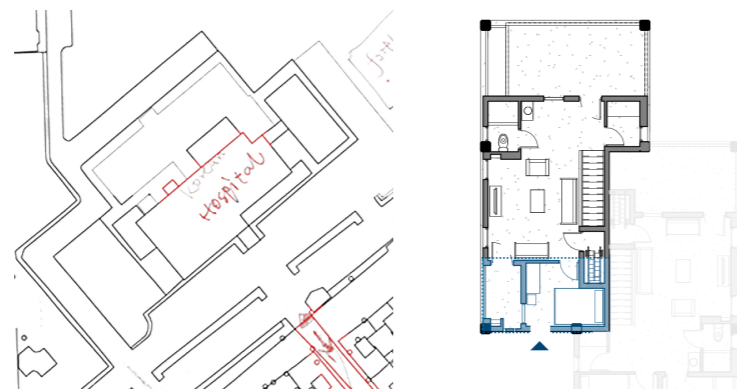
A STORY OF LIYA AND HER FAMILY



Liya is a lady who lives in Gerji site since the 1980s. She owns a small single-bedroom house with a big courtyard where she has planted many plants.



As the Gerji densification going, she left her house and moved into a duplex unit with an extra bedroom in the new constructed neighbourhood.



Soon, she lent the spare bedroom on the upper floor to a young visiting doctor of the Korean hospital.



On the ground floor looking at the staircase leading up to 1st floor communal terrace

Everyday coming back to home, she passes by the communal terraces on the ground and first floor, where she meet her old friends and meantime the new neighbours.



1st floor communal terrace

She get to know a girl who always dry her spices on the terrace, who is new to the city and rents an unit on the ground floor.

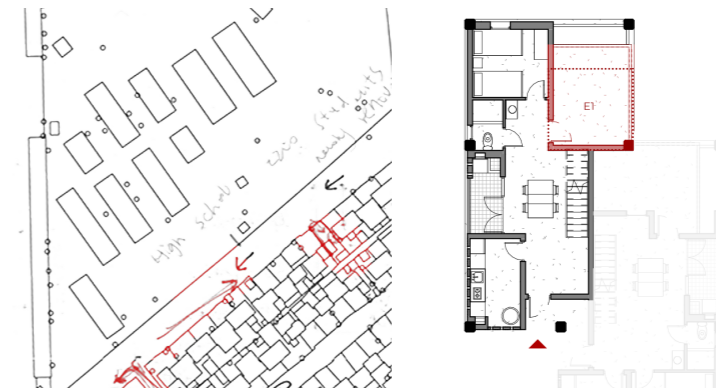


On the staircase landing looking at another dwelling block

The girl became Liya's helper later. At a normal day, she would walk up to Liya's apartment and help with the housework, and by night returning to her own room.



On the staircase landing looking at the door of apartments



The grandson of Liya, Kofi, would start his year in the close-by high school, so he moved in with his grandma. Liya built an extension for the boy, right next to her own bedroom.



On the boy's way back from school, he would pass by the sequences of public space of the neighbourhood, where he sometimes would play with his school friends. When it's time for him to go back home for lunch, the smell of food that is filling the communal staircase would guide him home.





Later his parents also decide to move in. As the doctor has finished her program and left the country, They could move into the upper floor. The family always have their dinner together in the dining room downstairs and later go up to the living room to watch TV series.



As they have their private roof terrace, which Liya had turned it to a roof garden again, they don't often use the communal roof terrace. But one of the things Kofi likes to do most is to watch their neighbours on the communal terrace, and talk with them through air.

A few years later, Liya's helper brought her family to Addis. They bought a small 2 Bedroom apartment in the neighbourhood. And hopefully, everyone's life is heading to a better future.

Thanks.

谢谢。

with special thanks to:

First Mentor: Dr. go. Nelson Mota

Building Technology Mentor: Ir. Stephan Verkuijden

Research Mentor: Ir. Harald Mooij