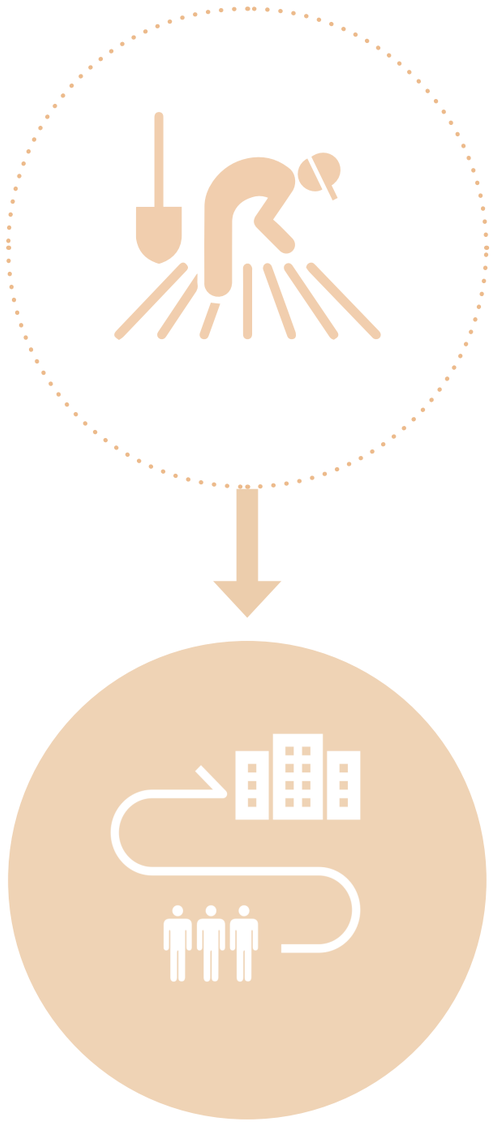
# A Framework For Resilient Communities

*An alternative strategy to the current affordable housing developments for the urban poor in suburban Mumbai*

**Global Housing Graduation Studio MSc 4**
Linn Opsahl / 4748085

# Background

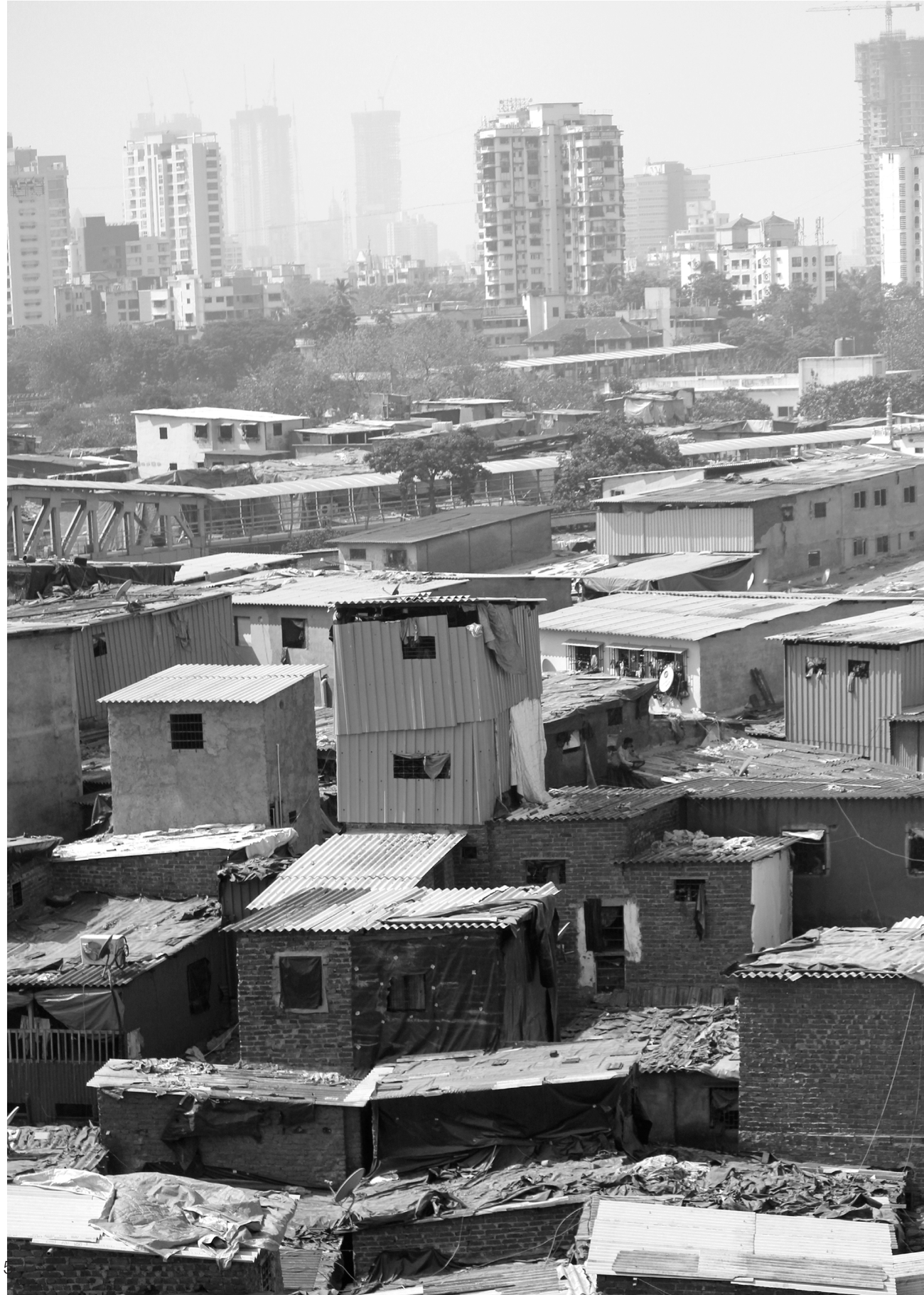



अपार्टमेंट
2

## 1.5 billion inhabitants

Mumbai City

Built up area



In the 1990s, India experienced an economic liberalization which marked the start of the country's market-driven housing development.

The main purpose has been to house as many dwellers as possible, with the lowest possible investment.


Nalasopara
Mumbai City
Built up area
Railway


6054C
WR
WR

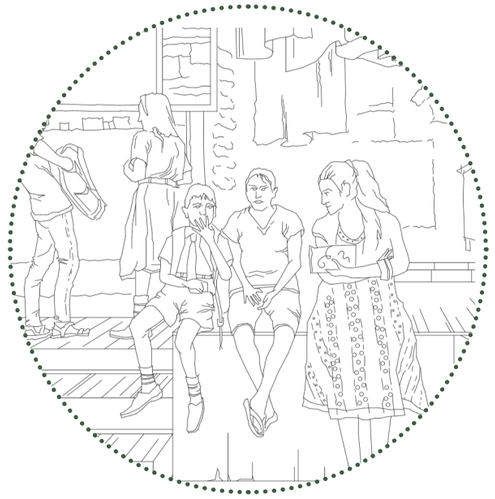

Nalasopara
Station

## Research Question

*How to contribute to a change in the current affordable housing development for the urban poor in Nalasopara, by developing a framework for living and resilient communities?*

# Patterns of Inhabitation

Nalasopara East



## 1 Social Activities

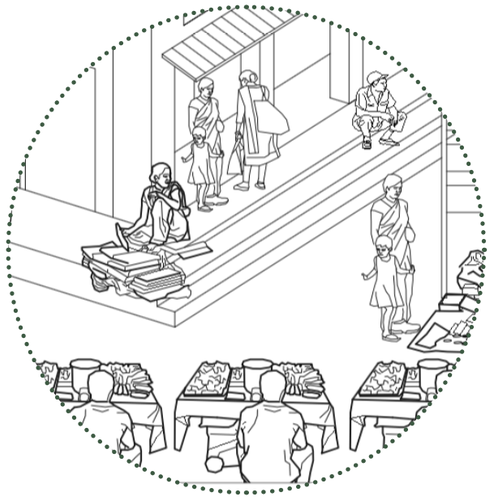
Raised plinth

Galleries

Smaller and larger
open areas

## 2 Domestic Activities

The Otla



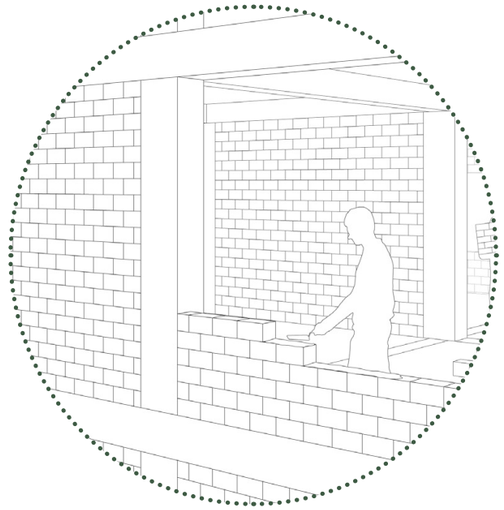
## 3 Income Generation

Informal corners

Market roads

Smaller shops

Mixed-use units



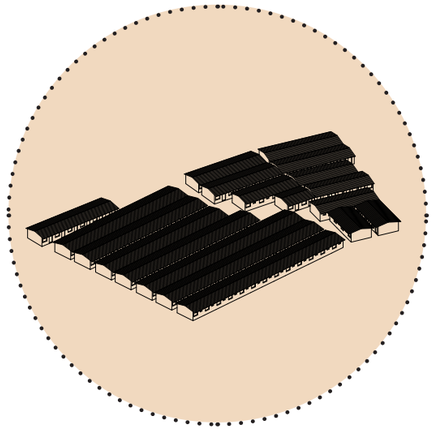
## 4 Building Techniques

Frame structure

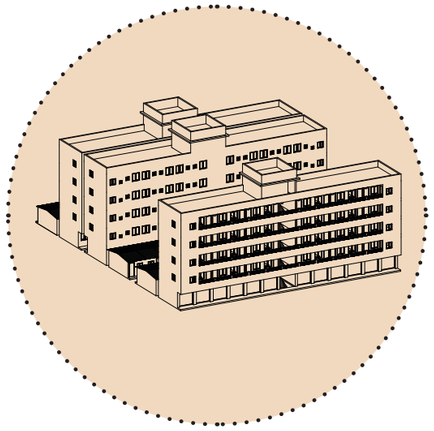
Raised Corrugated roofs

Tiled and painted
surfaces

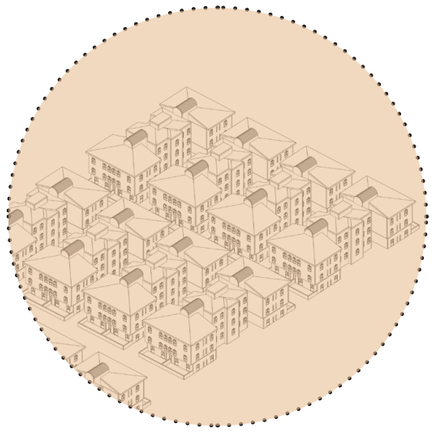
Nalasopara Station



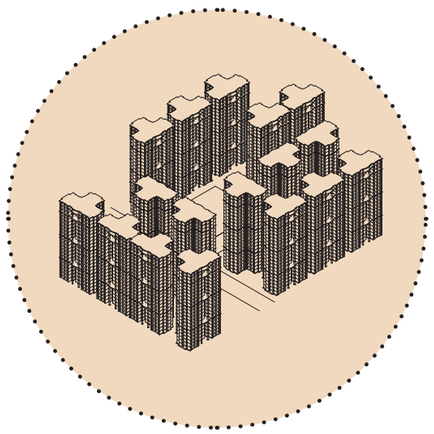
**1** Baithi Chawls



**2** ‘Handshake’ Chawls



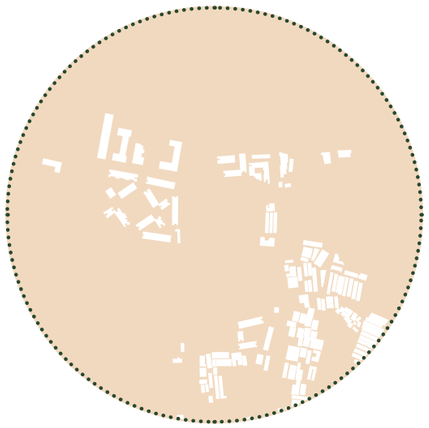
**3** Mid-rise buildings



**4** High-rise buildings

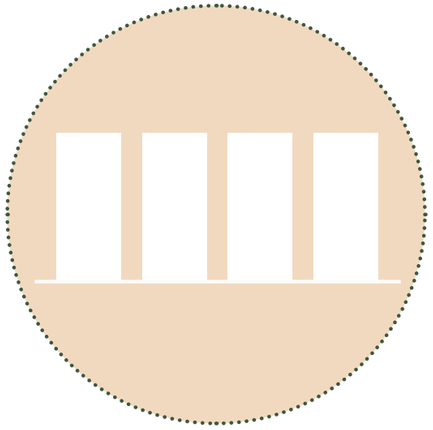
## Main Urban Problem

poor infrastructure

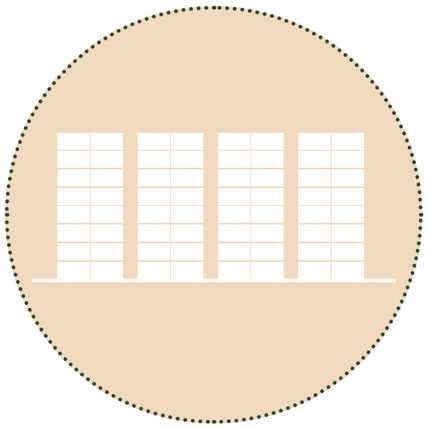


isolated developments

## Main Building Problem



uniform buildings / rubber stamping



units stacked as storage boxes

...the main focus has been *“on **efficiency** (building quickly and cheaply), overlooking the **resilience** of the new communities.”*

Global Housing, course manual

*“In Nature, ecosystems have survived over time by adjusting to changing circumstances resulting in a search for equilibrium between two opposing poles, of efficiency and resilience.*

Affordable Housing in the Urban Global South: Seeking Sustainable Solutions, edited by Jan Bredenoord, Paul van Lindert, Peer Smets

*“Urban living involves... a whole system of spaces that people need.”*

Charles Correa

## Efficiency

*“achieving maximum productivity with minimum wasted effort or expense.”*

The Oxford Dictionaries

*the structure of a system*

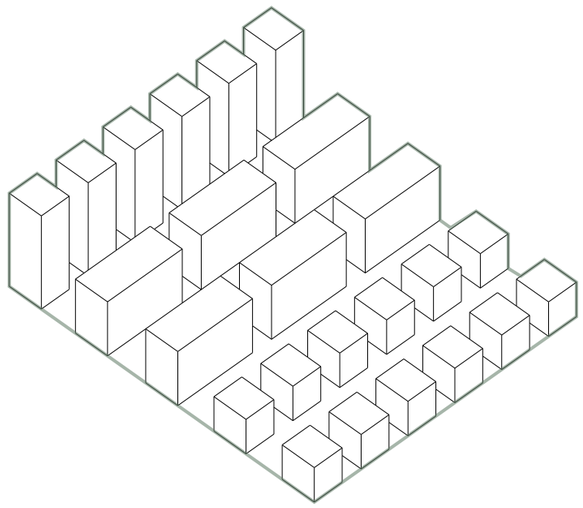
## Resilience

*“...refers to the capacity of a system to absorb disturbance and reorganize while undergoing change, so as to retain essentially the same structure.”*

Affordable Housing in the Urban Global South: Seeking Sustainable Solutions, edited by Jan Bredenoord, Paul van Lindert, Peer Smets

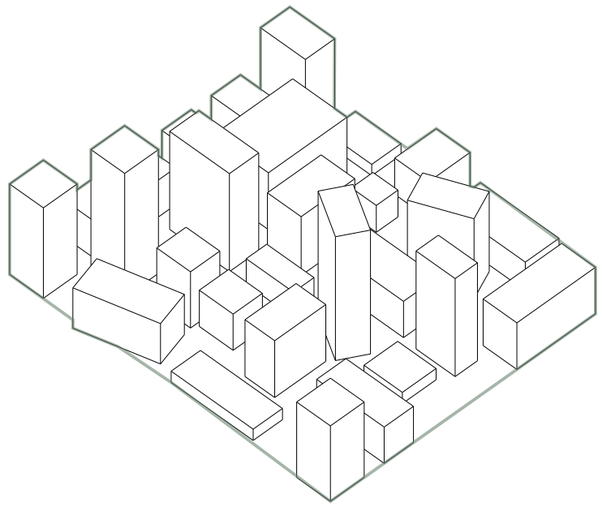
*the ability of a system to adapt to change*

# Design Hypothesis



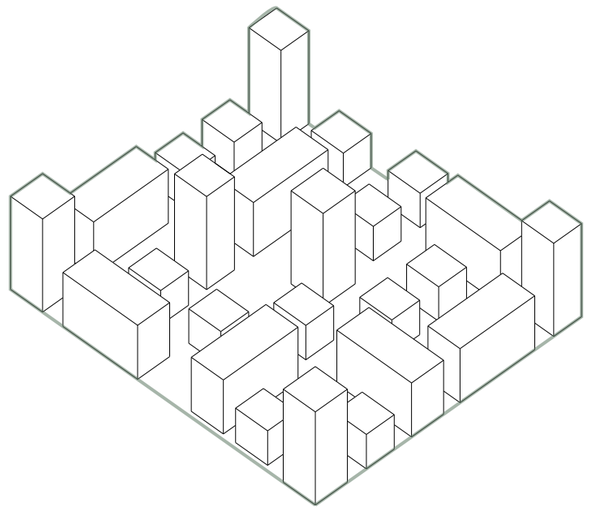
## Too Much Efficiency

too much efficiency will lead to **little diversity** and stagnation in the system.



## Too Much Resilience

too much resilience will lead to **too much diversity** and a lack of coherence and purpose to grow.



## Trade-off

the optimum balance between efficiency and resilience, sustainability.

Affordable Housing in the Urban Global South: Seeking Sustainable Solutions, edited by Jan Bredenoord, Paul van Lindert, Peer Smets

# Achieving a Trade-off

**Efficiency** ⟷ **Resilience**

# Key Elements in an Optimum Trade-off

**Efficiency**  Resilience

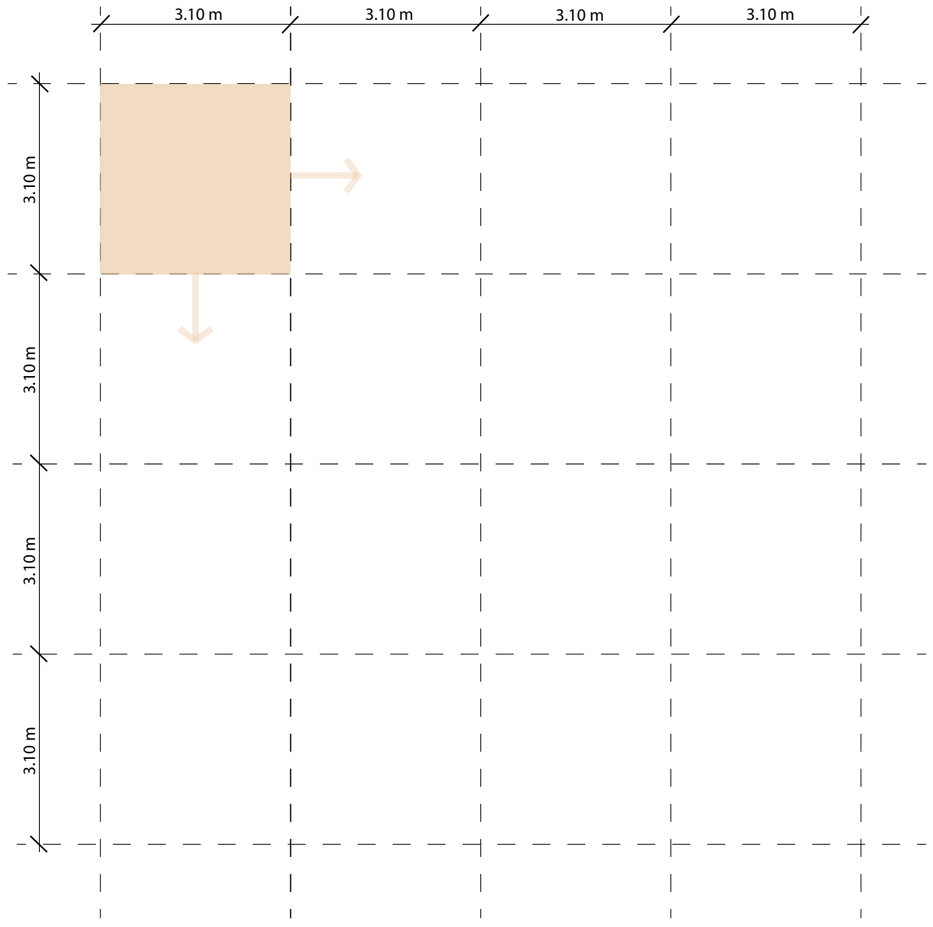
**1** a simple module

**2** a reduced palette of materials

**3** local construction method

# Design Hypothesis

## Efficiency // a simple module



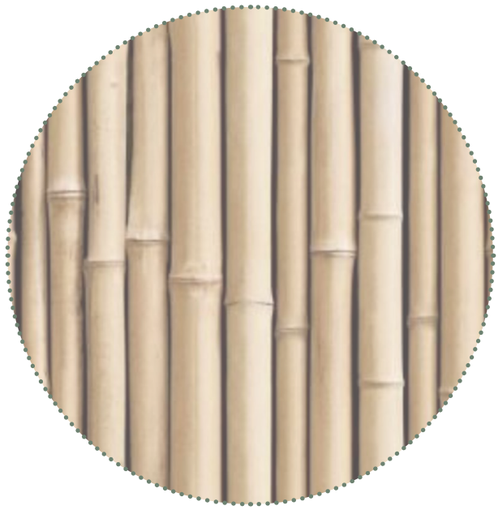

3.1 x 3.1 m module

# Design Hypothesis

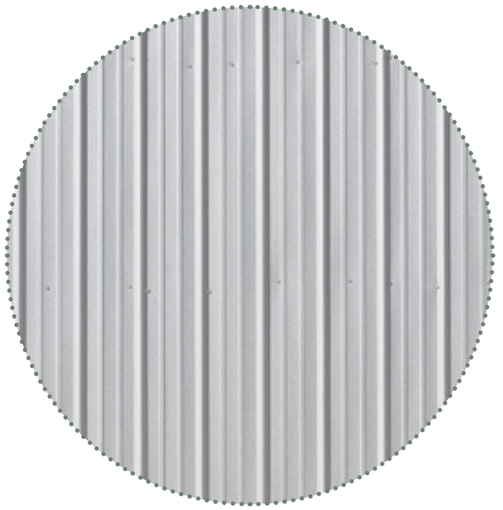
## **Efficiency //** reduced palette of materials

Concrete

Brick

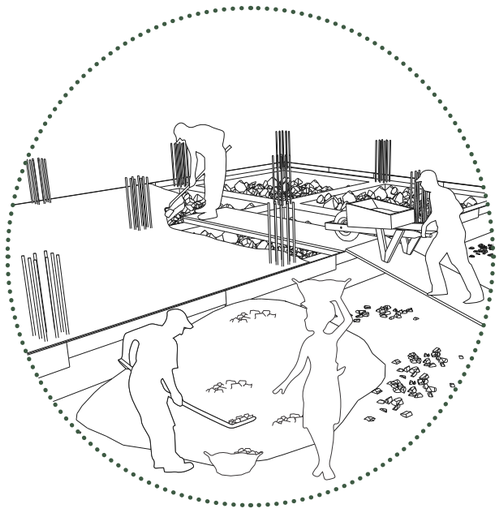


Bamboo

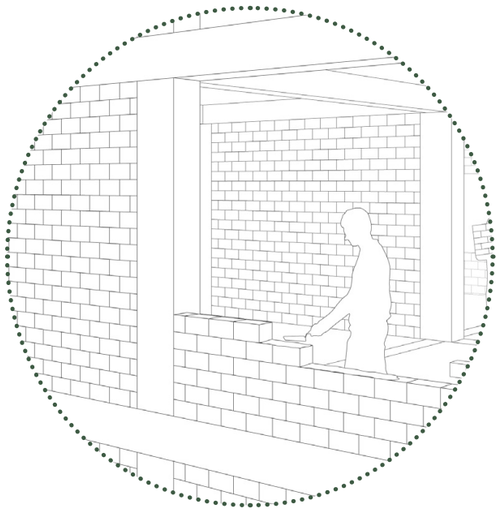


Corrugated metal

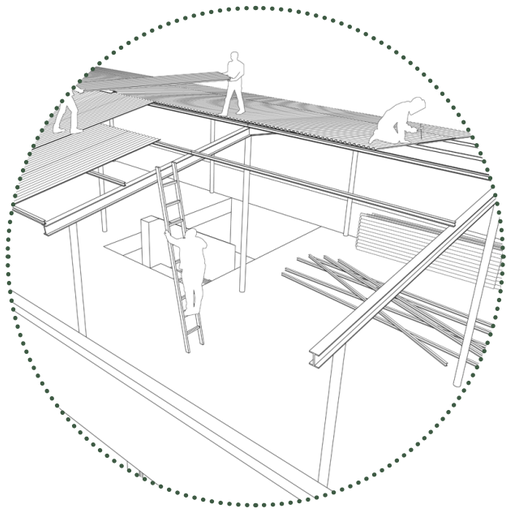
## **Efficiency //** local construction methods



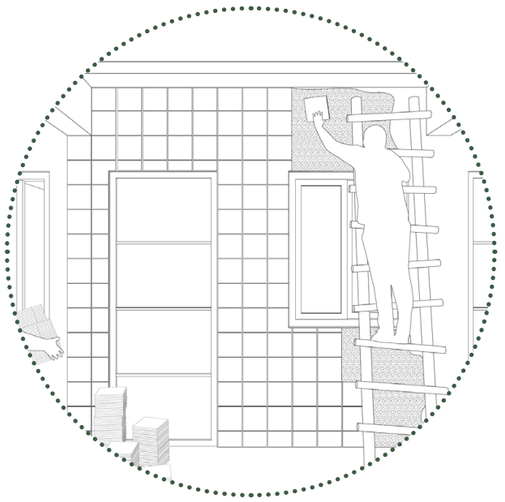
Raised Plinth



Reinfoced Concrete
Frame / Brick infill



Raised Corrugated
metal roof



Tiled surfaces

# Key Elements in an Optimum Trade-off

Efficiency

**Resilience**

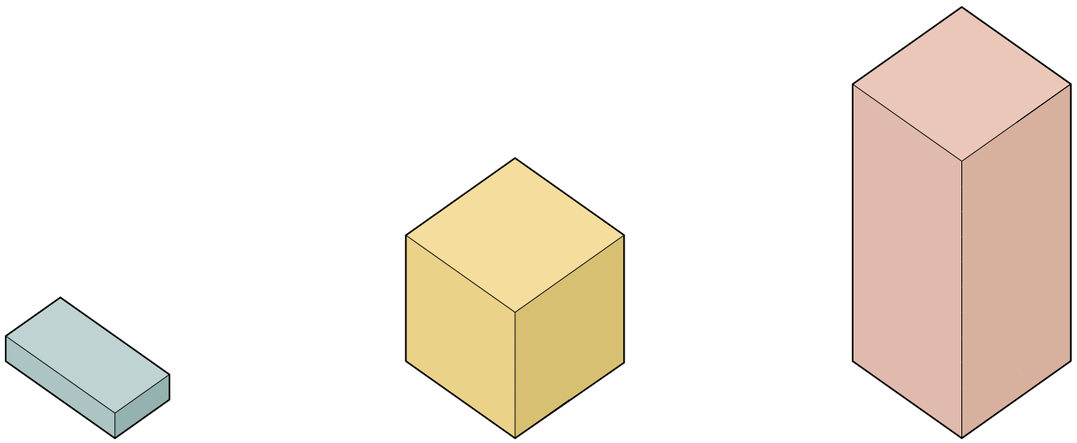
Typological mix:

**1** high-rise

**2** mid-rise

**3** low-rise

# Design Hypothesis
## Resilience // typological mix



Low-rise

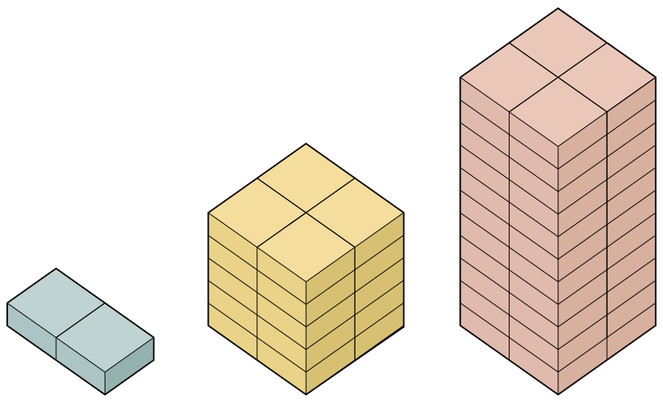
Mid-rise

High-rise

# Design Proposal

# 01 Building Strategy

Based only on efficiency

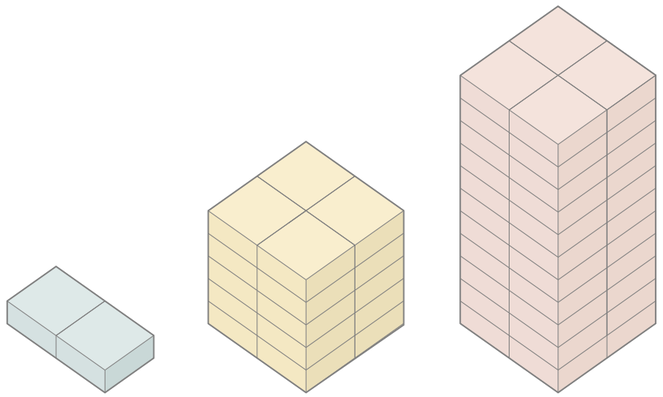


Too much Efficiency

Single unit type

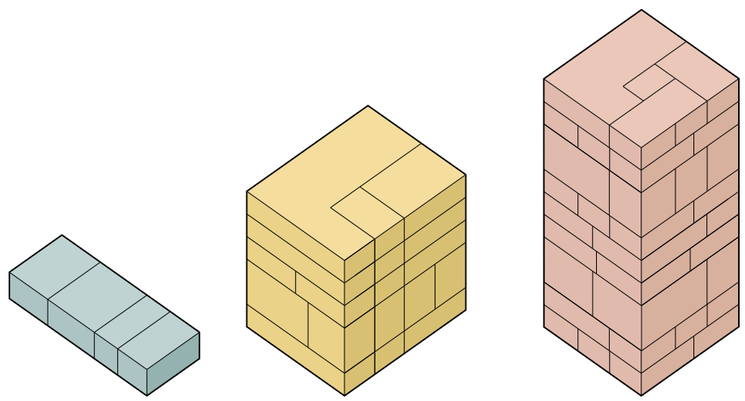
# 01 Building Strategy

Based only on resilience



Too much Efficiency

Single unit type

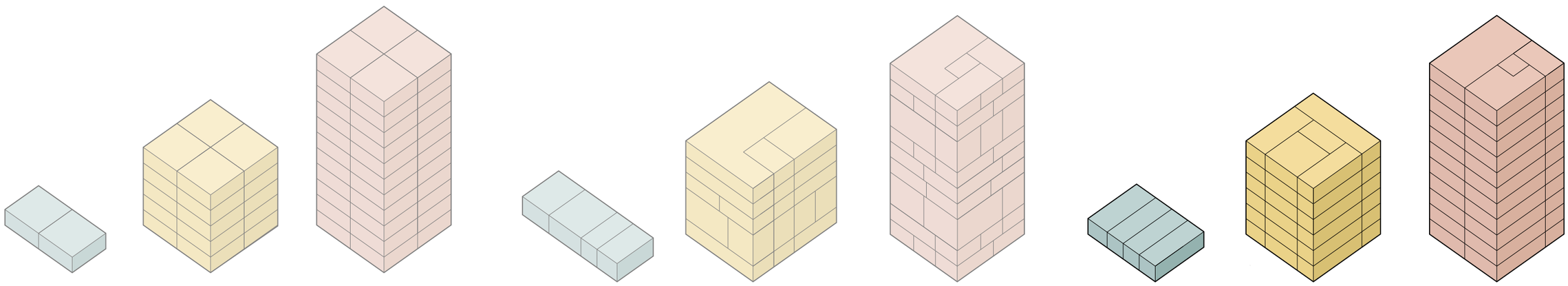


Too much Resilience

Numerous unit types

# 01 Building Strategy

## Trade-off



Too much Efficiency

Single unit type

Too much Resilience

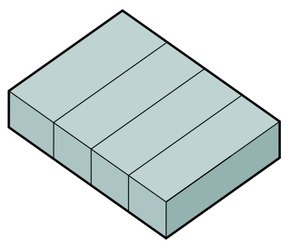
Numerous unit types

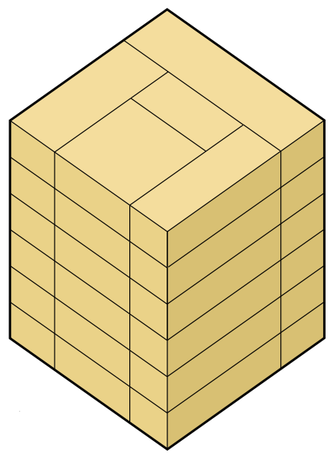
Trade-off

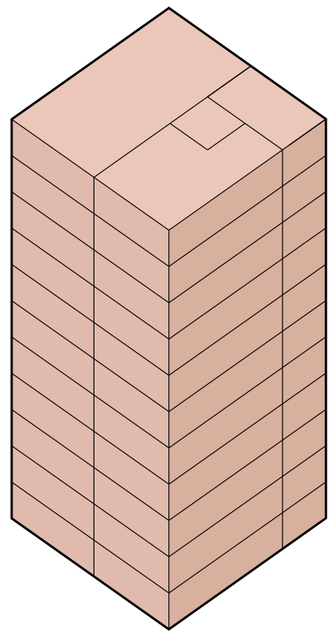
Optimum balance

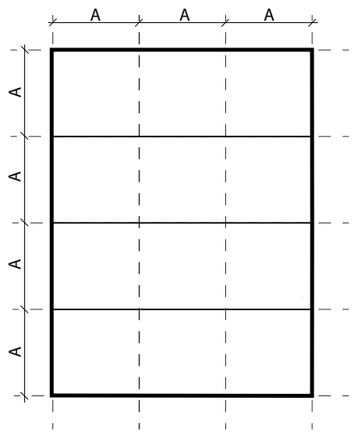
# 01 Building Strategy

## Trade-off

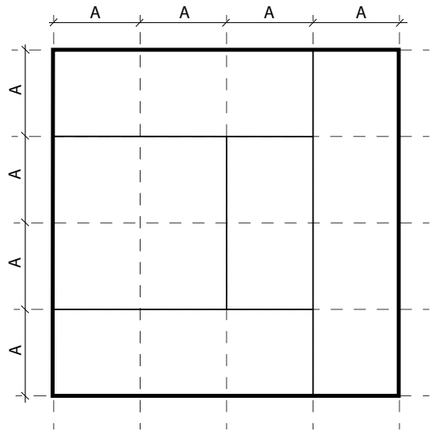




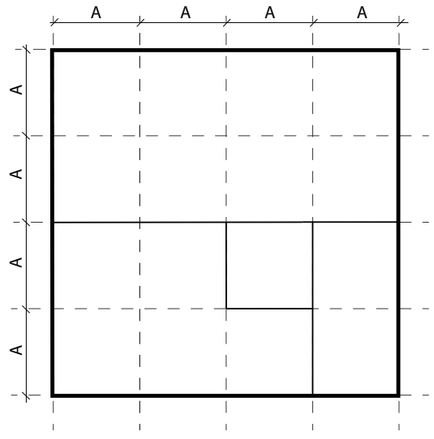





Low-rise




Mid-rise



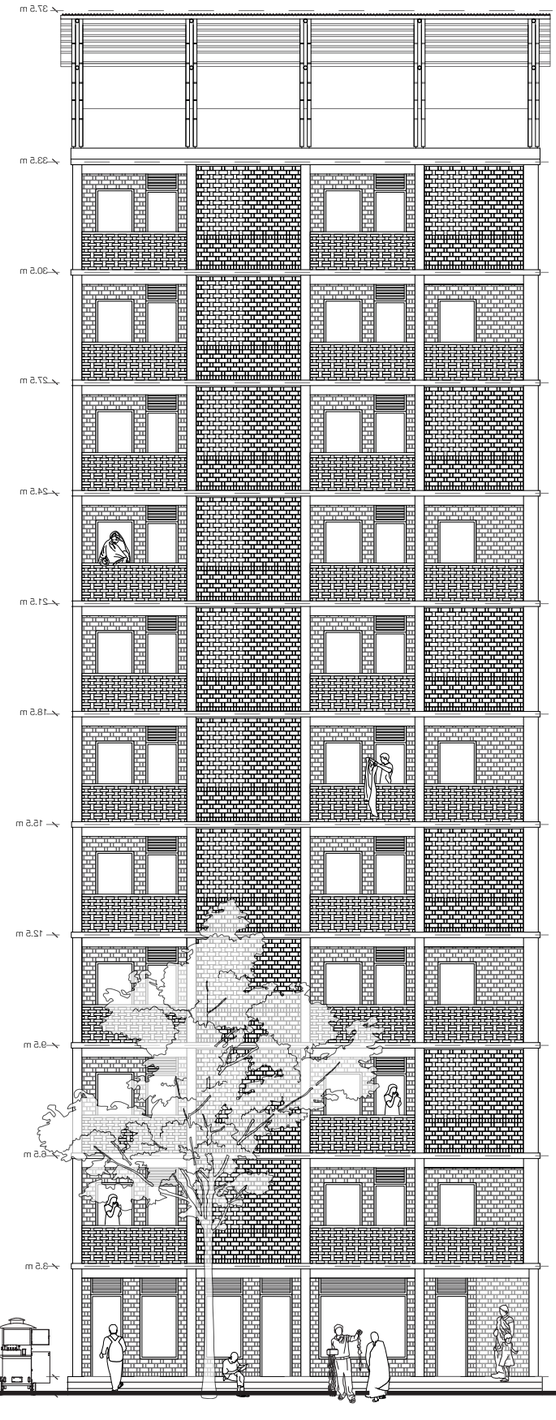

High-rise

**A = 3.10 m**

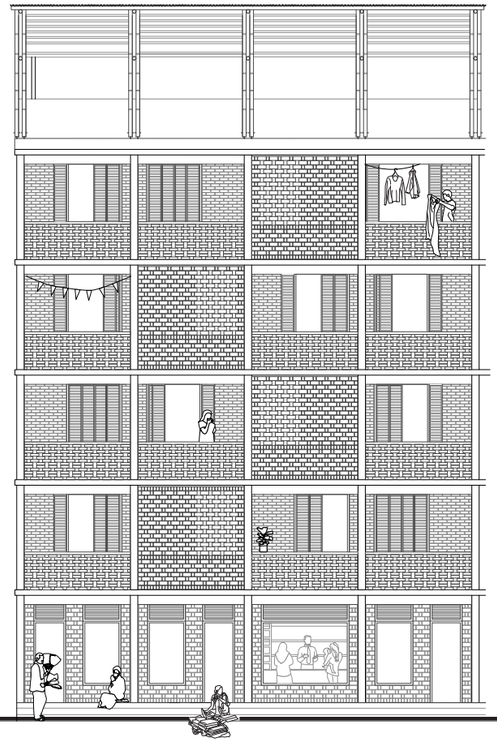
# 01 Building Strategy

## Typological mix

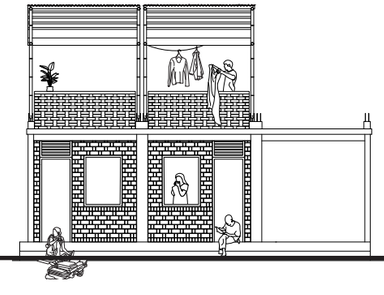
### HIGH RISE - TOWER




### MID RISE - SLAB

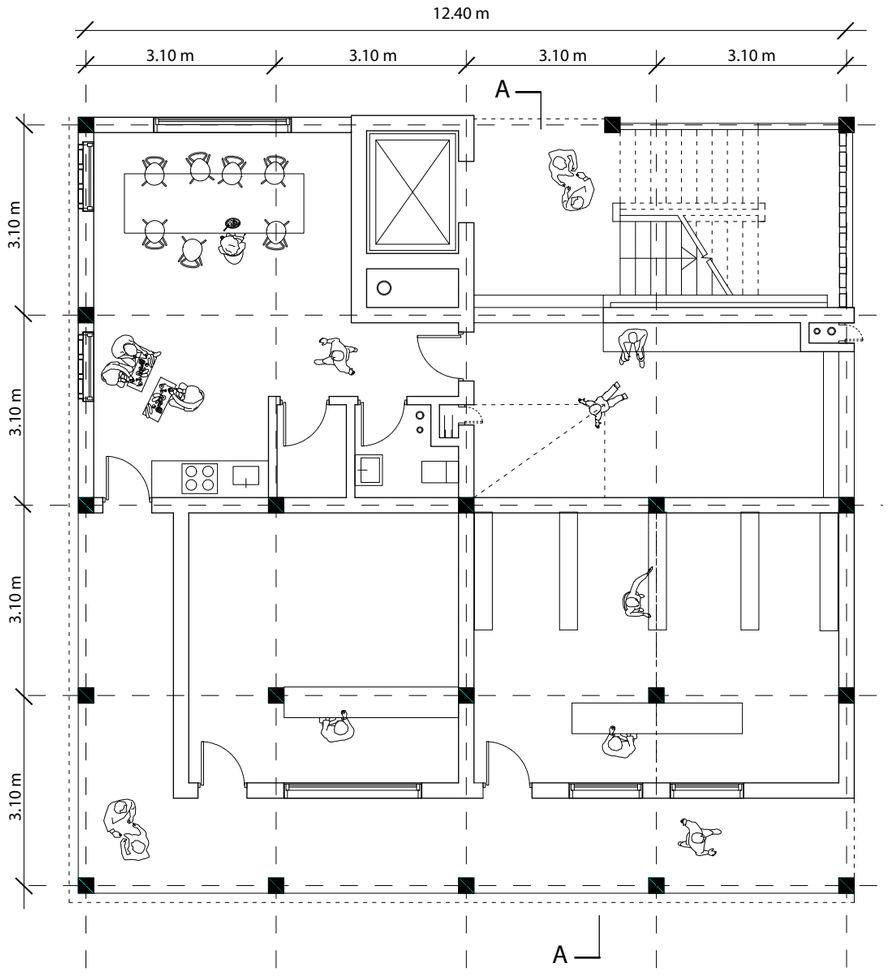


### LOW RISE - ROW-HOUSE

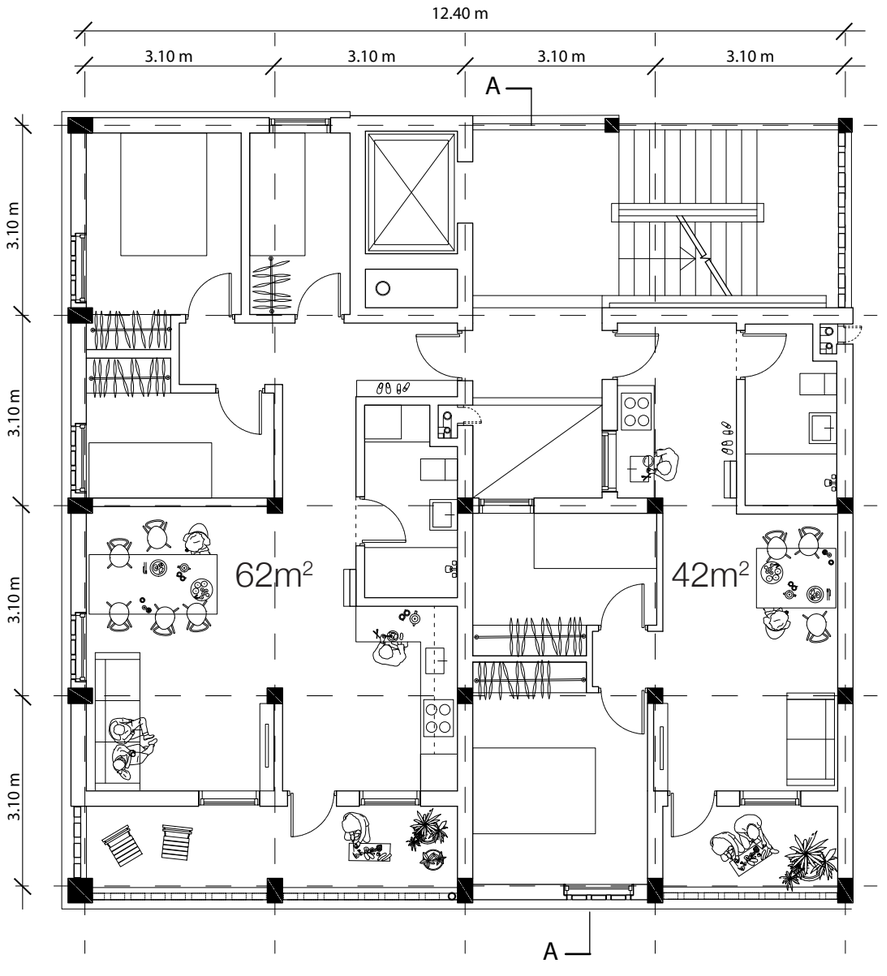


# 01 Building Strategy

## *High Rise-Tower* // Plans



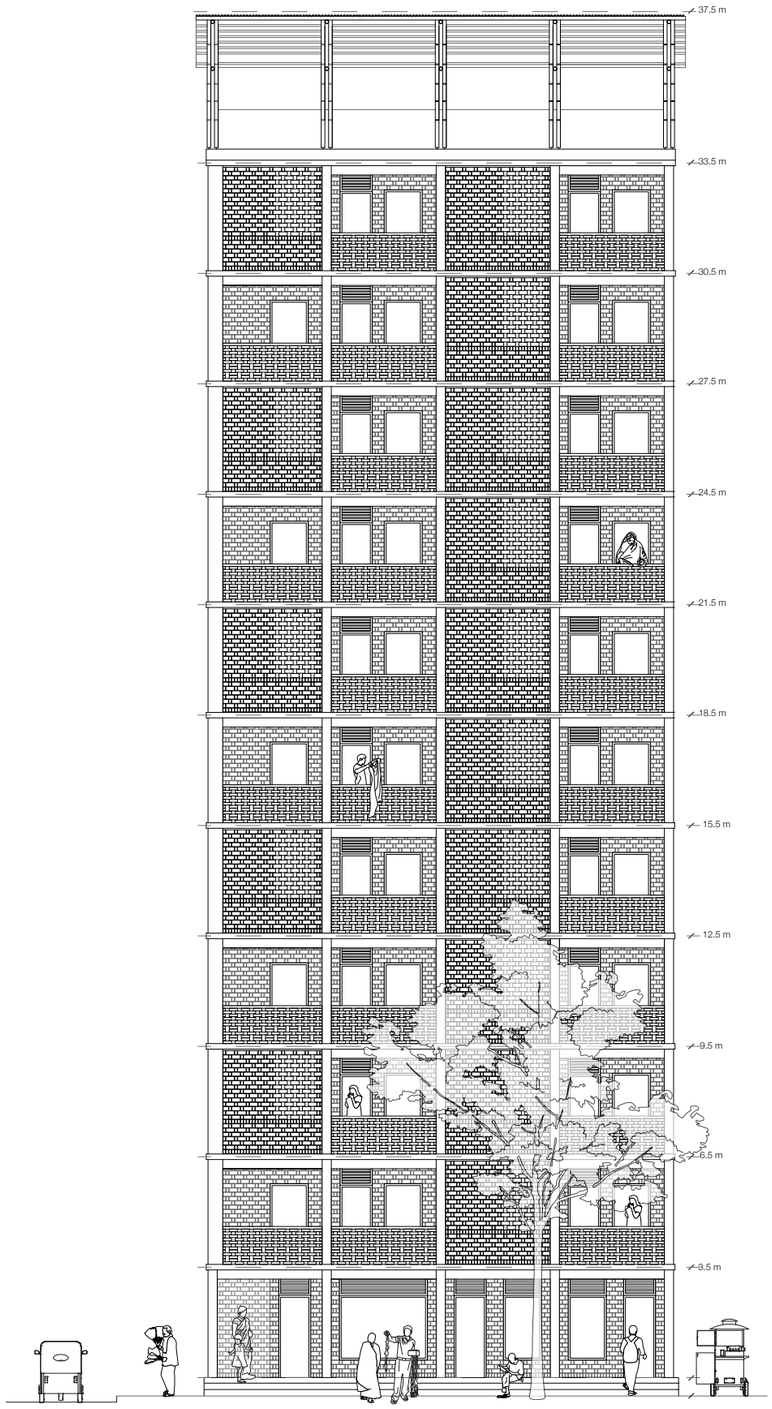

Ground floor plan



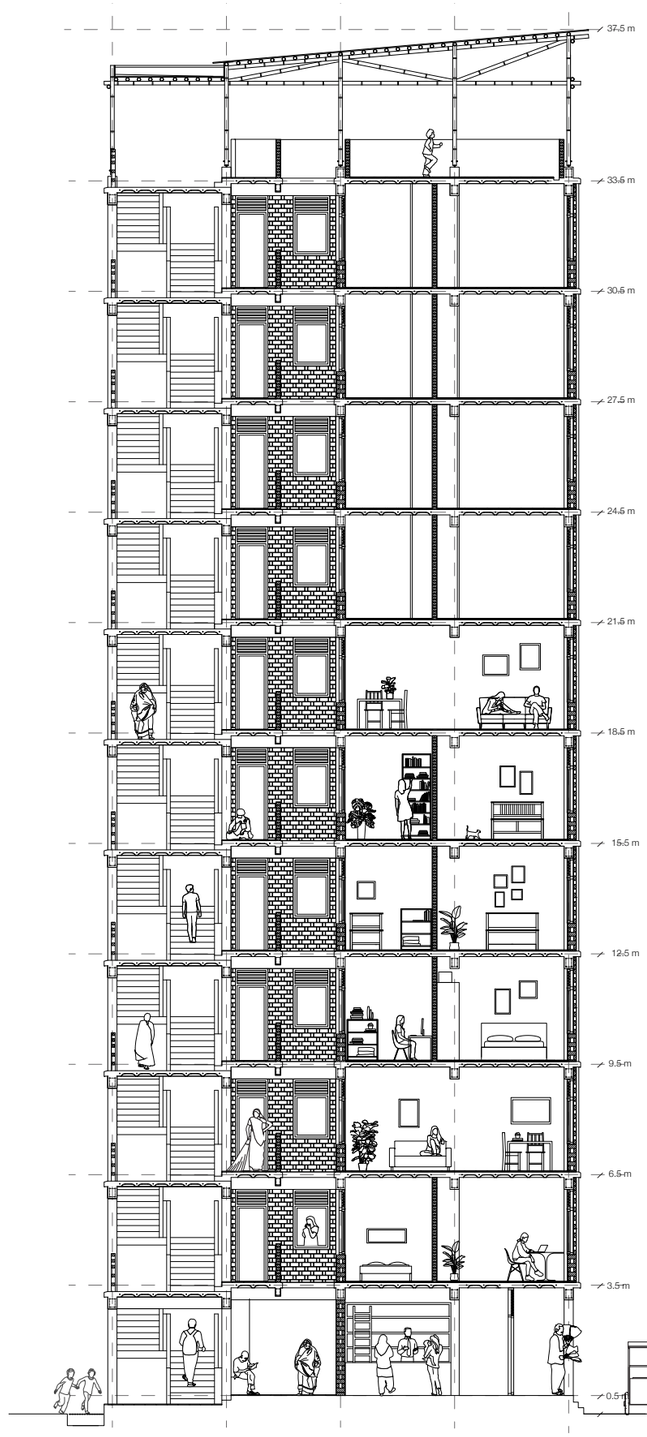

Typical upper floor plan

# 01 Building Strategy

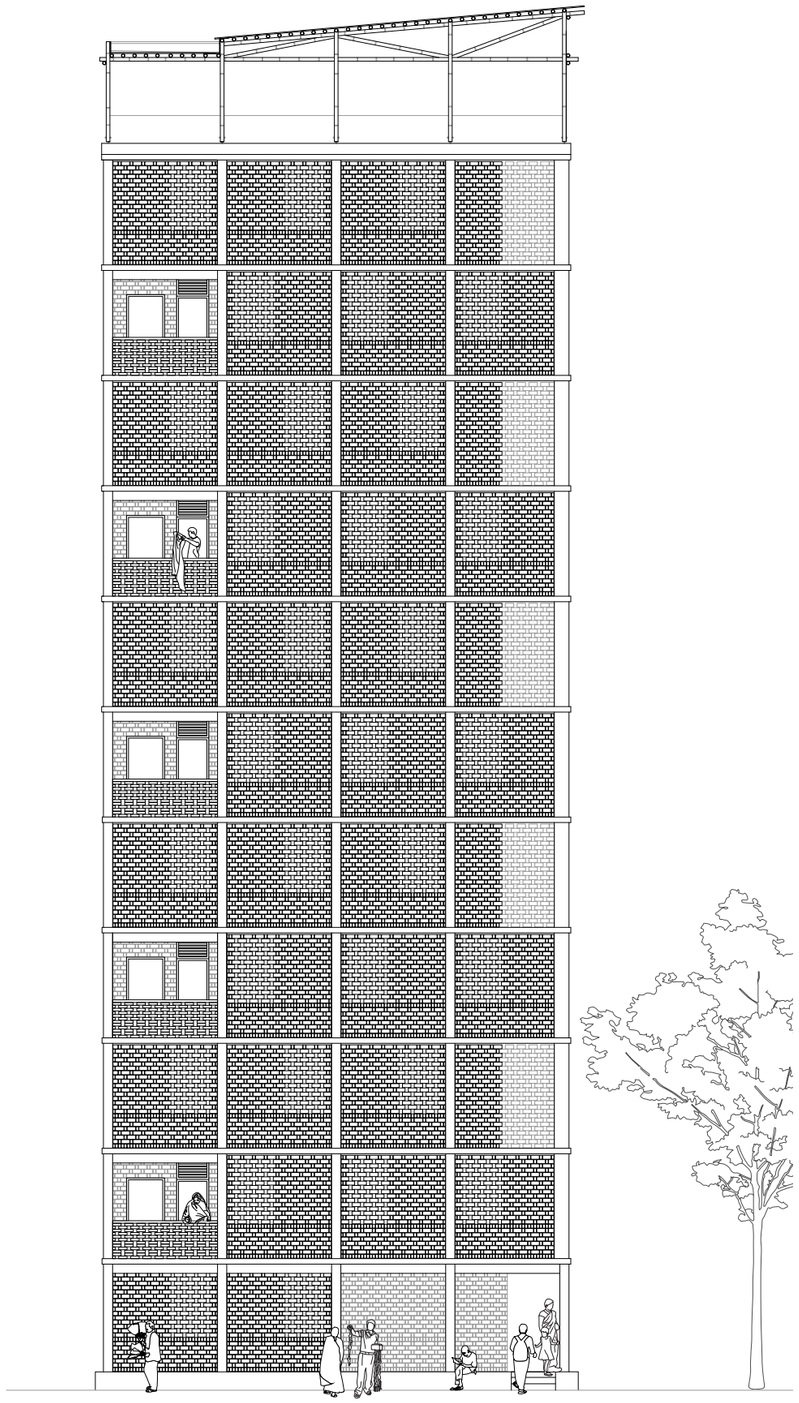
## *High Rise-Tower* // Facades-Sections




Front facade



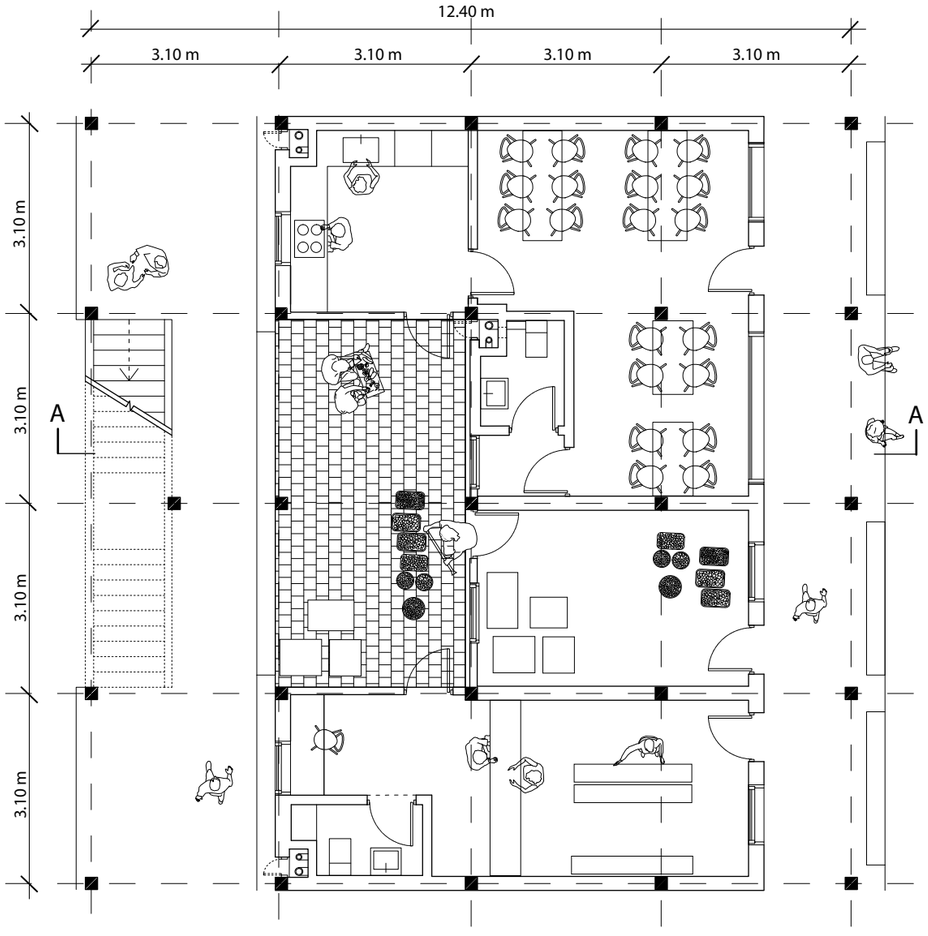

Section A



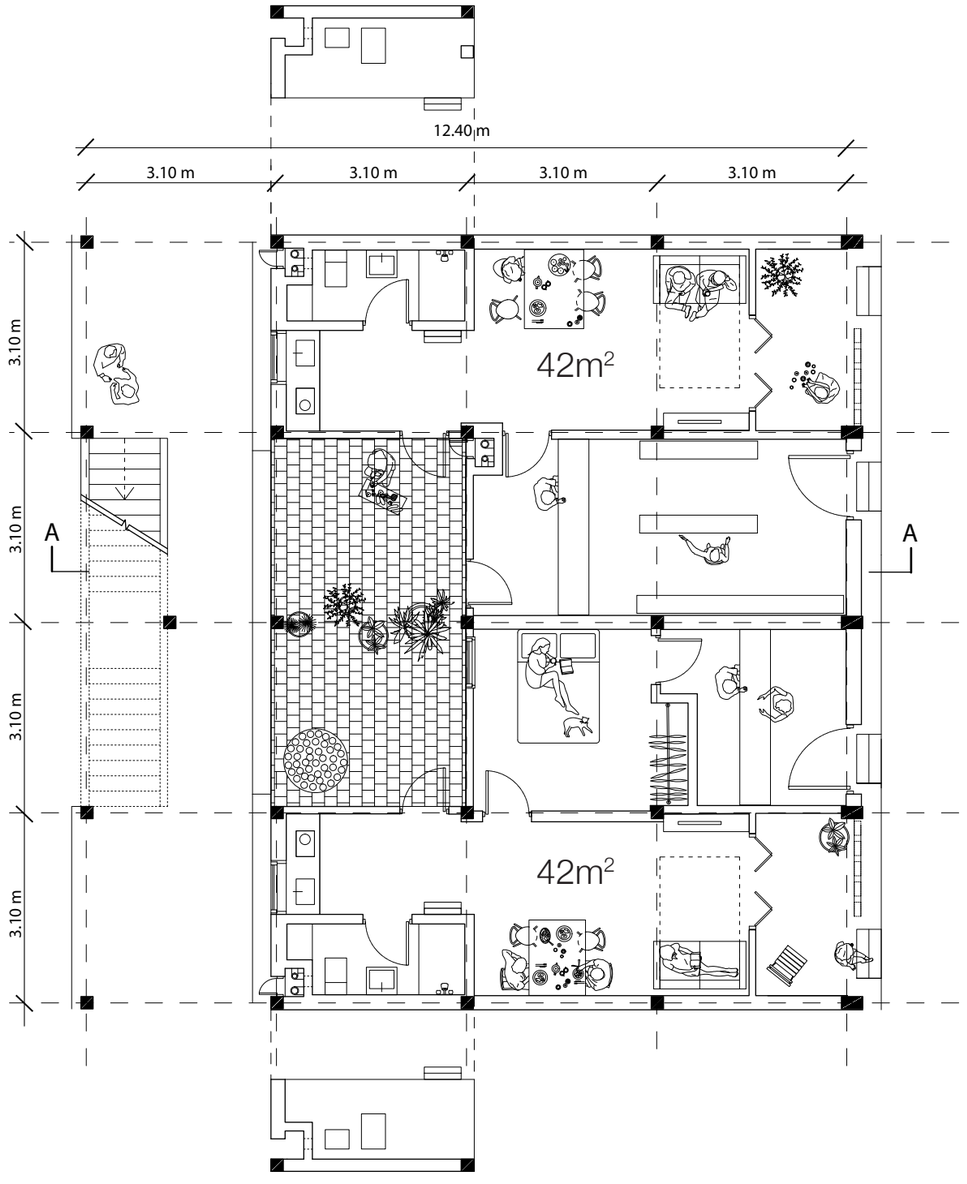
Side facade

# 01 Building Strategy

## *Mid Rise-Slab* // Plans



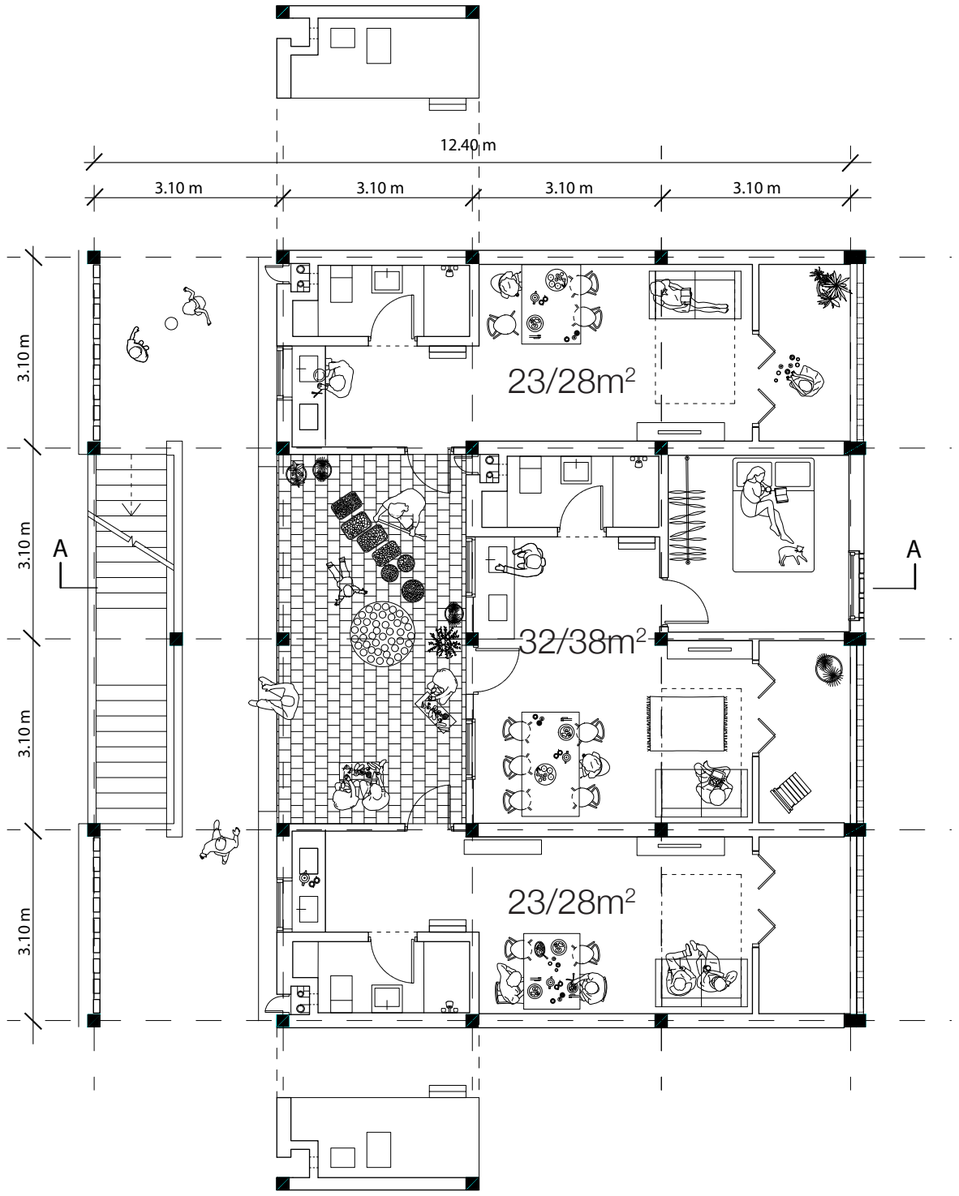

Ground floor plan / commercial




Ground floor plan / mixed use

# 01 Building Strategy

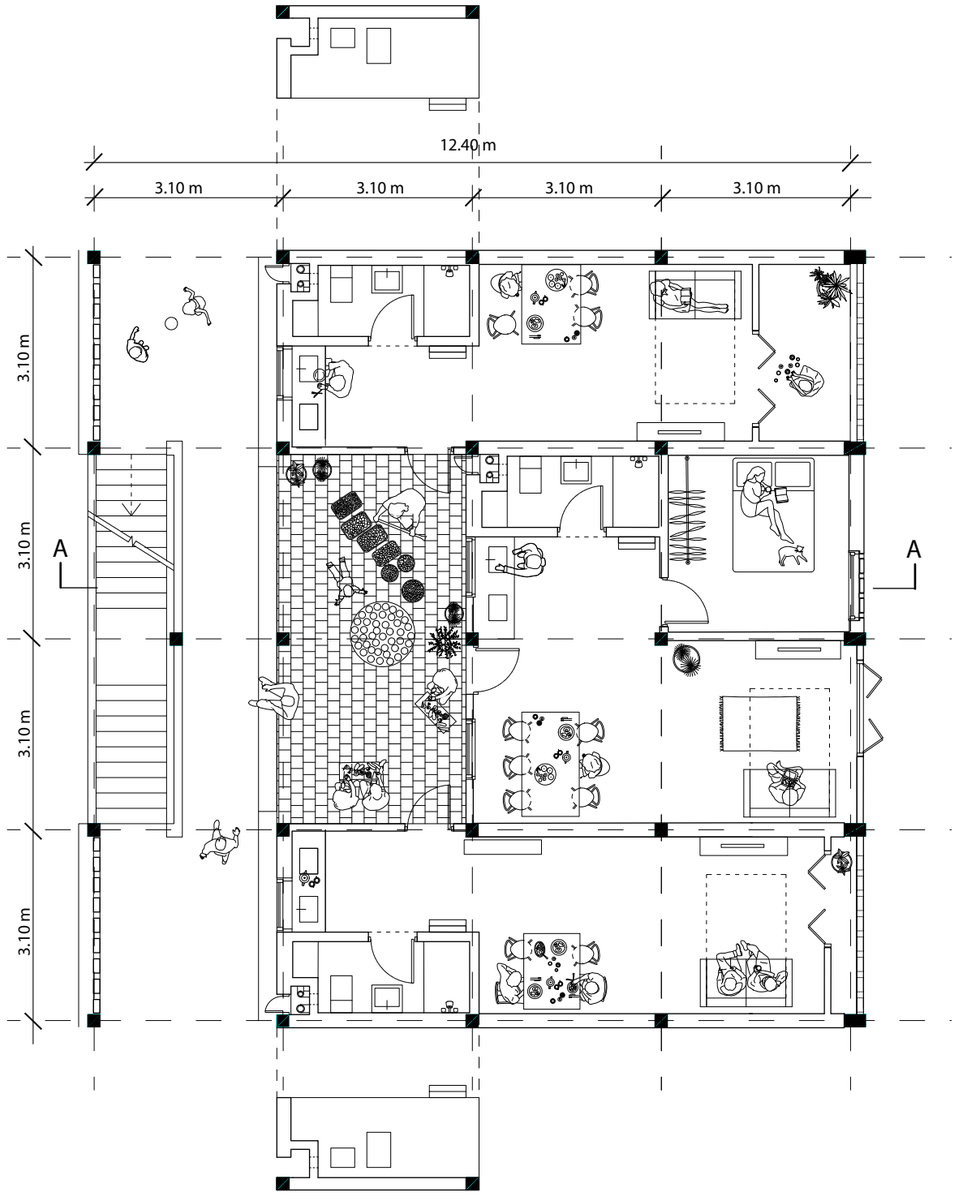
## *Mid Rise-Slab* // Plans




Typical upper floor plan

# 01 Building Strategy

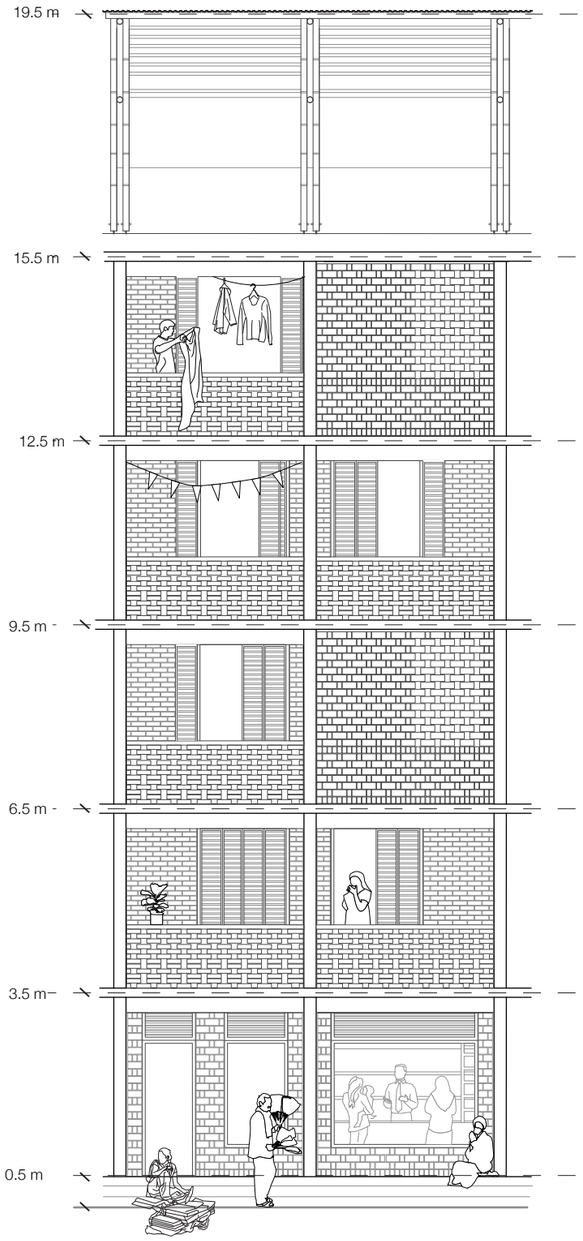
## *Mid Rise-Slab* // Plans Extended



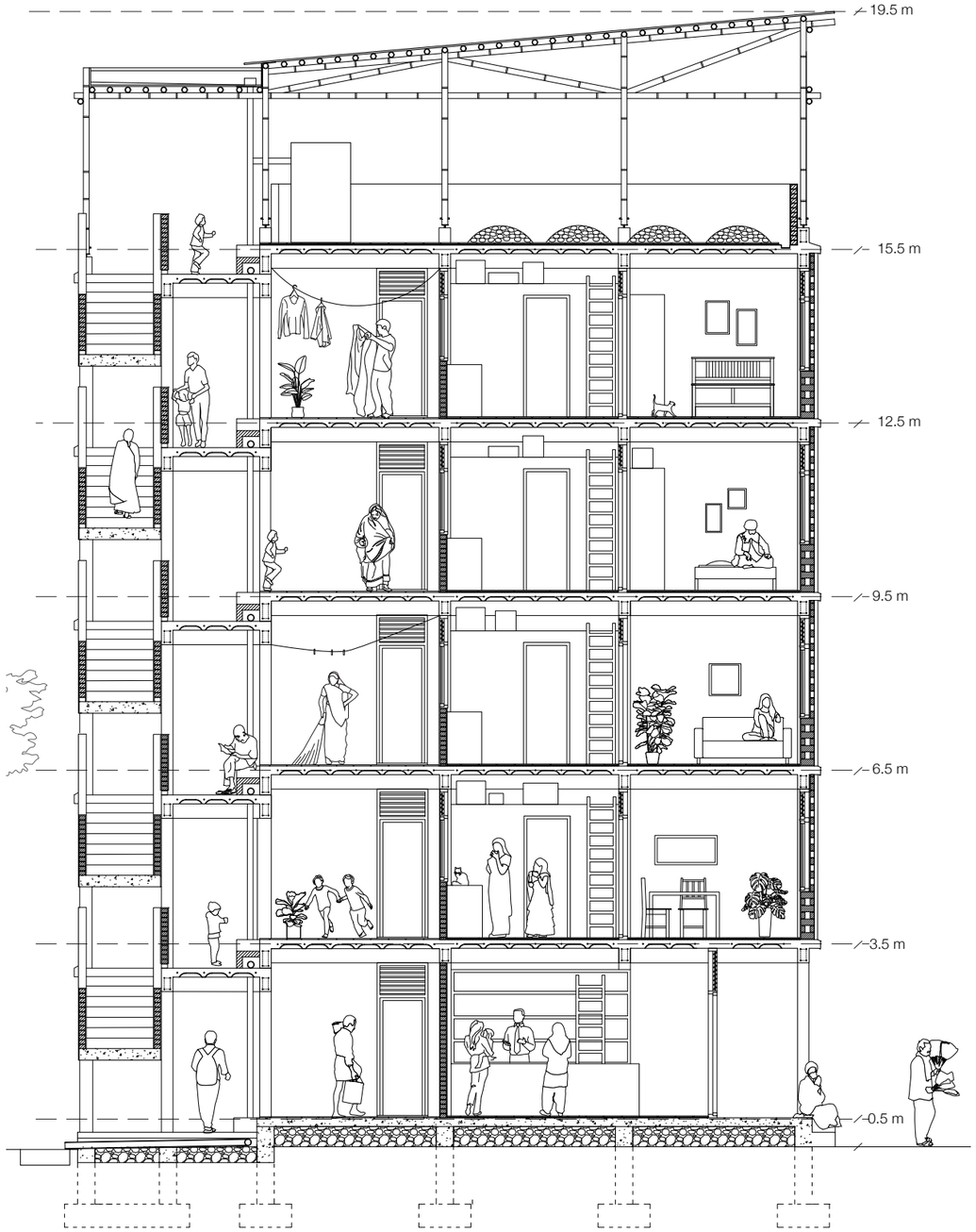

Typical upper floor plan

# 01 Building Strategy

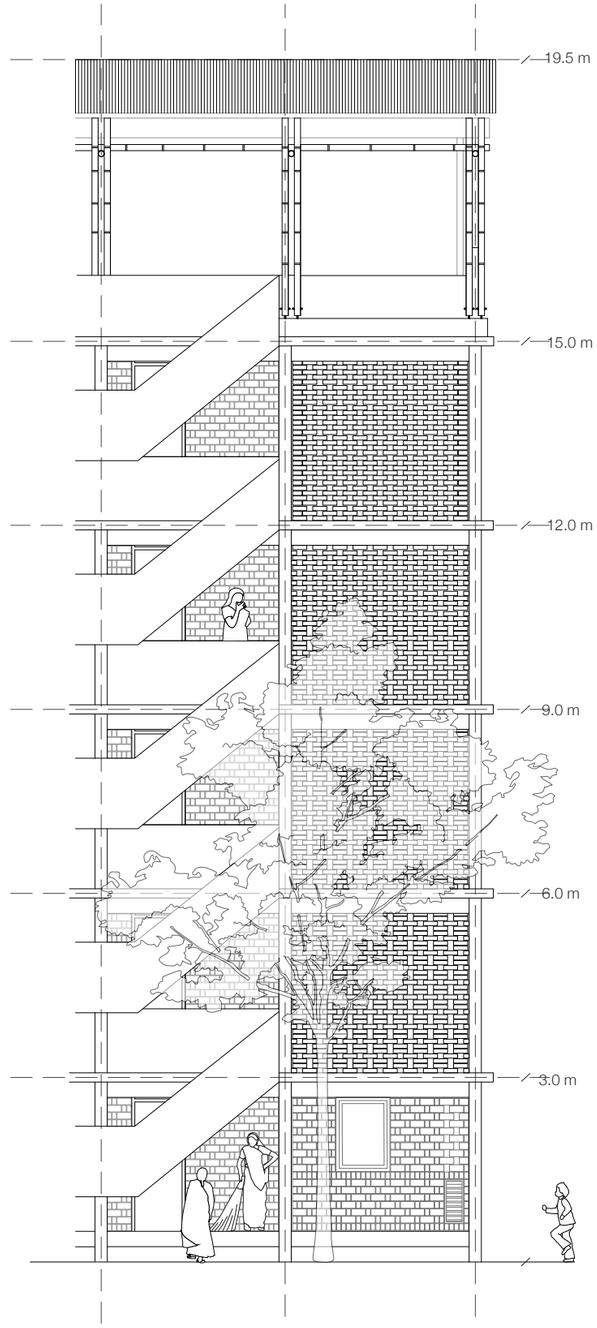
## *Mid Rise-Slab* // Facades-Sections




Front facade

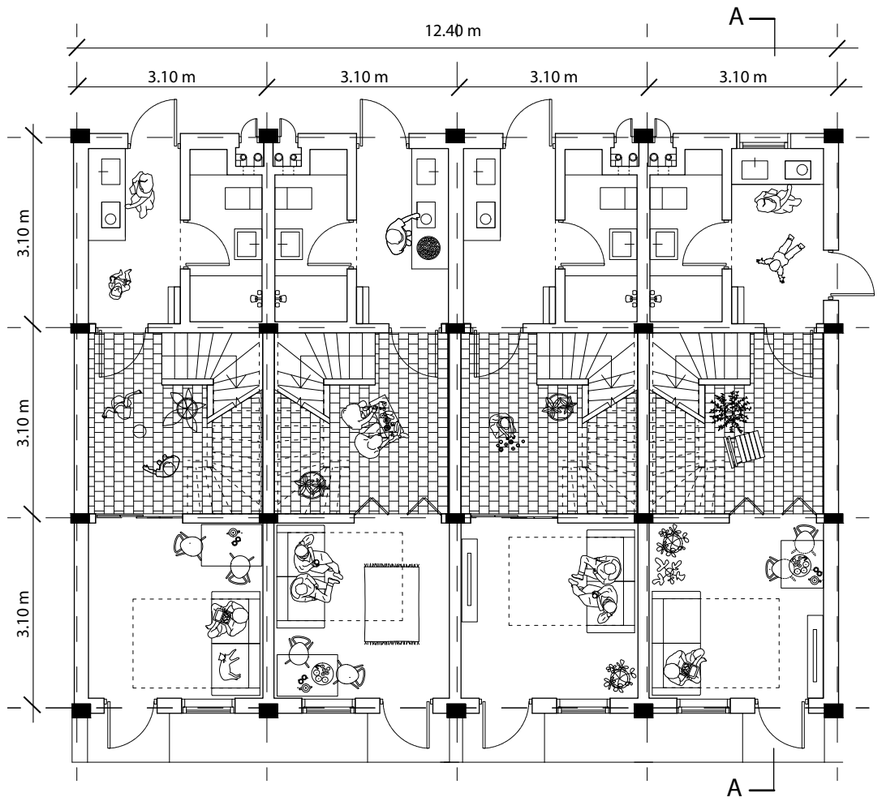



Section A




Back facade

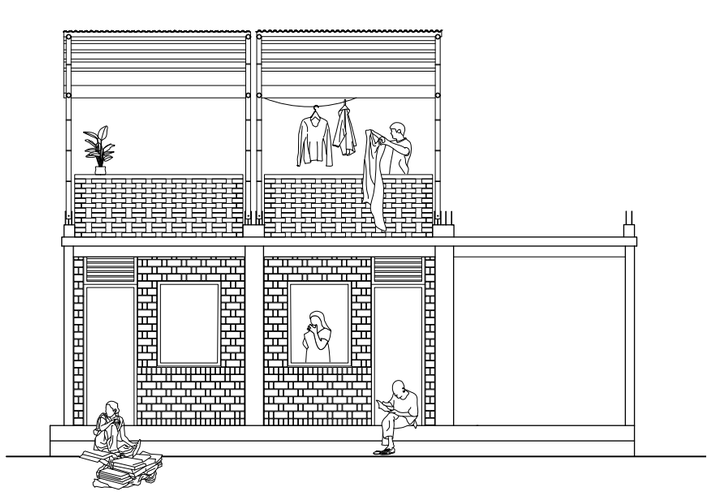
# 01 Building Strategy
## *Low Rise - Row-Housing* // Plans



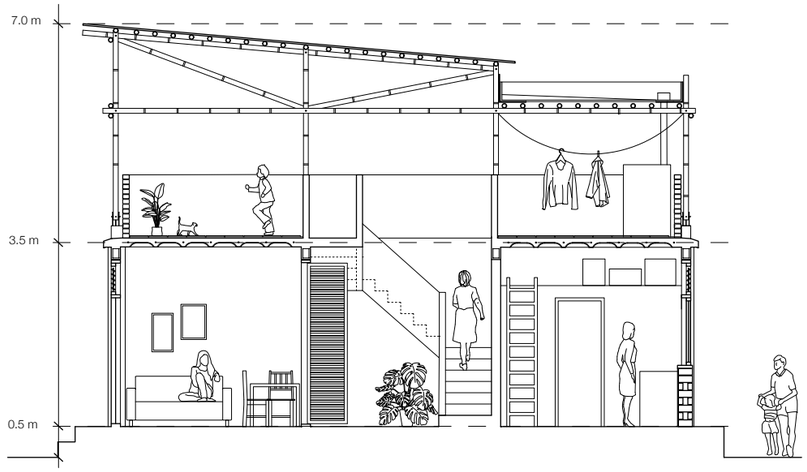

Ground floor plans

# 01 Building Strategy

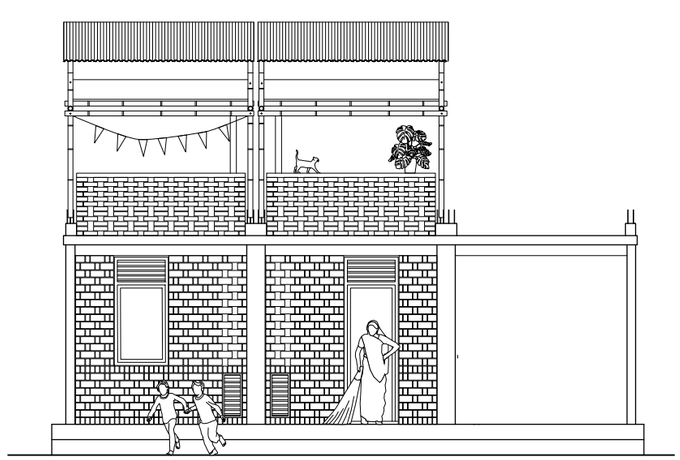
## *Low Rise - Row-Housing* // Facades-Sections



Facade facing roads



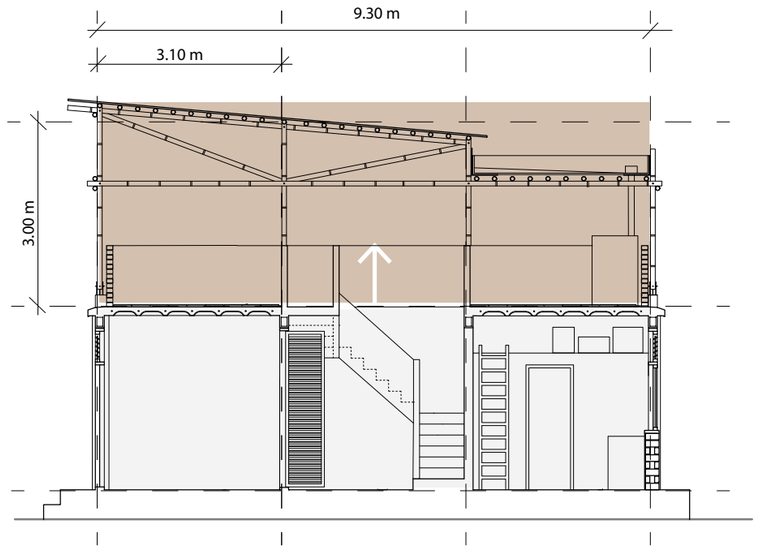

Section A



Facade facing courtyard

# 01 Building Strategy

## *Low Rise - Row-Housing* // Program extended



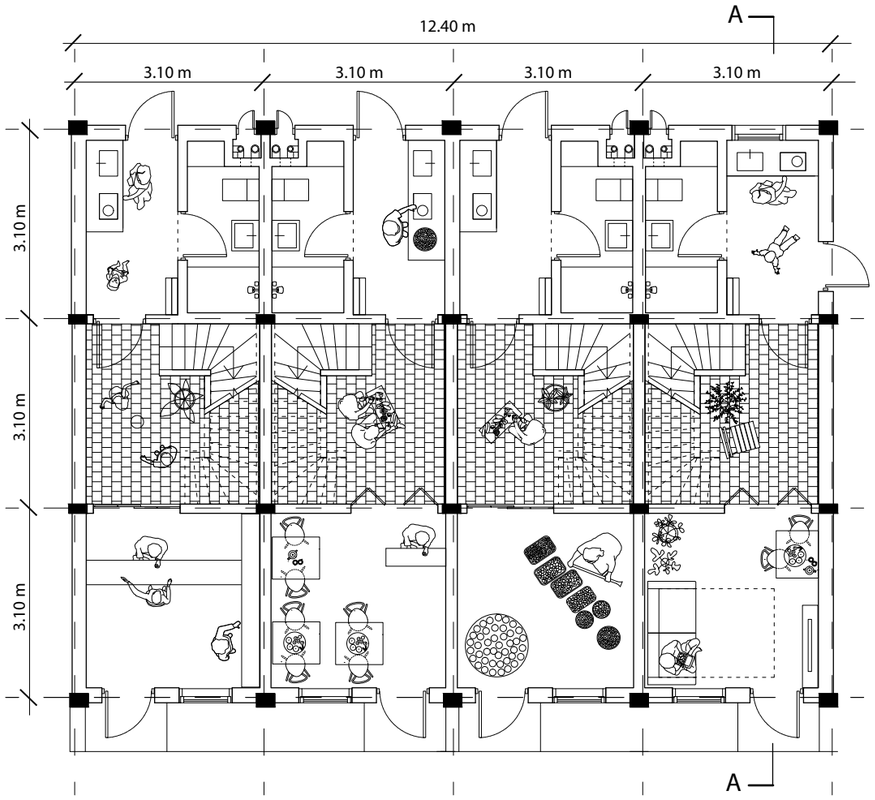

unit

space of ‘opportunity’

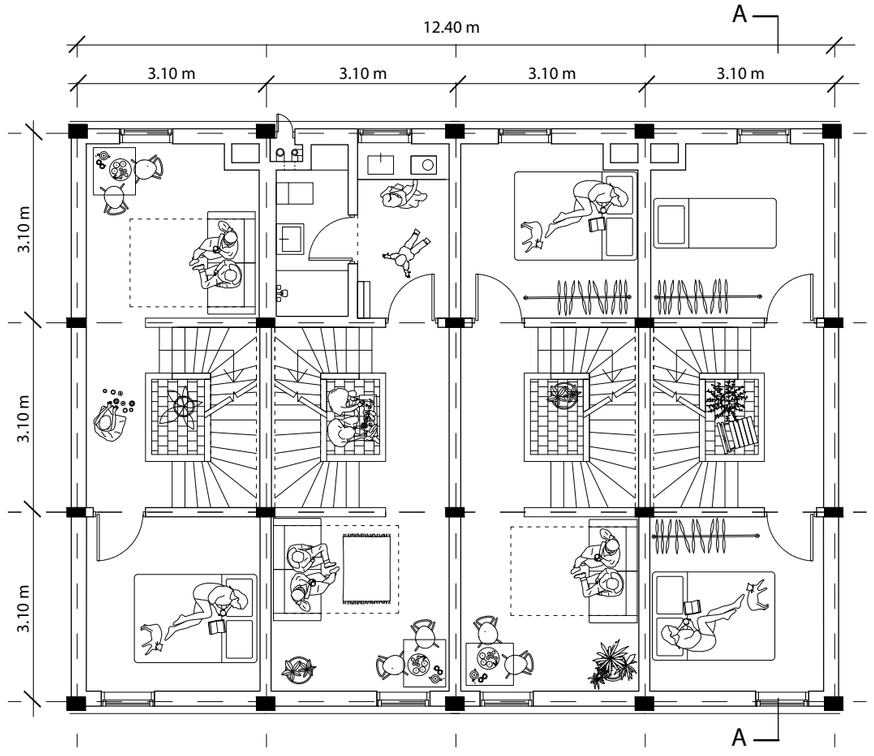
Typical section

# 01 Building Strategy

## *Low Rise - Row-Housing* // Plans Extended



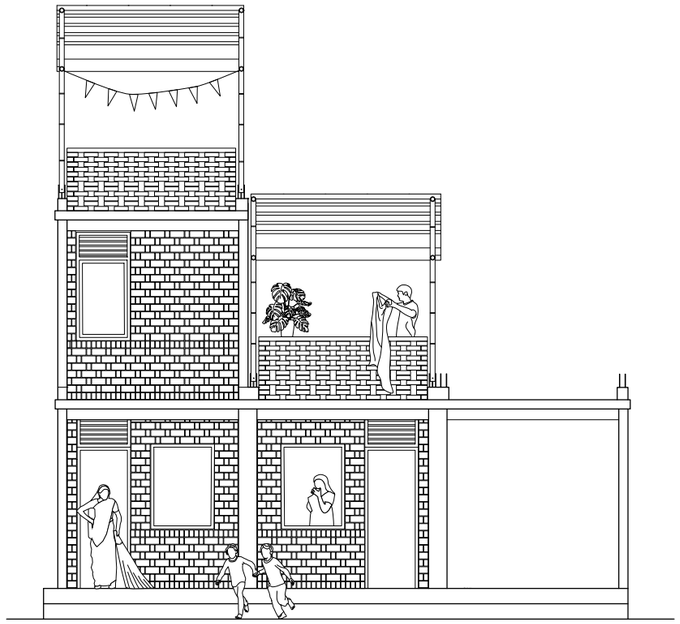

Ground floor plans



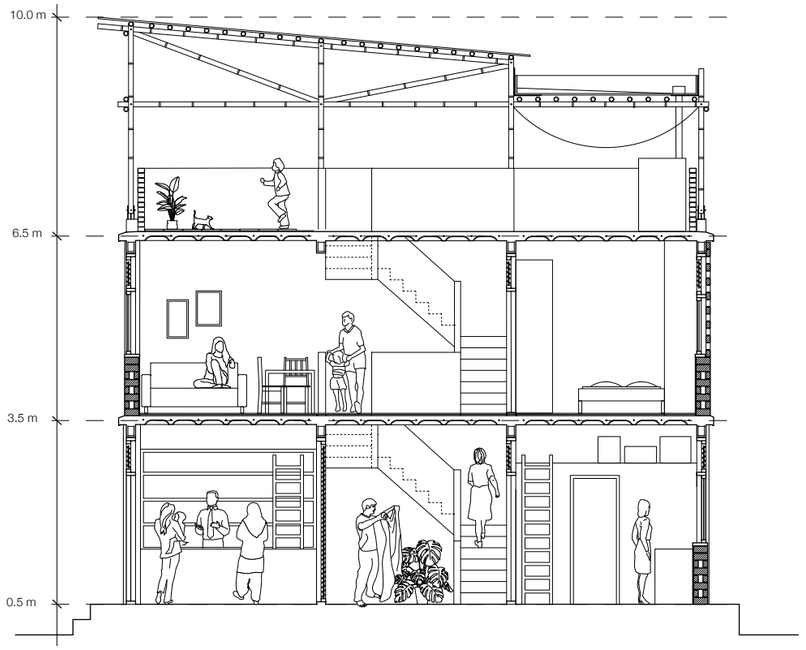

Upper floor plans

# 01 Building Strategy

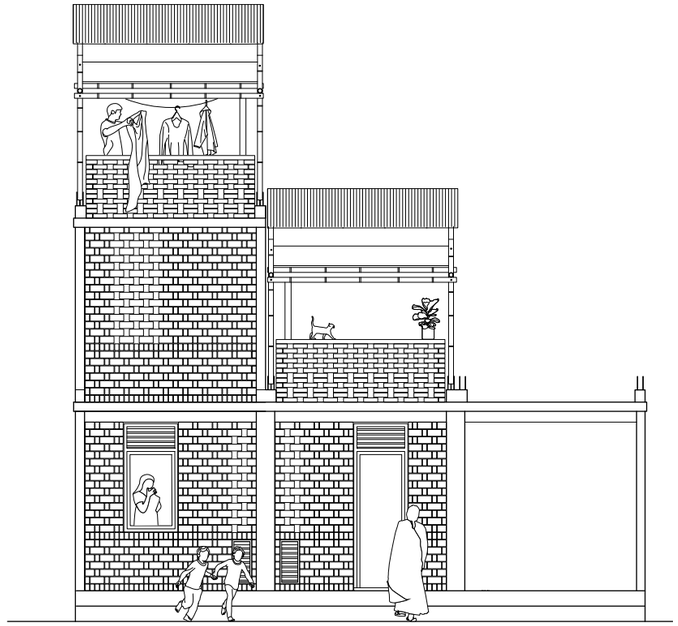
## *Low Rise - Row-Housing* // Facades-Sections Extended



Front facade



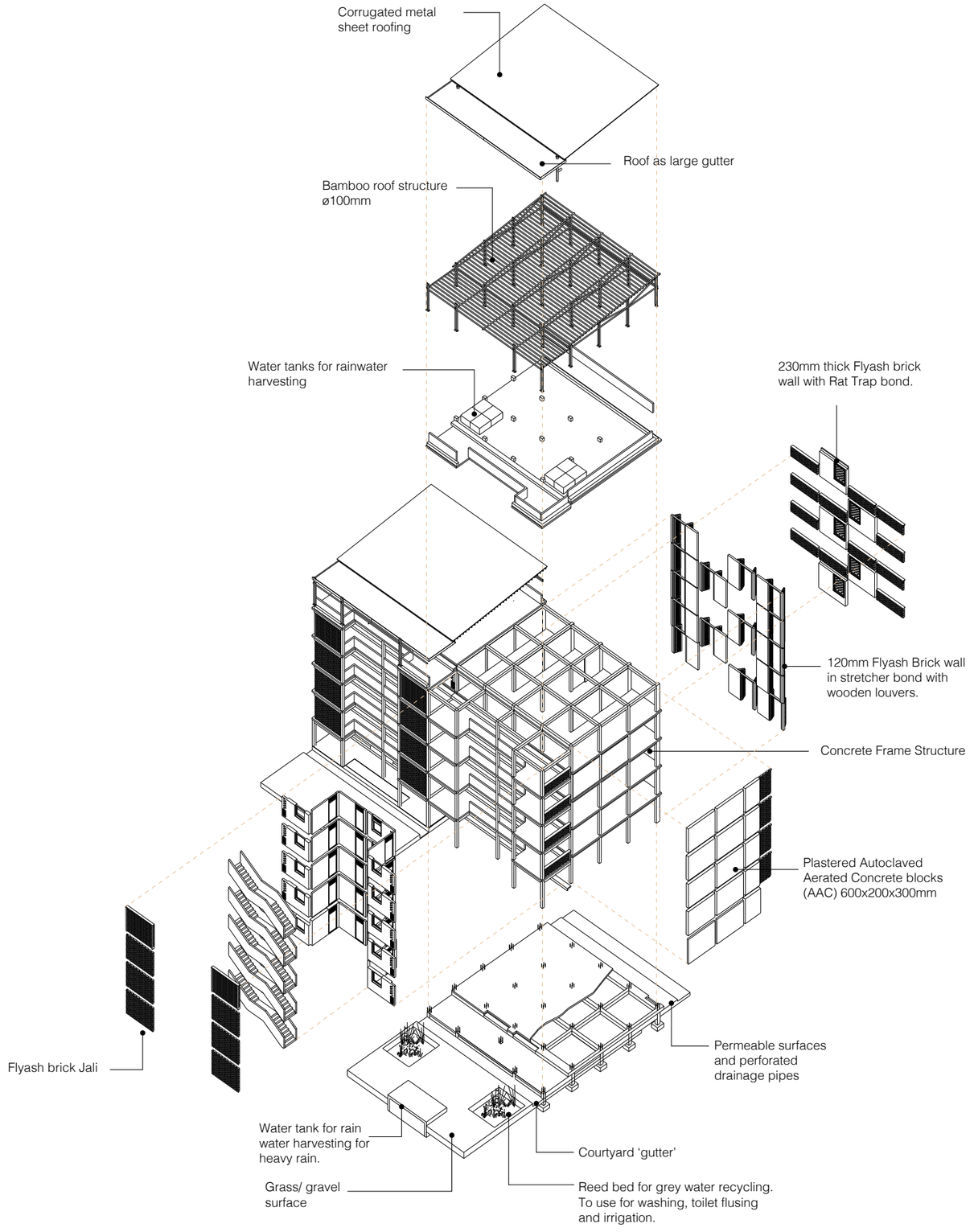

Section A



Back facade

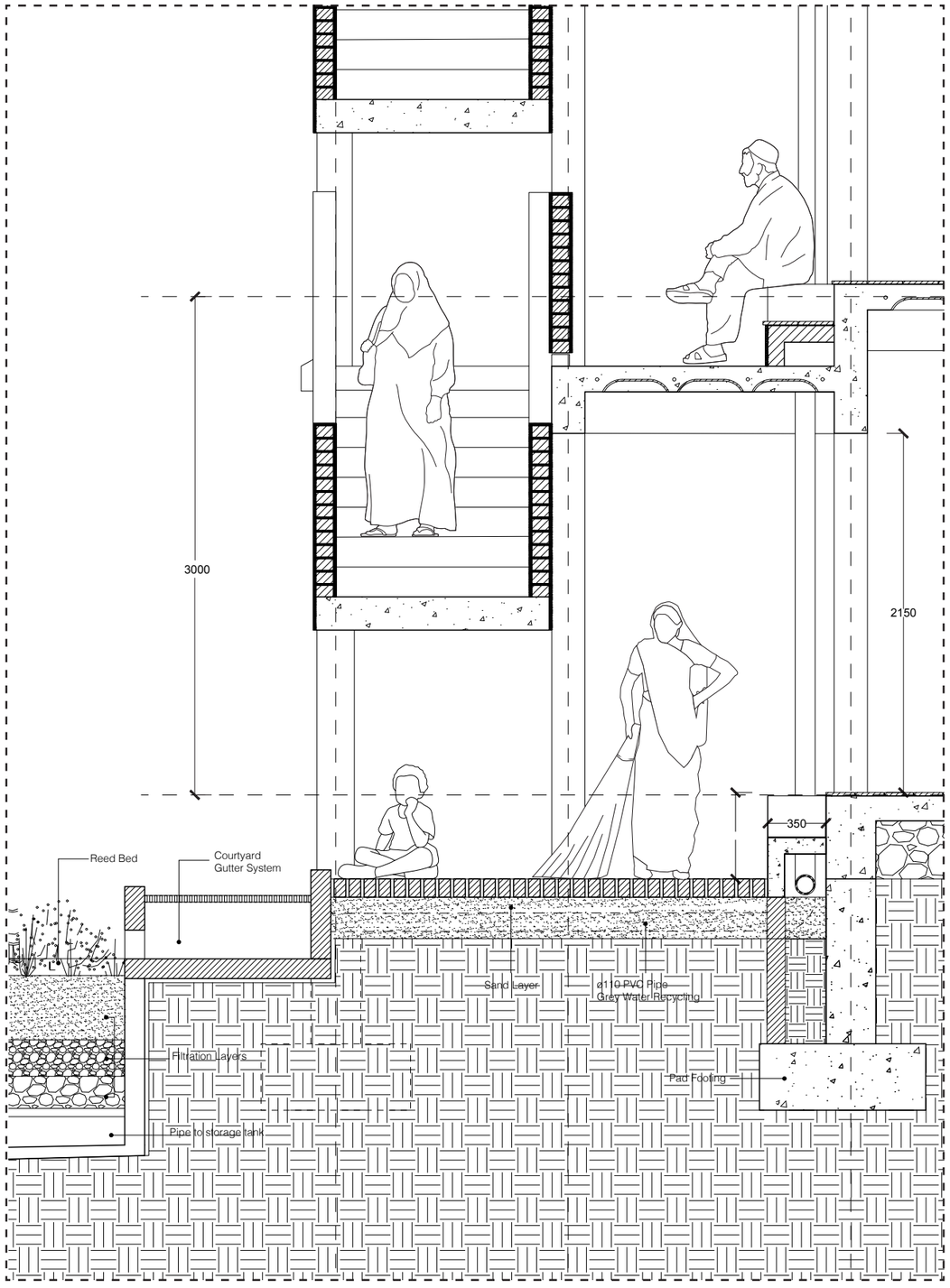
# 01 Building Strategy

## Construction Method and Materiality

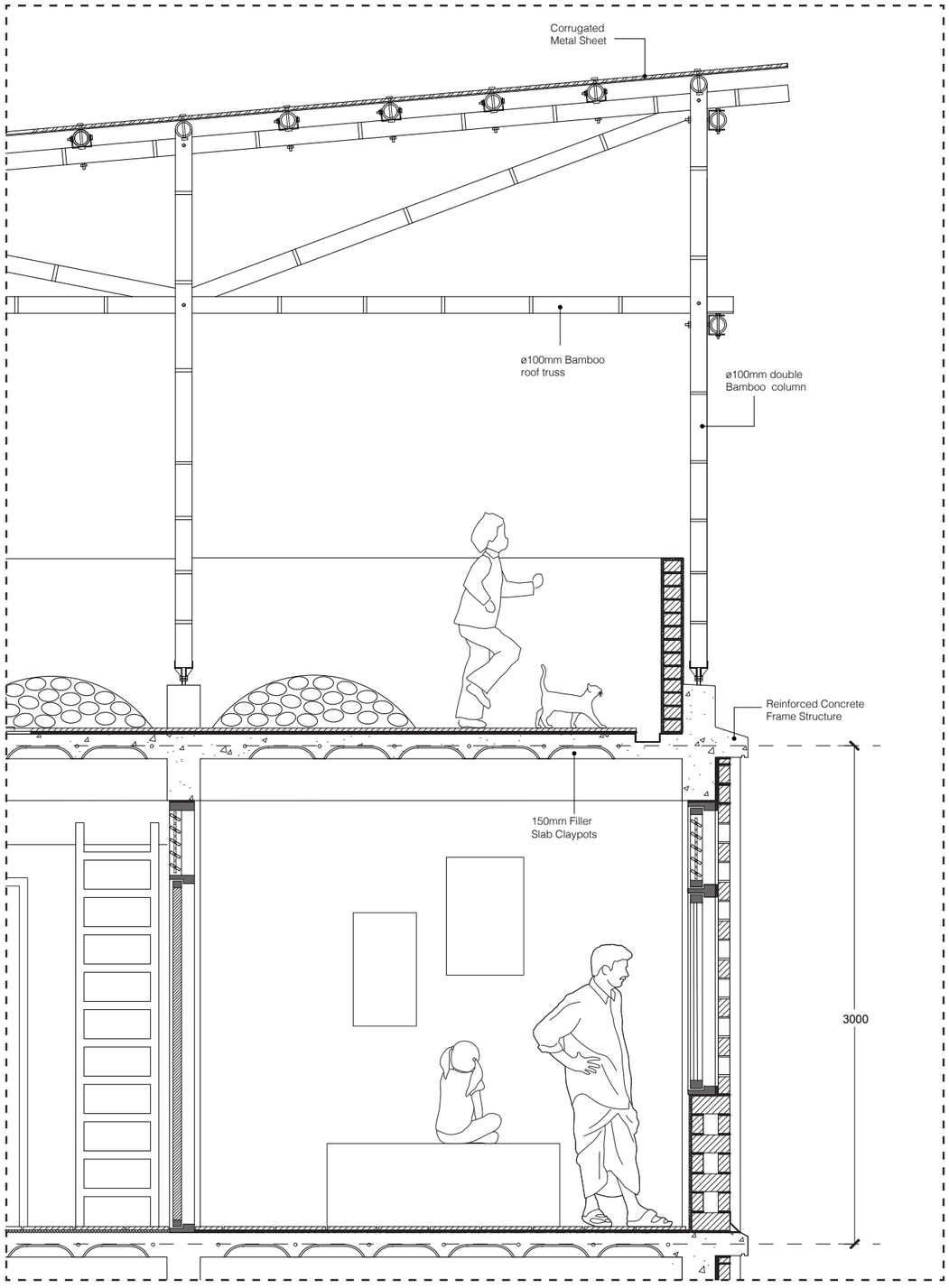


# 01 Building Strategy

## 1/20 Details



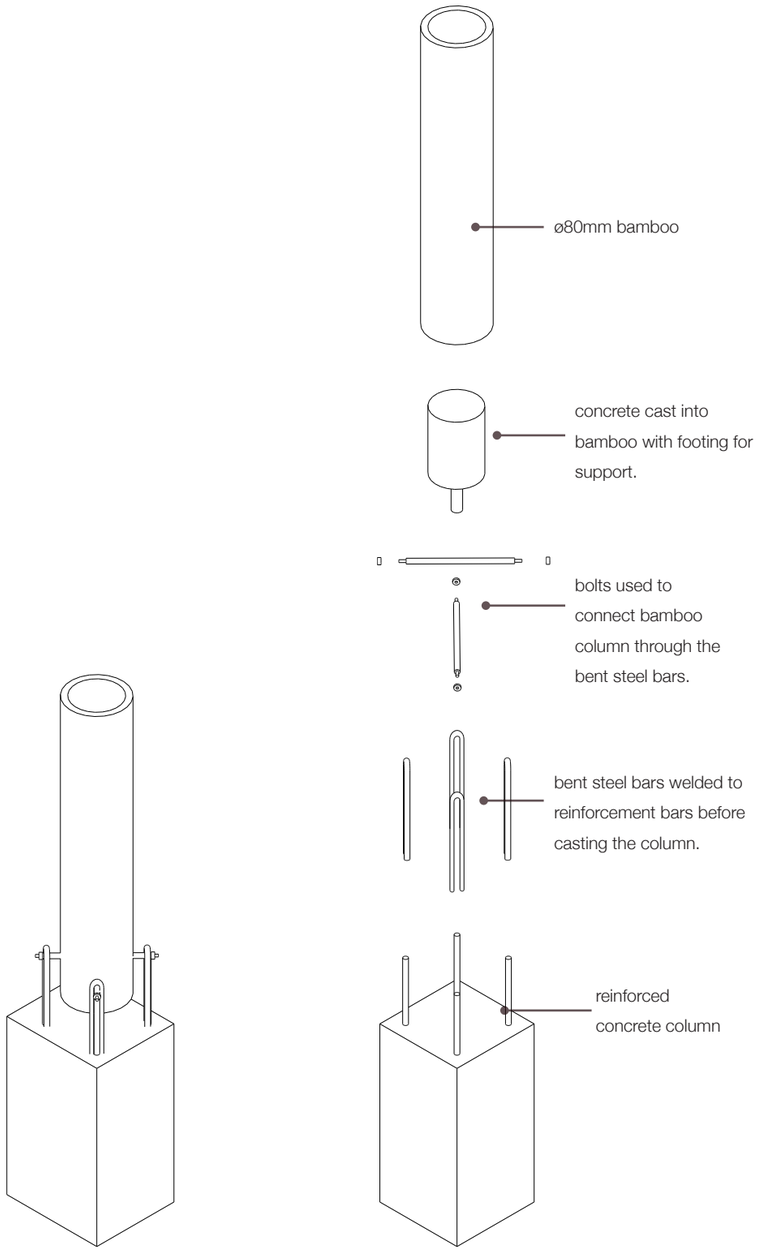

Ground section fragment



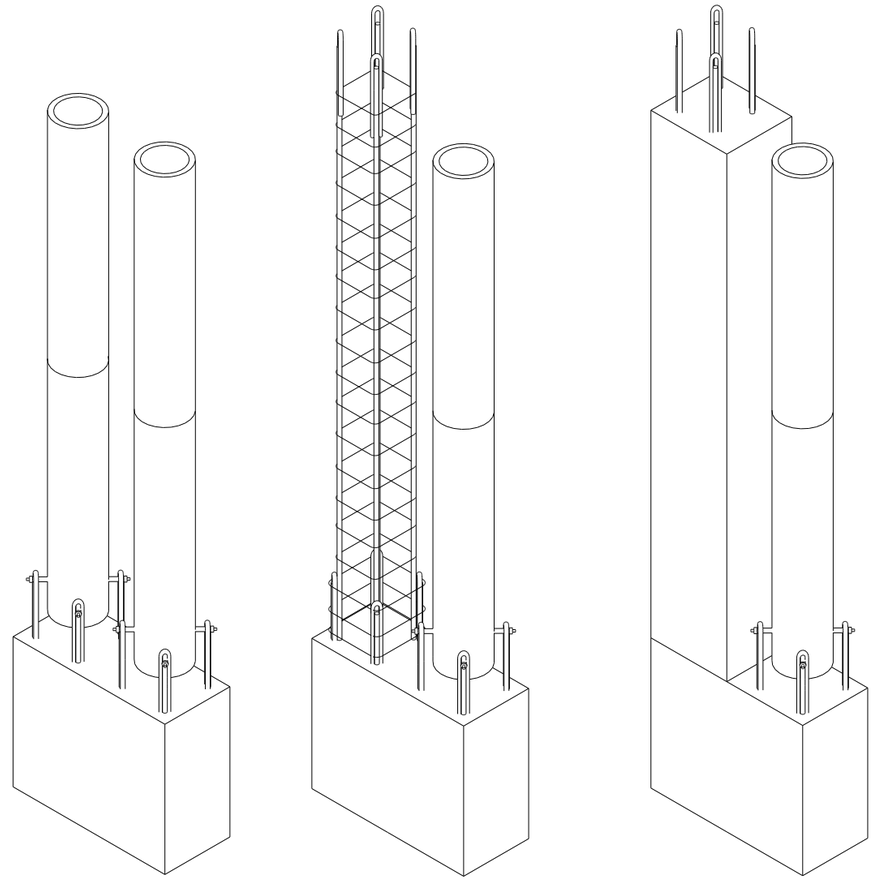

Roof section fragment

# 01 Building Strategy

## Low Rise Bamboo Detail



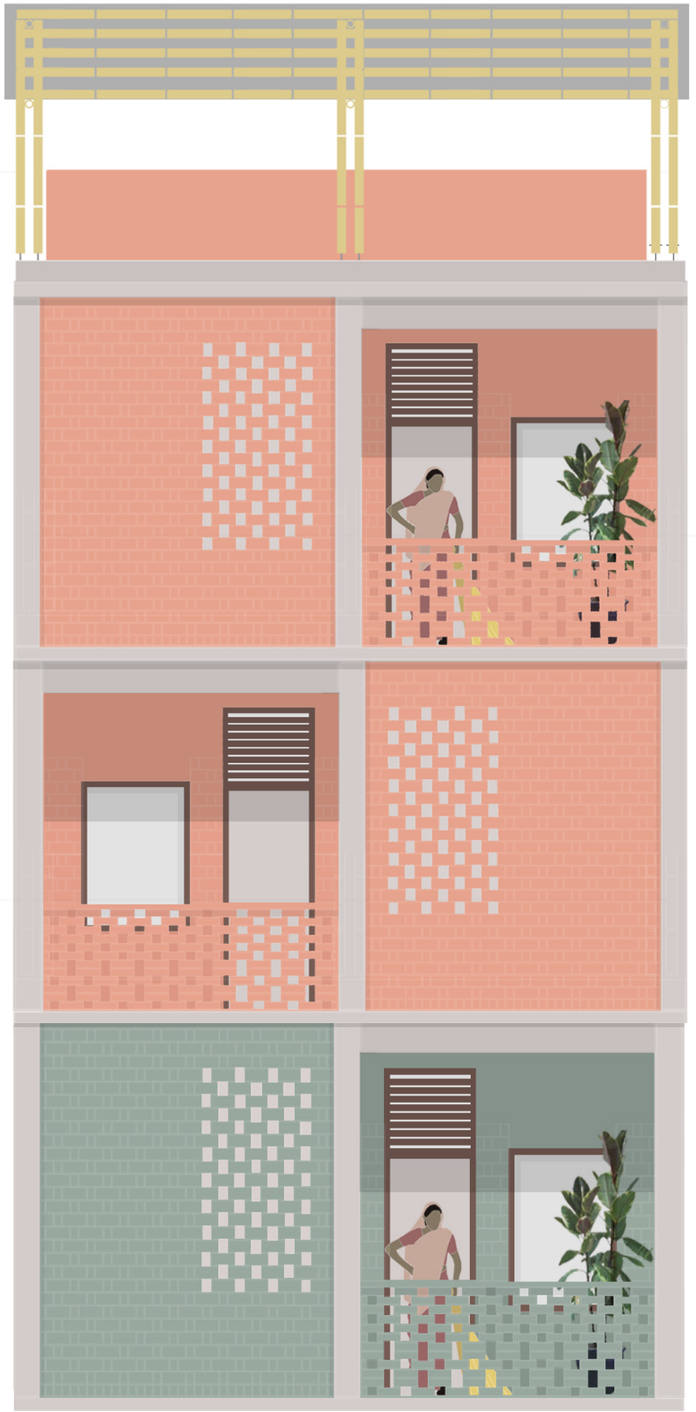

Structural components



Process of extention

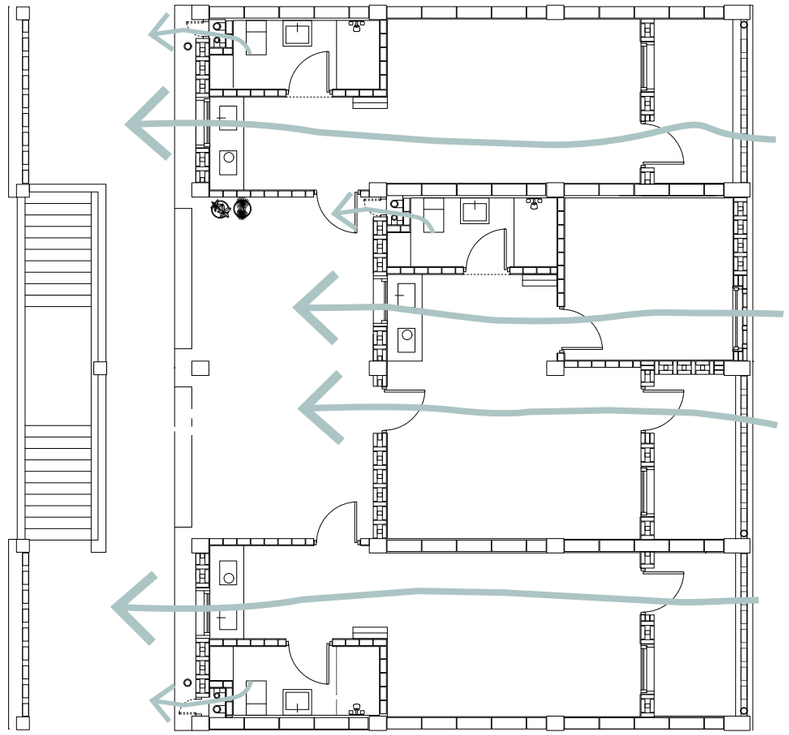
# 01 Building Strategy

## Materiality

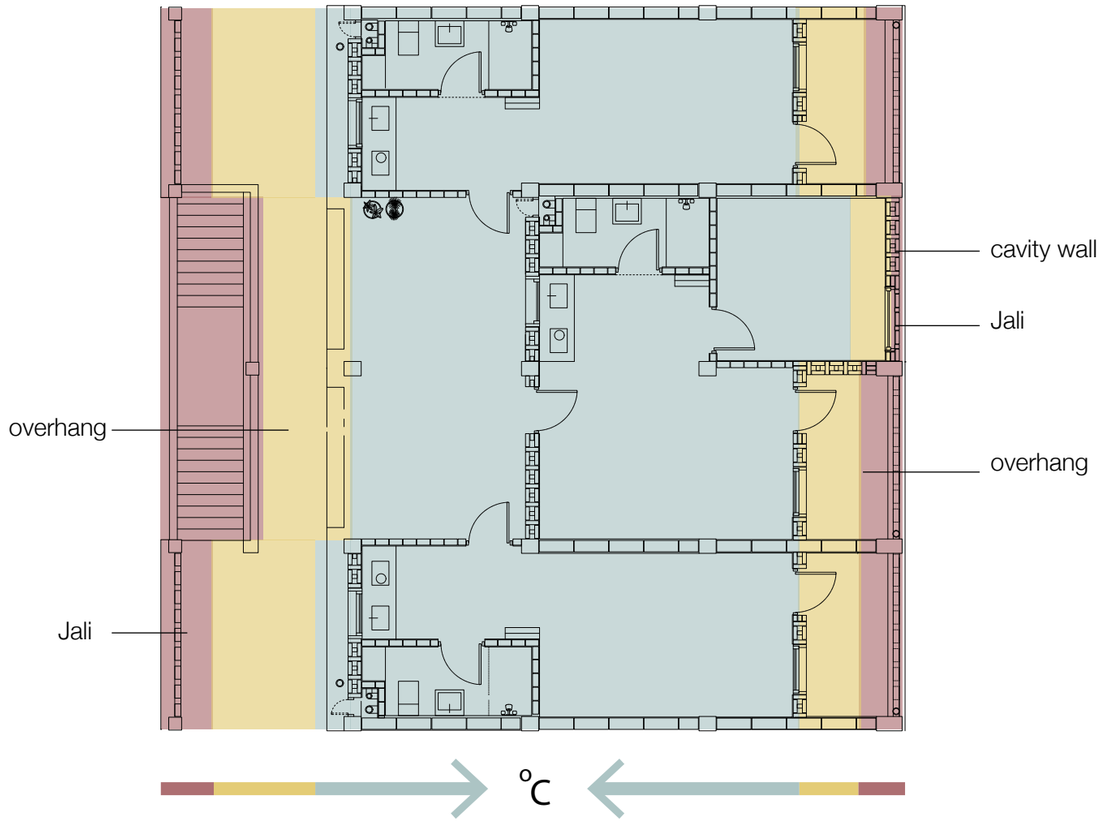


# 01 Building Strategy

## ***Building*** // Ventilation and Shading



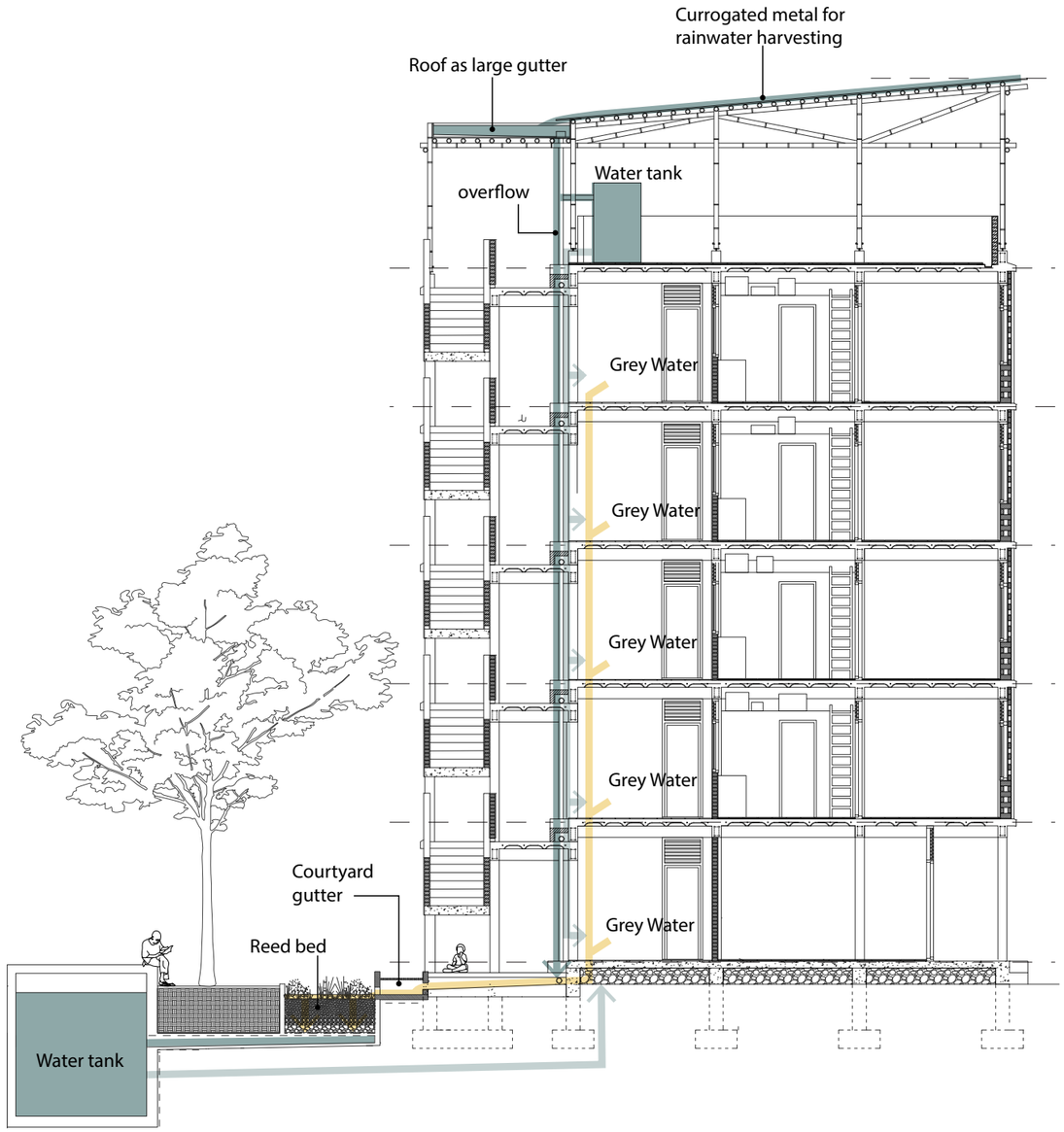
Natural ventilation




Shaded area

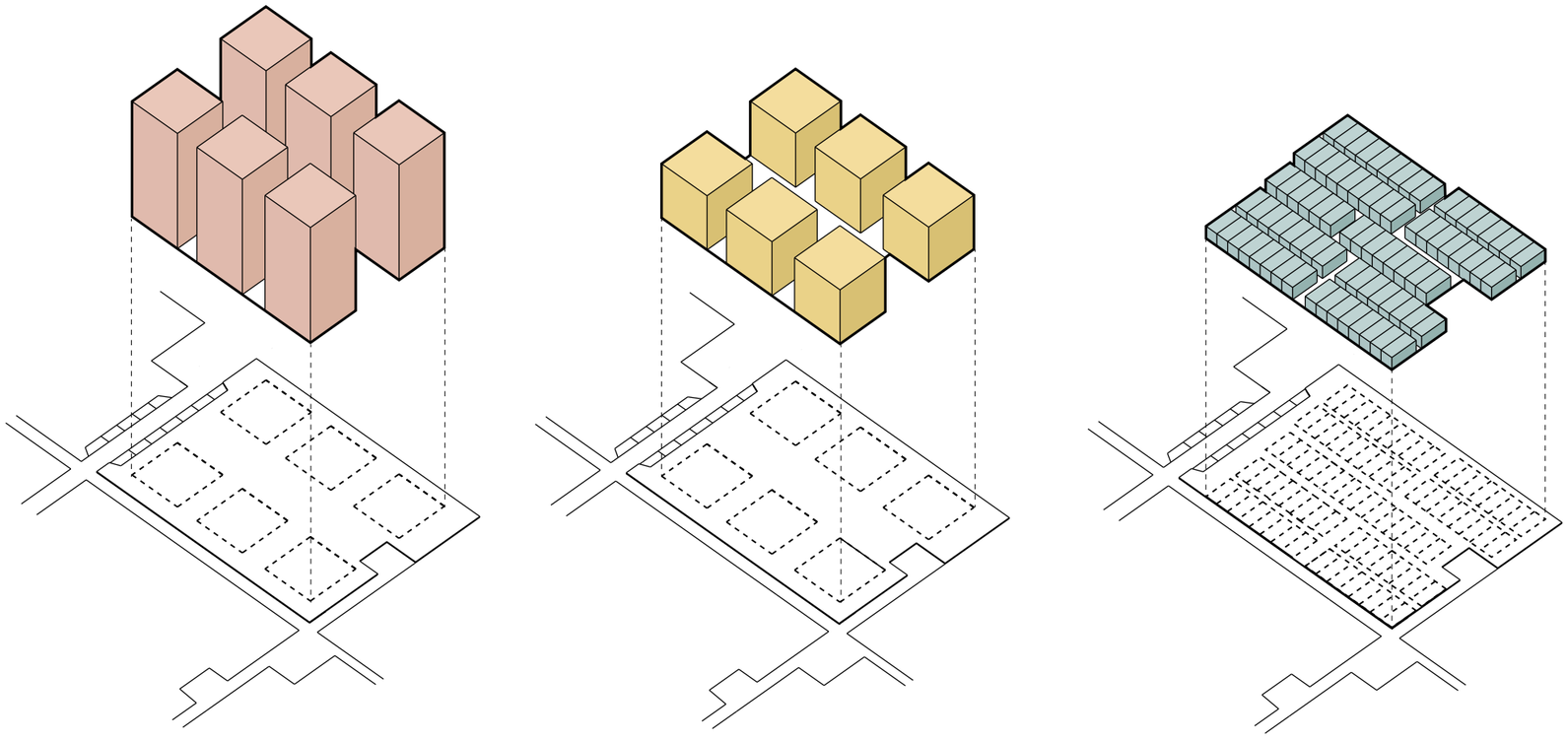
# 01 Building Strategy

## *Building* // Water Management




# 02 Clustering

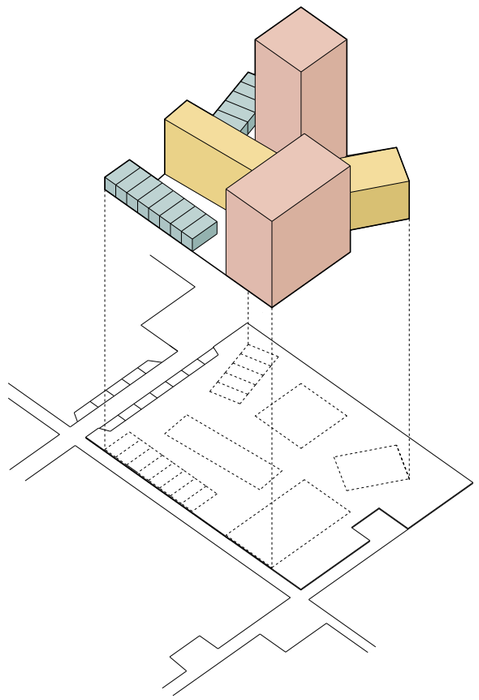
Based only on efficiency



Too little diversity

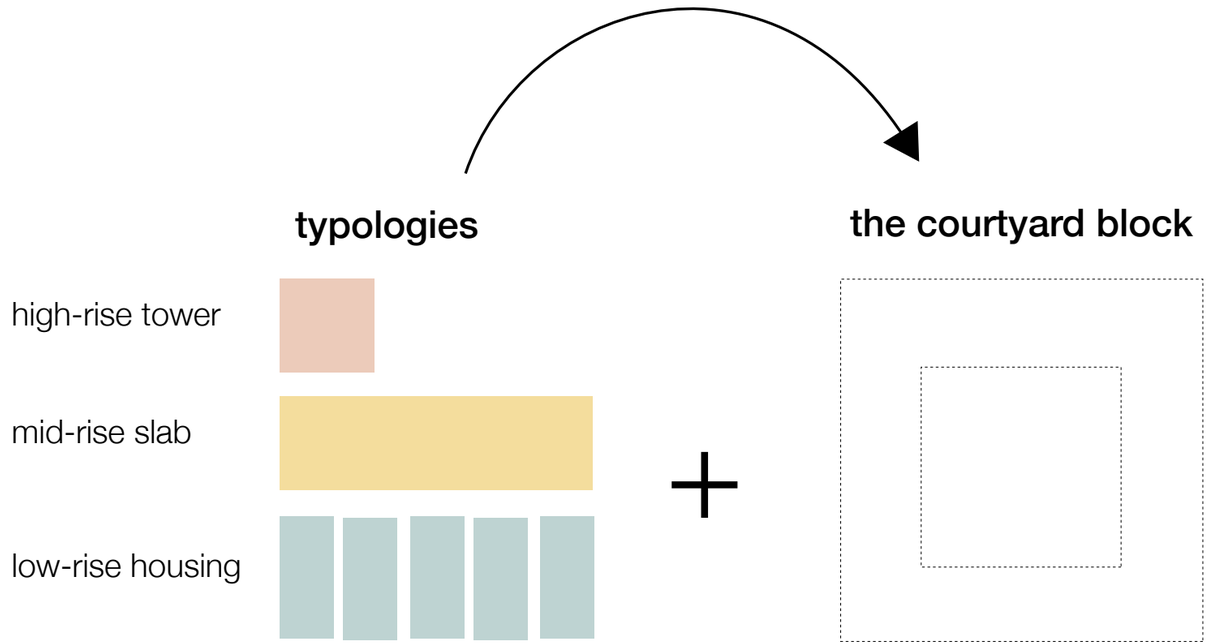
# 02 Clustering

Based only on resilience



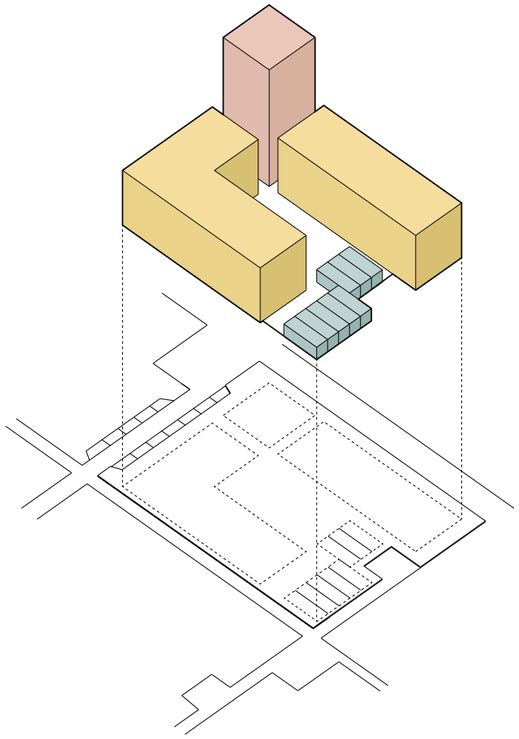
Too much diversity

# 02 Clustering
Strategy



# 02 Clustering

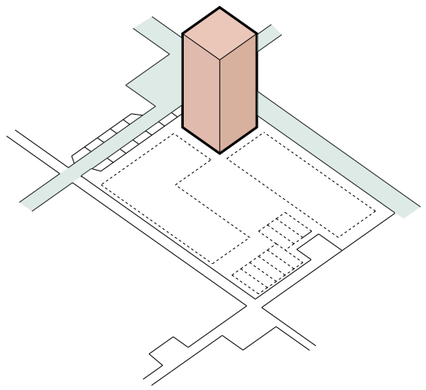
## Trade-off



Typical cluster

# 02 Clustering

## Strategy

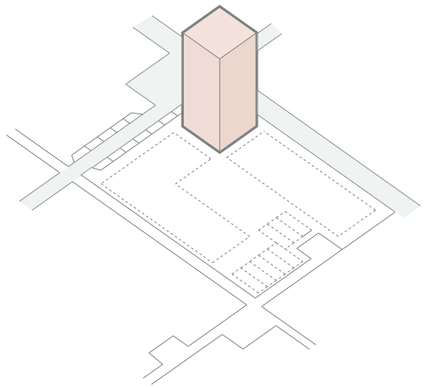


The Tower

Primary, secondary roads
and larger squares.

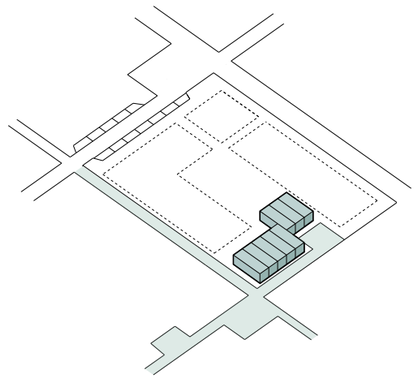
# 02 Clustering

## Strategy



The Tower

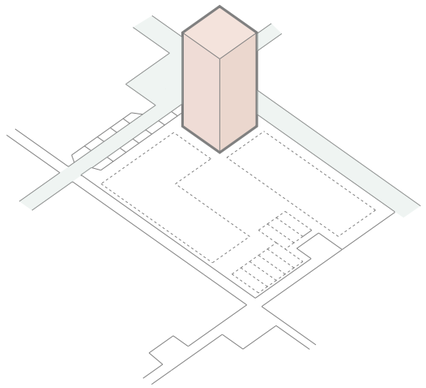
Primary, secondary roads
and larger squares.



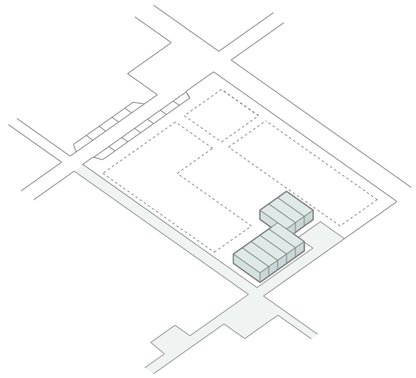
The Row-housing

Local roads

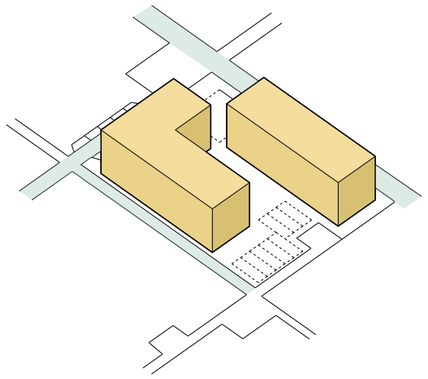
# 02 Clustering
## Strategy



The Tower



The Row-housing

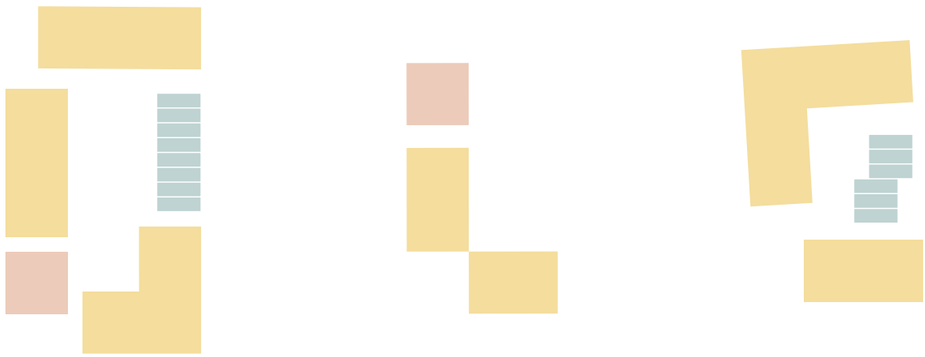


The Slab

All road hierarchies.
Adaptable ground floor.

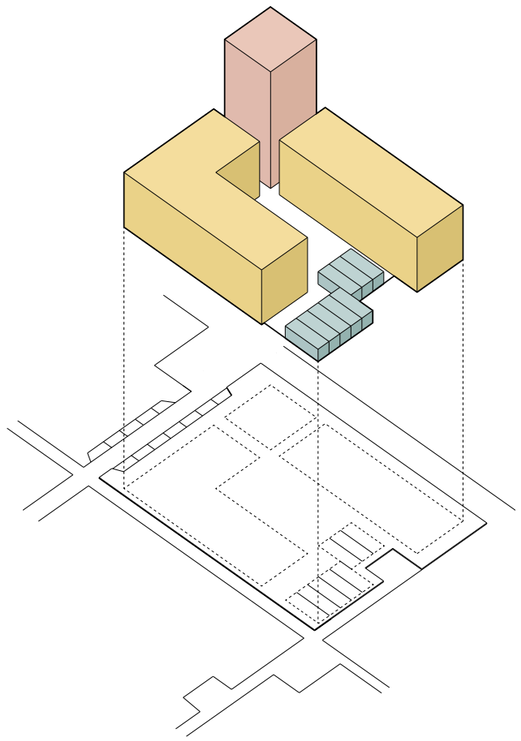
# 02 Clustering

Different Configurations



# 02 Clustering

## Density

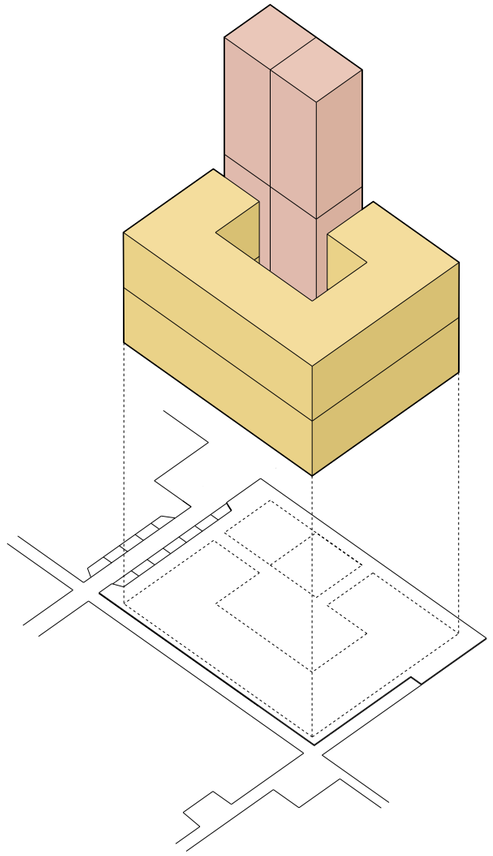


Proposal

Plot area: 2680 m2
Dwelling units: 116

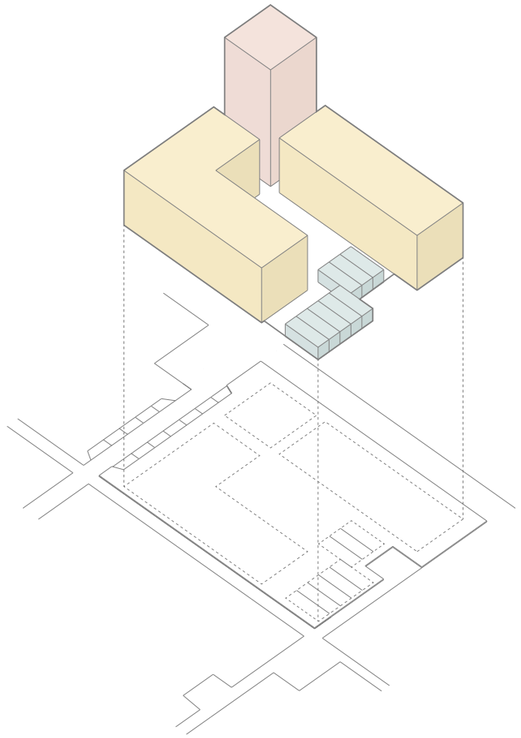
# 02 Clustering

## Density



Maximizing density

Plot area: 2680 m2
Dwelling units: 268

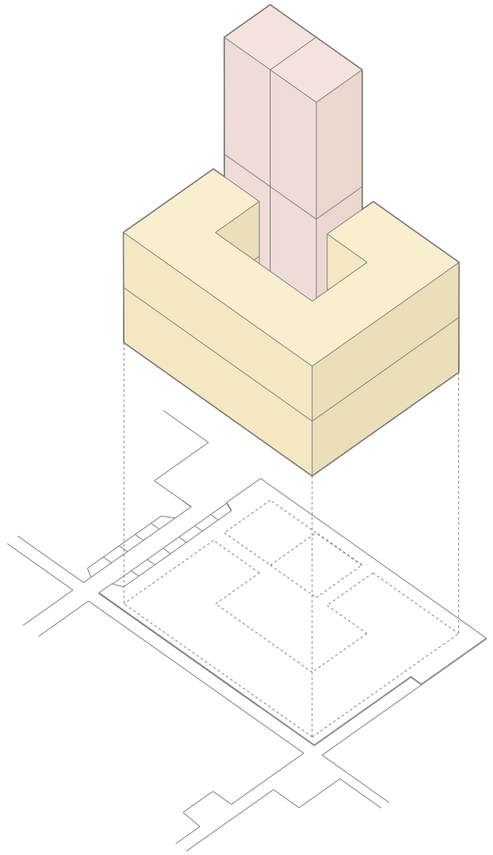


Proposal

Plot area: 2680 m2
Dwelling units: 116

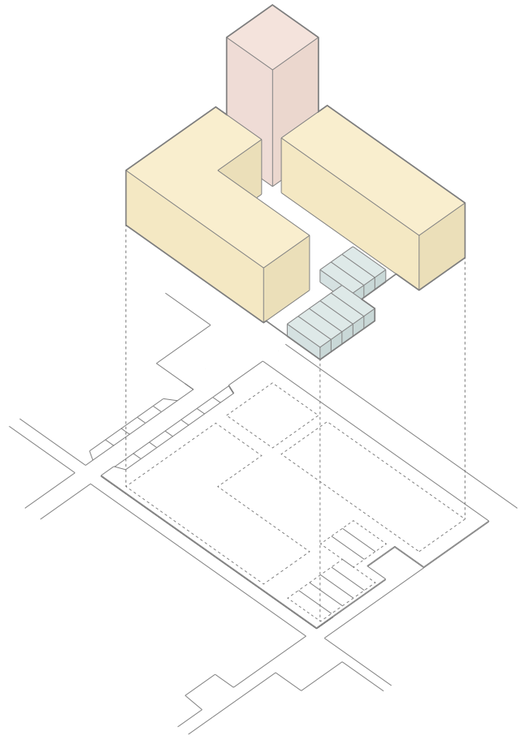
# 02 Clustering

## Density



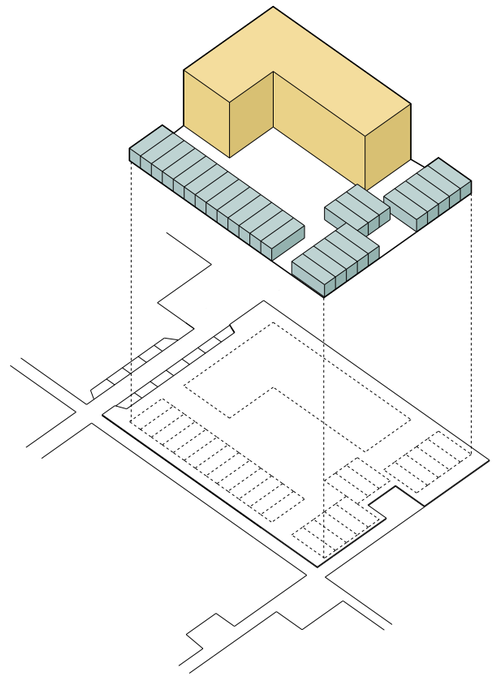
Maximizing density

Plot area: 2680 m2
Dwelling units: 268



Proposal

Plot area: 2680 m2
Dwelling units: 116



Decreasing density

Plot area: 2680 m2
Dwelling units: 84

# 02 Clustering

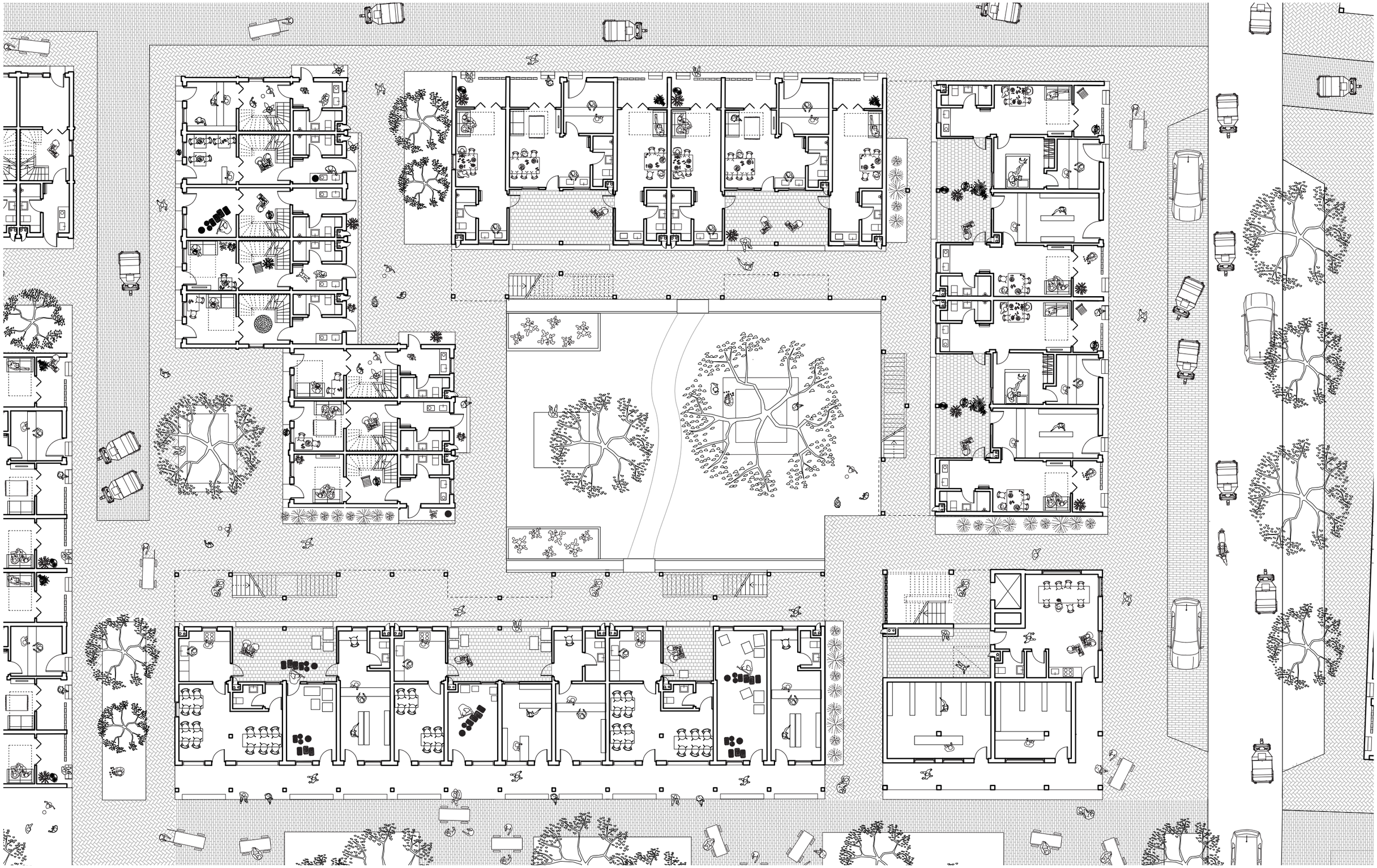
## 1/200 Typical cluster // Typologies

# 02 Clustering

## 1/200 Typical cluster // Program

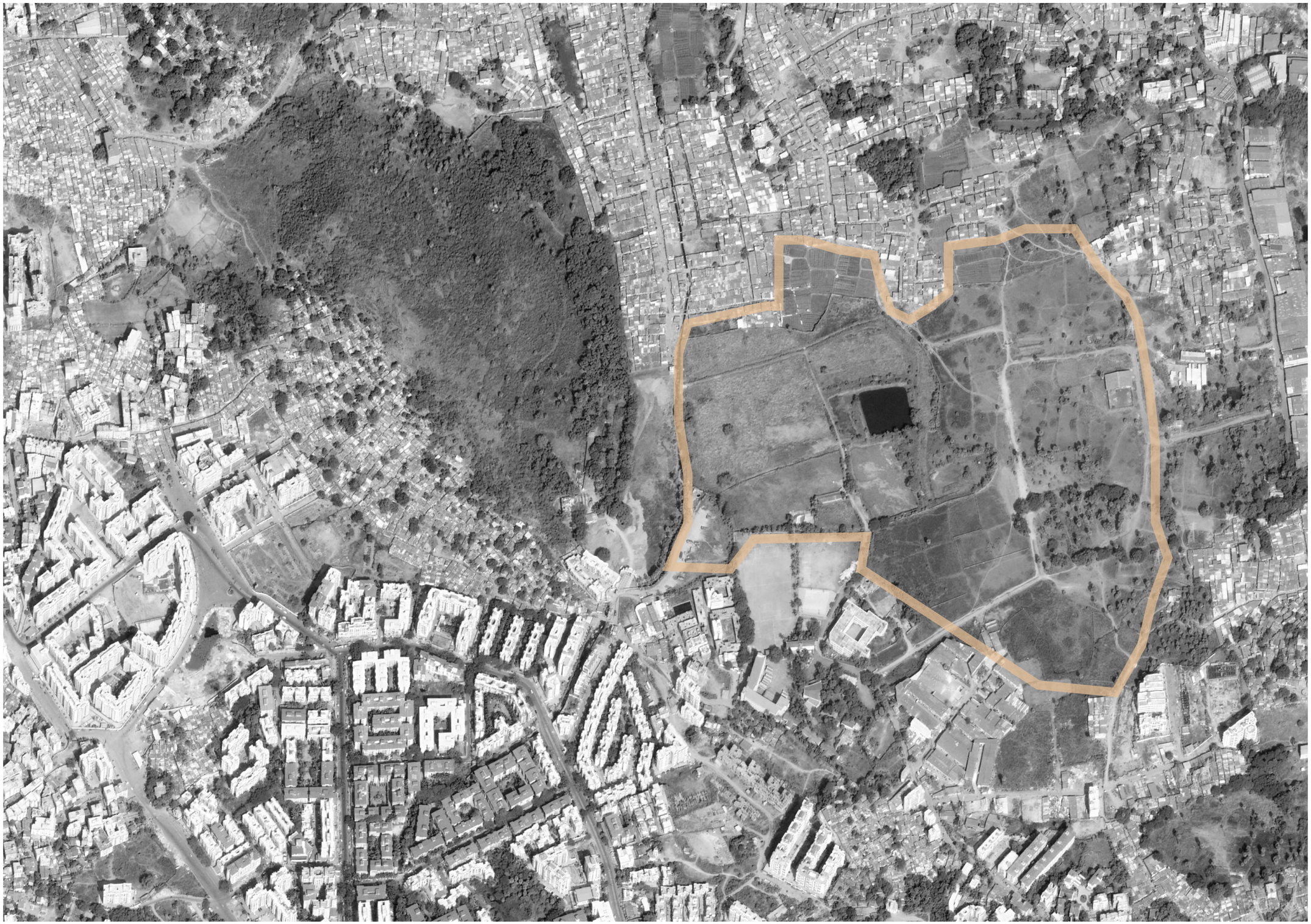
# 02 Clustering

## 1/200 Typical cluster



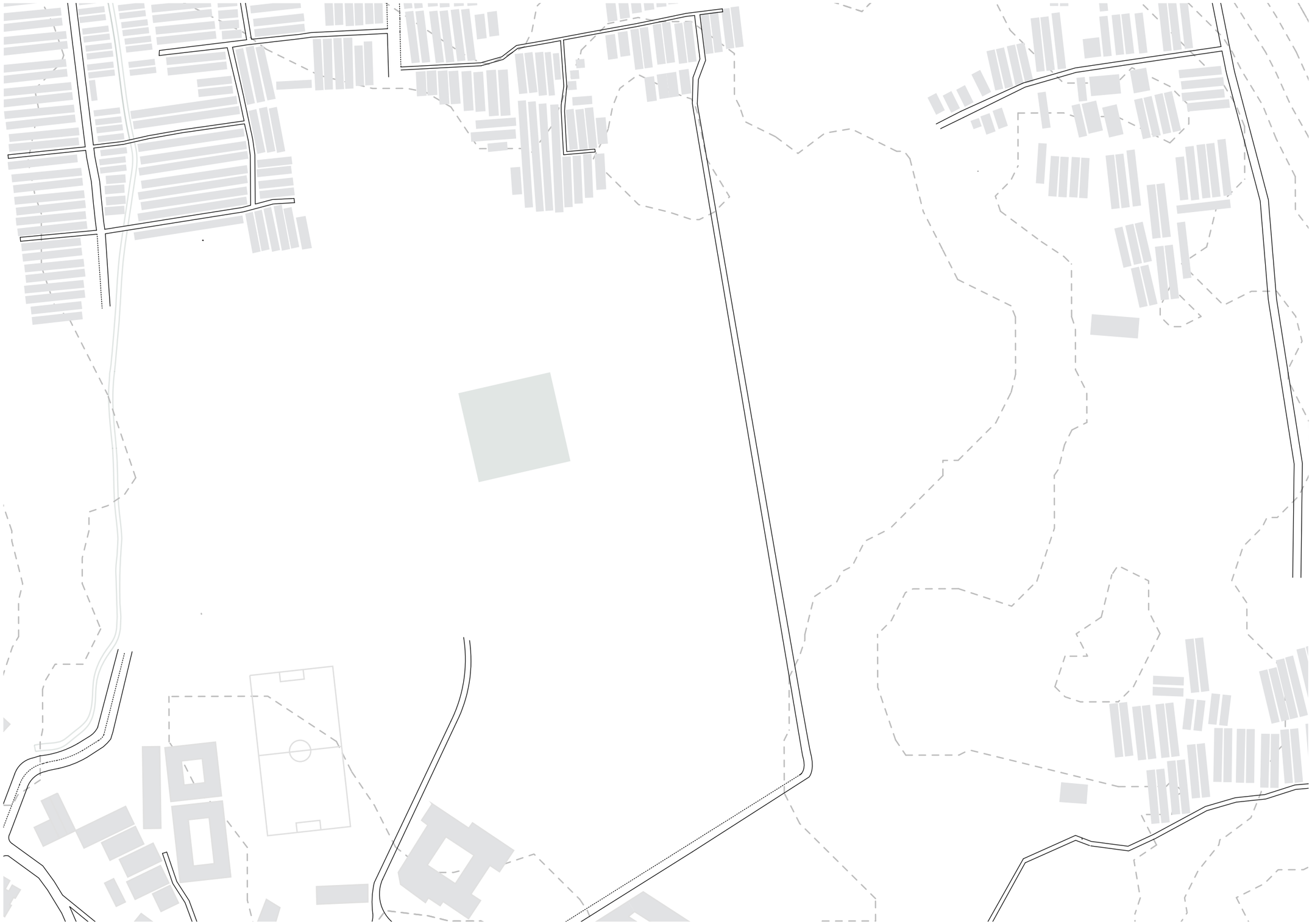
# 03 Urban Strategy

## Location // chosen area



# 03 Urban Strategy

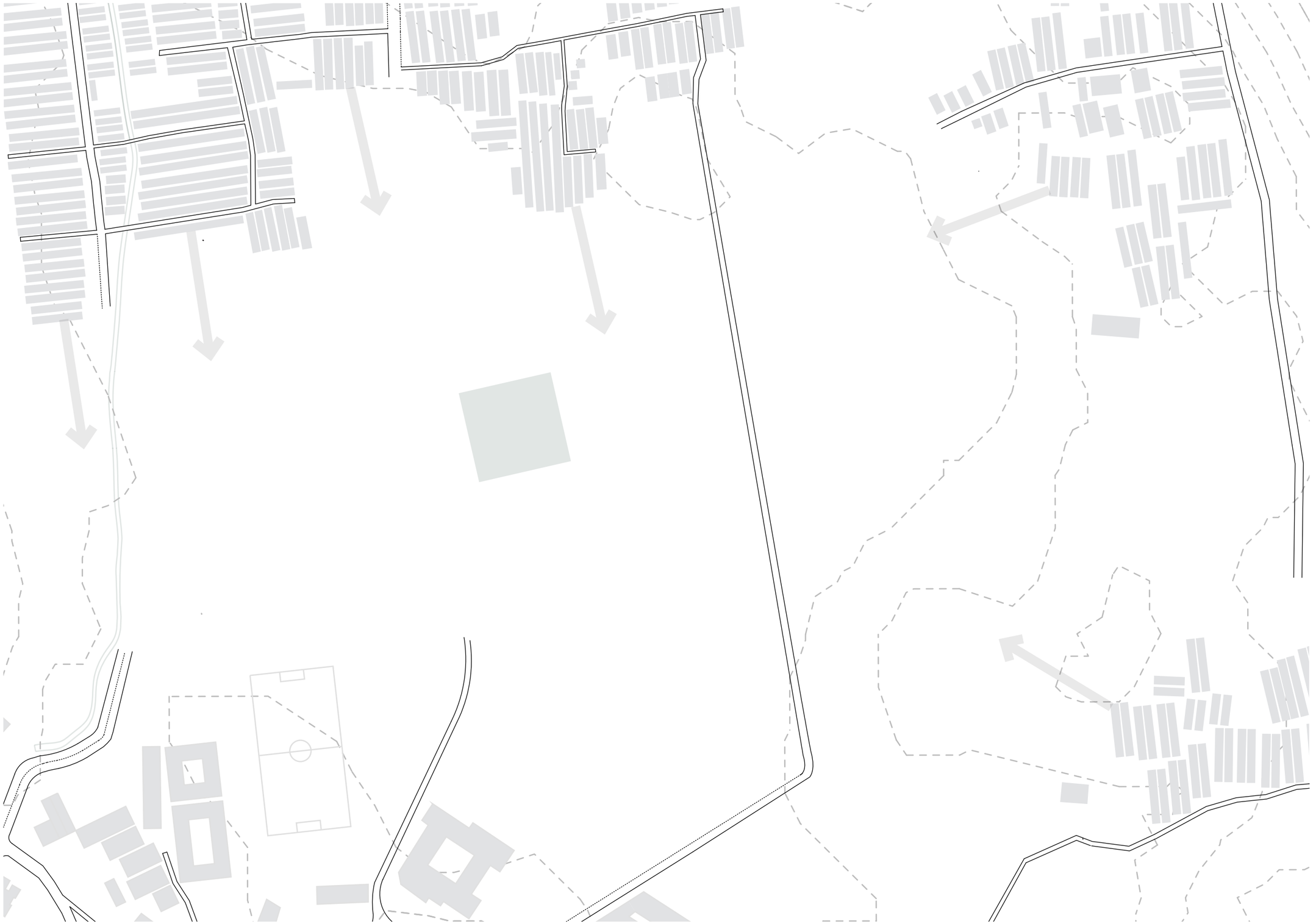
## Existing context



**What are possible future scenarios for the chosen site, if an alternative strategy is not given?**

# 03 Urban Strategy

## Future scenario 1



# 03 Urban Strategy

## Future scenario 1

# 03 Urban Strategy

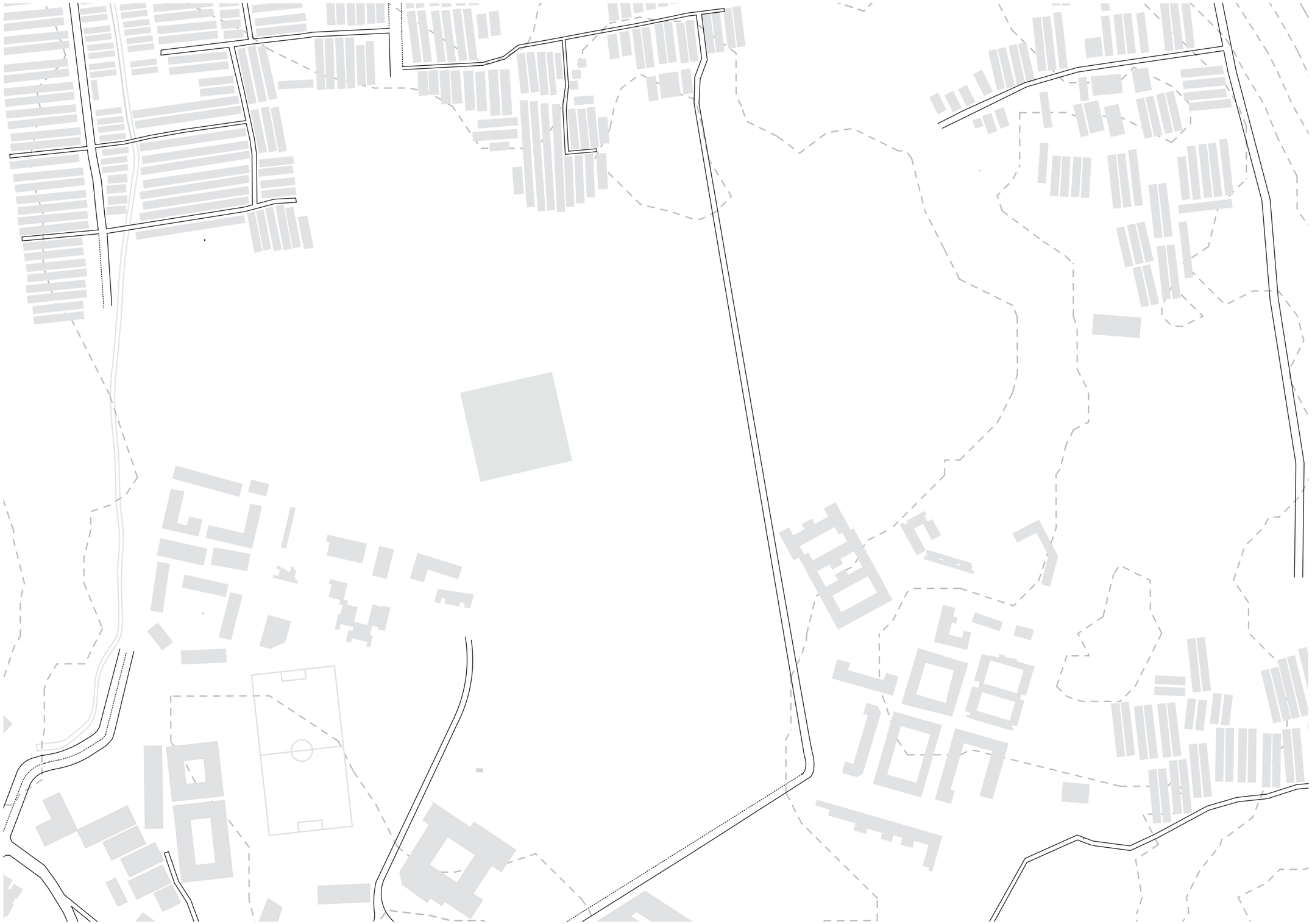
## Future scenario 2

# 03 Urban Strategy

## Future scenario 2

# 03 Urban Strategy

## Future scenario 2



# 03 Urban Strategy

## Future scenario 2

# 03 Urban Strategy

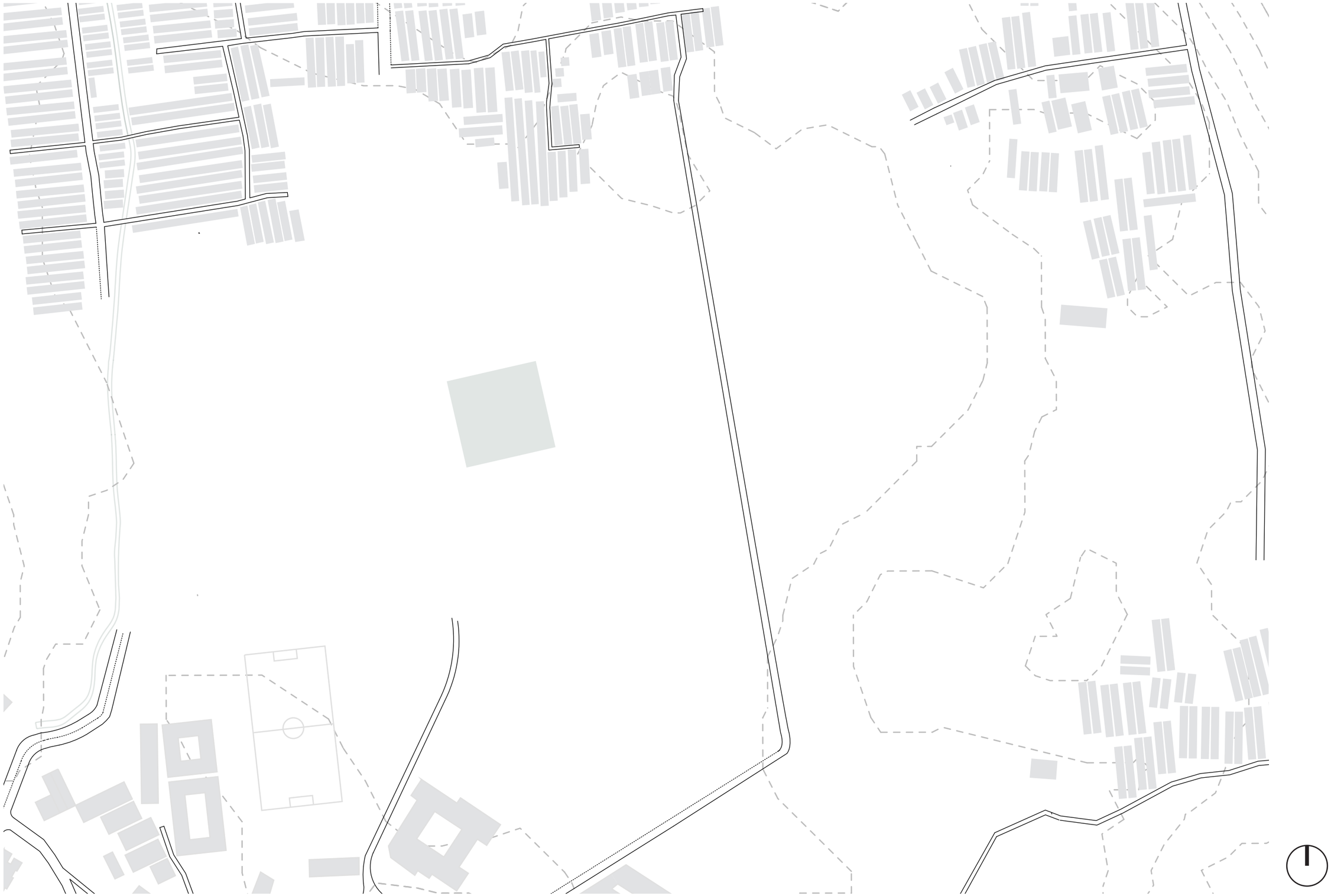
## Future scenario 2

# 03 Urban Strategy

## Future scenario 2

# 03 Urban Strategy

Future scenario 3?

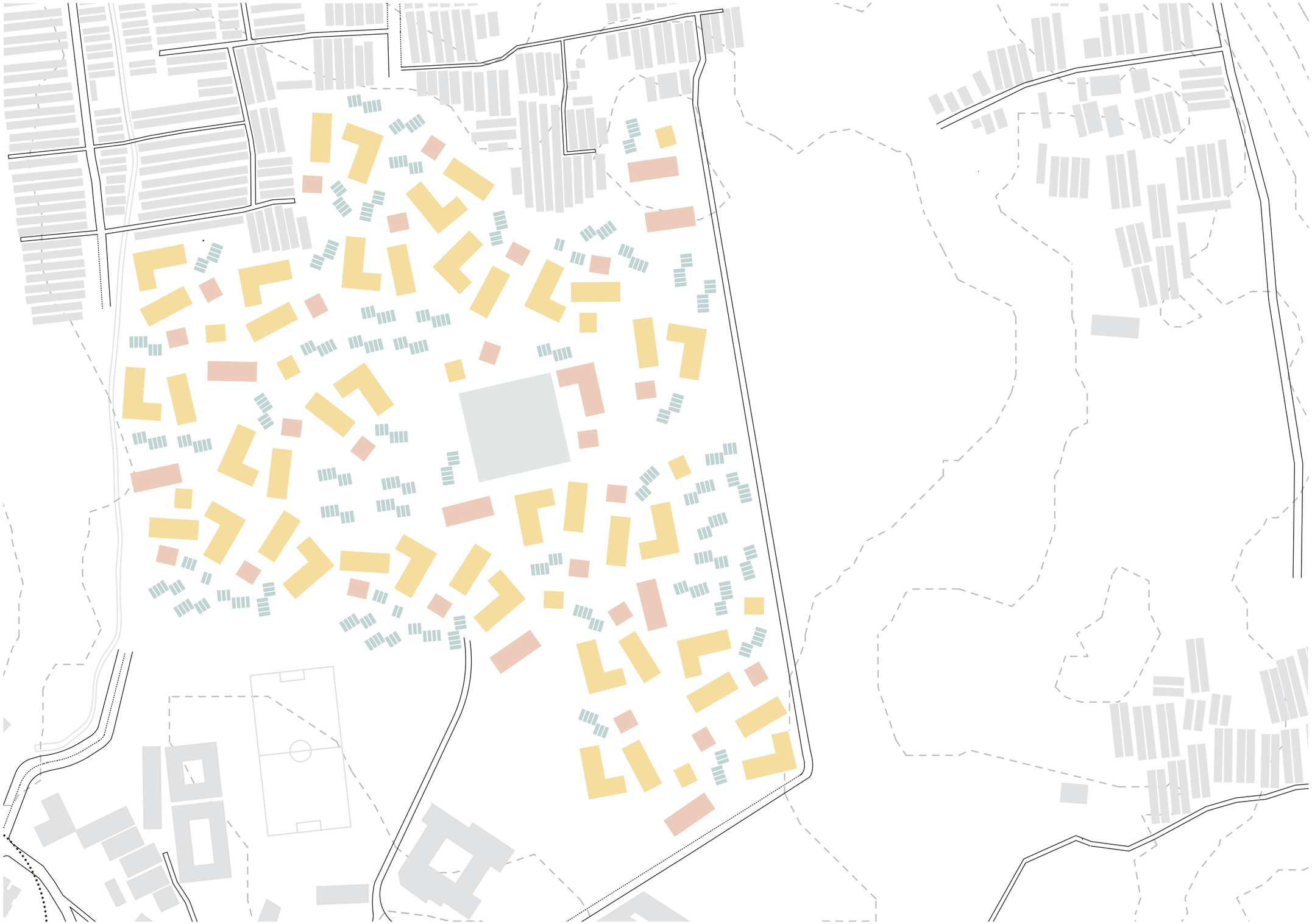


# 03 Urban Strategy

Based only on efficiency

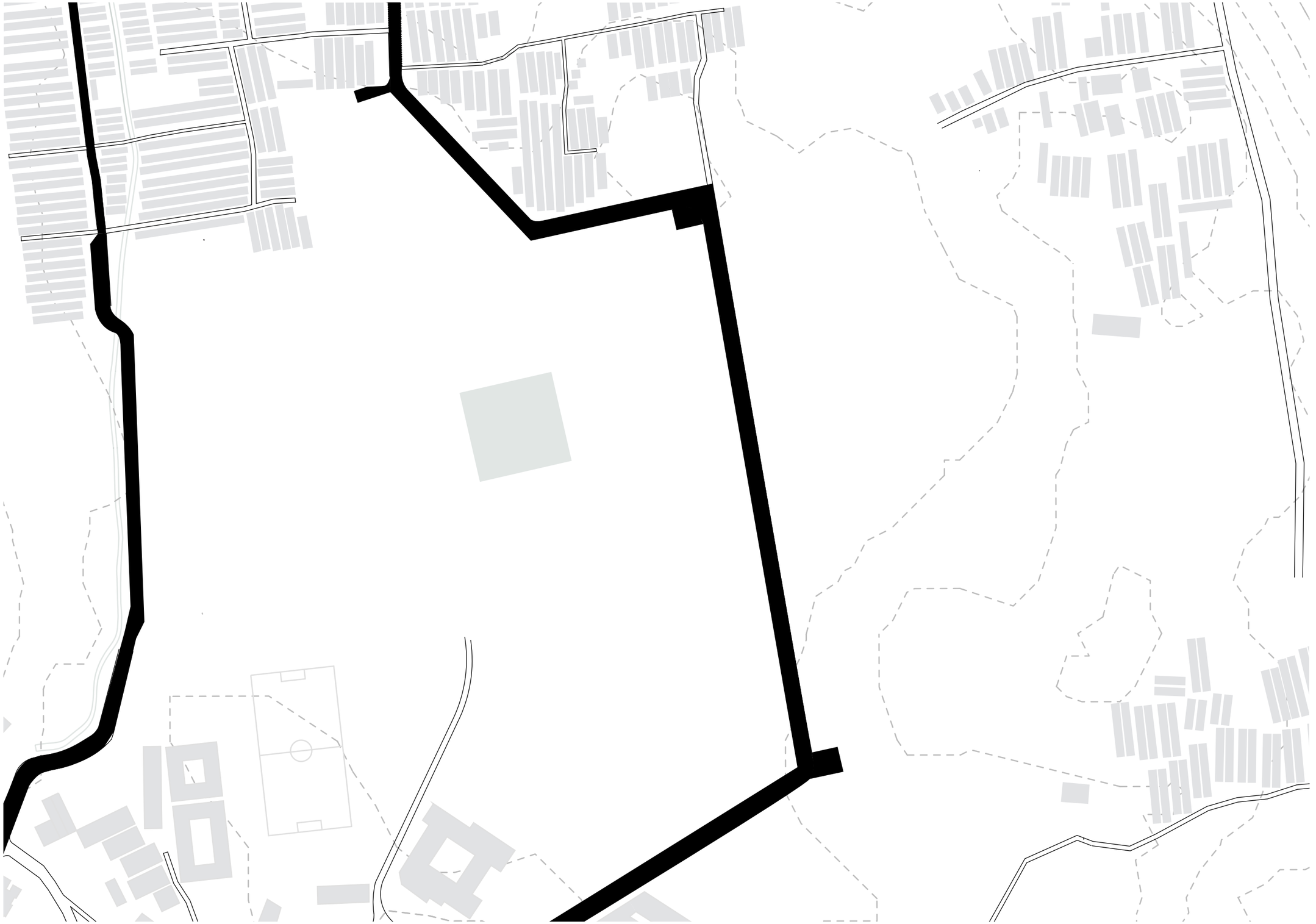
# 03 Urban Strategy

Based only on resilience



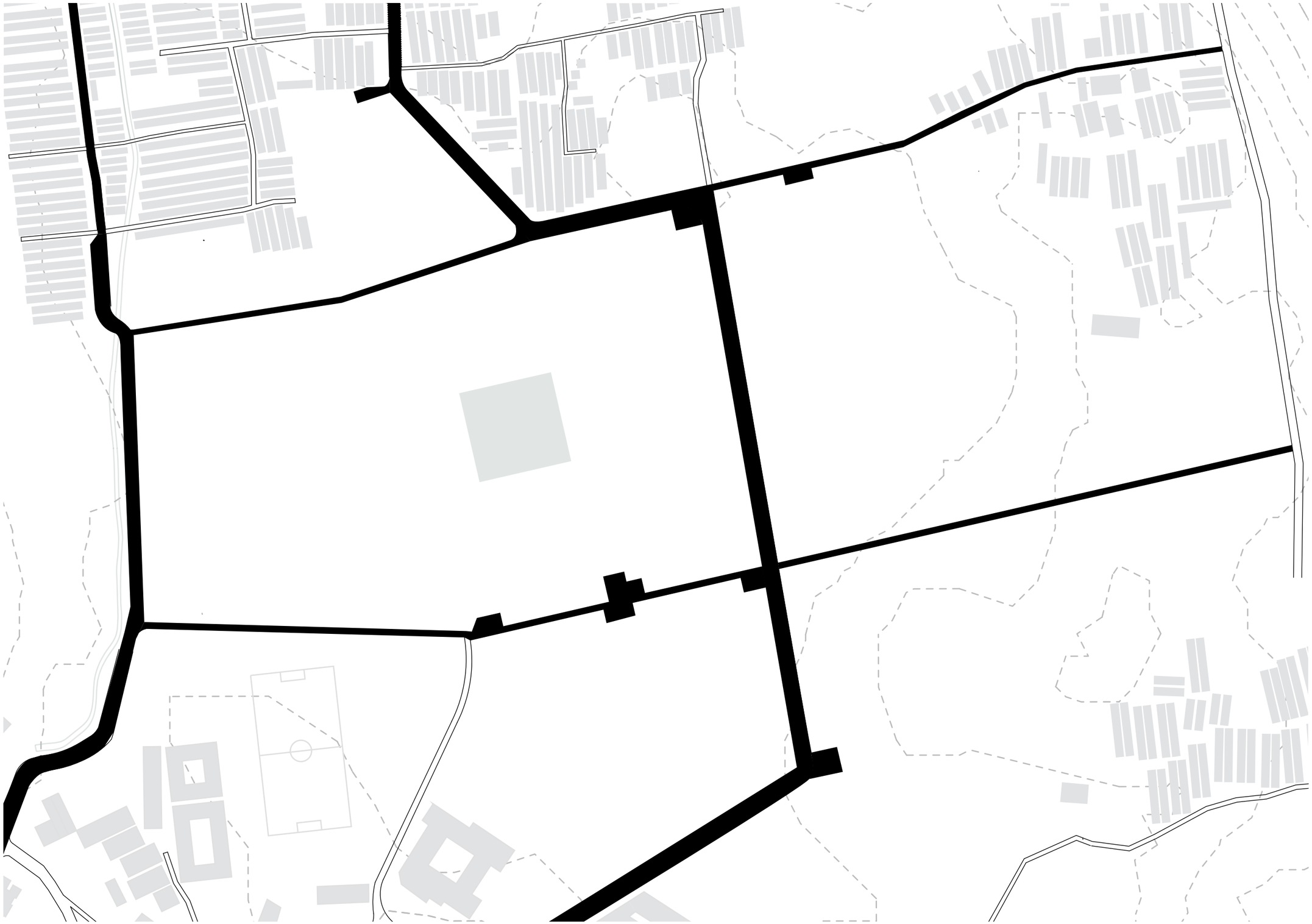
# 03 Urban Strategy

## Hierachy of roads // Primary



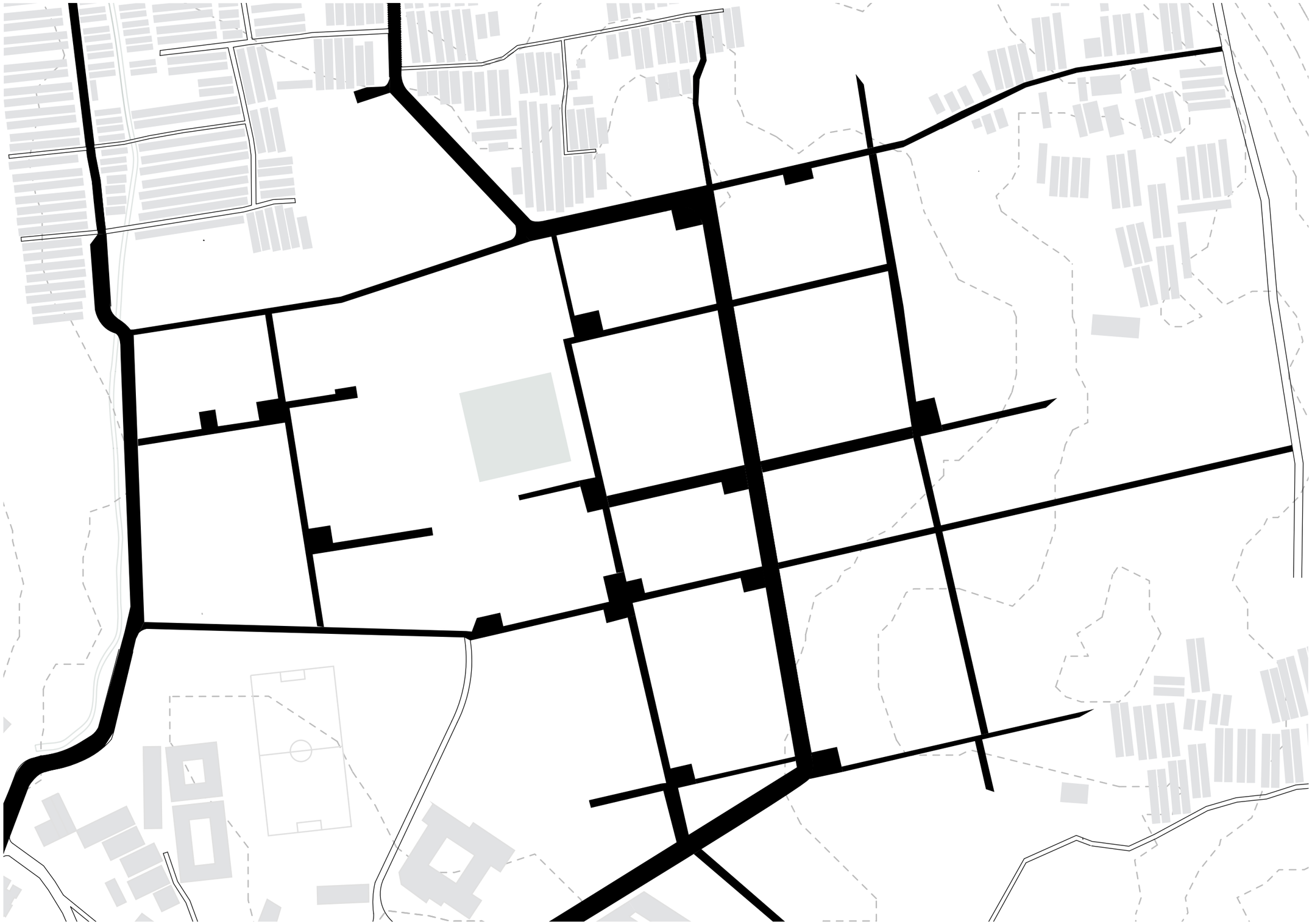
# 03 Urban Strategy

## Hierachy of roads // Secondary



# 03 Urban Strategy

## Hierachy of roads // Local 1

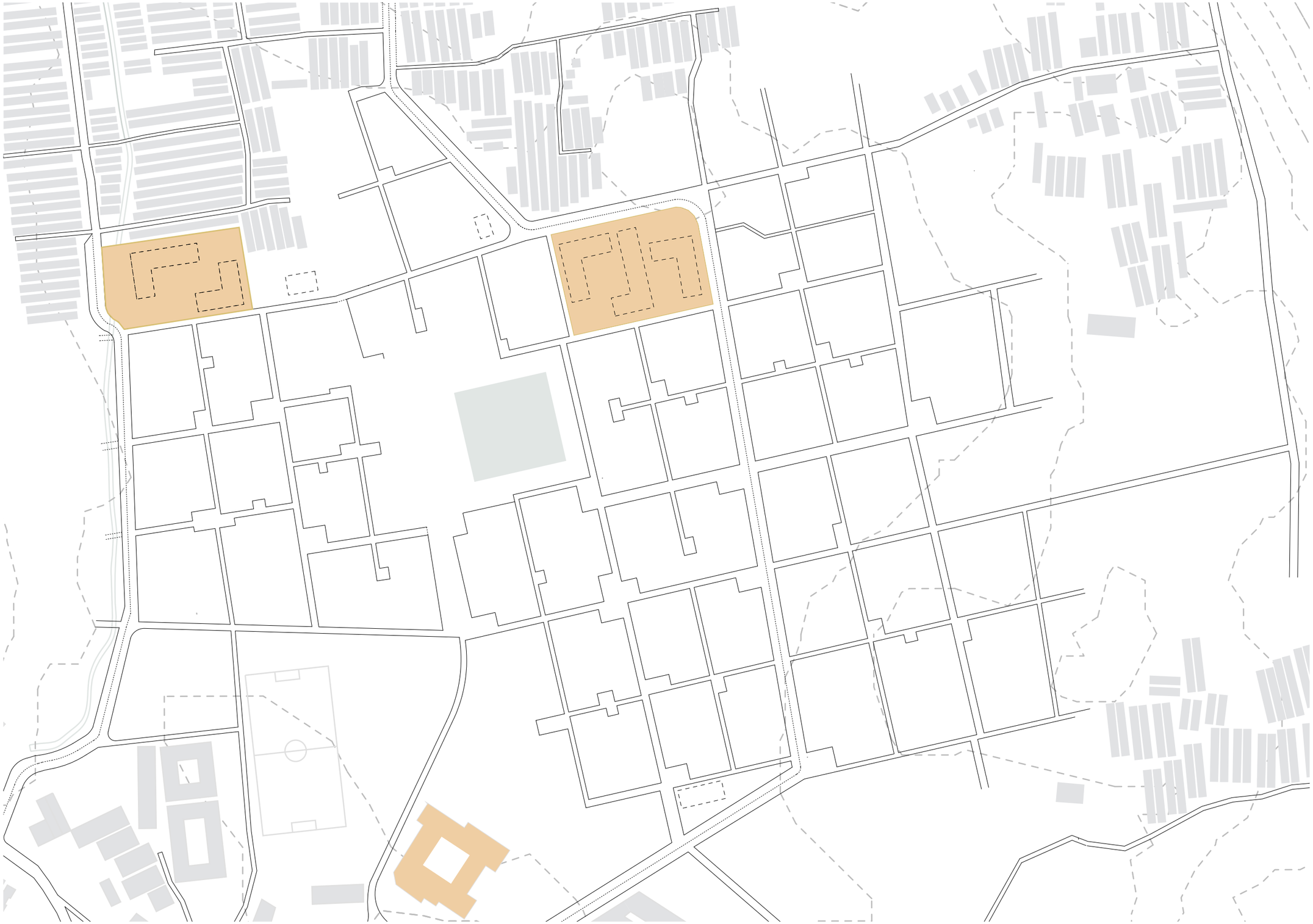


# 03 Urban Strategy

Hierachy of roads // Local 2

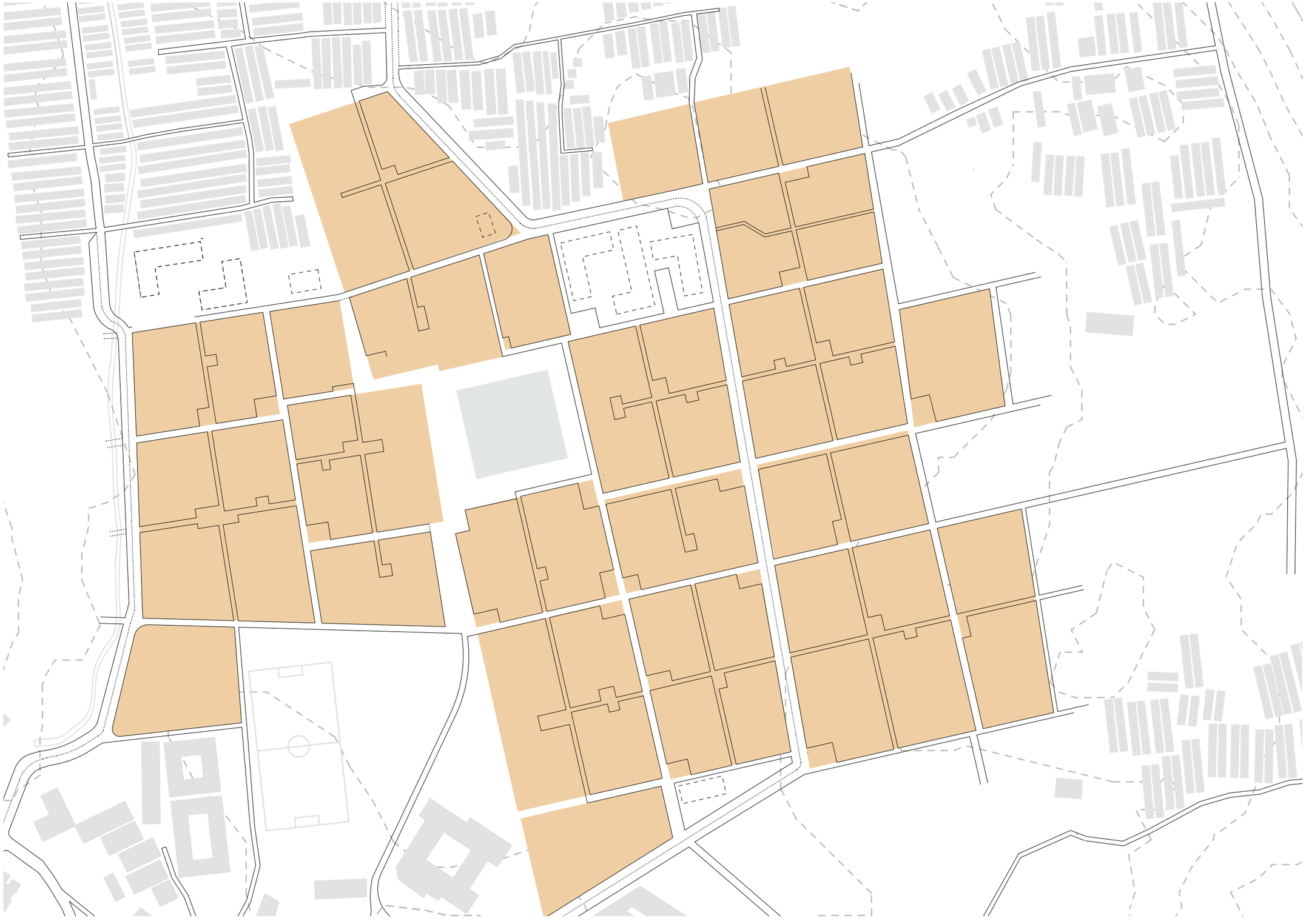
# 03 Urban Strategy

## Larger amenities



# 03 Urban Strategy

## Plots



# 03 Urban Strategy

## Towers

# 03 Urban Strategy

## Row-housing

# 03 Urban Strategy

## Slab

# 03 Urban Strategy

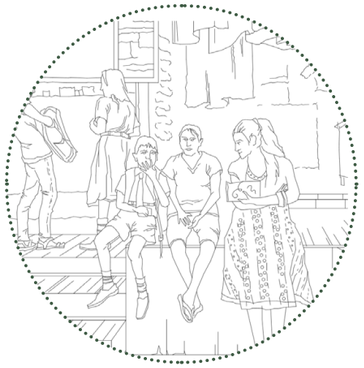
## Clusters

# 03 Urban Strategy

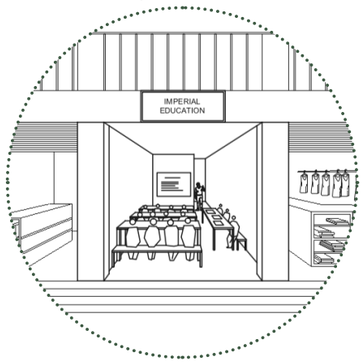
## Green areas and open spaces

# 03 Urban Strategy

## Fragment // Secondary Road

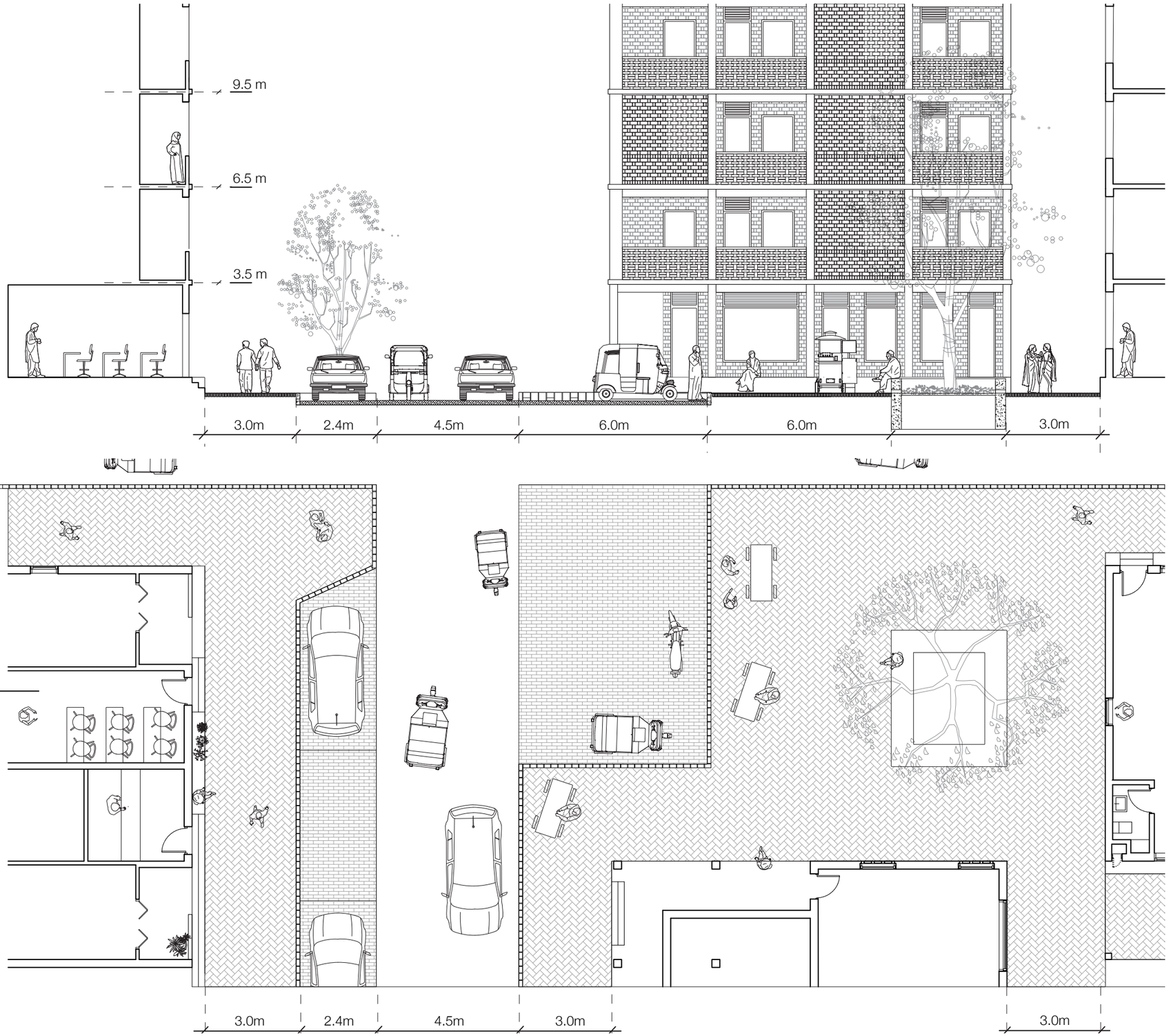


space to sit



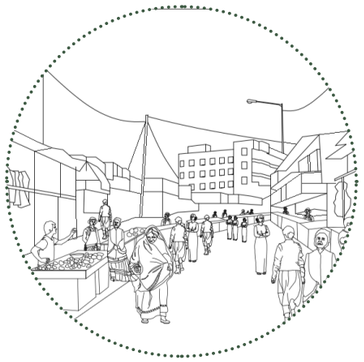

commcercial activities
and smaller amenities

informal corners

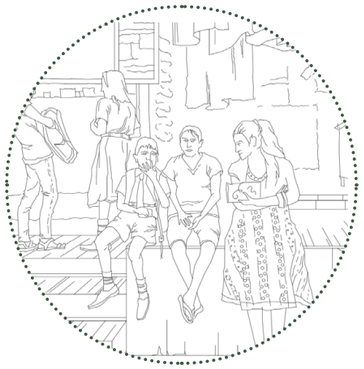


# 03 Urban Strategy

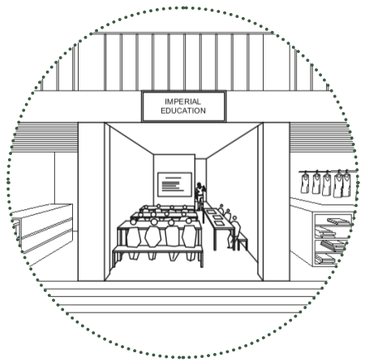
## Fragment // Community Spine



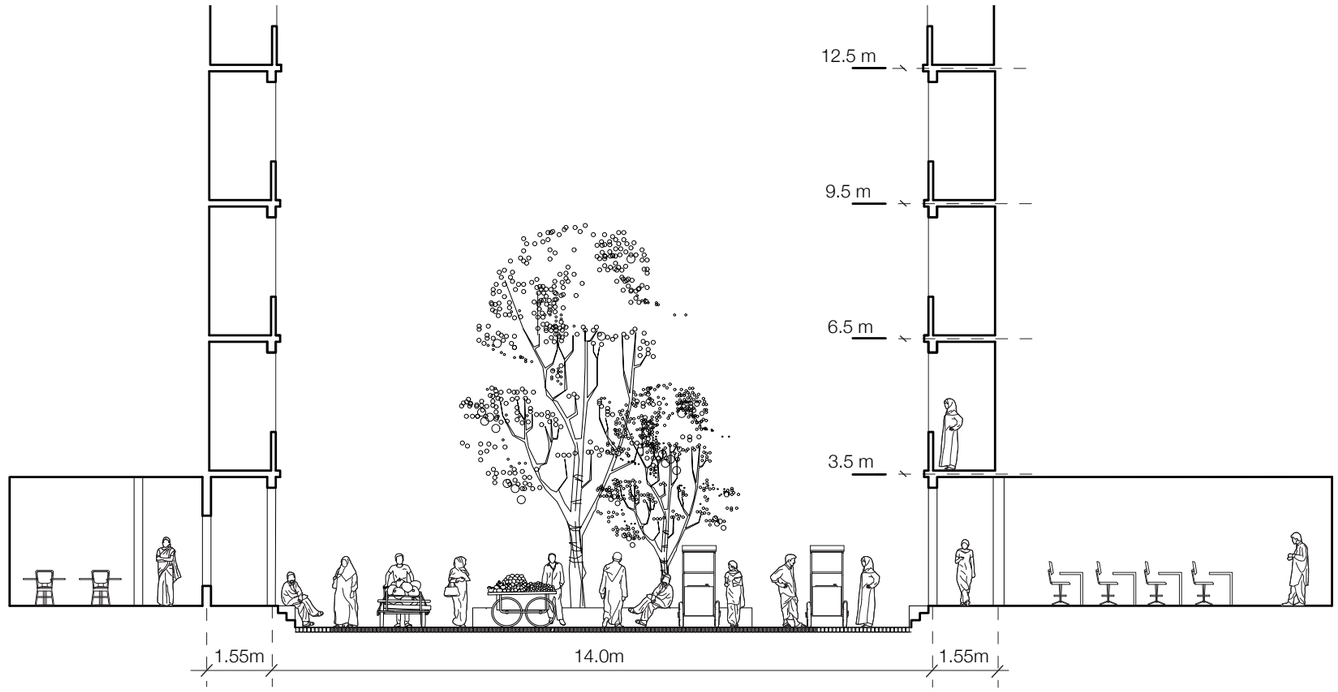
Night market

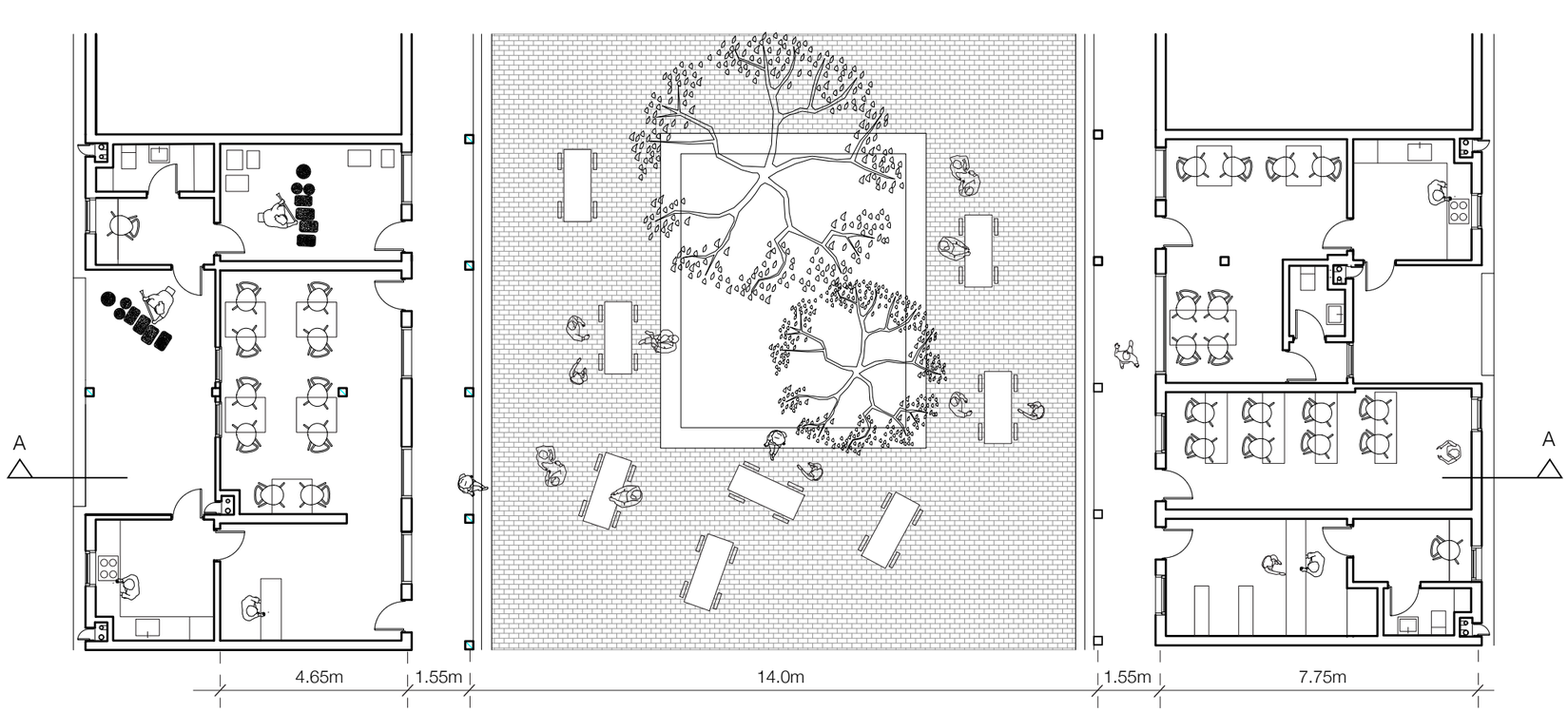


Space to sit




commcercial activities
and smaller amenities



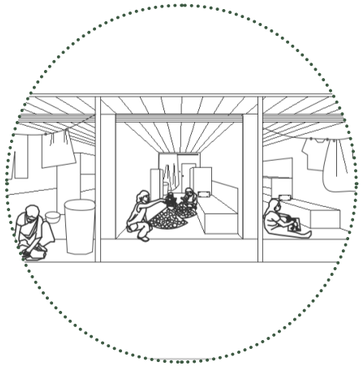



# 03 Urban Strategy

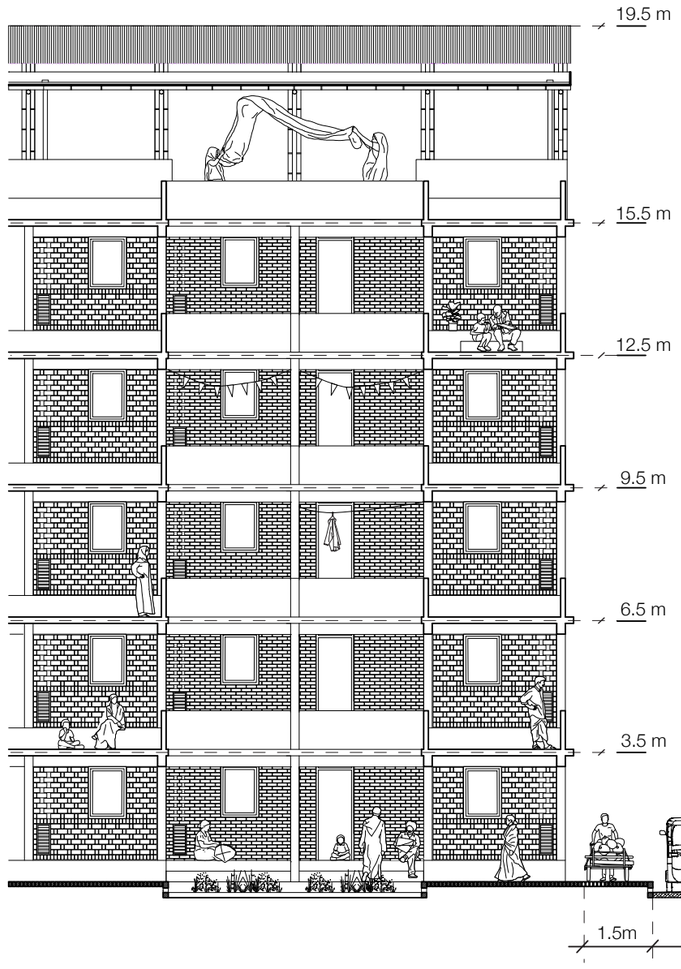
## Fragment // Corner Slab Block

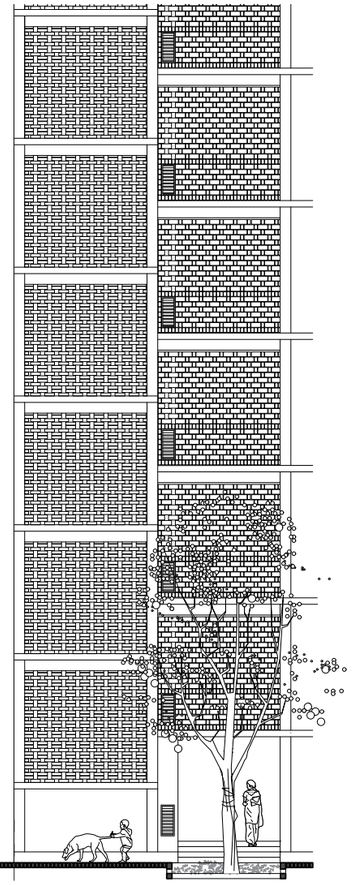
galleries

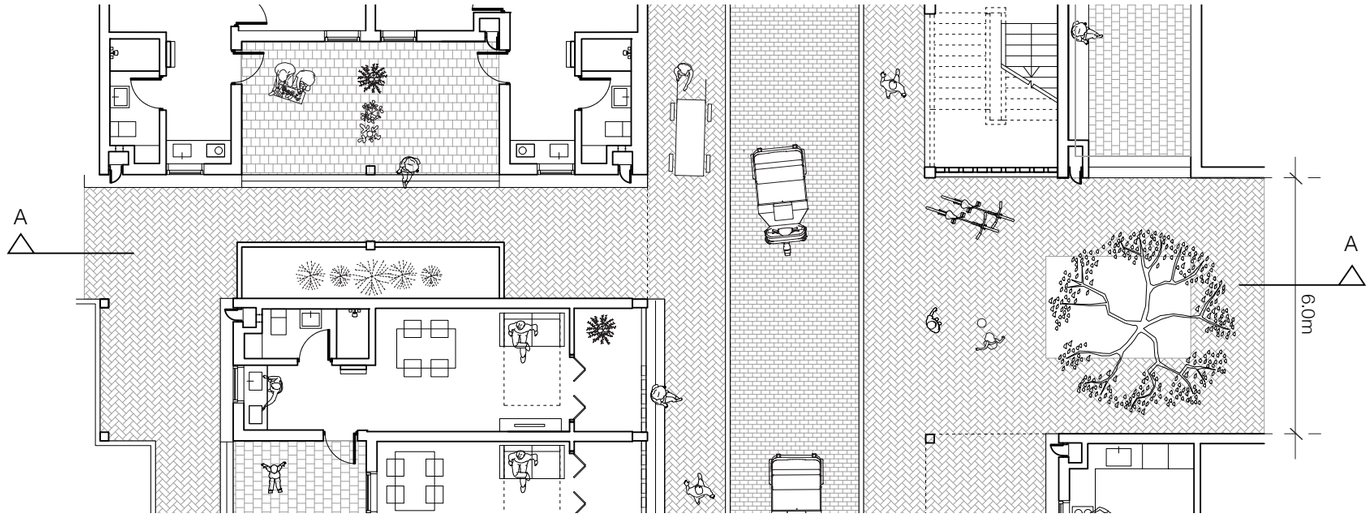
otlas / raised plinth



working from home



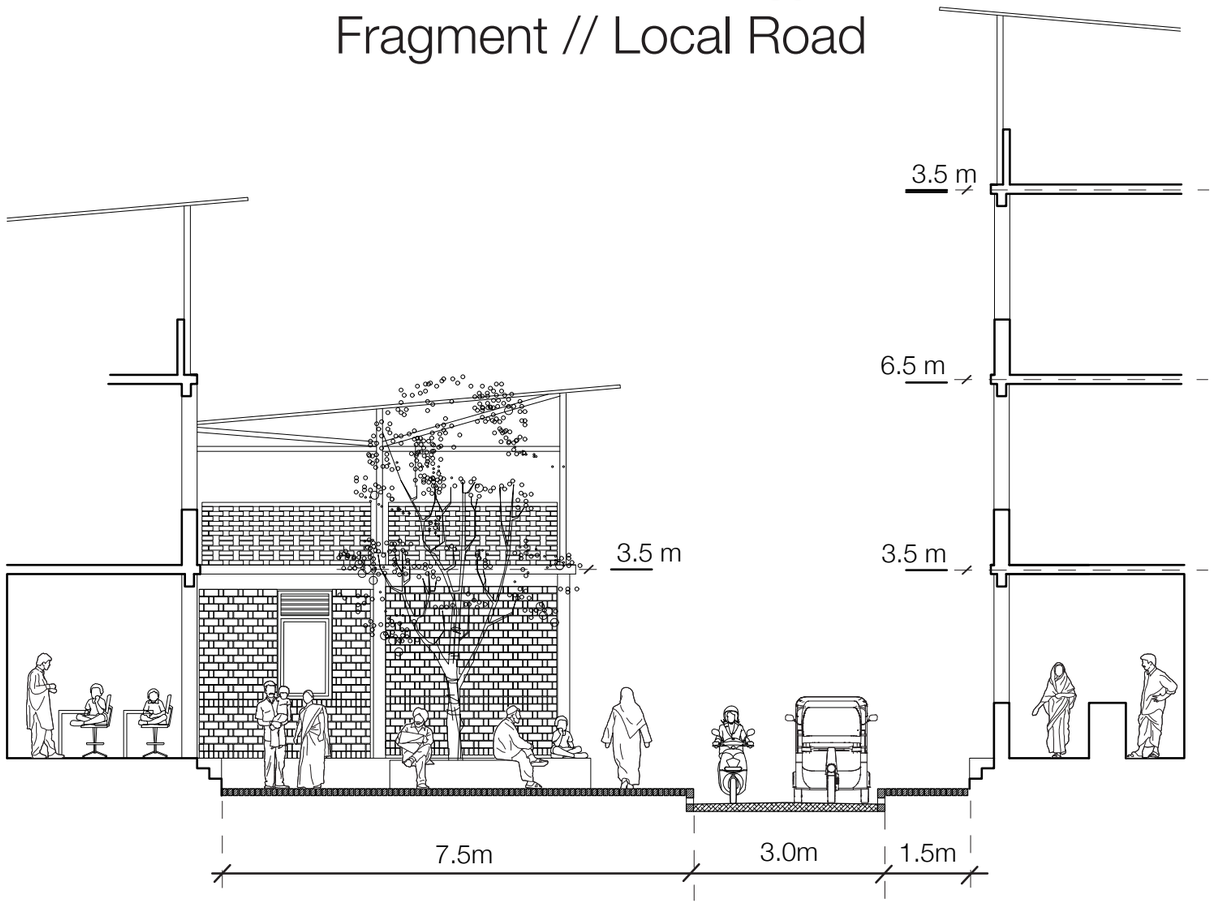


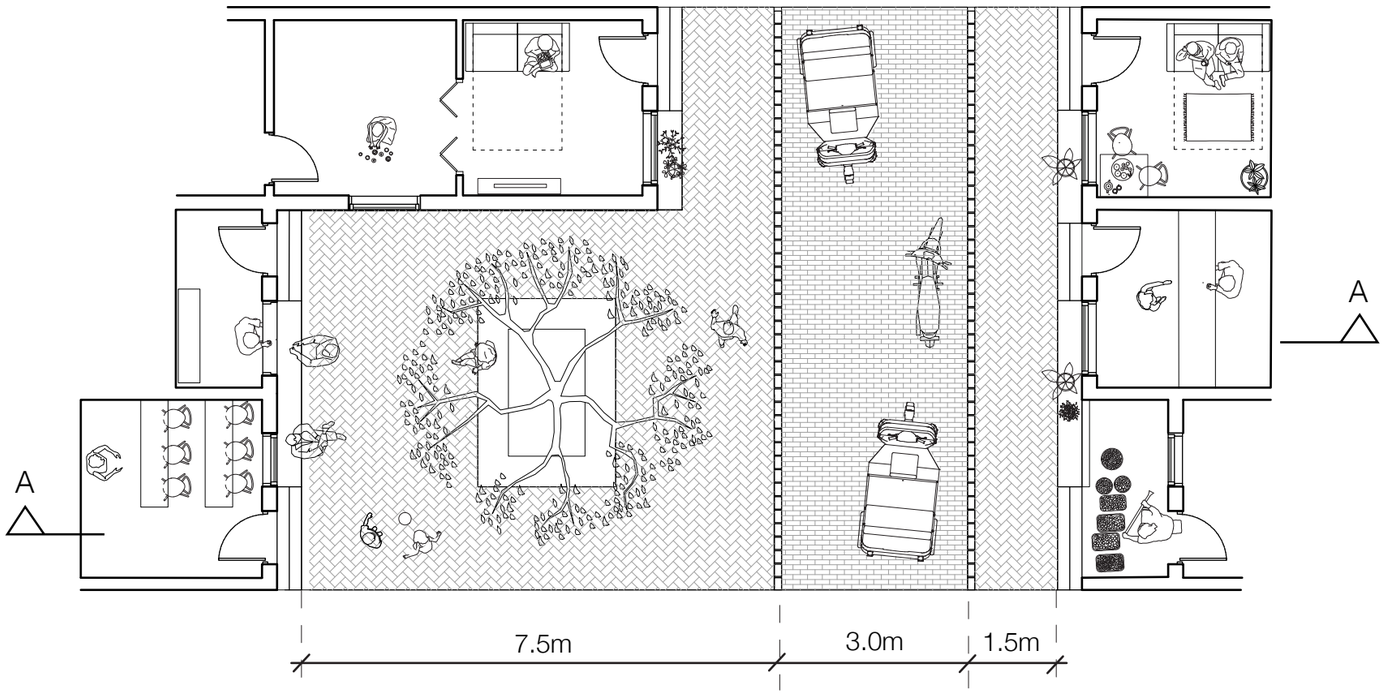

space to sit

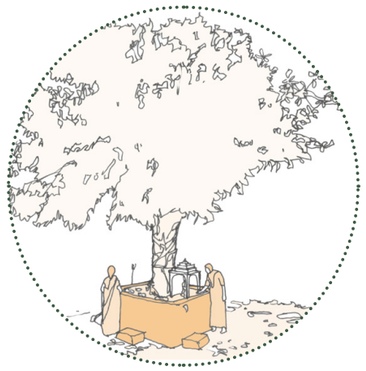
space to play

# 03 Urban Strategy

## Fragment // Local Road



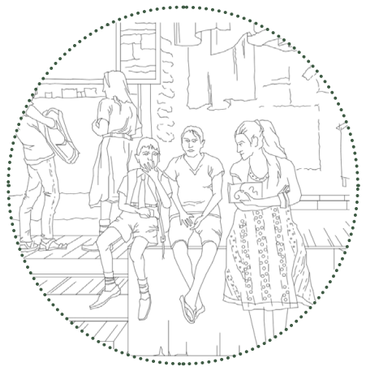



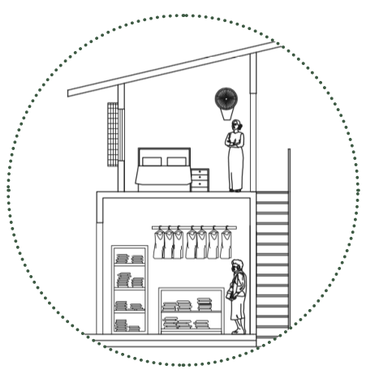
Tree temples

otlas / raised plinth

space to play



space to sit



mixed-use

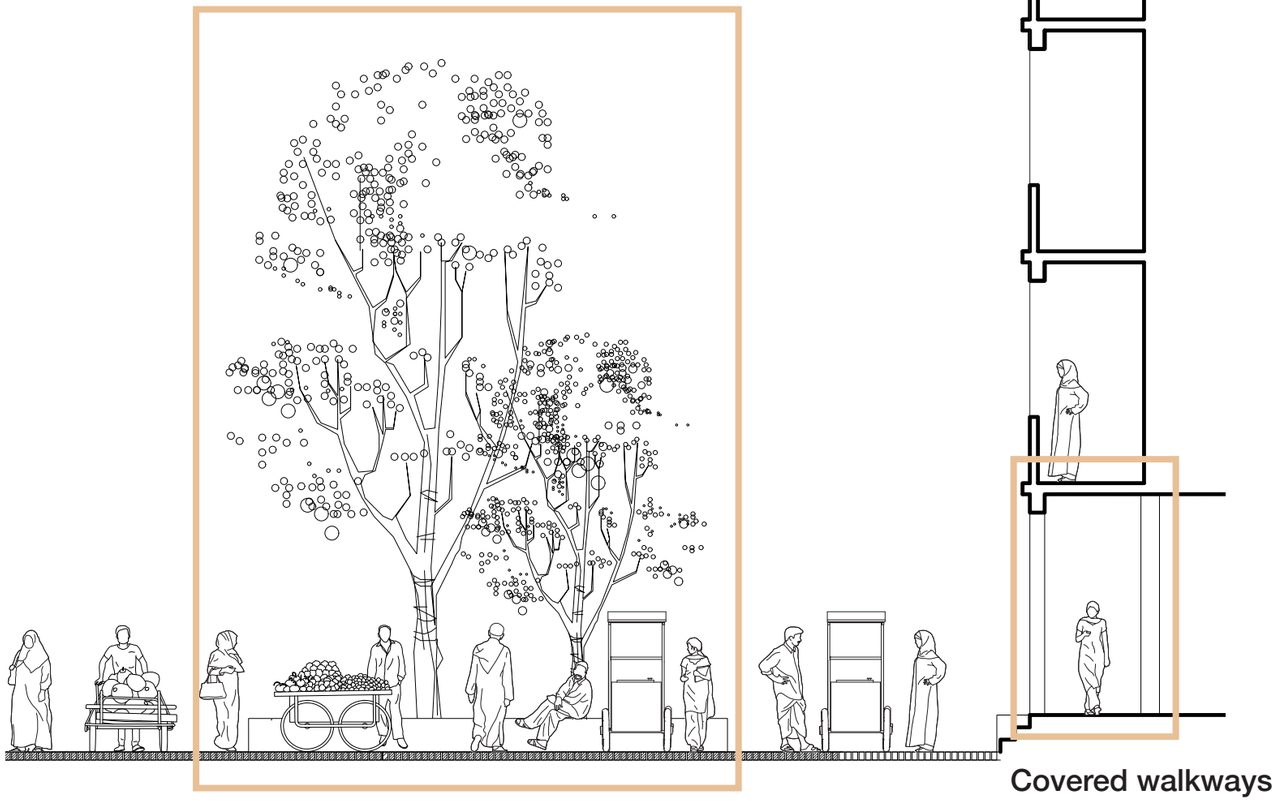
# 03 Urban Strategy

1/500 The Quarter

# 03 Urban Strategy

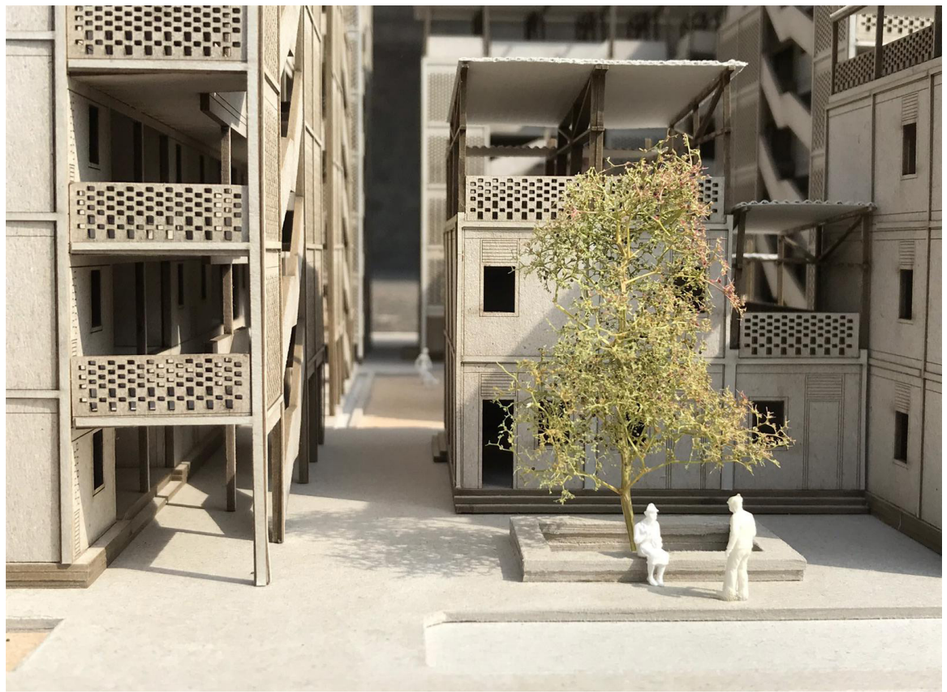
## Shading and Cooling

**Vegetation / Trees**





**Covered walkways**

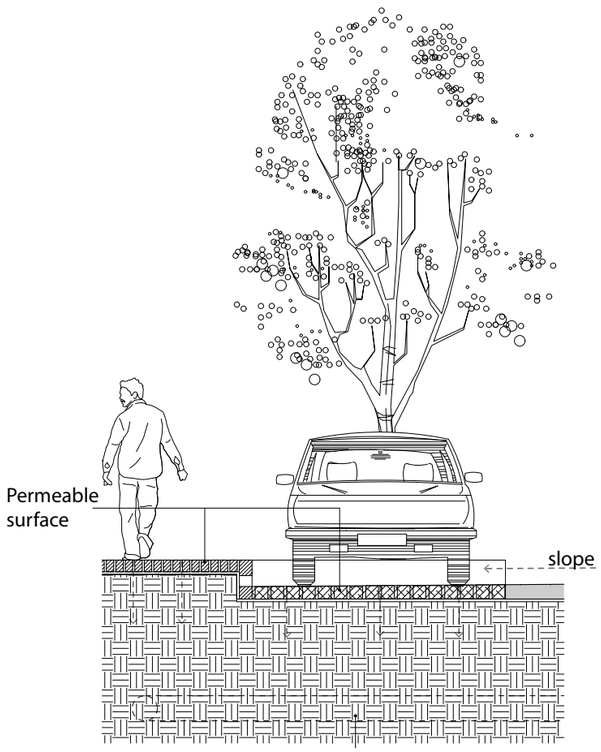


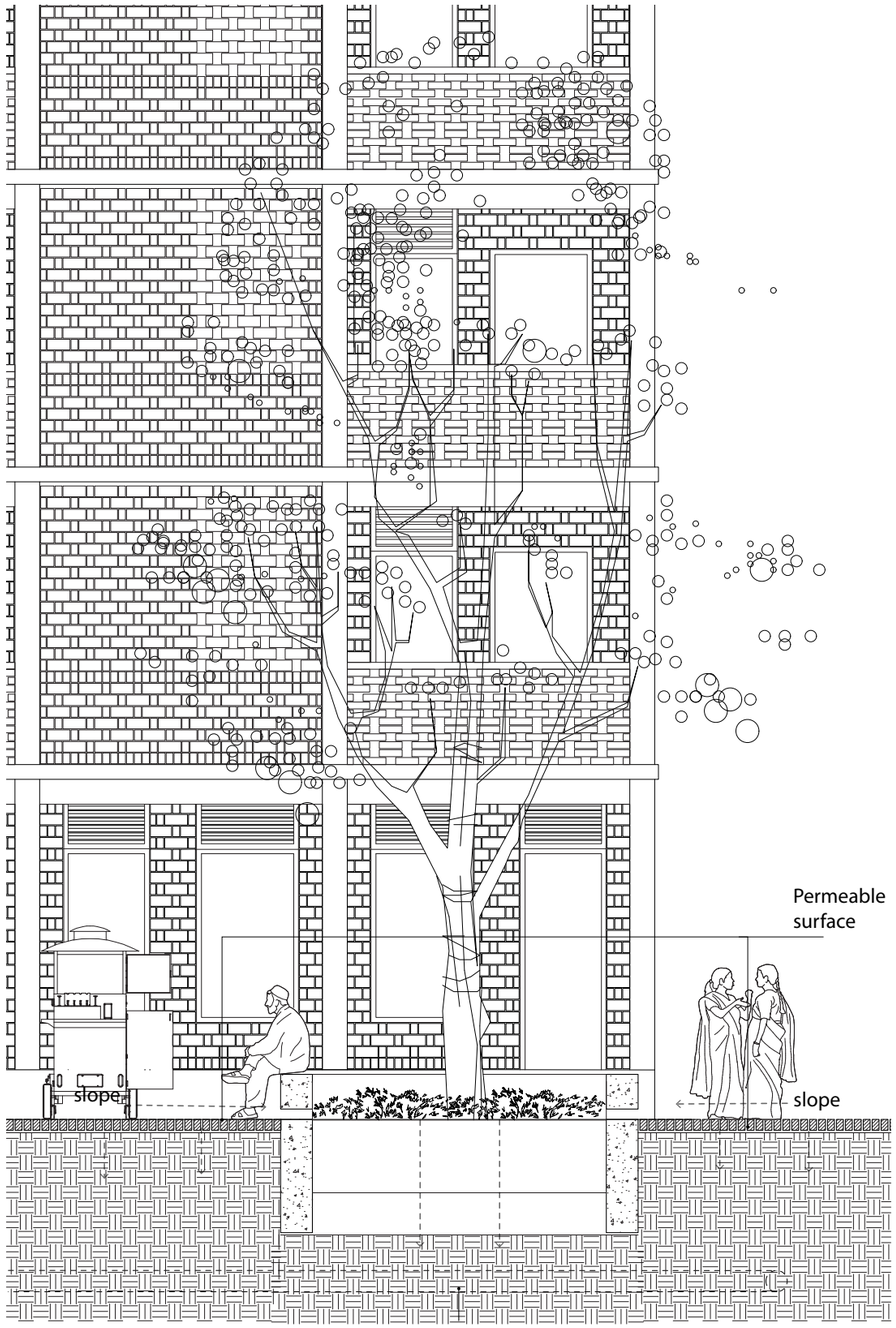
# 03 Urban Strategy

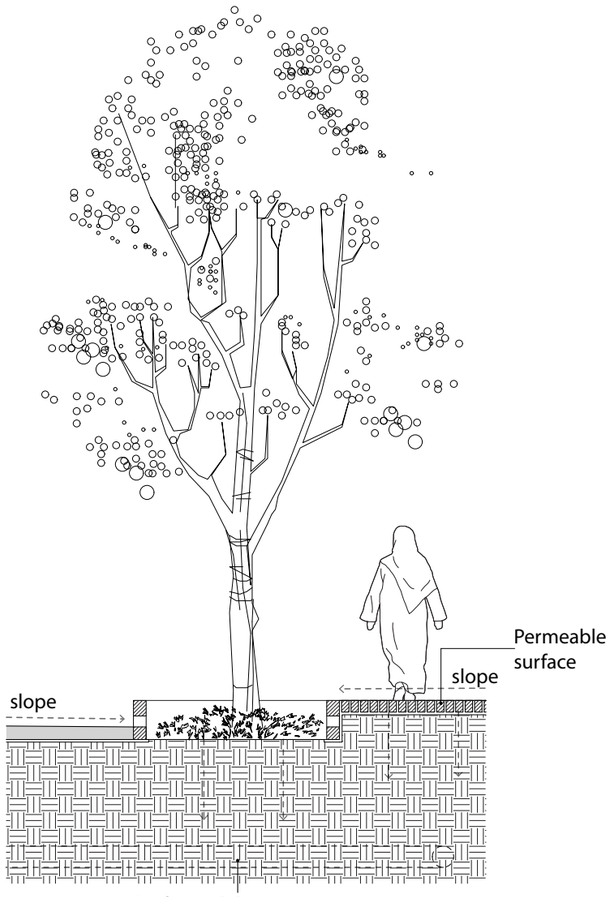
## Water Management

# 03 Urban Strategy

## Water Management

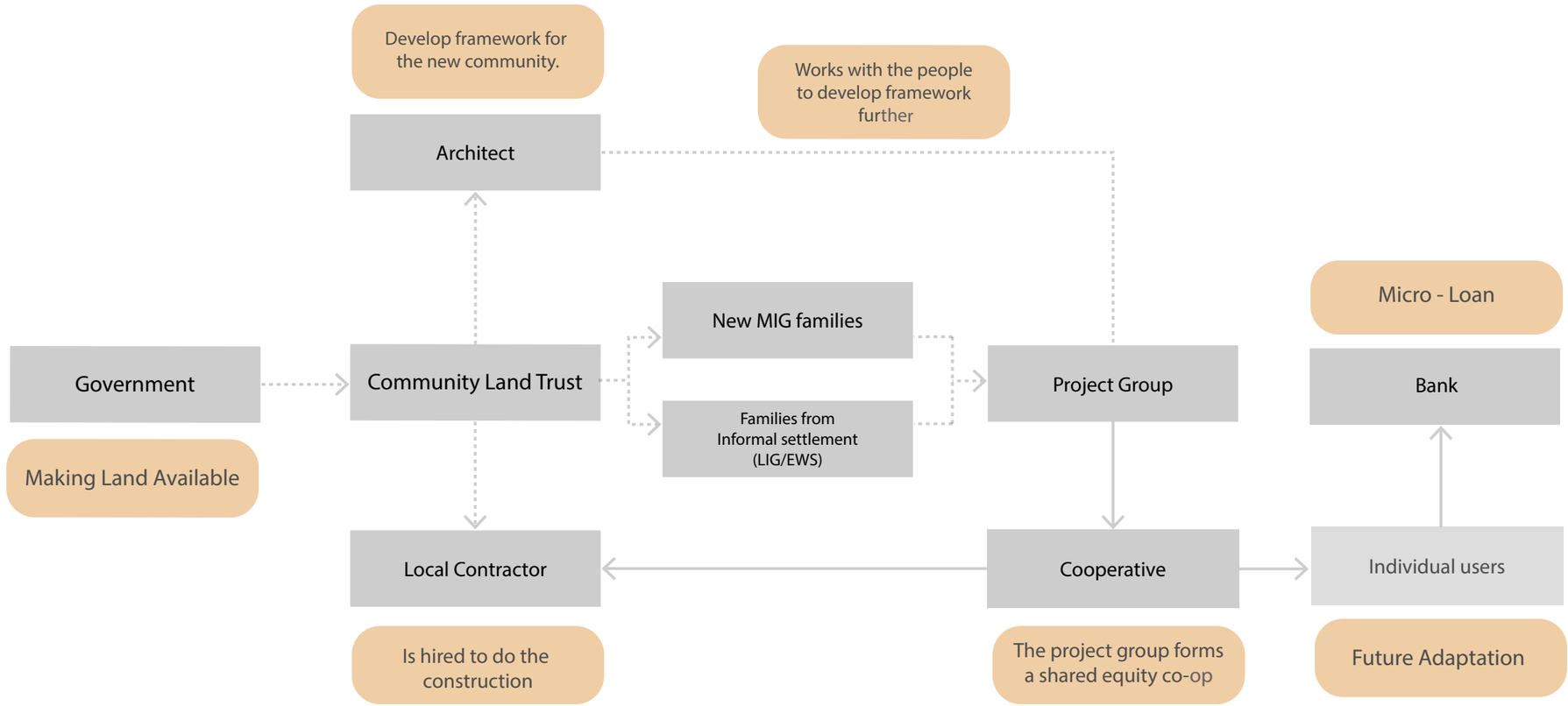


# 04 Proposed managerial scheme

## Stakeholders and roles



# 05 Atmospheric Impressions

First built: Primary/secondary junction

Lived in: Primary/secondary junction

Green courtyard within a cluster

Covered walkaway with ‘otla’ towards green courtyard

Shared ‘otla’ in slab as an extension of the dwelling

Stairway and threshold for two units within Tower

Internal patio within Row-House

First Built: Local roads

Lived in: Local roads