



Rediscovering the Roots of the City

Creating Synergy Between Addis Ababa's Urban Dwellers and Rivers

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P5 Presentation
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Problem statement

Introduction site

Design hypothesis

Vision for a river culture

Productive Urban Open Space System

Managerial structure and phasing

Materiality and building system

People and typology

Design

Building technology

Conclusion

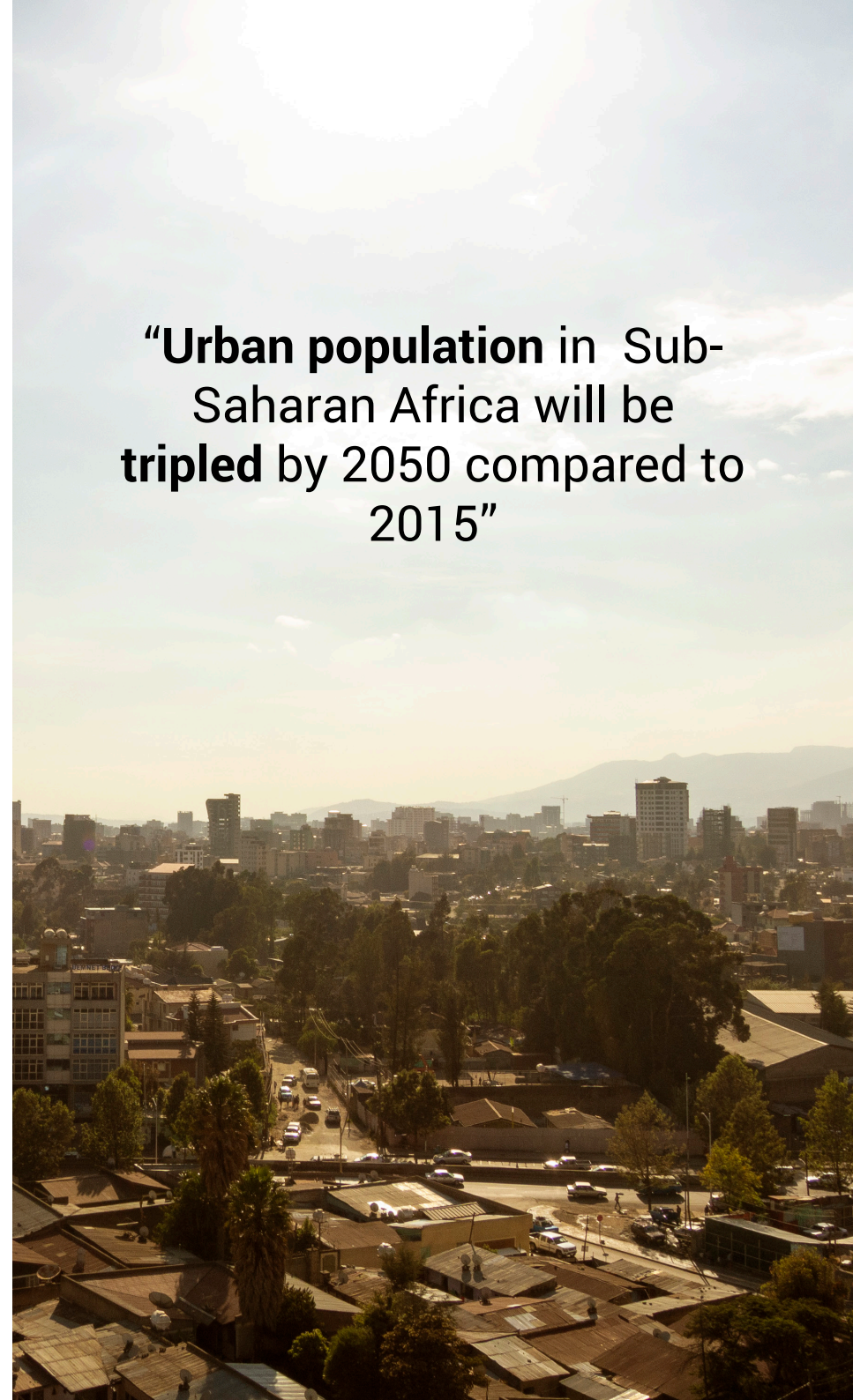
A global issue

Urbanisation in developing cities



“Public authorities can’t manage the rapid urbanisation which results in a lack of basic infrastructure and services”

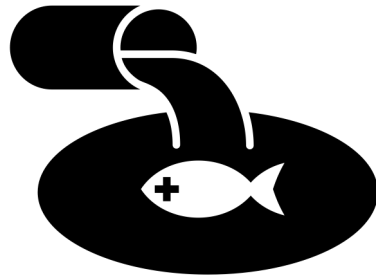
“Urban population in Sub-Saharan Africa will be tripled by 2050 compared to 2015”



A global issue

Polluted water bodies in developing cities

“Rivers get invariably ignored by urban planners”



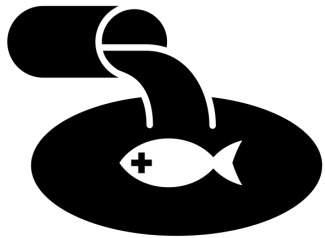
“Water bodies become the armpit of the city; The water quality is poor and riverbanks become dumpsites and homes for the poorest of the city”



Addis Ababa

No exception

“Projected to **grow by 3.8%** each year in the upcoming 15 years”

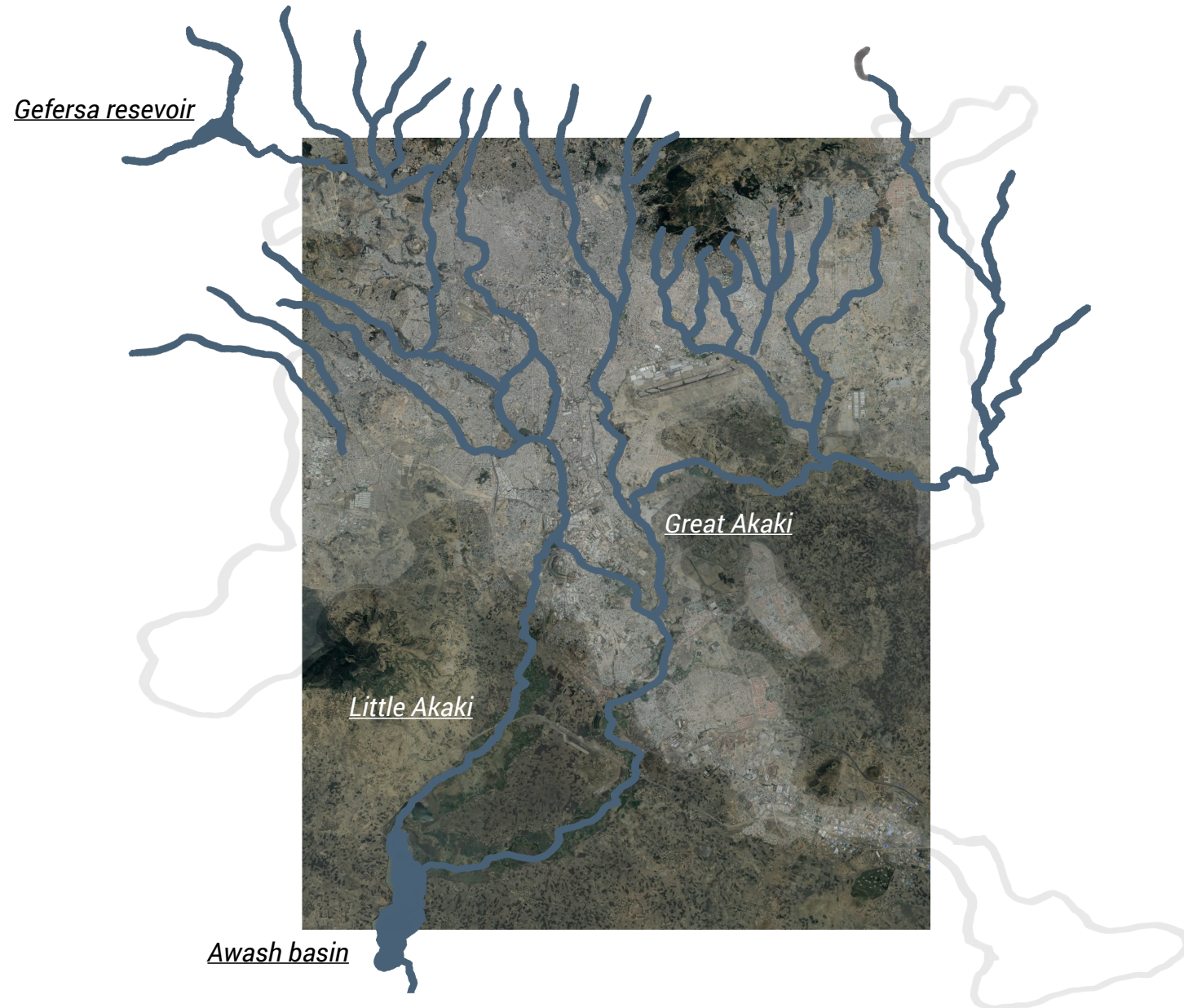


“Rivers have become the **waste dump** of the city.”



Addis Ababa

And its rivers



Water bodies

Their current state

Waste dump



Informal settlements



Not accessible



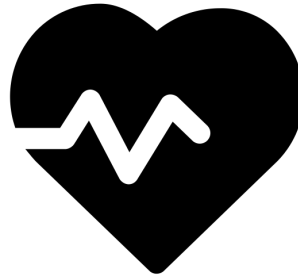
Polluted water bodies

Their consequences

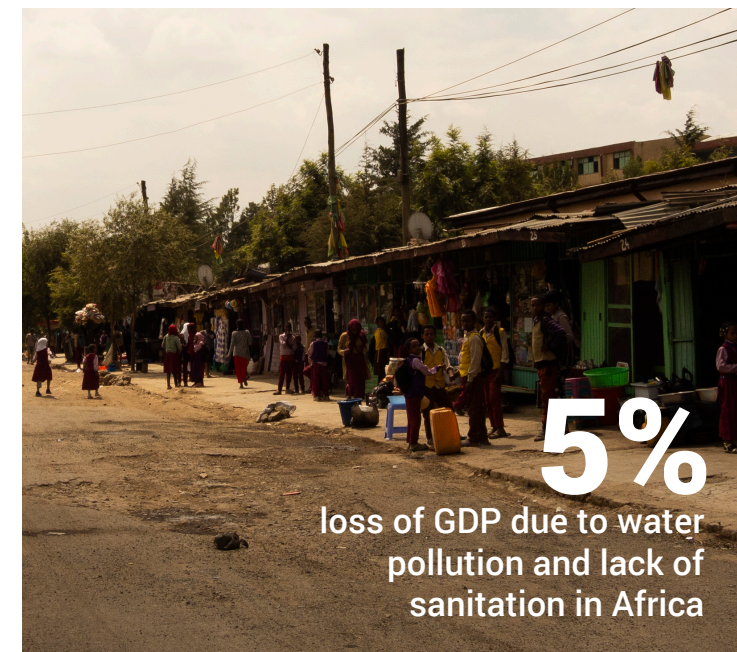
Highly damaged ecosystem



Community's health affected



Economic loss



Sollution: A river culture

Living in harmony with water



River culture: An environment in which people live in **harmony** and **respectfully with water**

Sollution: A river culture - Dwelling landscape

Interaction river culture and dwelling landscape



River culture: An environment in which people live in **harmony** and **respectfully with water**



Dwelling landscape: A landscape that **houses** its inhabitants and **support** their (informal) **activities** and **needs**

Shortcomings dwelling landscape

3 shortcomings in public domain



1. Shortage of green space

- *Damaged ecosystem*
- *Heat island effect*

Area of forestland shrunk the
last 3 decades with

62.1%

Shortcomings dwelling landscape

3 shortcomings in public domain

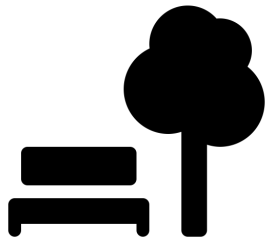


1. Shortage of green space

- *Damaged ecosystem*
- *Heat island effect*

Area of forestland shrunk the last 3 decades with

62.1%



2. Lack of public open spaces

- *No support for healthy community living*
- *No support for informal activities*

None of the 31 (together 888ha) planned future parks have been built

Shortcomings dwelling landscape

3 shortcomings in public domain



1. Shortage of green space

- *Damaged ecosystem*
- *Heat island effect*

Area of forestland shrunk the last 3 decades with

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2. Lack of public open spaces

- *No support for healthy community living*
- *No support for informal activities*

None of the 31 (together 888ha) planned future parks have been built



3. Urban farming

- *Many families dependent on urban farming*
- *Not integrated in urban planning scheme*

51 000

Families' livelihoods are directly supported by urban farming

Sollution: A river culture - Dwelling landscape

Lack of well-planned urban green spaces ties into the problem of mismanged waterbodies



River culture: An environment in which people live in **harmony** and **respectfully** with water



*Green space
Public open space
Urban farming*



Dwelling landscape: A landscape that **houses** its inhabitants and **support** their (informal) **activities** and **needs**

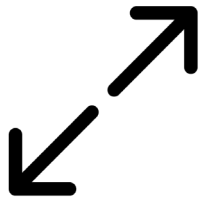
Research question

Main reserach question

*How can the **dwelling landscape** contribute to the development of a healthy '**river culture**' in Addis Ababa and vice versa?*

Design assignment

Overview

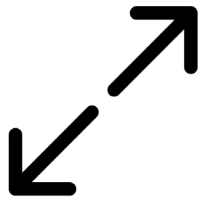


City level intervention

- *Shows the river culture vision on a city scale*
- *Tackle issues regarding restoration of the water bodies*

Design assignment

Overview



City level intervention

- *Shows the river culture vision on a city scale*
- *Tackle issues regarding restoration of the water bodies*



Implementation 24 Kebele

- *Embedment of interaction of river culture with dwelling landscape worked out into detail*
- *Seek for balance between a river culture and need of densification*
- *Solutions for lack of green space, open public space and urban farming*
- *Dealing with attachment of current inhabitants' livelihoods with 24 Kebele*
- *Construction should support local economies*



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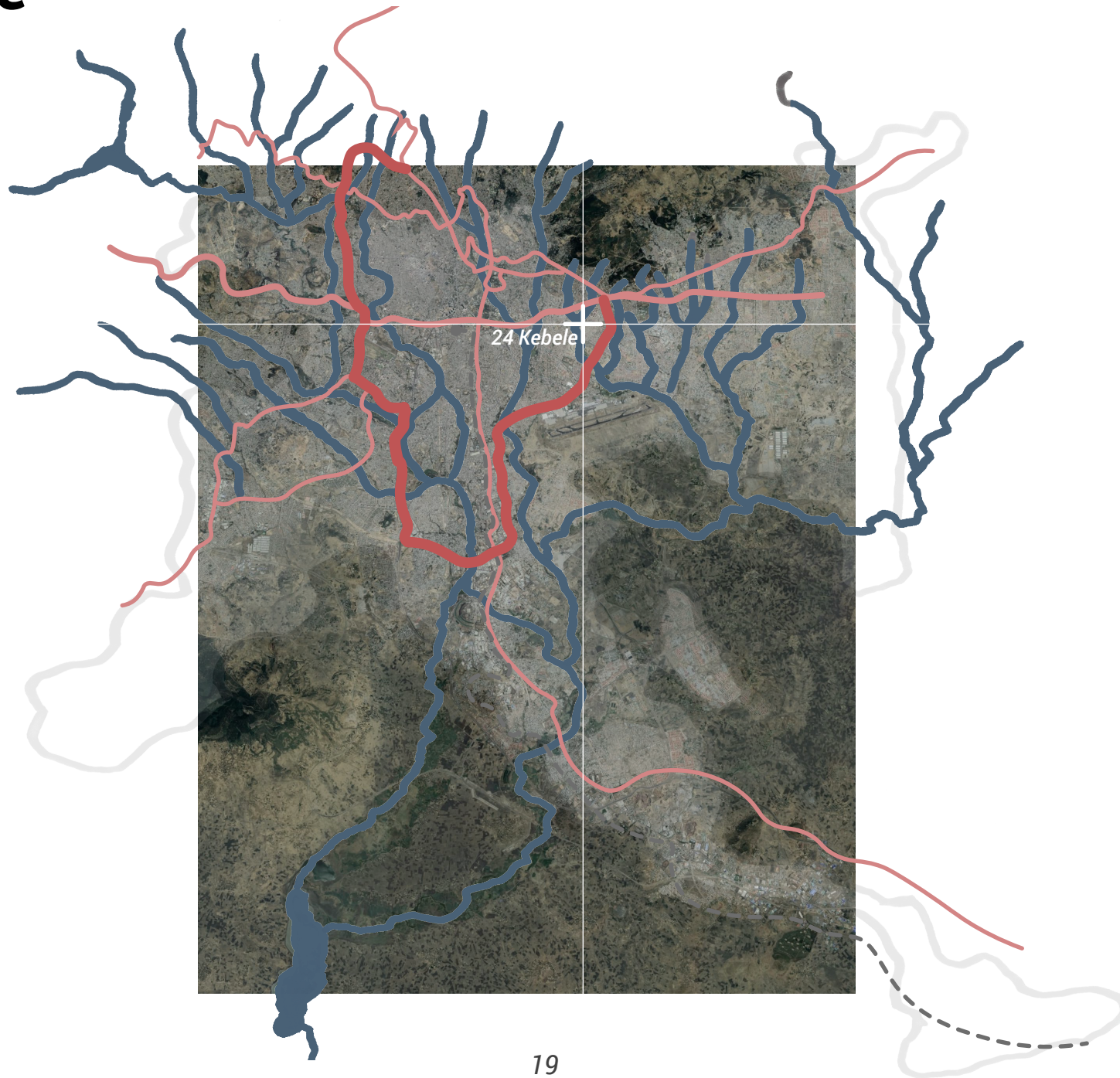
Design

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24 Kebele

Location



24 Kebele

Location



24 Kebele

Aerial picture



24 Kebele

Site and focus area



24 Kebele

Impression waterbodies



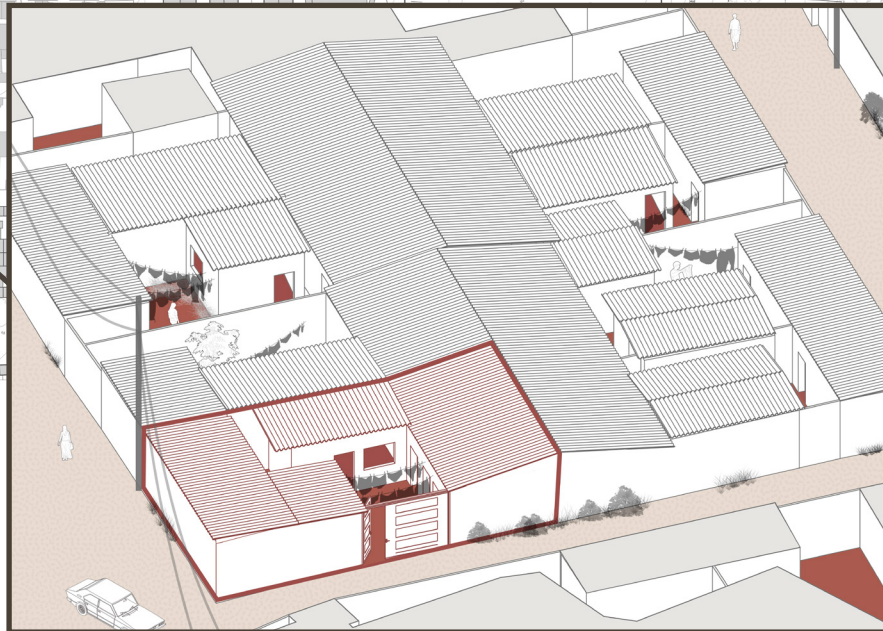
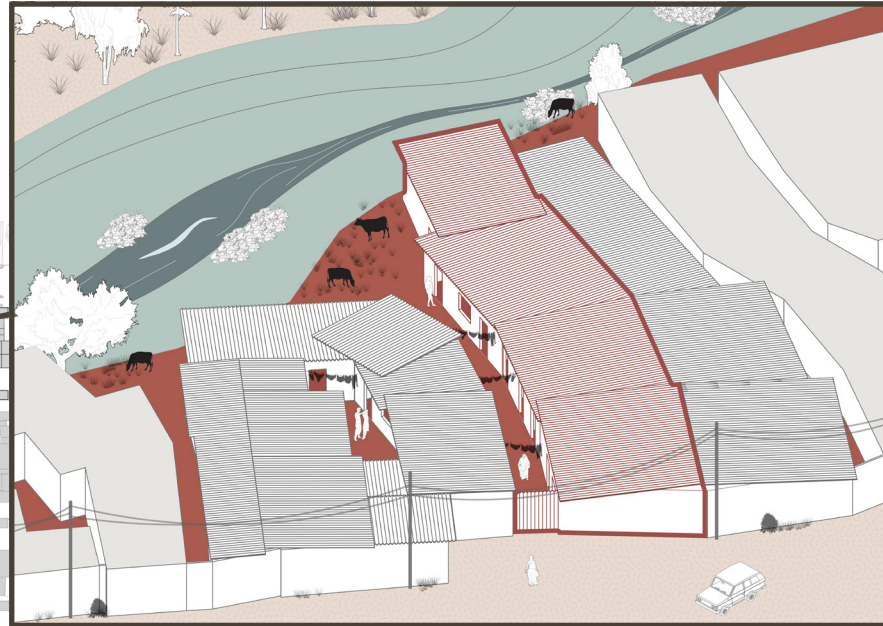
24 Kebele

Impression streets



24 Kebele

Dwelling typologies





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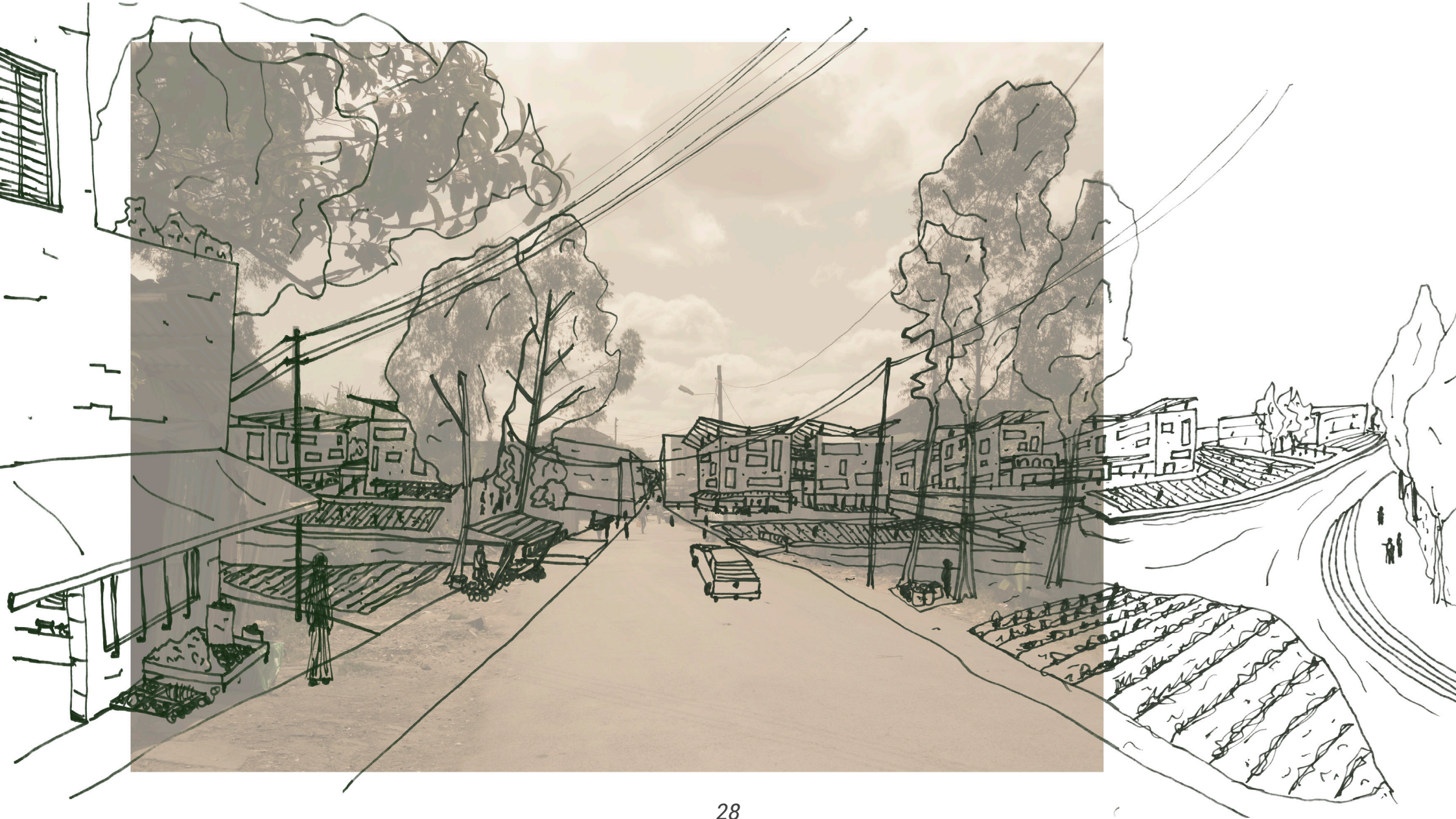
Design hypothesis

Current situation



Design hypothesis

How it could be





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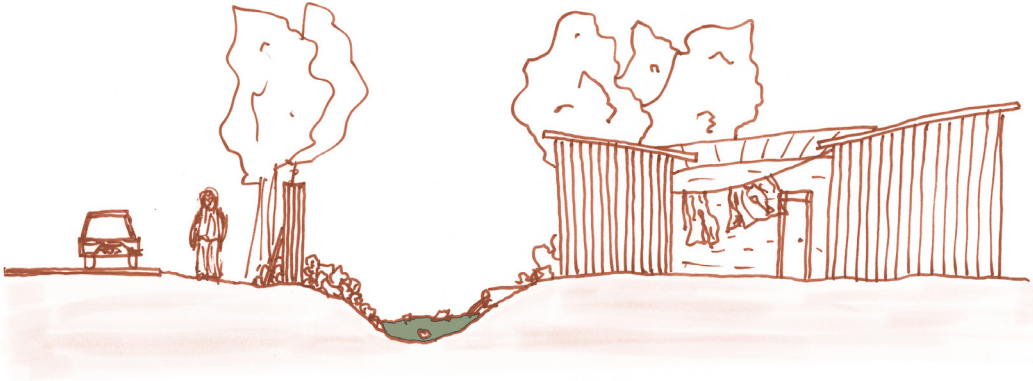
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Current state water bodies

The armpit of the city



Waste dump

*Polluted rivers
Damaged ecosystems*



Not accessible

Fenced



Illegal informal settlements

Poor housing conditions



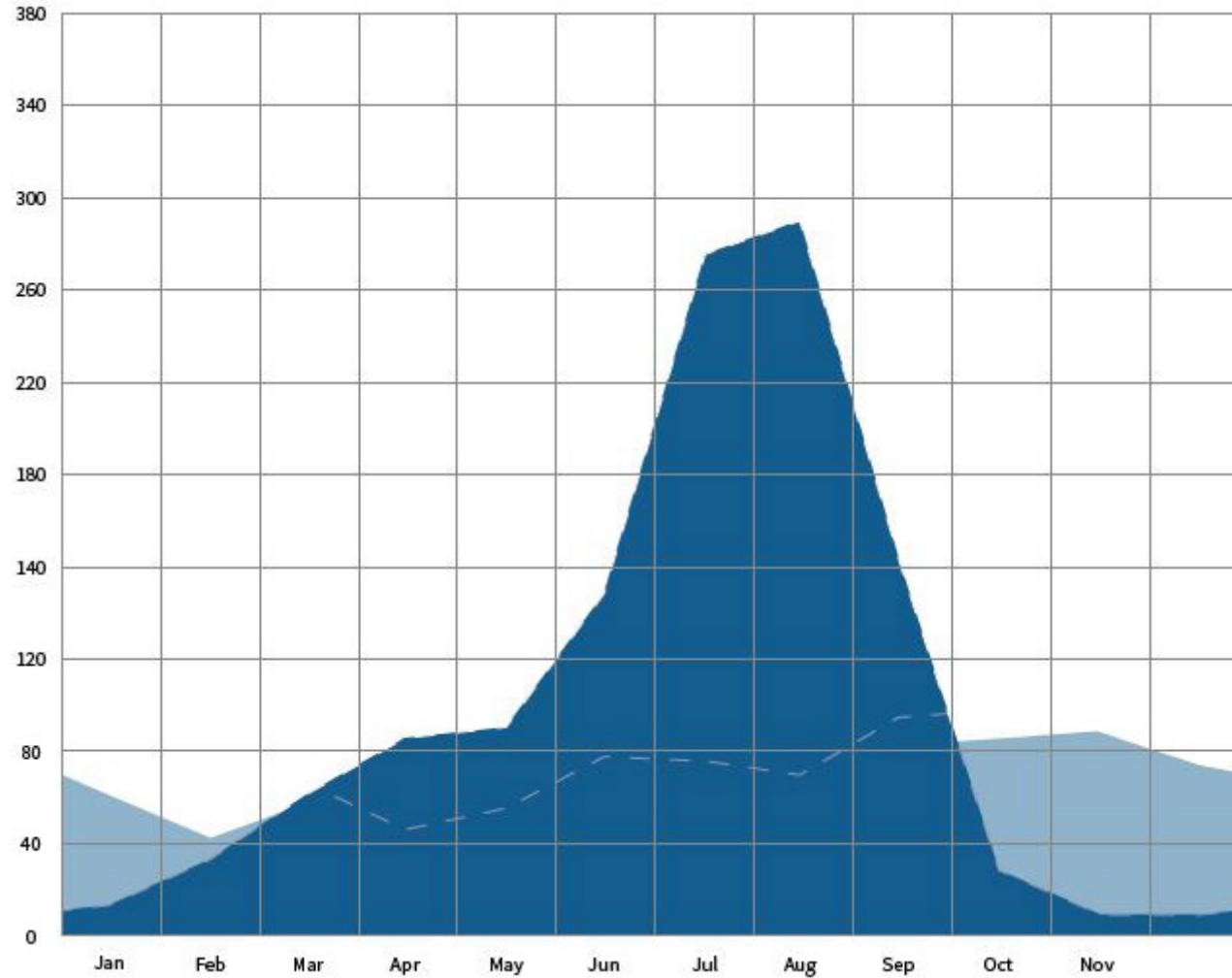
Floodings

No space for water



Rain pattern

Compared with the Netherlands



Source: Research Booklet Global Housing, Addis Ababa Living Lab, Hard Data booklet, p.8

Floods occur

Having negative impact on the daily life



Source: <https://www.undp.org/content/undp/en/home/blog/2015/7/21/The-Addis-Ababa-Action-Agenda-A-step-forward-on-financing-for-development-.html>

Addis Ababa riverside project

A 1.028 billion \$ plan stretching 51 km

*“Aims to **lift the image and potential** of the capital and **create jobs** in the project phase. It also aims to create **riverside economies**, increase **urban tourism**, and provide the city’s residents with **areas for respite**.”*

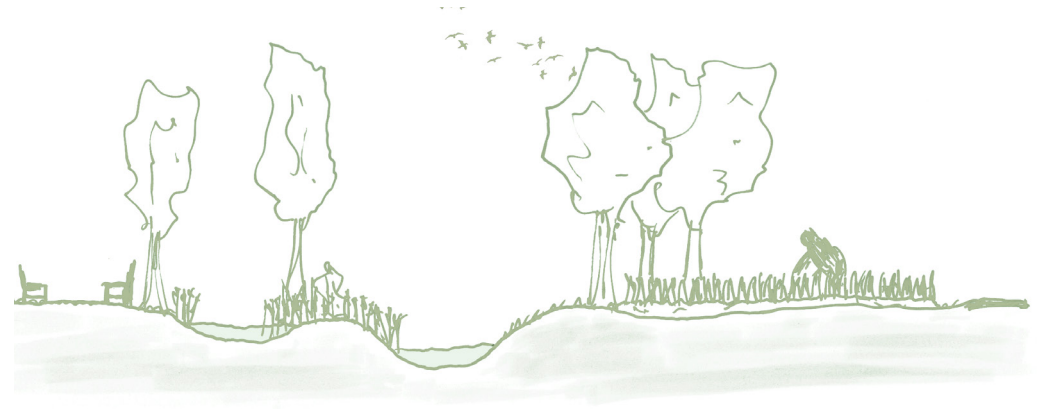
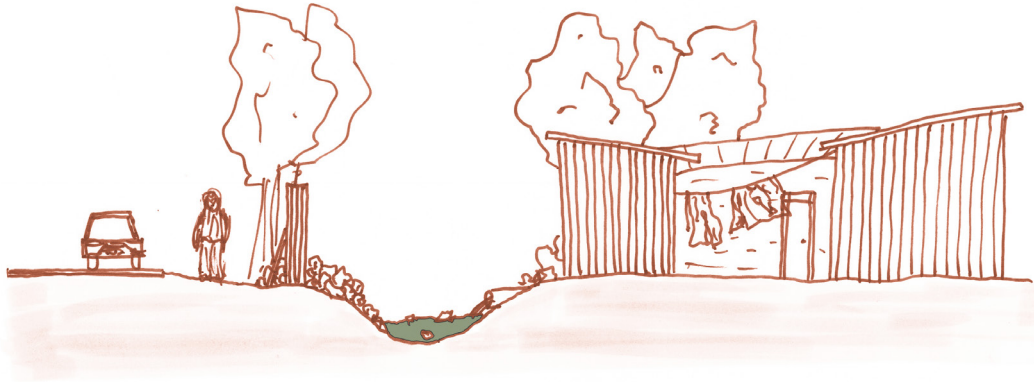
Not addressing all issues nor creating a healthy relationship between urban dwellers and rivers.



Source: <https://ethiopianembassy.be/2019/02/25/addis-ababa-launches-ambitious-project-to-make-river-banks-green/>

Vision for water bodies

Current situation versus desired situation



Waste dump

*Polluted rivers
Damaged ecosystems*



Not accessible

Fenced



Illegal informal settlements

Poor housing conditions



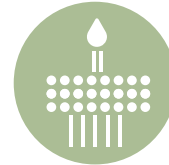
Floodings

No space for water



Buffer

Water during rainy season



Purify

Polluted rivers



Restore ecology

Restore nature as it was



Participation in ecosystem

*Public space
Urban Farming*

Urban wetland

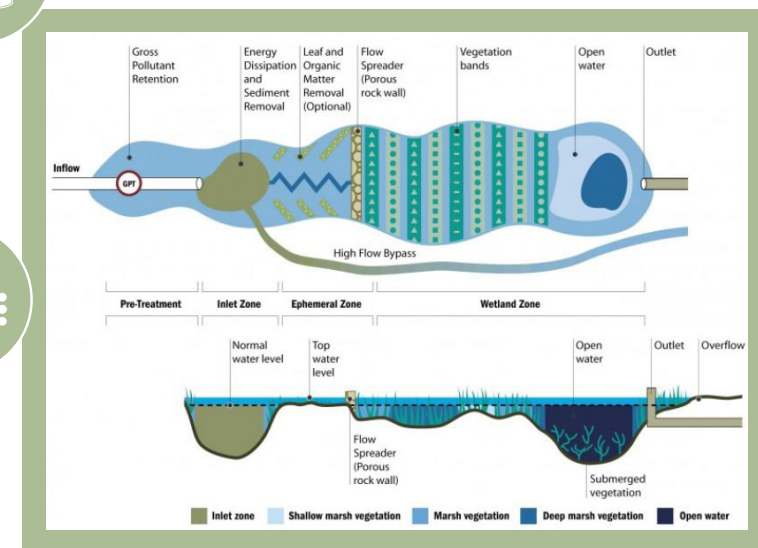
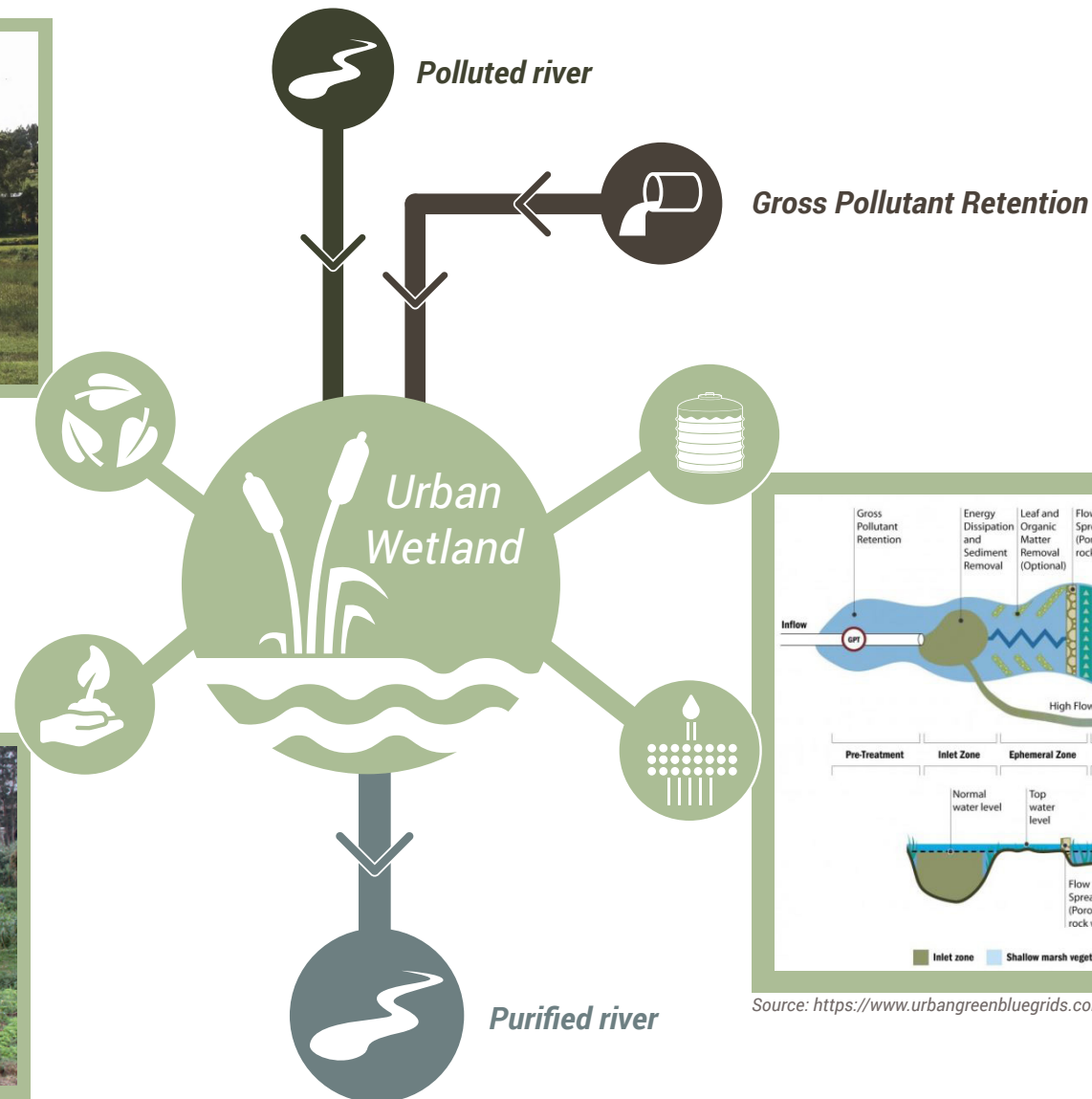
More than an area for respite



Source: Atlas of the Potential vegetation, by Ib Friis, Sebsebe Demissew and Paulo van Breugel



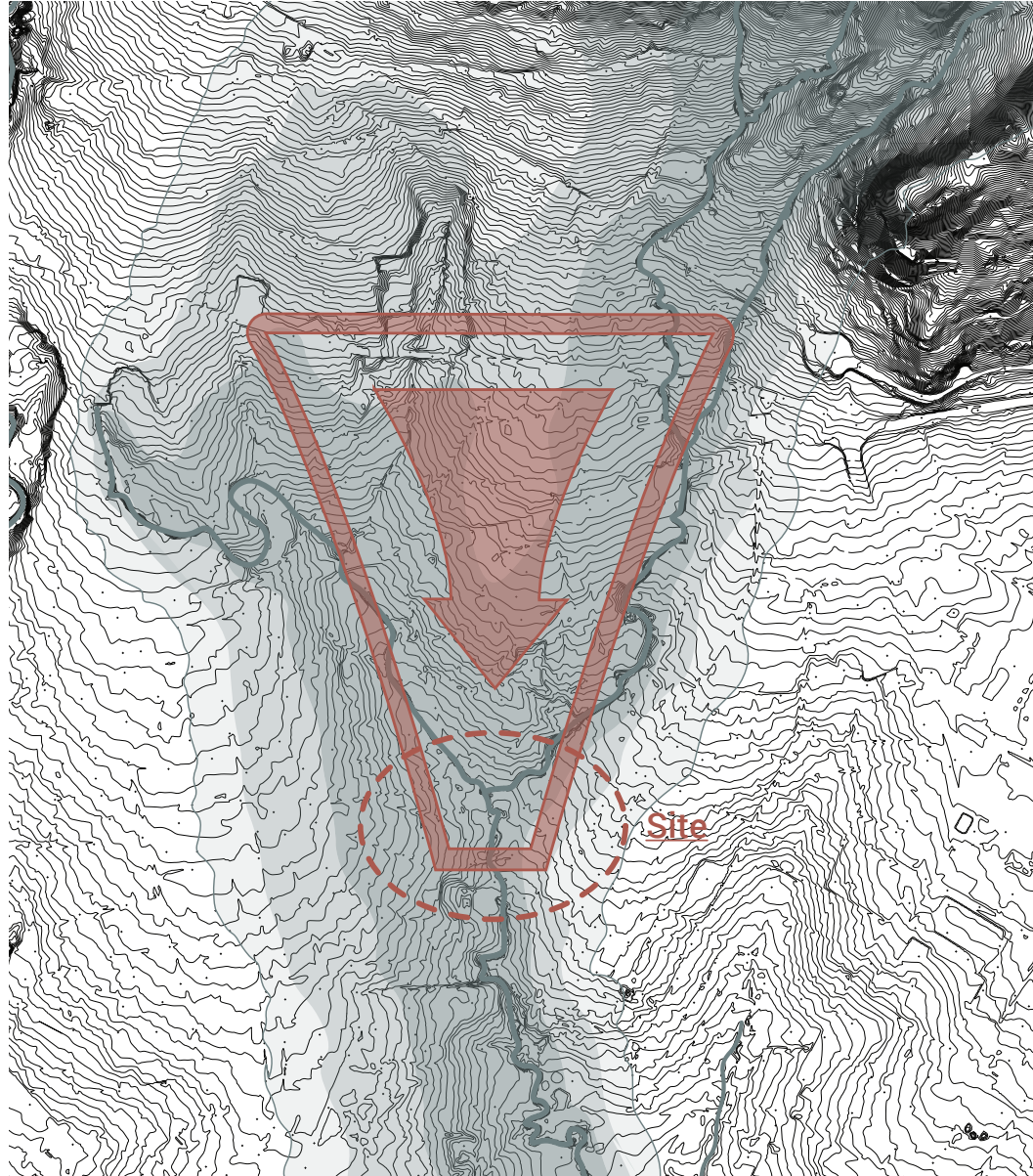
Source: https://addisfortune.net/wp-content/uploads/2014/05/Rise_1.jpg



Source: <https://www.urbangreenbluegrids.com/measures/urban-wetlands/>

Site

At the narrowest point of the waterstreams



Current state of the site

No space for water



Urban wetland

First site for the implementation of the urban wetland



Urban wetland

Continuation in the future, green wedges connecting urban wetland with urban dwellers



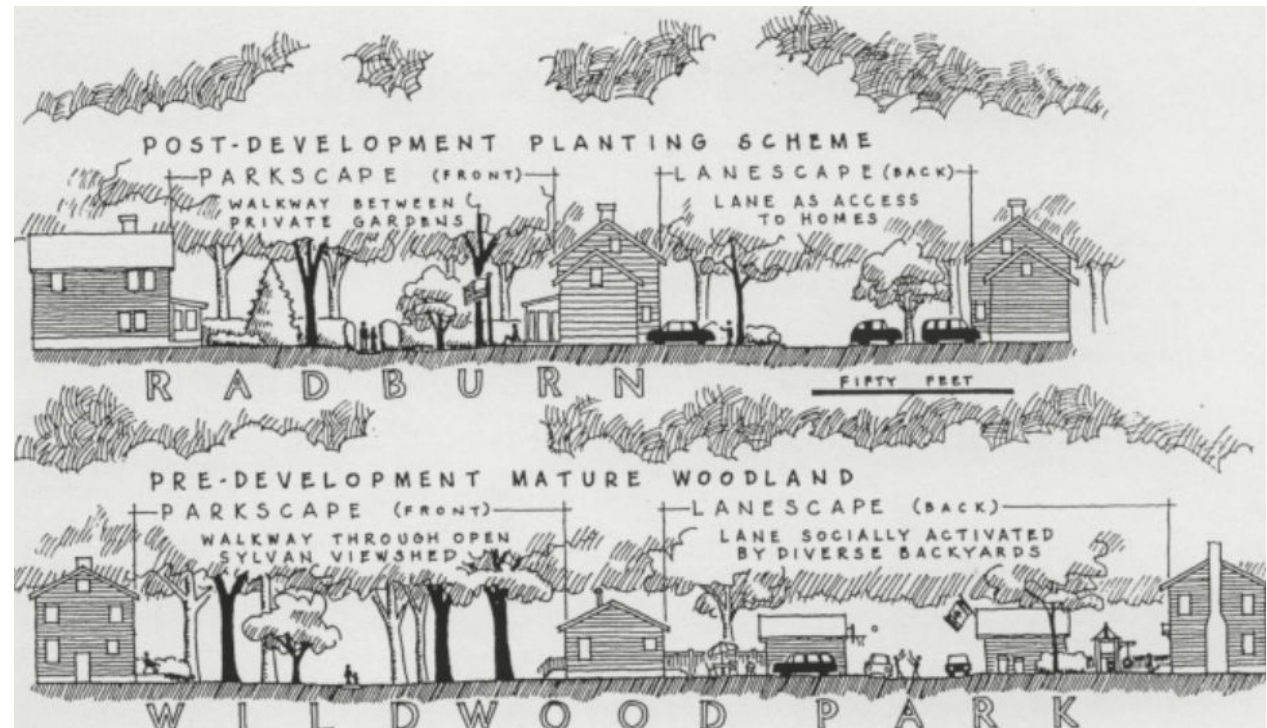
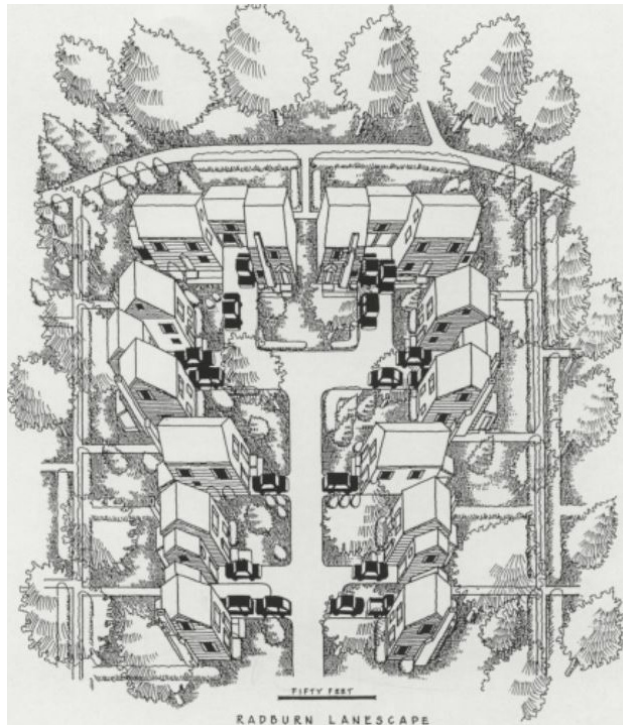
Radburn planning principle

Emerged from garden city movement

Seperation of **parkscape** and **lanescape**

Parkscape: Garden and pedestrian area

Lanescape: Street

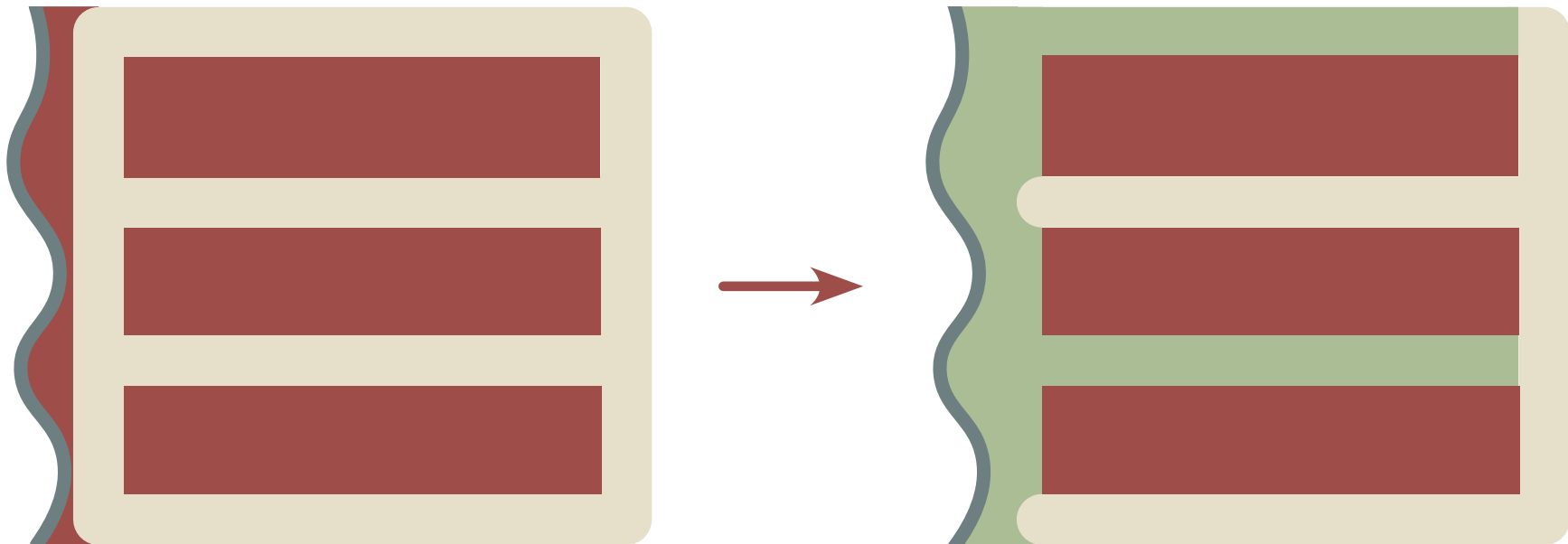


Source: Author: Michael David Martin, Retrieved from: https://www.jstor.org/stable/43323549?read-now=1&refreqid=excelsior%3A9760d1811fabe0c73e4d42ccb3687493&seq=6#page_scan_tab_contents

Implementing radburn in 24Kebele

Preserve what works

Retain current perimeters of ***buildingblocks*** and ***infrastructure*** while implementing the ***green wedges***



Current situation

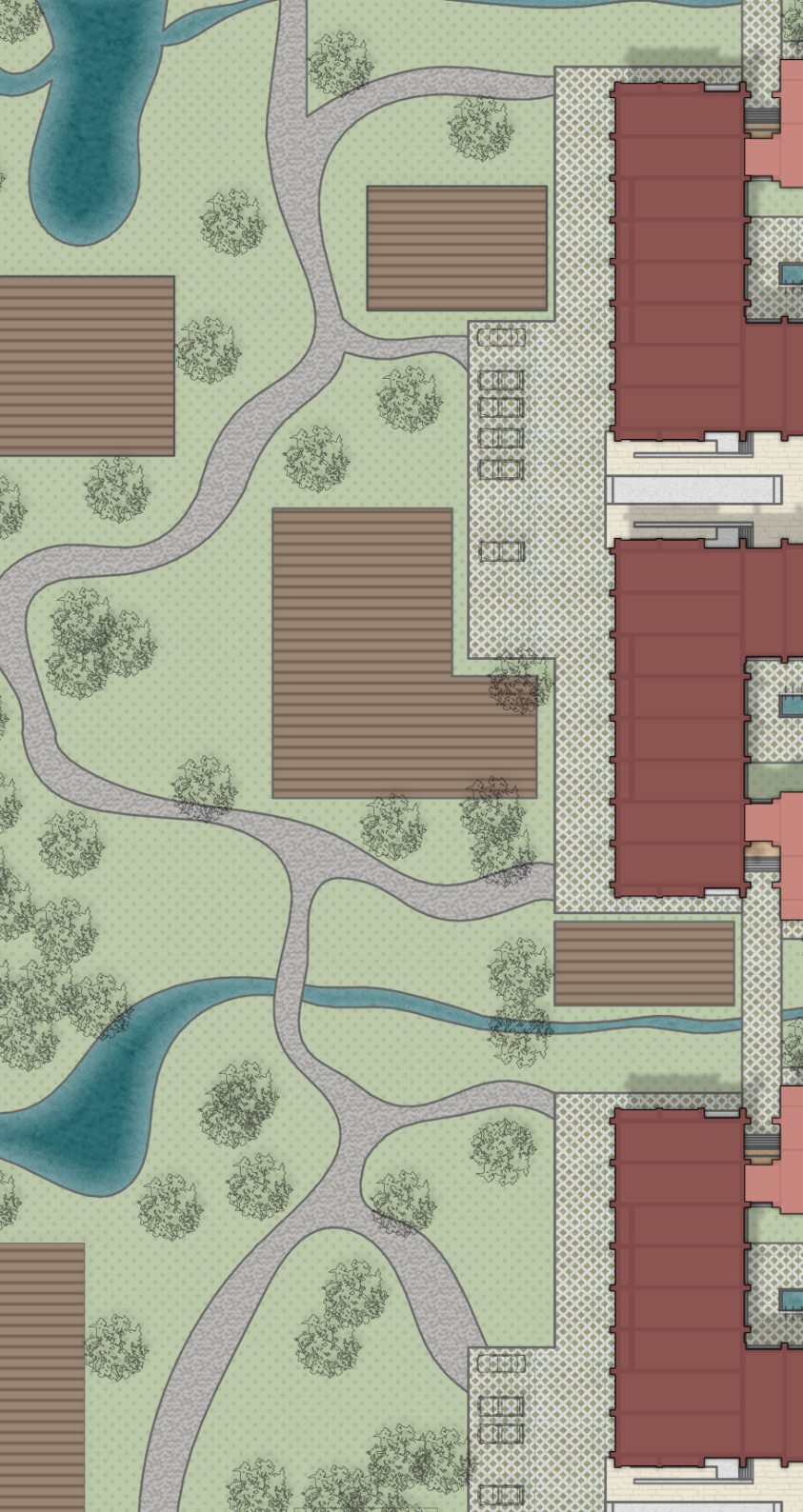
No connection between people and river



New situation

Green wedges connecting the neighborhood with the urban wetland





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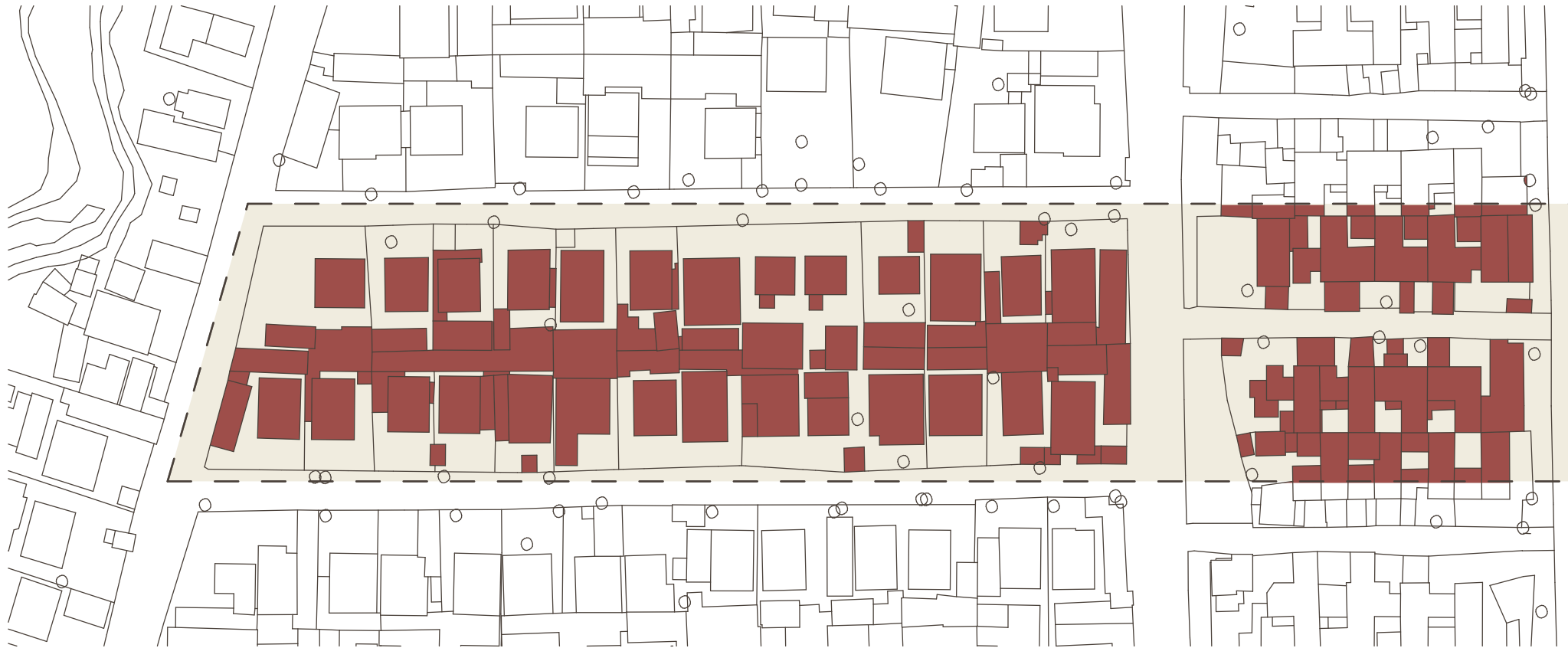
Urban block

Pars pro toto approach



Urban block

Current situation



Currently

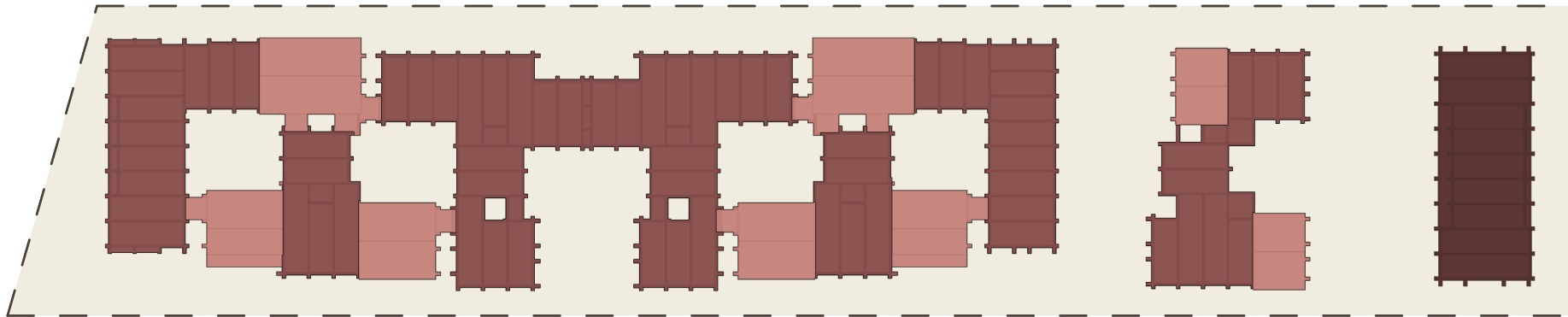
FSI: ca. 0,4

Dwel.: ca. 160 (23m² average)



Morphology

Expands public space



Currently

FSI: ca. 0,4

Dwel.: ca. 160 (23m² average)



New situation

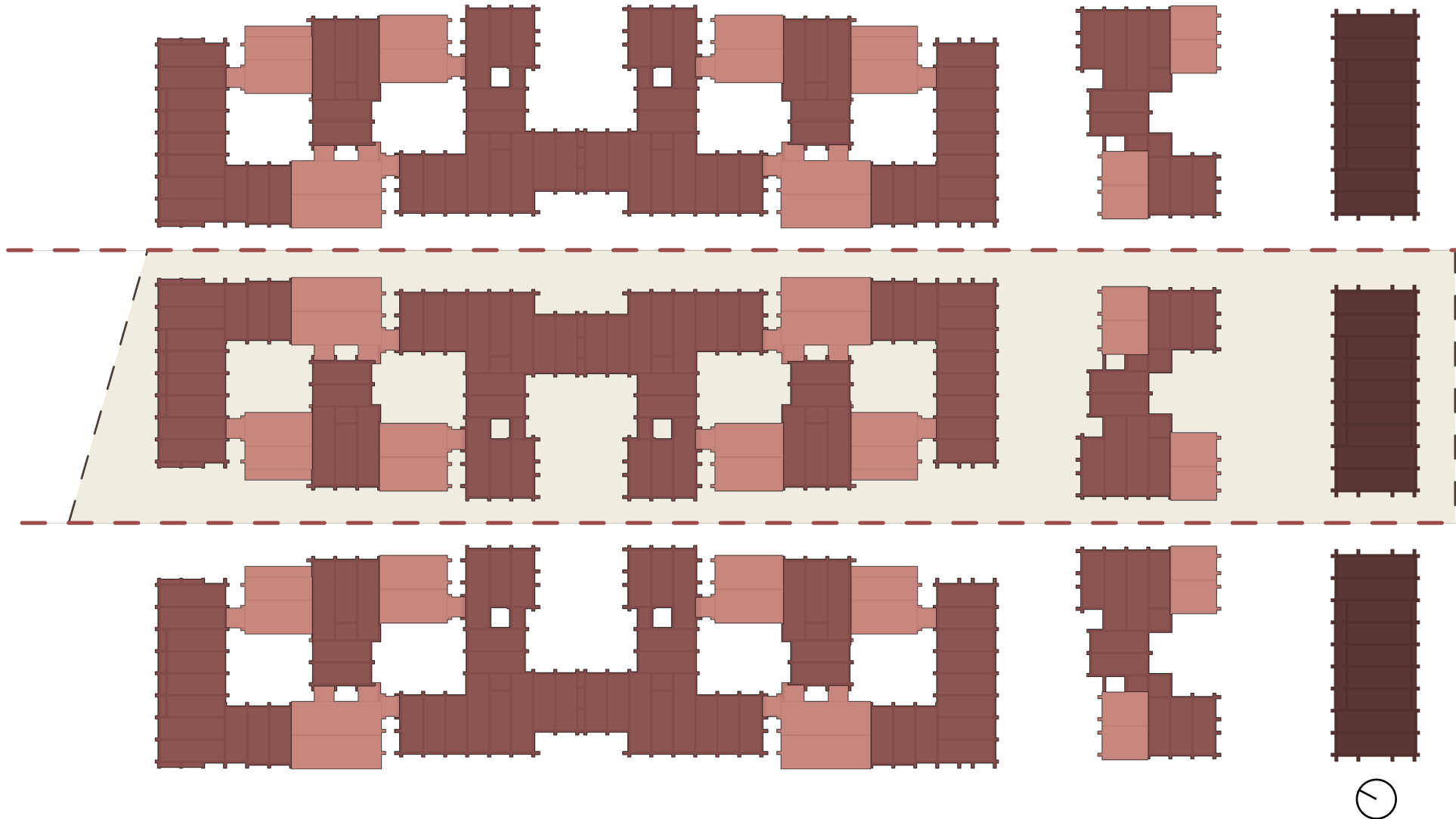
FSI: ca 2,7

Dwel.: 350 (50m² average)



Morphology

Urban blocks cooperate with staggered composition



Productive urban open space system

A system in which local residents can participate and can sustain itself



Flexible commerce



Fixed commerce



Communal agriculture



Household supportive amenities



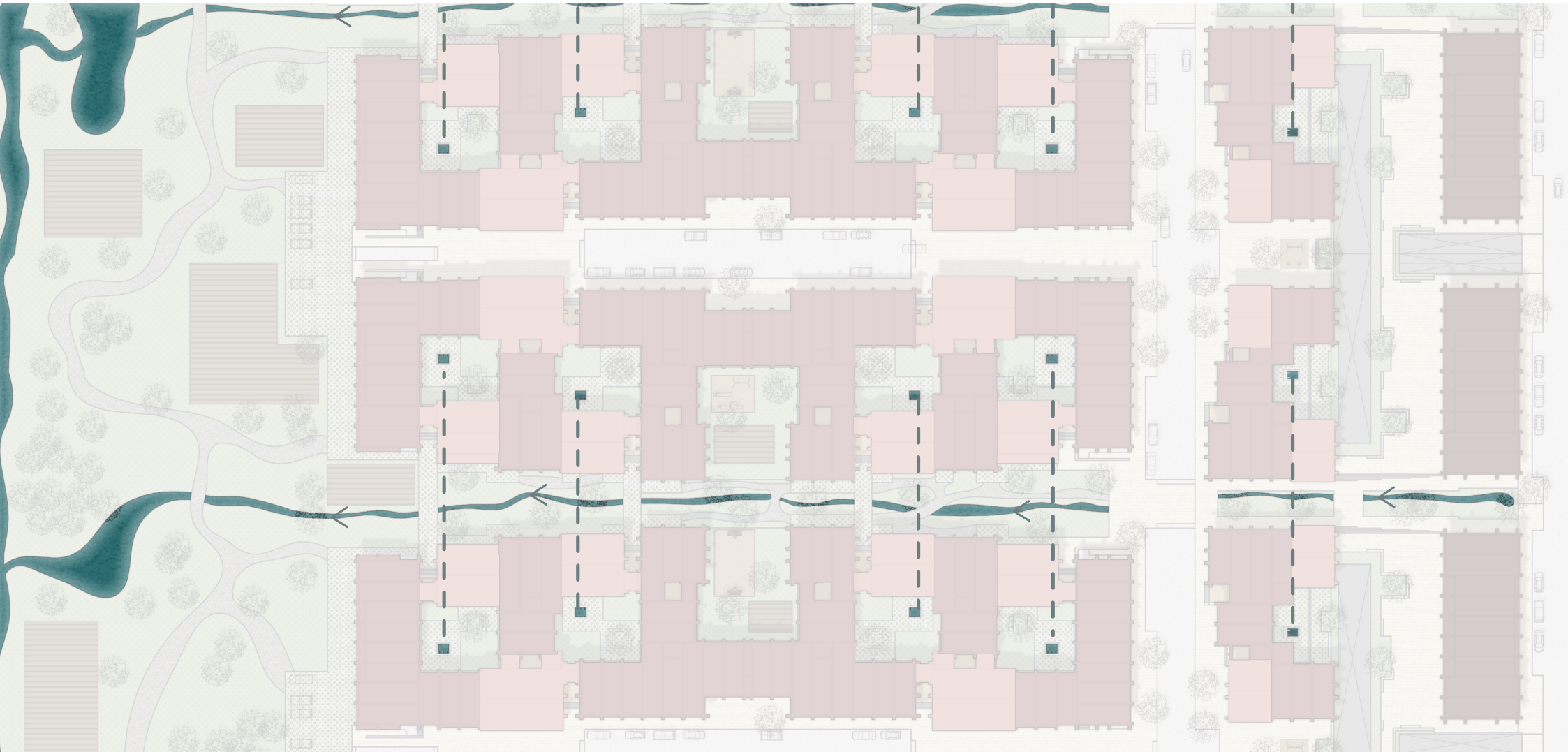
Playground/recreative



Productive forest

Water management

Local buffer zones connected with bioswales



Water management

Local buffer zones connected with bioswales



Source: Atlas of the Potential vegetation, by Ib Friis, Sebsebe Demissew and Paulo van Breugel



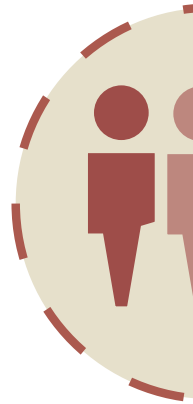
Source: <https://www.urbangreenbluegrids.com/measures/bioswales/>



Source: https://addisfortune.net/wp-content/uploads/2014/05/Rise_1.jpg



Productive urban open
spaces



Iddir co



1. Current

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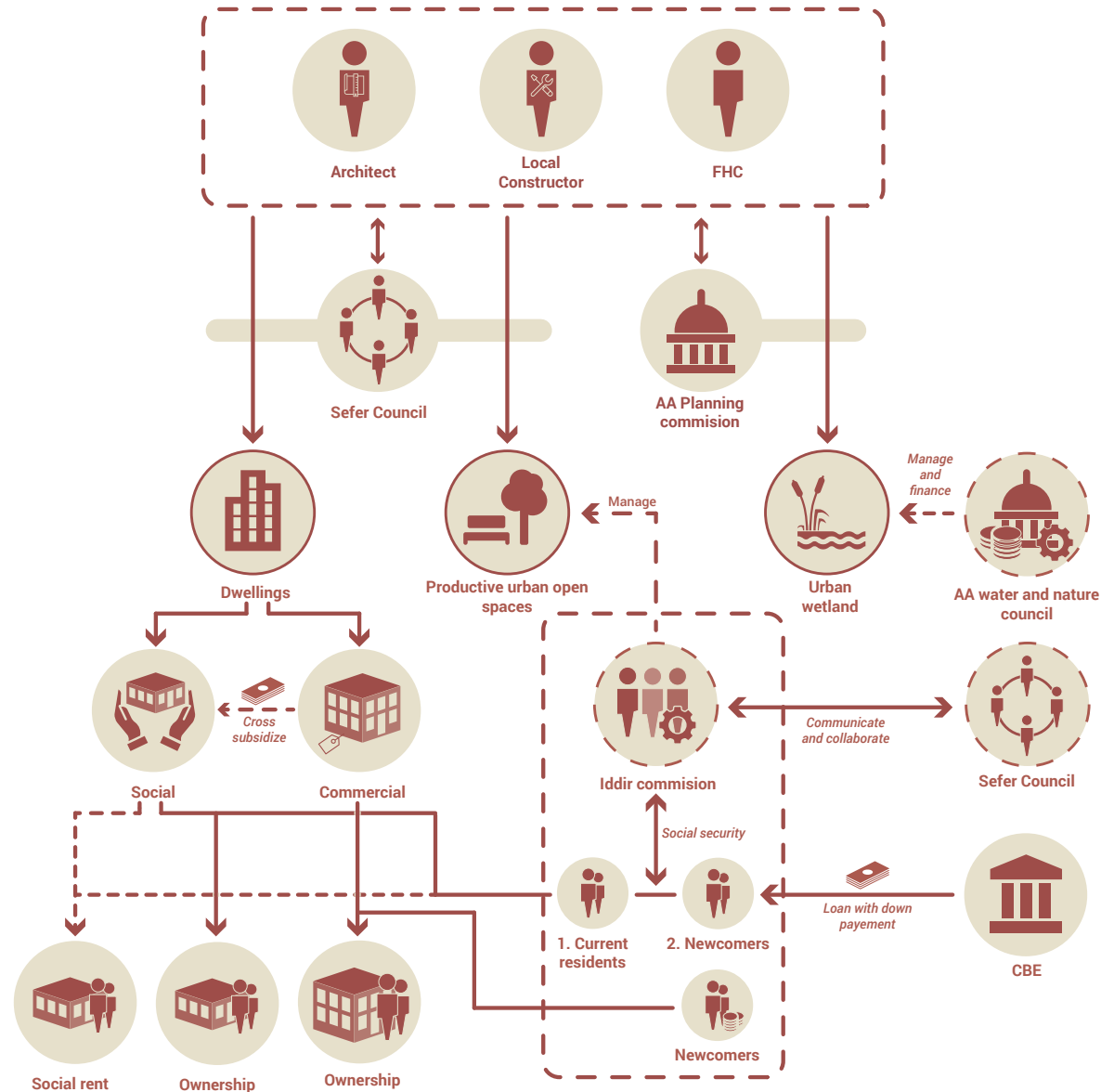
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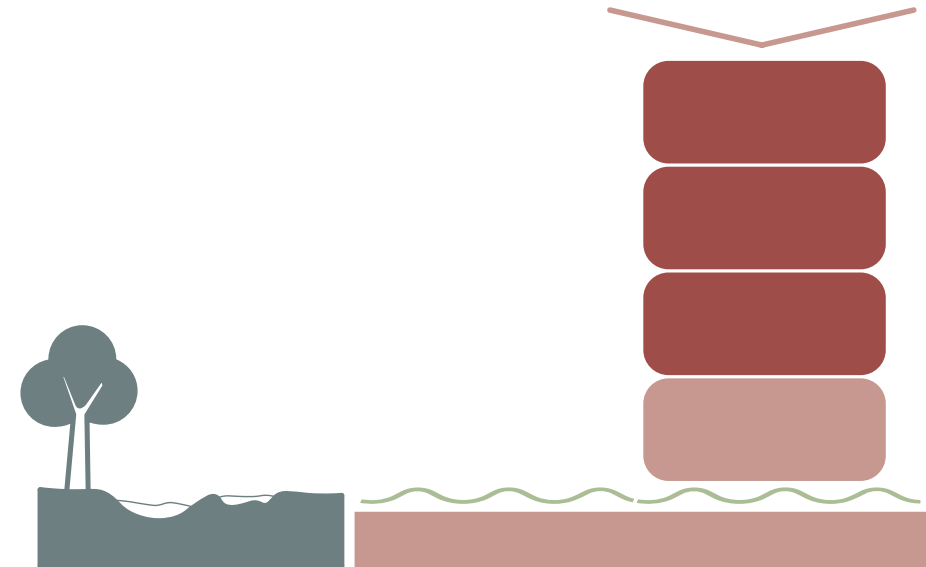
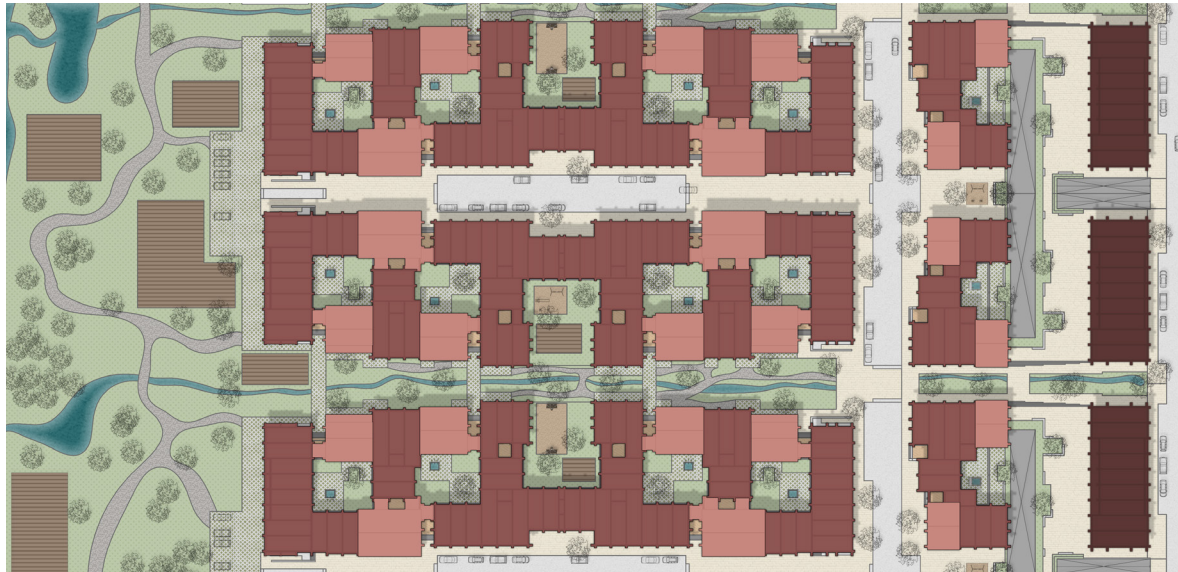
Managerial structure

Based on urban vision



Ownership and management

Iddir commision responsible for productive urban open spaces



AA water and nature council | Iddir commision | FHC | Residents

Phasing

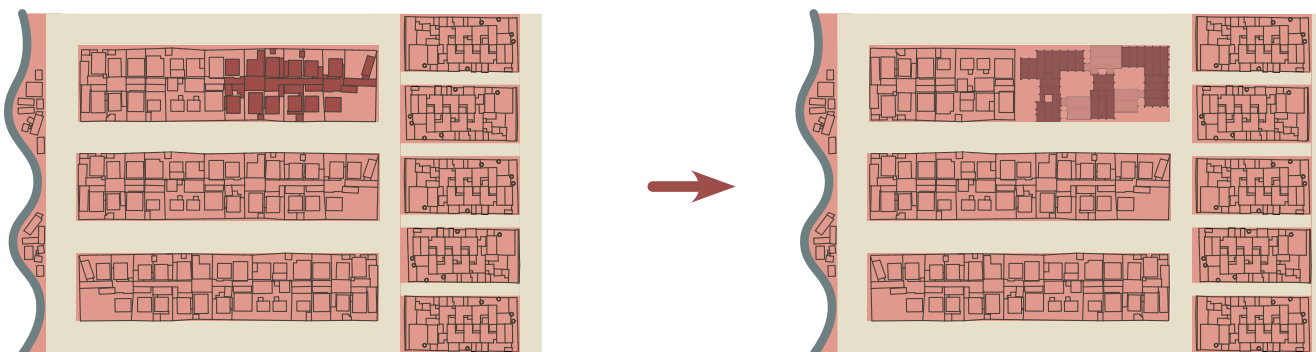
Plot based

Step 1

- Ca. 50 households resettled in/ close to 24 kebele.
- In total 143 new apartments constructed of which 93 empty

Com. market: 0

LC: 143, 93 empty

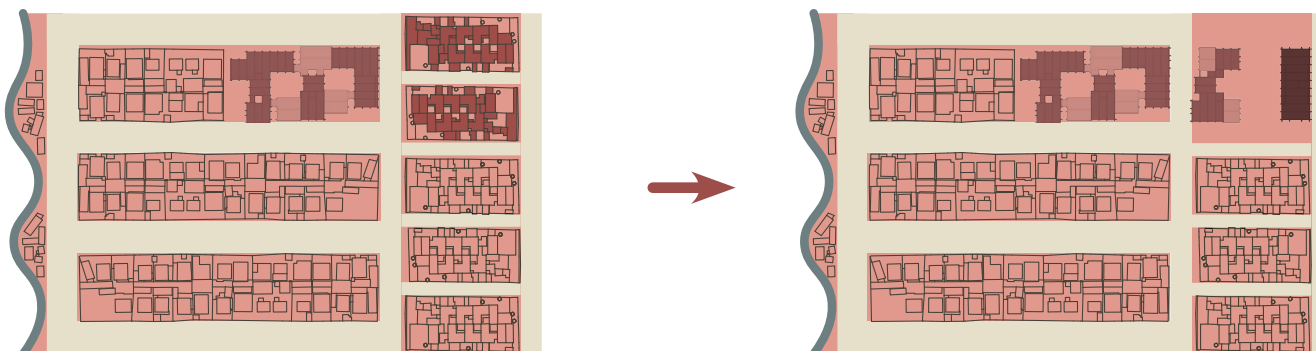


Step 2

- Ca. 60 households resettled in newly constructed dwelling unit
- In total 207 new apartments constructed of which 97 are empty

Com. market: 16

LC: 191, 81 empty

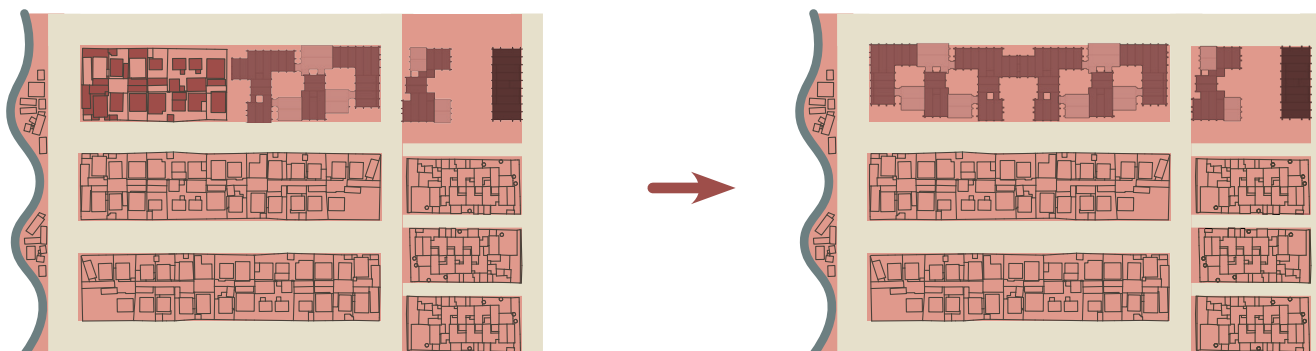


Step 3

- Ca. 50 households resettled in newly constructed dwelling unit
- In total 350 new apartments constructed of which 190 are empty

Com. market: 32

LC: 350, 190 empty



Phasing

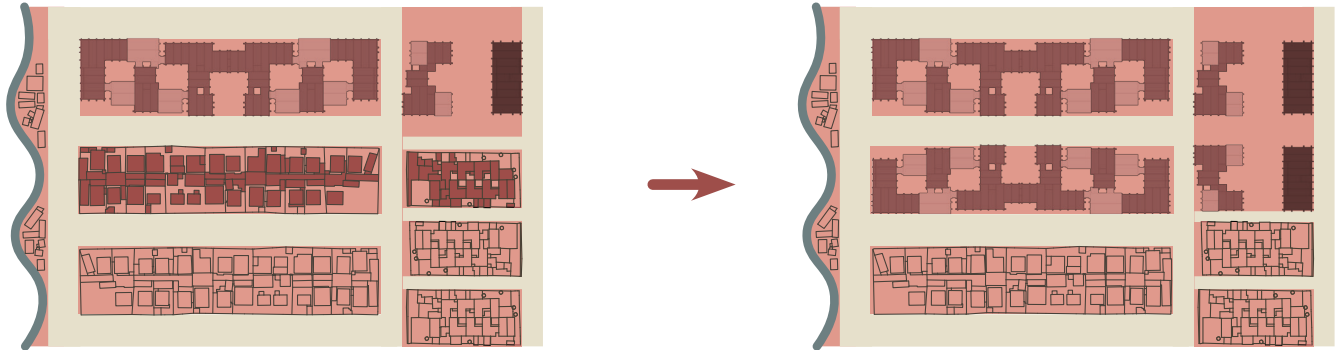
Plot based

Step 4

- Ca. 130 households resettled in newly constructed dwelling unit
- In total 700 new apartments constructed of which 410 empty

Com. market: 64

LC: 700, 410 empty

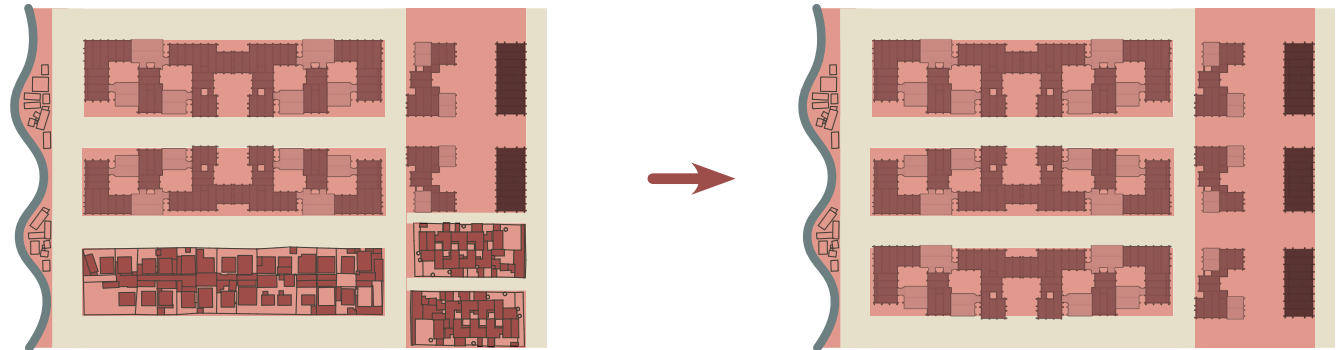


Step 5

- Ca. 160 households resettled in newly constructed dwelling unit
- In total 1050 new apartments constructed of which 600 empty

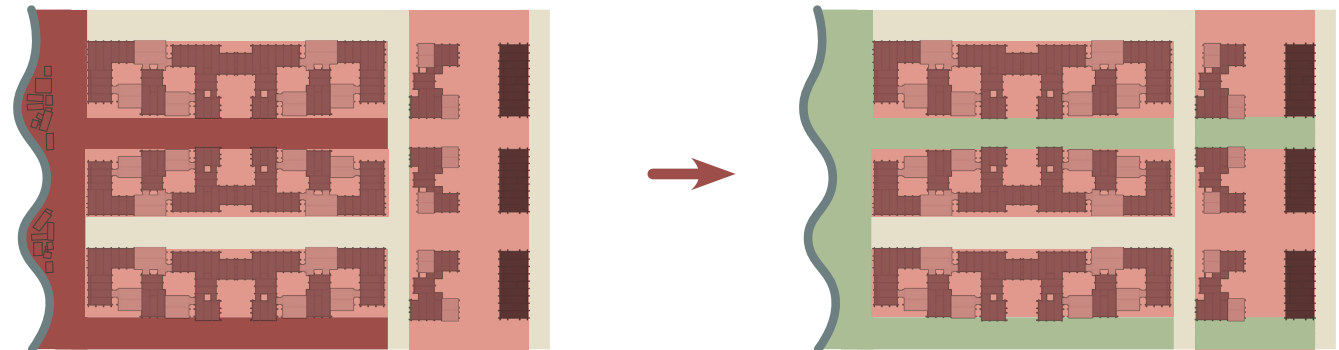
Com.: 96

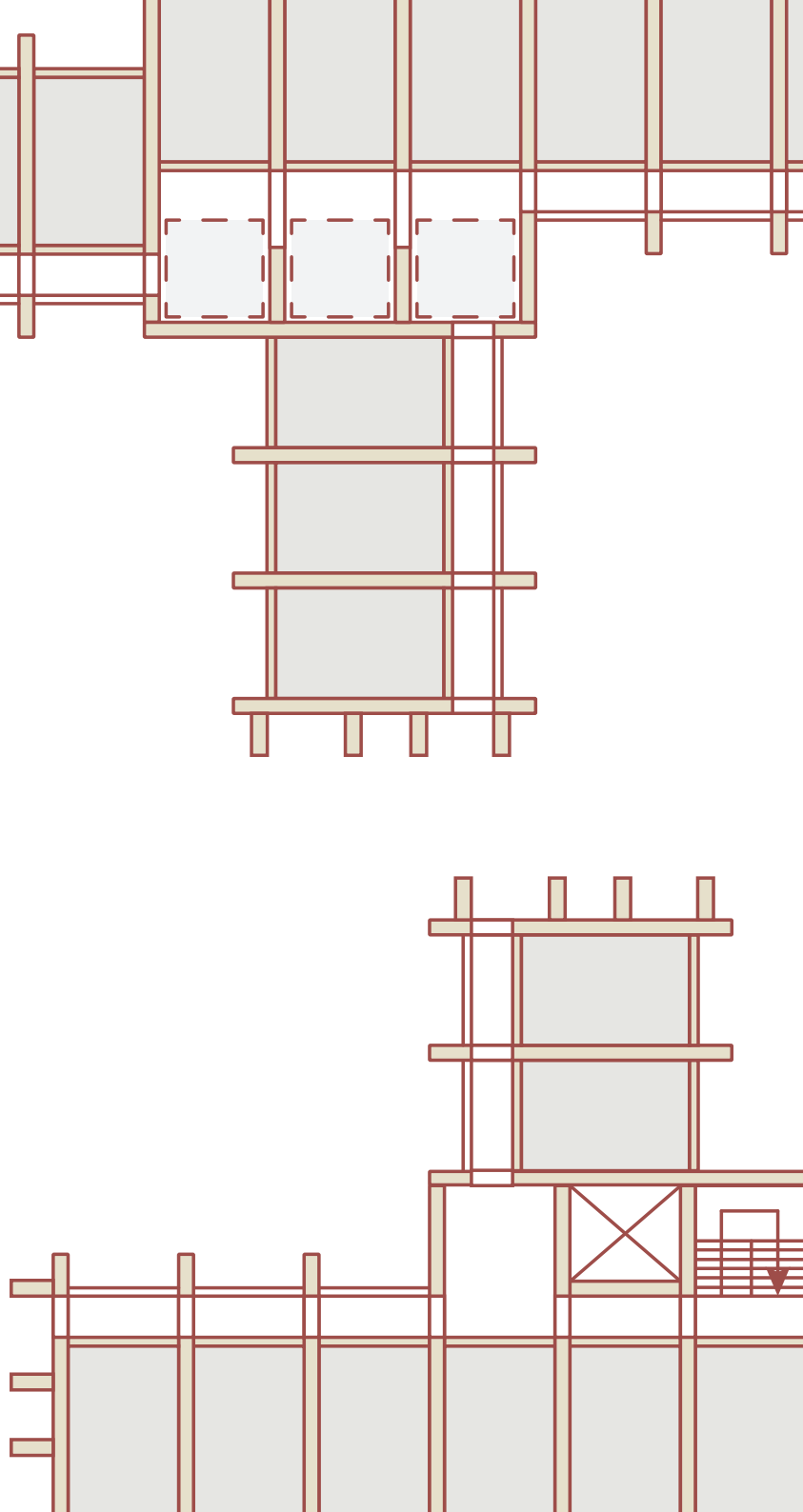
LC: 1050, 600 empty



Step 6

- Informal dwellers resettled in newly constructed dwelling units
- Construction of urban wetland





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Materiality and building system principles

To make a considerate choice of building material and building system



1. Local materials

Cost efficiency and support of local economies



2. Environmentally responsible

Low carbon oxide footprint and durable



3. Low tech

Constructed and maintained with local low skilled labour

Material ranking

Earth as main construction material

1. Earth



2. Bamboo



3. Concrete

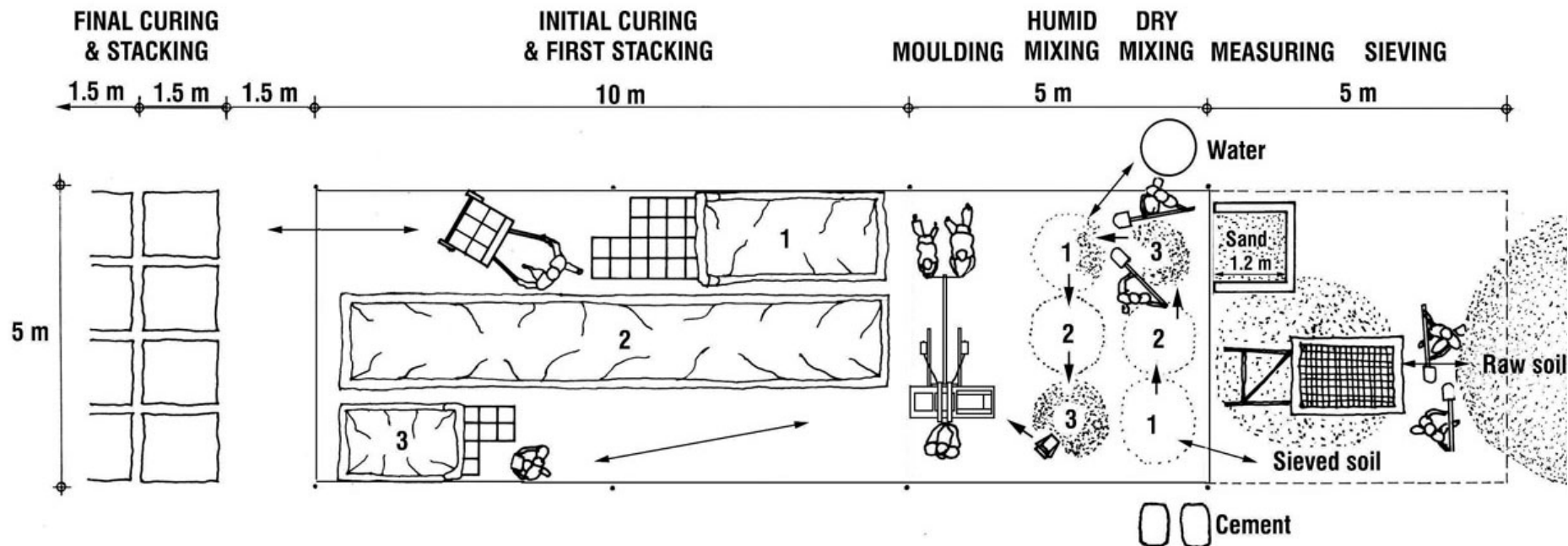


4. Timber



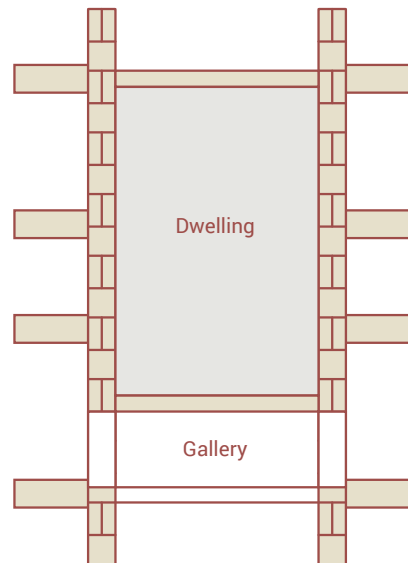
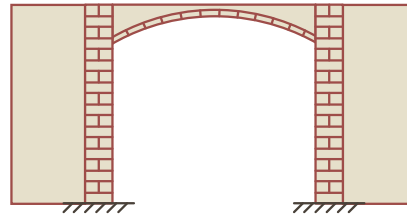
Stabilised Compressed Earth Blocks (SCEB)

3% cement stabilization, enabling to built 5 stories high and ensures durability and social acceptance



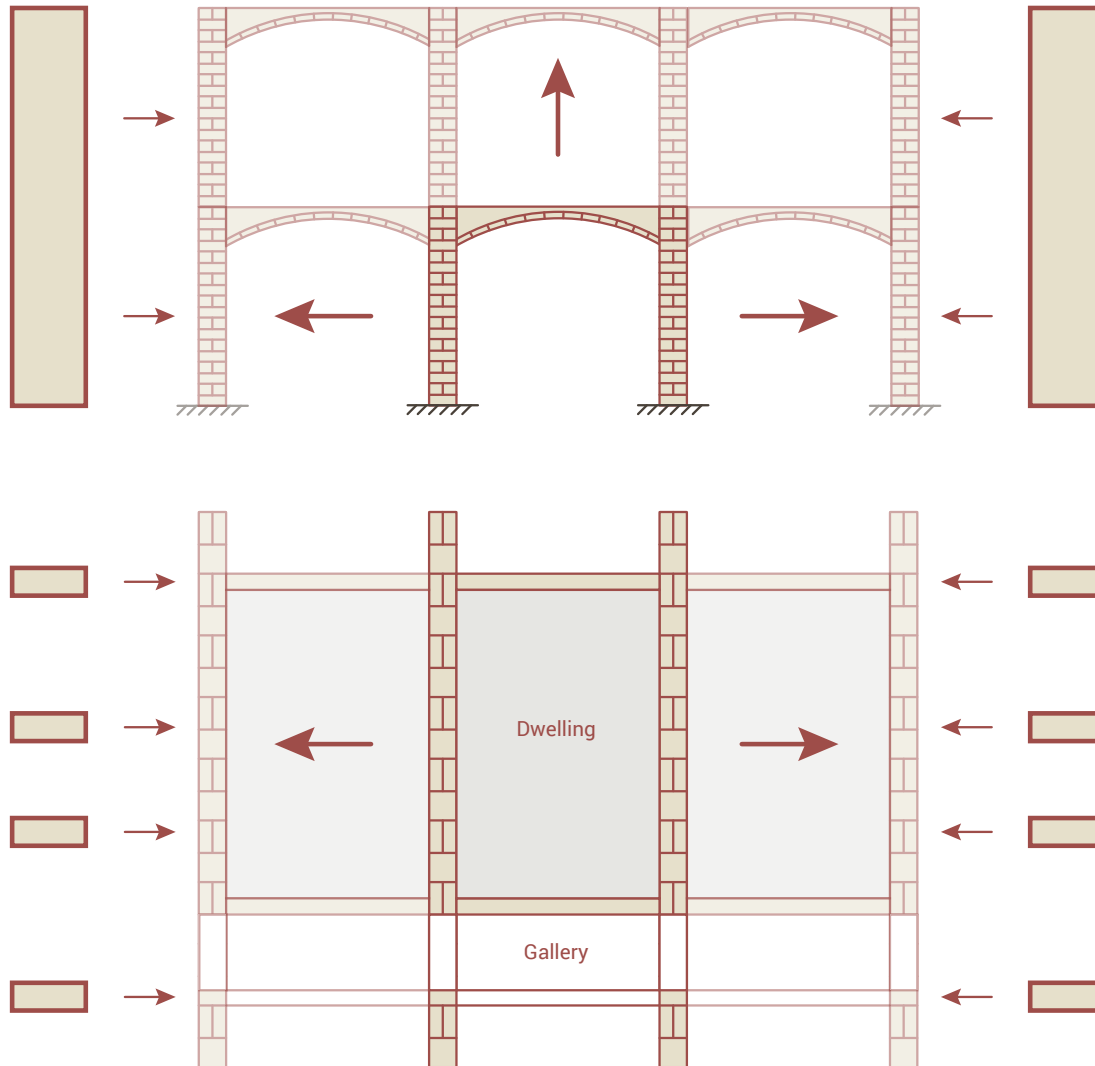
Building system based on SCEB

Loadbearing walls with masonry vault floors and buttress



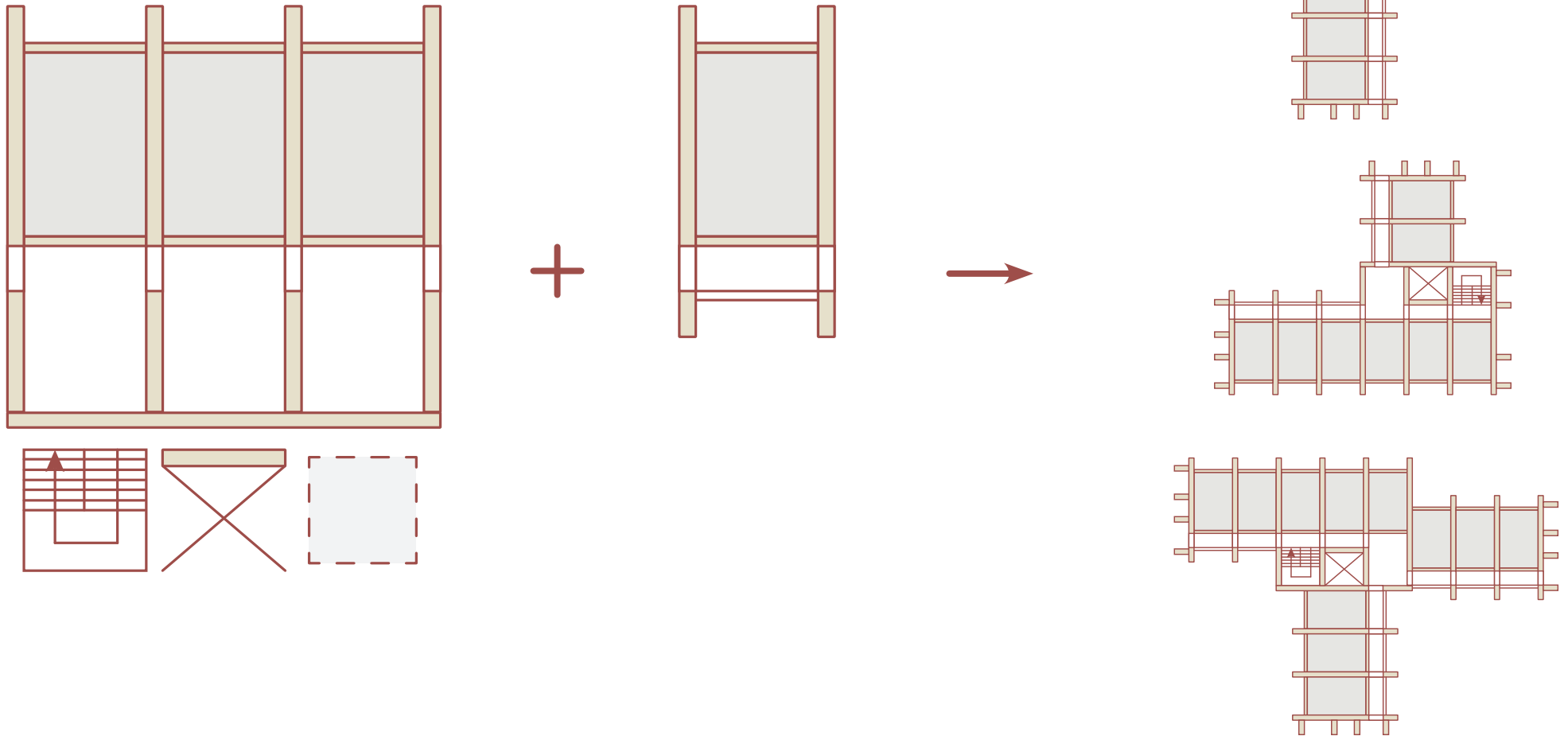
Building system based on SCEB

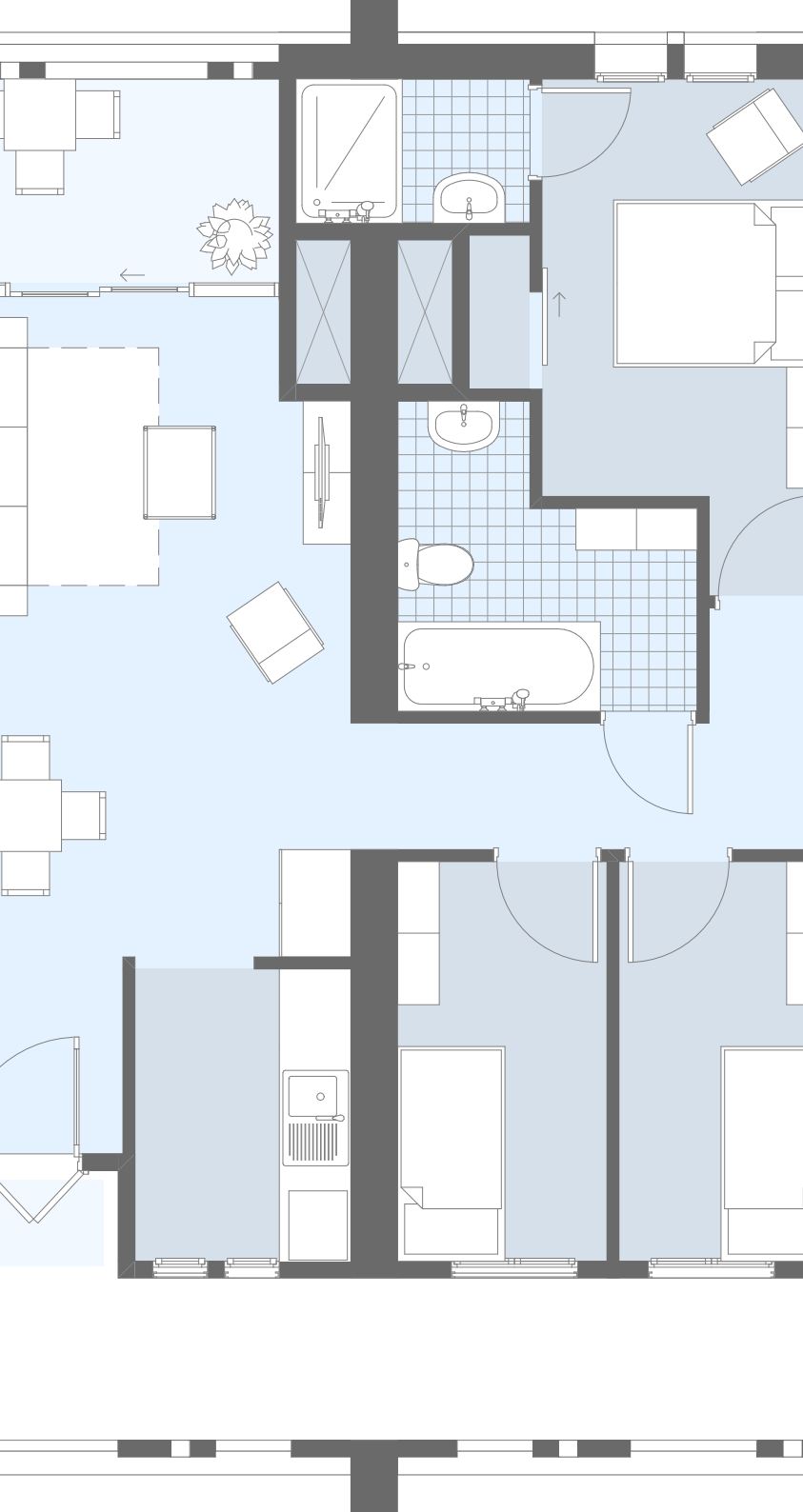
Units can repeat itself in x and y direction in order to create larger structures



2 Modules

wide variety of compositions enables morfology of the urban vision

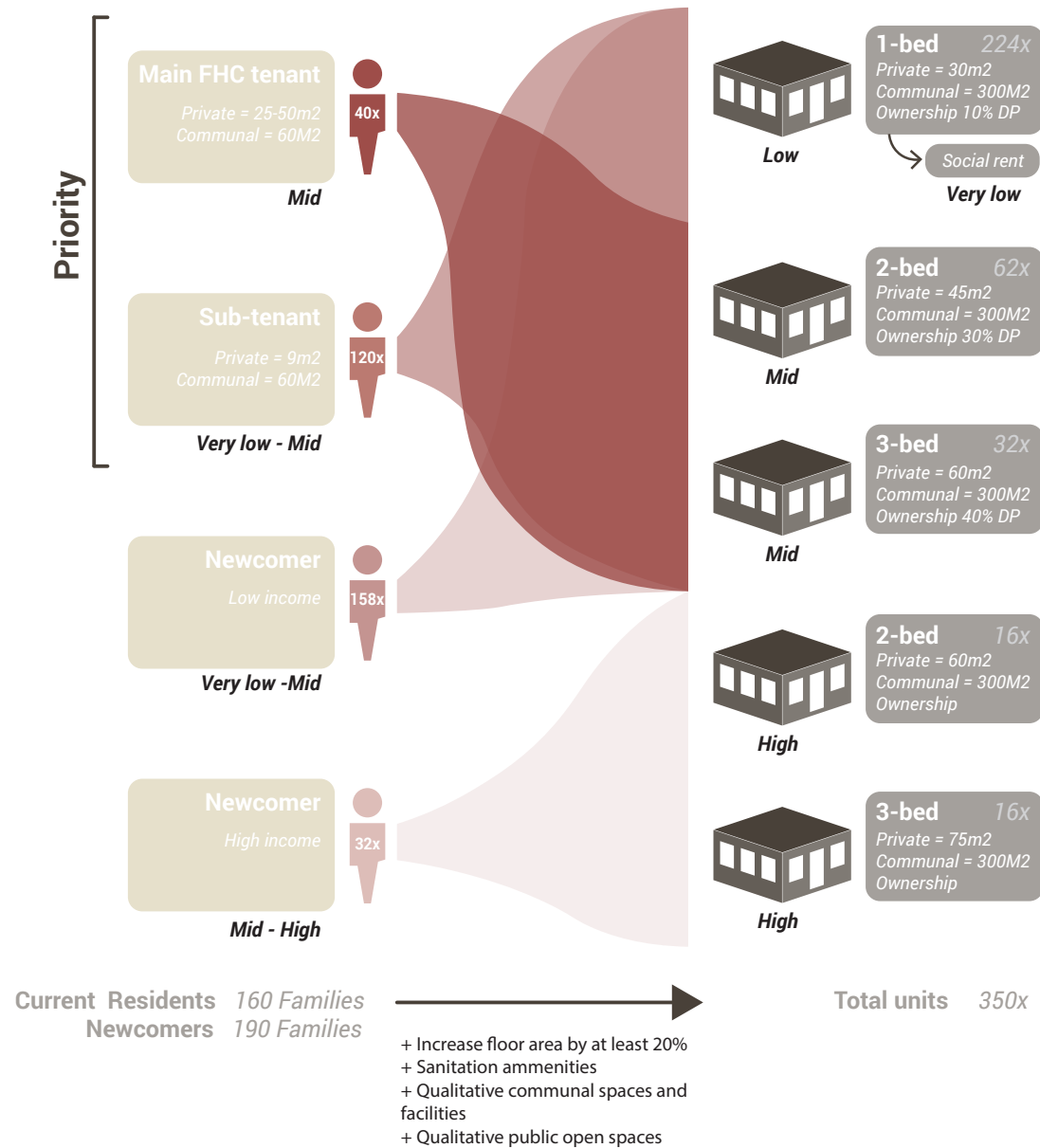




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People and typology

Inclusive for all different classes in 24 Kebele



1-Bedroom apartment

Bedroom, kitchen, bathroom and living room.

Target group

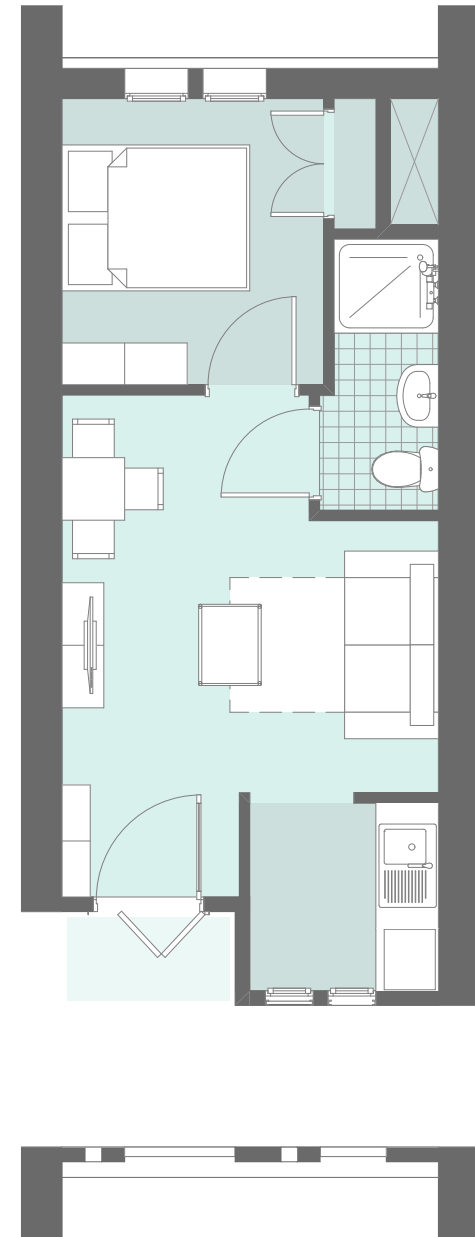
Low to very low income

Payment

Social rent or ownership with 10% DP

Floor area

30 m²



1-Bedroom apartment with shop option

Shop option ground floor

Target group

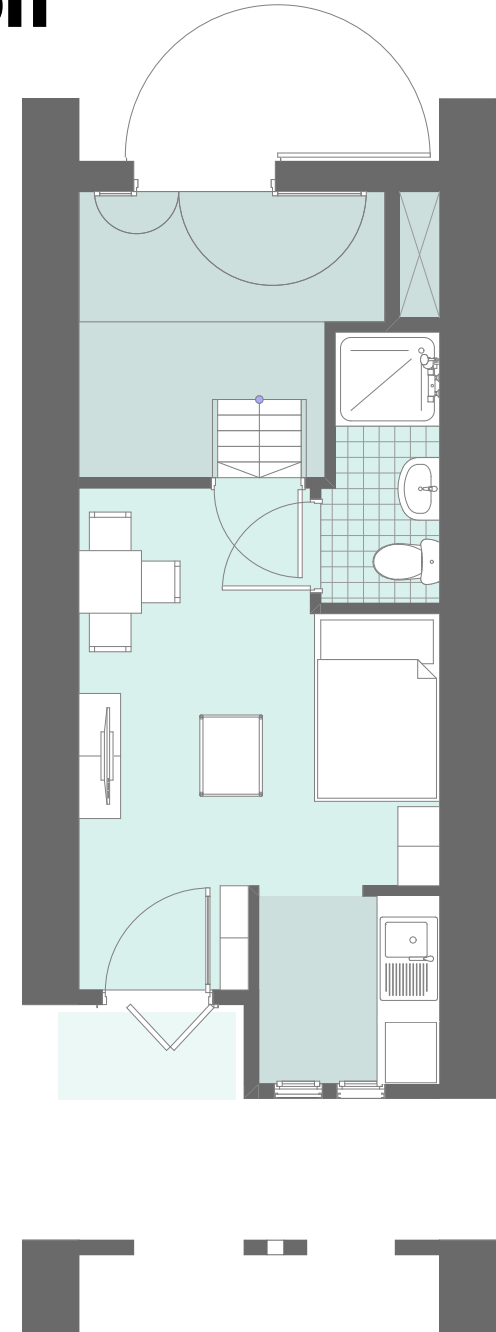
Low to very low income

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Floor area

30 m²



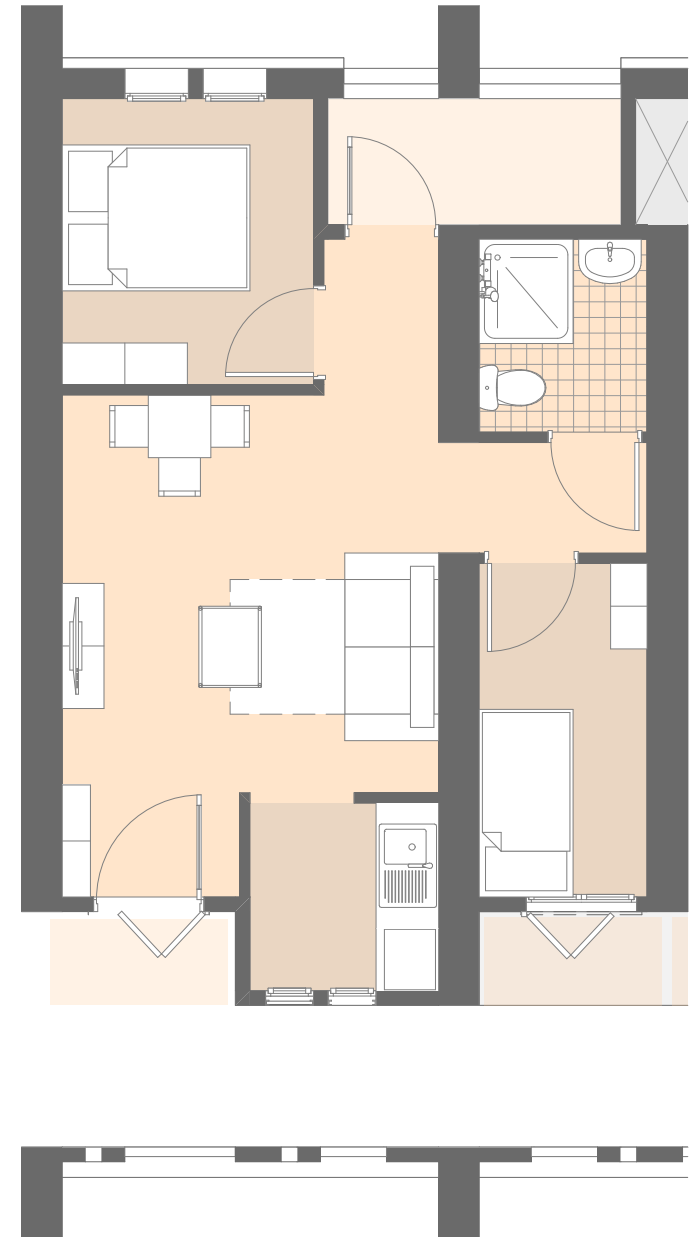
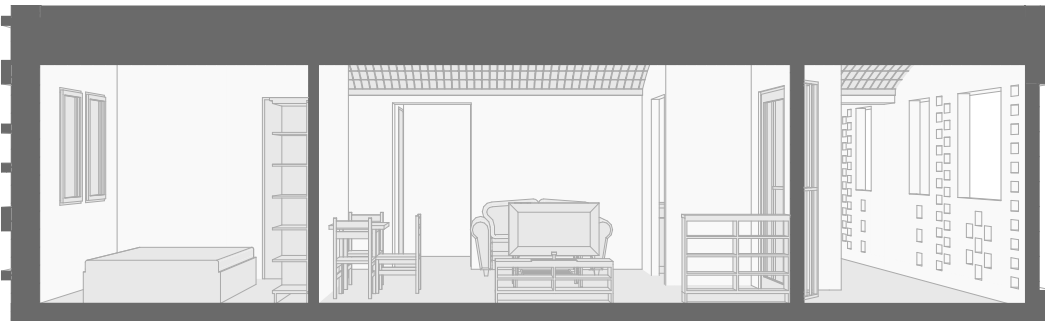
2-Bedroom apartment

Two bedrooms, loggia, kitchen, bathroom and living room.

Target group
Middle income

Payment
Ownership with 30% DP

Floor area
45 m²



2-Bedroom apartment with shop option

bedroom, bedroom/shop, storage, kitchen, bathroom and living room.

Target group

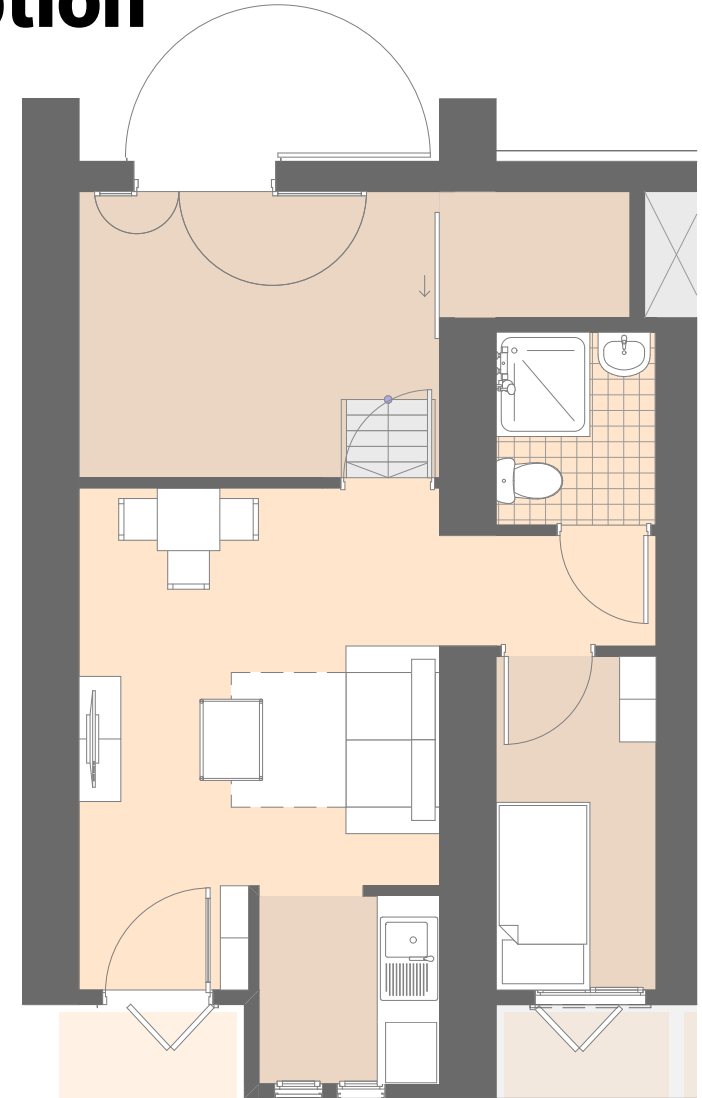
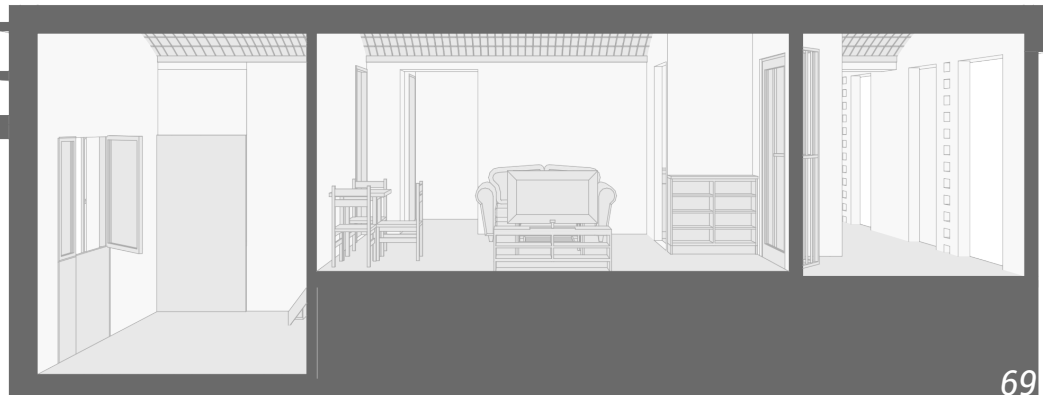
Middle income

Payment

Ownership with 30% DP

Floor area

45 m²



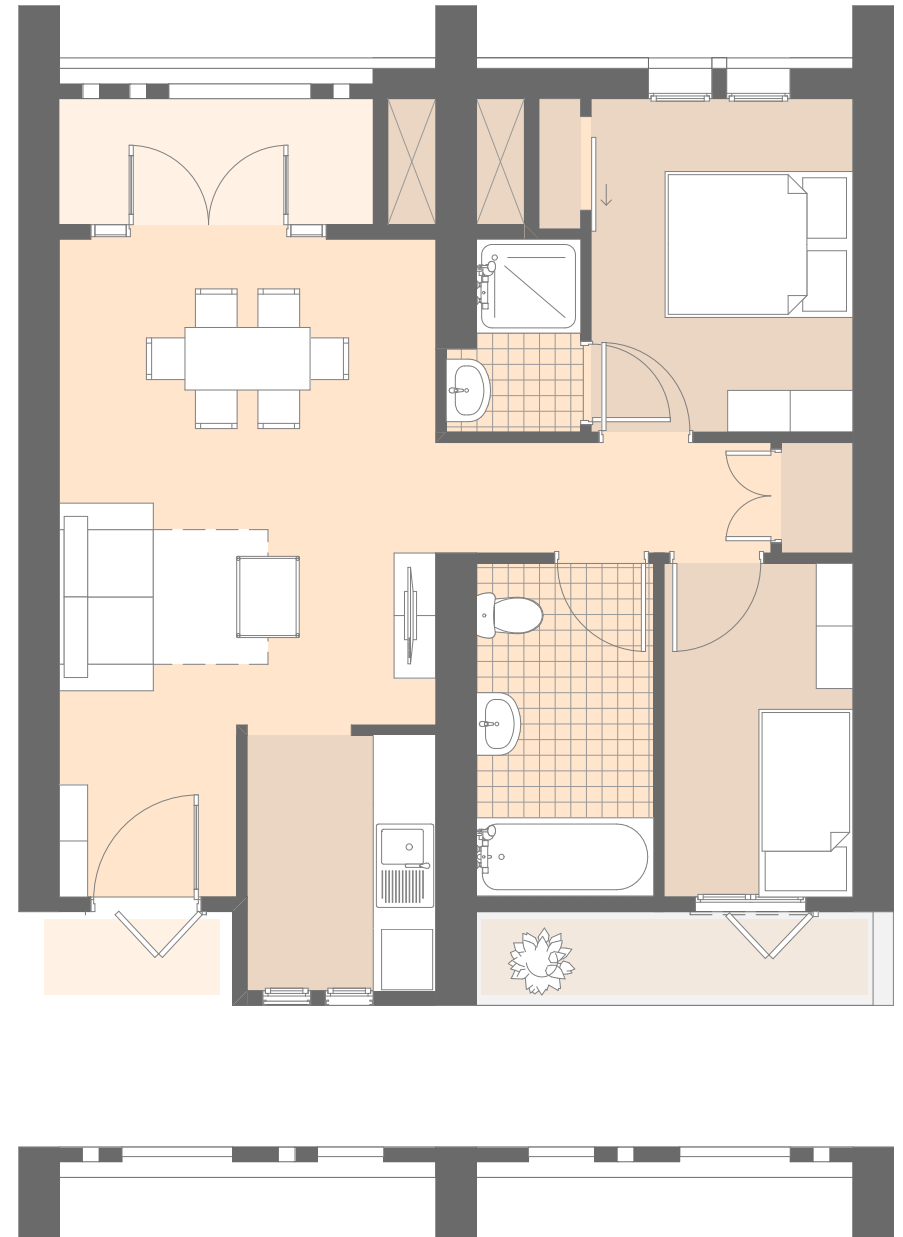
2-Bedroom apartment commercial

master bedroom with ensuite bathroom

Target group
High income

Payment
Commercial market

Floor area
60 m²



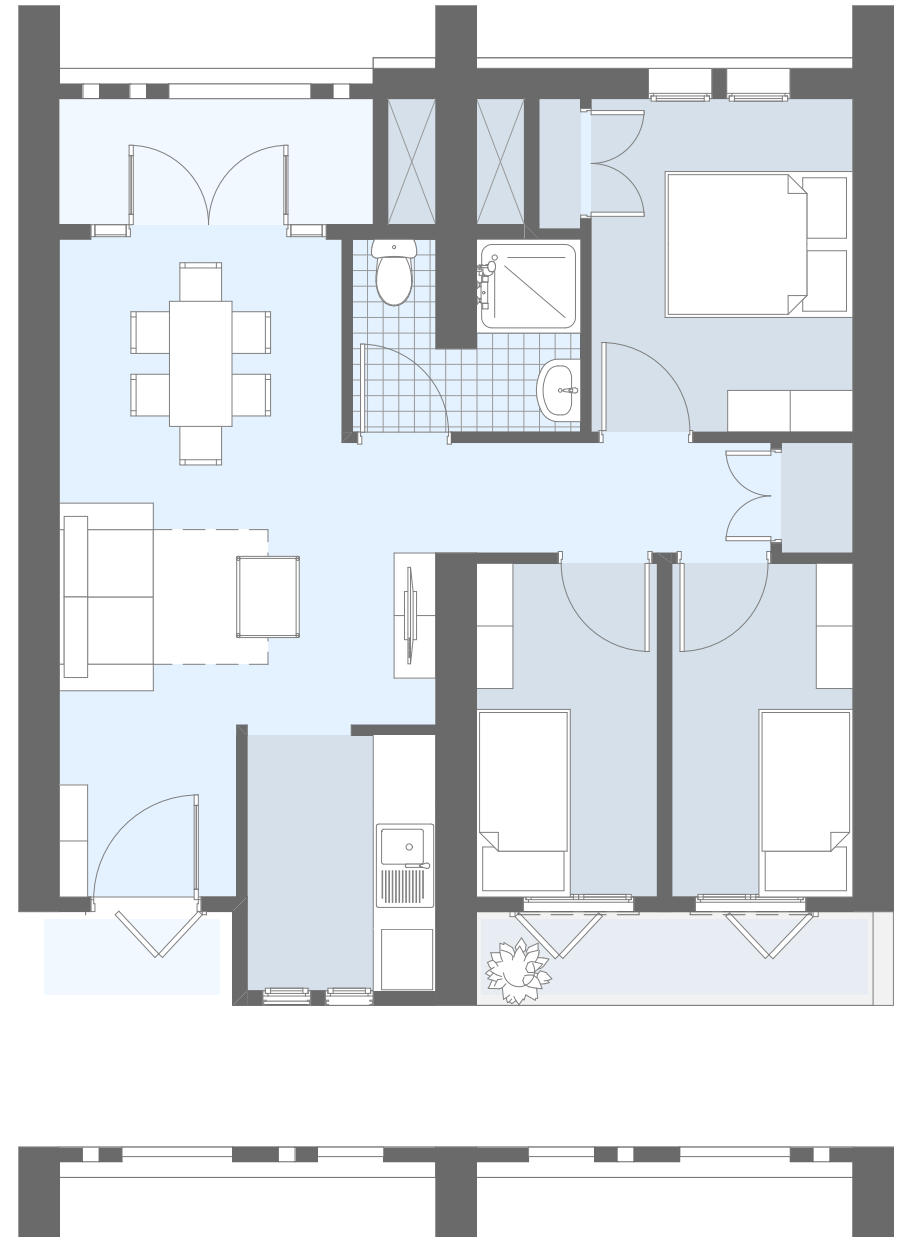
3-Bedroom apartment

Three bedrooms, loggia, kitchen, bathroom and living room.

Target group
Middle income

Payment
Ownership with 40% DP

Floor area
60 m²



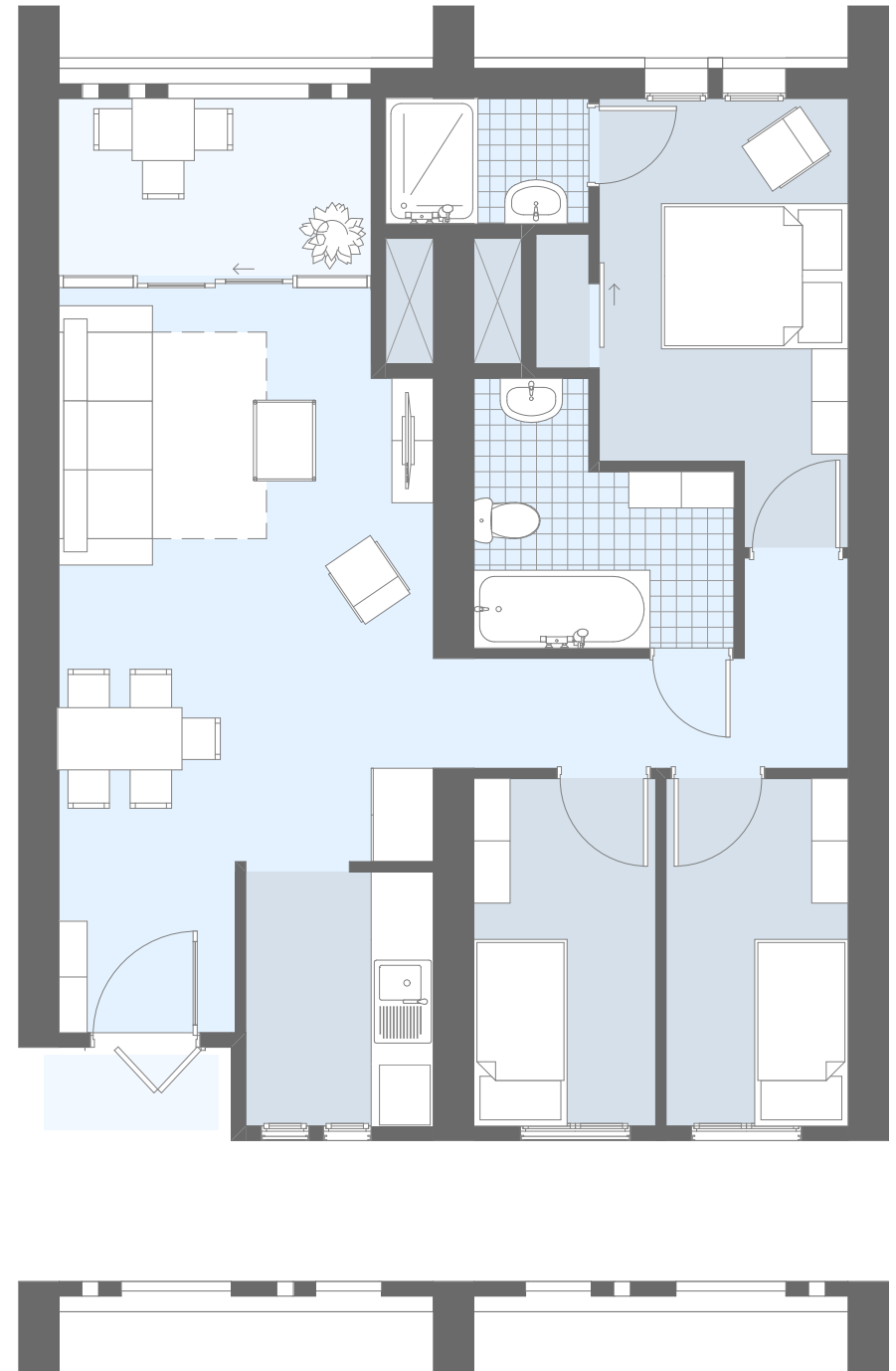
3-Bedroom apartment commercial

Bigger loggia and ensuite bathroom for master bedroom

Target group
High income

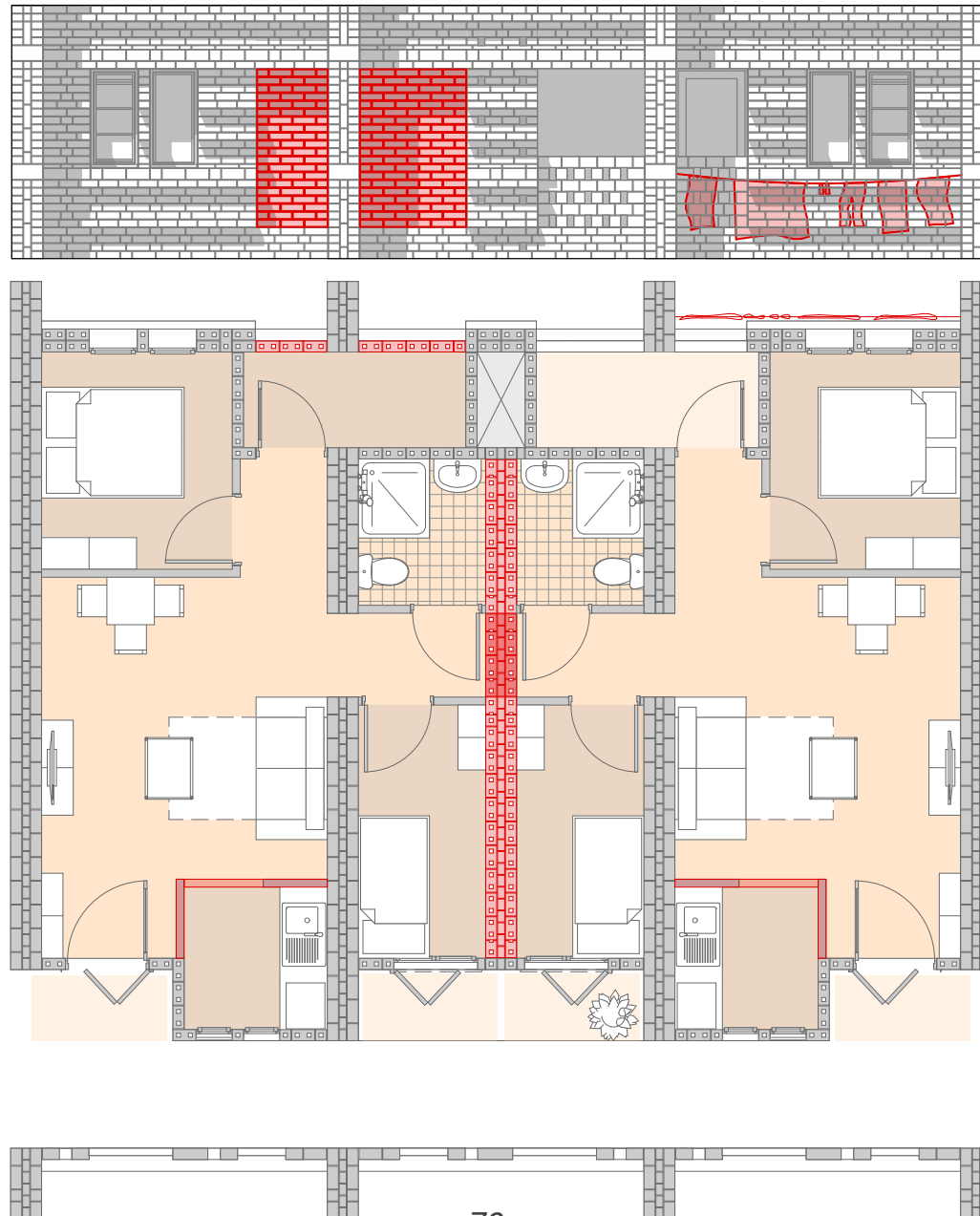
Payment
Commercial market

Floor area
75 m²



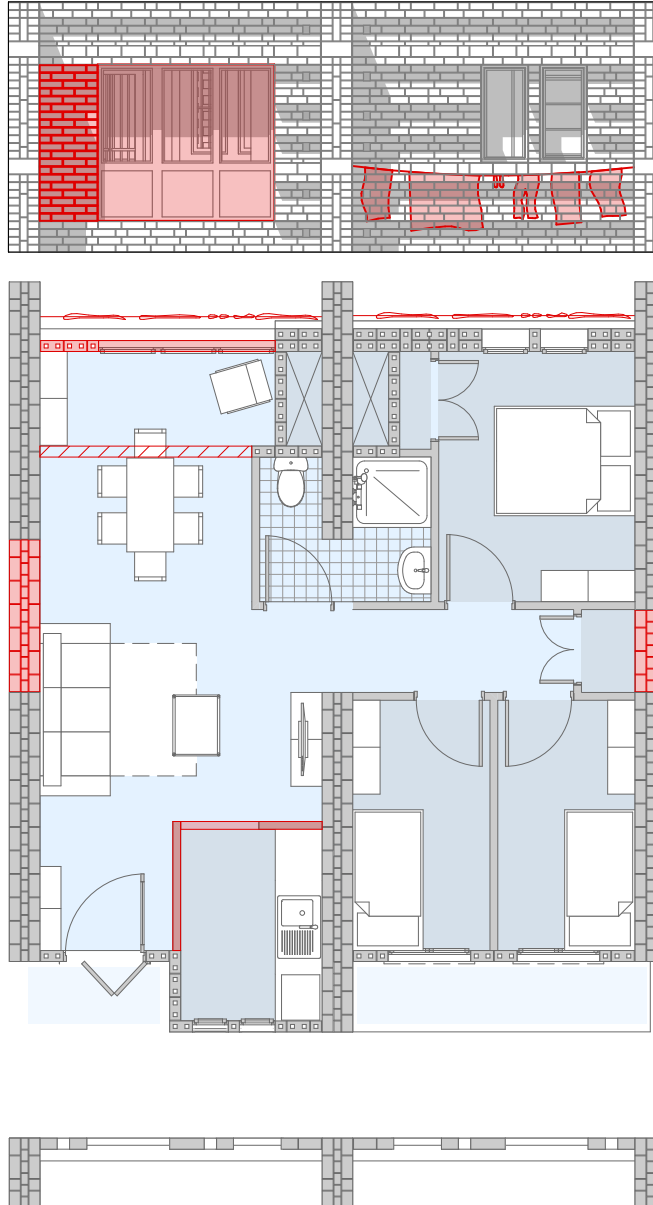
Flexibility options within unit

2-bedroom typology



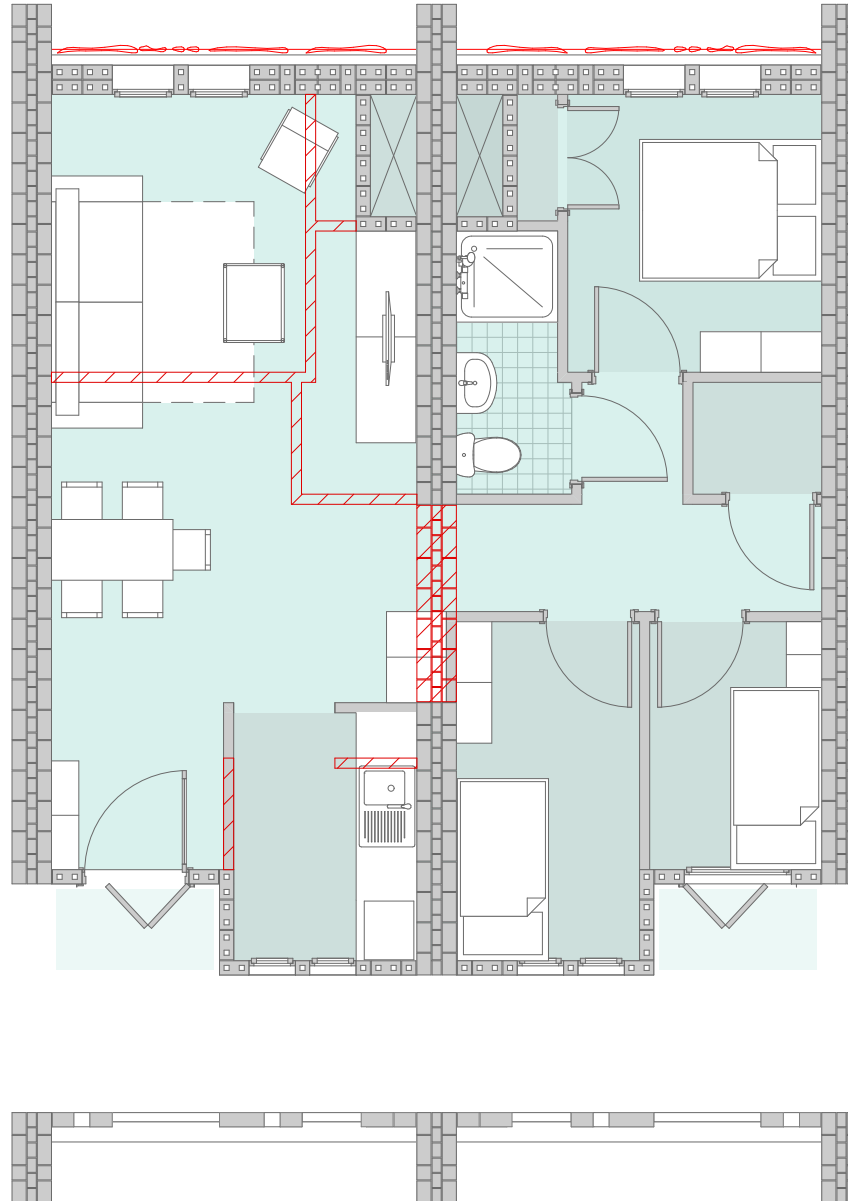
Flexibility options within unit

3-bedroom typology could expand living room



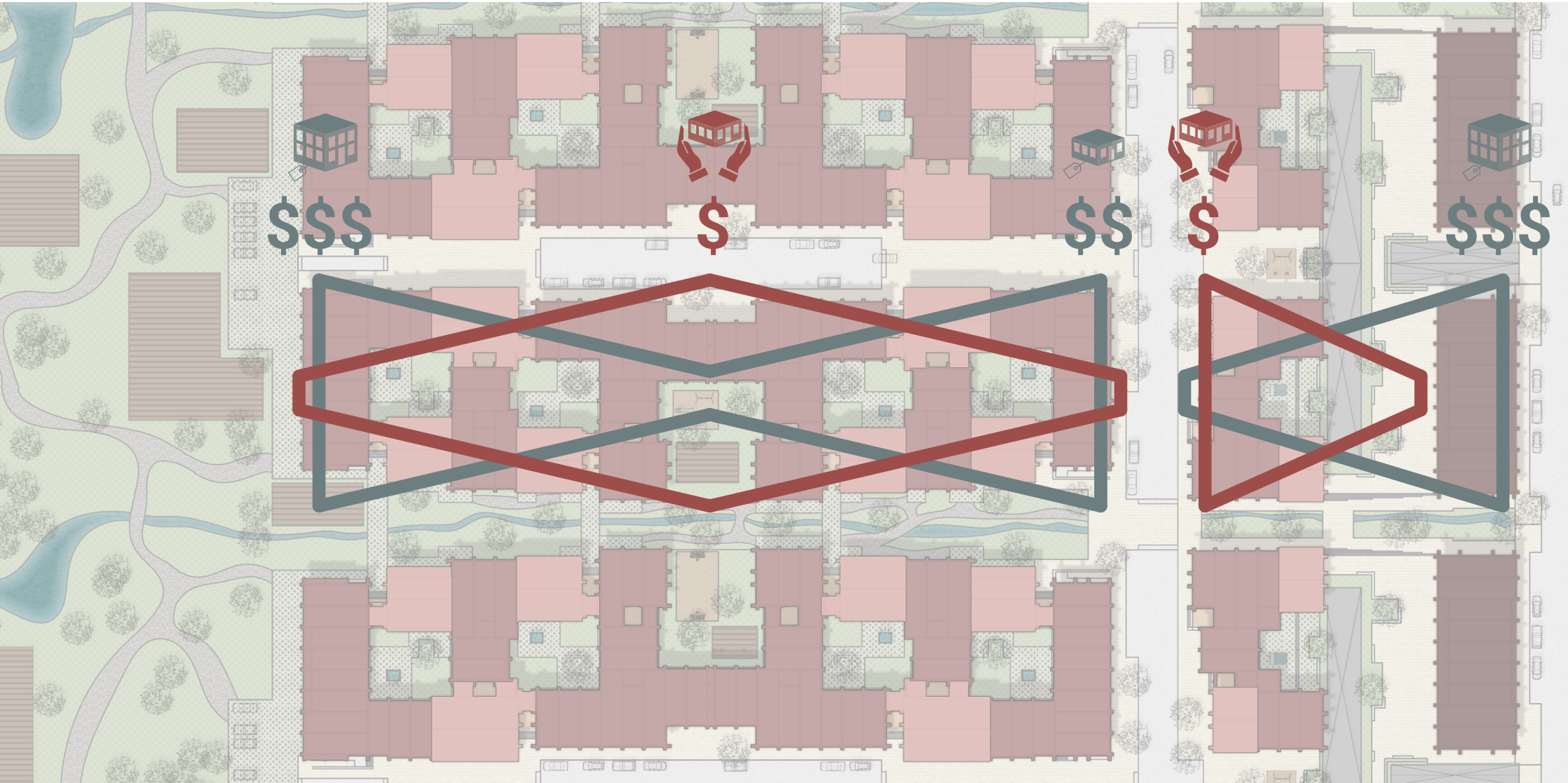
Duplexity

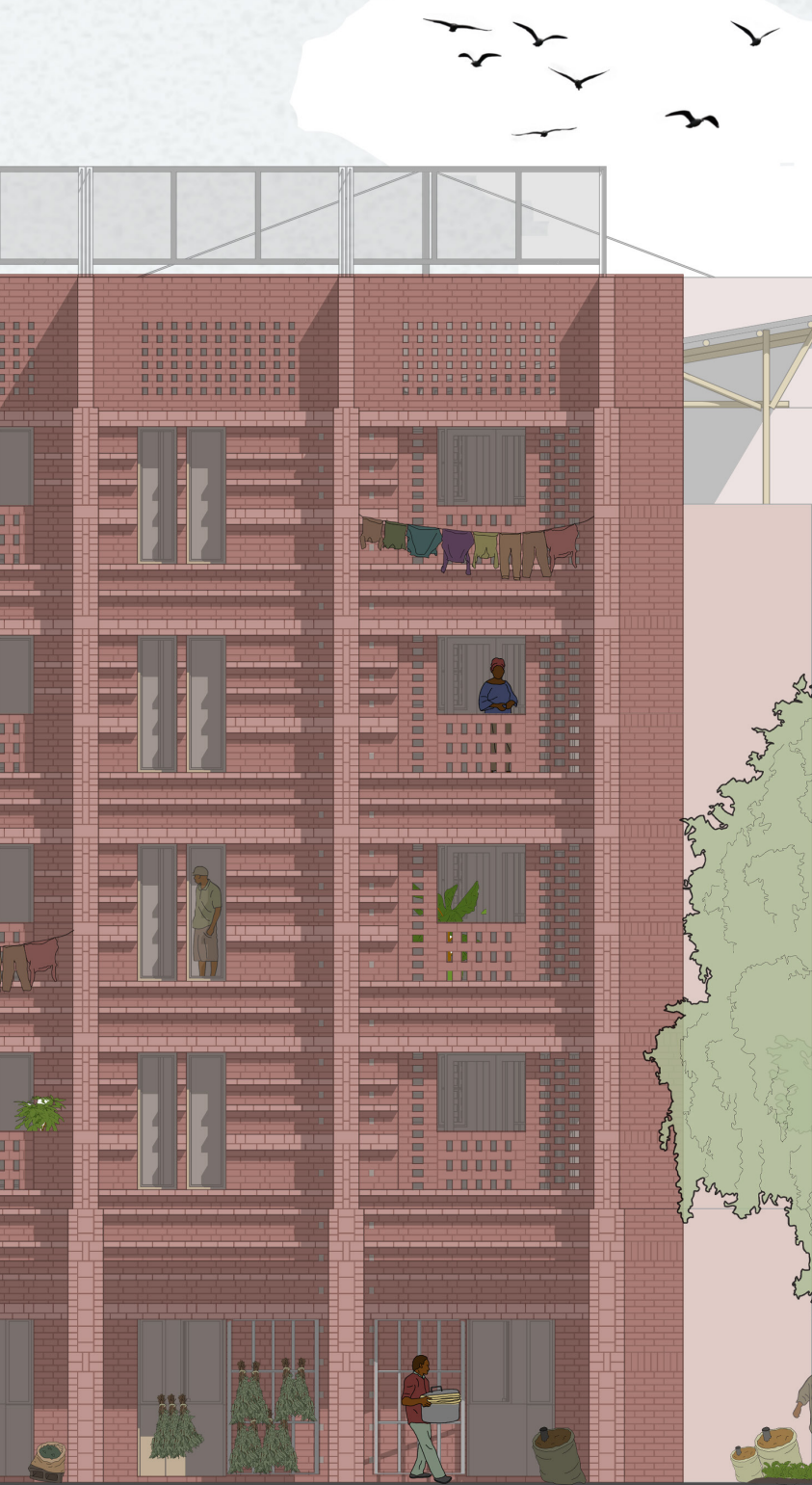
Two 1-bedrooms can merge into a 3-bedroom apartment



Typology distribution

For all the different classes in 24 Kebele

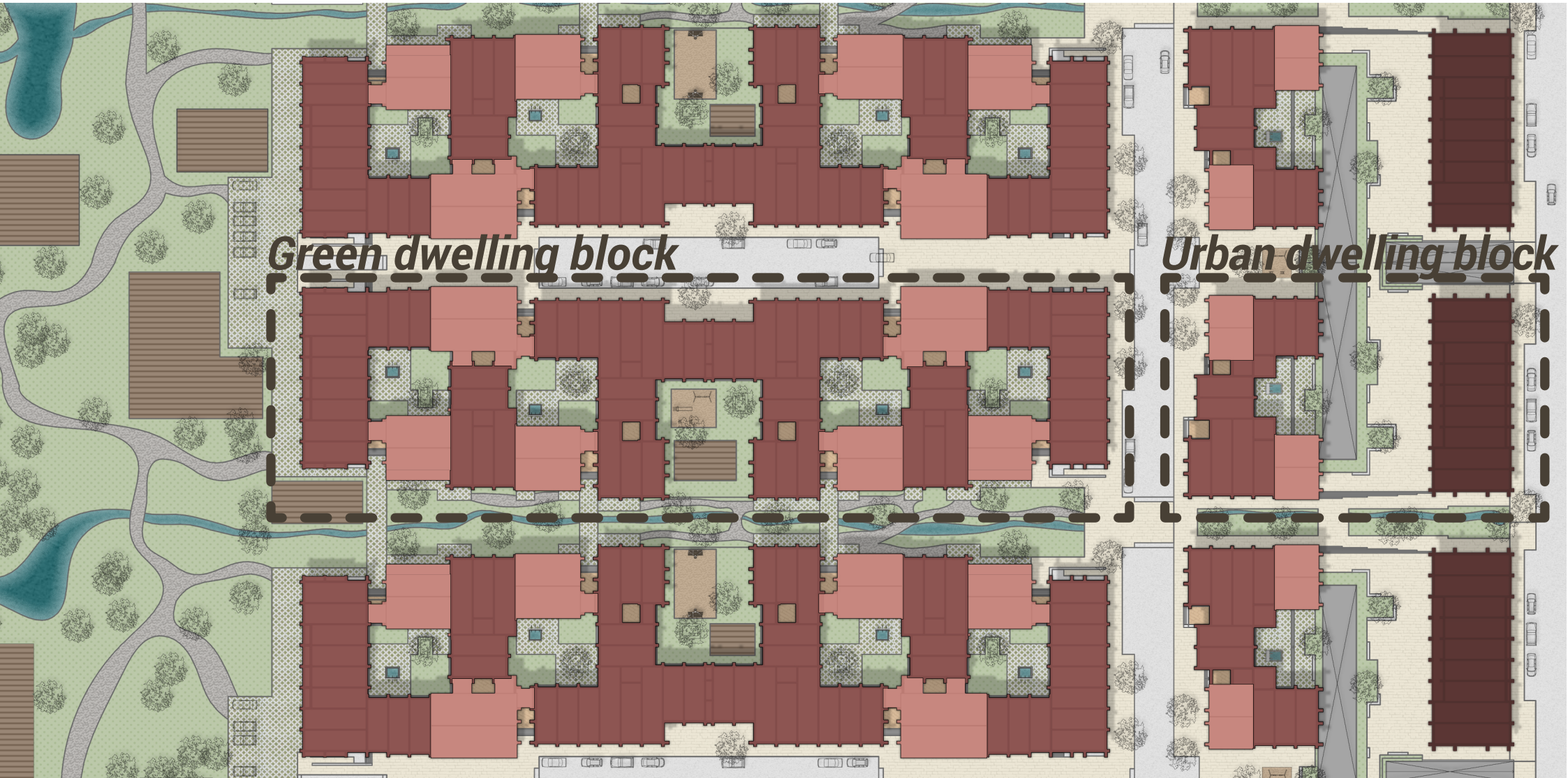




Problem statement
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The green and urban dwelling block

Two zooms representative for the project



The green dwelling block

In close relation with the green wedges and urban wetland

Amount of apartments

1-Bedroom 194

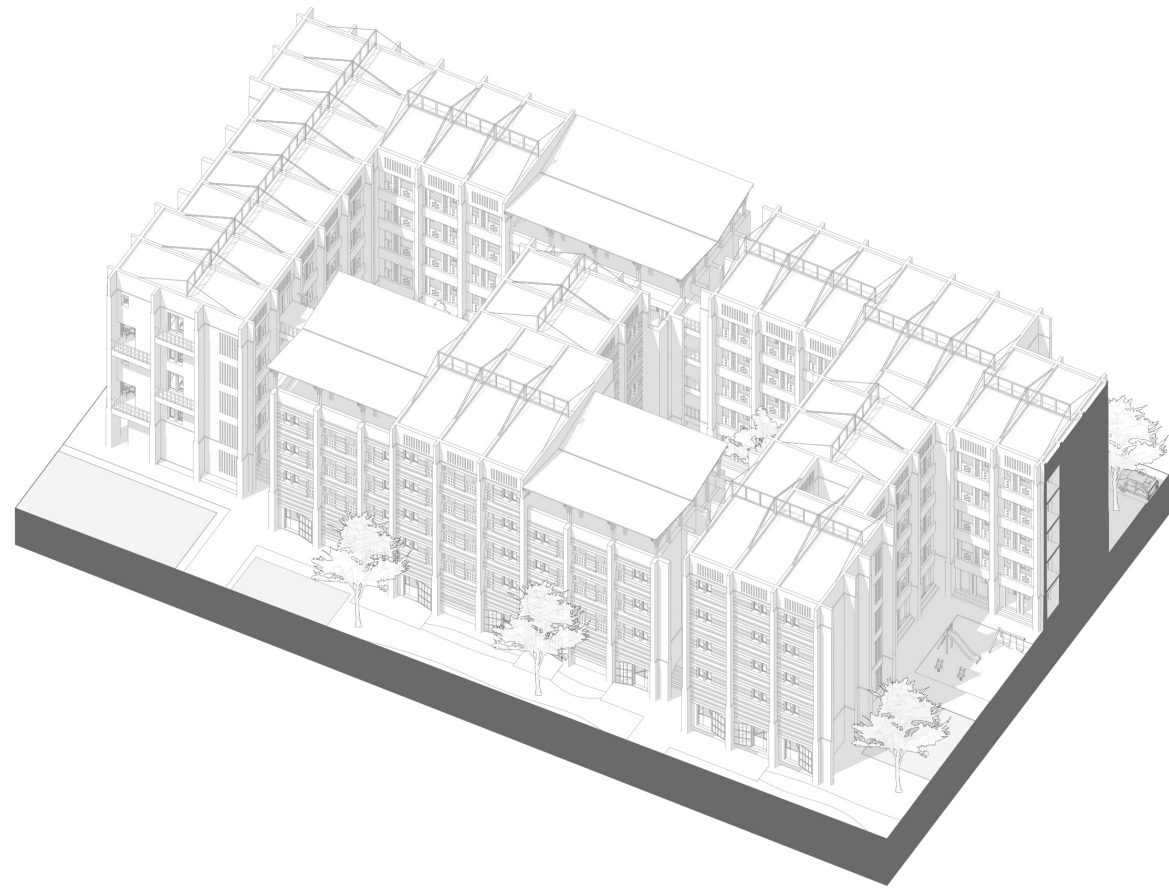
2-Bedroom 52

3-Bedroom 24

2-Bedroom own. 8

3-Bedroom own. 8

Total 286



Plan GF

Shop options, communal multifunctional spaces and inner courtyard

Amount of apartments

1-Bedroom 50

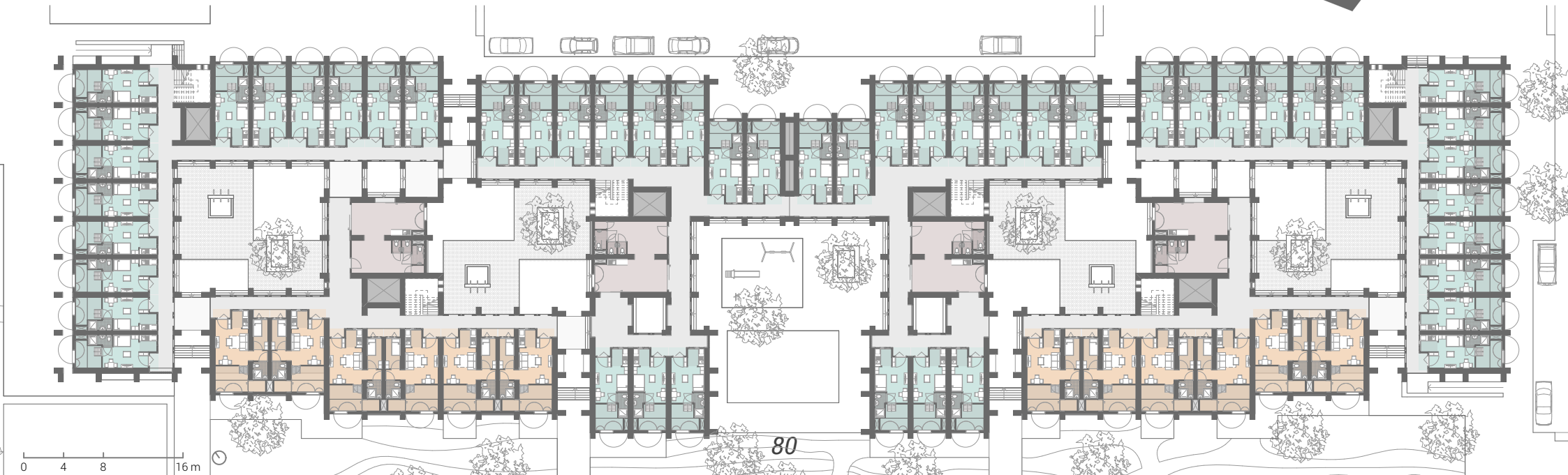
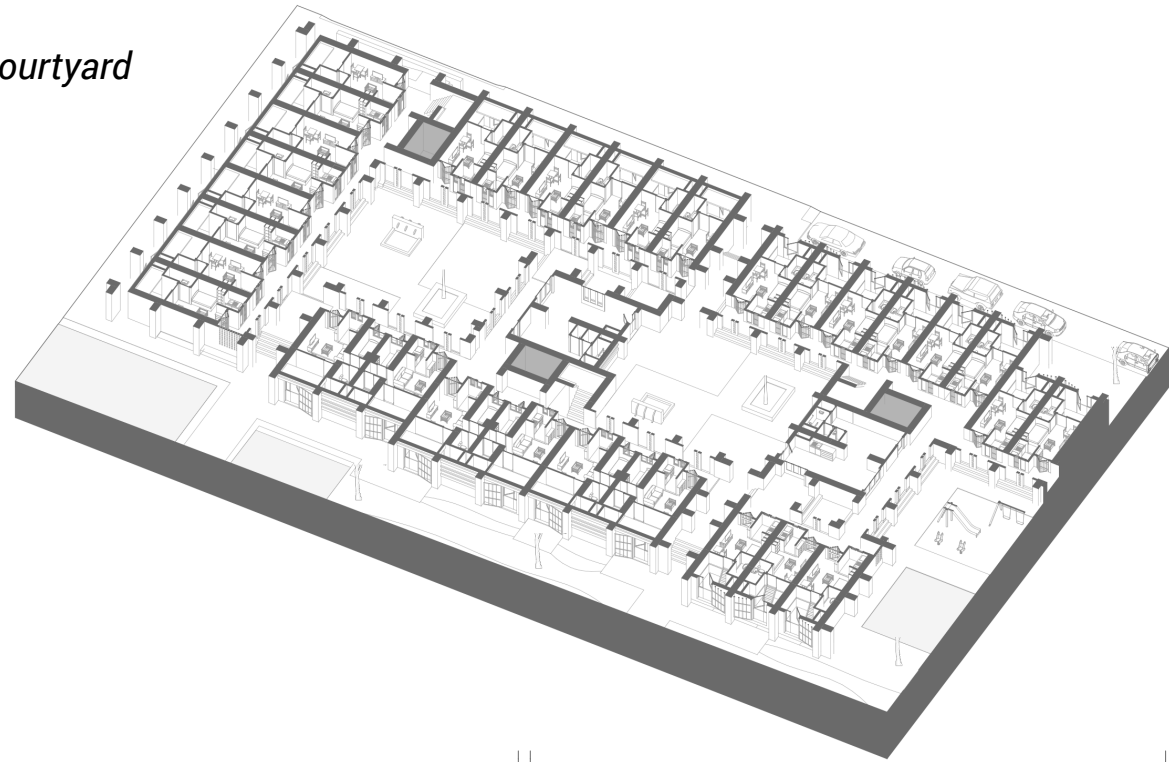
2-Bedroom 12

3-Bedroom 0

2-Bedroom own. 0

3-Bedroom own. 0

Total 62



Plan 1-3

Typology distribution

Amount of apartments

1-Bedroom 38

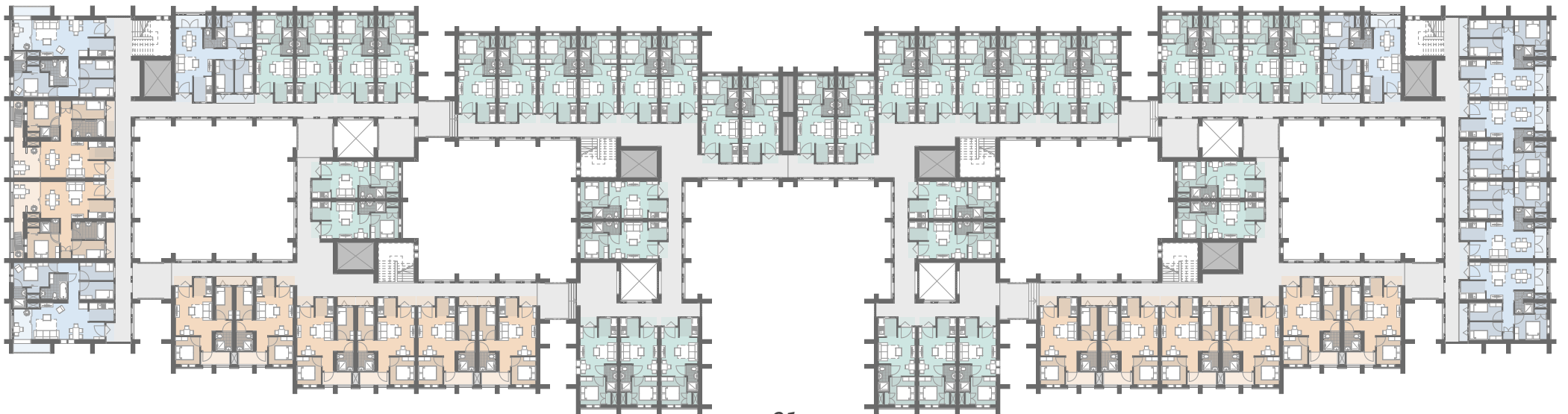
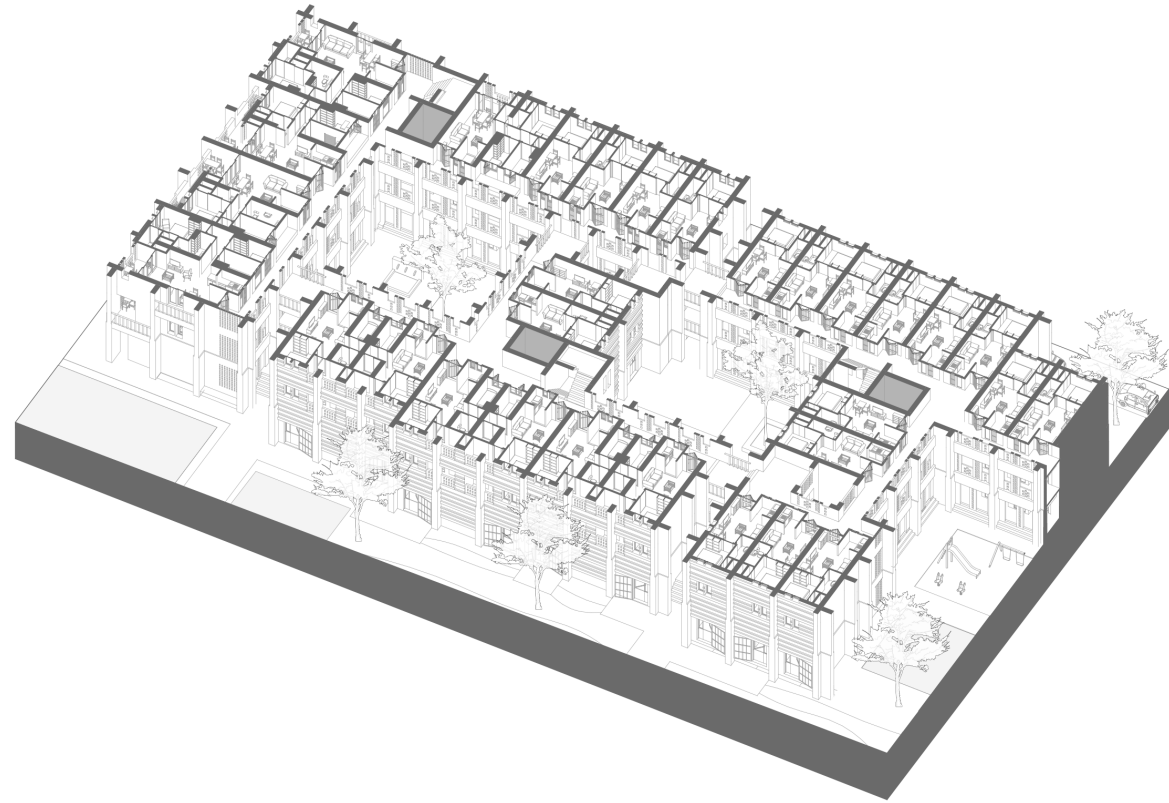
2-Bedroom 12

3-Bedroom 6

2-Bedroom own. 2

3-Bedroom own. 2

Total 60



Plan 4

Shared rooftop spaces

Amount of apartments

1-Bedroom 30

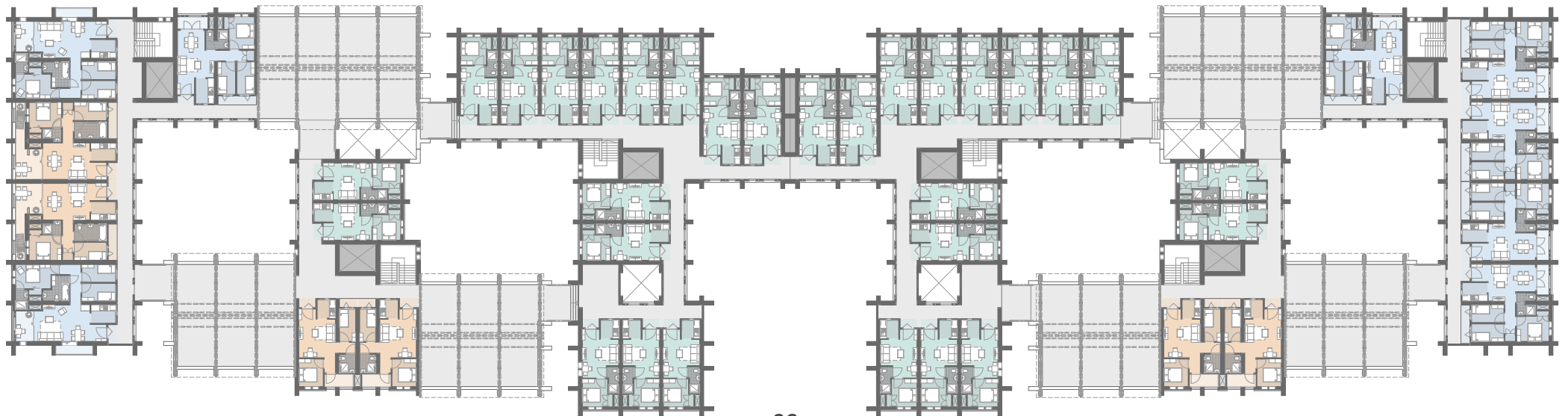
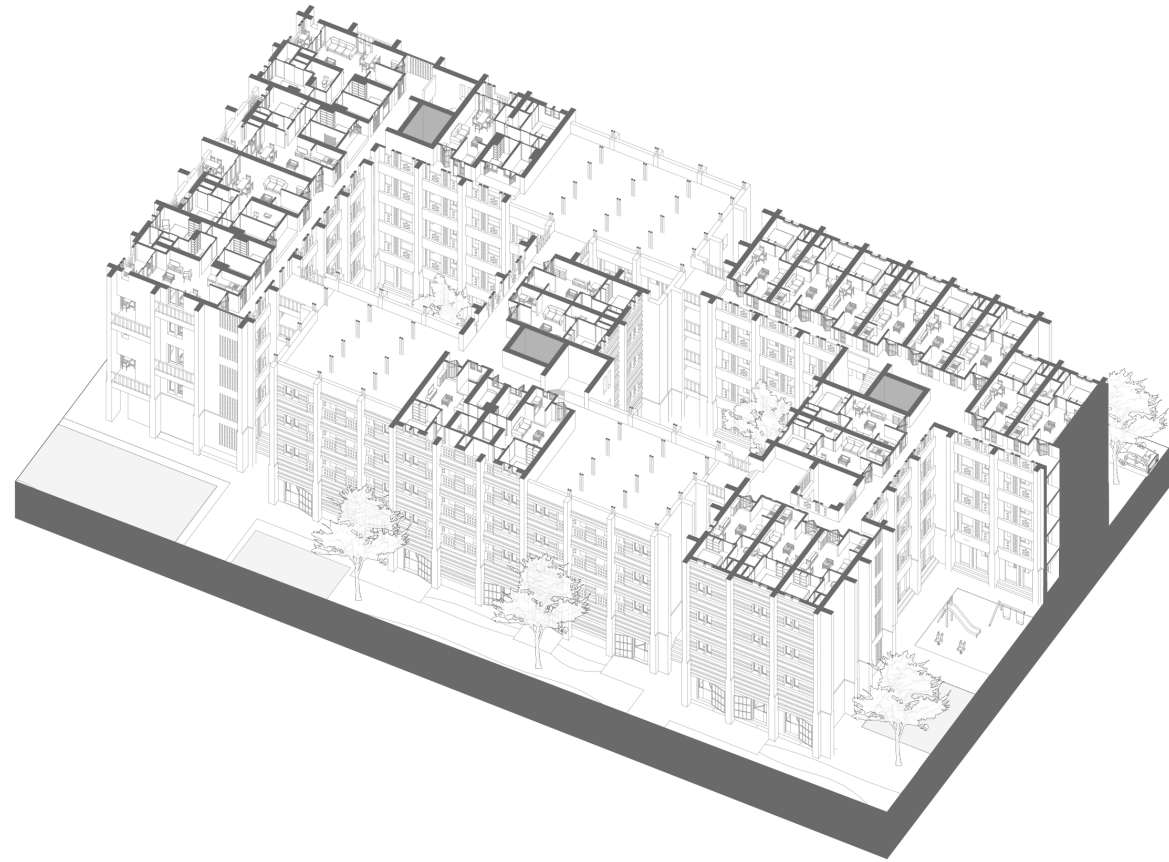
2-Bedroom 4

3-Bedroom 2

2-Bedroom own. 2

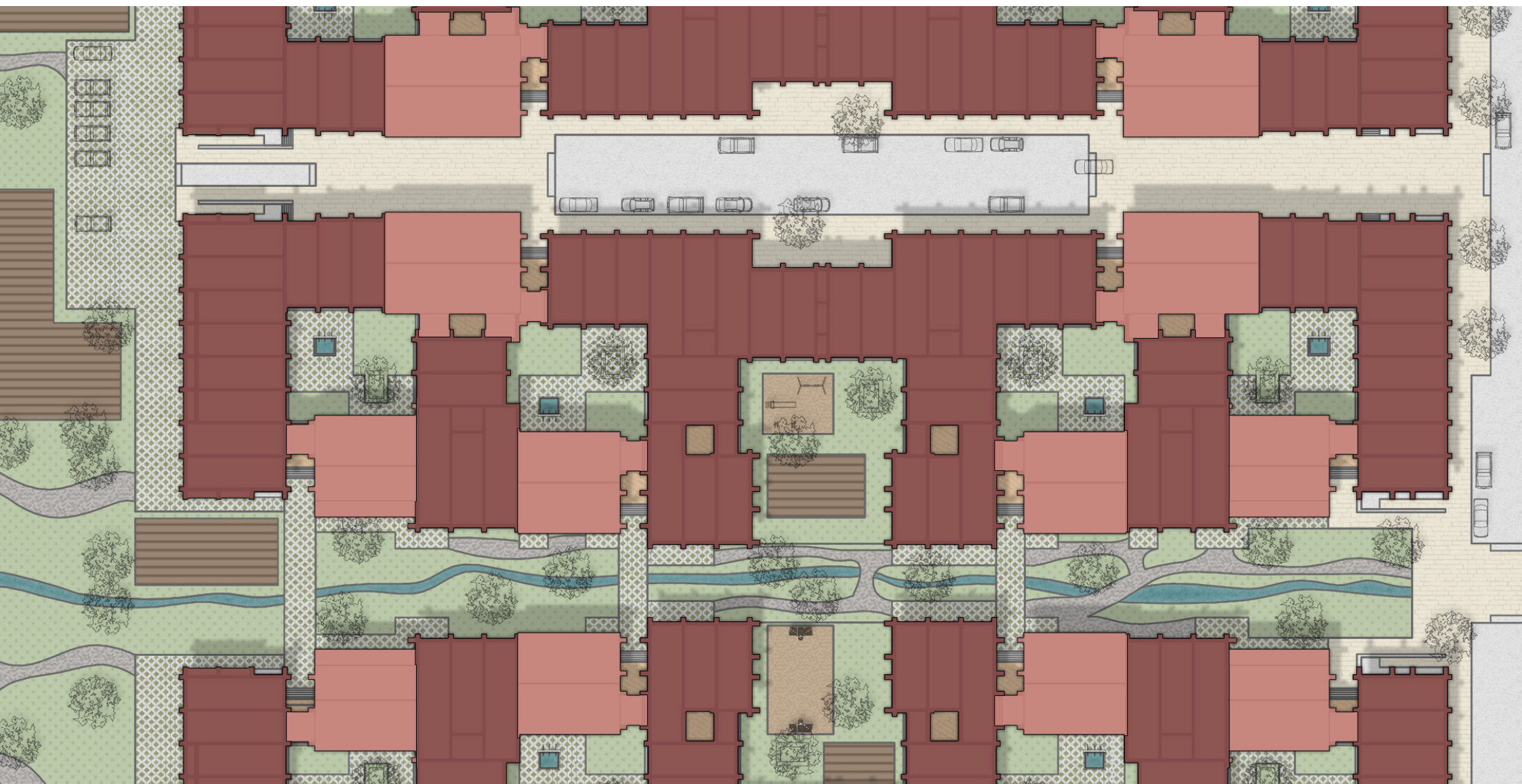
3-Bedroom own. 2

Total 40

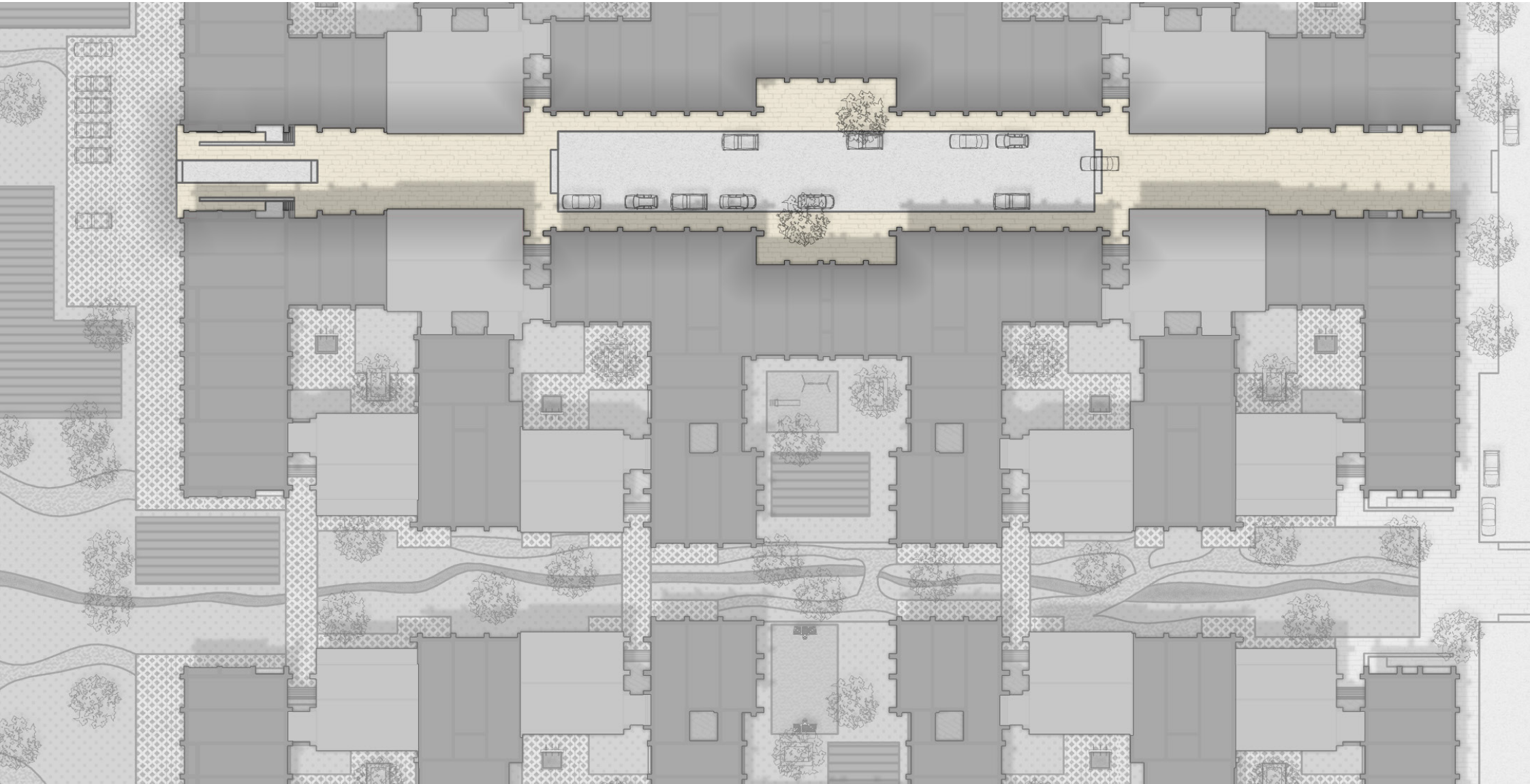


Public spaces

elaboration on the different public spaces

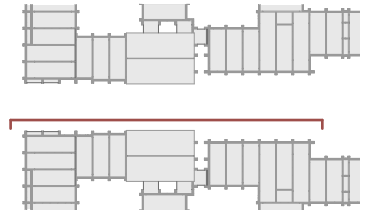


Street Side



Elevation

Street side with commercially activated plinth, Facade development



Elevation

Right after construction



Elevation

5 years after construction

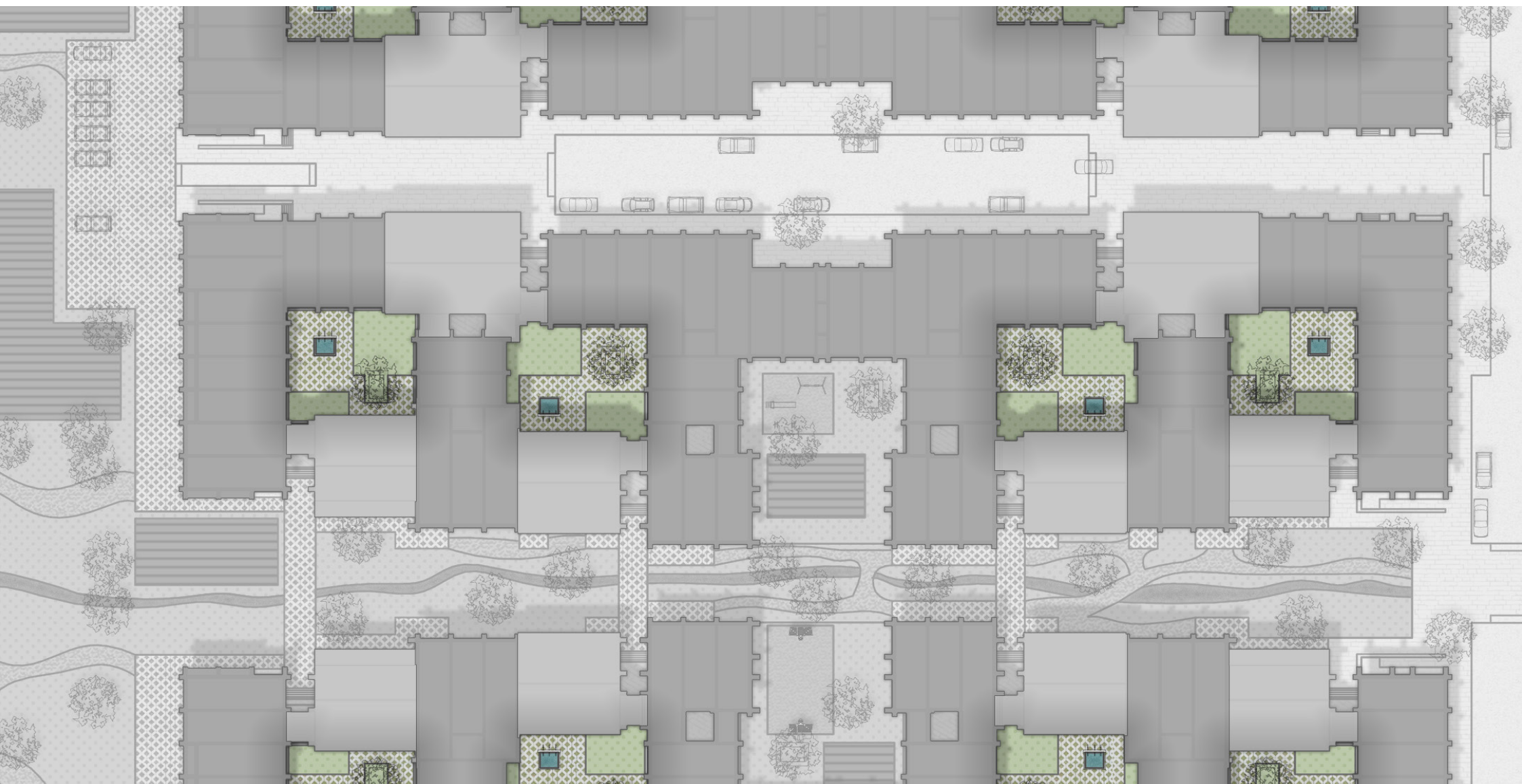


Atmospheric impression

Cars as guests allowing a commercially and socially activated street.

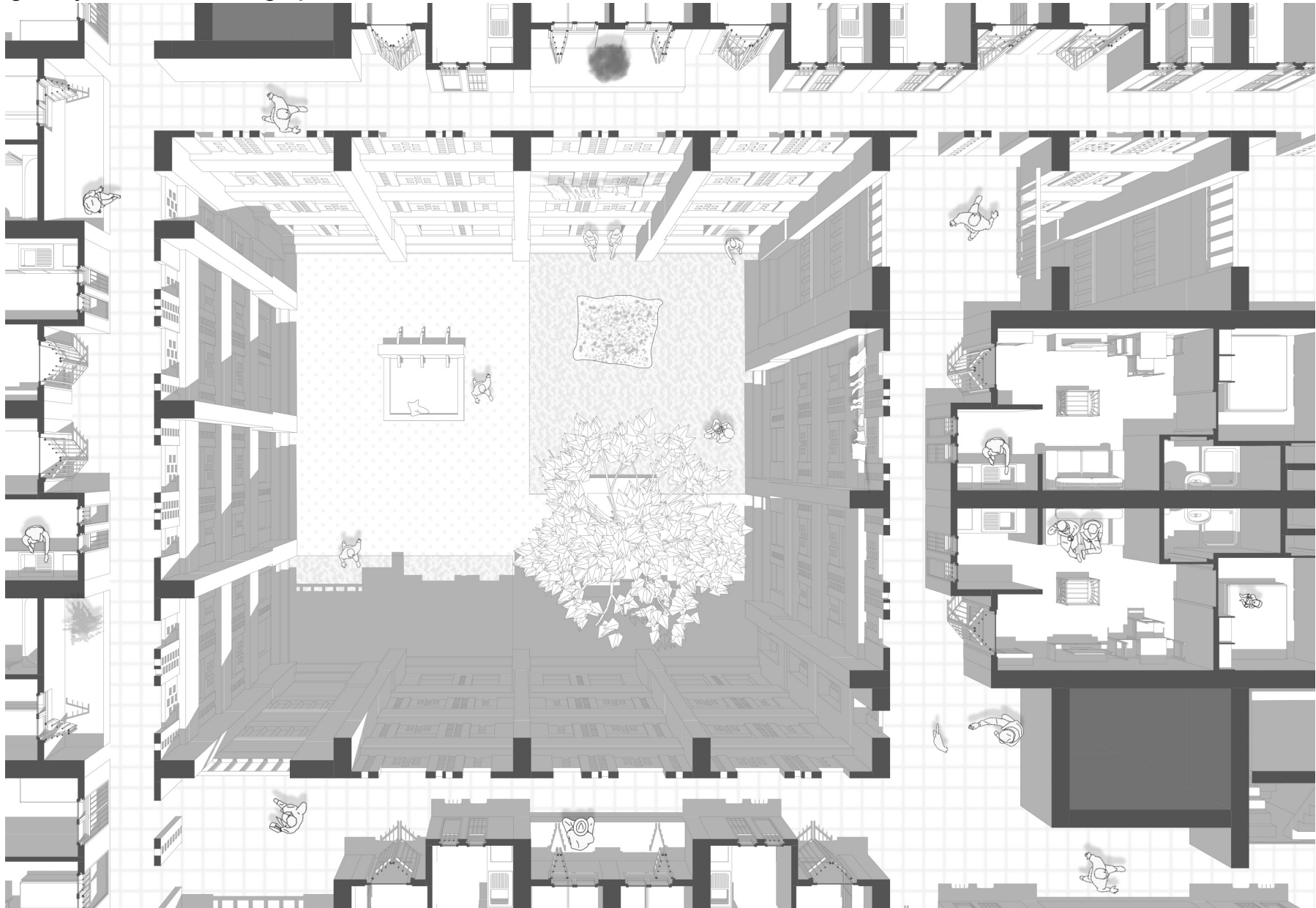


Inner courtyard



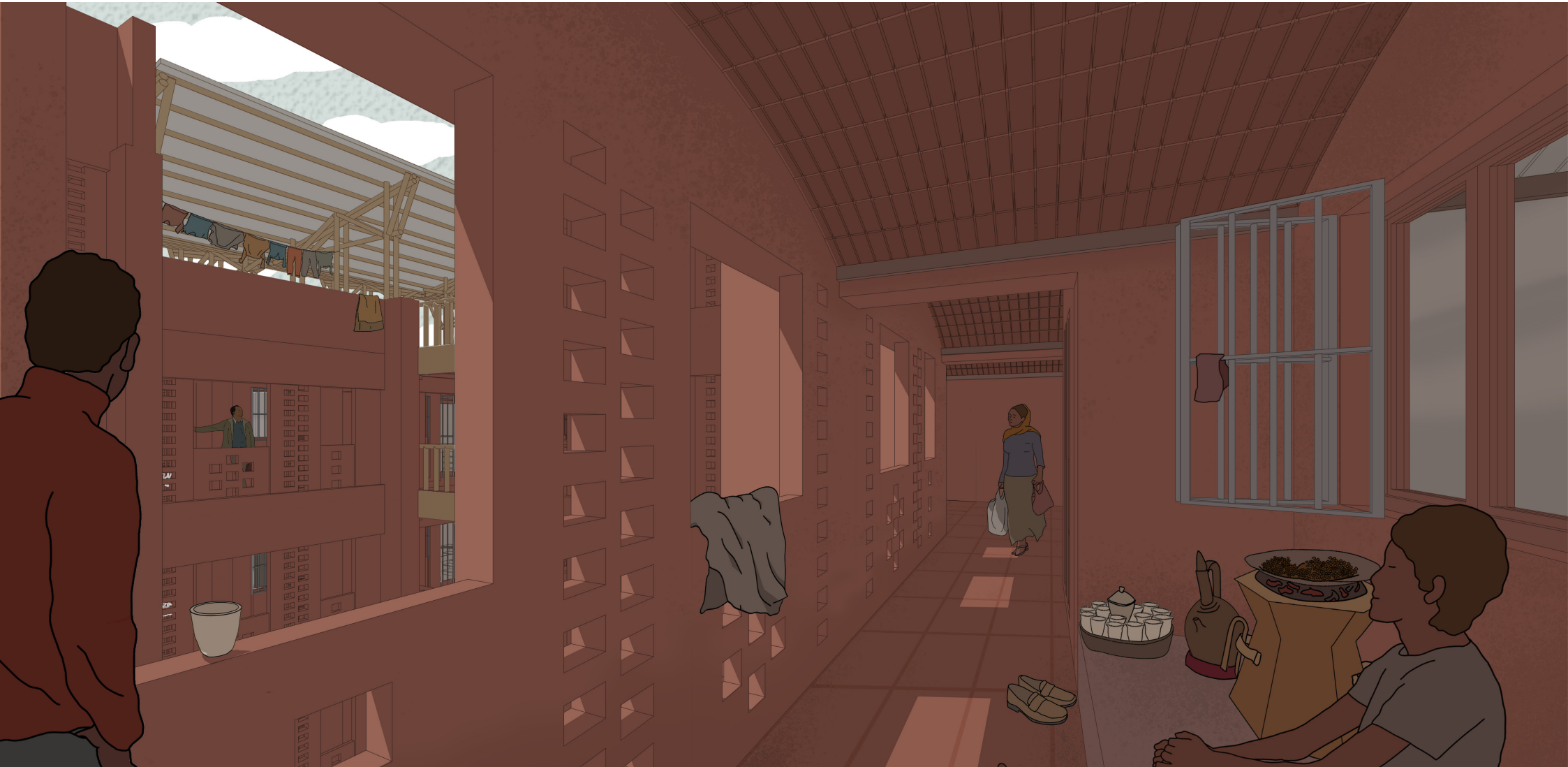
Gallery

Routing, gallery widens creating space for informal activities



Gallery

Slightly elevated semi private spaces making it more private



Inner courtyard

High sun altitude ensures direct sunlight

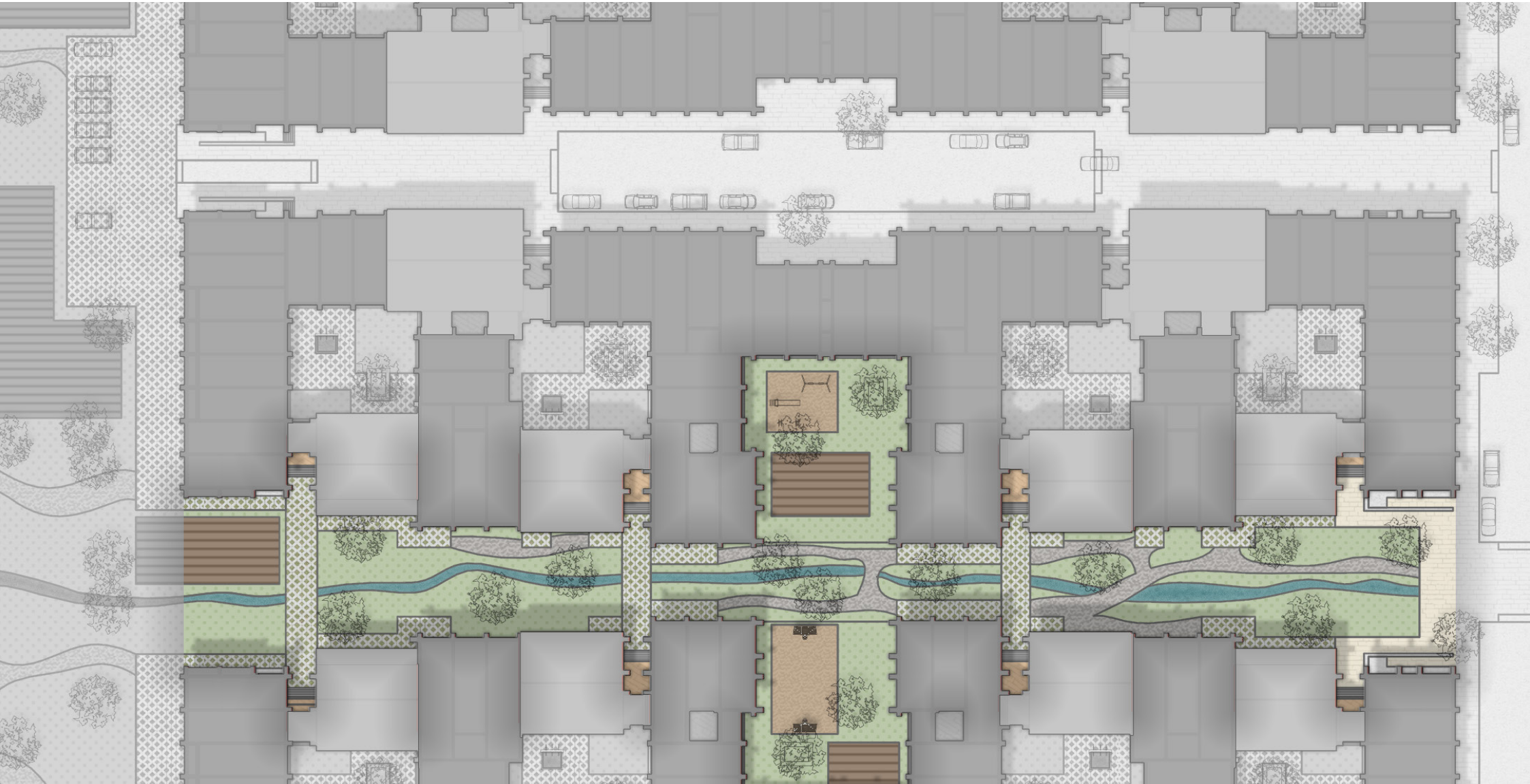


Inner courtyard

Houses a tree as shaded gathering space, water pump for household support and stairs as outdoor furniture

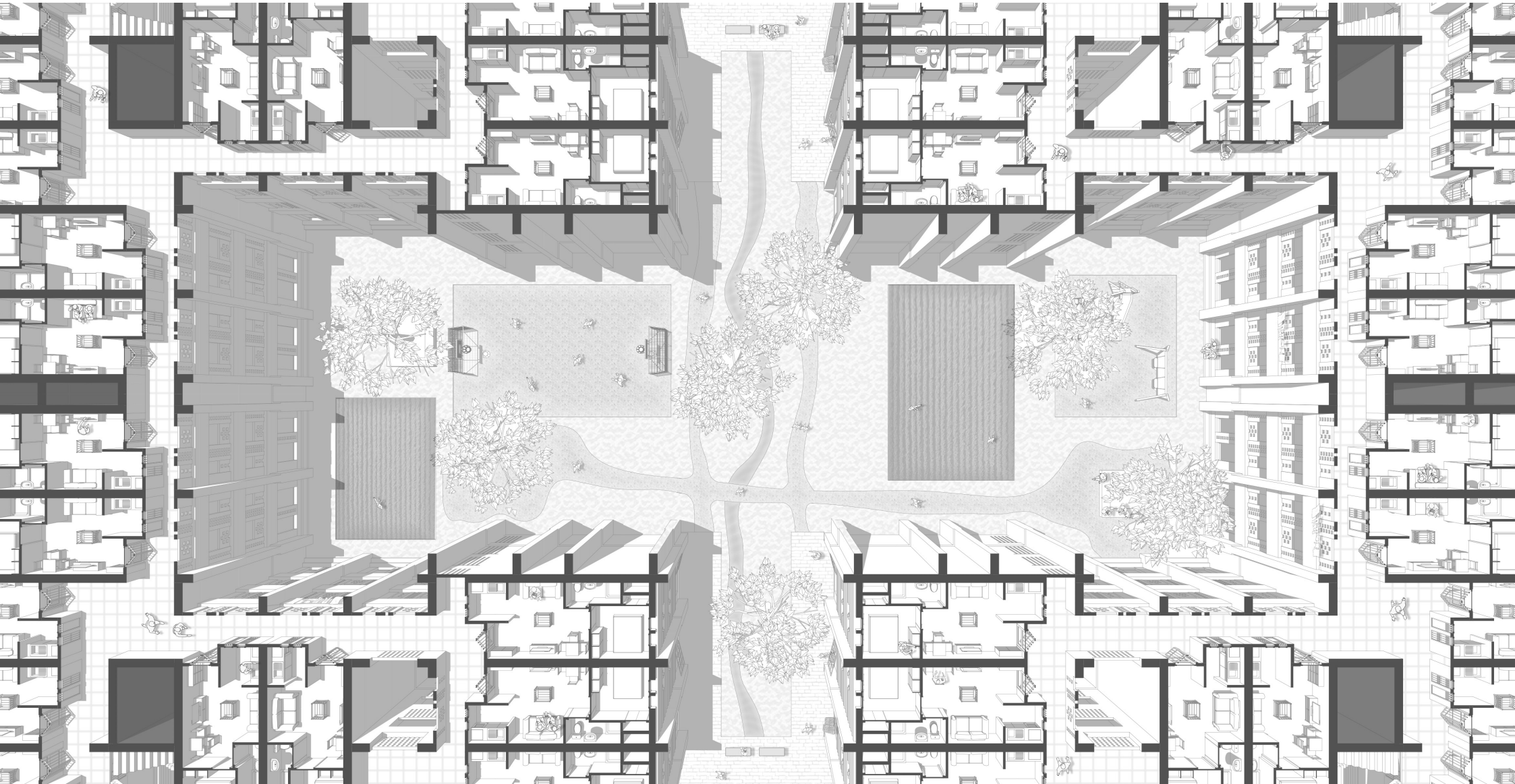


Green wedge



Green wedge

Urban agriculture and playgrounds serve informal activities of low income households



Green wedge

Rainy season

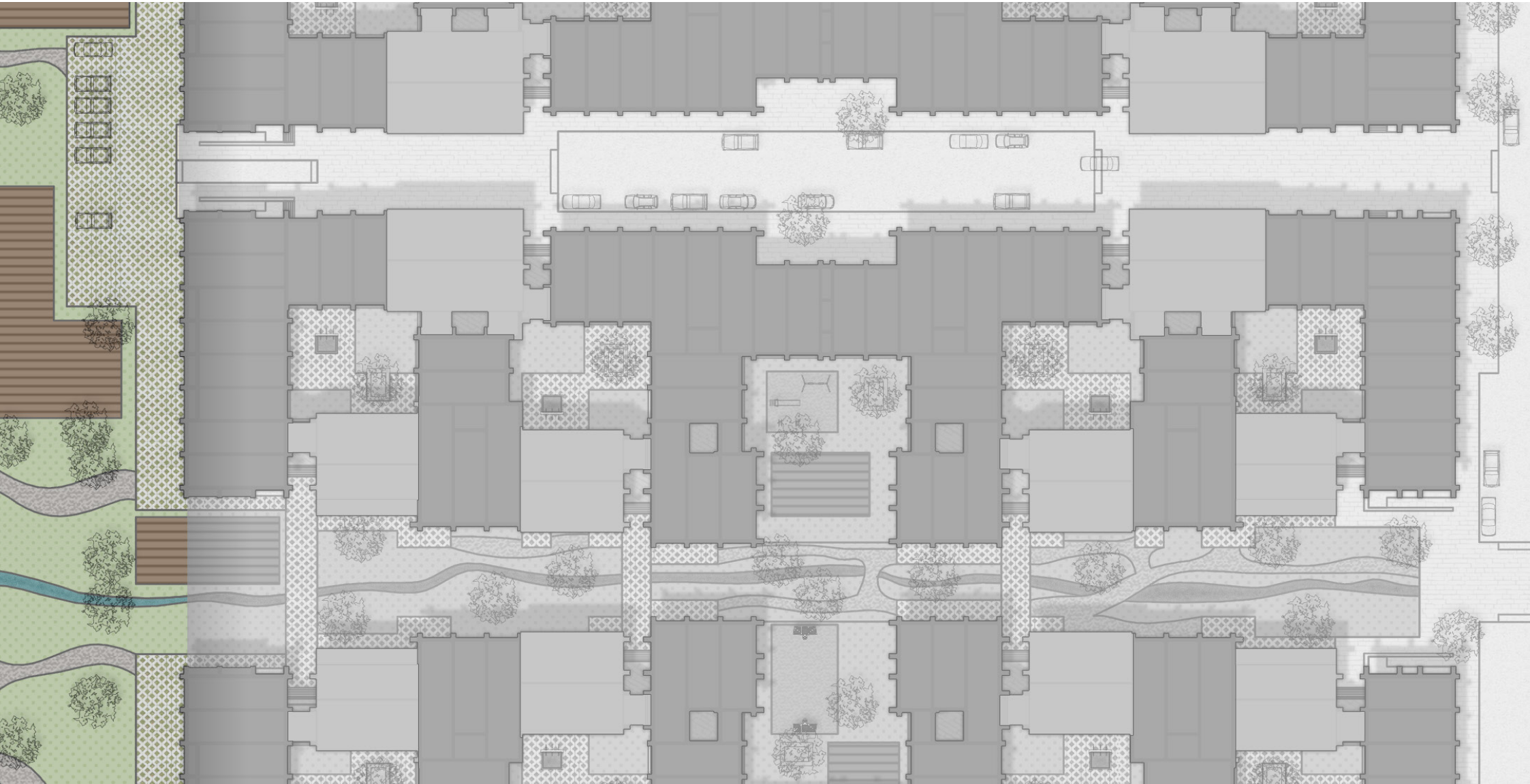


Green wedge

Dry season



Urban wetland



Urban wetland

Apartments are facing the urban wetland as much as possible



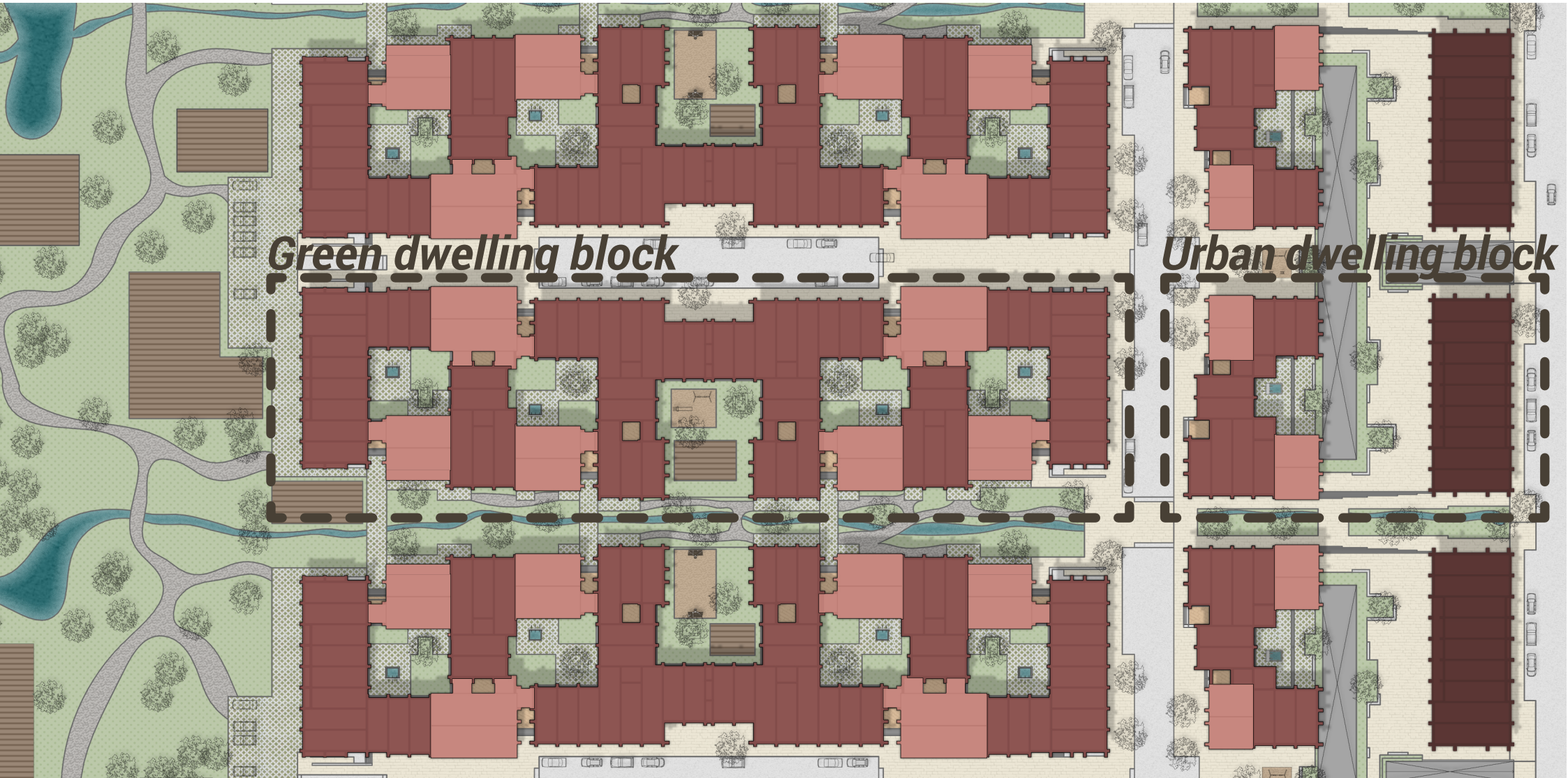
Urban wetland

Closely relates with dwelling landscape and productive urban open space system



The green and urban dwelling block

Two zooms representative for the project



The urban dwelling block

Active on a city level

Amount of apartments

1-Bedroom 30

2-Bedroom 10

3-Bedroom 8

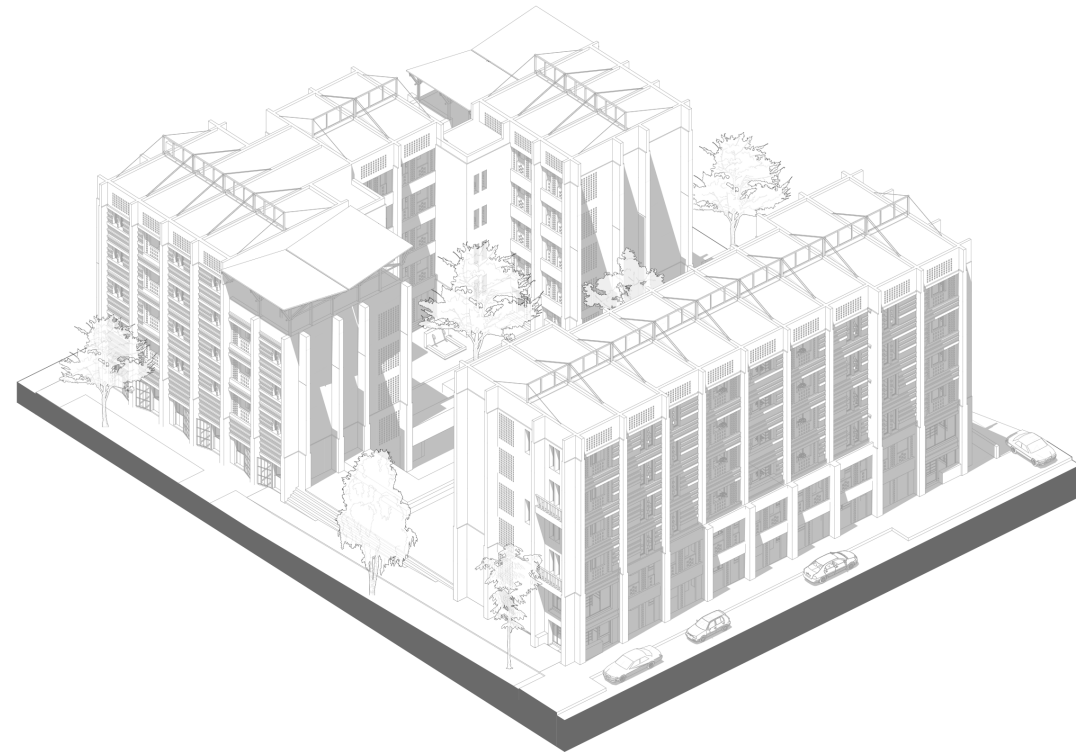
2-Bedroom com. 8

3-Bedroom com. 8

Total 64

Shops 10-22

Parking spaces 32



Section

Commercial block with parking garage and typical low-cost housing scheme.



Plan basement level -1

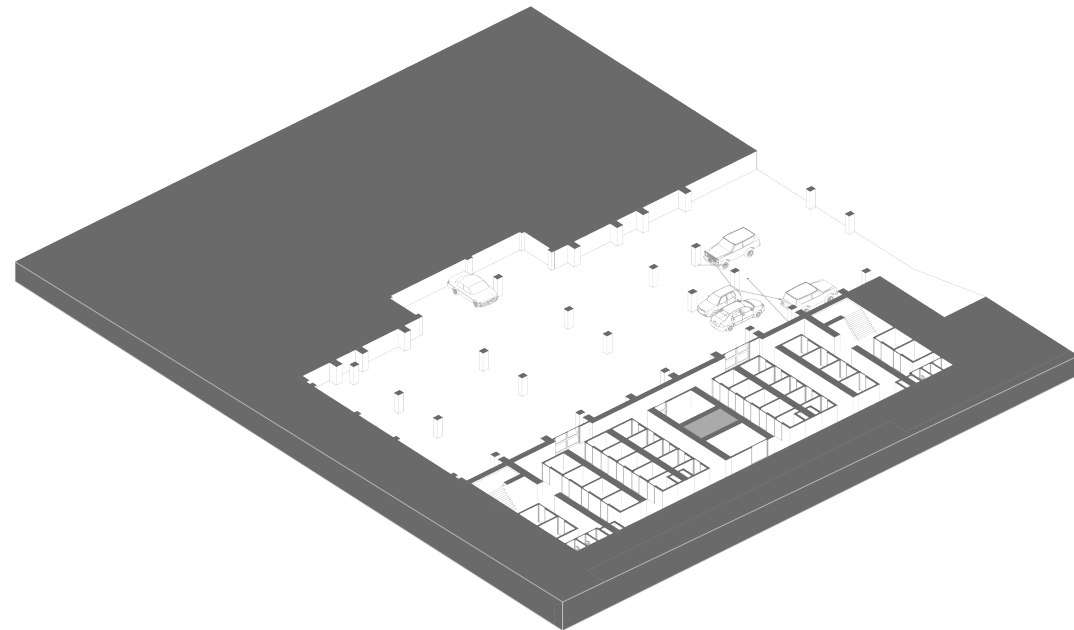
Parking garage ensures parking spaces

Amenities

Parking spaces 32

Storage facilities 33

Toiletblocks 2



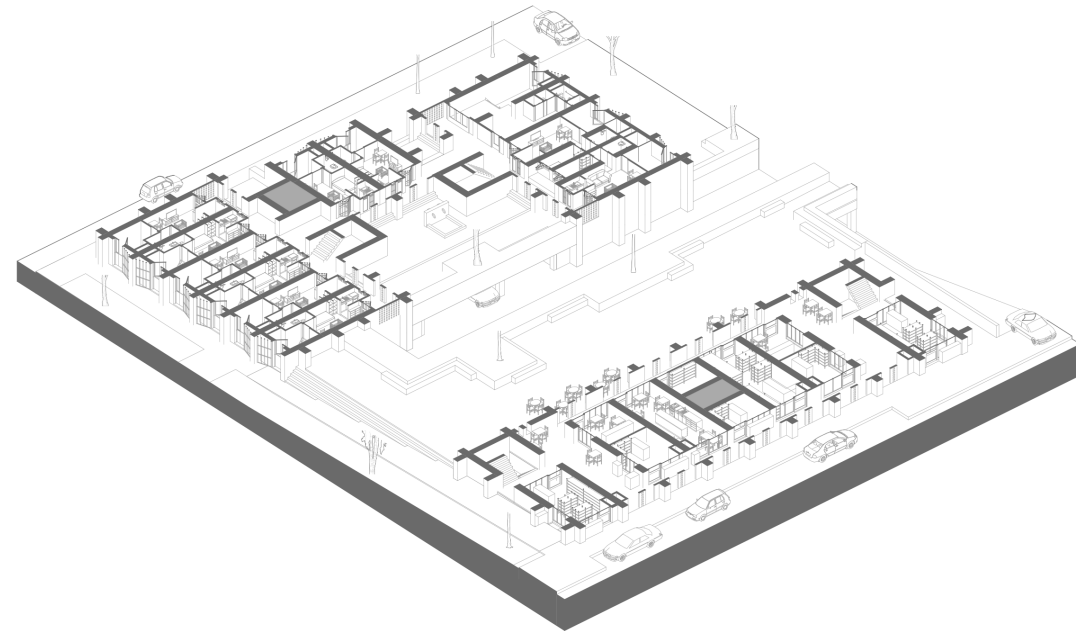
Plan ground floor level 0

Expansion of commercial activity on inner square

Amount of apartments

1-Bedroom 8
2-Bedroom 2
3-Bedroom 0
2-Bedroom com. 0
3-Bedroom com. 0
Total 10

Shops 5-11



Plan level 1

Shops

Amount of apartments

1-Bedroom 6

2-Bedroom 2

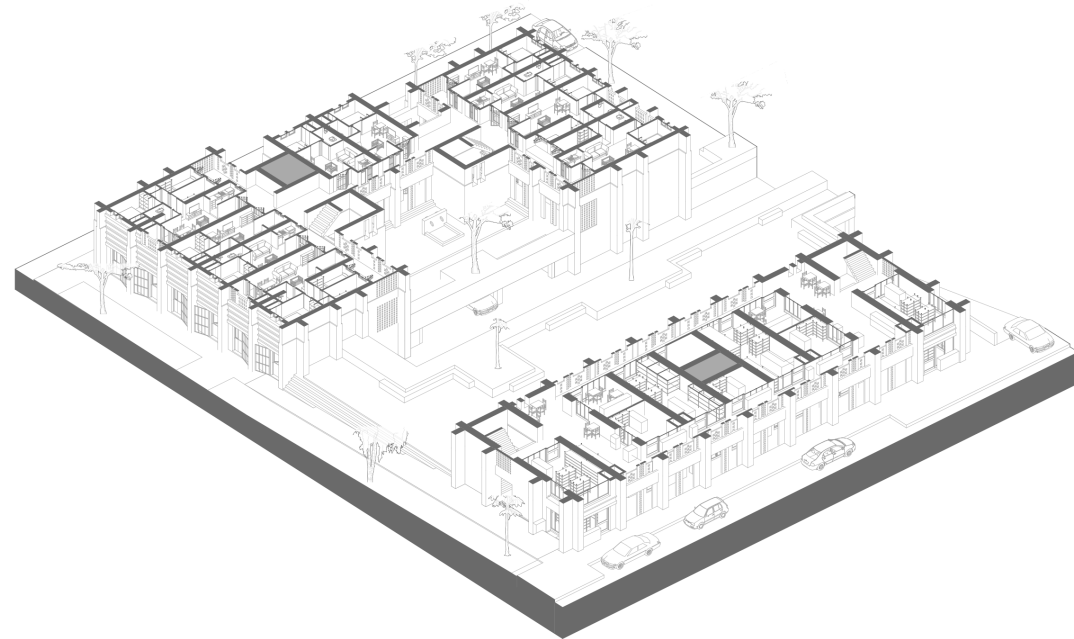
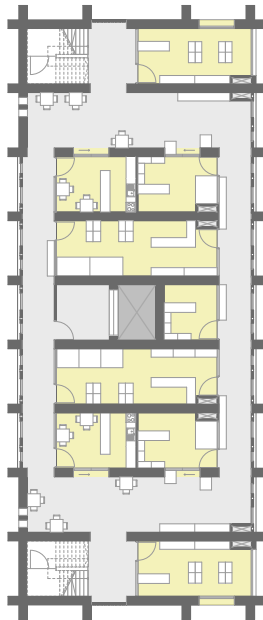
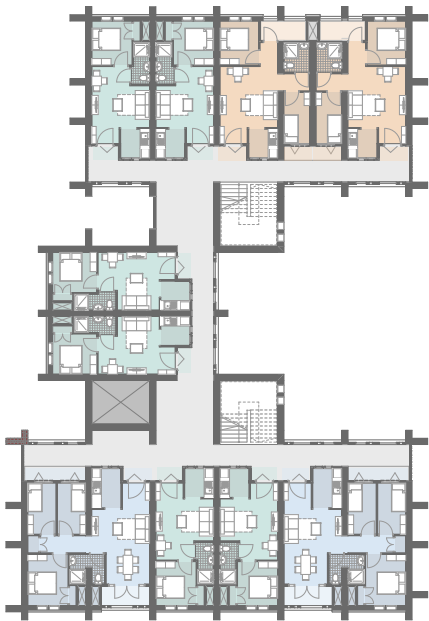
3-Bedroom 2

2-Bedroom com. 0

3-Bedroom com. 0

Total 10

Shops 5-11



0 4 8 16m

Plan level 2-3

High income typologies

Amount of apartments

1-Bedroom 6

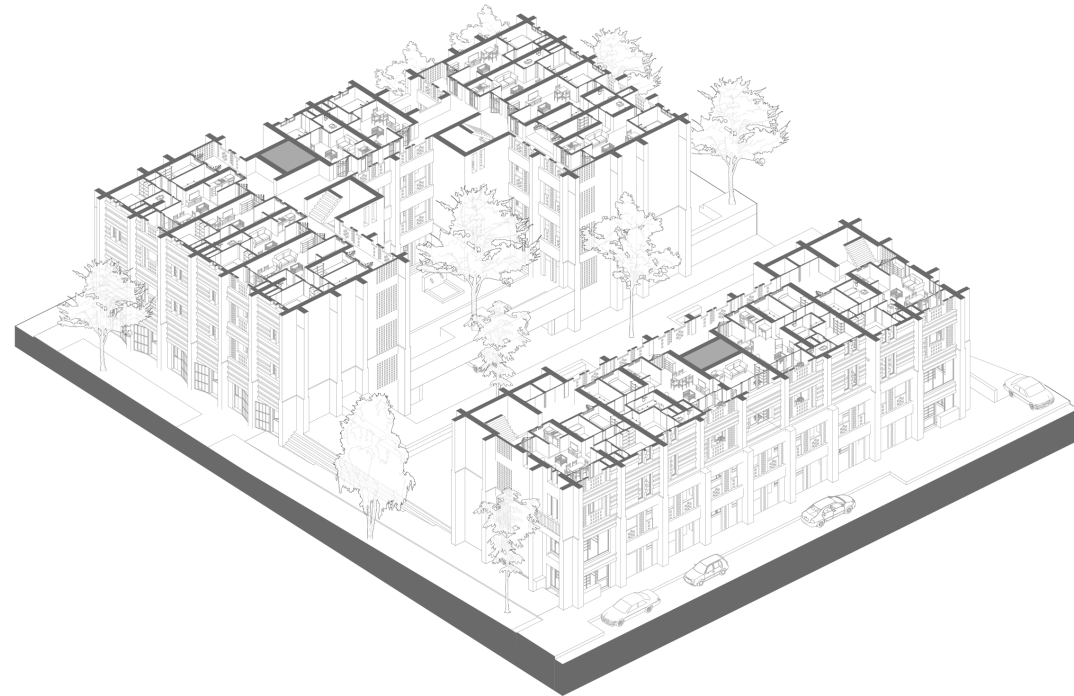
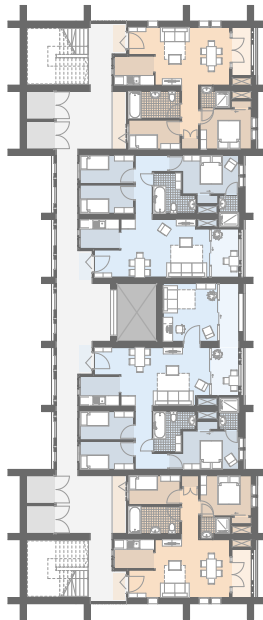
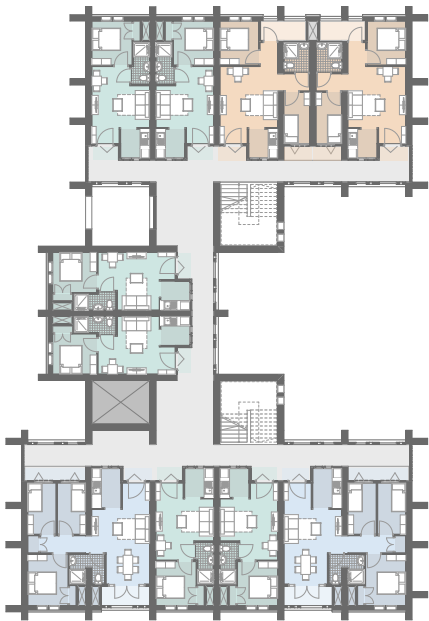
2-Bedroom 2

3-Bedroom 2

2-Bedroom com. 2

3-Bedroom com. 2

Total 14



0 4 8 16 m

Plan level 4

Rooftop spaces on social housing block

Amount of apartments

1-Bedroom 4

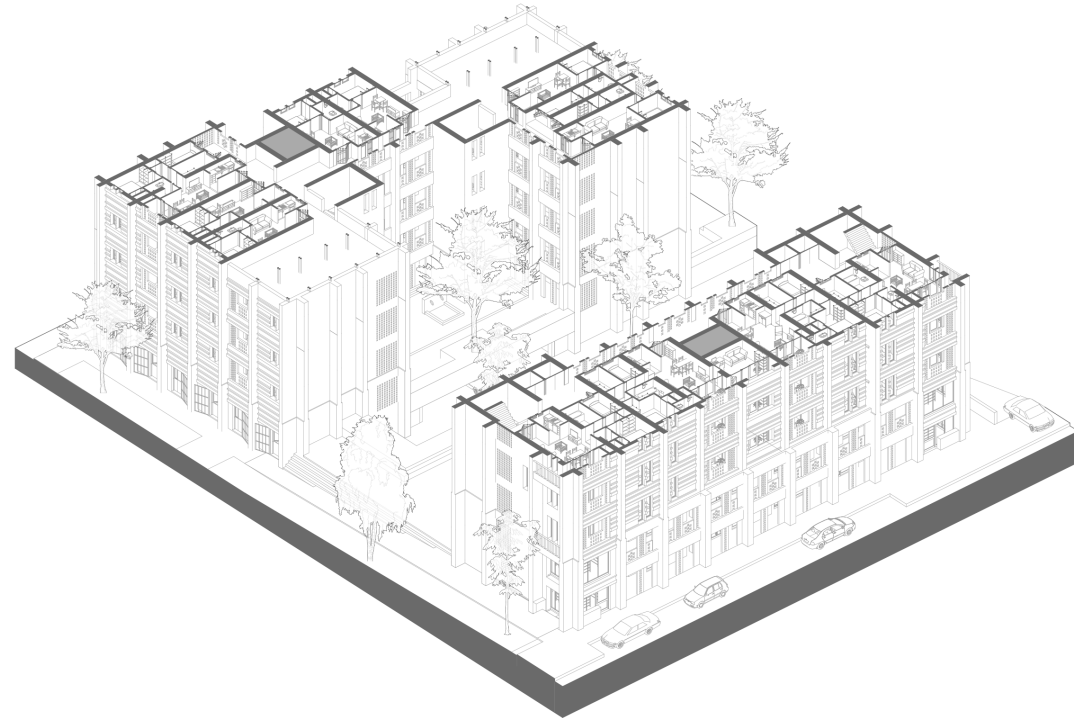
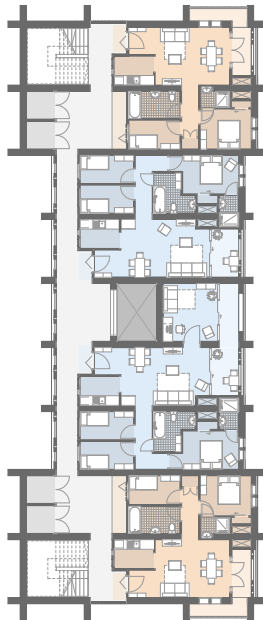
2-Bedroom 2

3-Bedroom 1

2-Bedroom com. 2

3-Bedroom com. 2

Total 11

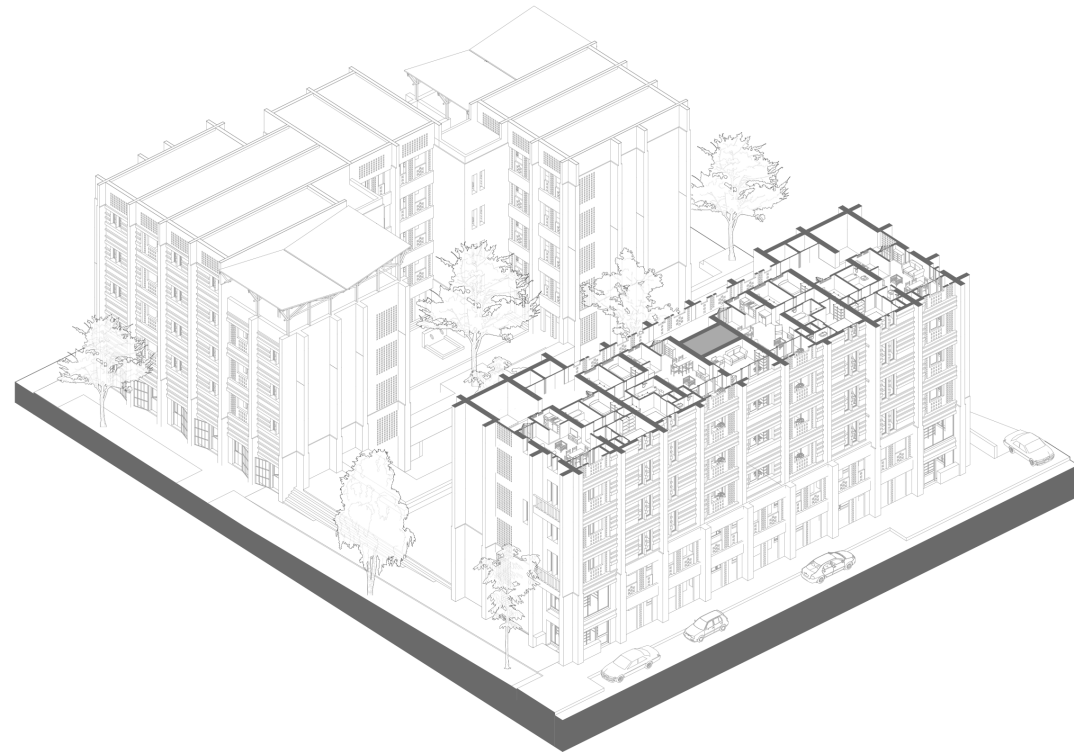
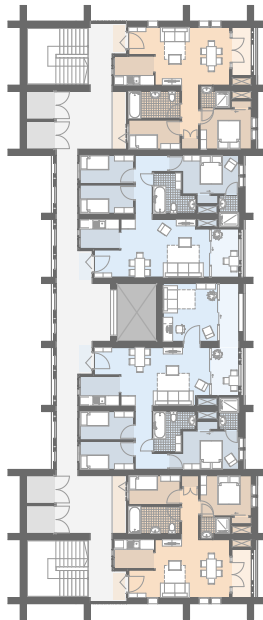
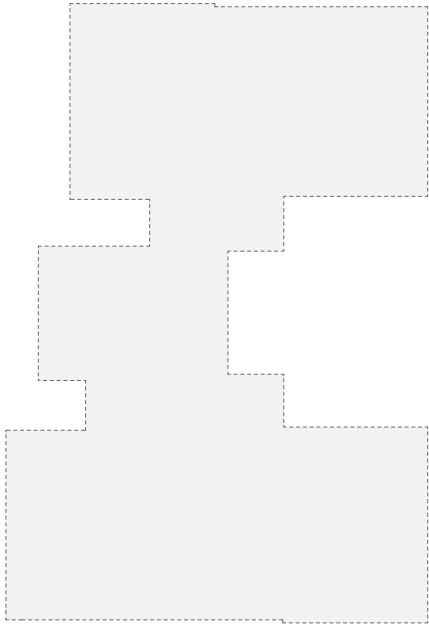


Plan level 5

Elevator positioned in core for efficient routing and stability purposes

Amount of apartments

1-Bedroom 0
2-Bedroom 0
3-Bedroom 0
2-Bedroom com. 2
3-Bedroom com. 2
Total 4



0 4 8 16 m



Public spaces

Elaboration on the different public spaces



Main street



Main street

Facade shop floors distinguishable from apartments



Inner square and parking garage



Inner square

Connected by green wedges with urban wetland



Inner square

Space for fixed and flexible commerce



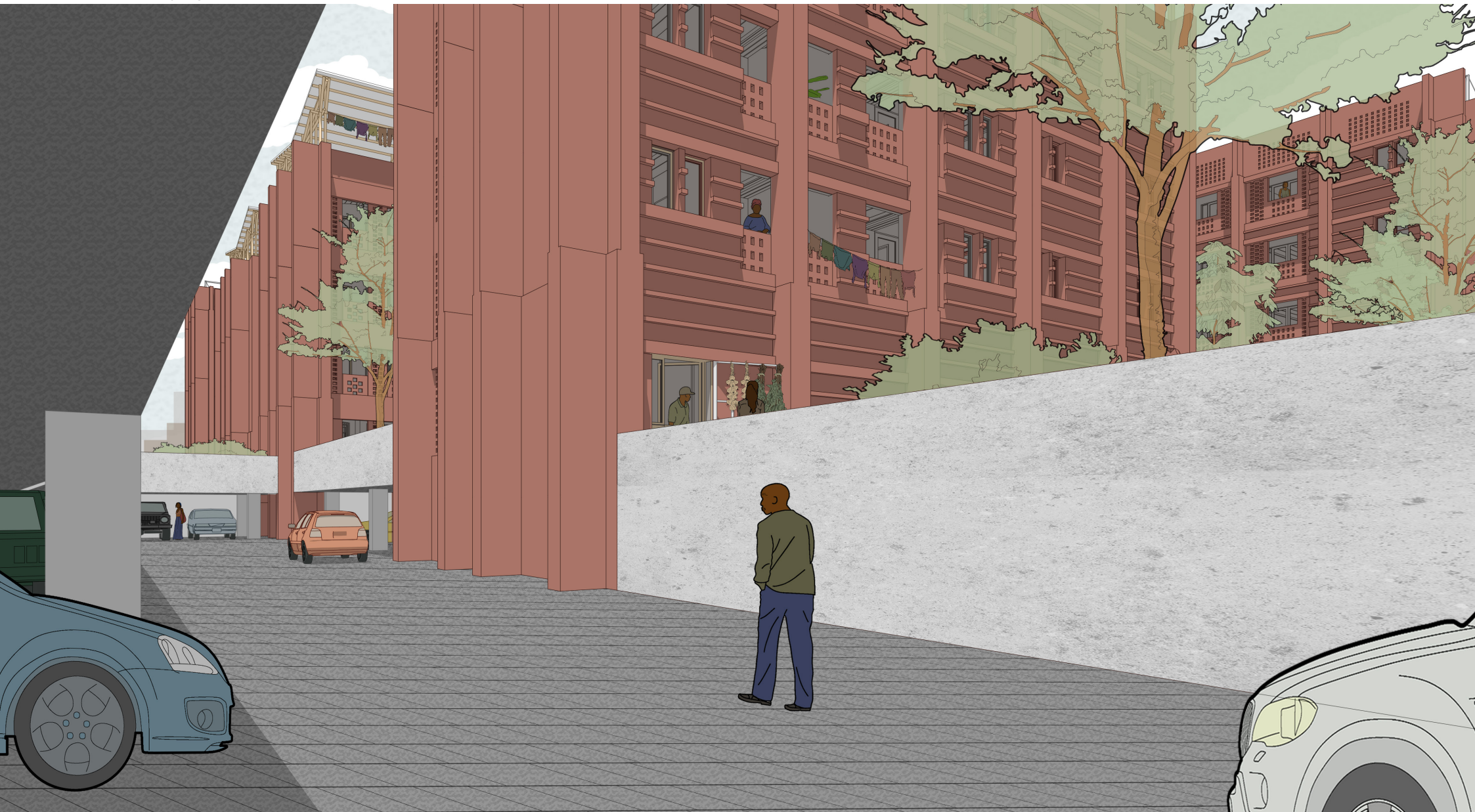
Parking garage

As spatial barrier



Parking garage

Natural daylight



Side Street

Access road connecting all the cull de sacs



Side street

Dead-end square



Side street

Continuation of green wedge



Urban Vision

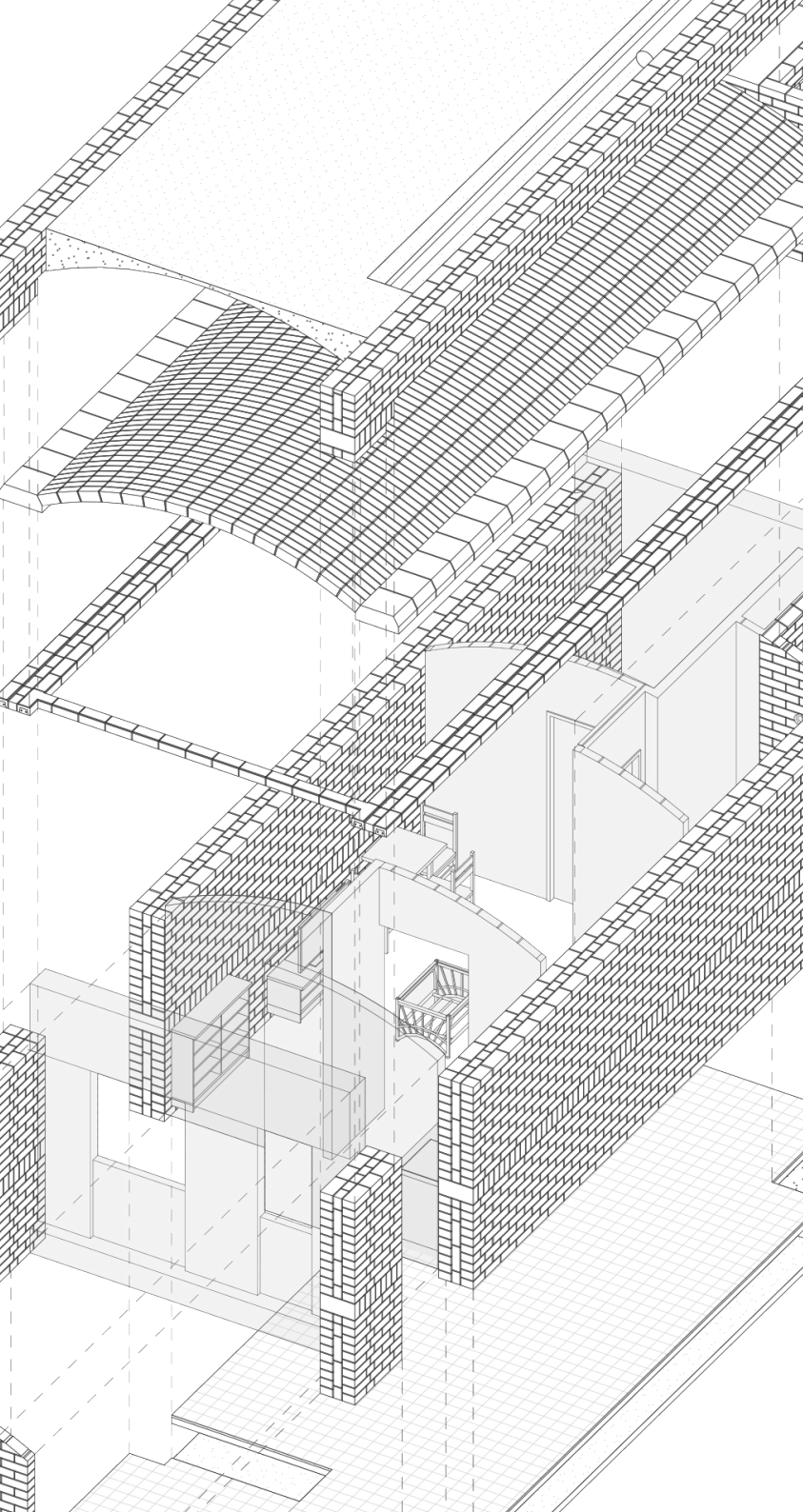
As a principle



Implemented in 24 Kebele

Versatile modular building systems enables to respond to its environment

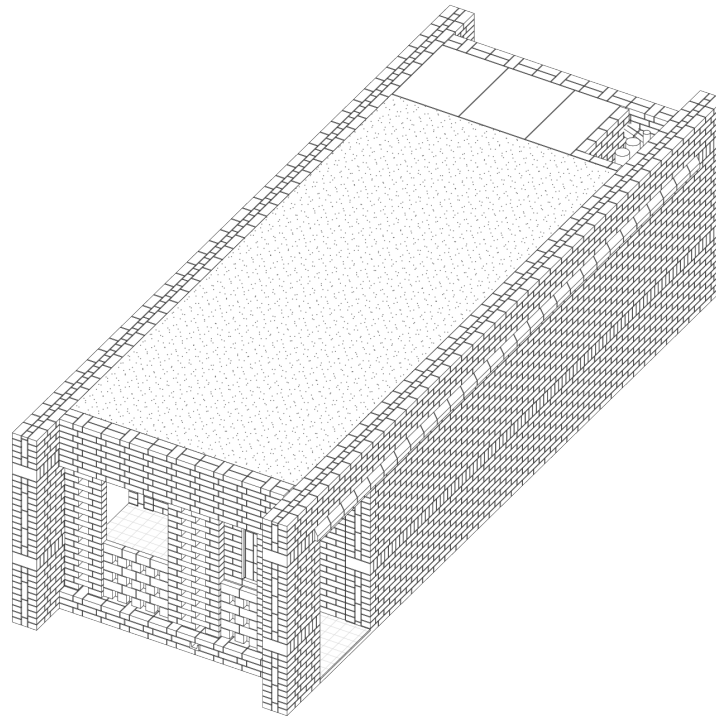




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Unit principle

Repeats itself throughout the building with minor adjustments



Unit principle

Components

Sand fill

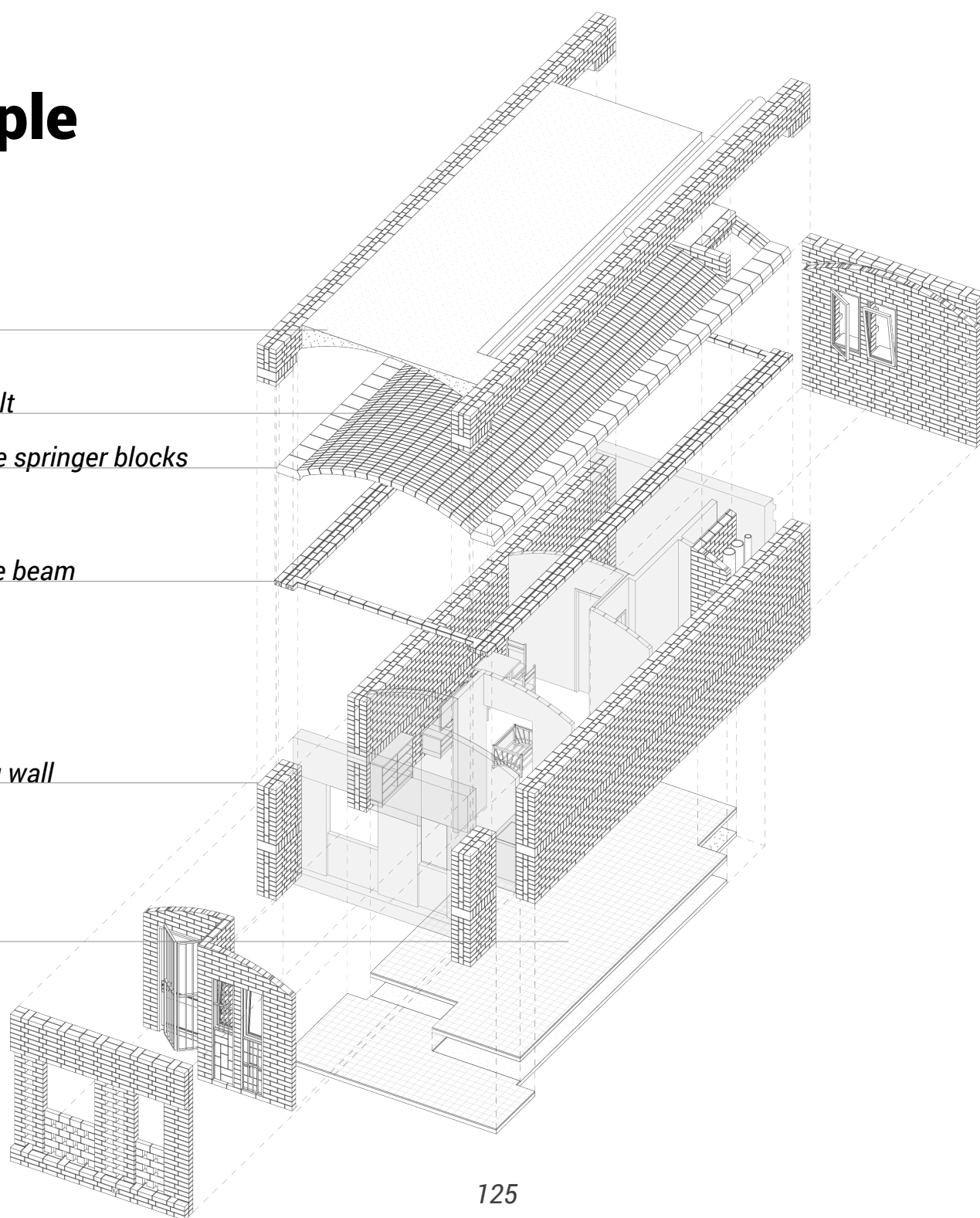
Masonry vault

Natural stone springer blocks

Horizontal tie beam

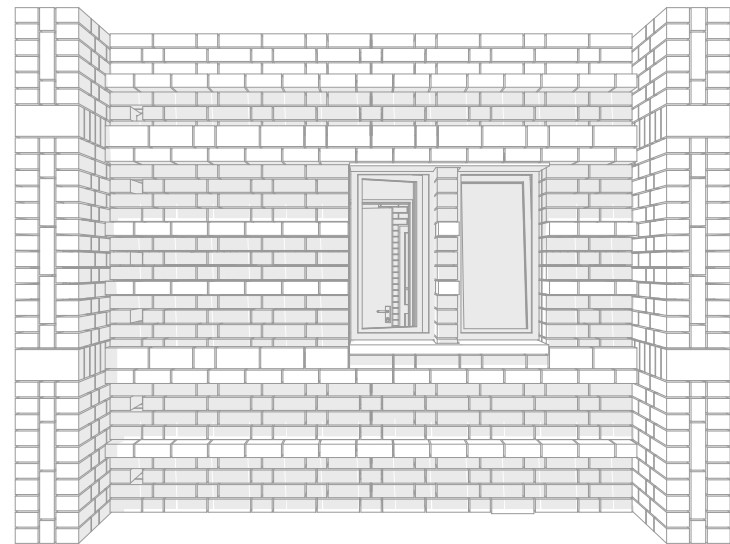
Load-bearing wall

Adobe tiles

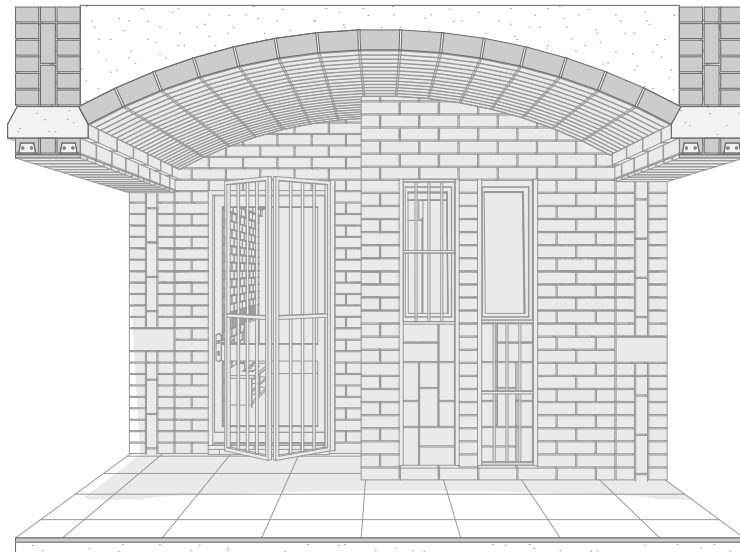


Unit principle

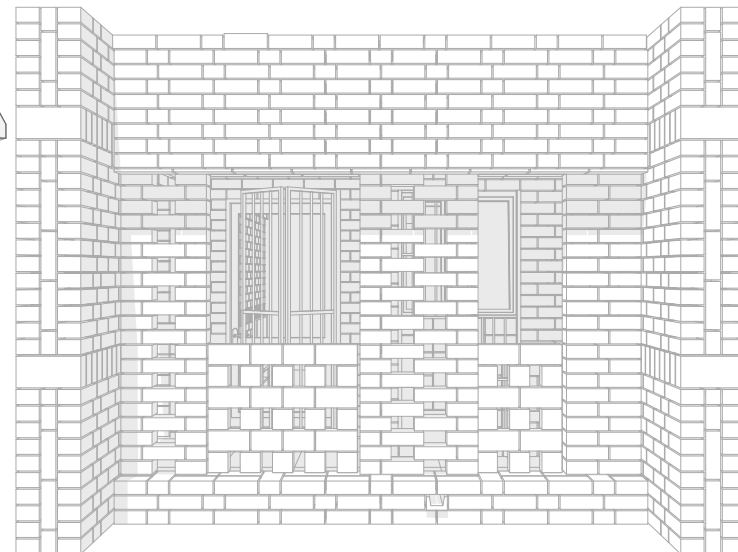
Serrated facade, entrance facade with optional steel bar enclosure, perforated balustrade



A



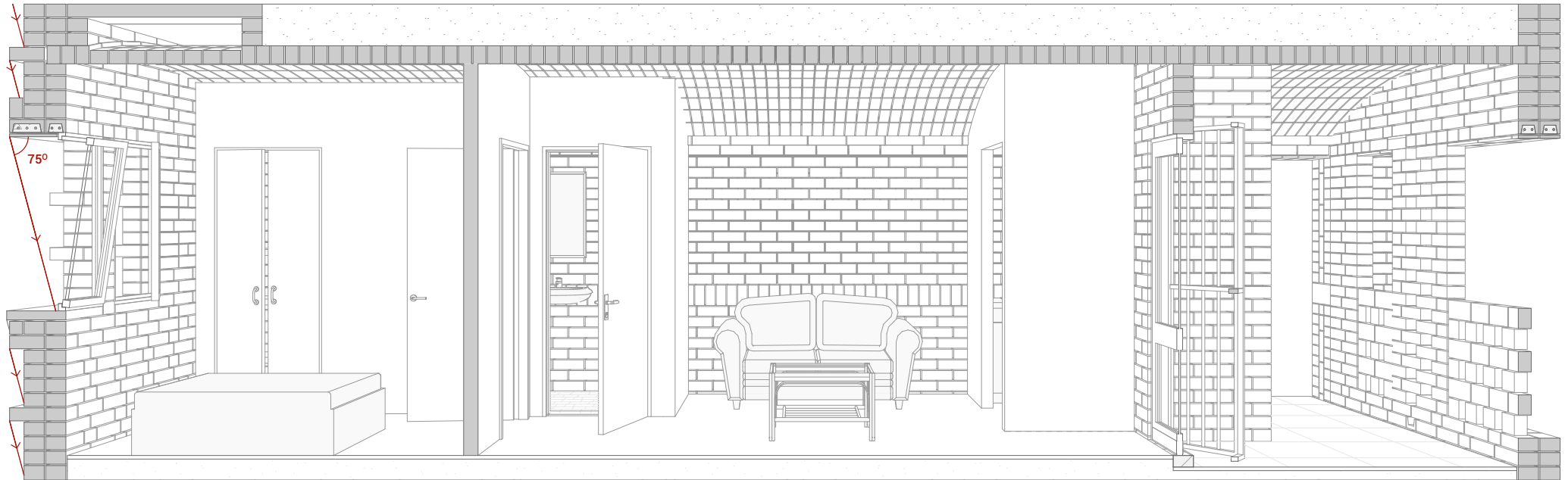
B



C

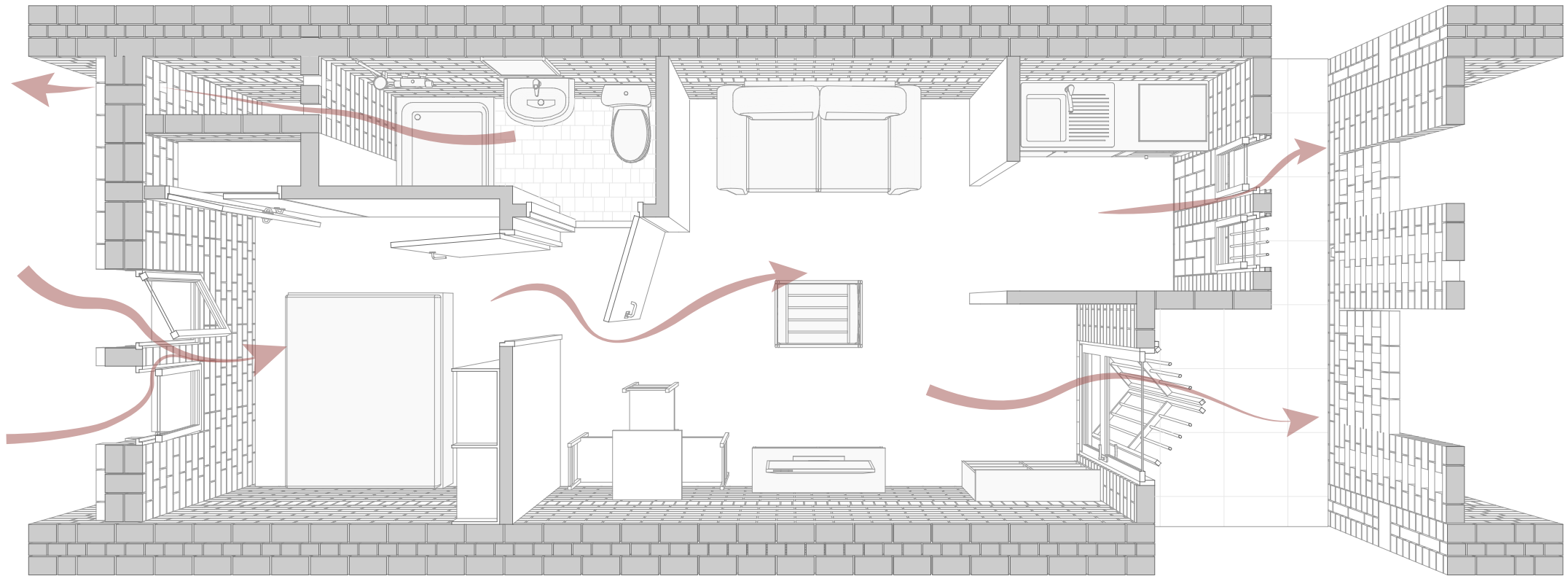
Unit principle

Deep-set windows, Thick earth walls



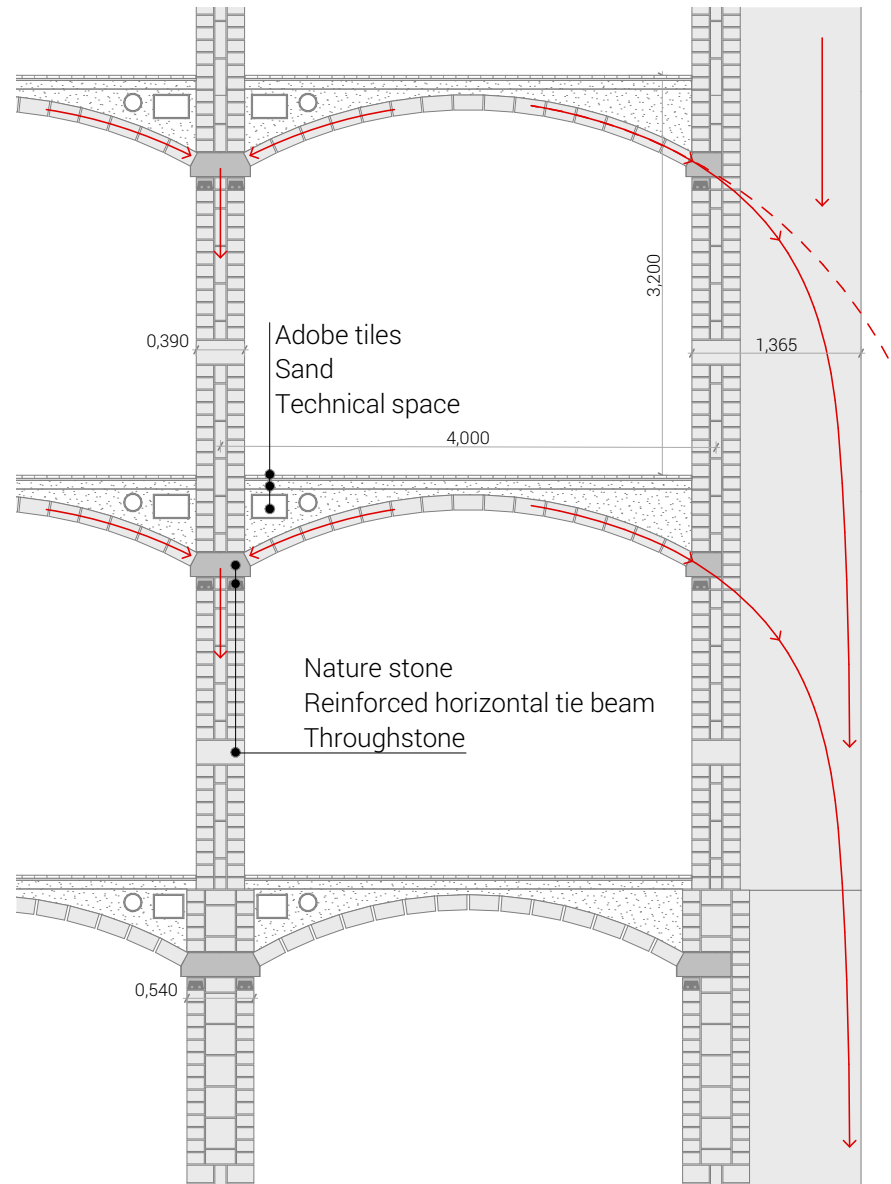
Unit principle

Cross-ventilation, thick earthen walls balances air humidity and functions as acoustic isolation



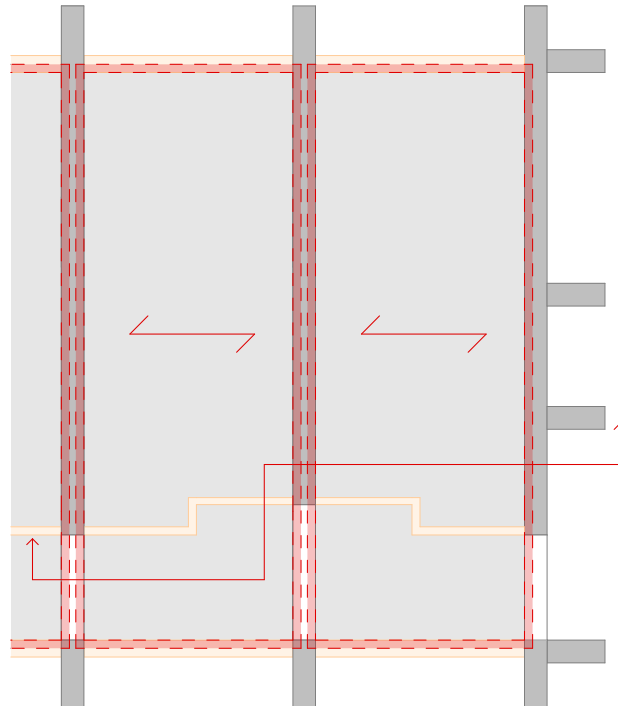
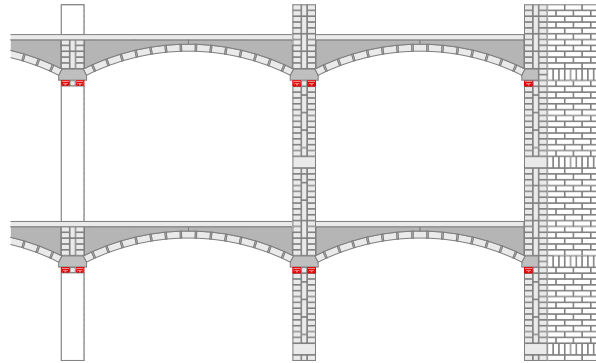
Structural diagram

Masonry vault , buttresses bearing the thrust of the arch



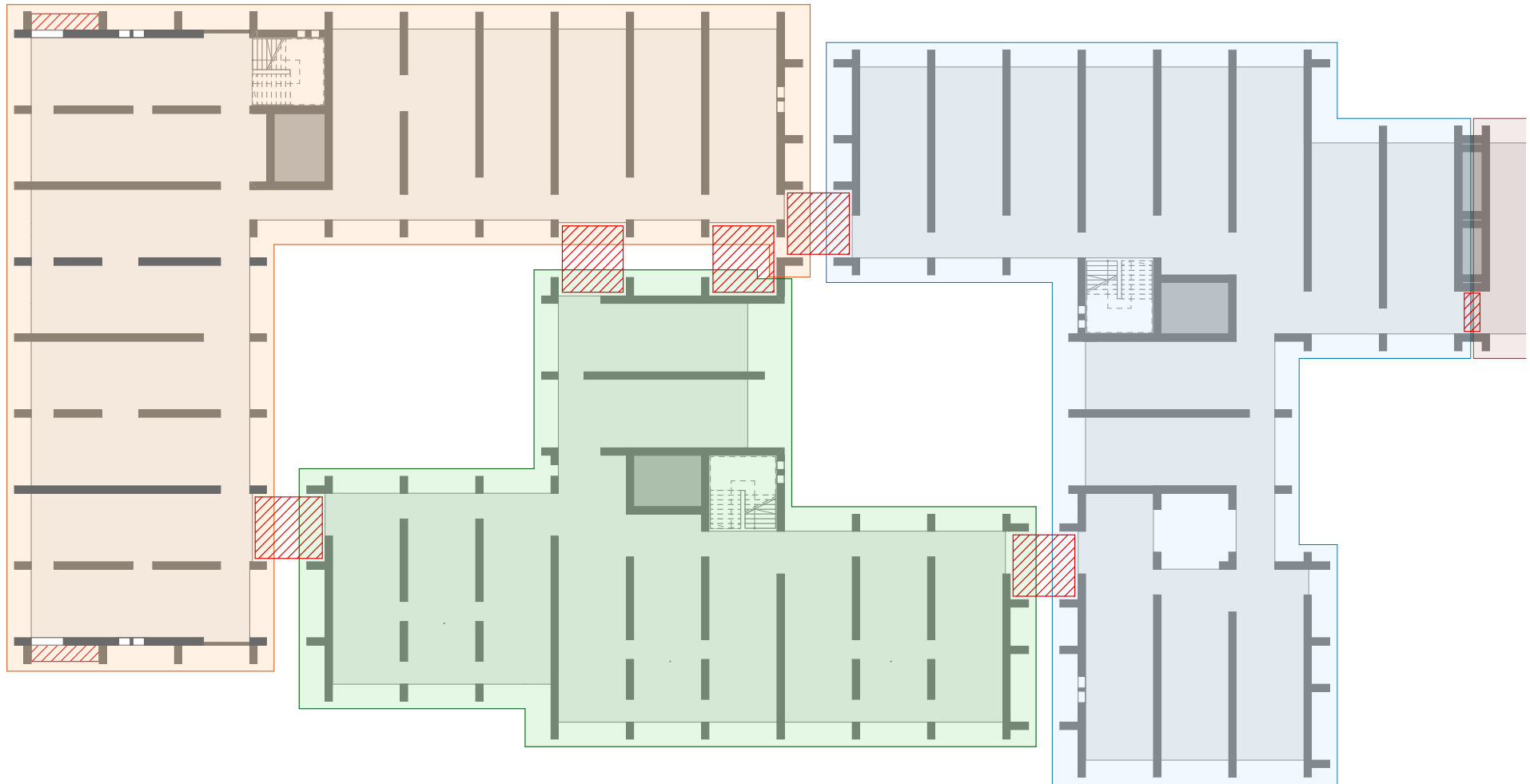
Horizontal tie beam

Ring beam, increase loadbearing capacity of vault, helps to bear the thrust of the arch, lintel



Stability

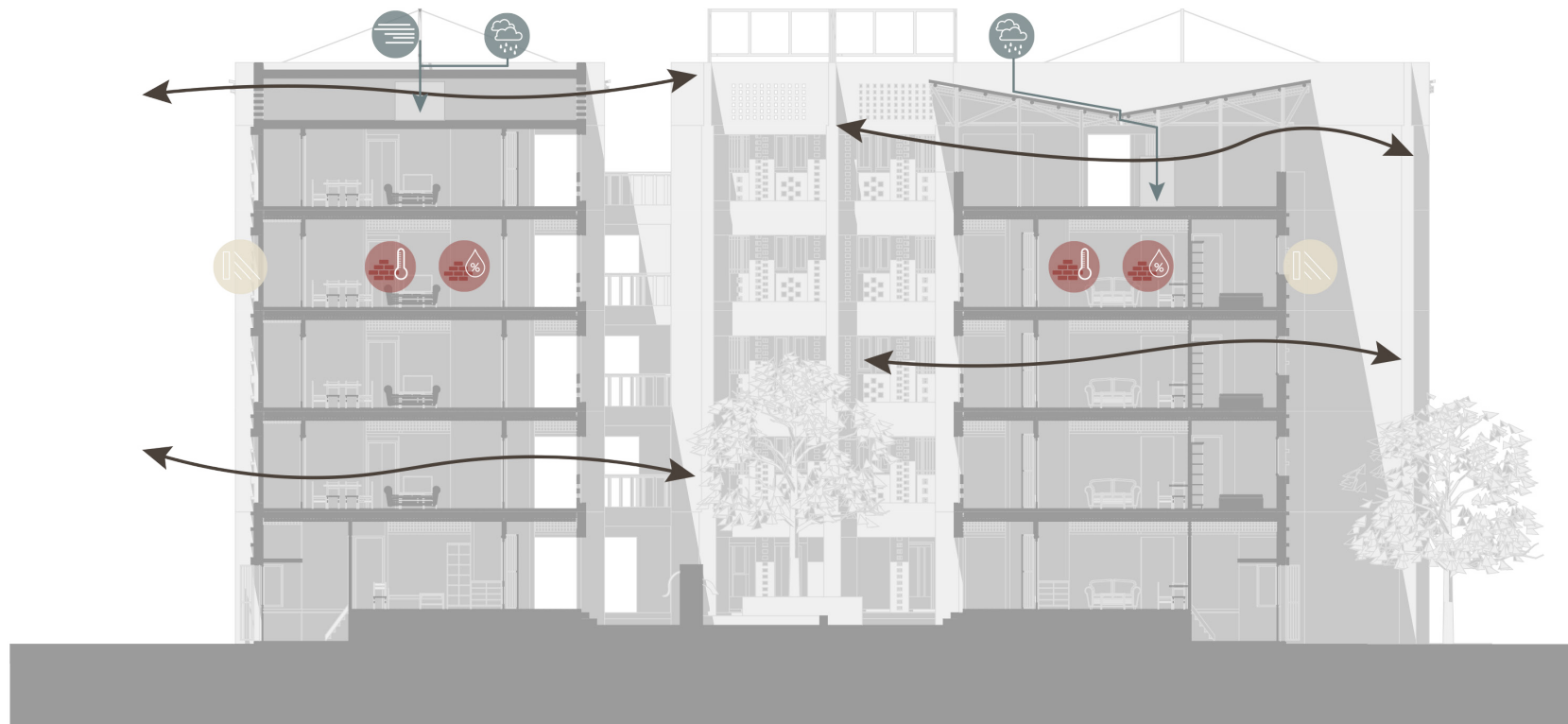
Structurally independent units of max 45 meters connected with bamboo bridges



 Bamboo bridge or balcony

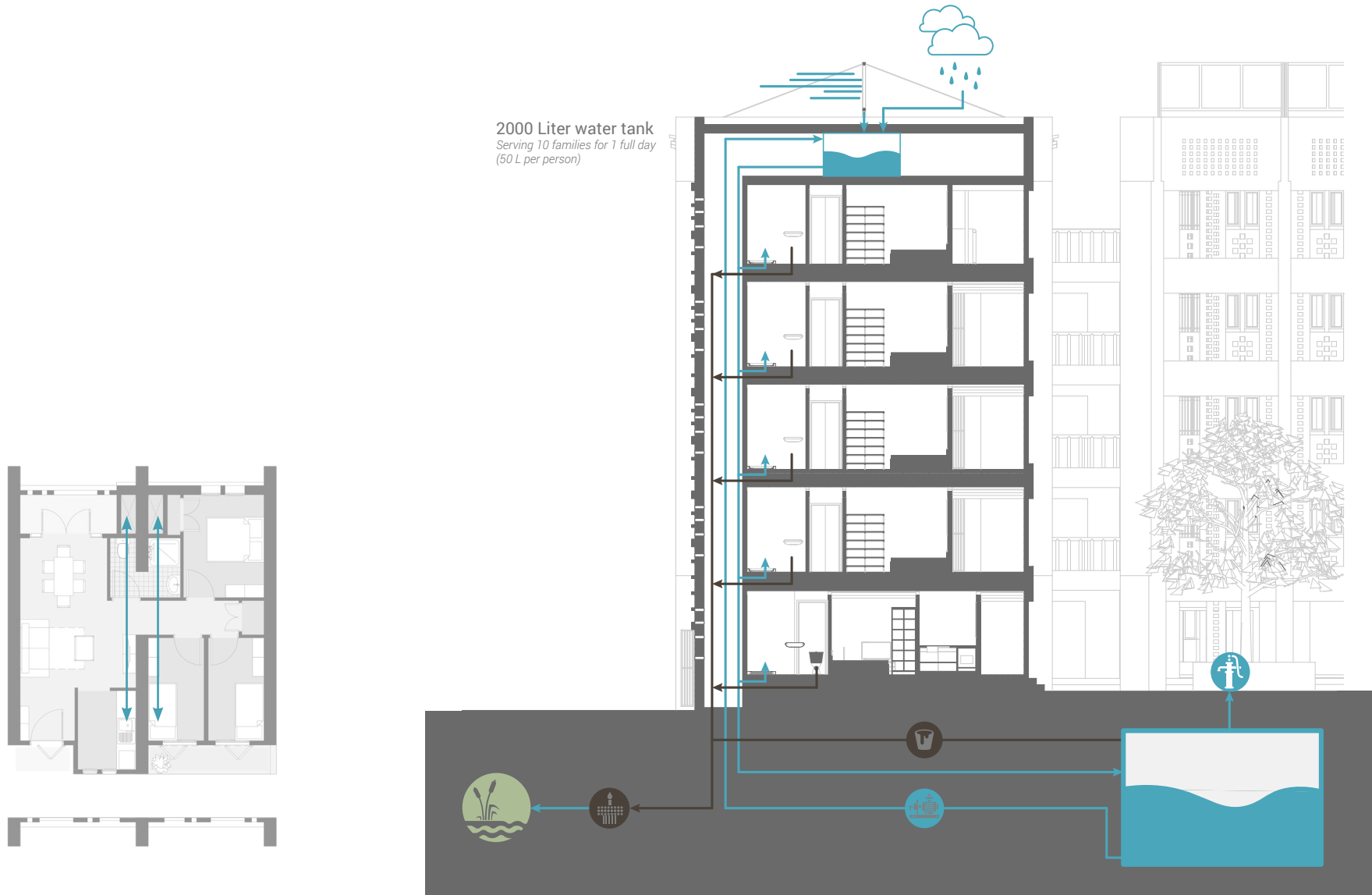
Climate

Cross ventilation, double layered roof



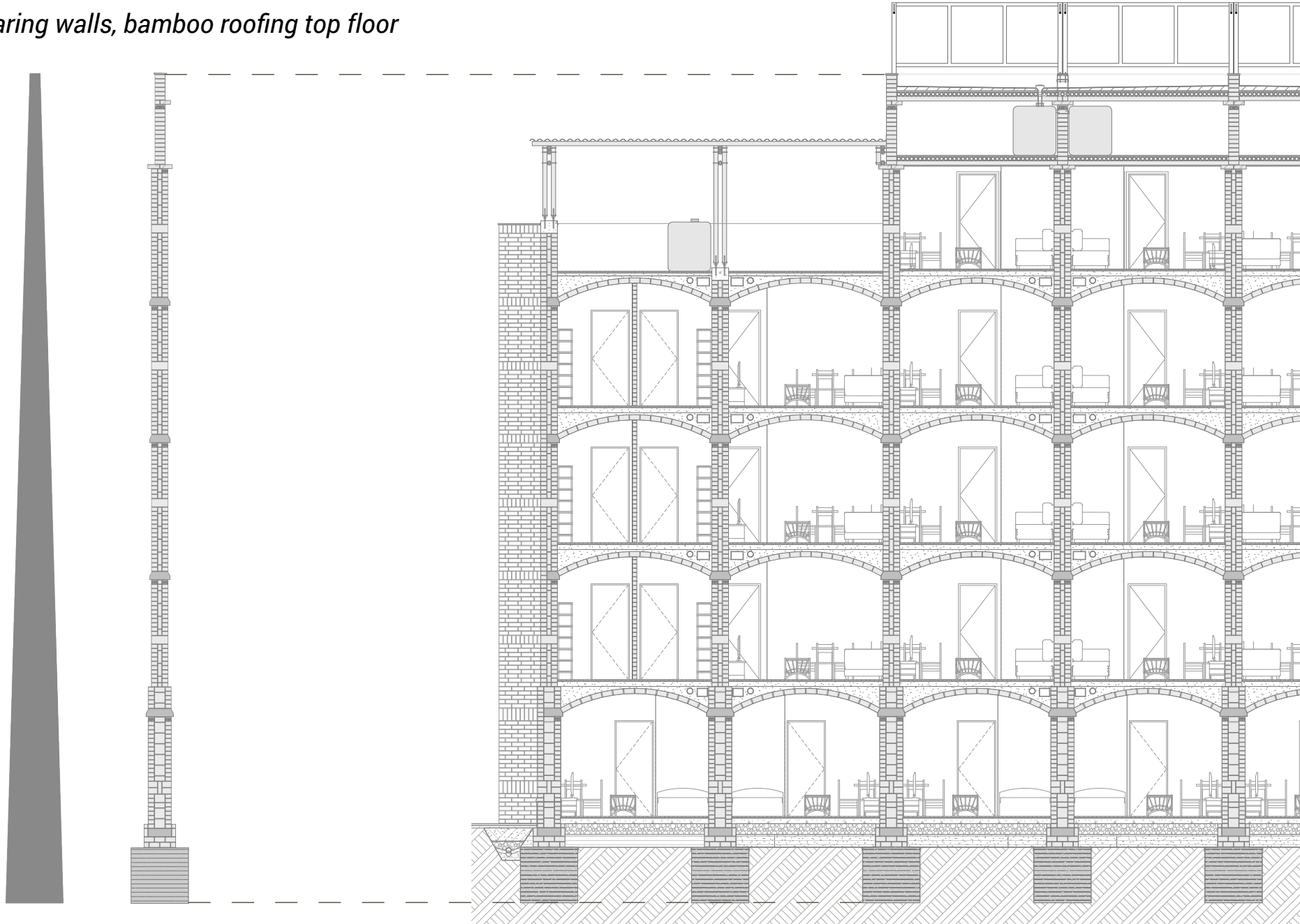
Waterflow

Water harvesting of rain and air humidity, sewage water purified in urban wetland



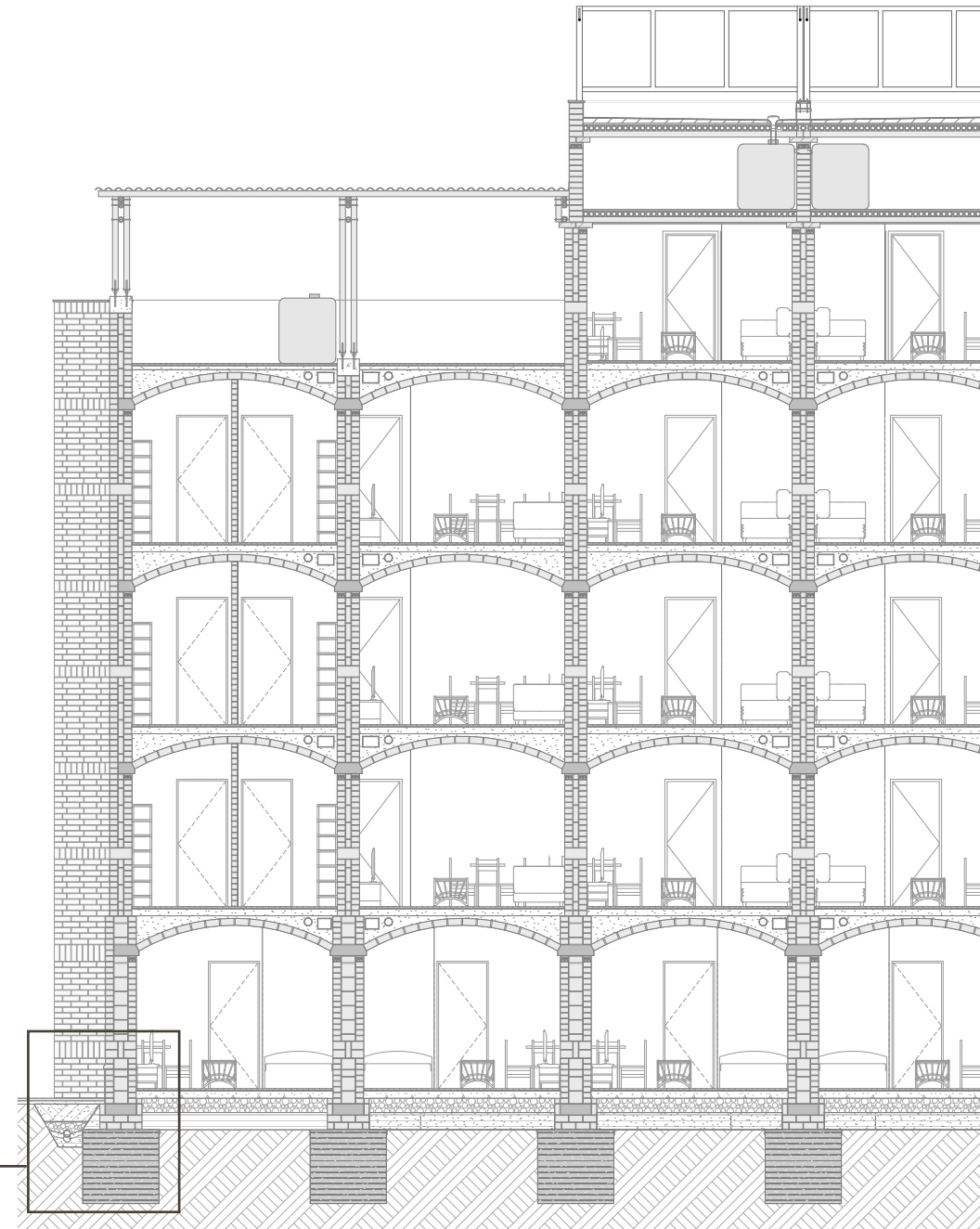
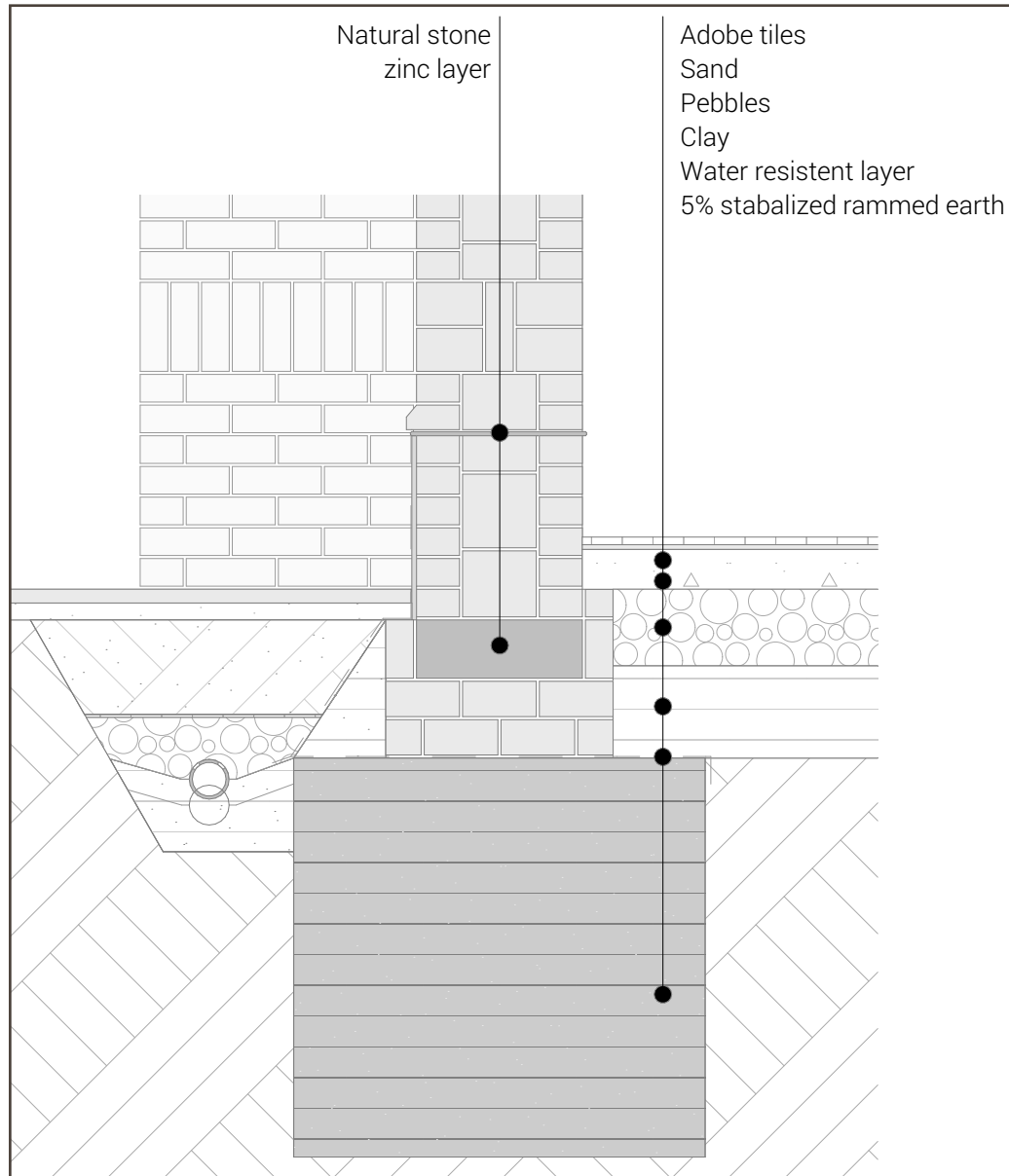
Longitudinal section

Optimized loadbearing walls, bamboo roofing top floor



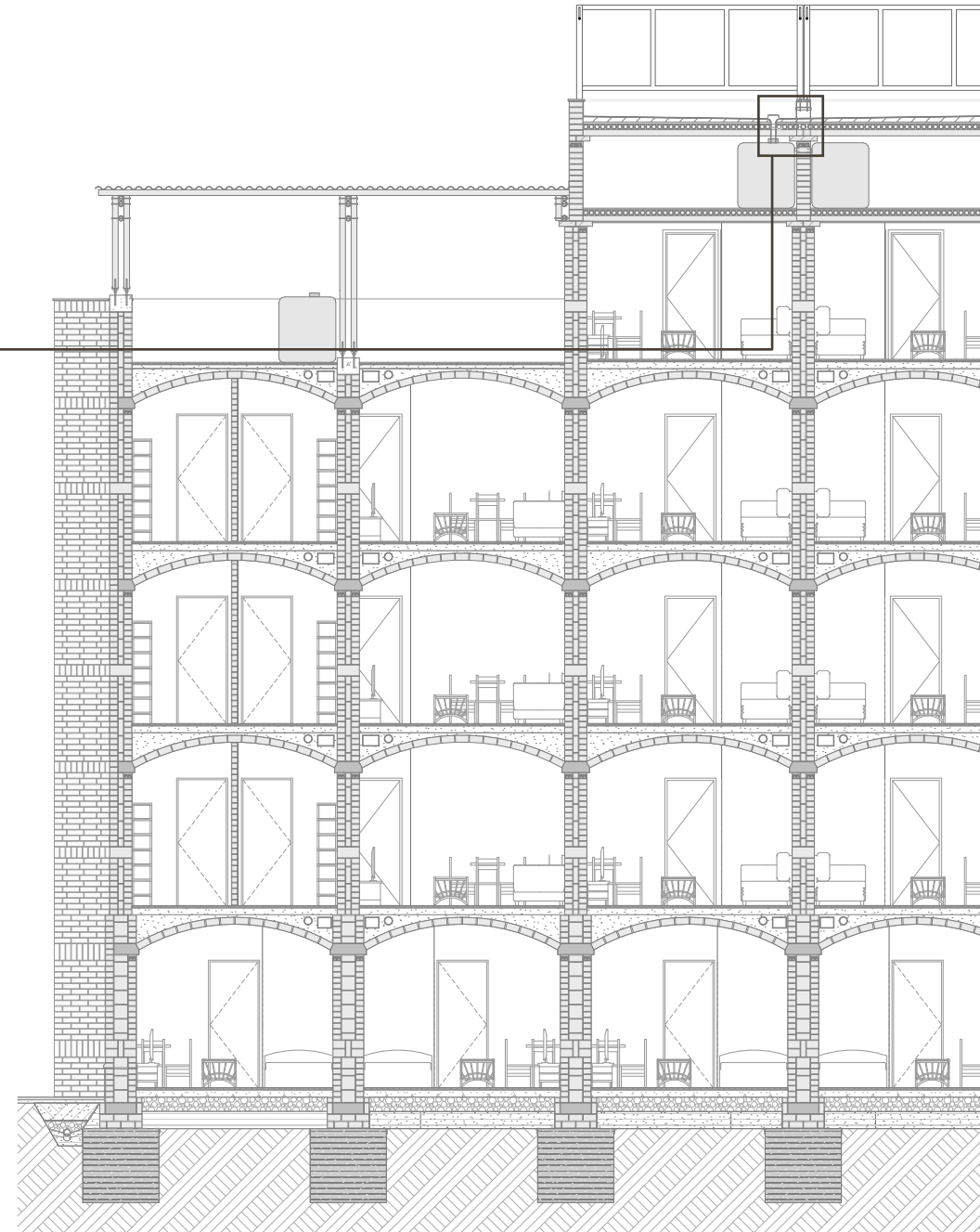
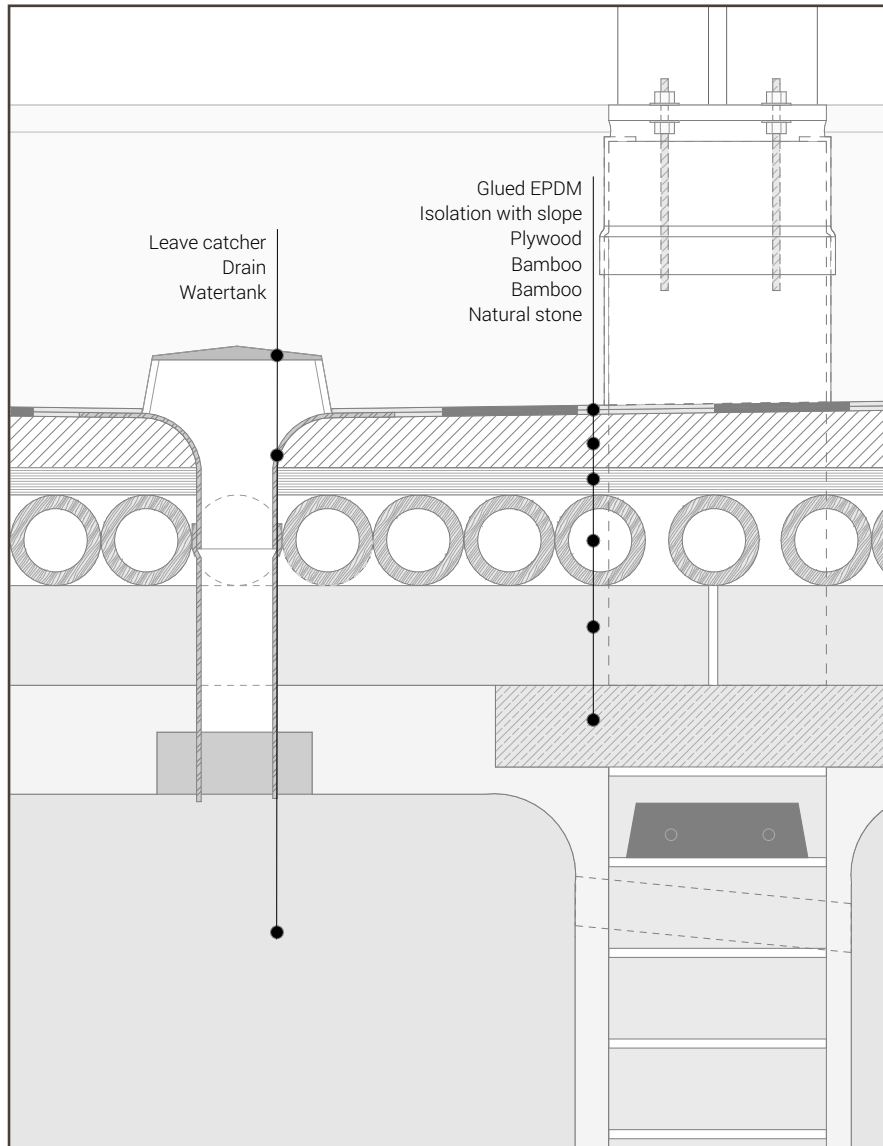
Detail foundation

5% stabilized rammed earth foundation



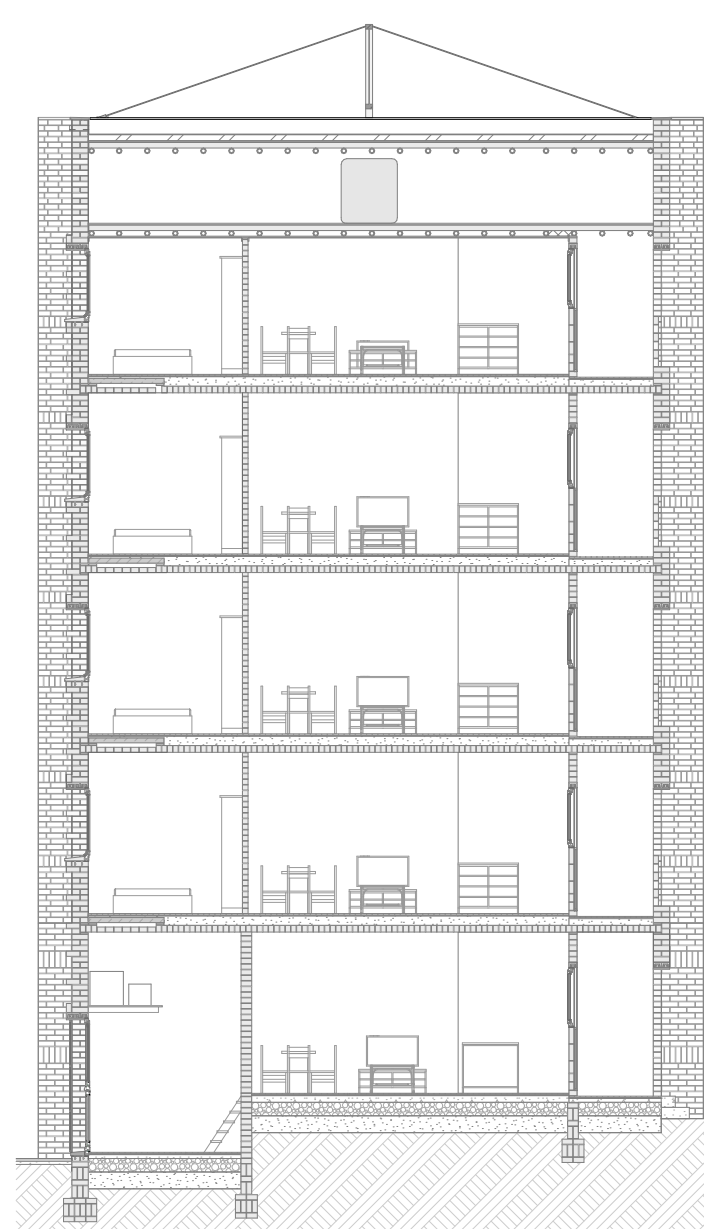
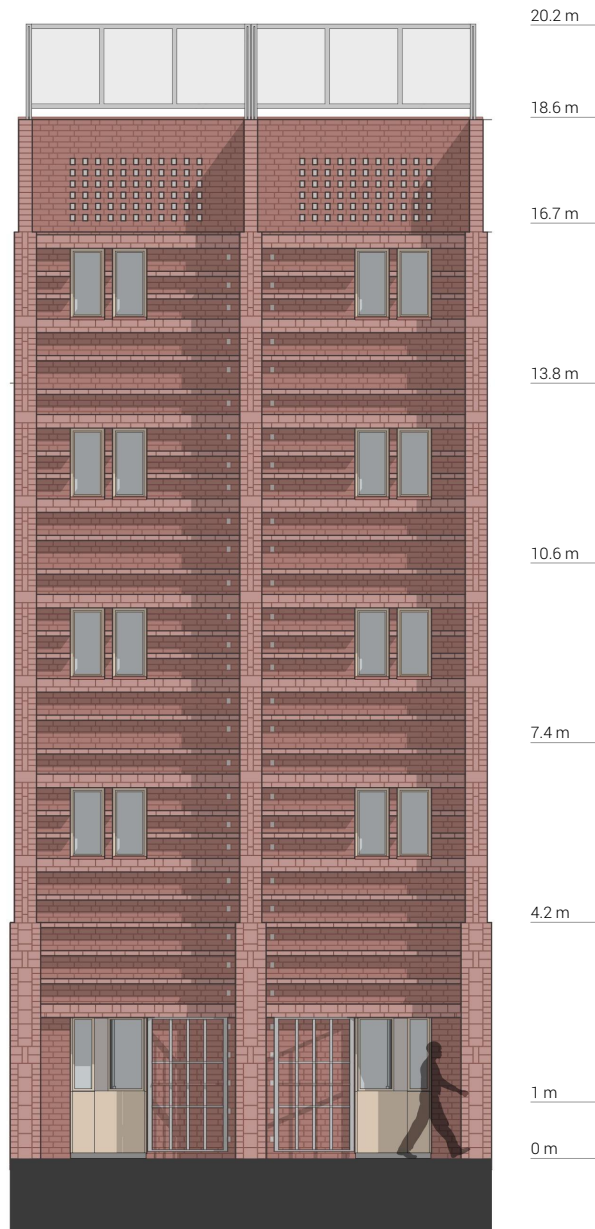
Detail water catchment

Bamboo floor, plywood, isolation on slope, glued epdm



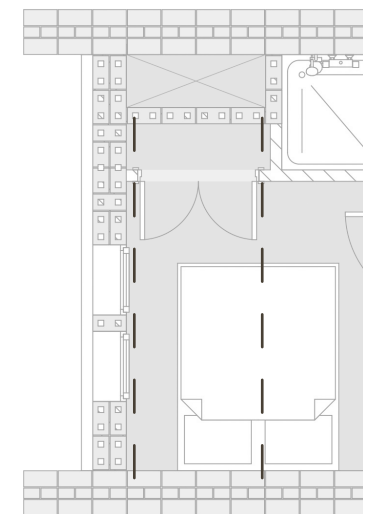
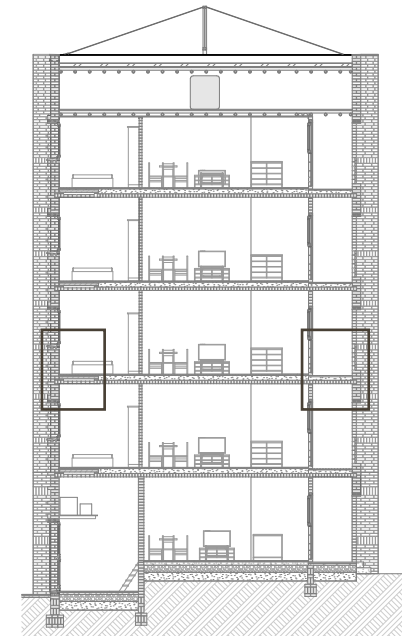
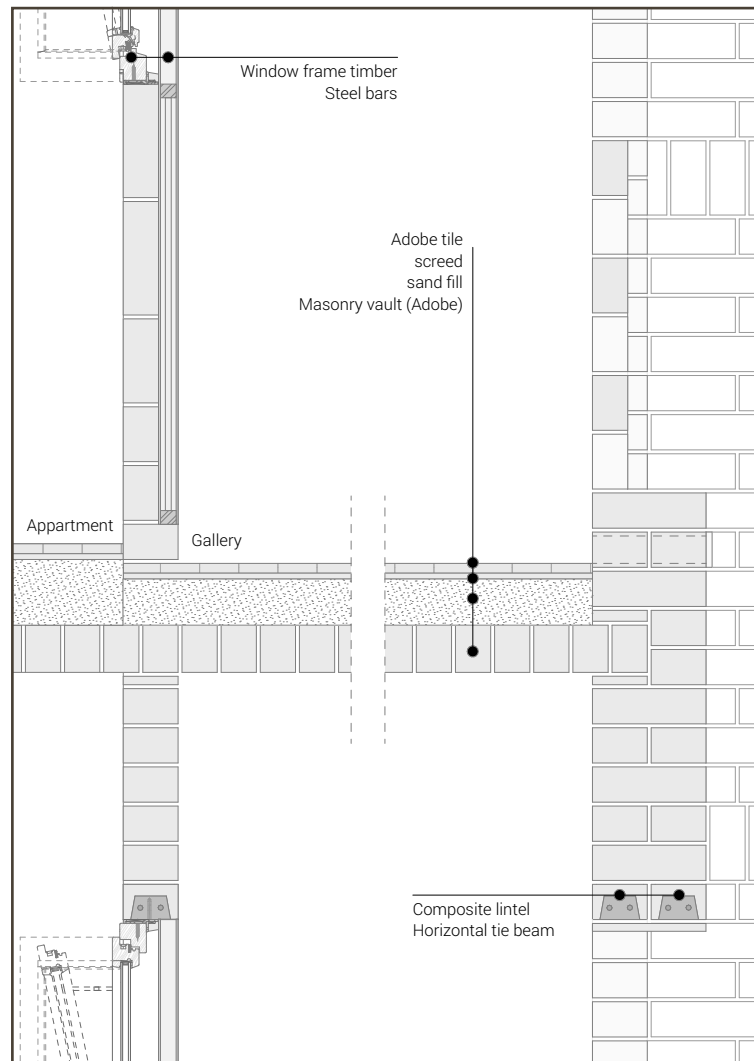
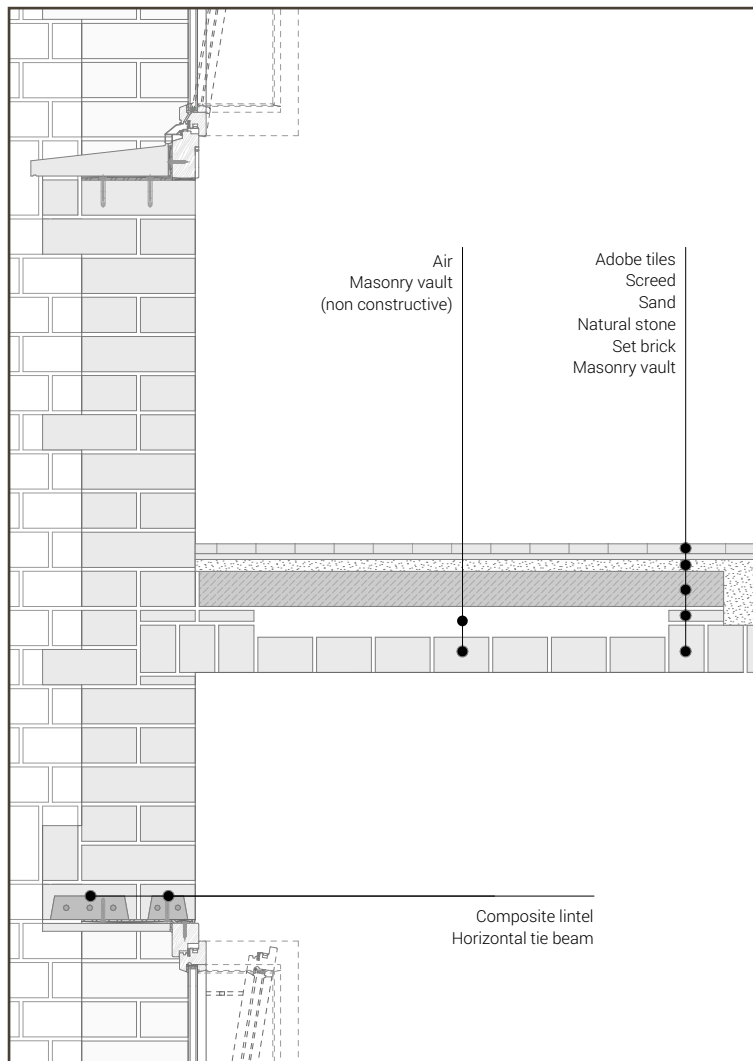
Cross section principle

Serrated facade and perforated ballustrades



Detail facades

Vault carries facade enabling vertical extension gaps, natural stone spans non constructive vault.





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Conclusion

How can the dwelling landscape contribute to the development of a healthy 'river culture' in Addis Ababa and vice versa?

This project exploited to the utmost the qualities and properties that the river and the waterbodies of Addis Ababa possess. By introducing the productive urban open space system the waterbodies have become a valuable asset interwoven in the daily patterns of life. It blurred the boundaries between the dwelling landscape and a river culture, between people and nature, and contributes to a synergetic environment between the urban dwellers and the rivers of the city.

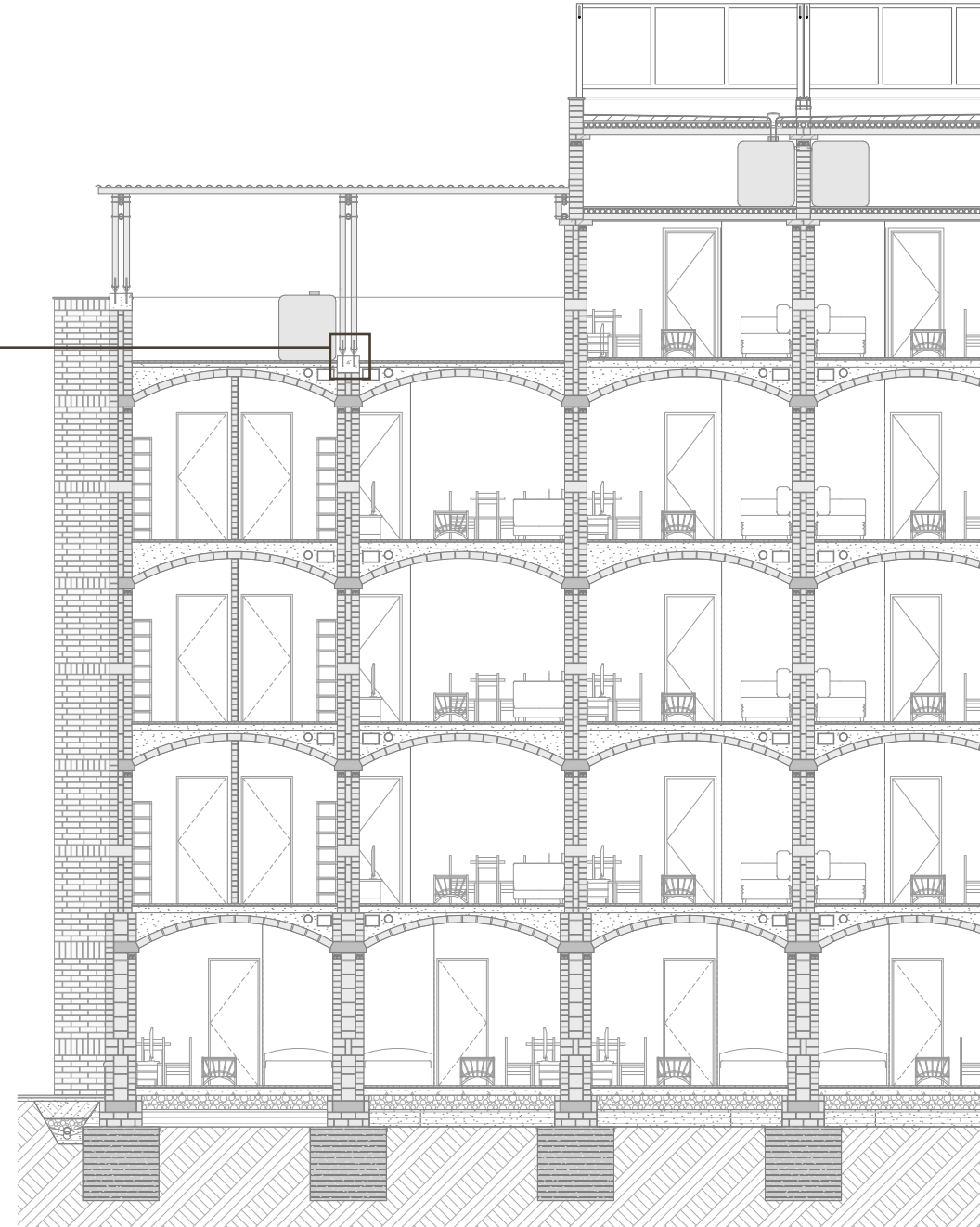
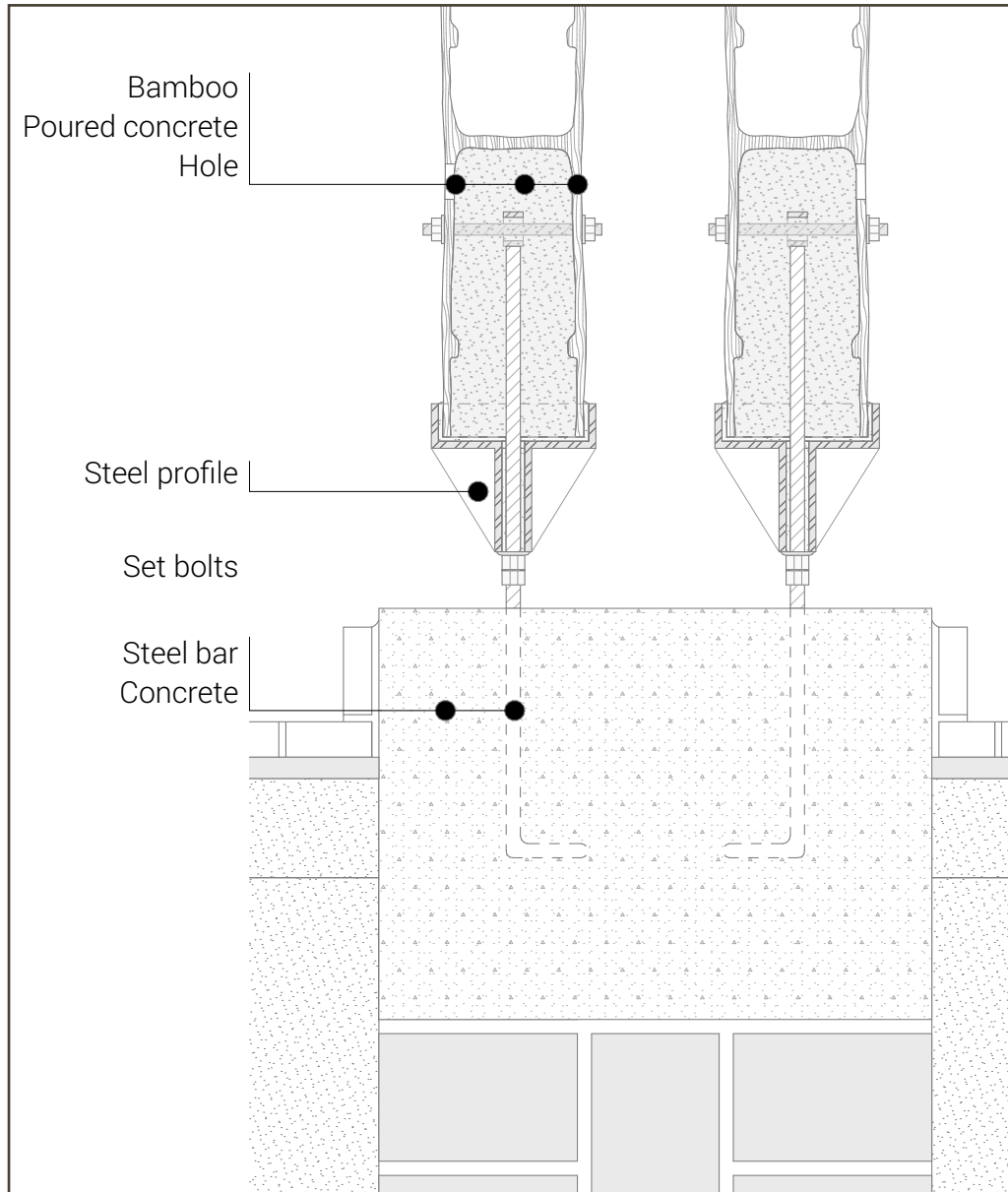
Thank you



Extra slides

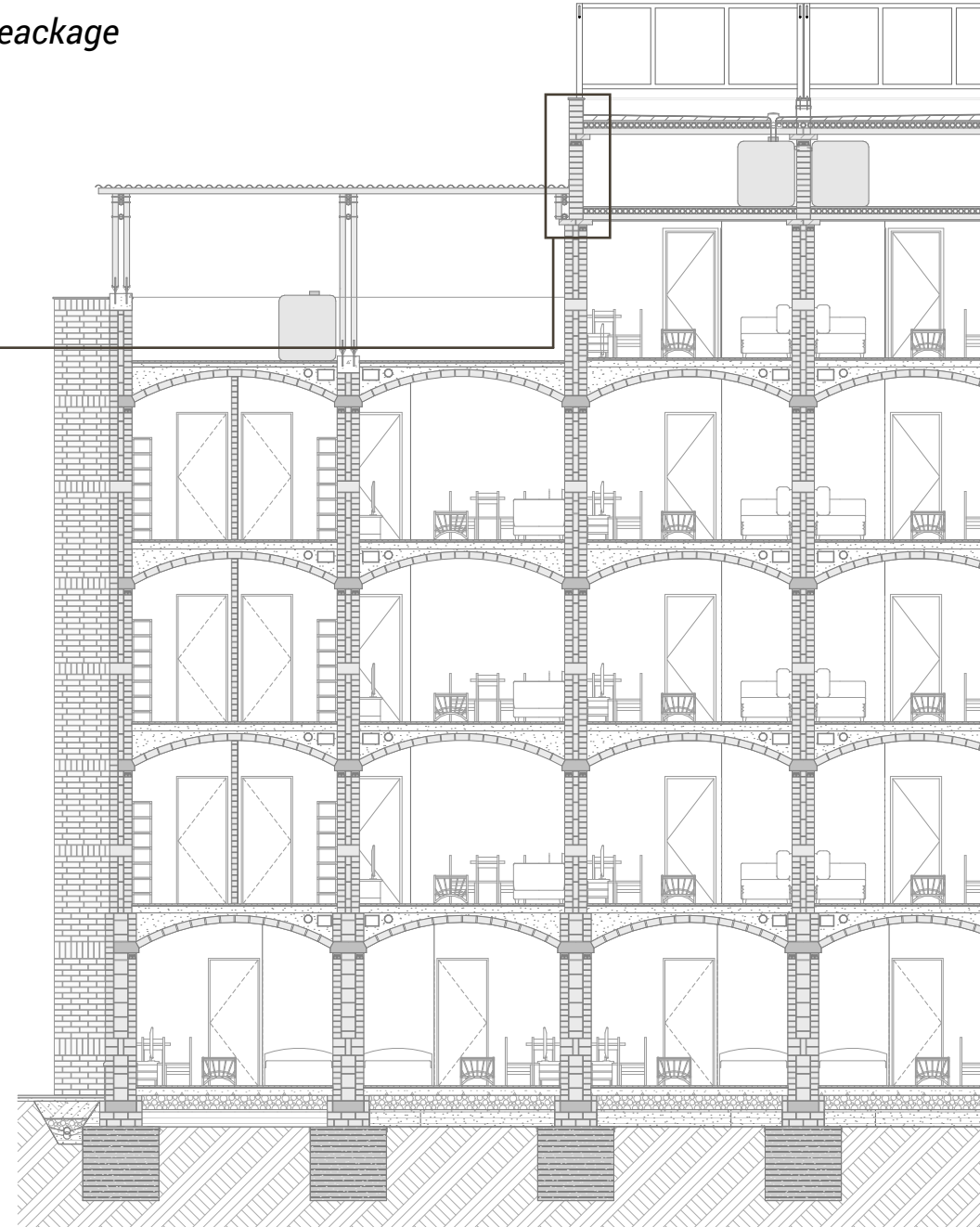
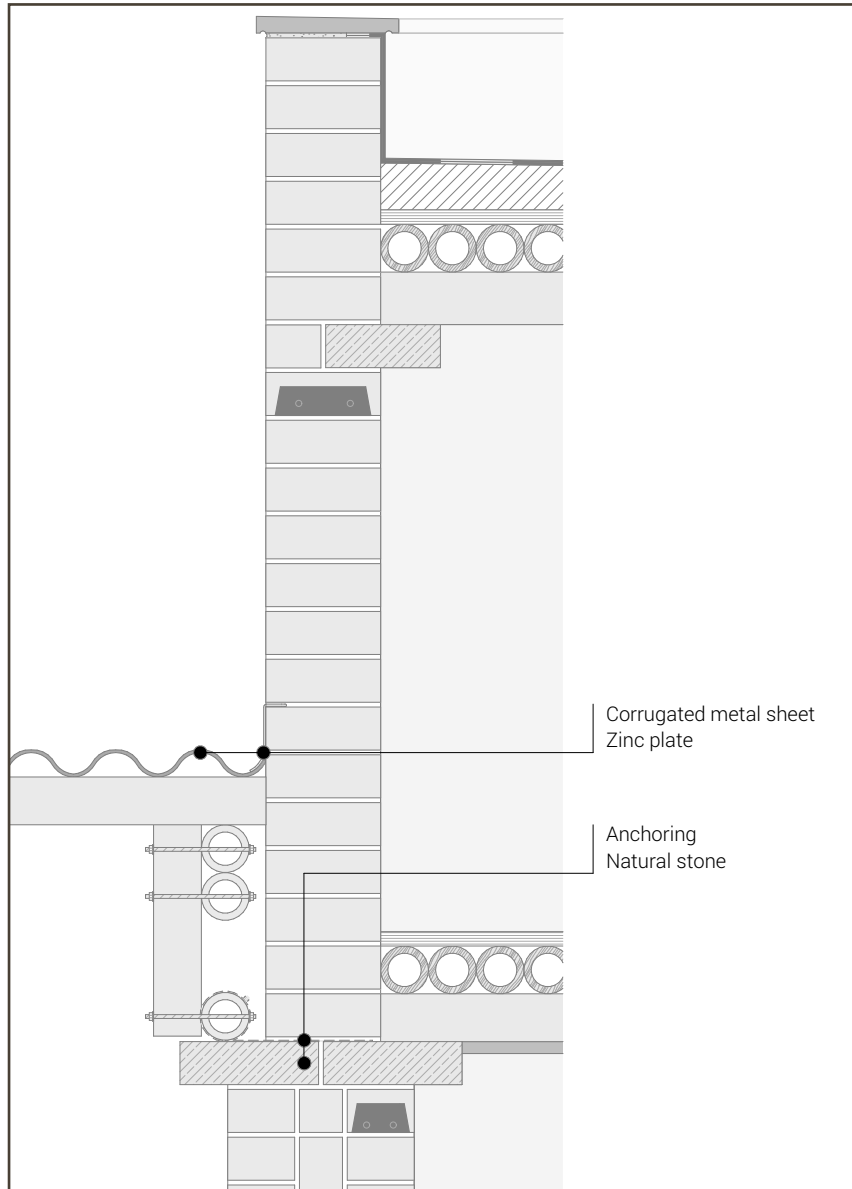
Detail bamboo column foundation

Steel profile transmits forces from bamboo to concrete foundation



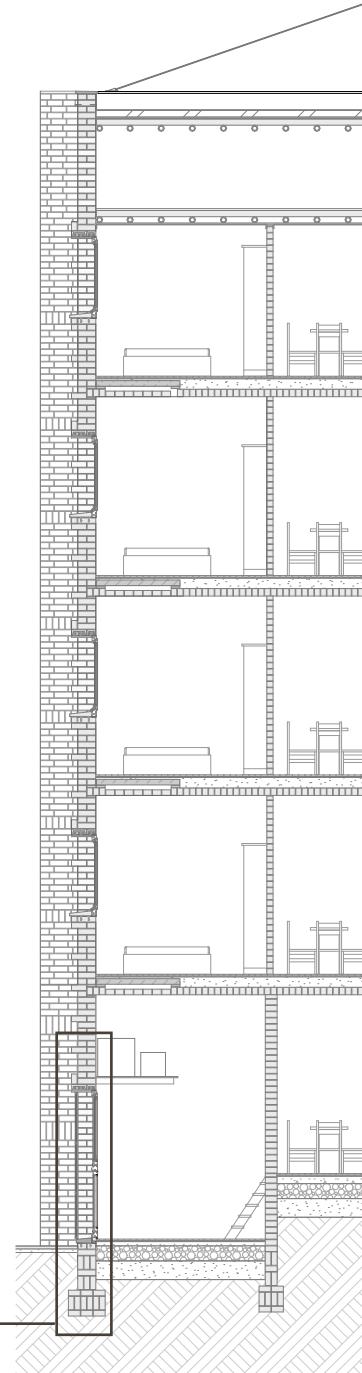
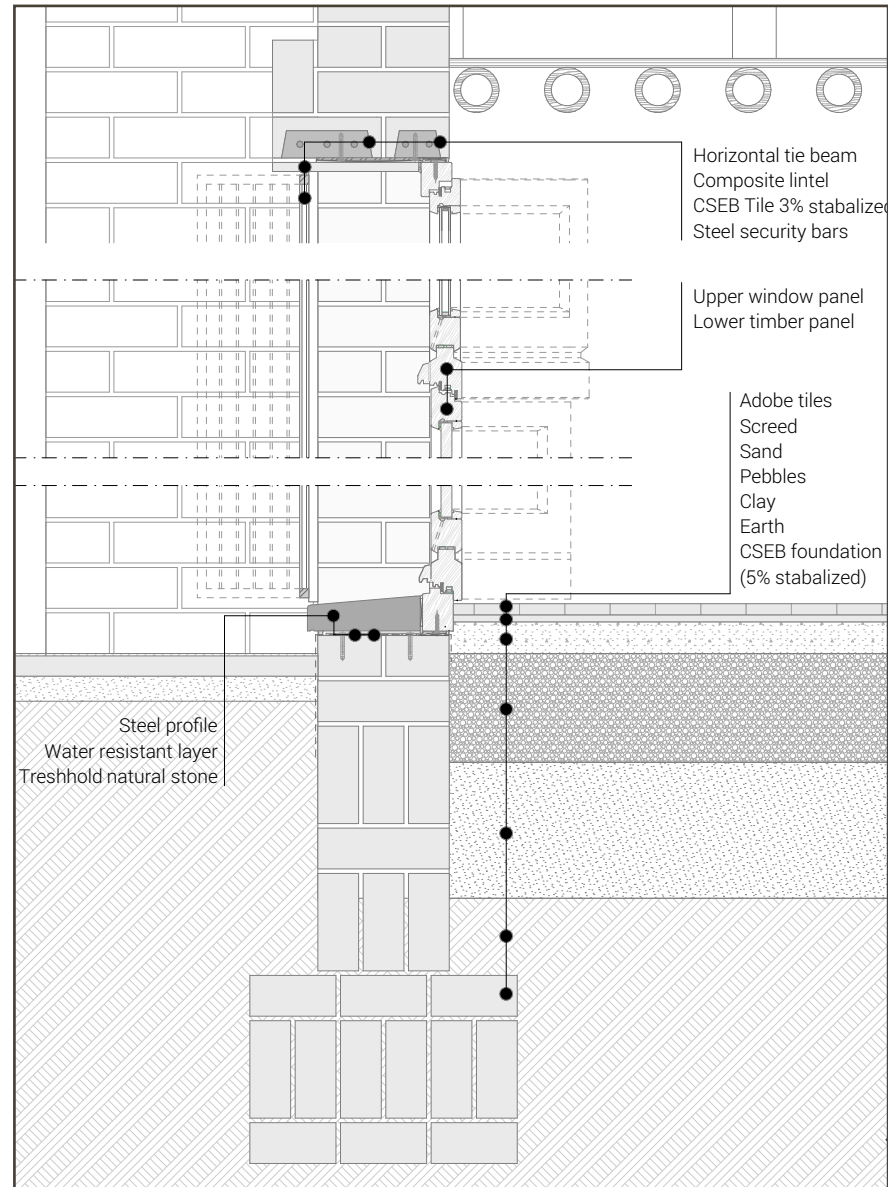
Detail eaves

Bamboo truss carried by loadbearing wall, zinc plate prevents water leakage



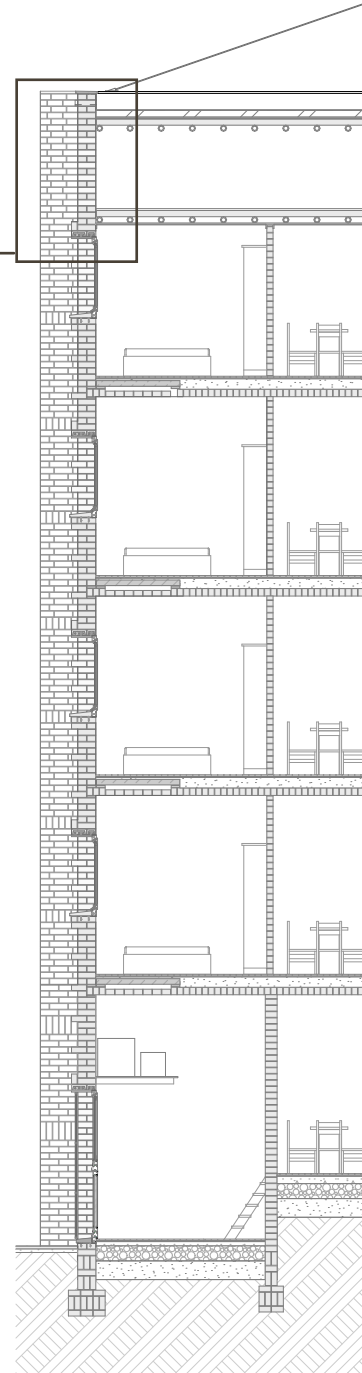
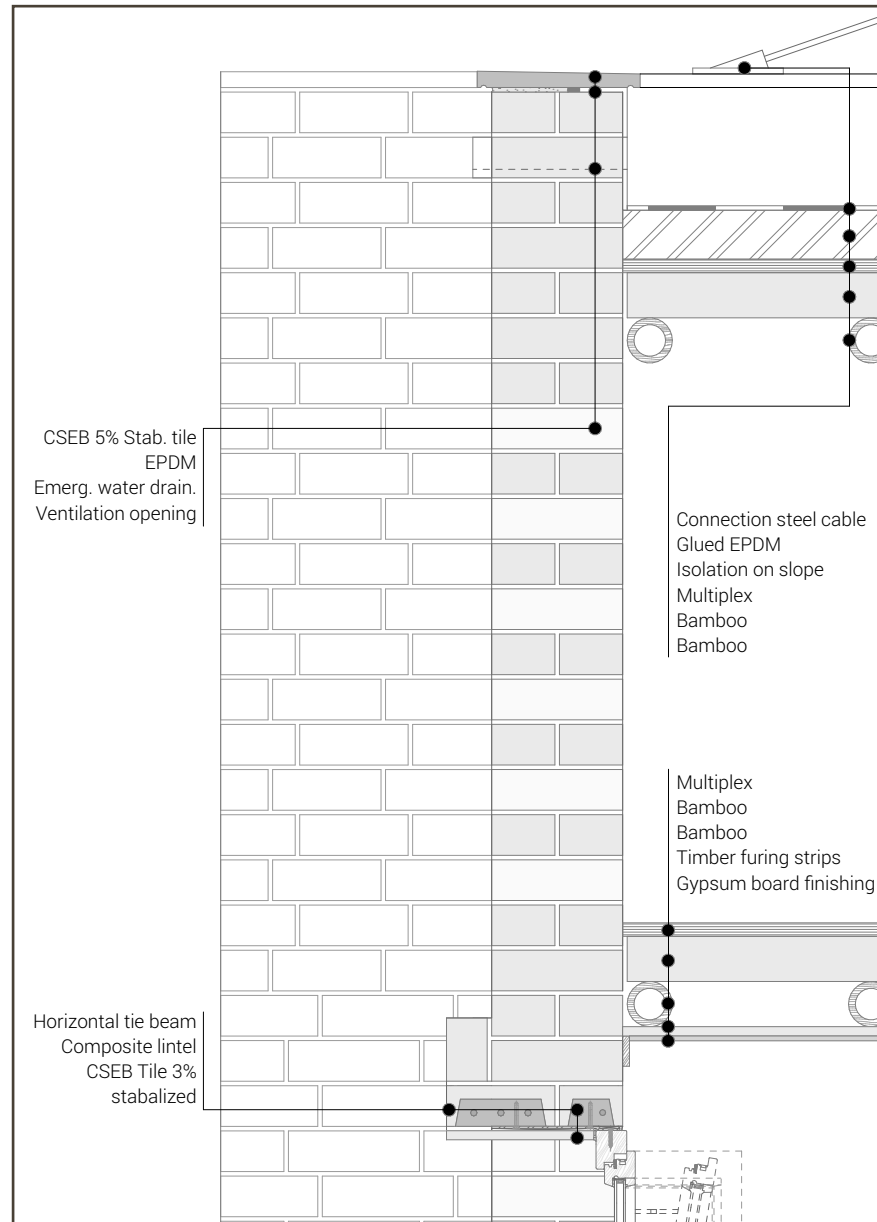
Detail Dutch farmer door

Exterior wall carried by CSEB foundation



Detail Eaves

Connection fog catcher and perforated wall for cross ventilation



Green wedge

Development facade, narrow elevated entrances securing a private atmosphere



Core street side

