STILT-CITY

Carla Tietzsch
Graduation Project

LIVING WITH THE SEASONS

Nelson Mota **Marina Tabassum** **Ludovica Cassina** **Antonio Paoletti**



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PROBLEM STATEMENT

GLOBAL TREND OF URBANISATION

In most Third World countries, the annual **population growth** rate is somewhere between **2 to 3%**, but the **towns and cities** themselves are increasing in more than **double this speed**.

This growth is compounded by the great waves of **distress migration from rural areas** where farmlands cannot sustain the population."

- Charles Correa, 1989,
The New Landscape: Urbanisation in the Third World



GLOBAL TREND OF URBANISATION

REASONS FOR RURAL-URBAN MIGRATION

- Increasing frequency of extreme weather events

  --> Unstable living conditions

  --> Crop losses

  --> Financial instability

- Lack of access to alternative income sources



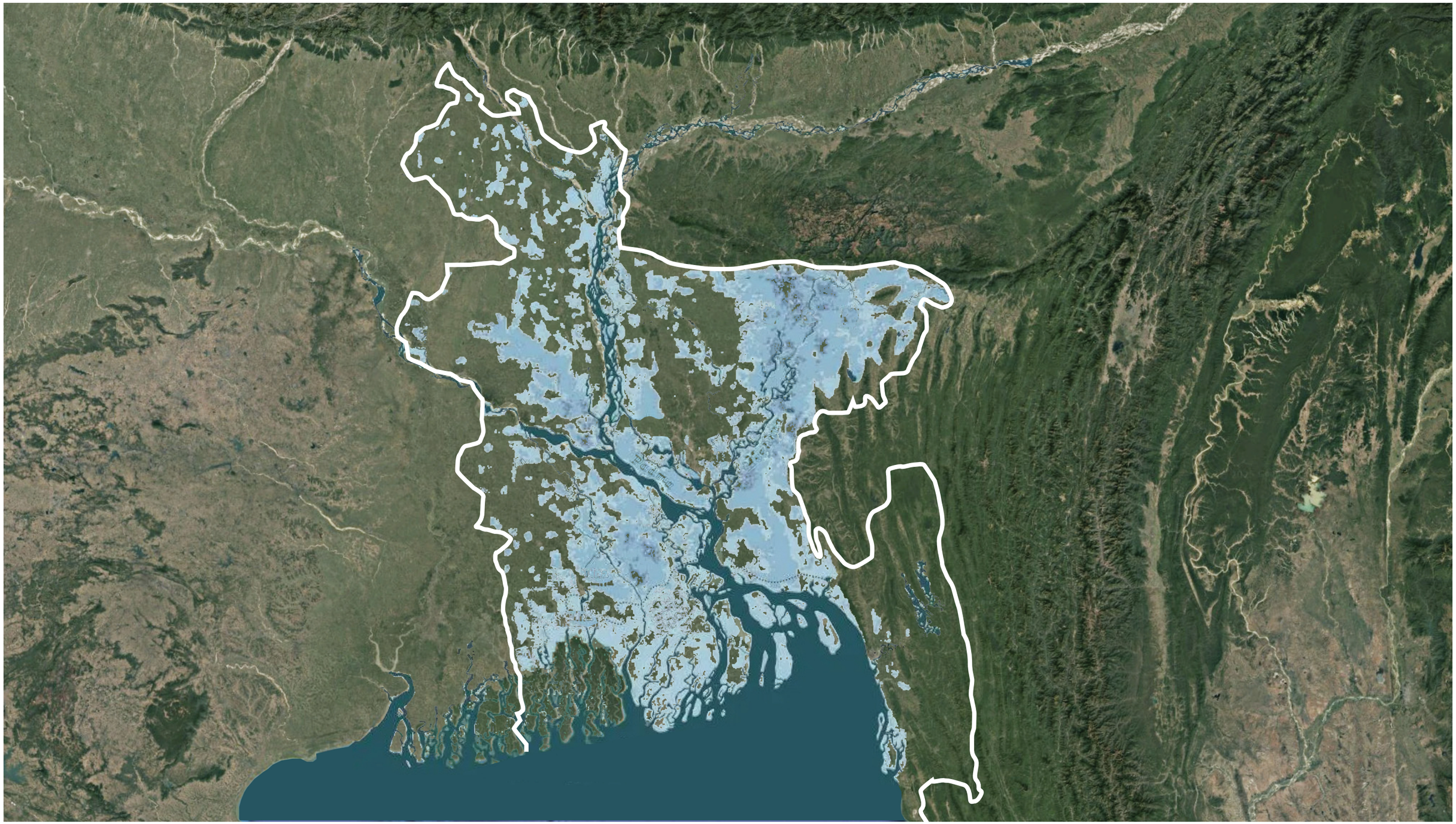
CONTEXT

BANGLADESH



CONTEXT

FLOOD PRONE COUNTRY



GLOBAL TREND OF URBANISATION

RESULTING CHALLENGES (EXAMPLE: DHAKA)

- Rapidly growing cities

- Overpopulation of urban areas

- Formation of informal urban settlements

- Decrease of living quality

  --> Noise- and air- polution

  --> Extreme density

- Insufficient infrastructures

- Loss of rural living qualities





DEVELOPMENTS IN SYLHET

RESEARCH FOCUS

SYLHET CITY



SYLHET - URBAN EXPANSION

1984



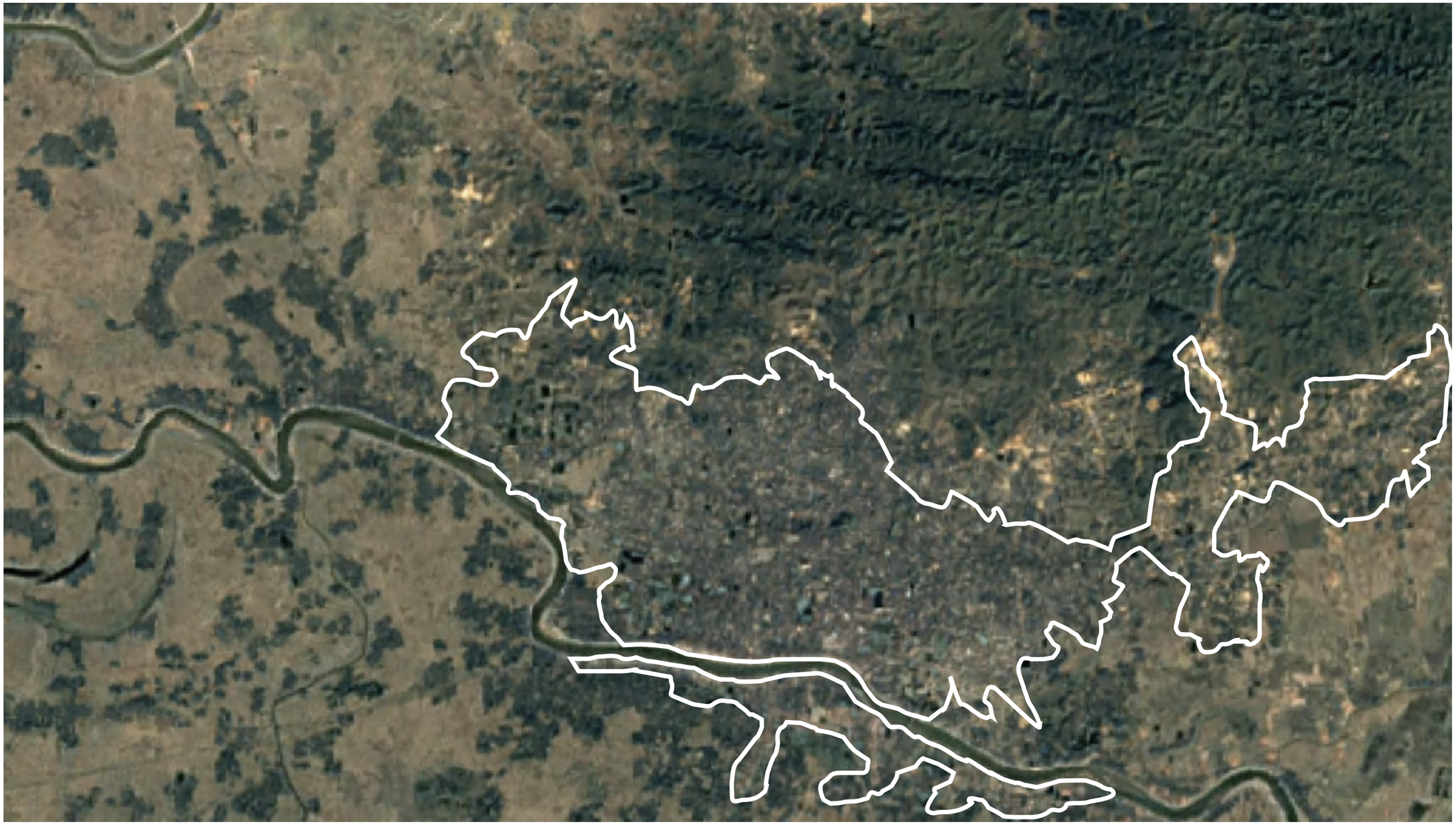
SYLHET - URBAN EXPANSION

1994



SYLHET - URBAN EXPANSION

2003



SYLHET - URBAN EXPANSION

2014



SYLHET - URBAN EXPANSION

2022



SYLHET - URBAN EXPANSION

PREDICTED FUTURE DEVELOPMENT



URBANISATION PROCESS

POTENTIALS

+ Improvement of **infrastructure** (e.g. access to water)

+ Cultivation of **alternative income sources**

+ Improved **connection to city** and its ammenities

--> Access to **job oportunities** in the city

+ Improved **flood-resilience of houses and infrastructures**



URBANISATION PROCESS

RISKS

- Loss of **rural living qualities**

- Loss of space for cattle

- Loss of oportunities for **self-sufficient food-supply**

- **Noise & air pollution**

- Loss of sense of **community**



RESEARCH QUESTION

How can **rural areas** of Sylhet be **transformed** according to the trend of **rural-urban transition** while maintaining crucial **living qualities** of rural populations?

DESIGN GOAL

Creating a pilot project which can
guide the future urban development
of Sylhet City during the process of its
expansion.

AREA OF INTEREST

RURAL AREA NORTH-WEST FROM SYLHET CITY



AREA OF INTEREST

PROMINENT ASPECTS



NEWLY BUILT HIGHWAY

A CATALYST FOR URBAN EXPANSION



ADJACENT VILLAGES

WILL BE AFFECTED BY URBANISATION PROCESS



SHONATOLA VILLAGE

SELECTED SITE



SHONATOLA VILLAGE

EXISTING SITE

SHONATOLA VILLAGE AND ADJACENT AREAS





EXISTING SITE

AGRICULTURAL





EXISTING SITE

AGRICULTURAL





FLOOD LEVEL

PROMINENT ISSUE

< 0,5 M

< 1,5 M

< 2,5 M

< 4 M



PRESENT STRATEGIES FOR FLOOD-PROTECTION

TACTICS IN DIFFERENT AREAS OF BANGLADESH



PLINTH



ELEVATED LAND



BUILDING ON STILTS

EXISTING SITE

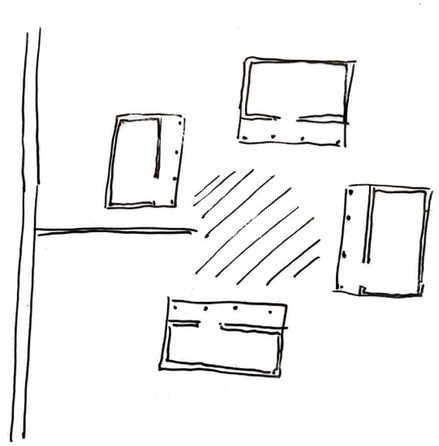
LOW DENSITY





SHONATOLA VILLAGE

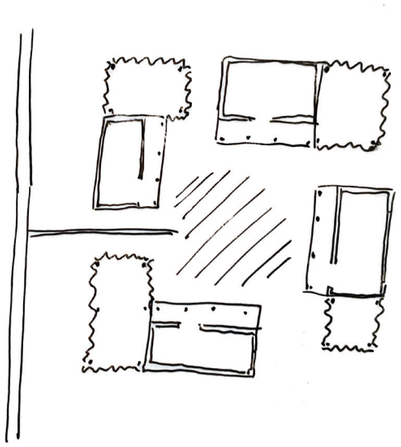
SPATIAL ORGANISATION



CLUSTERS AROUND COURTYARDS



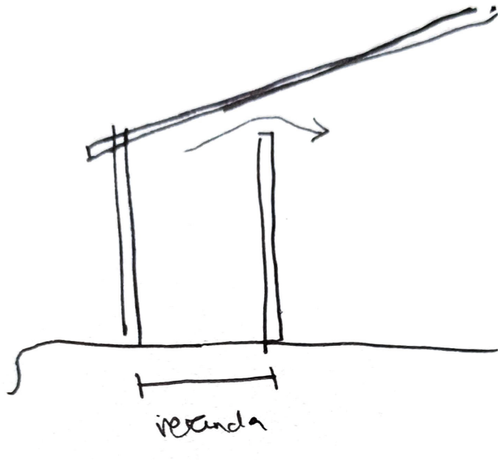
VERANDAS AS INTERMEDIATE SPACES



EXPANSIONS OVER TIME

SHONATOLA VILLAGE

USE OF SPACE



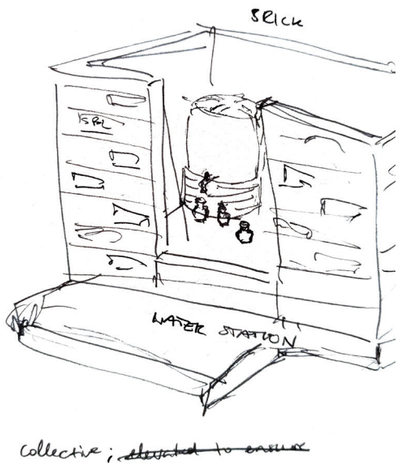
NATURAL VENTILATION



VERTICAL USE OF SPACE

SHONATOLA VILLAGE

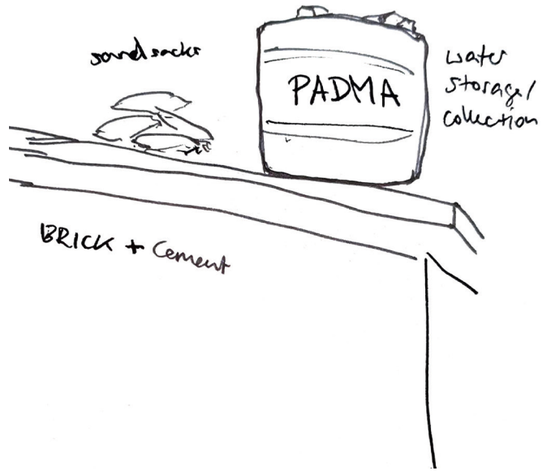
WATER STATEGIES



COLLECTIVE USE OF WATER



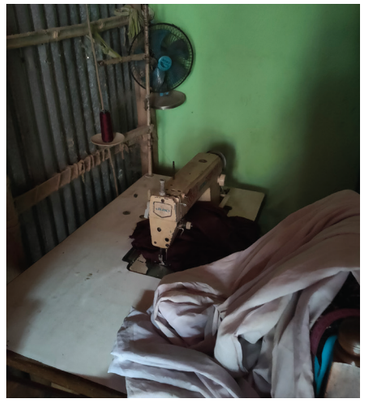
PRIVATE STORAGE FOR DAILY WATER SUPPLY



RAINWATER COLLECTION ON ROOFS

SHONATOLA VILLAGE

GENERATION OF ALTERNATIVE INCOME SOURCES



SEWING



SMALL SHOPS ADJACENT TO STREET



WORKSHOP SPACES



PHARMACY



CRAFTMANSHIP



RICE STORE



HAIR DRESSER



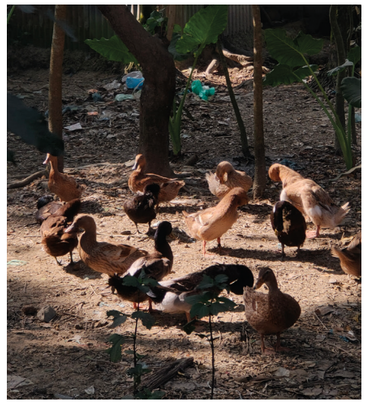
BAKERY

SHONATOLA VILLAGE

INCORPORATED FARMING SPACES



INTEGRATED GARDEN AREAS



DUCKS AND CHICKENS



INCORPORATED SPACE FOR CATTLE



SPACE FOR DOVES



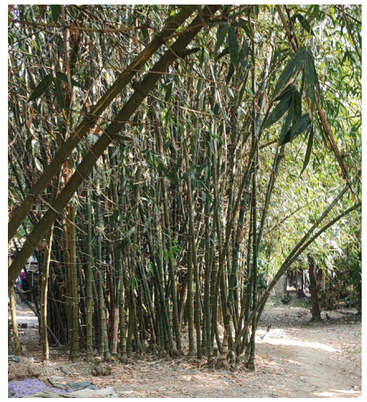
FARMING AREAS



COW DUNG USED FOR FIRES



STORAGE FOR HAY

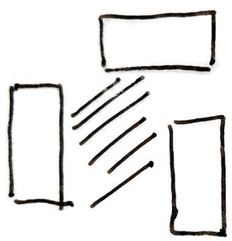


AREAS FOR BAMBOO

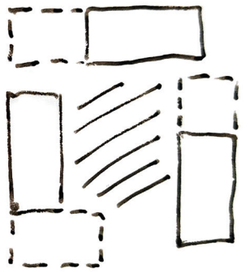
DESIGN PRINCIPLES

DESIGN PRINCIPLES

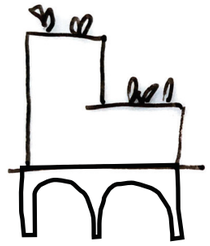
GUIDING THE DESIGN PROCESS



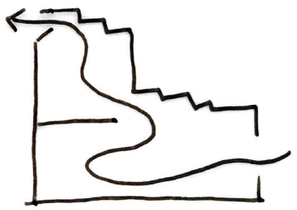
CLUSTERING



SPACE FOR FLEXIBLE USE AND INCREMENTAL GROWTH



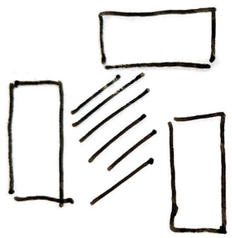
VERTICAL USE OF SPACE



NATURAL VENTILATION

DESIGN PRINCIPLES

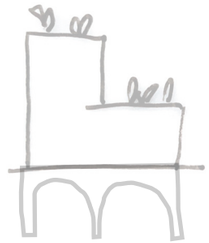
GUIDING THE DESIGN PROCESS



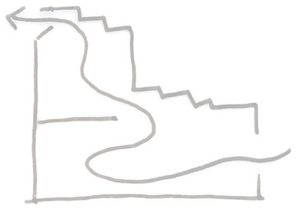
CLUSTERING



SPACE FOR FLEXIBLE USE AND INCREMENTAL GROWTH



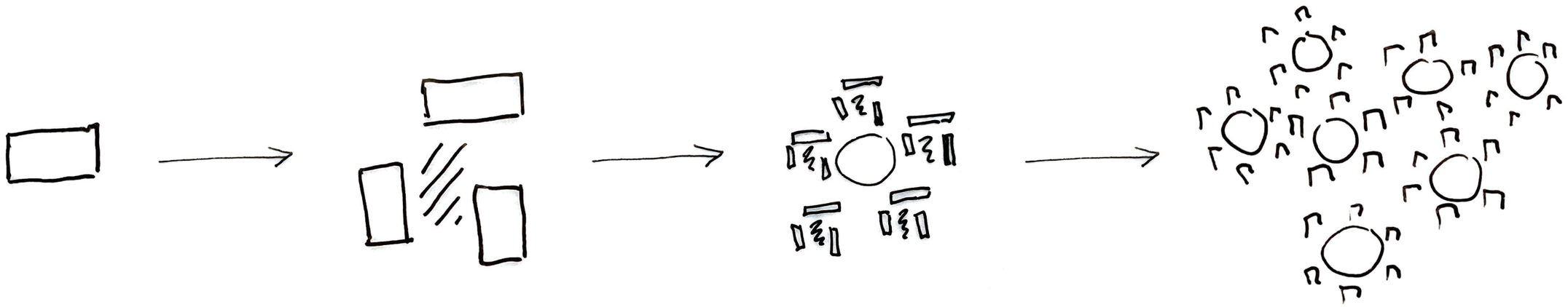
VERTICAL USE OF SPACE



NATURAL VENTILATION

CLUSTERING STRATEGY

FROM UNIT TO COMMUNITY



REPEATABLE UNIT

CLUSTER

COMMUNITY

NETWORK



UNIT

TARGET GROUPS

SPECIFIC NEEDS



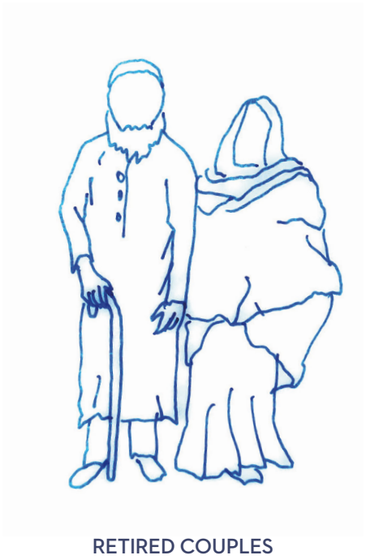
FARMERS

TARGET GROUPS

SPECIFIC NEEDS



FARMERS



RETIRED COUPLES

TARGET GROUPS

SPECIFIC NEEDS



FARMERS



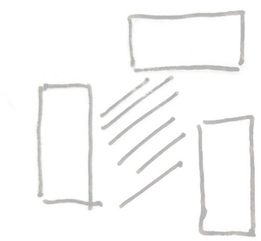
RETIRED COUPLES



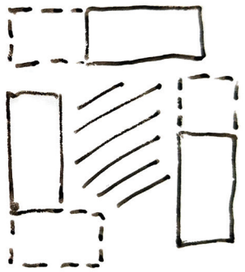
YOUNG FAMILIES

DESIGN PRINCIPLES

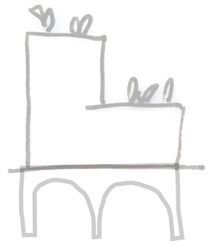
GUIDING THE DESIGN PROCESS



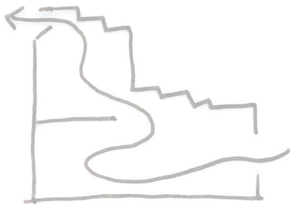
CLUSTERING



SPACE FOR FLEXIBLE USE AND INCREMENTAL GROWTH



VERTICAL USE OF SPACE



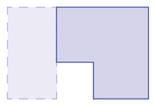
NATURAL VENTILATION

DIFFERENT UNIT SIZES

SPACES FOR EXPANSION



unit B: 53,5 m2 + 27 m2 expansion area



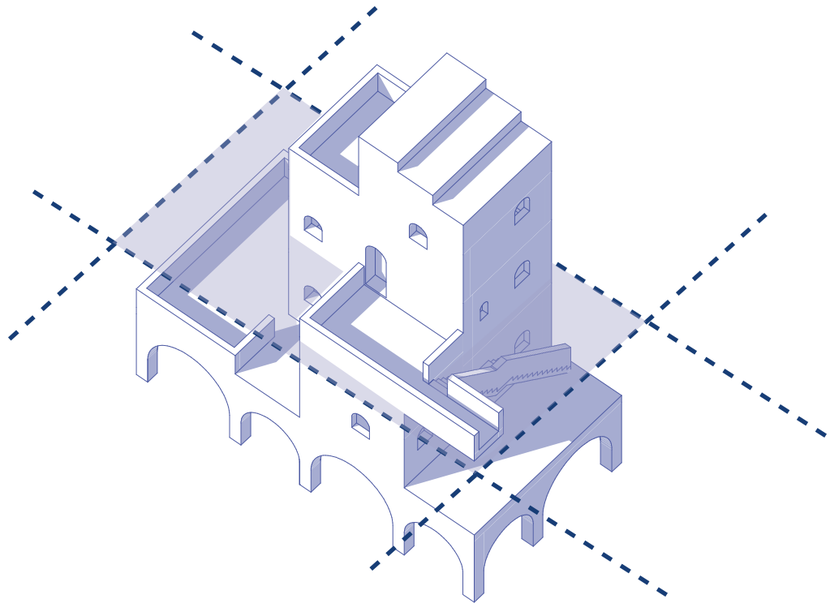
unit A: 47 m2 + 30 m2 expansion area

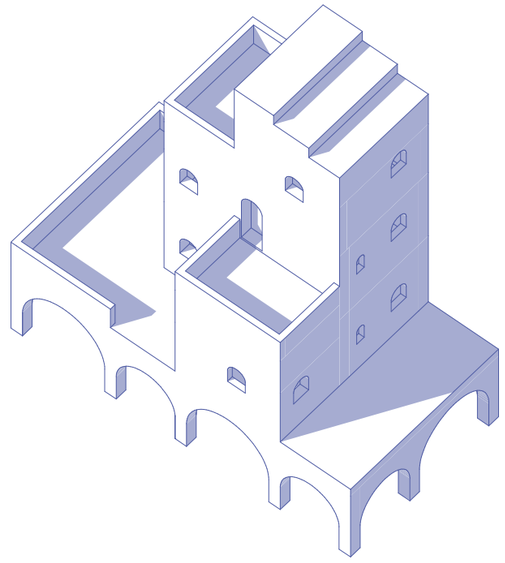


POSSIBLE TRANSFORMATION INTO SINGLE UNIT



unit C: 100,5 m2 + 57 m2 expansion area



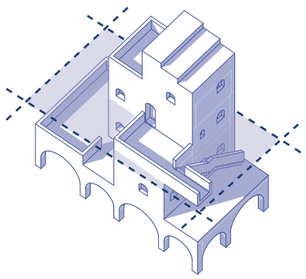


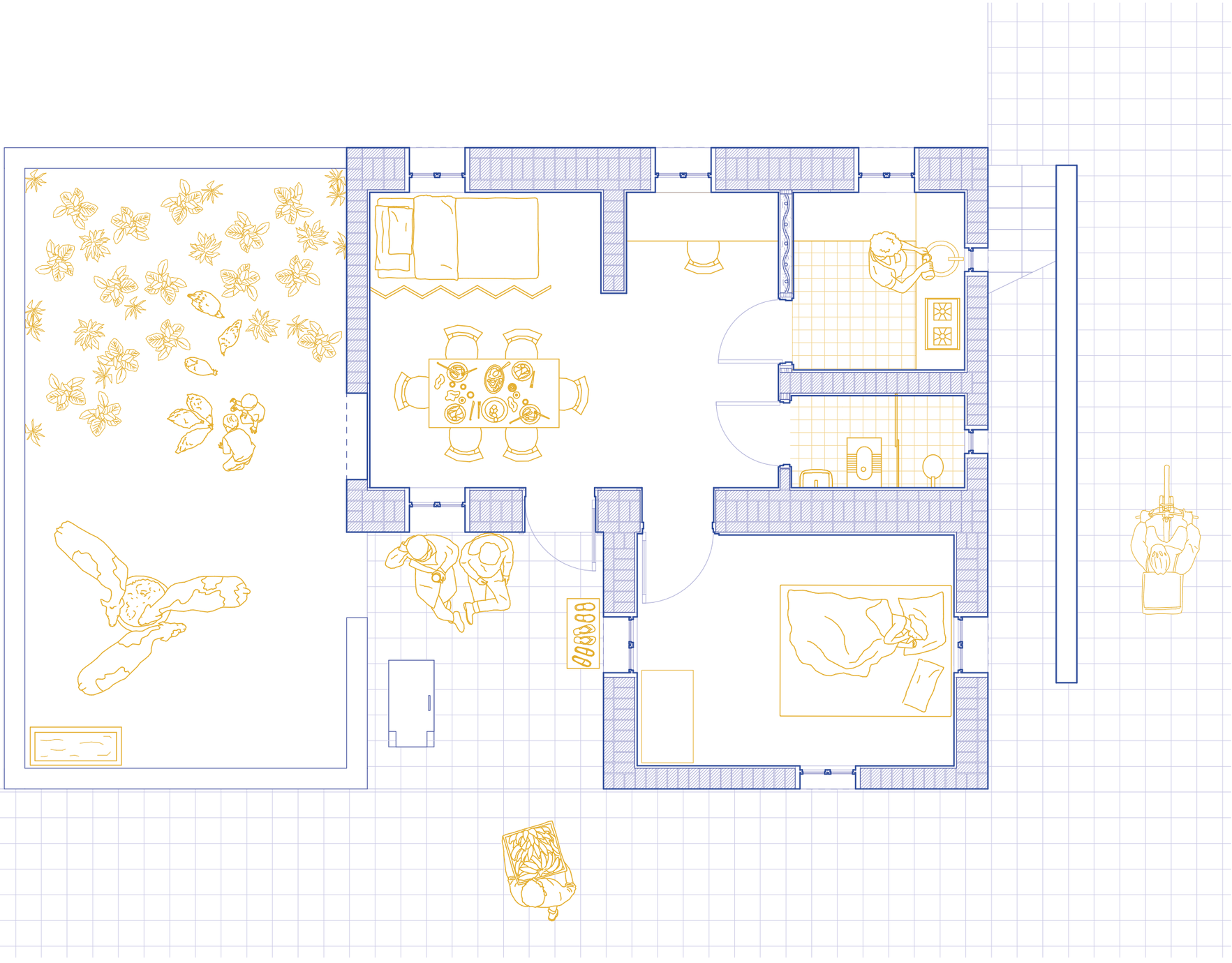
UNIT A

1st FLOOR



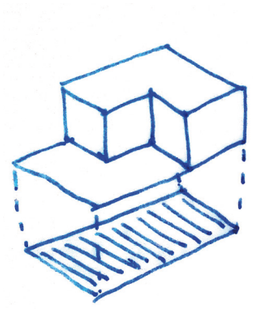
47 m2 + 30 m2 expansion area



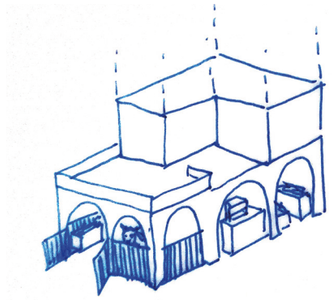


SEASONALITY

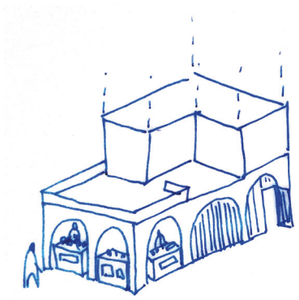
TEMPORARILY AVAILABLE SPACES



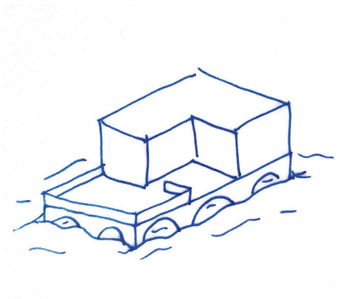
PRIVATE PLOT BELOW EACH UNIT



SCENARIO 1:
SHELTER FOR CATTLE + WORKSHOP SPACE



SCENARIO 2:
SHOP + STORAGE SPACE

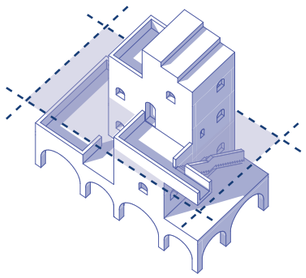


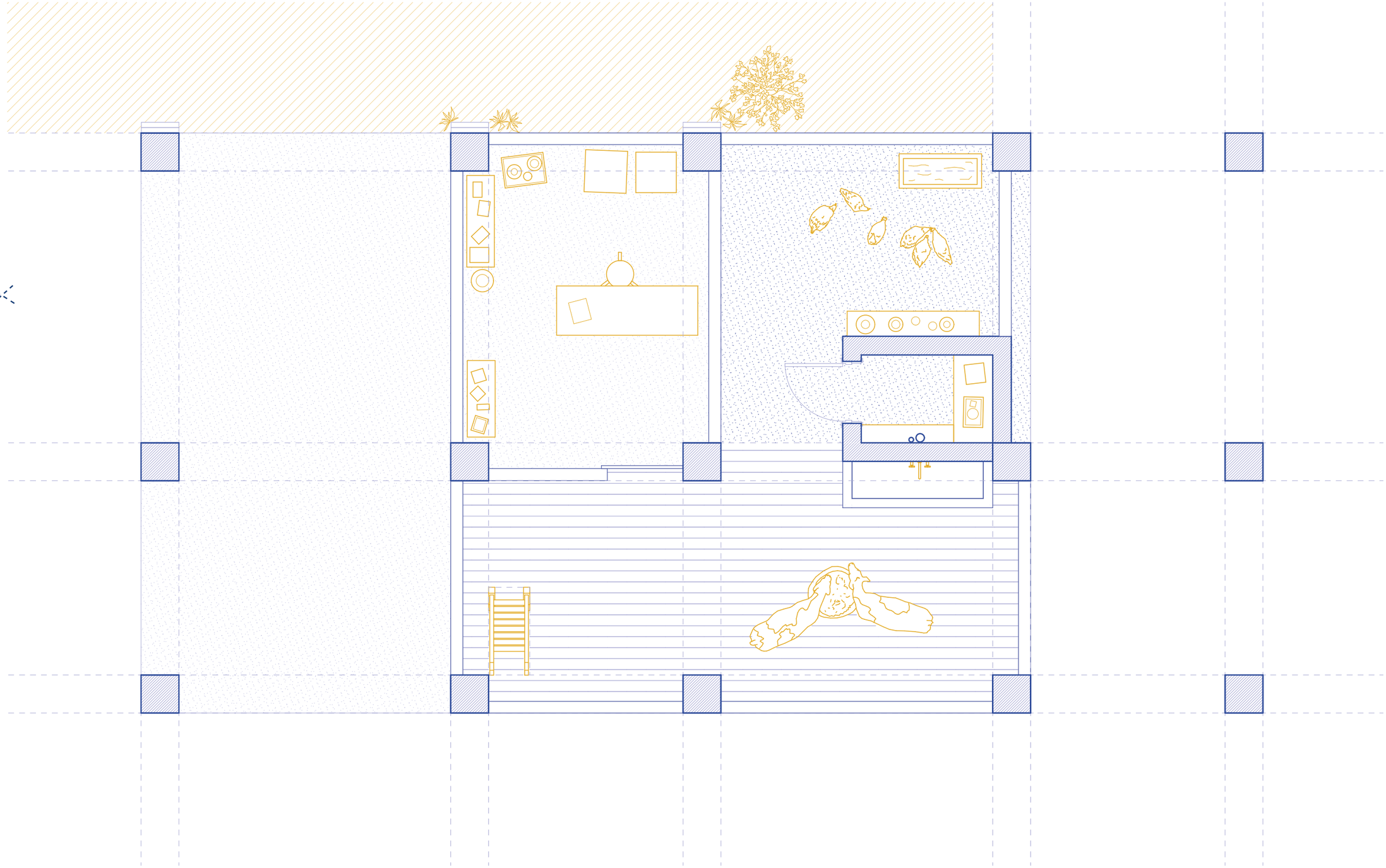
SCENARIO 2:
FLOOD SEASON

FLEXIBLE SPACE DURING DRY SEASON

GROUND FLOOR

77 m2



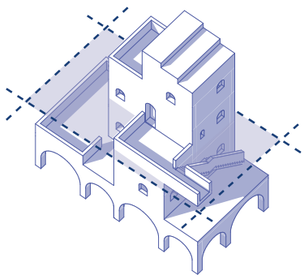


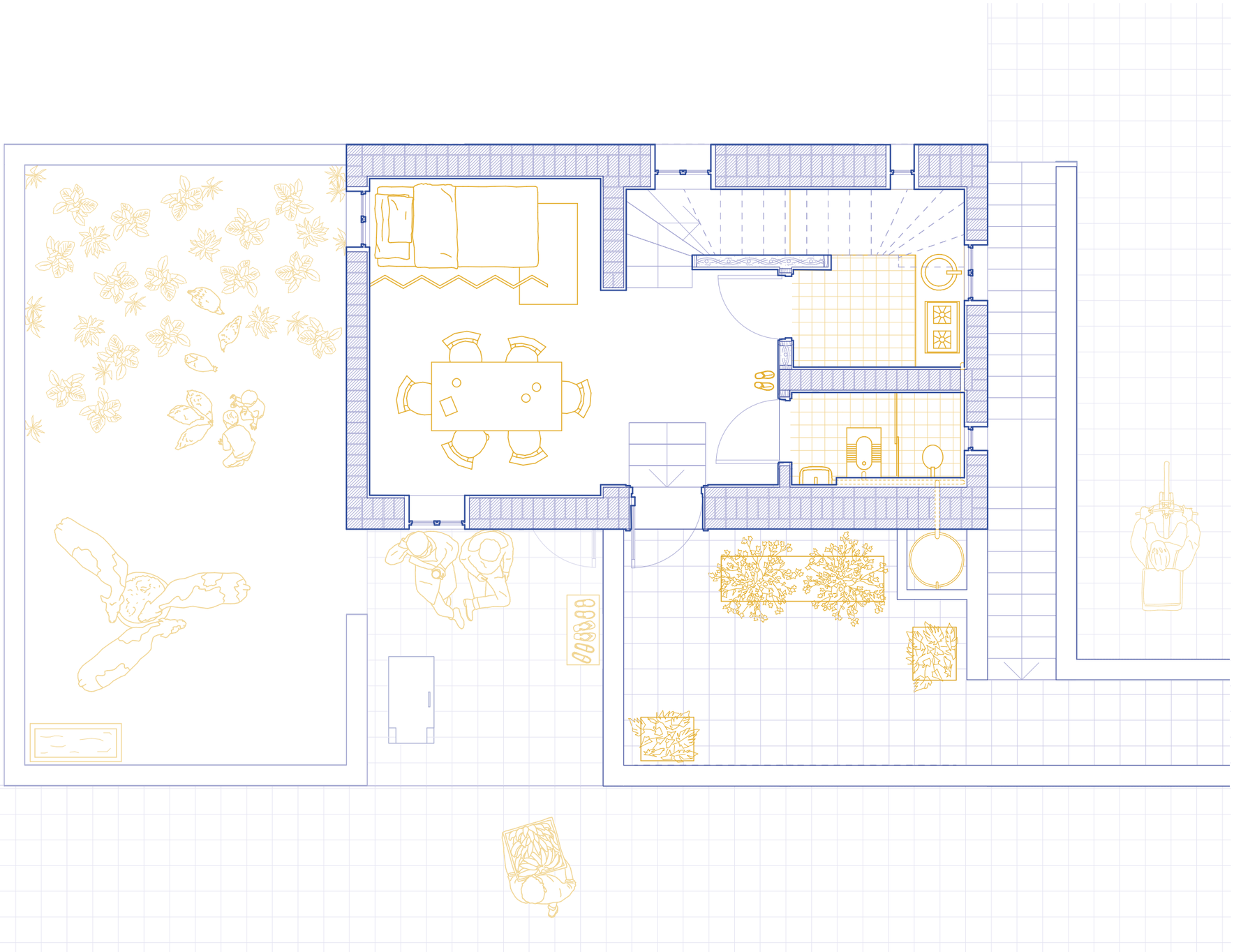
UNIT B

2nd & 3rd FLOOR



53,5 m2 + 27 m



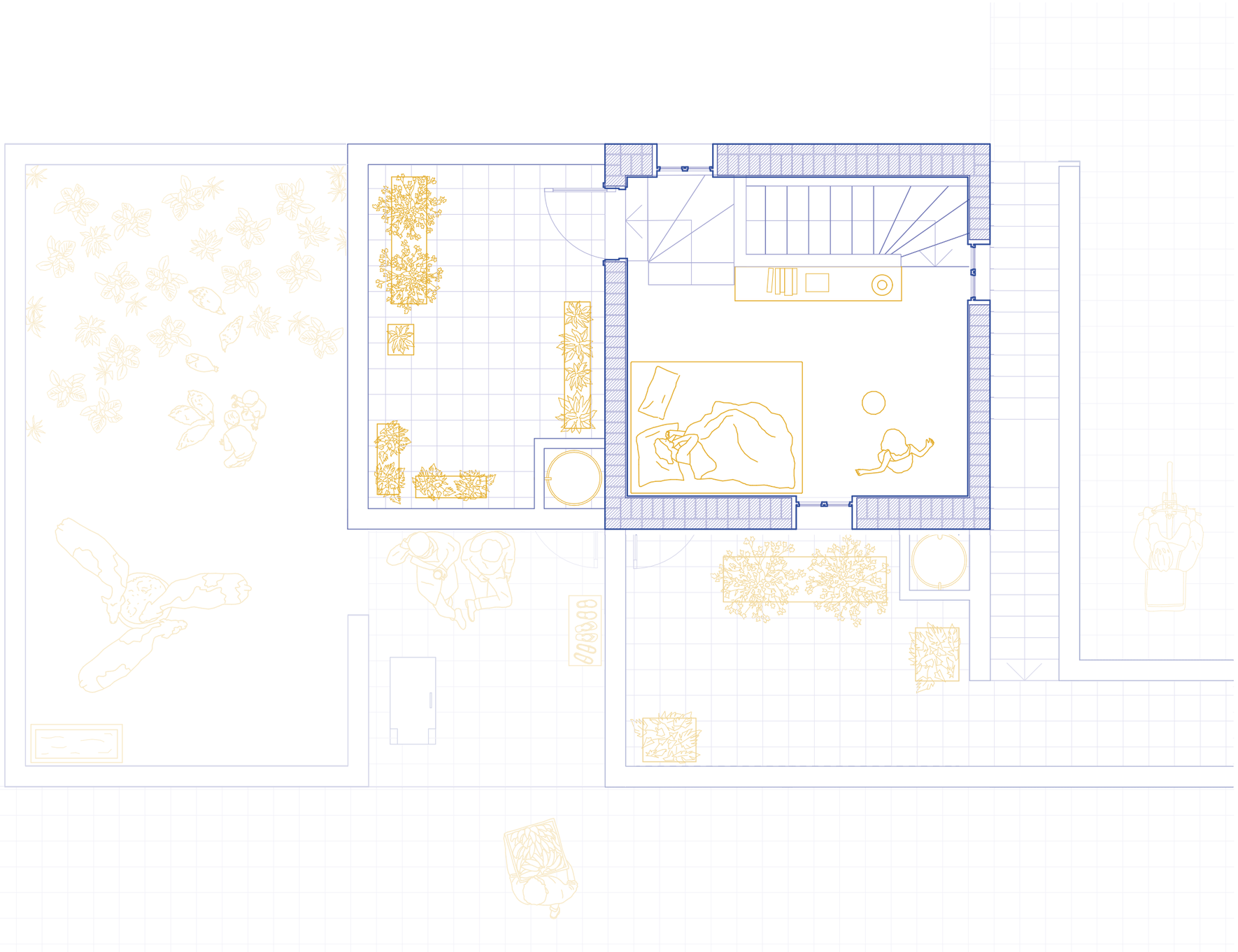


UNIT B

2nd & 3rd FLOOR

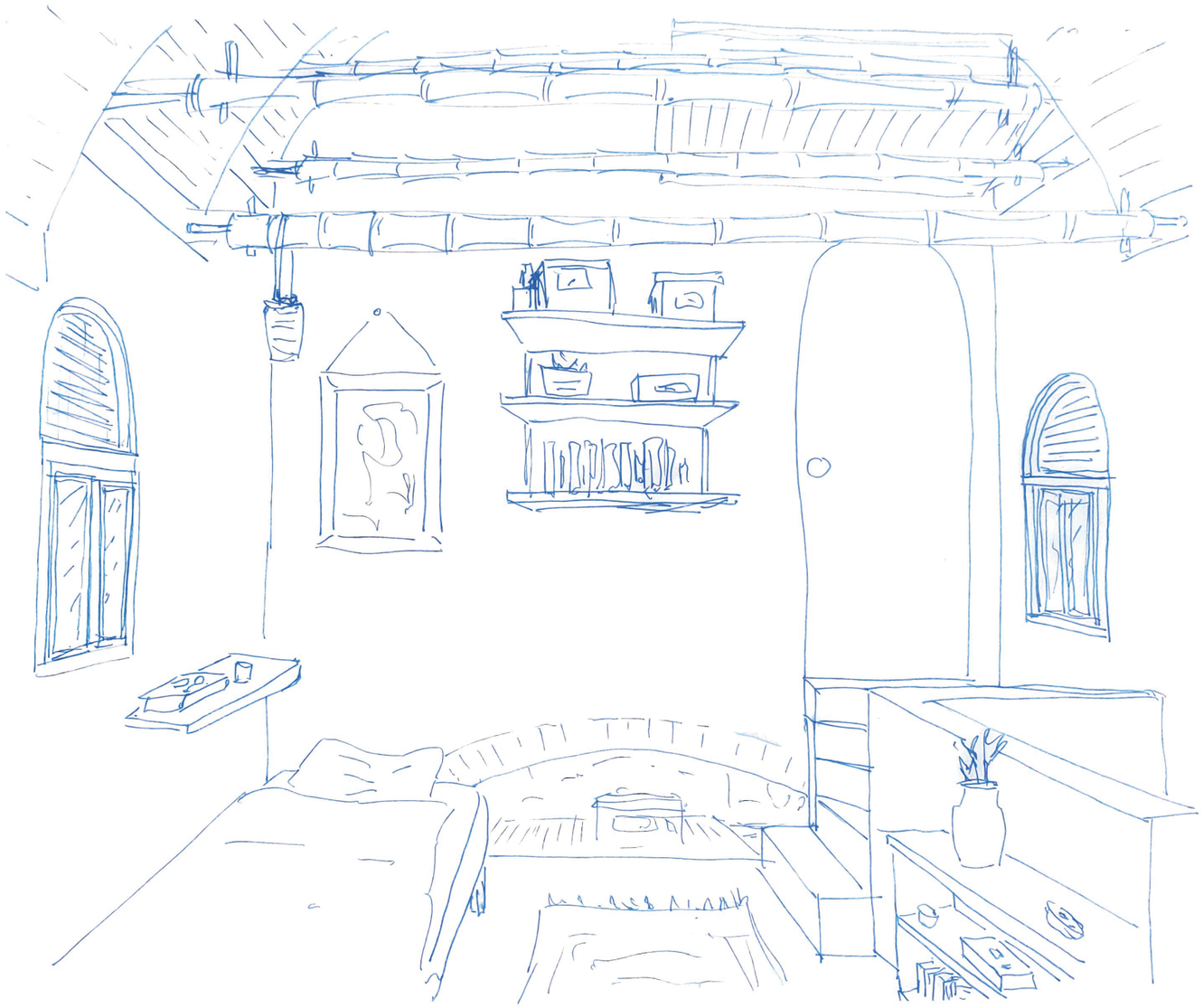


53,5 m2 + 27 m



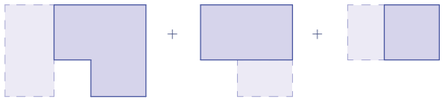
INDOOR PERSPECTIVE

SECOND FLOOR

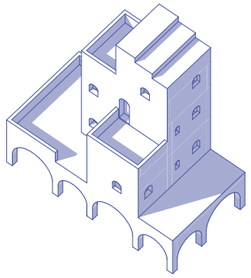


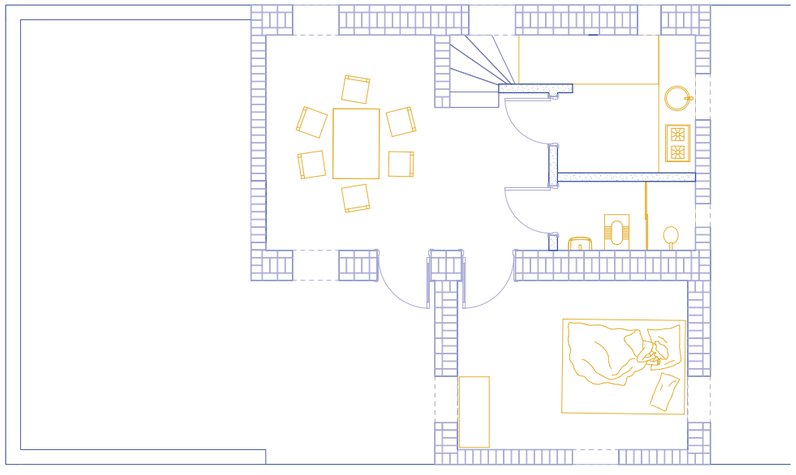
UNIT C

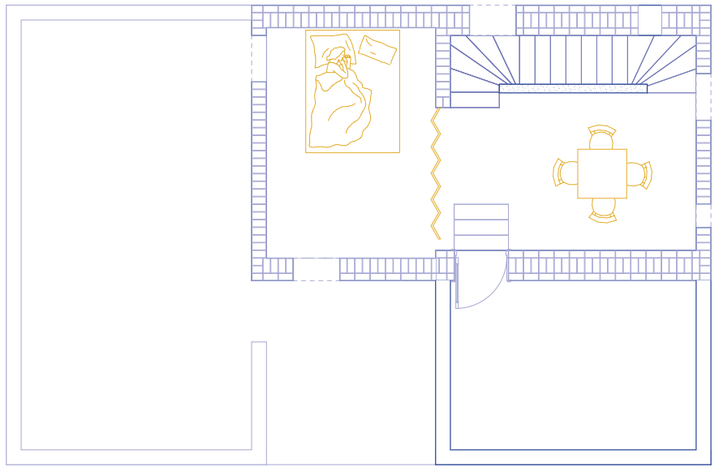
COMBINED UNIT

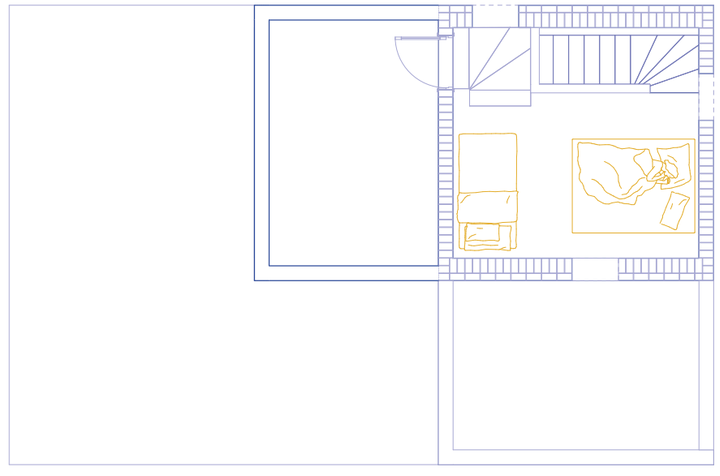


100,5 m2 + 57 m2 expansion area



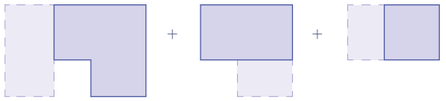




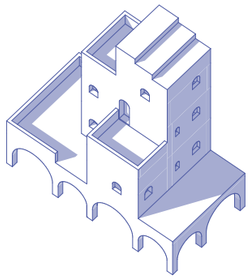


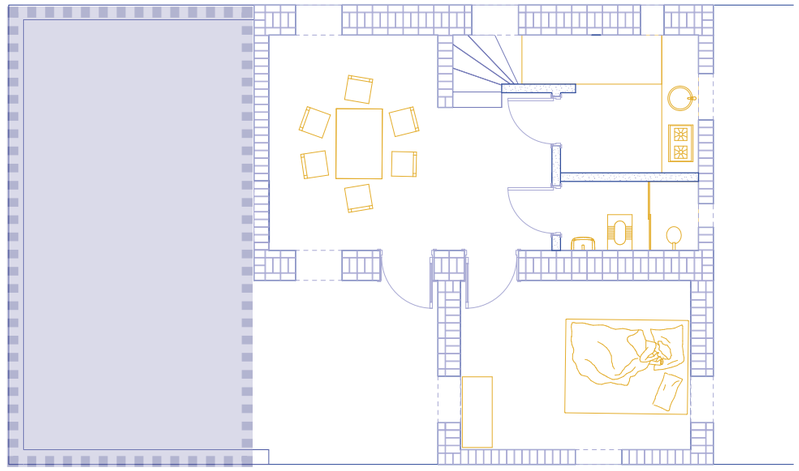
UNIT C

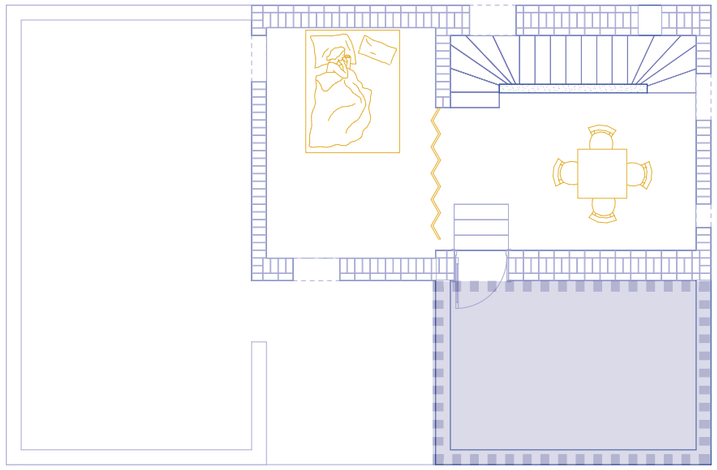
EXPANSION AREAS

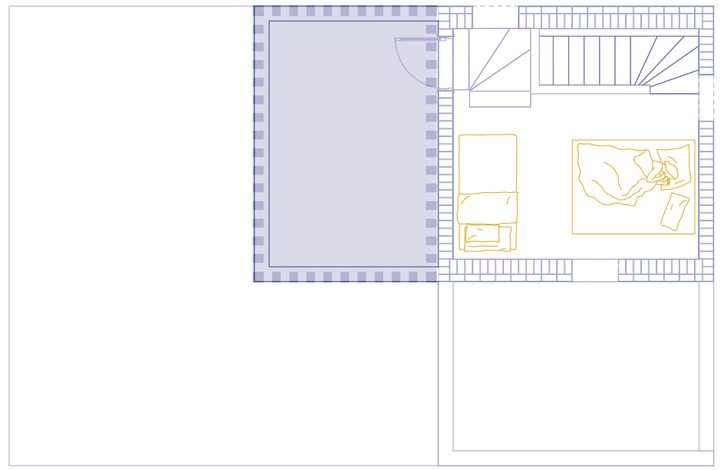


100,5 m2 + 57 m2









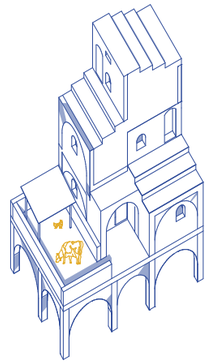
ADAPTABILITY

SPACES FOR EXPANSION & FLEXIBLE USE



FARMERS



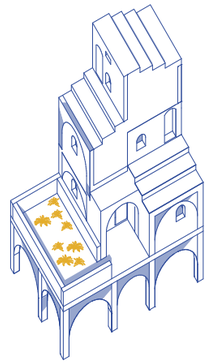


shelter for cattle & chickens



RETIRED COUPLES



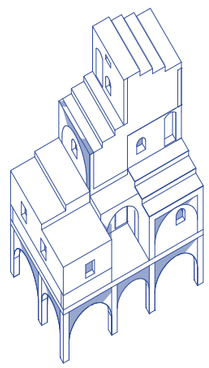


gardening



YOUNG FAMILIES





expansion of built space

DRY SEASON

BEFORE AND AFTER EXPANSION





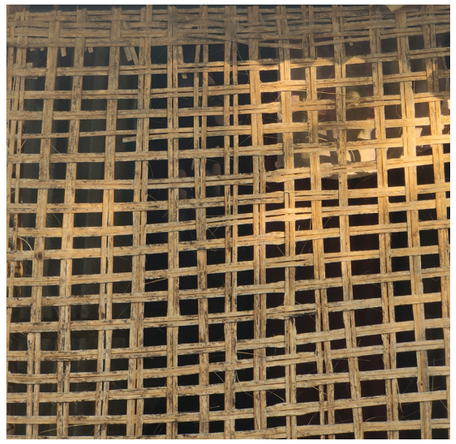
FLOODING SEASON

BEFORE AND AFTER EXPANSION

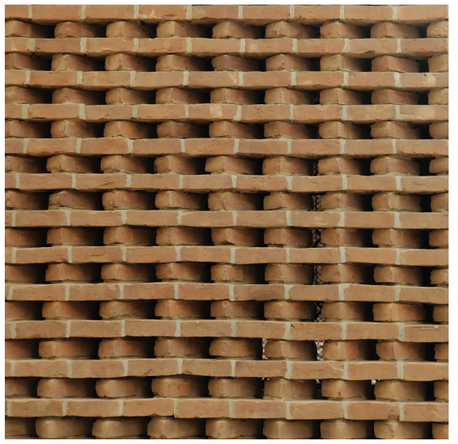


MATERIAL RESEARCH

COLLECTED SAMPLES FROM FIELD TRIP



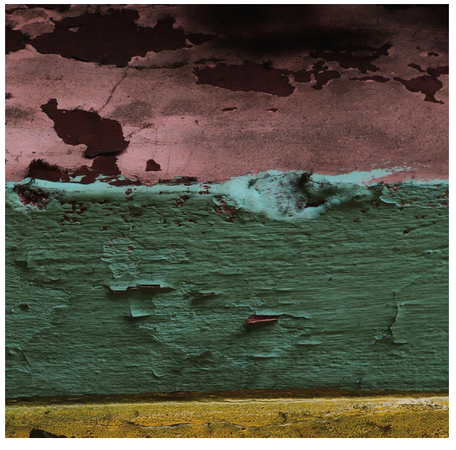










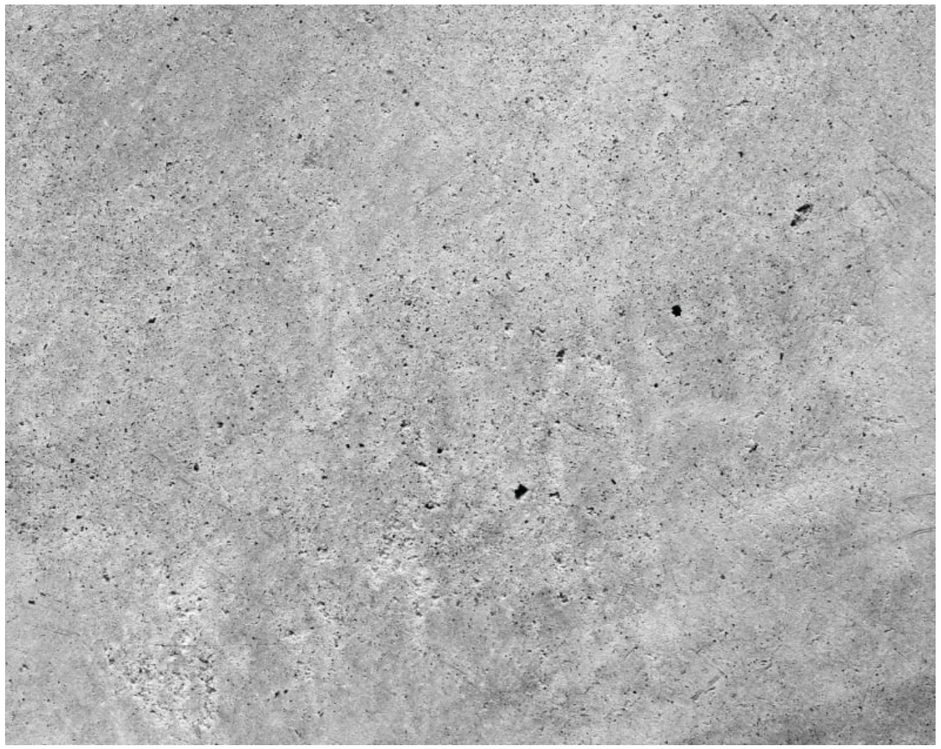




FIRED BRICK & CONCRETE

FLOOD RESISTANT STILT STRUCTURE





COMPRESSED STABILISED EARTH BLOCKS

FLOOD PROTECTED STRUCTURES





BAMBOO

ADAPTABLE STRUCTURES





WATTLE & DAUB

TRADITIONAL BUILDING TECHNIQUE FOR LESS PERMANENT WALLS





EARTH PLASTER

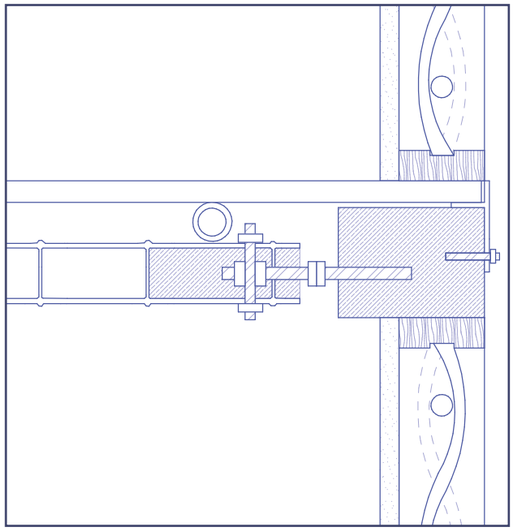
FOR A HEALTHY INDOOR CLIMATE

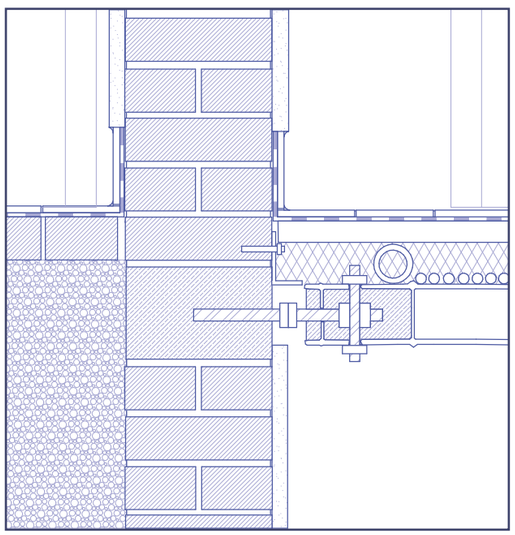




DIFFERENT TEMPORALITIES OF MATERIALS

JOINTS

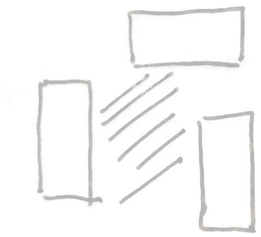






DESIGN PRINCIPLES

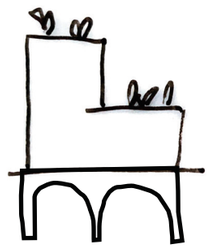
GUIDING THE DESIGN PROCESS



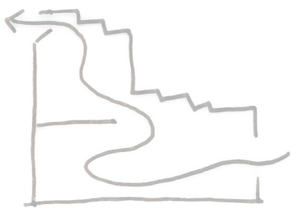
CLUSTERING



SPACE FOR FLEXIBLE USE AND
INCREMENTAL GROWTH



VERTICAL USE OF SPACE



NATURAL VENTILATION

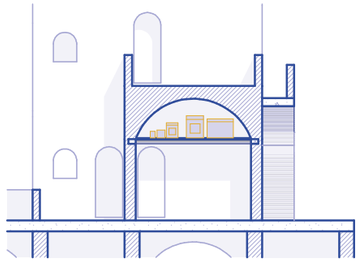
VERTICAL USE OF SPACE

SPACES FOR FLEXIBLE USE



RETIRED COUPLES



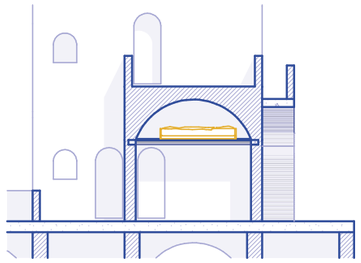


storage space



YOUNG FAMILIES



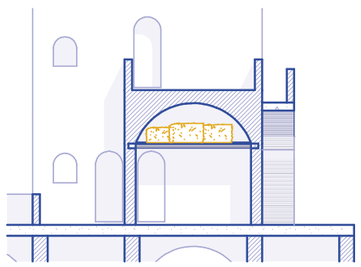


extra sleeping space



FARMERS

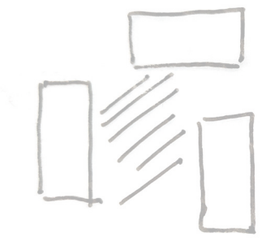




dry storage for crops

DESIGN PRINCIPLES

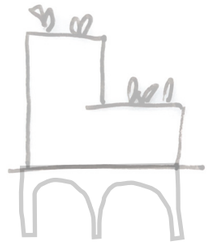
GUIDING THE DESIGN PROCESS



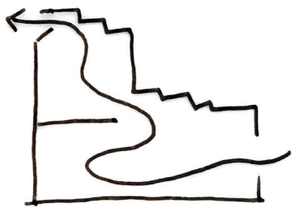
CLUSTERING



SPACE FOR FLEXIBLE USE AND INCREMENTAL GROWTH



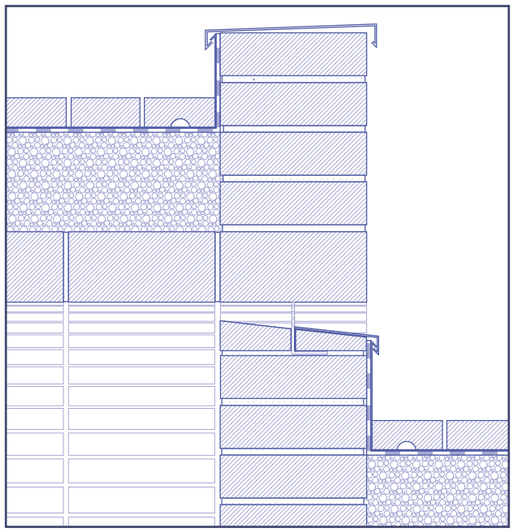
VERTICAL USE OF SPACE

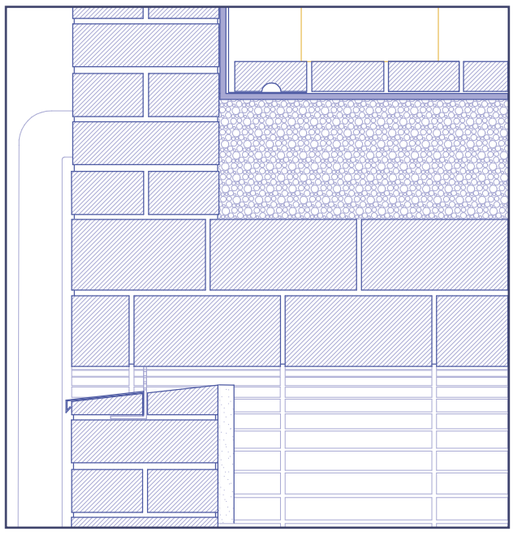


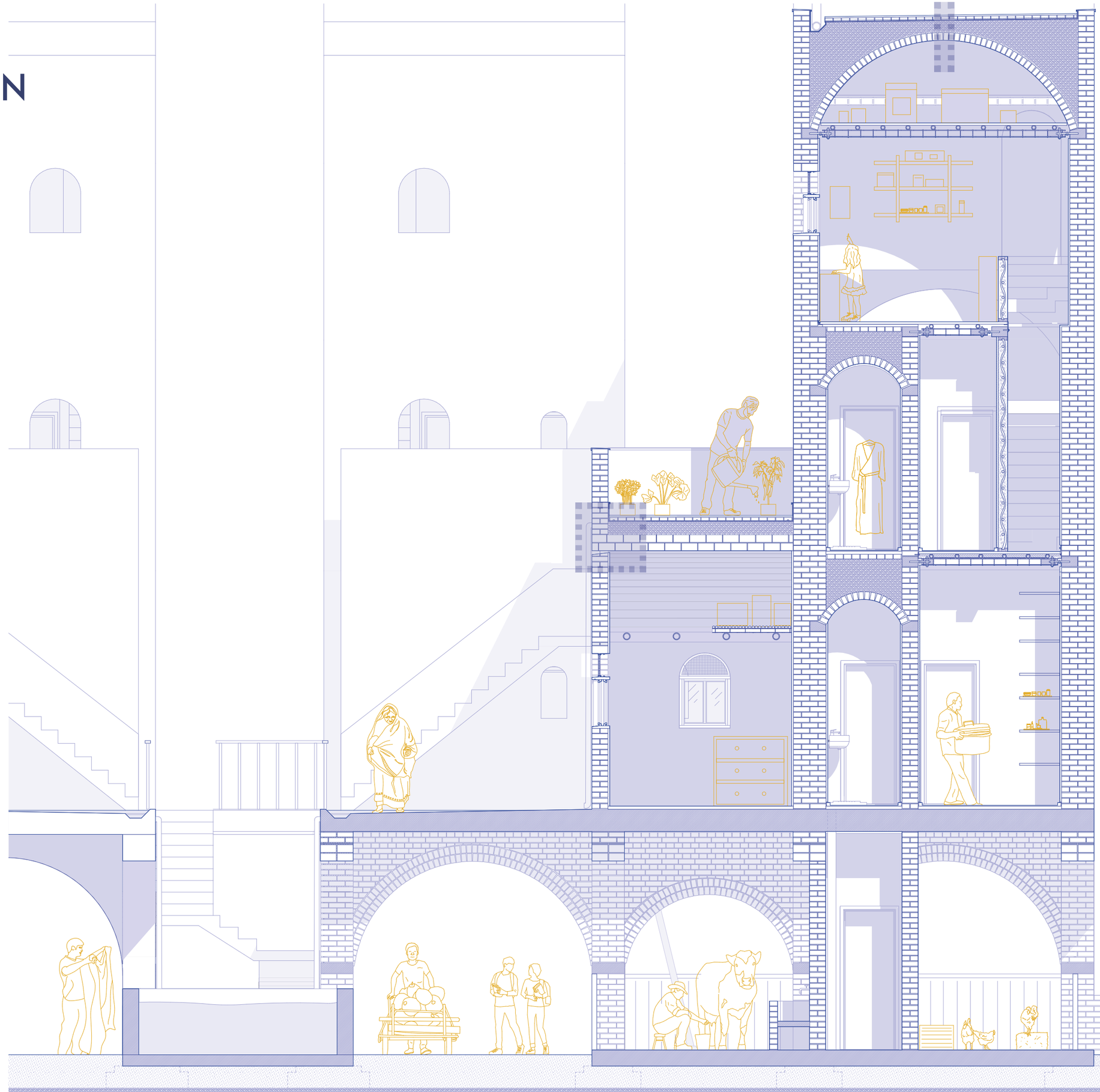
NATURAL VENTILATION

NATURAL VENTILATION

INCORPORATED VENTILATION SLIDS

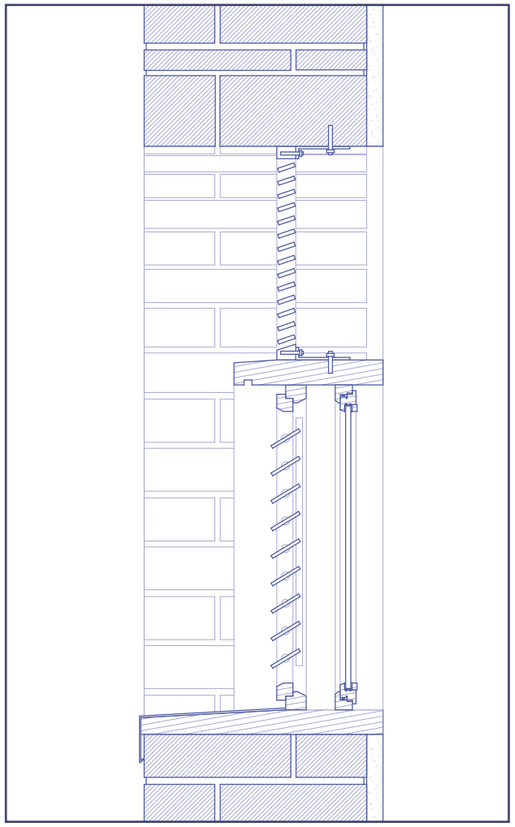


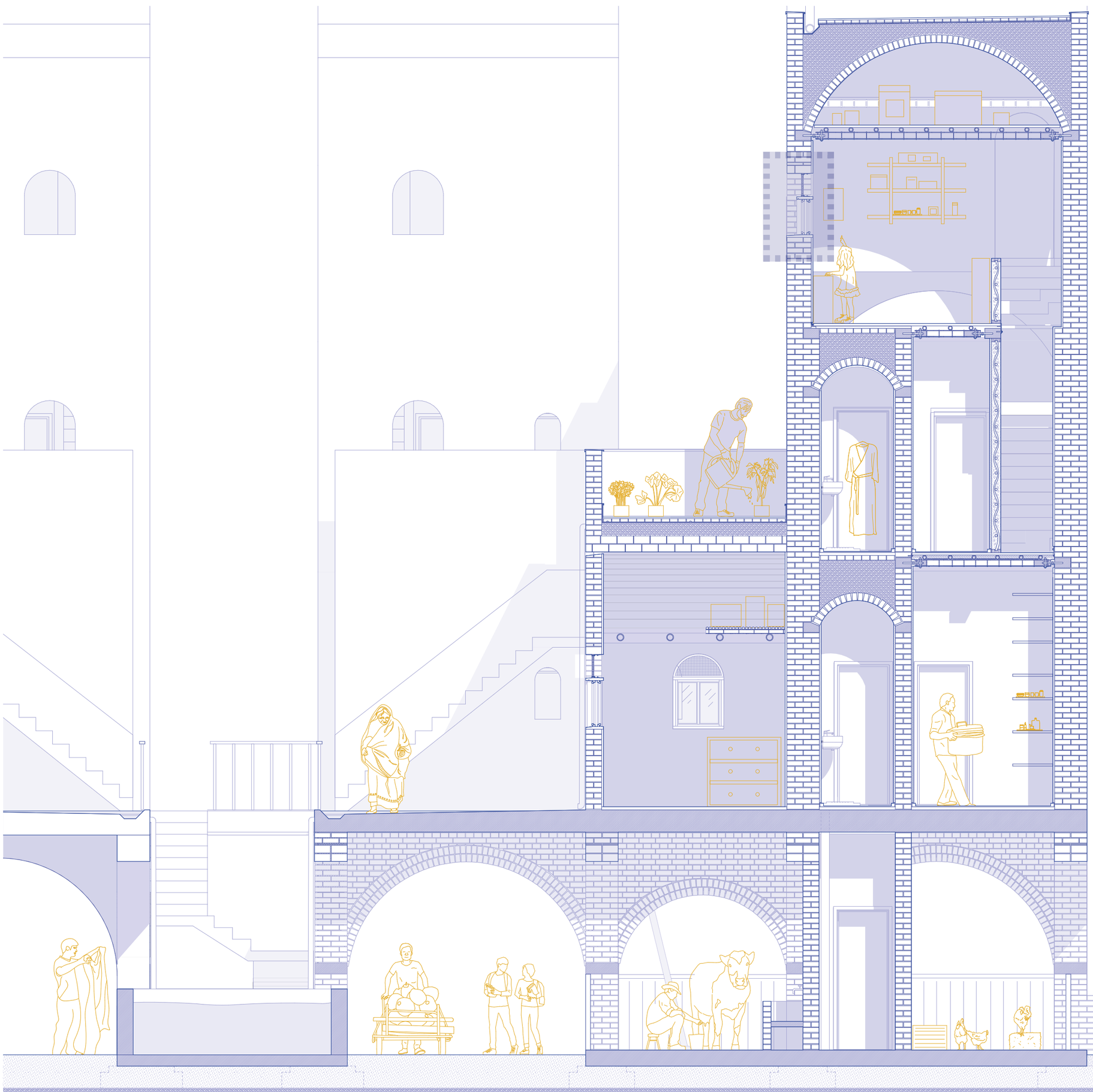




SHADING

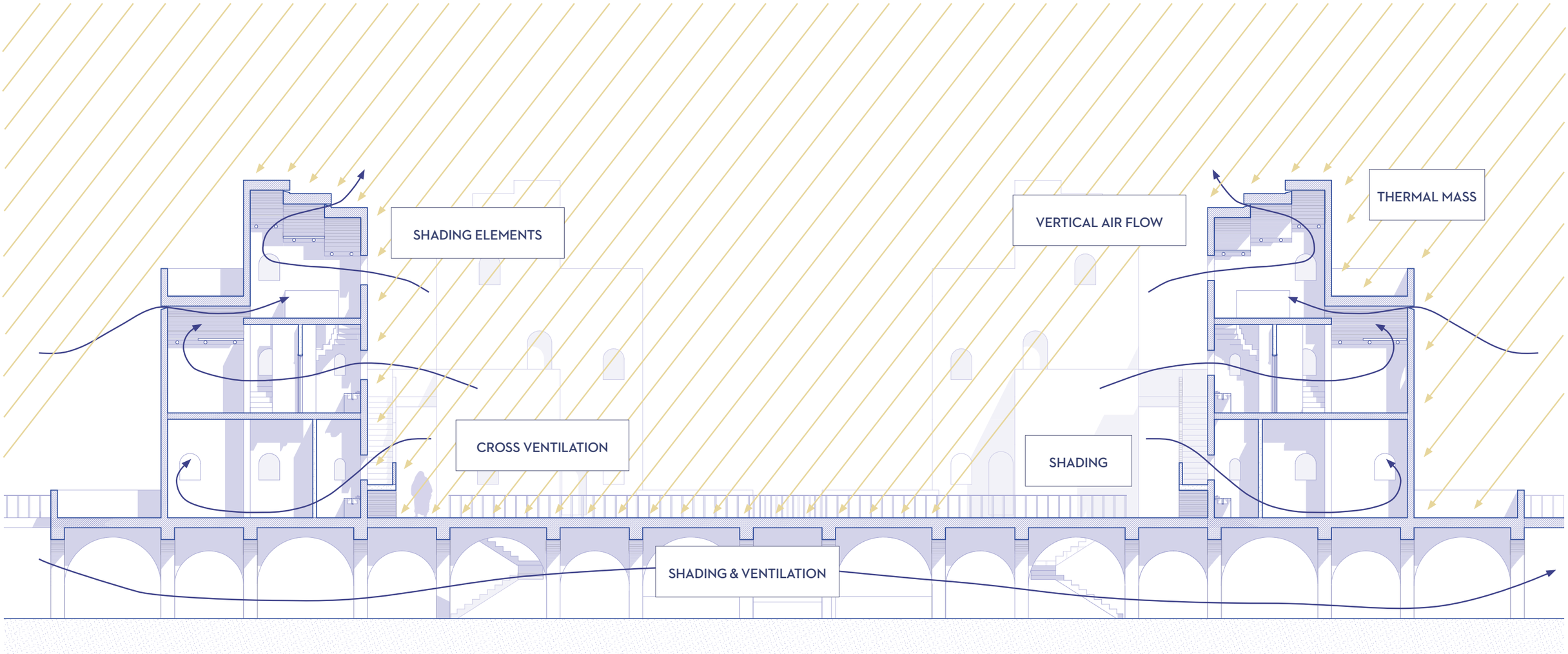
SUN PROTECTION & VENTILATION





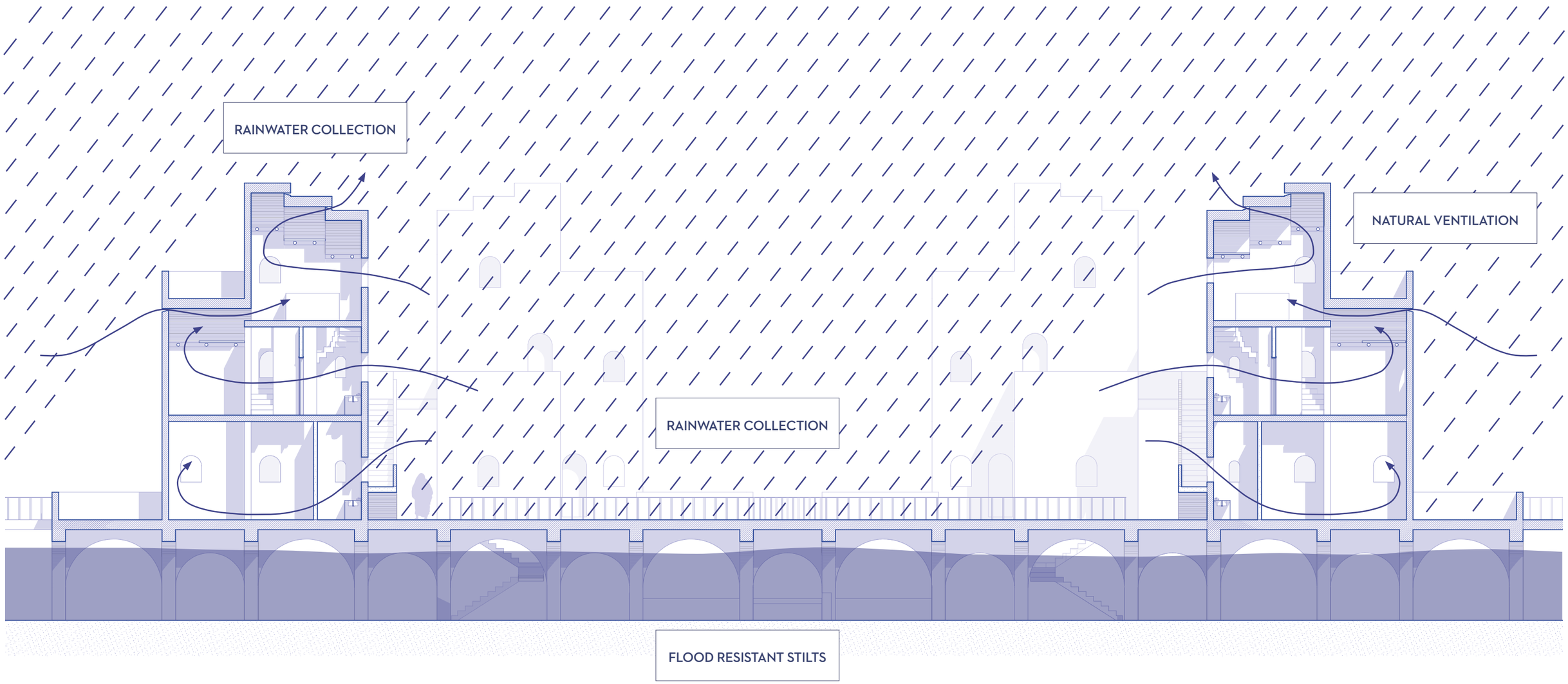
CLIMATE-STRATEGY - DRY SEASON

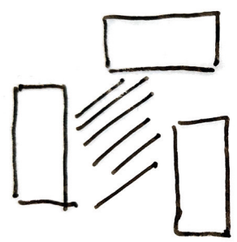
NATURAL VENTILATION AND SHADING



CLIMATE-STRATEGY - FLOOD SEASON

NATURAL VENTILATION, RAIN - AND FLOOD PROTECTION

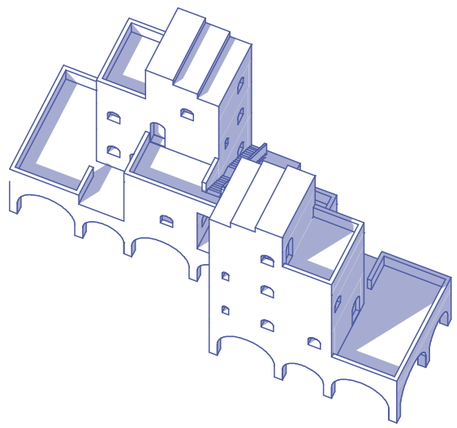




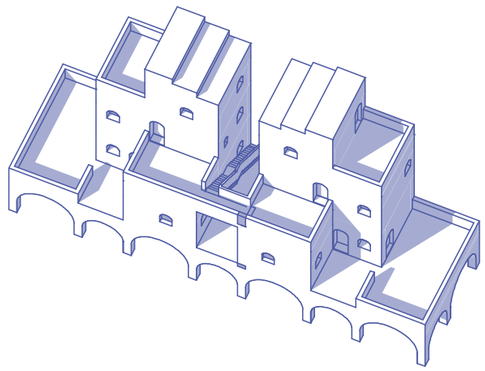
CLUSTER

CLUSTERING STRATEGIES

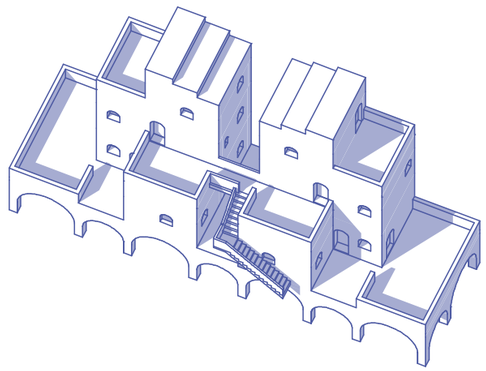
COMBINATIONS OF REPEATABLE UNIT



CLUSTERING STRATERY 1



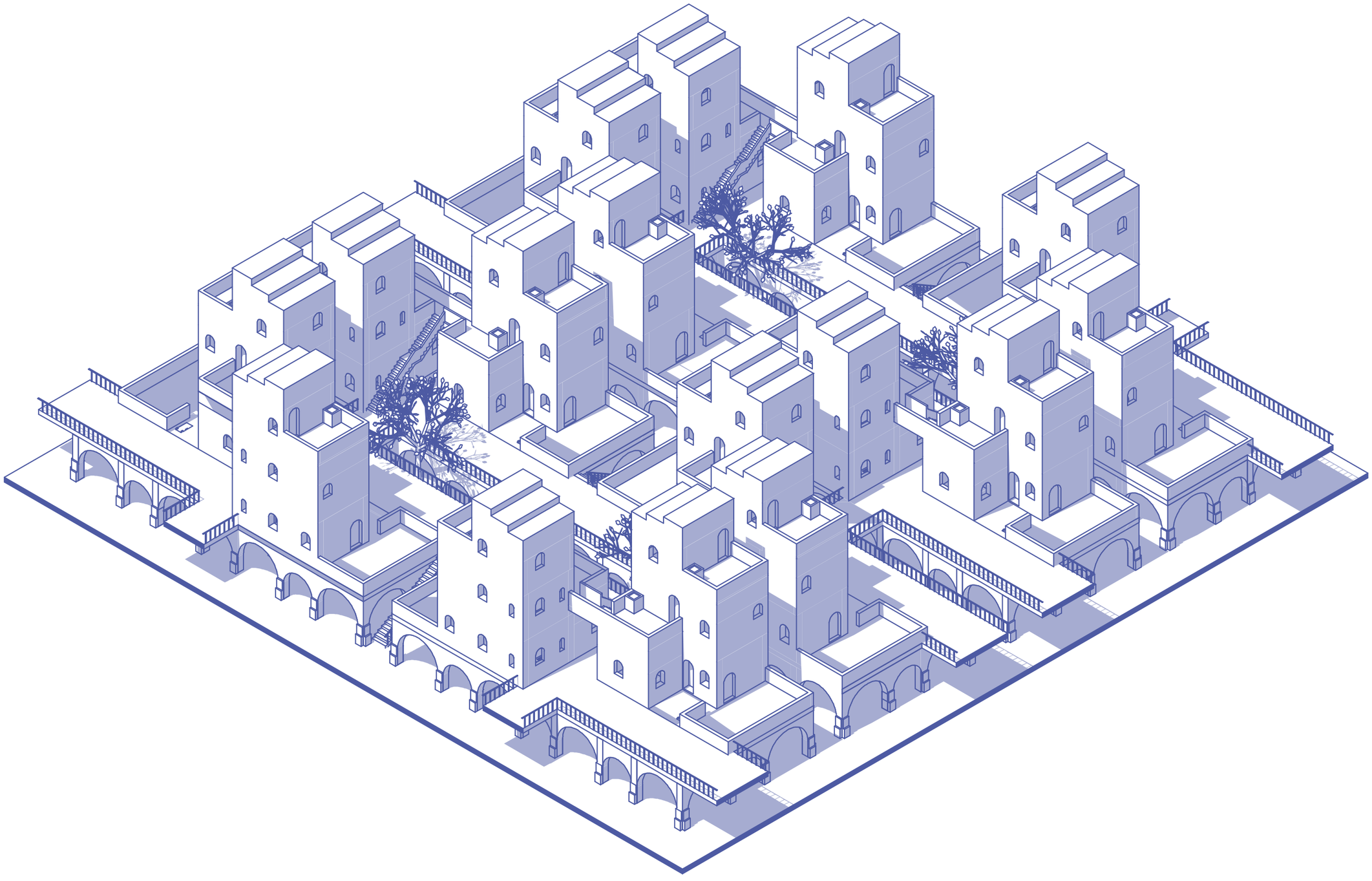
CLUSTERING STRATERY 2



CLUSTERING STRATERY 3

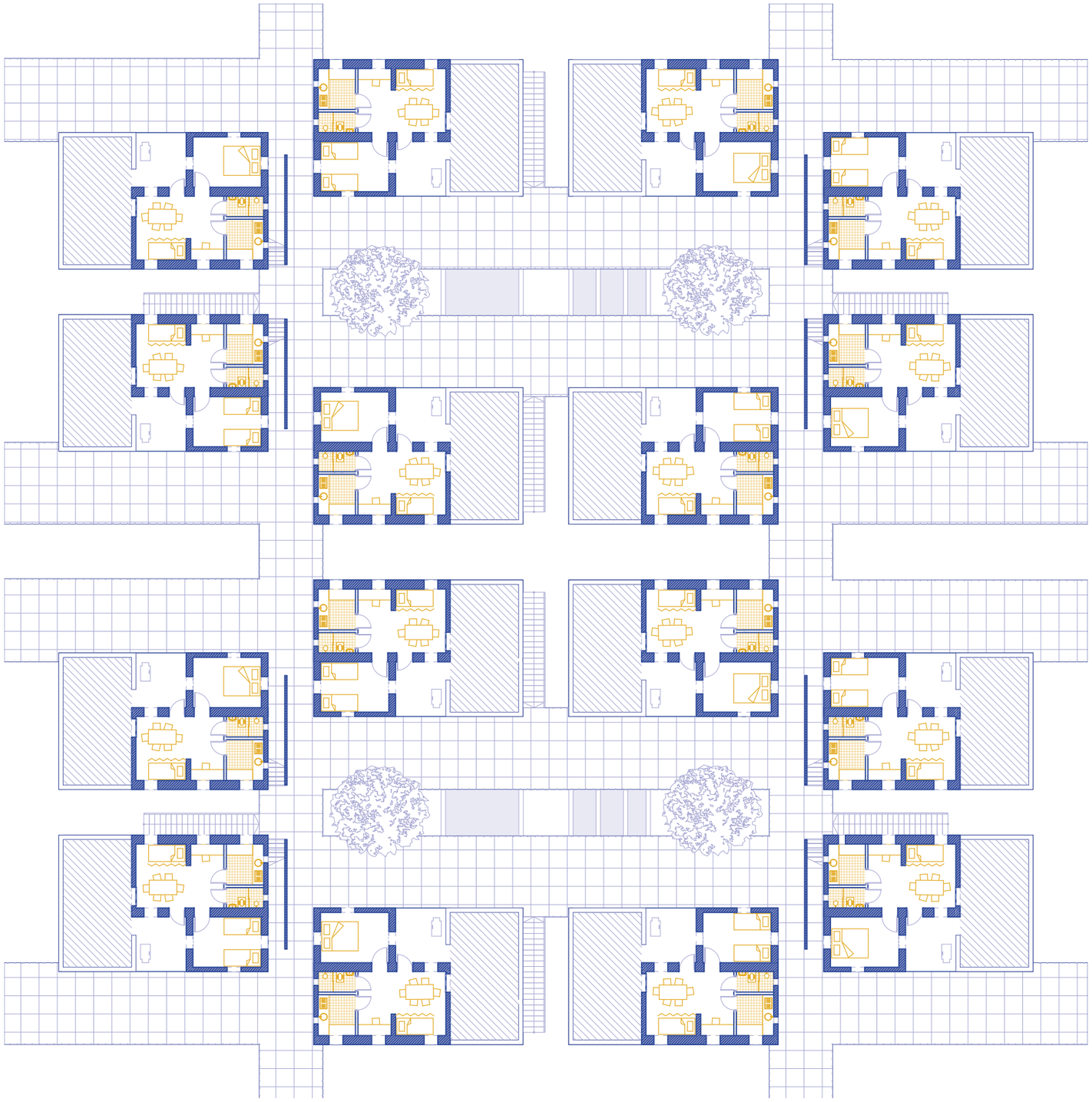
2 CLUSTERS

OVERVIEW



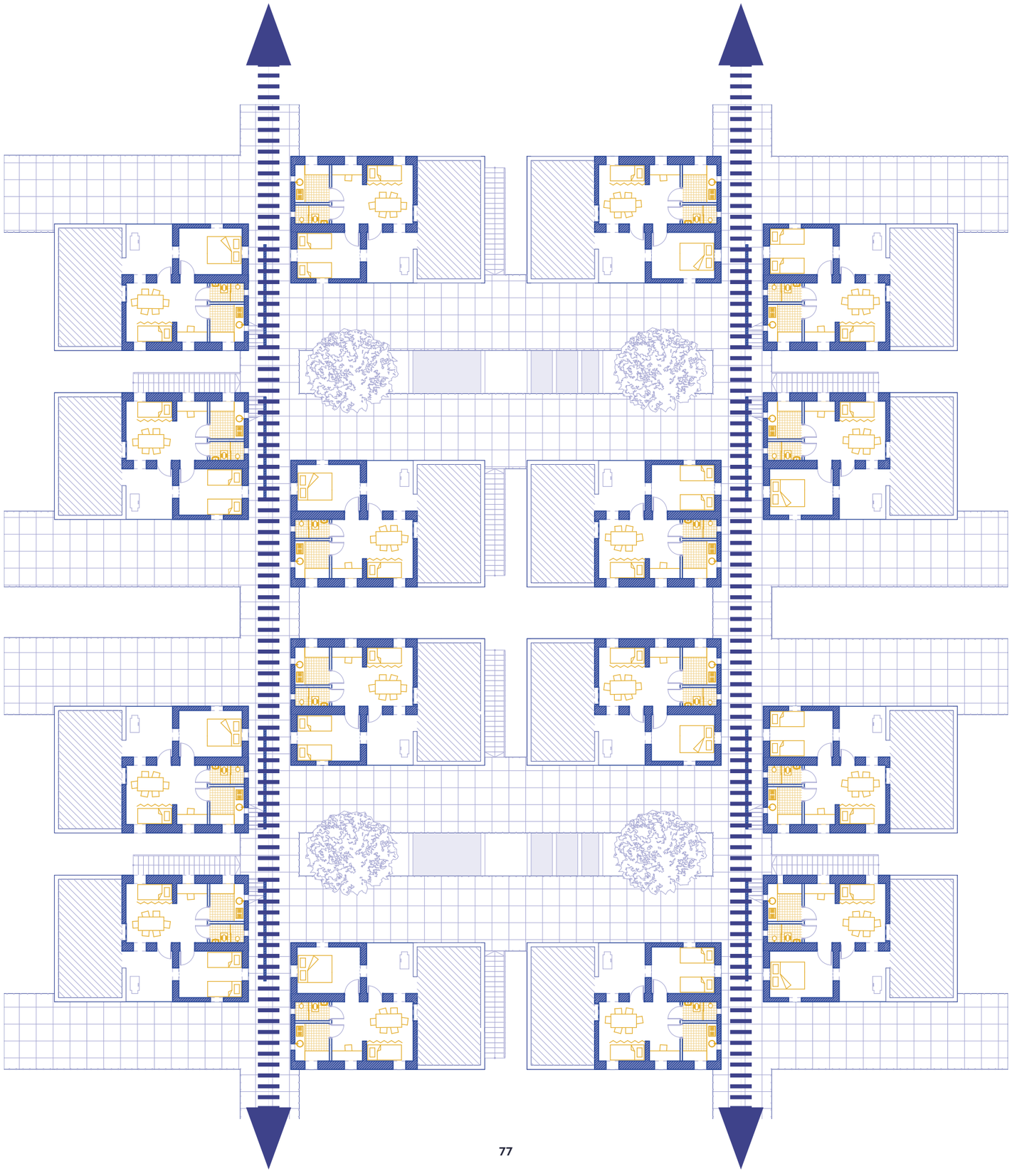
2 CLUSTERS

FLOORPLAN ON PLATFORM LEVEL



2 CLUSTERS

PEDESTRIAN PATHS

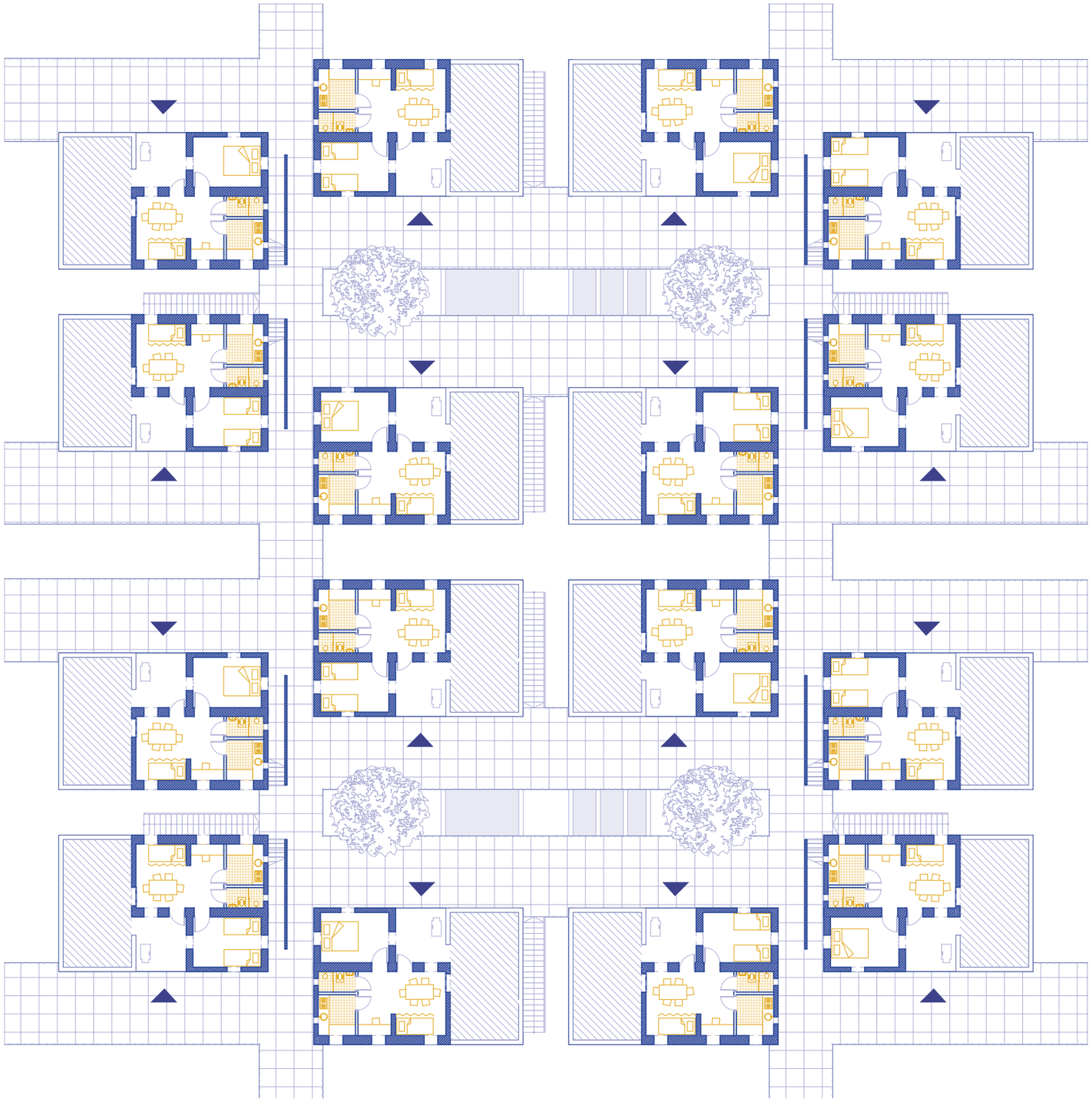


PEDESTRIAN PATHS



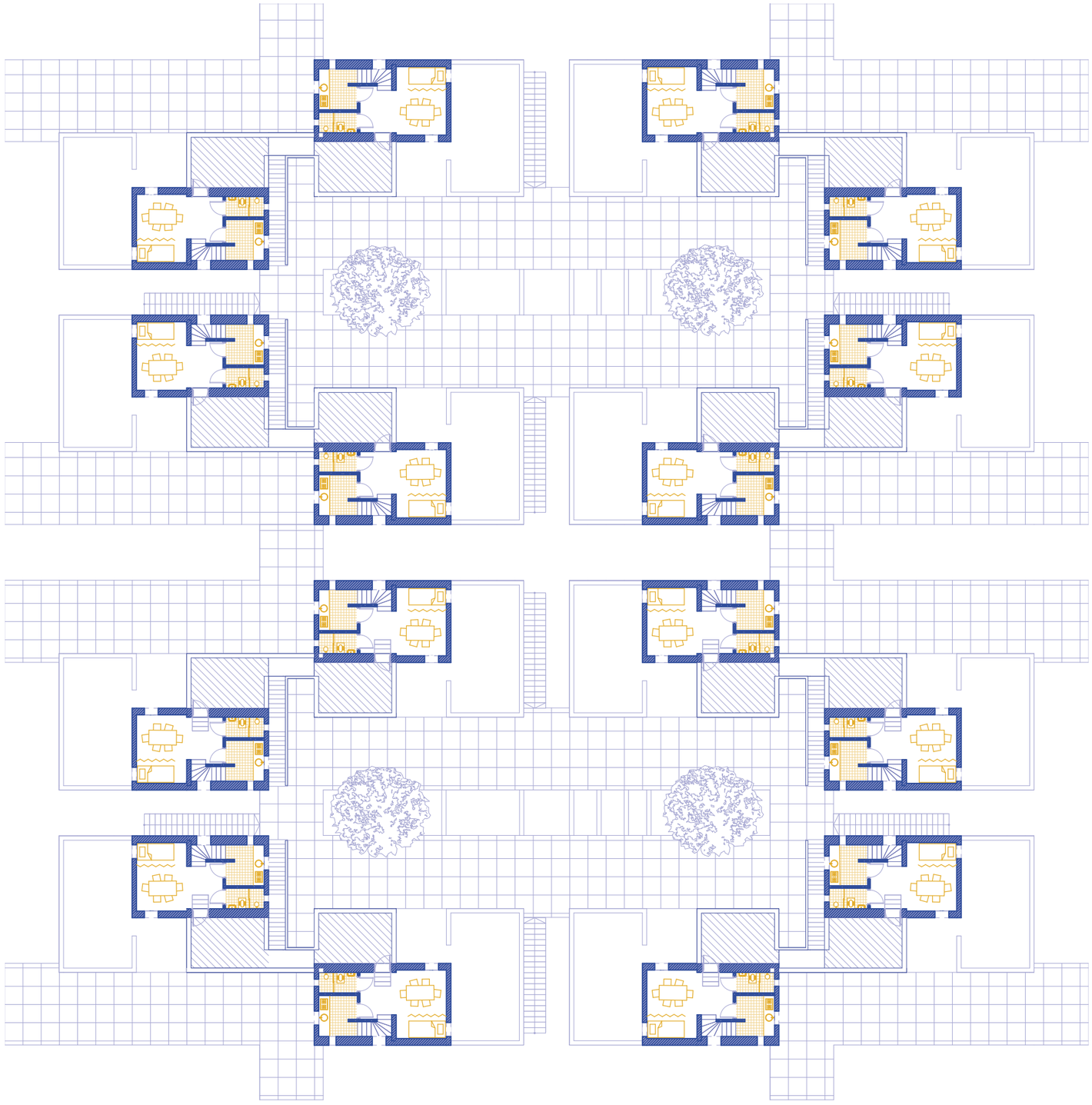
2 CLUSTERS

ENTRANCES



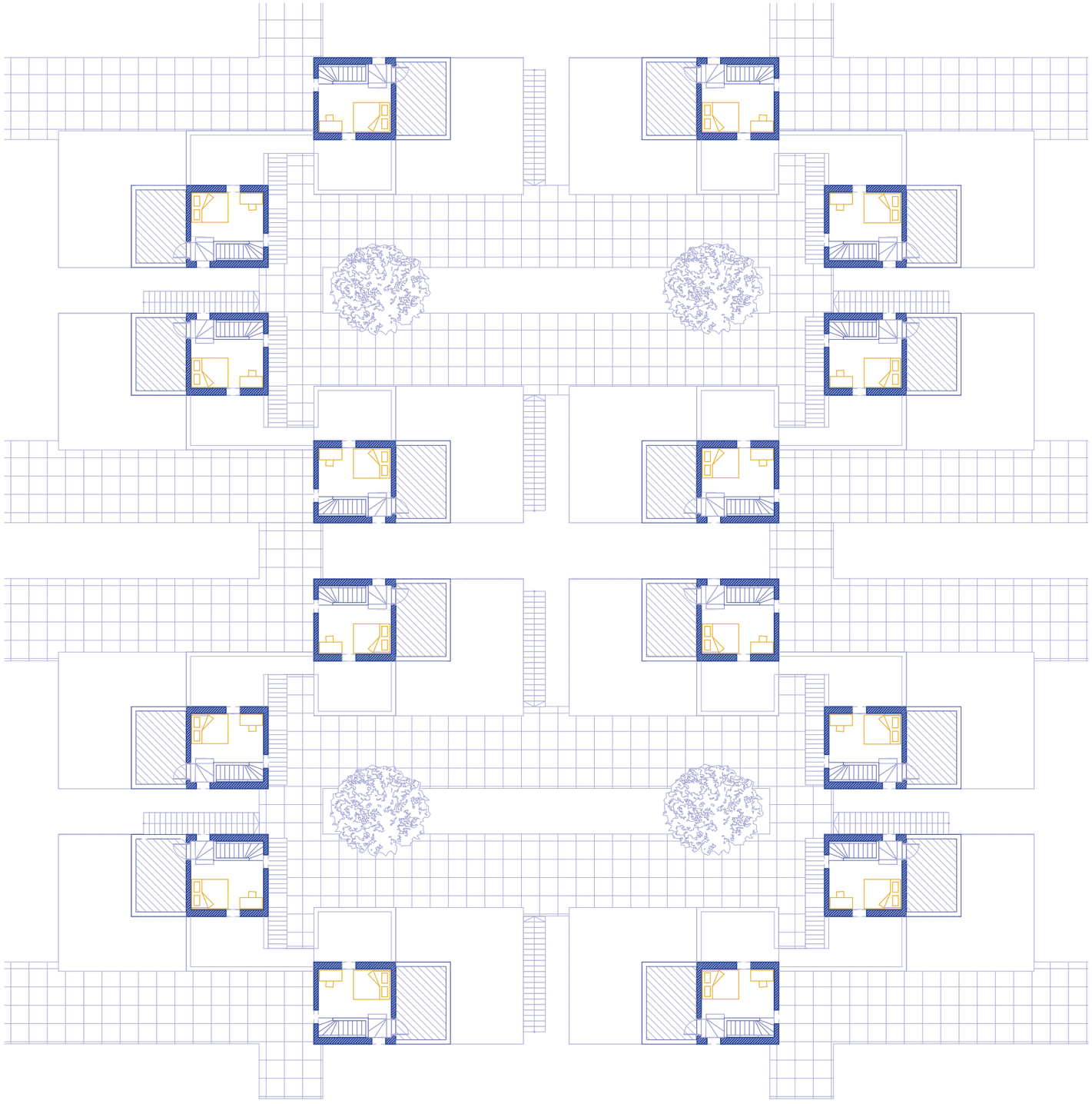
2 CLUSTERS

2ND FLOOR



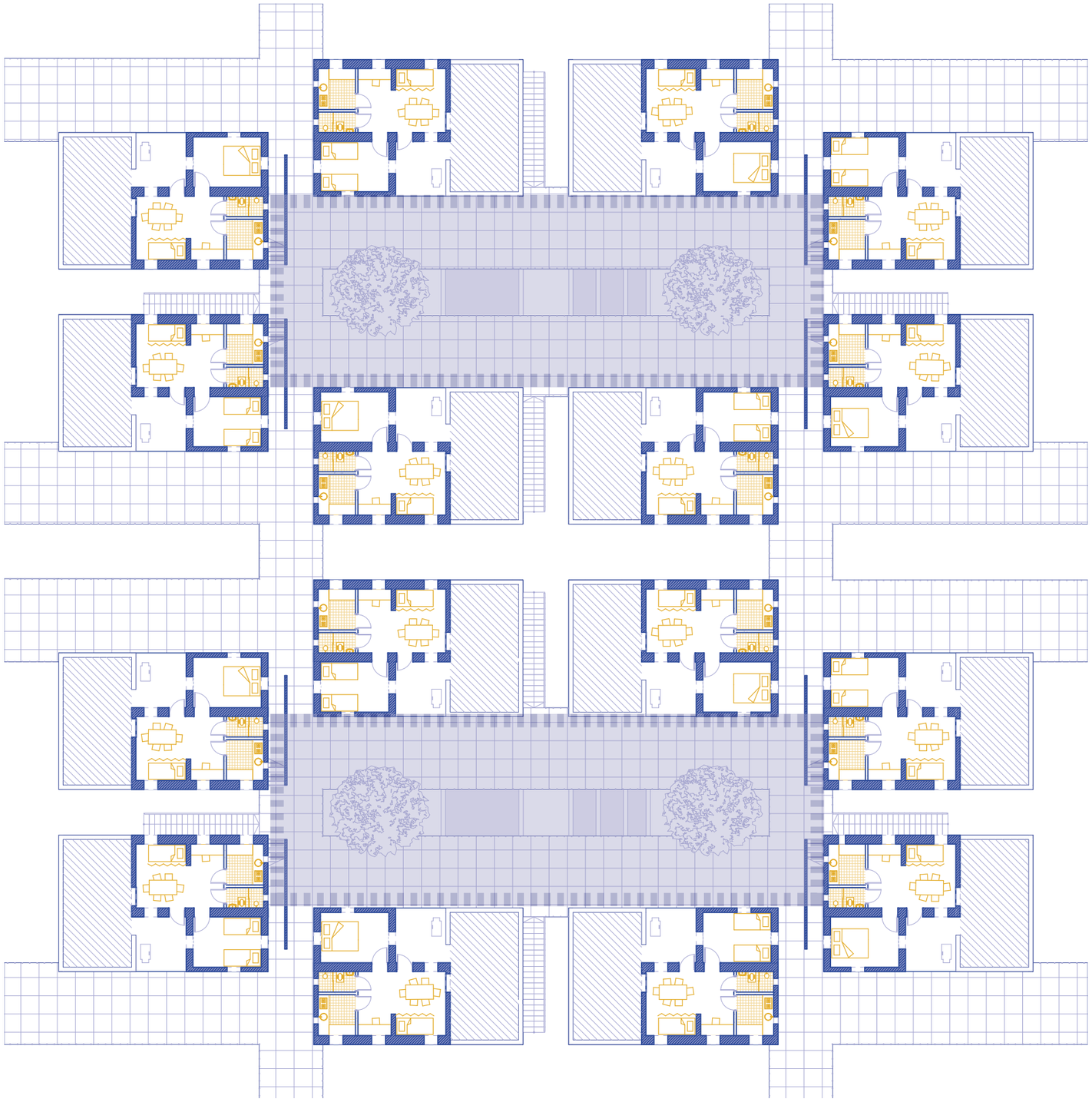
2 CLUSTERS

3RD FLOOR

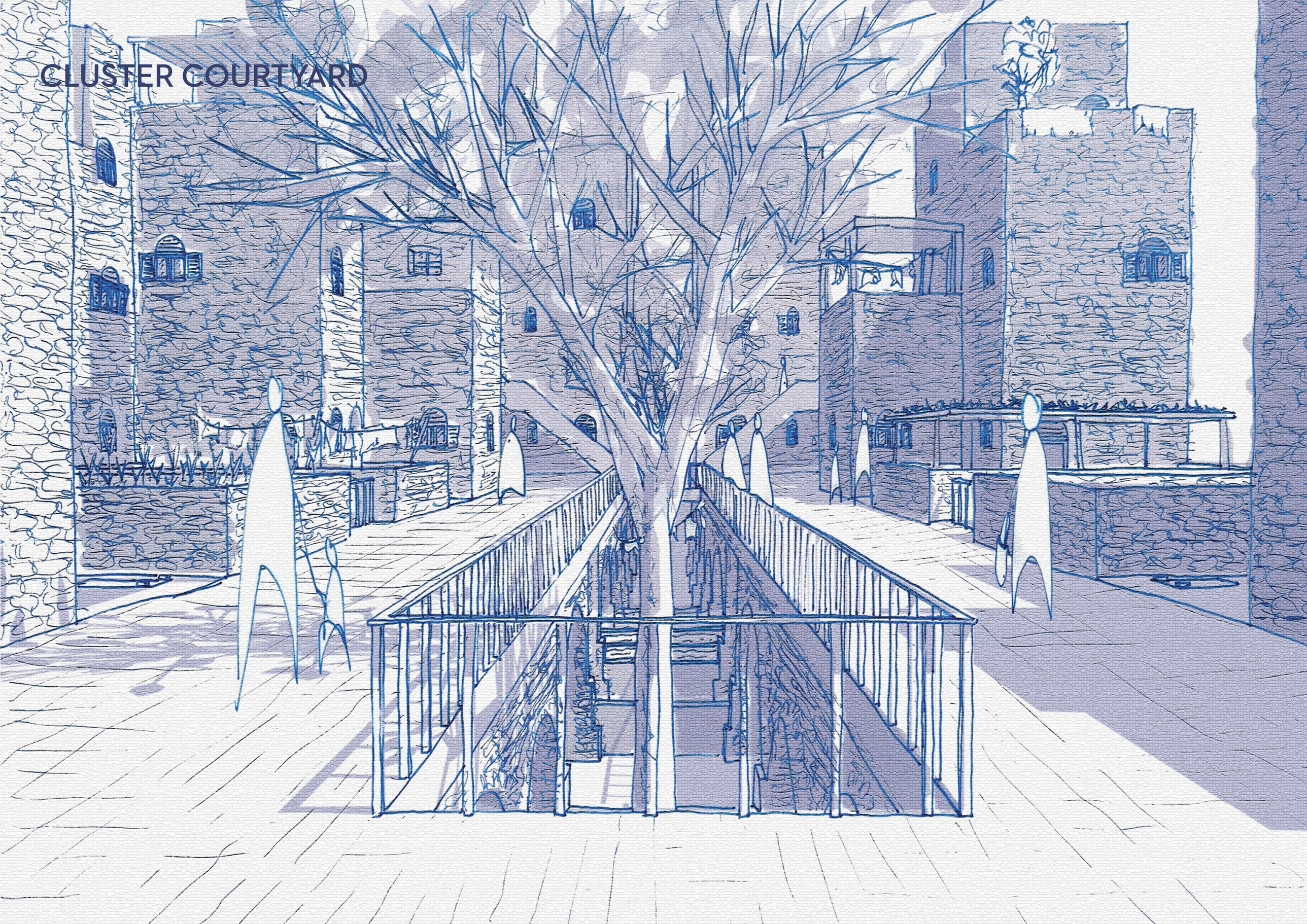


2 CLUSTERS

CENTRAL COURTYARDS

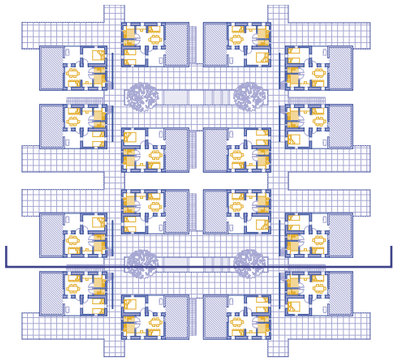


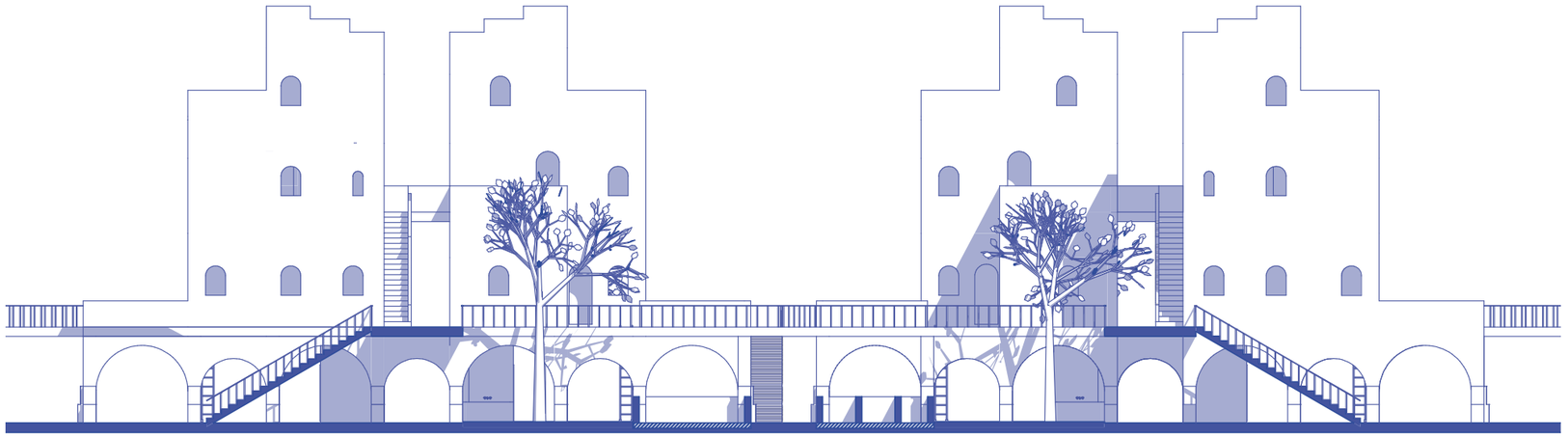
CLUSTER COURTYARD



CLUSTER COURTYARD

CONNECTION BETWEEN GROUND AND PLATFORM





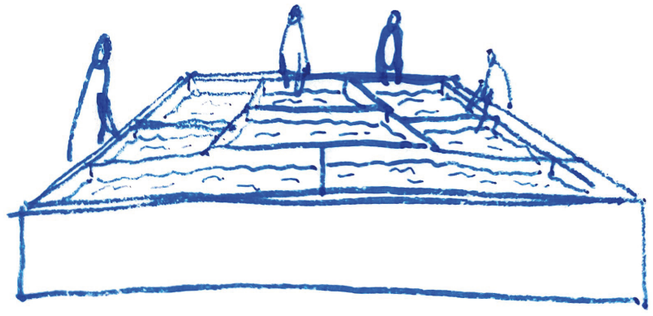
CLUSTER COURTYARD

GROUND FLOOR

COMMUNAL LAUNDRY CENTER

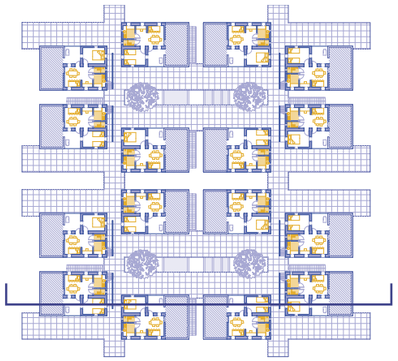
INSPIRED BY Lavadouro público da Afurada

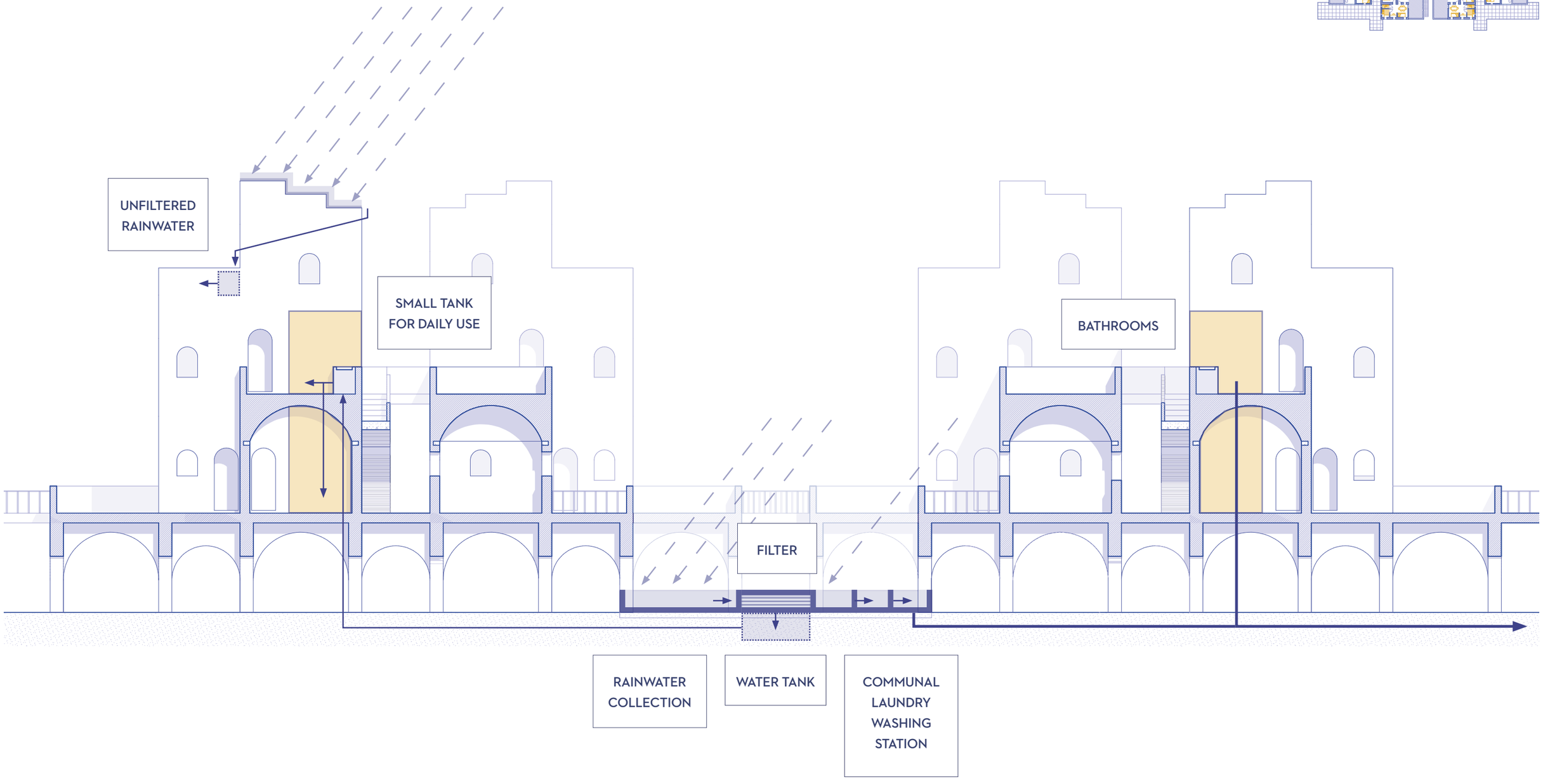




COMMUNAL LAUNDRY CENTER

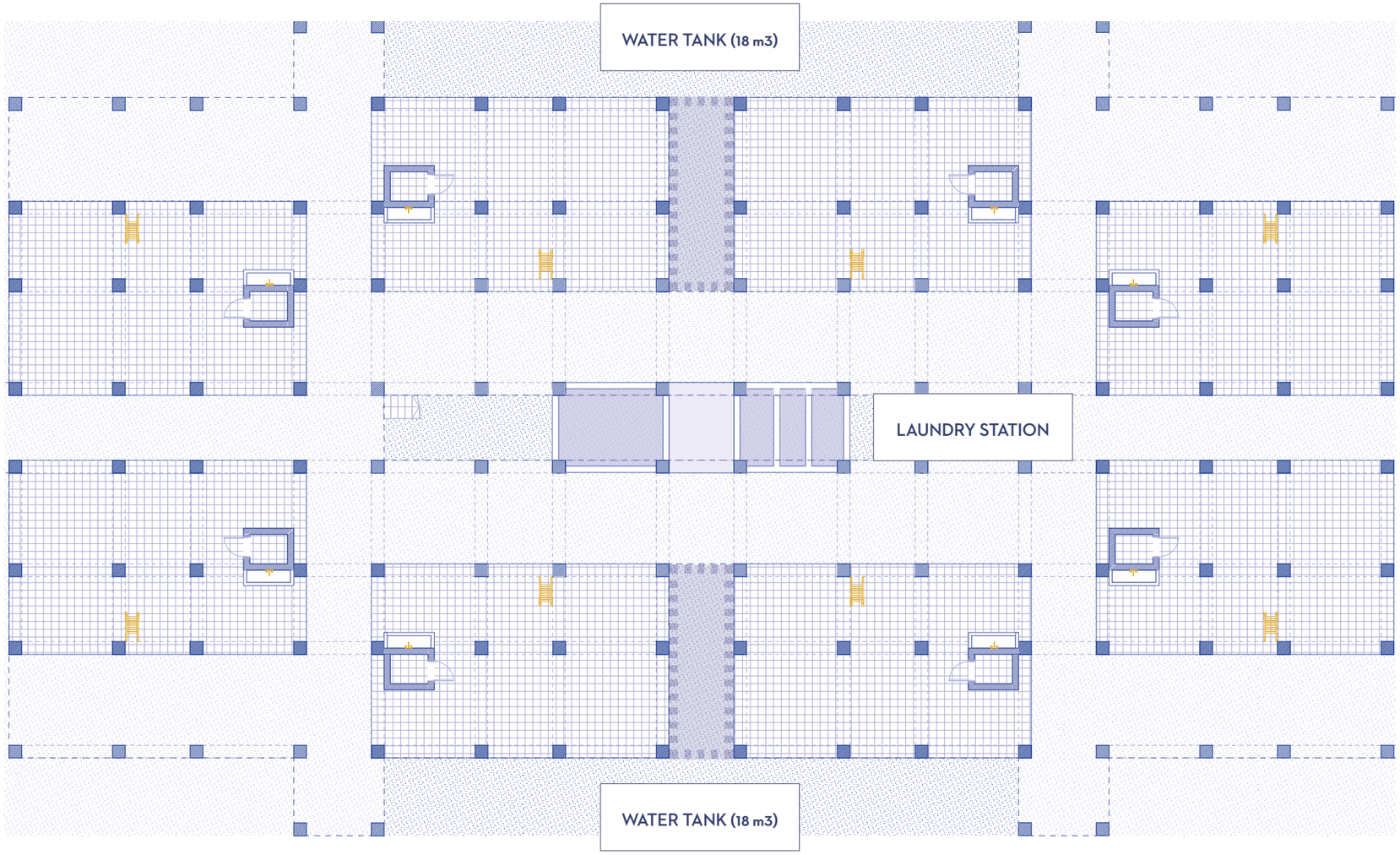
COLLECTIVE WATER STRATEGY





COMMUNAL LAUNDRY CENTER

GROUNDFLOOR LEVEL

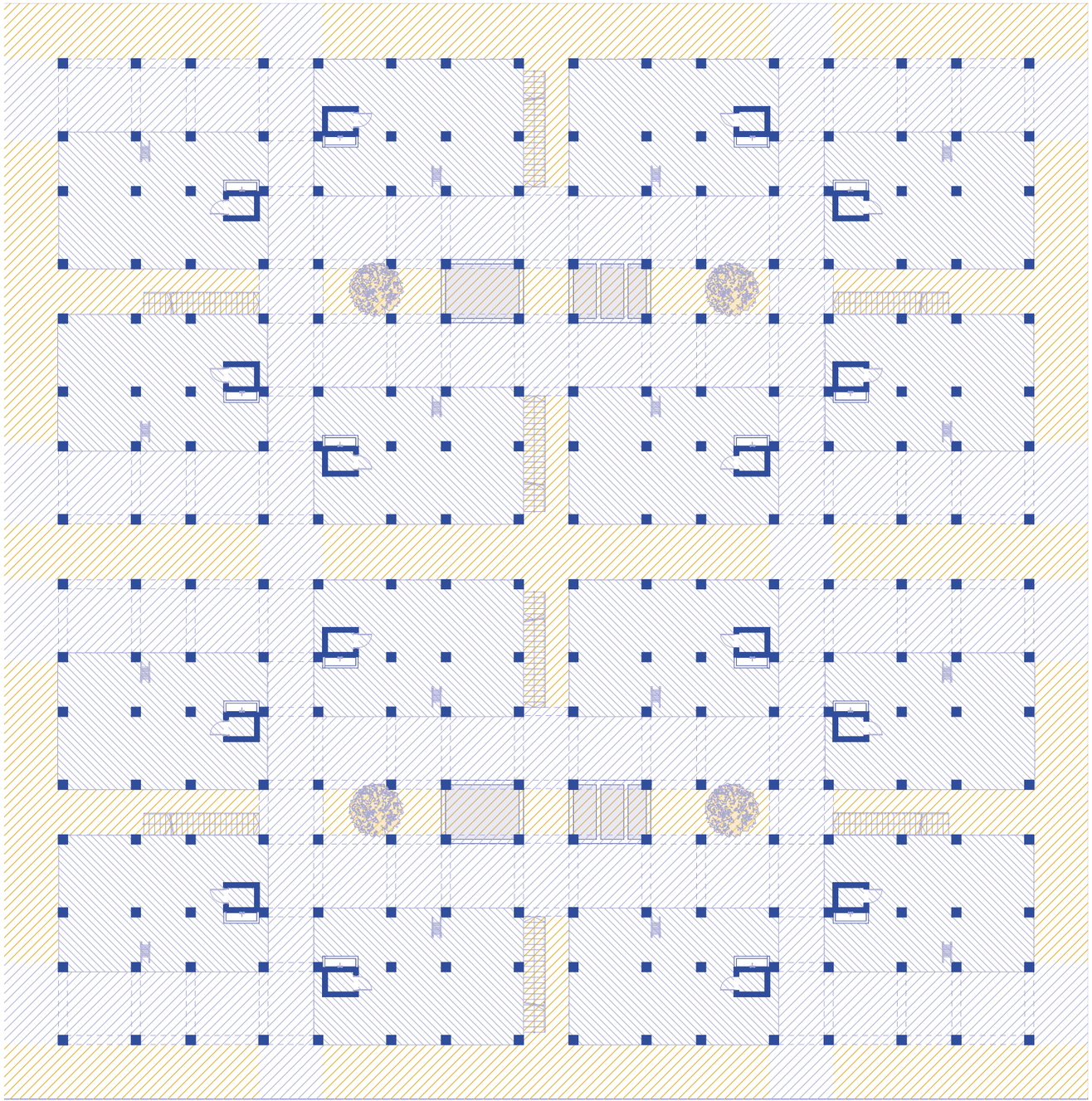


COMMUNAL LAUNDRY CENTER



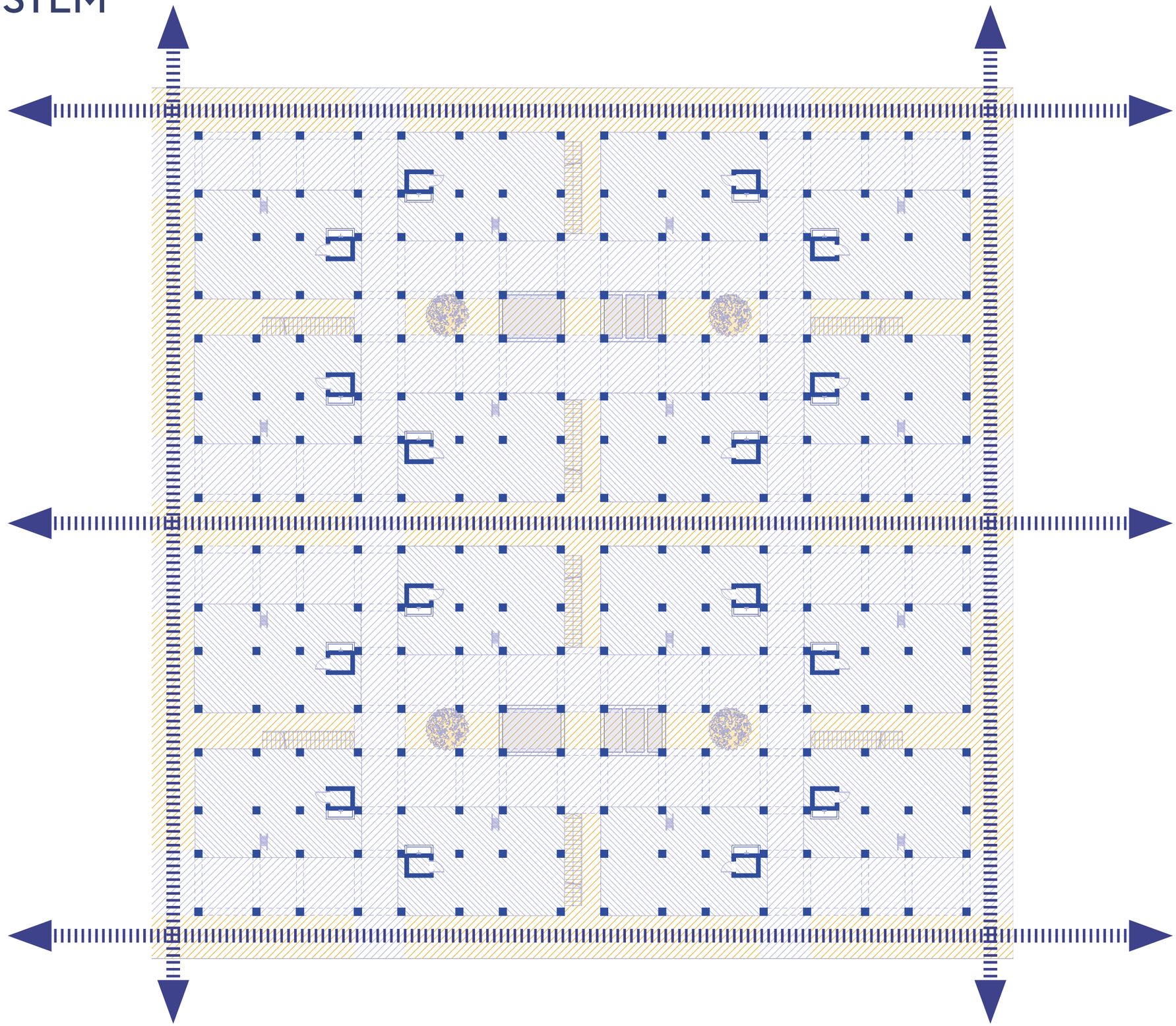
LIGHTING

GROUND FLOOR



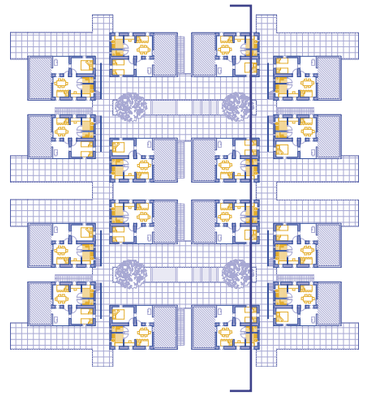
ACCESS SYSTEM

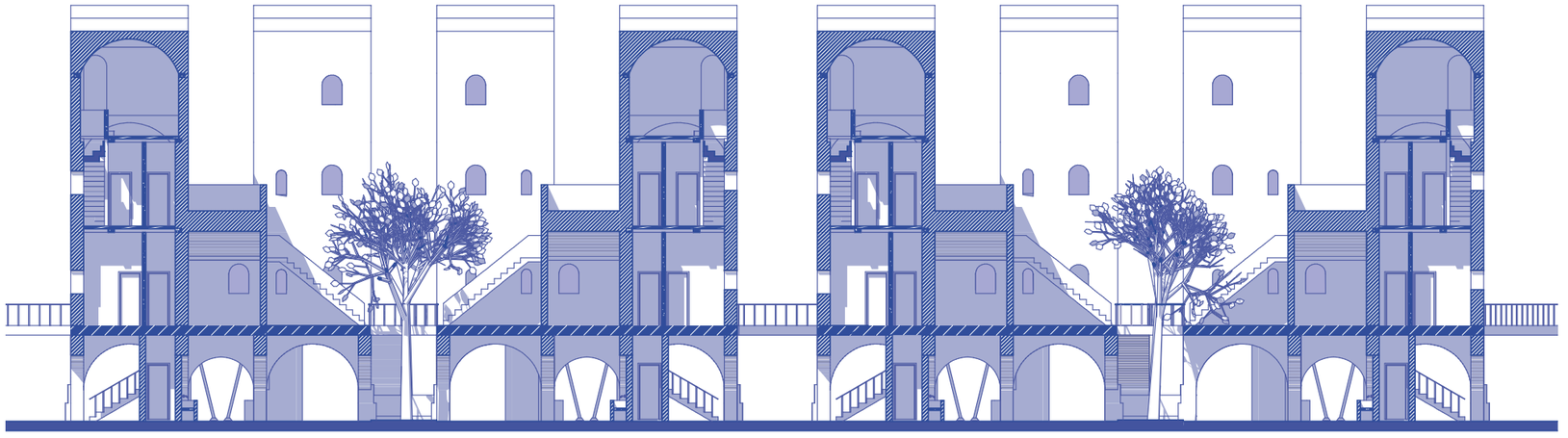
PRIMARY AXIS



ACCESS SYSTEM

STREET PROFILES

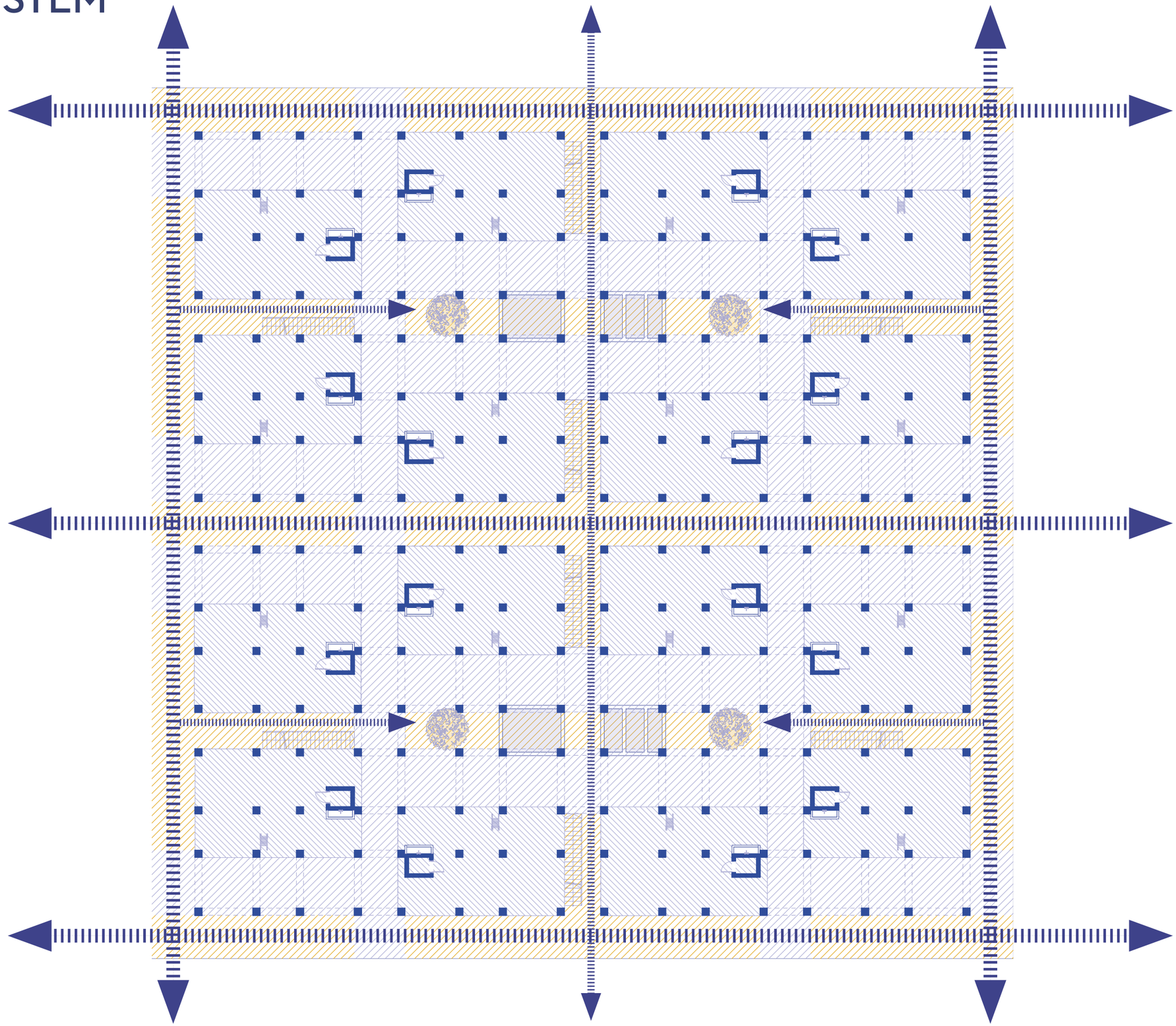




PRIMARY AXIS

ACCESS SYSTEM

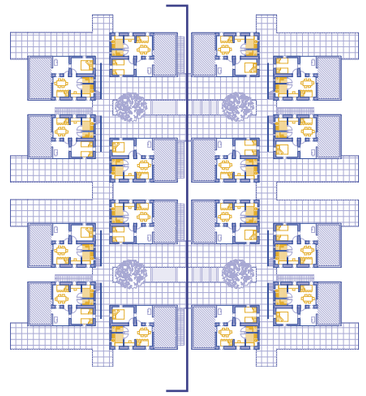
PEDESTRIAN PATHS



PEDESTRIAN PATH

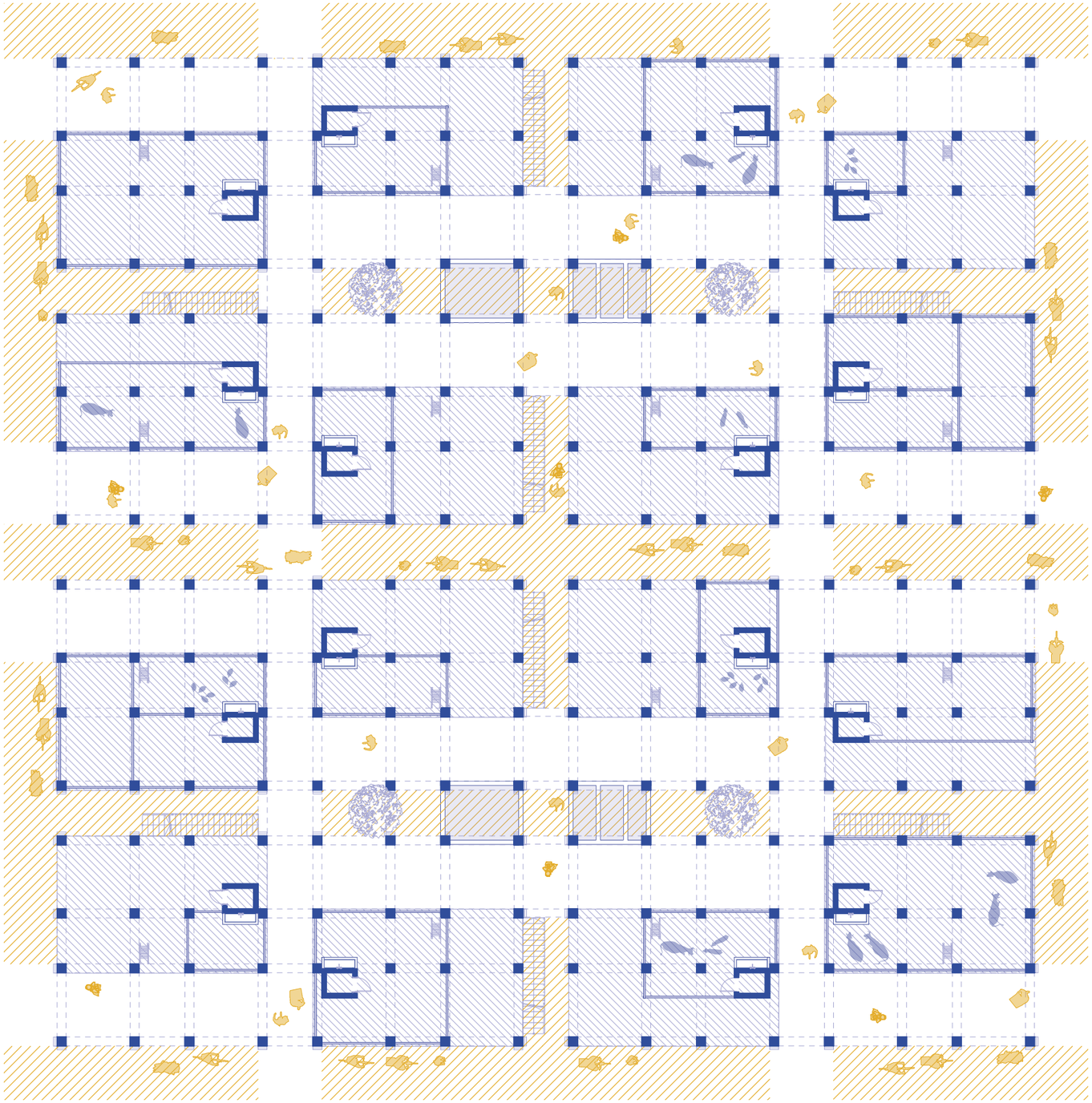
ACCESS SYSTEM

OVERVIEW



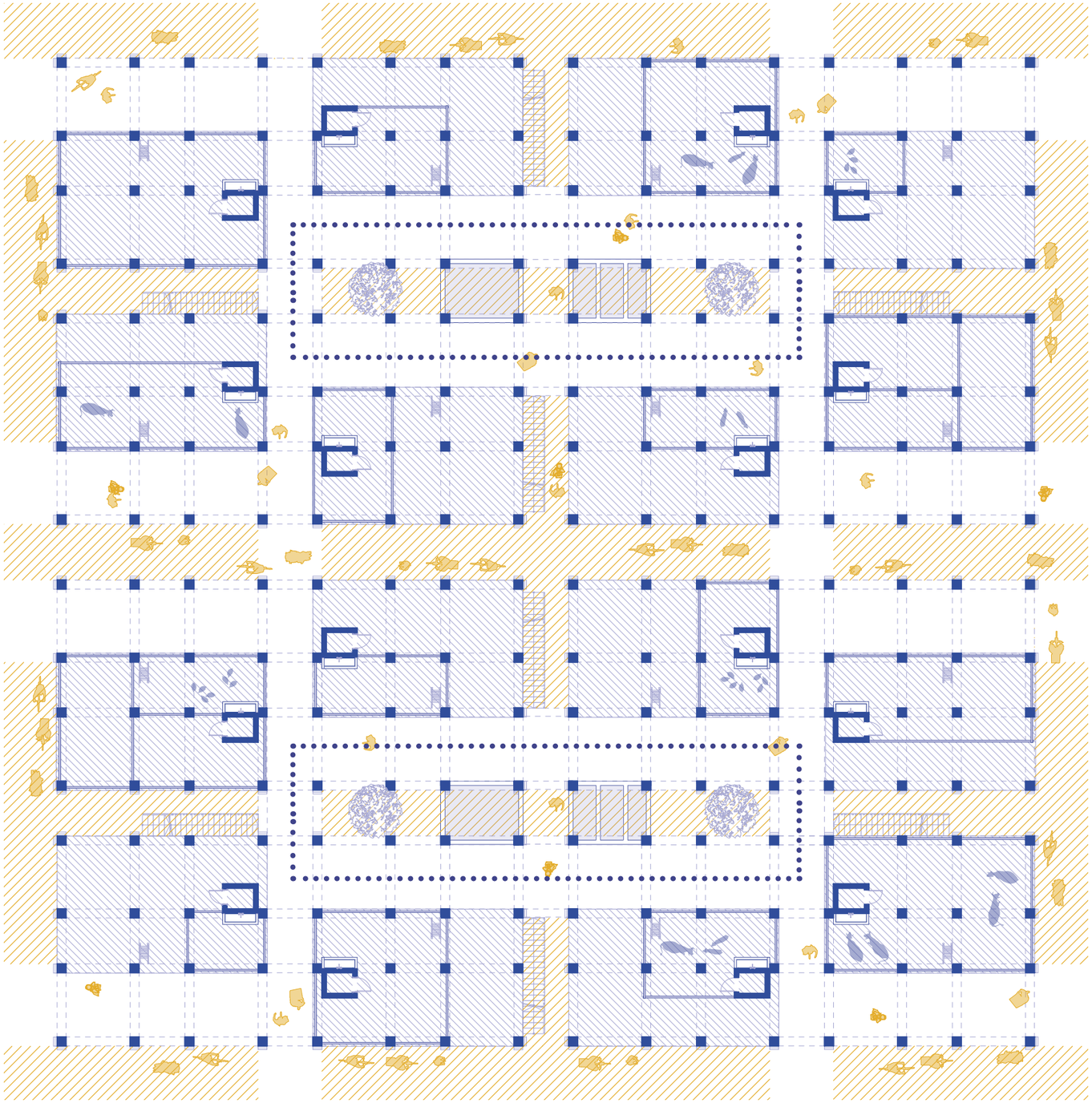
MOVEMENT PATTERNS

GROUND FLOOR

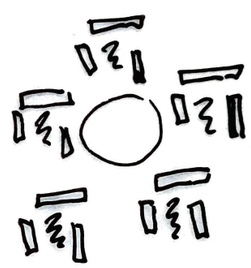


MOVEMENT PATTERNS

EXTENDED COURTYARDS



EXTENDED COURTYARD



COMMUNITY

EXISTING SITE

OVERVIEW



EXISTING SITE

PRIMARY ACCESS ROUTE



EXISTING SITE

SECONDARY ACCESS ROUTE



EXISTING SITE

NETWORK OF TERCIARY ACCESS ROUTES



EXISTING SITE

DISCONNECTED AREA



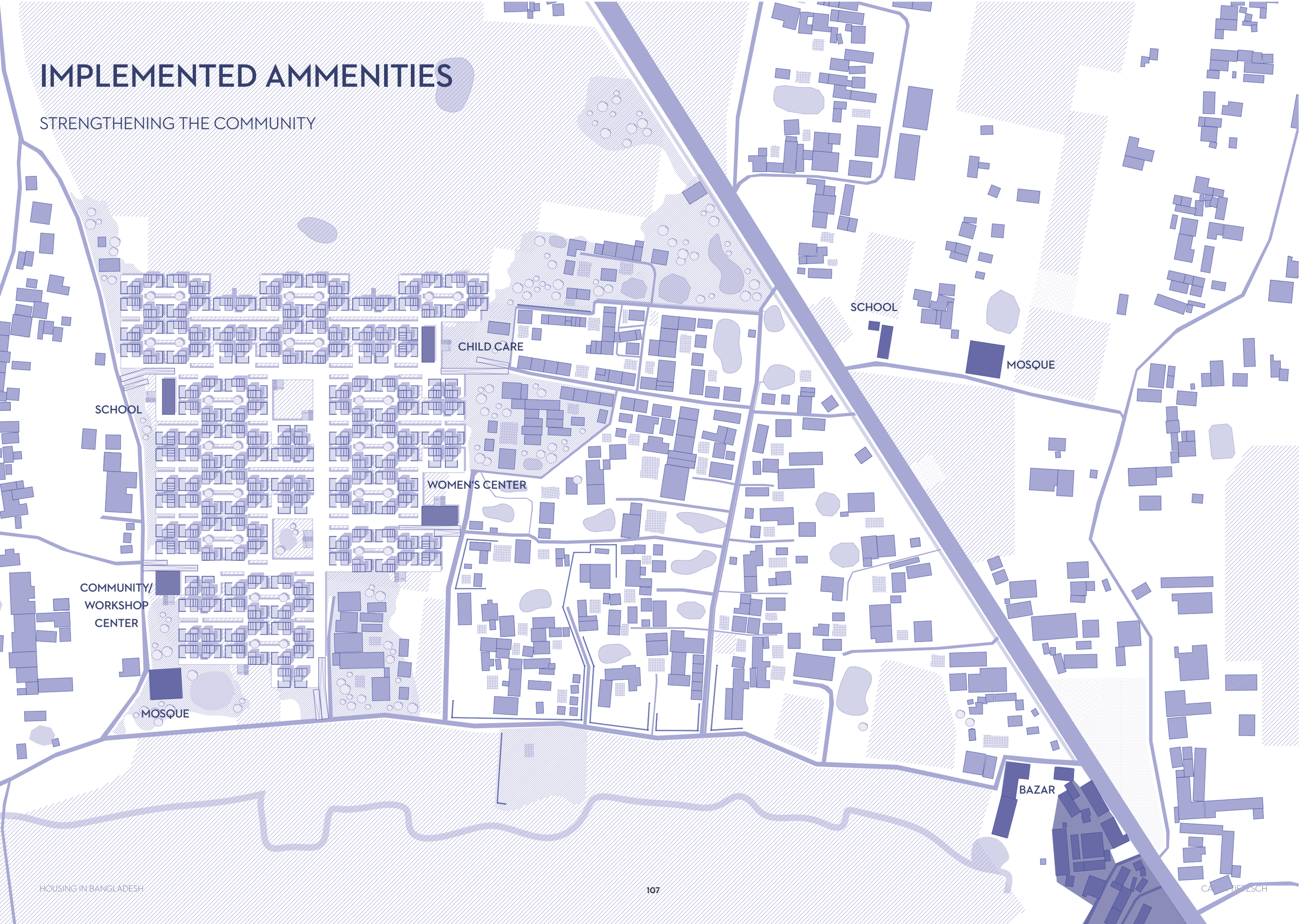
EXISTING SITE

MISSING CONNECTIONS



IMPLEMENTED AMMENITIES

STRENGTHENING THE COMMUNITY



FLOOD SEASON

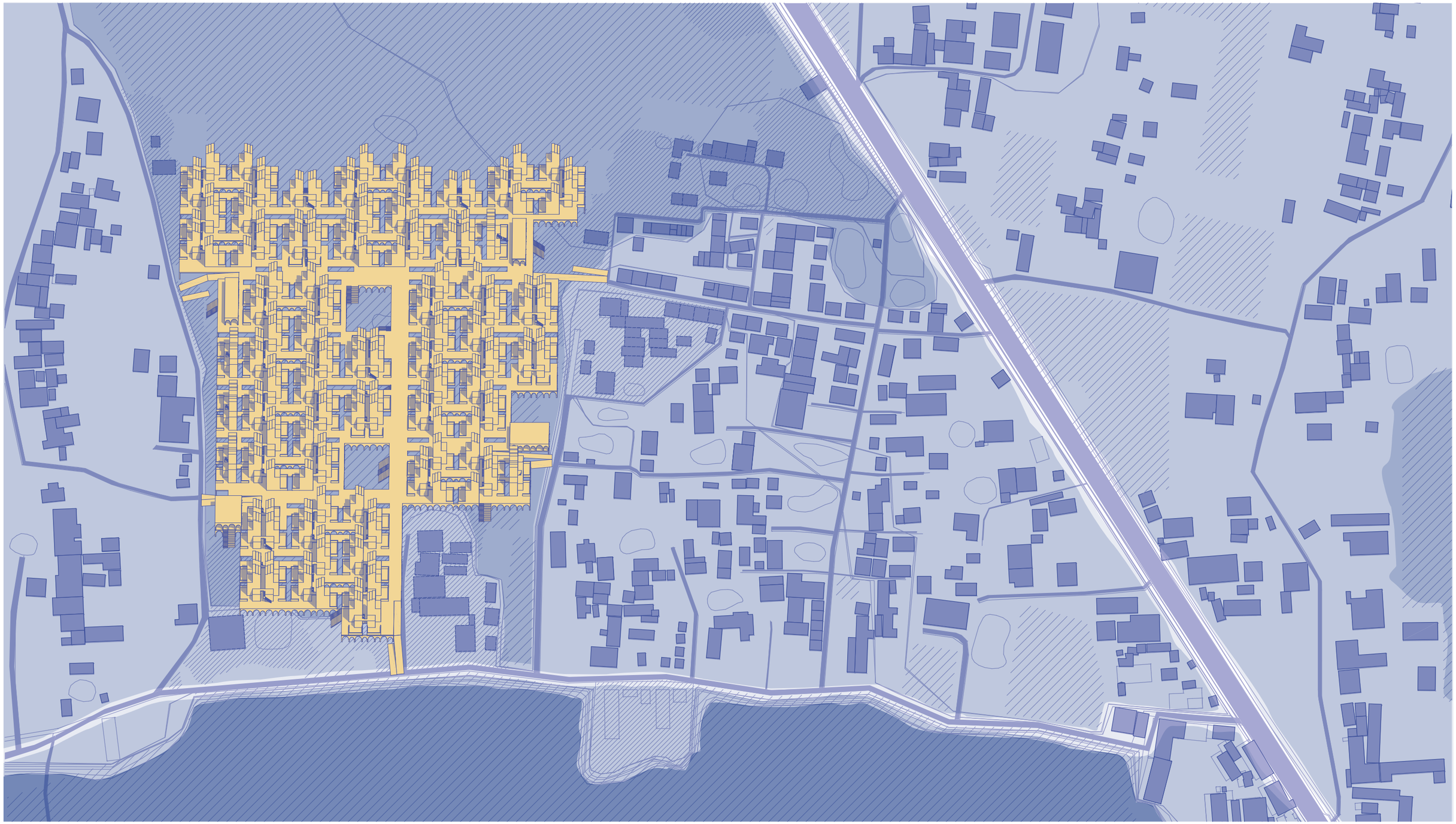
OFFERS SHELTER FOR ADJACENT VILLAGES

< 0,5 M

< 1,5 M

< 2,5 M

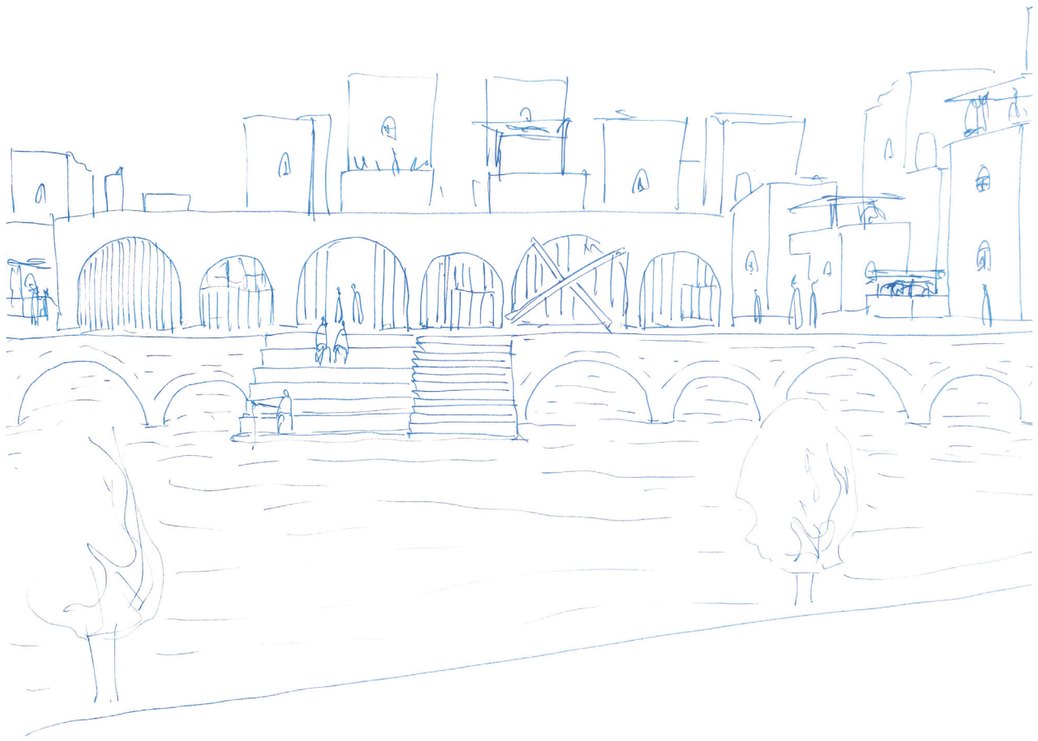
< 4 M



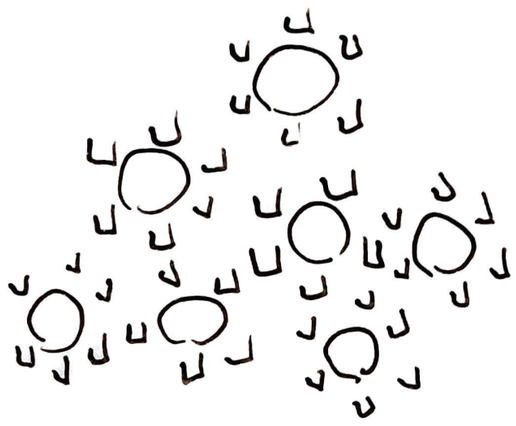
COMMUNAL AMMENITIES

SHELTER DURING FLOOD SEASON





NETWORK



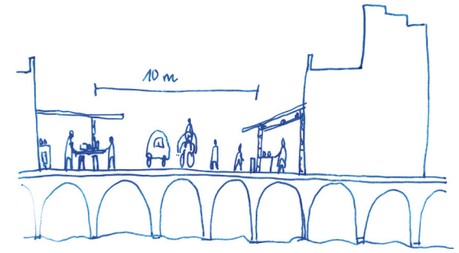
GOAL

CREATING CONNECTIONS

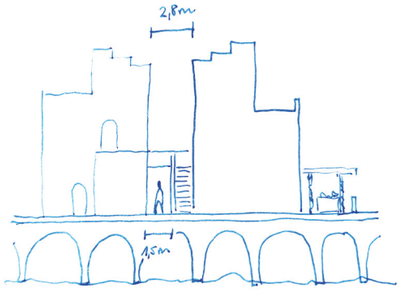


ACCESS SYSTEM

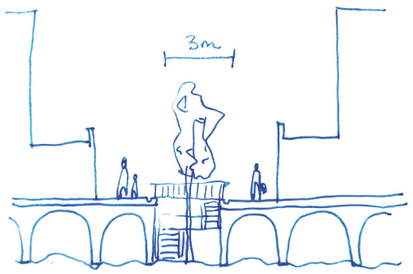
PRIMARY, SECONDARY AND TERTIARY ACCESS ROUTES



wide streets, suitable for car traffic



narrow streets for pedestrians



semi-public courtyard of cluster

ENTRANCE

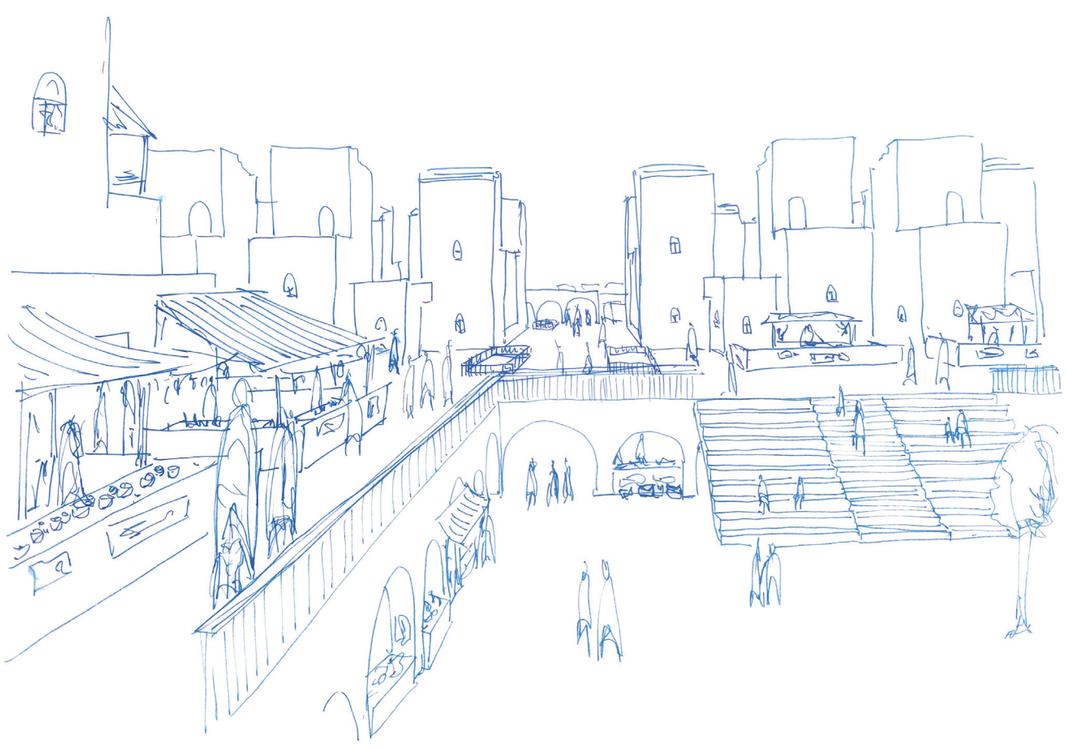


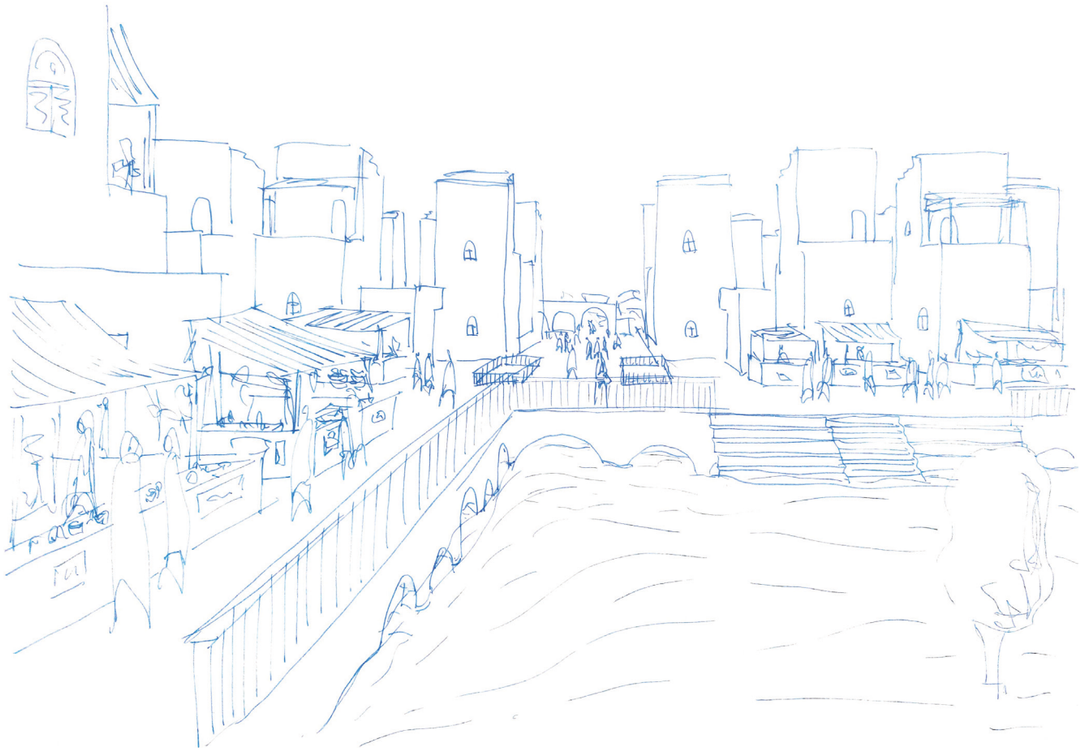
PRIMARY ACCESS ROUTE



CENTRAL PLAZA

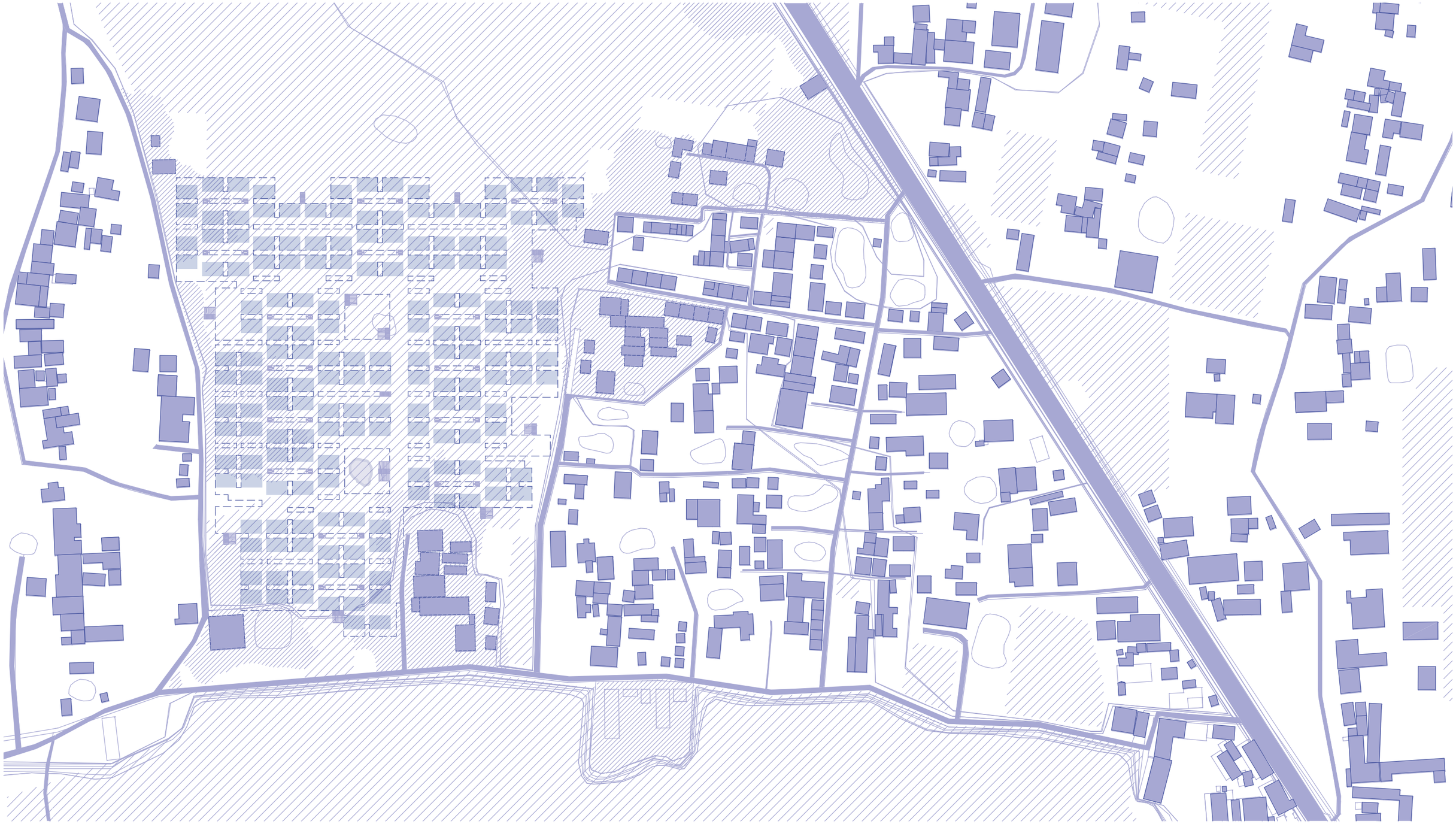
DRY AND FLOOD SEASON





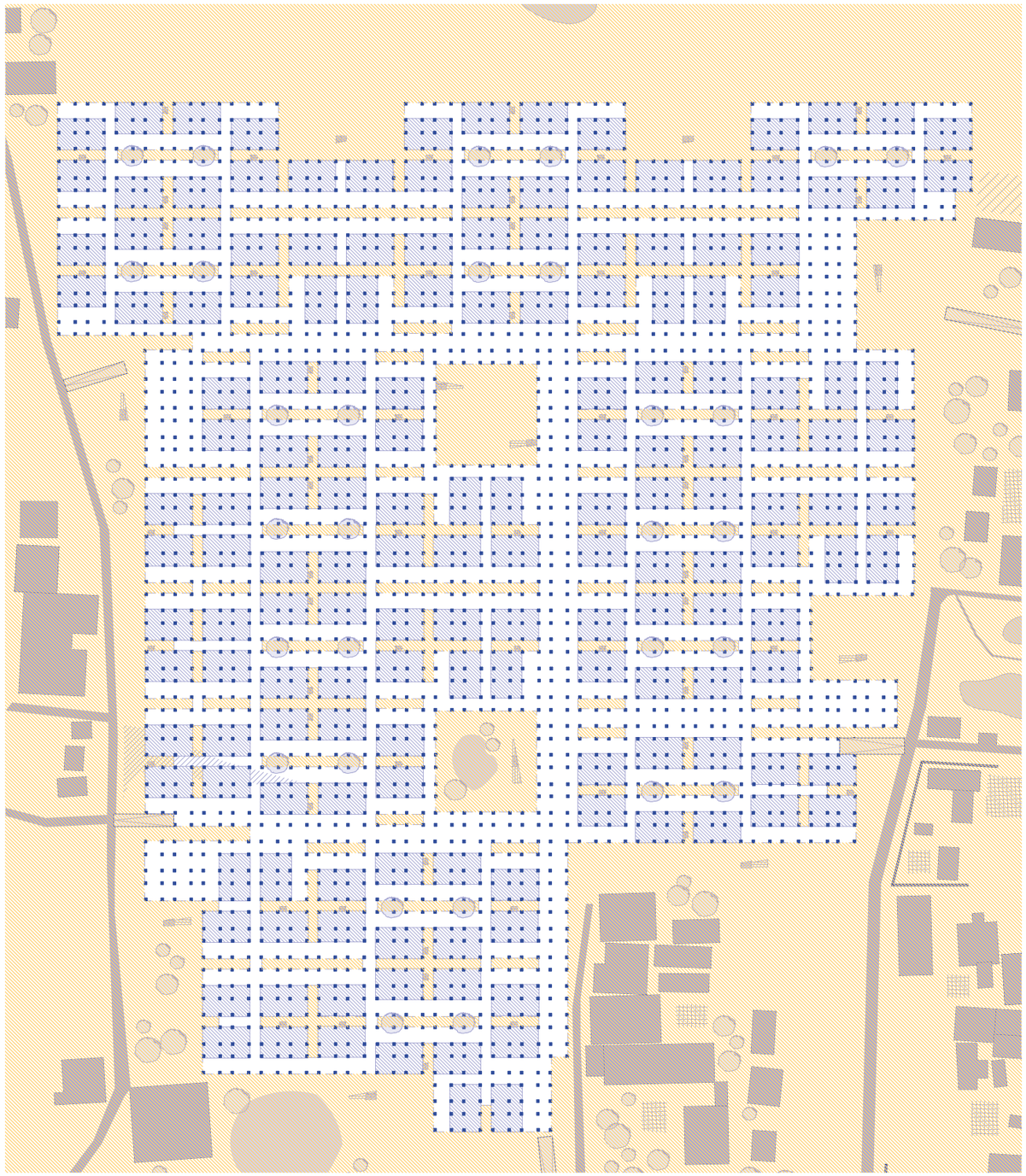
BELOW PLATFORM

PRIVATE PLOTS



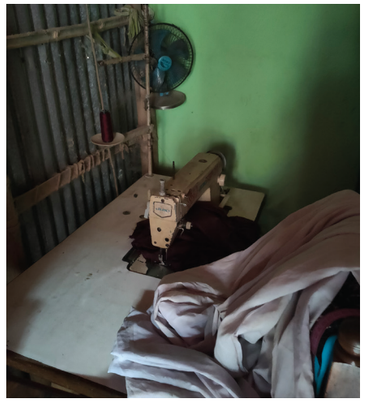
BELOW PLATFORM

LIGHTING



GENERATING ALTERNATIVE INCOME SOURCES

SHONATOLA



SEWING



SMALL SHOPS ADJACENT TO STREET



WORKSHOP SPACES



PHARMACY



CRAFTMANSHIP



RICE STORE



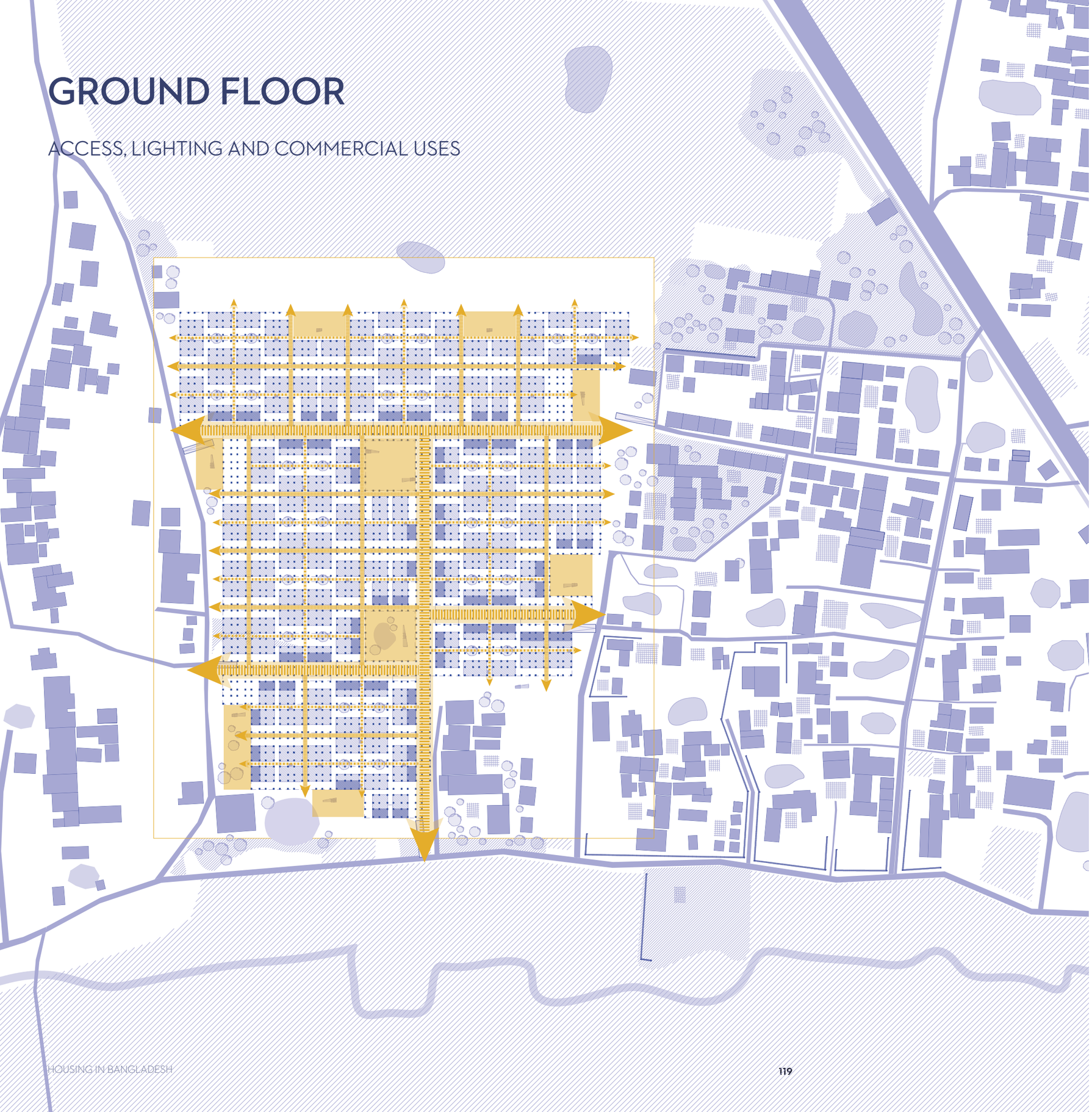
HAIR DRESSER



BAKERY

GROUND FLOOR

ACCESS, LIGHTING AND COMMERCIAL USES





private plot with commercial potential

narrow street through courtyards for slow, pedestrian traffic

wider path, accessible with CNGs and motor bikes



wide streets for public access

BAZAR

SPATIAL QUALITY













BAZAR SPACE BELOW PLATFORM

ATMOSPHERIC SKETCH



FSI (start): 0,39

FSI (scenario 1): 0,63

FSI (scenario 2): 0,95

buildings: 168

units: up to 336

plot: 43.000 m2

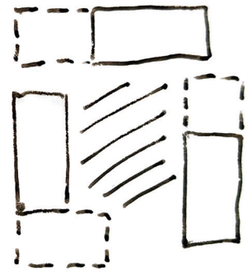
GSI: ~0,31

platform size: 32.700 m2

start building mass:
16.900 m2 --> building/platform - ration = 0,52

scenario 1 (maximal expansion during flood season):
27.200 m2 --> ratio = 0,83

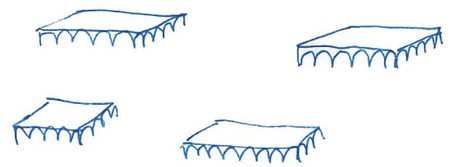
scenario 2 (maximal expansion during dry season):
40.900 m2 --> ratio = 1,25



EXPANSION OVER TIME

MANAGERIAL STRATEGY

FINANCED BY MUNICIPALITY





MANAGERIAL STRATEGY

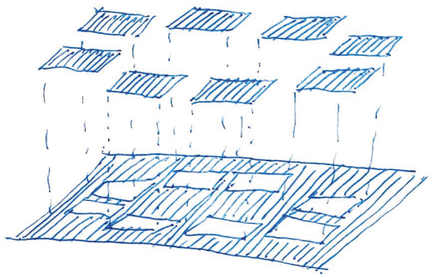
COMMUNITY LAND TRUSTS



currently: patchwork of
privately owned land

transformation into
several community
land trusts

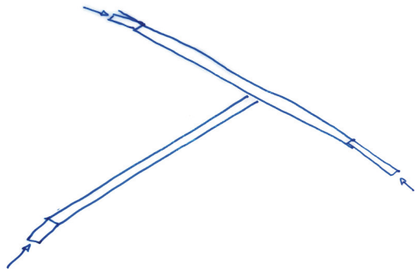
privately owned units



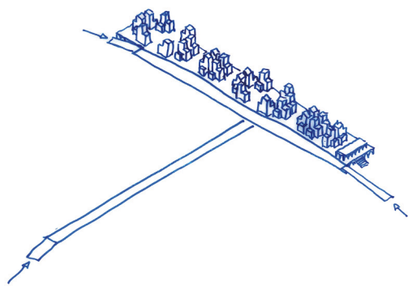
one community land
trust per cluster

PHASING

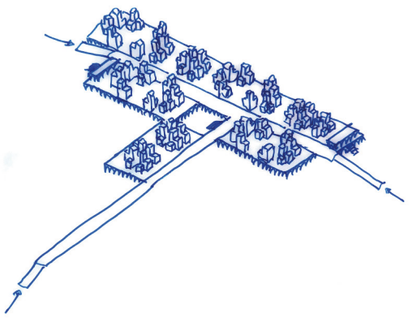
EXPANSION BY CLUSTERS



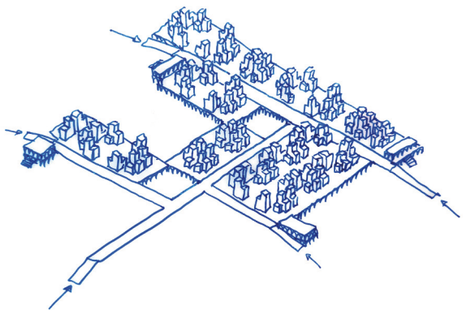
1.



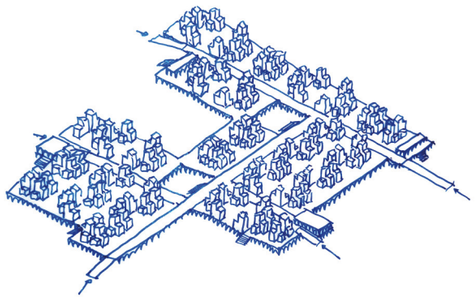
2.



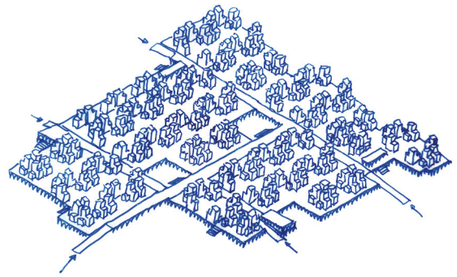
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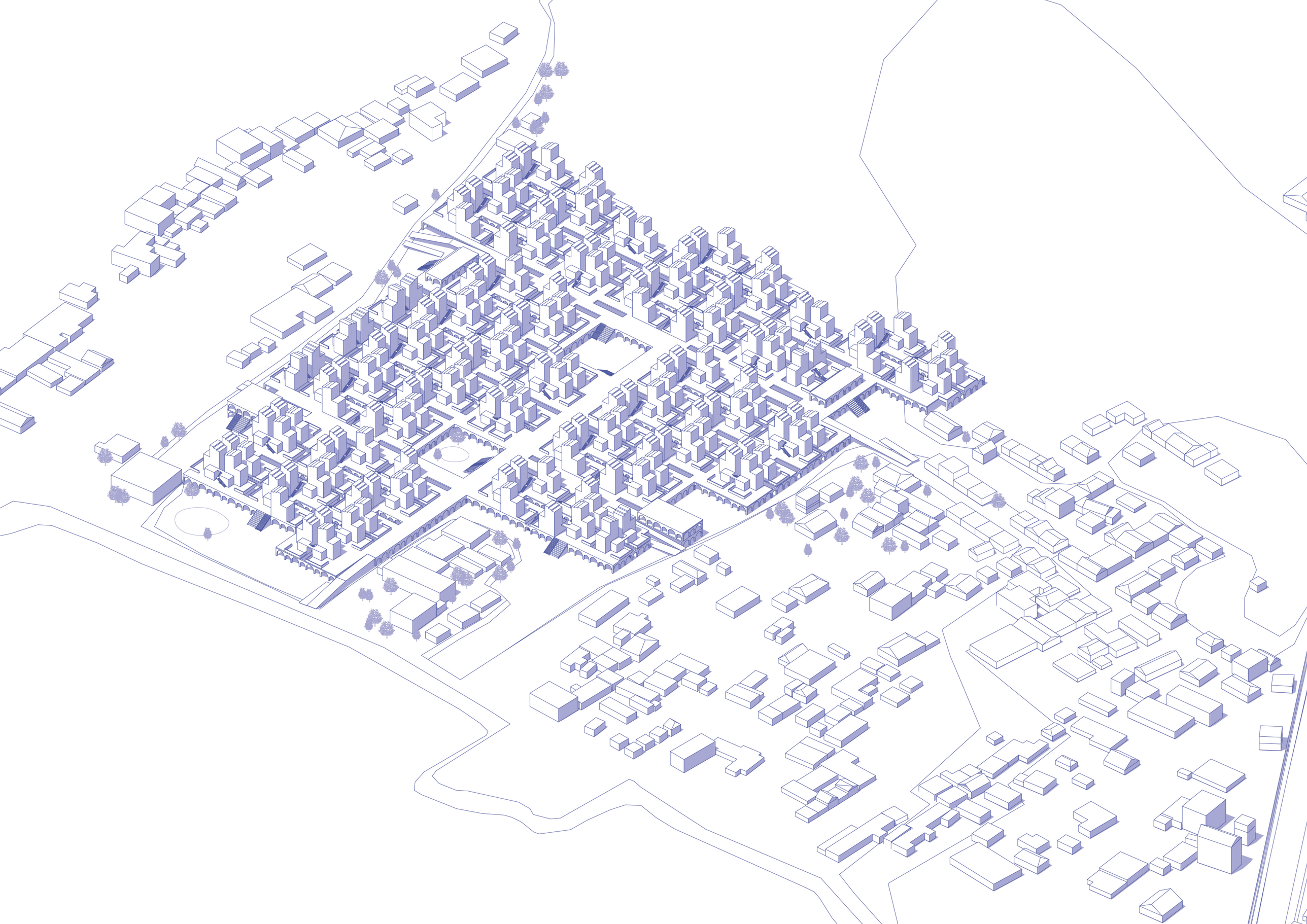
4.



5.



6.

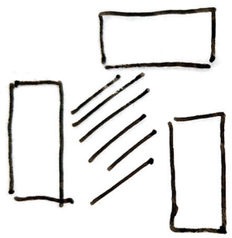


SYNTHESIS

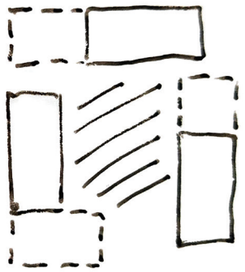
RESEARCH QUESTION

How can **rural areas** of Sylhet be **transformed** according to the trend of **rural-urban transition** while maintaining crucial **living qualities** of rural populations?

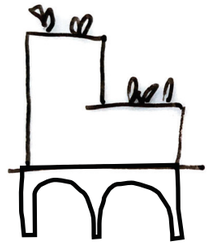
DESIGN PRINCIPLES



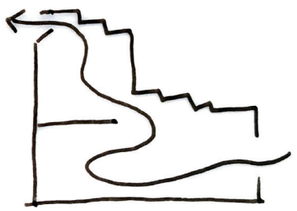
CLUSTERING



SPACE FOR INCREMENTAL GROWTH



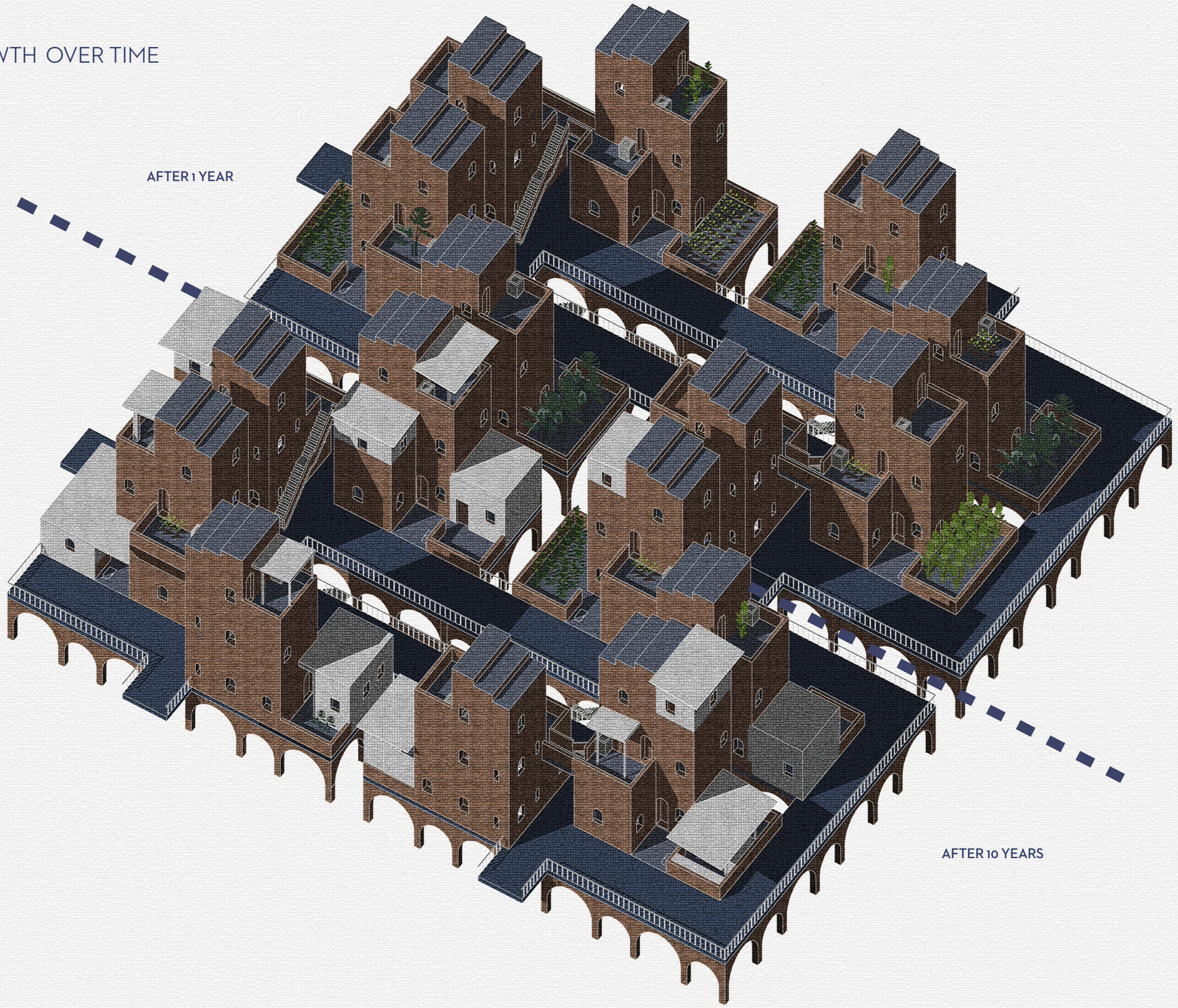
VERTICAL USE OF SPACE



NATURAL VENTILATION

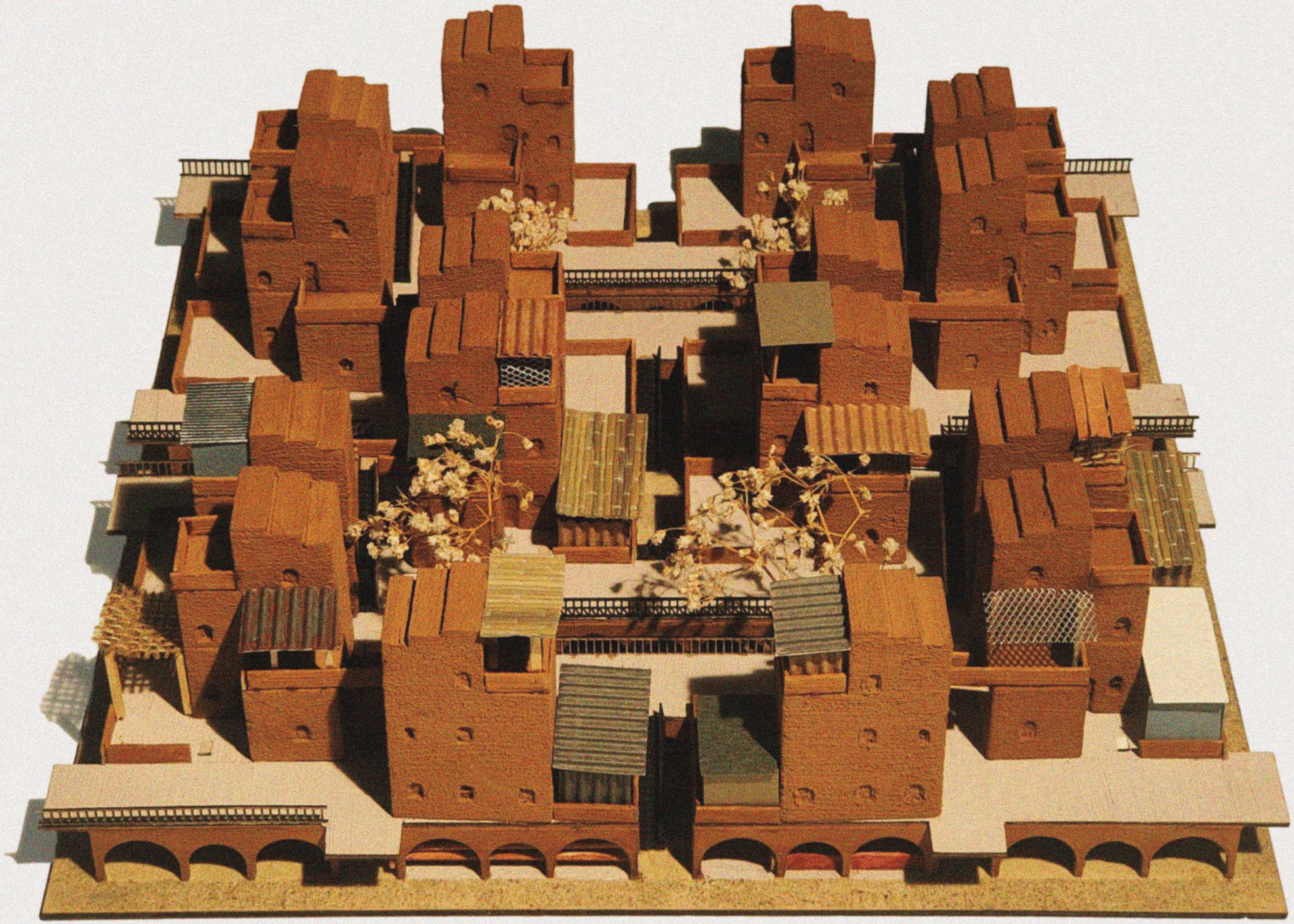
SYNTHESIS

INCREMENTAL GROWTH OVER TIME



SYNTHESIS

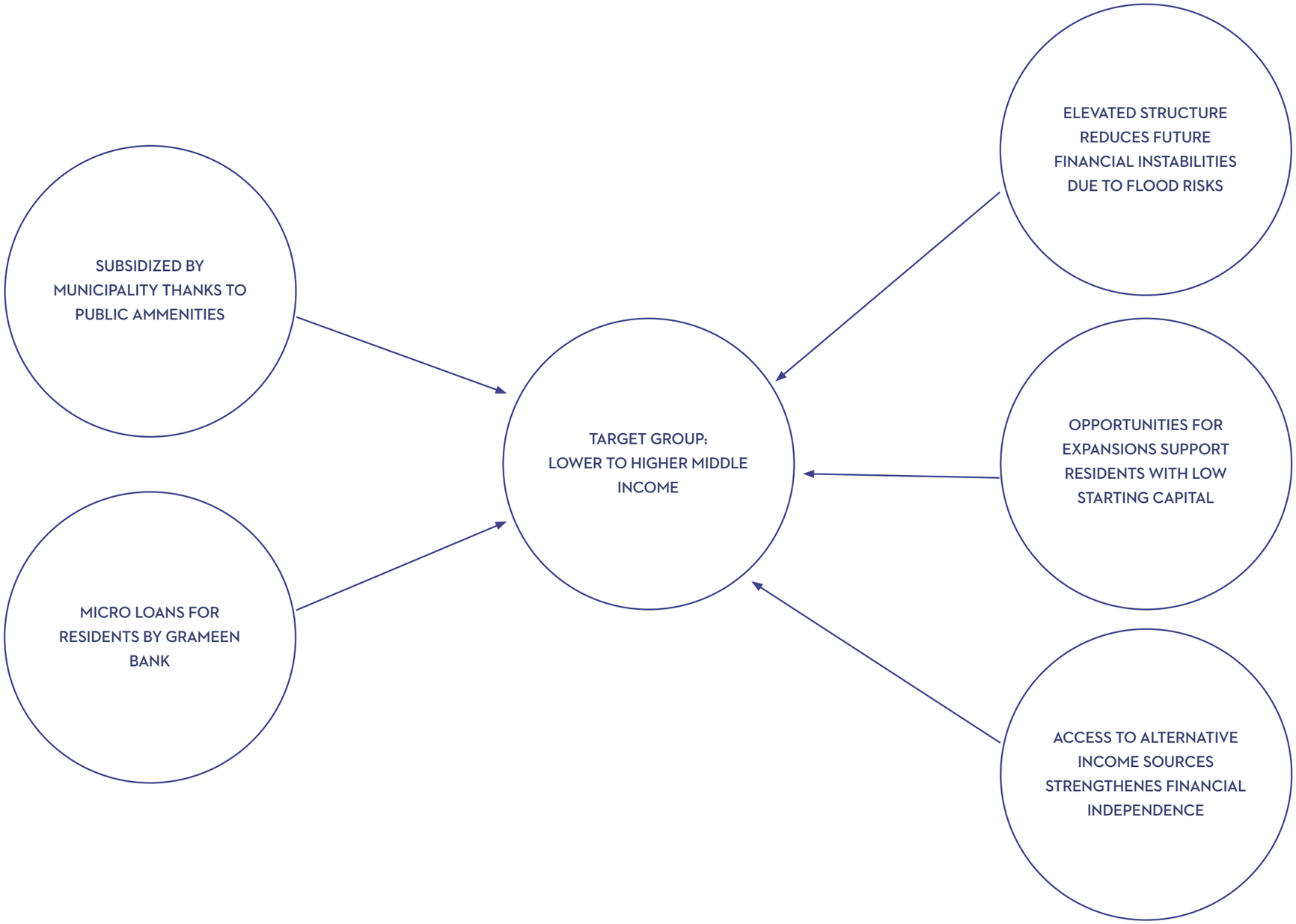
INCREMENTAL GROWTH OVER TIME



THANK YOU!

FINANCIAL CONCEPT

MANEGERIAL STRATEGY



WATER MANAGEMENT

NUMBERS

WATER USAGE PER DAY PER PERSON (WITHOUT DRINKING WATER AND LAUNDRY): 50 L

PEOPLE PER HOUSE: 6-10

WATER DEMAND PER HOUSE PER DAY: 400 L

3 HOUSES PER WATER TANK --> 1200 L PER DAY

WATER TANK CAPACITY: 18 M3 = 18.000 L

WATER STORAGE CAN ENSURE 2 WEEKS WATER SUPPLY

FOR DRINKING WATER AND EXTREMELY LONG DRY PERIODS THE COMMUNITY IS CONNECTED TO THE CITY'S WATER SUPPLY