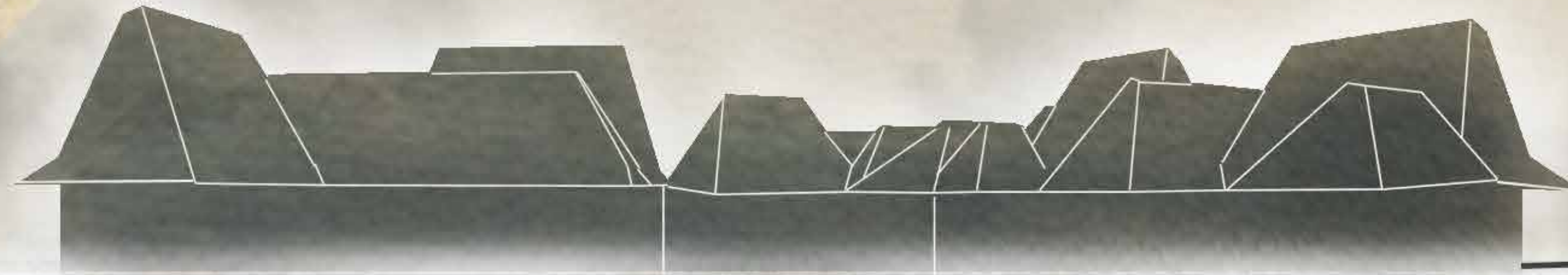


FLOATING FOR HEALTH

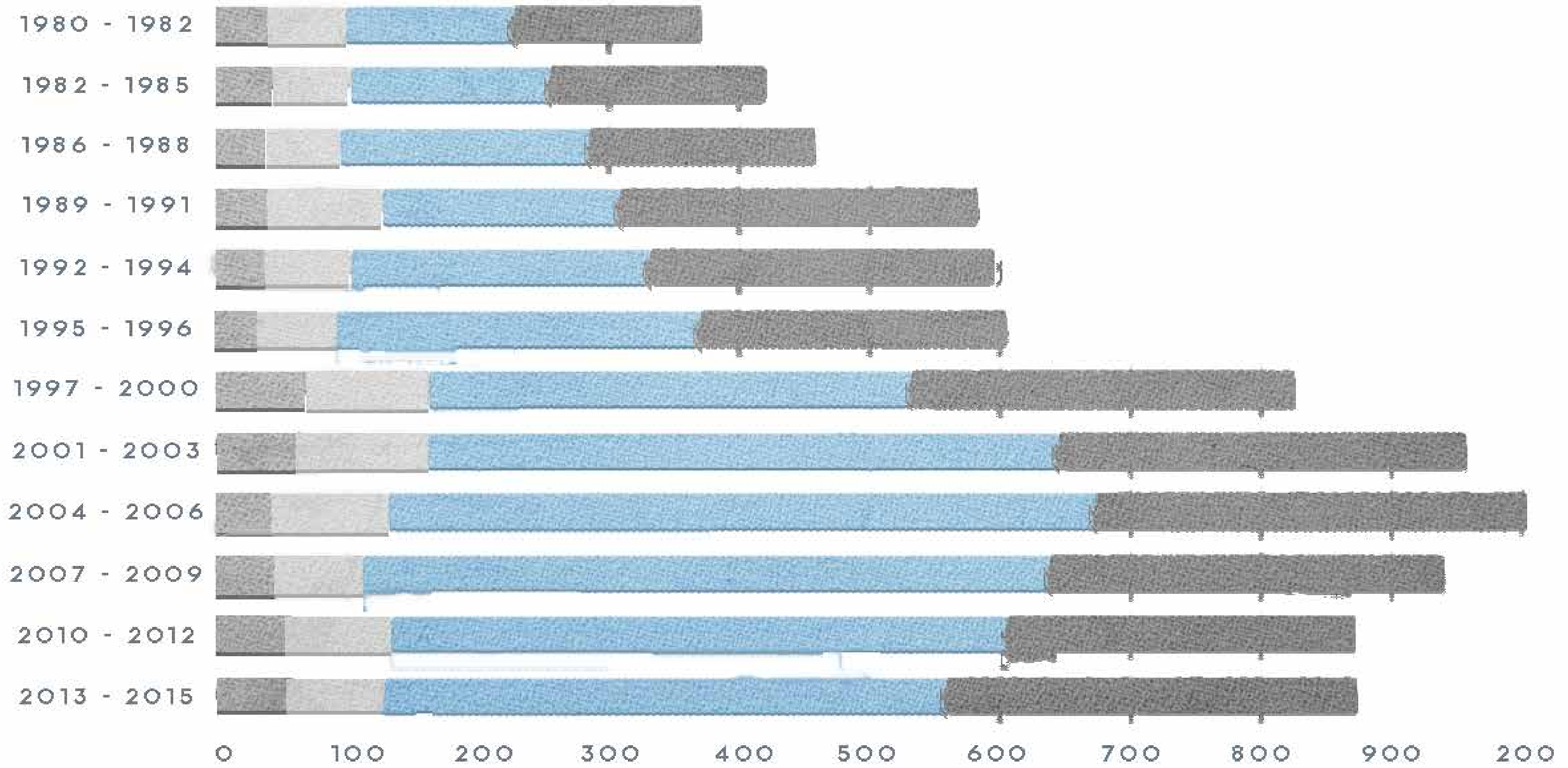


Bas de Pater
Graduation Presentation
06/11/2018

INTRODUCTION

INTRODUCTION

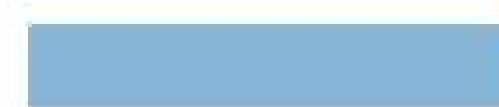
Overview



DROUGHT



EARTHQUAKE



FLOODING

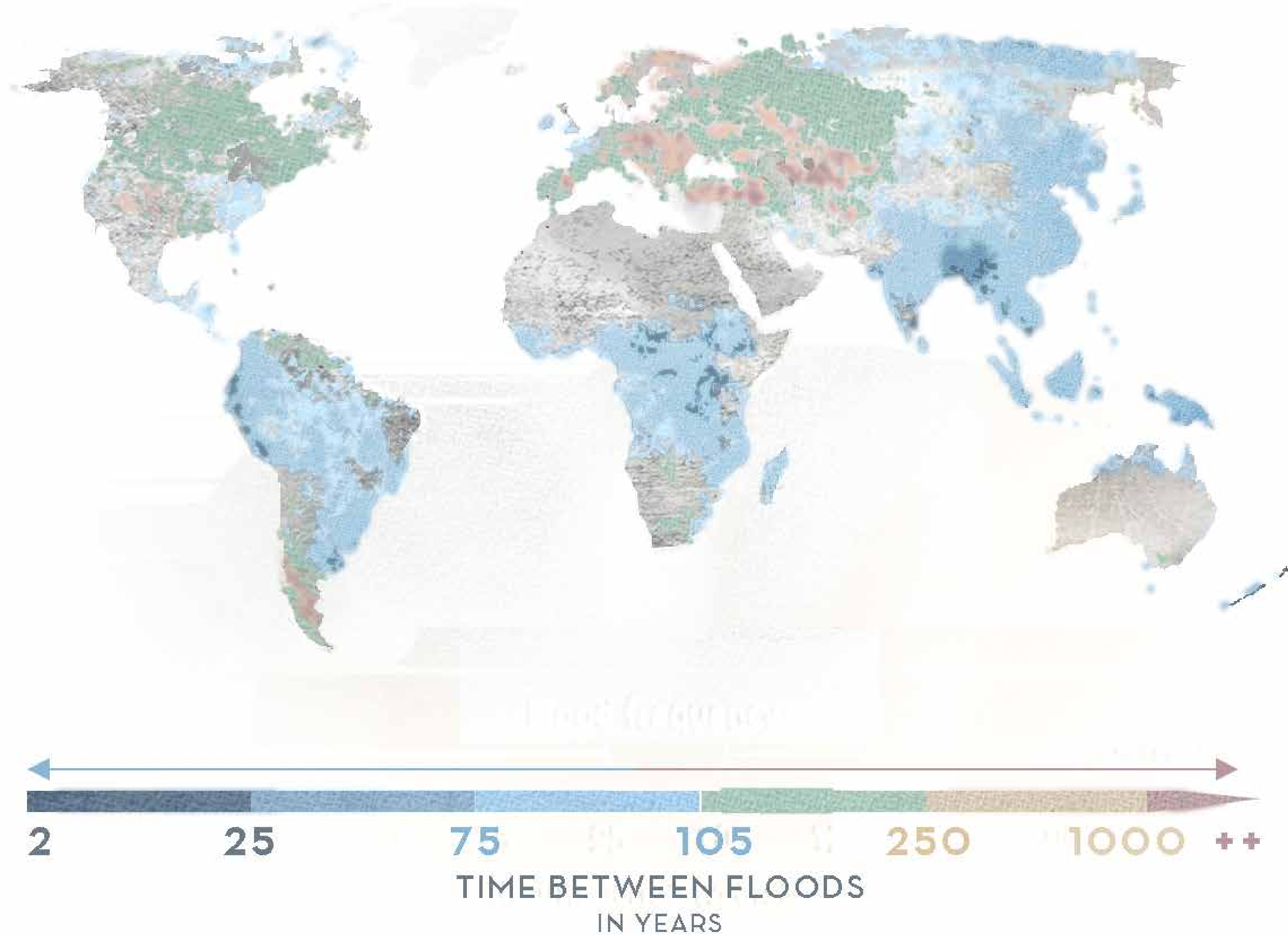


STORM

NATURAL DISASTERS REPORTED

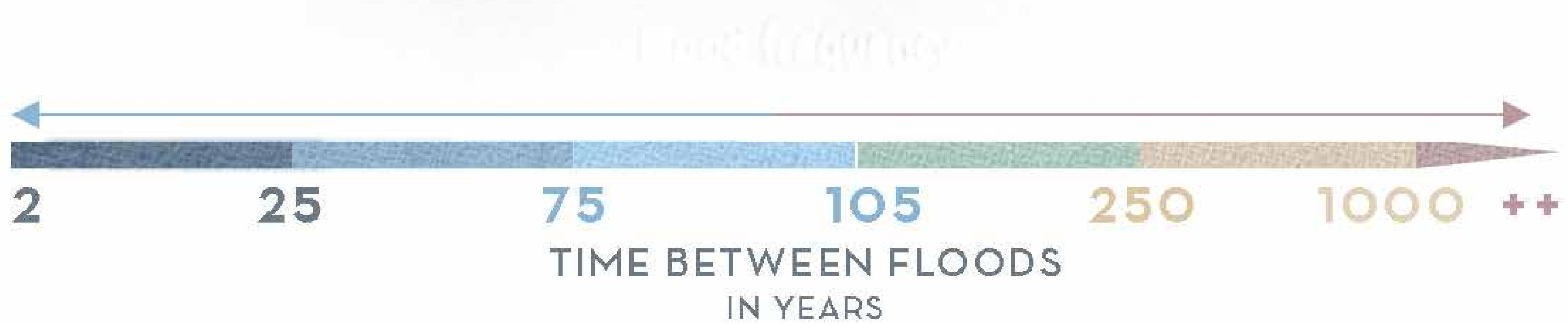
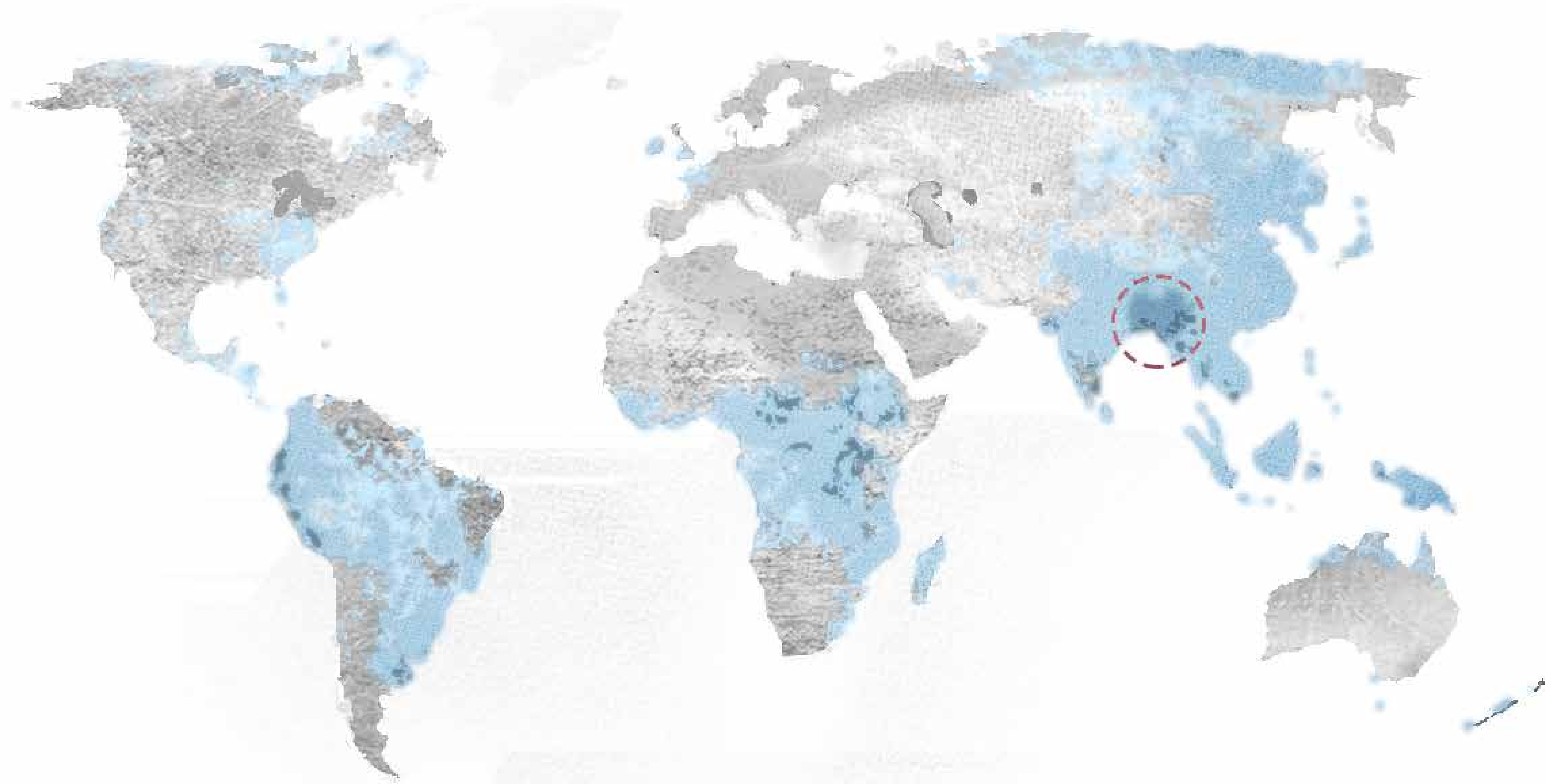
INTRODUCTION

Overview



INTRODUCTION

Overview



INTRODUCTION

Problem statement

LACK OF MEANS

to move or create preventive measures

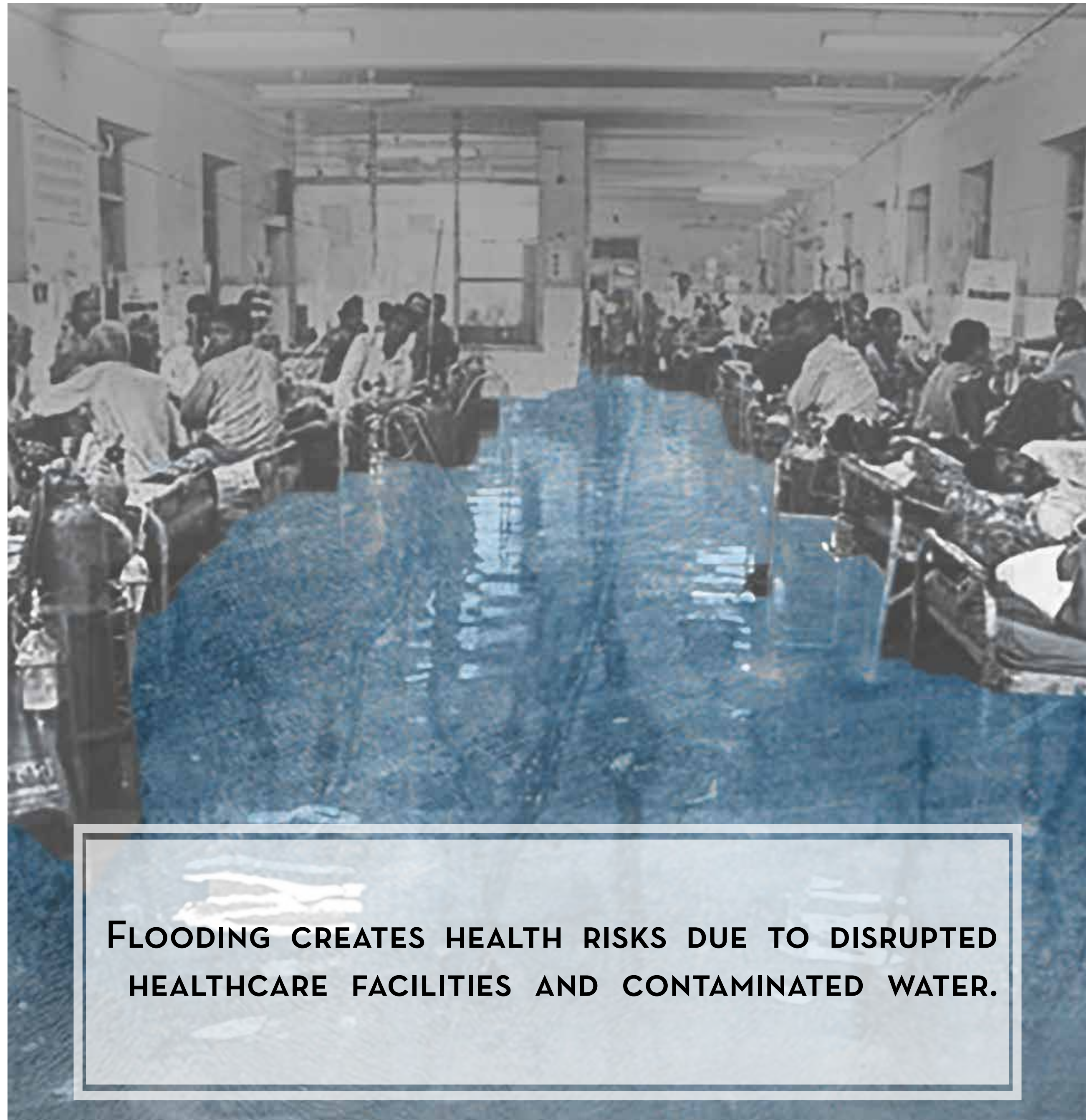


LACK OF SANITATION

is the cause of polluted floodwater, which creates health risks

INTRODUCTION

Problem statement



INTRODUCTION

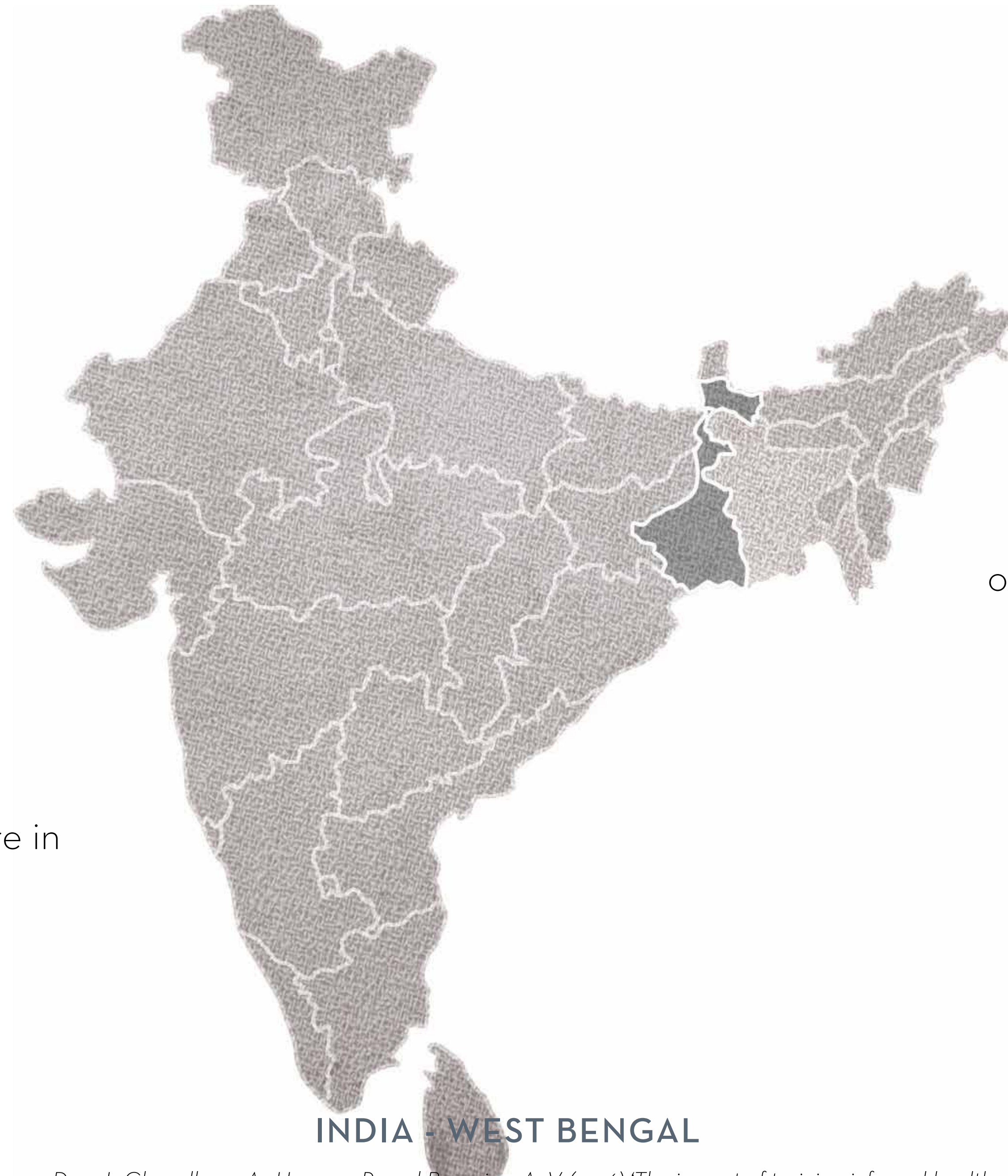
Problem Statement

68%

of India's population lives in rural areas.

30%

of India's healthcare facilities are in a rural environment.



INDIA - WEST BENGAL

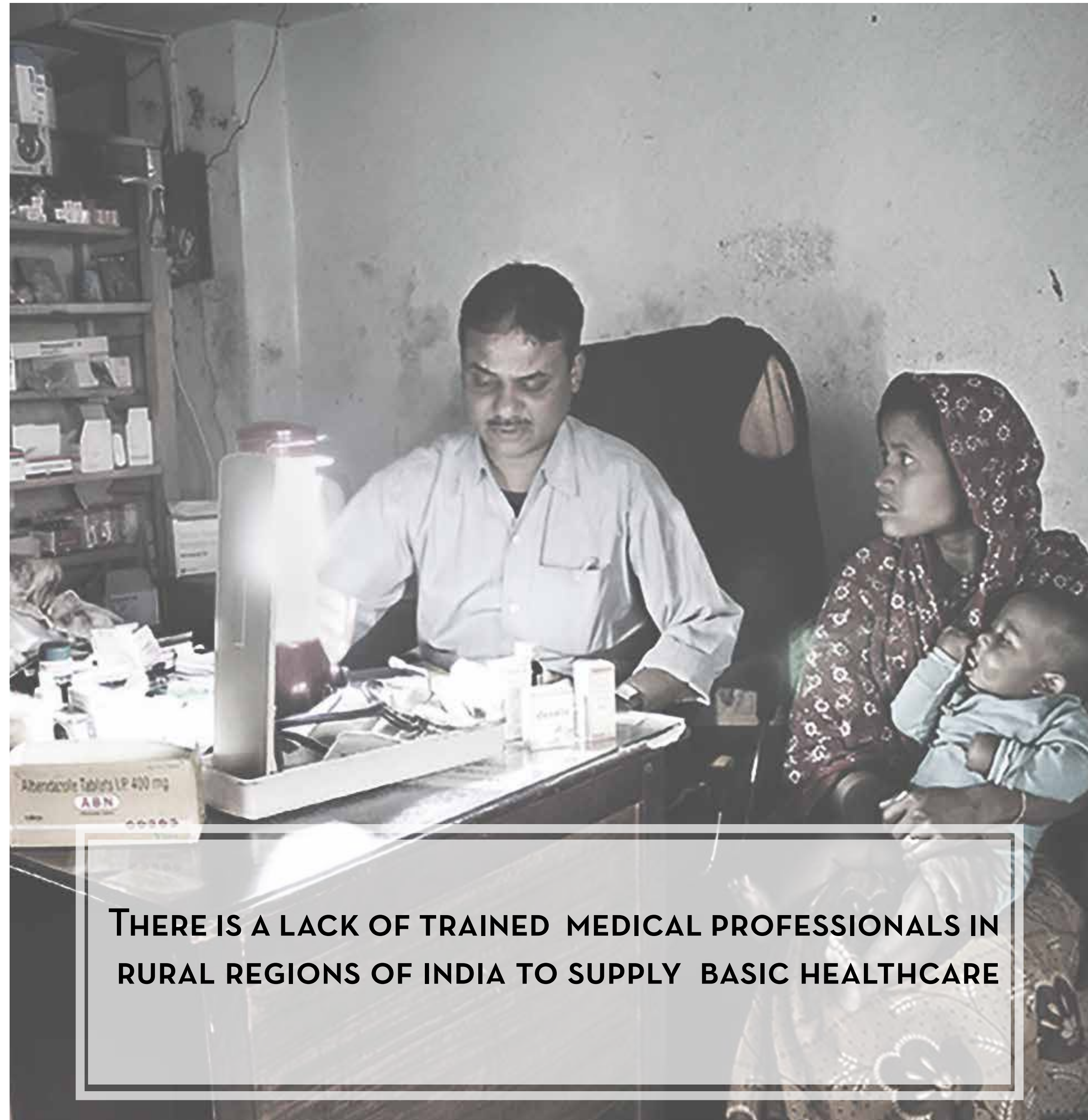
>70%

of patients in rural India are treated by informal practitioners: "Quacks" whom had no medical training.

Source: Das, J., Chowdhury, A., Hussam, R. and Banerjee, A. V. (2016) 'The impact of training informal health care providers in India: A randomized controlled trial', Science, 354(6308).

INTRODUCTION

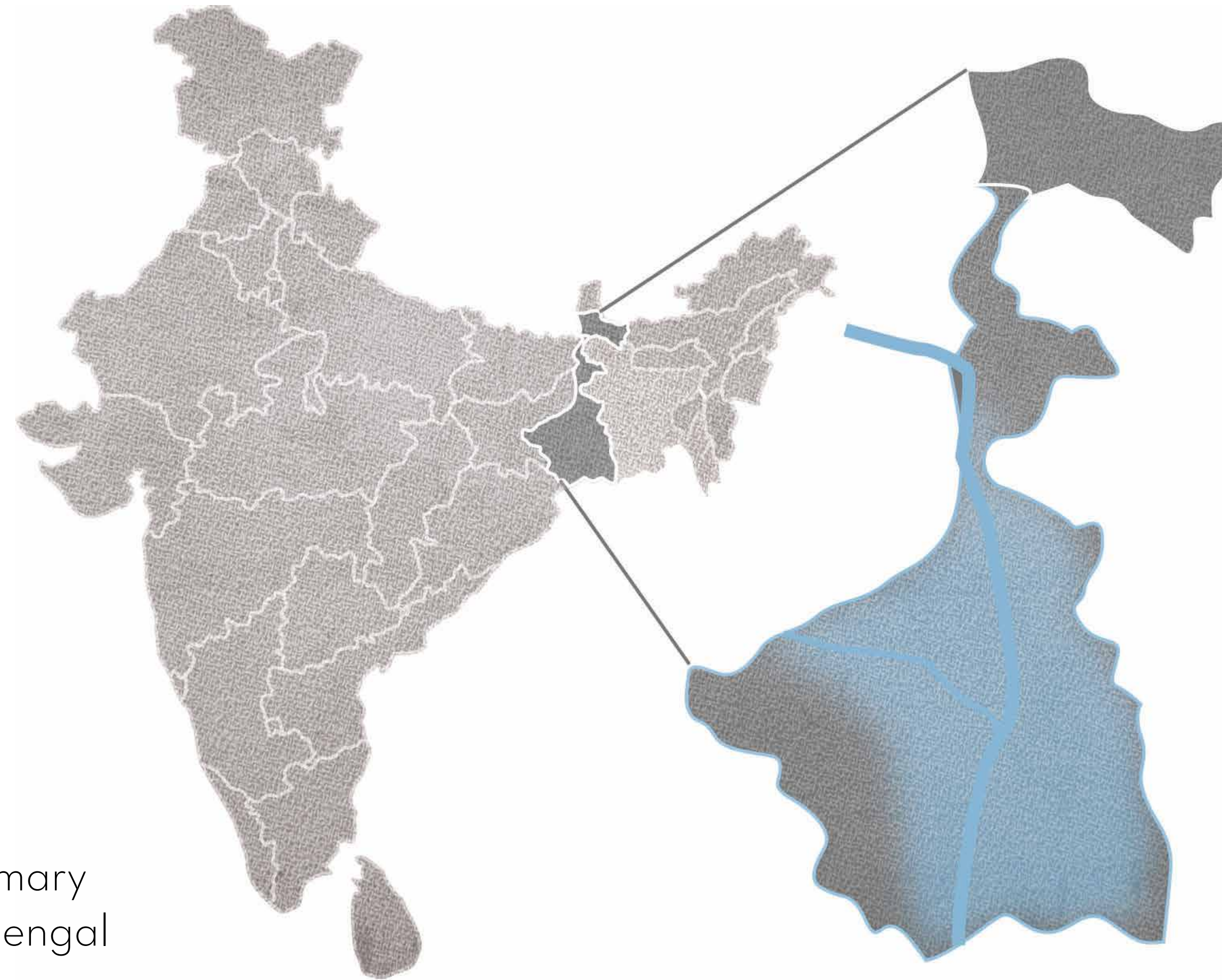
Problem Statement



THERE IS A LACK OF TRAINED MEDICAL PROFESSIONALS IN RURAL REGIONS OF INDIA TO SUPPLY BASIC HEALTHCARE

INTRODUCTION

Problem Statements



36%

Available of the needed primary
healthcare centres in West-Bengal

909 / 2500

(Indian norm for a population of 90 million)

FLOOD PRONE AREA OF WEST-BENGAL

INTRODUCTION

Problem Statements



HEAVY MONSOON FLOODS

3 - 5 months in a year the West-Bengal is plagued by heavy floods..



LACK OF FACILITIES

A rural region with little funds available to create preventive solutions and with a lack of facilities

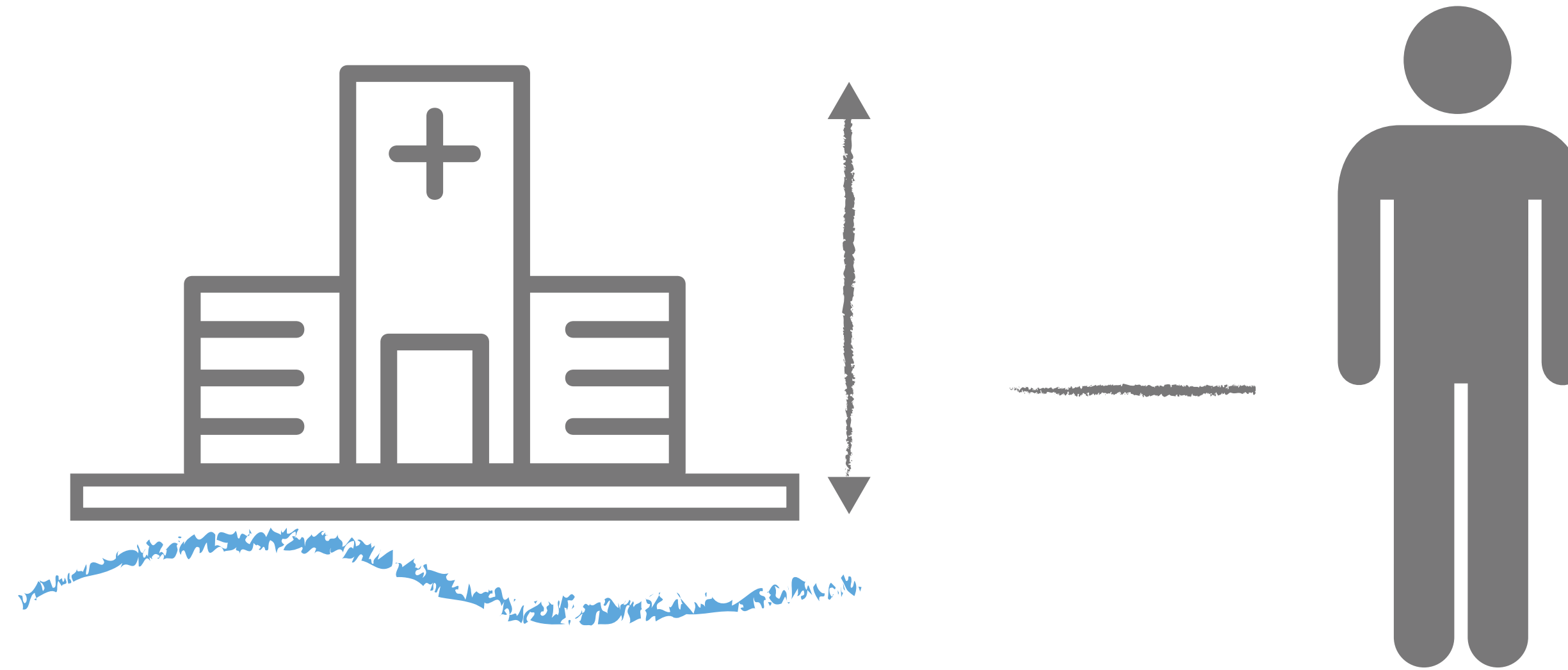


LACK OF KNOWLEDGE

trained medical personnel moves out of the rural region to higher salaries in cities

INTRODUCTION

Objective

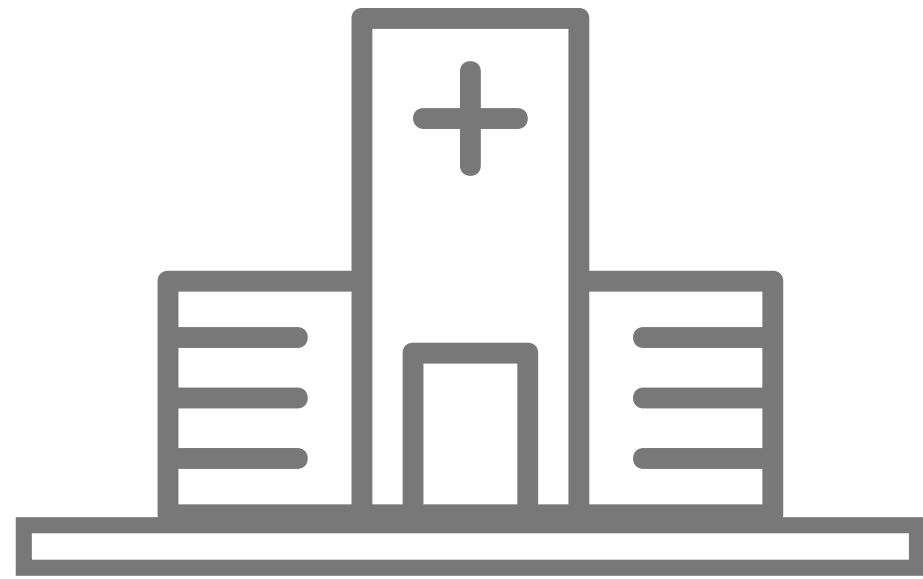


DEVELOP A *PERMANENT* SOLUTION FOR LOW INCOME, FLOOD PRONE AREAS BY OFFERING *FLOATING* HEALTHCARE AND MEDICAL TRAINING FACILITIES.

TO CREATE REAL SELF-RESILLIENCE, THE STRUCTURE SHOULD BE *BUILD* AND *OWNED* *LOCALLY*.

INTRODUCTION

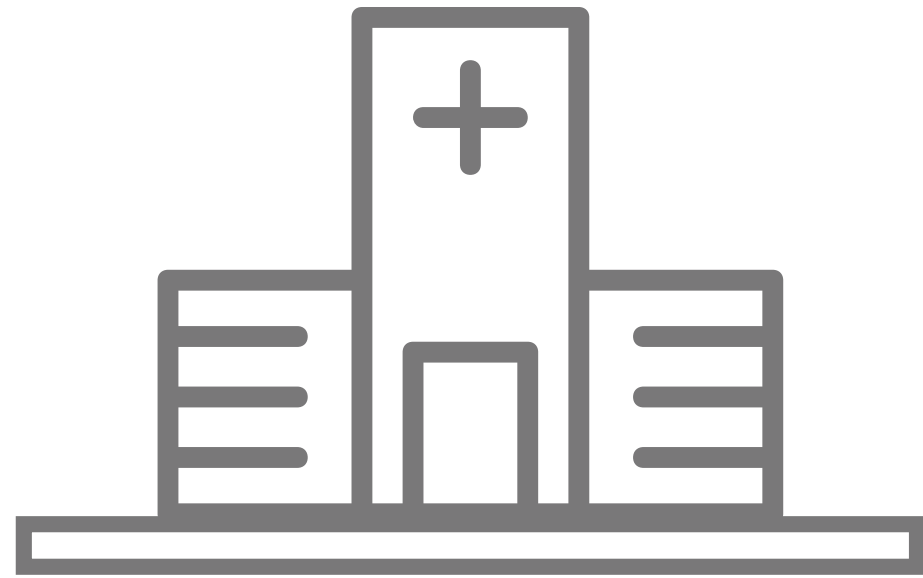
Needs



MEDICAL CLINIC

INTRODUCTION

Needs



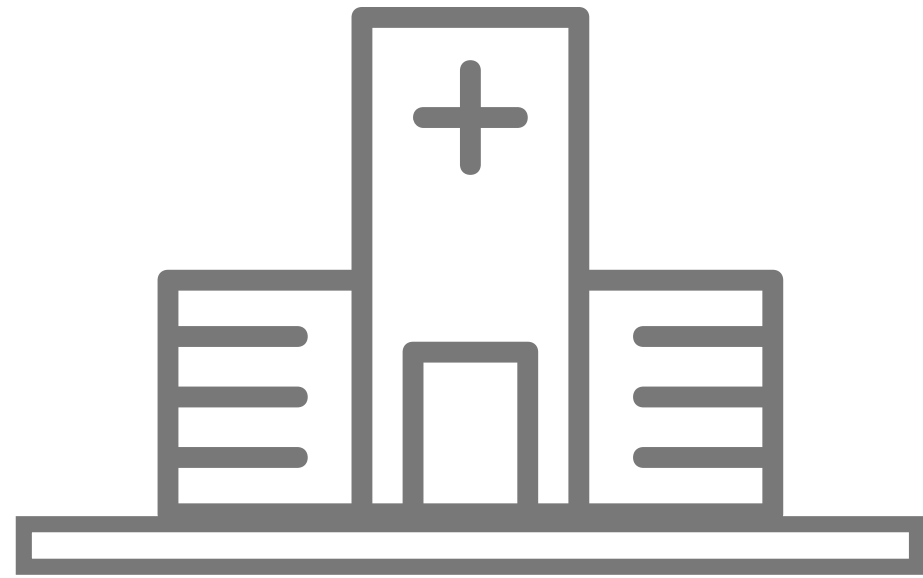
MEDICAL CLINIC



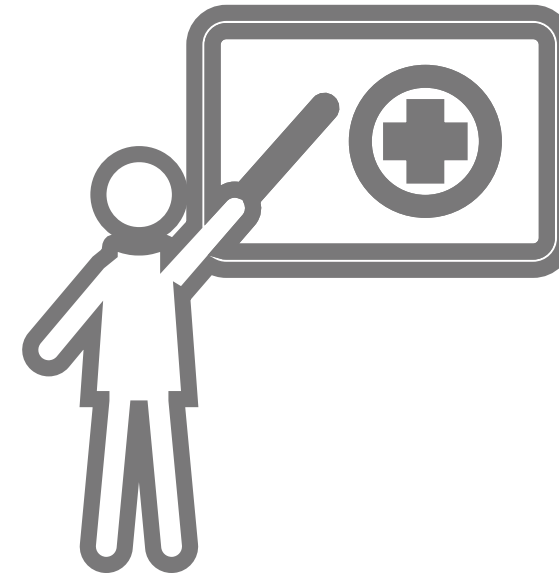
TRAINING CENTER

INTRODUCTION

Needs



MEDICAL CLINIC



TRAINING CENTER



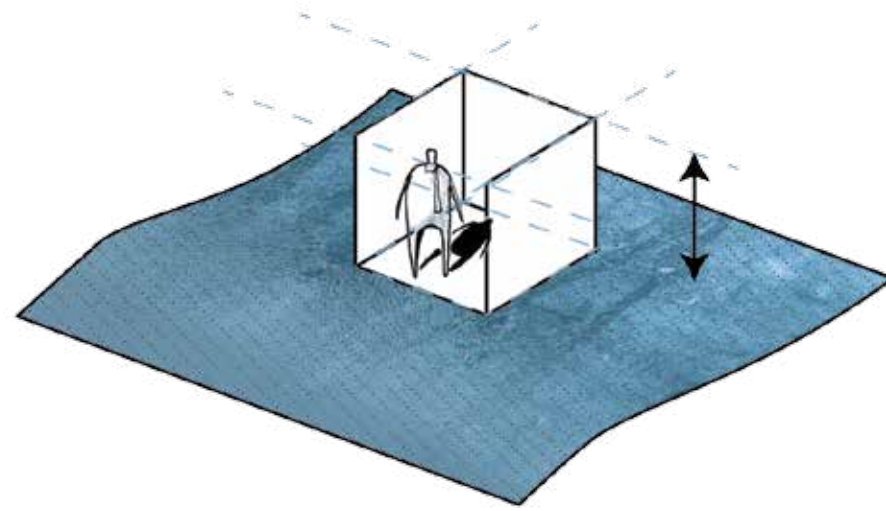
COMMUNITY /
EMERGENCY

BUILDING SYSTEM

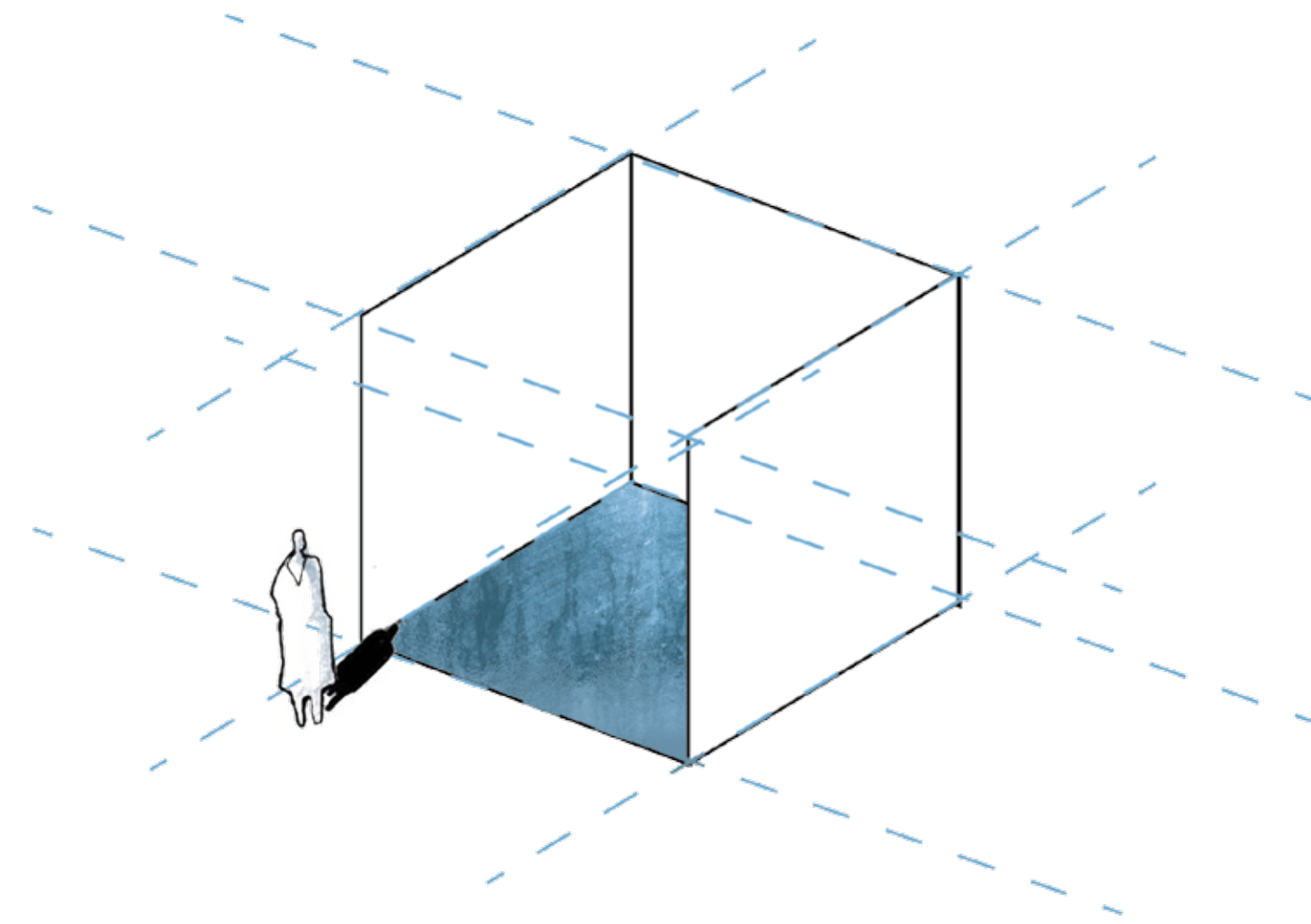
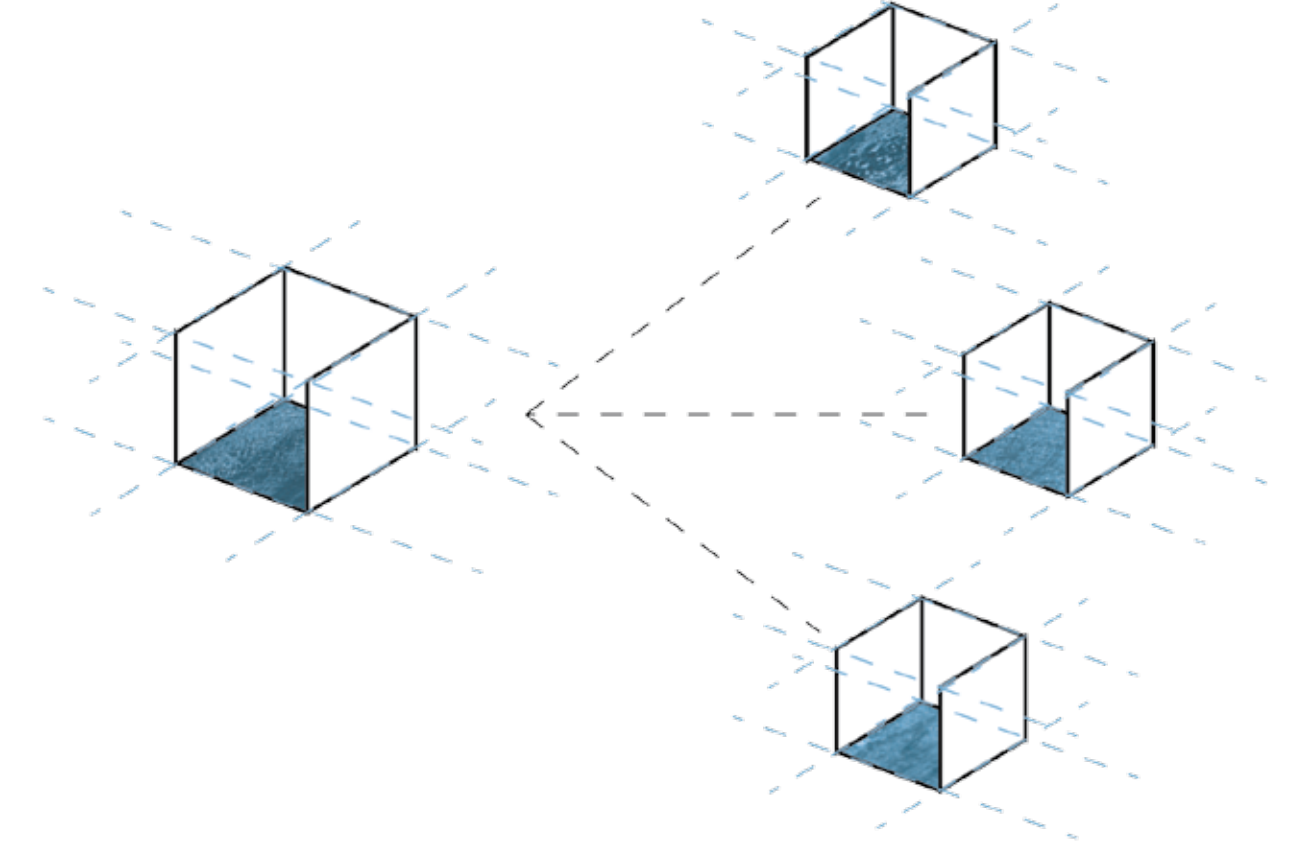
BUILDING SYSTEM

Requirements

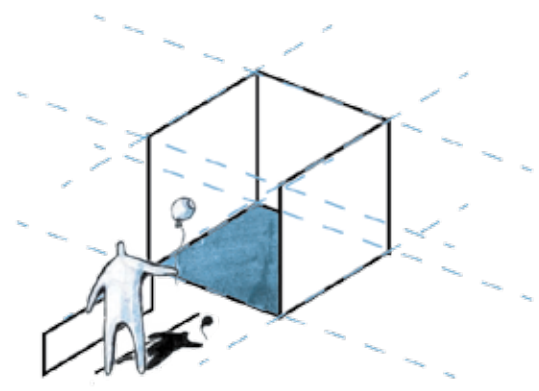
FLOOD RESISTANT



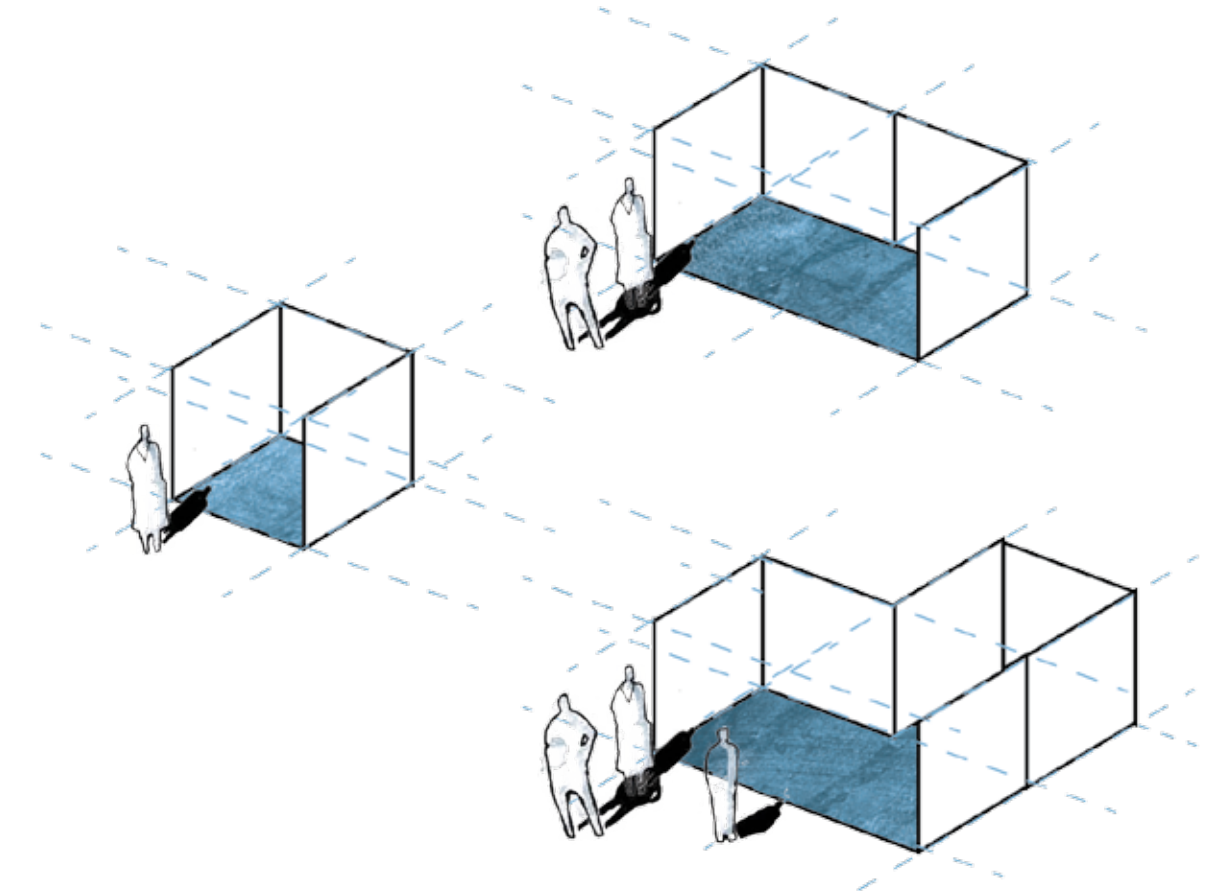
REPRODUCIBLE



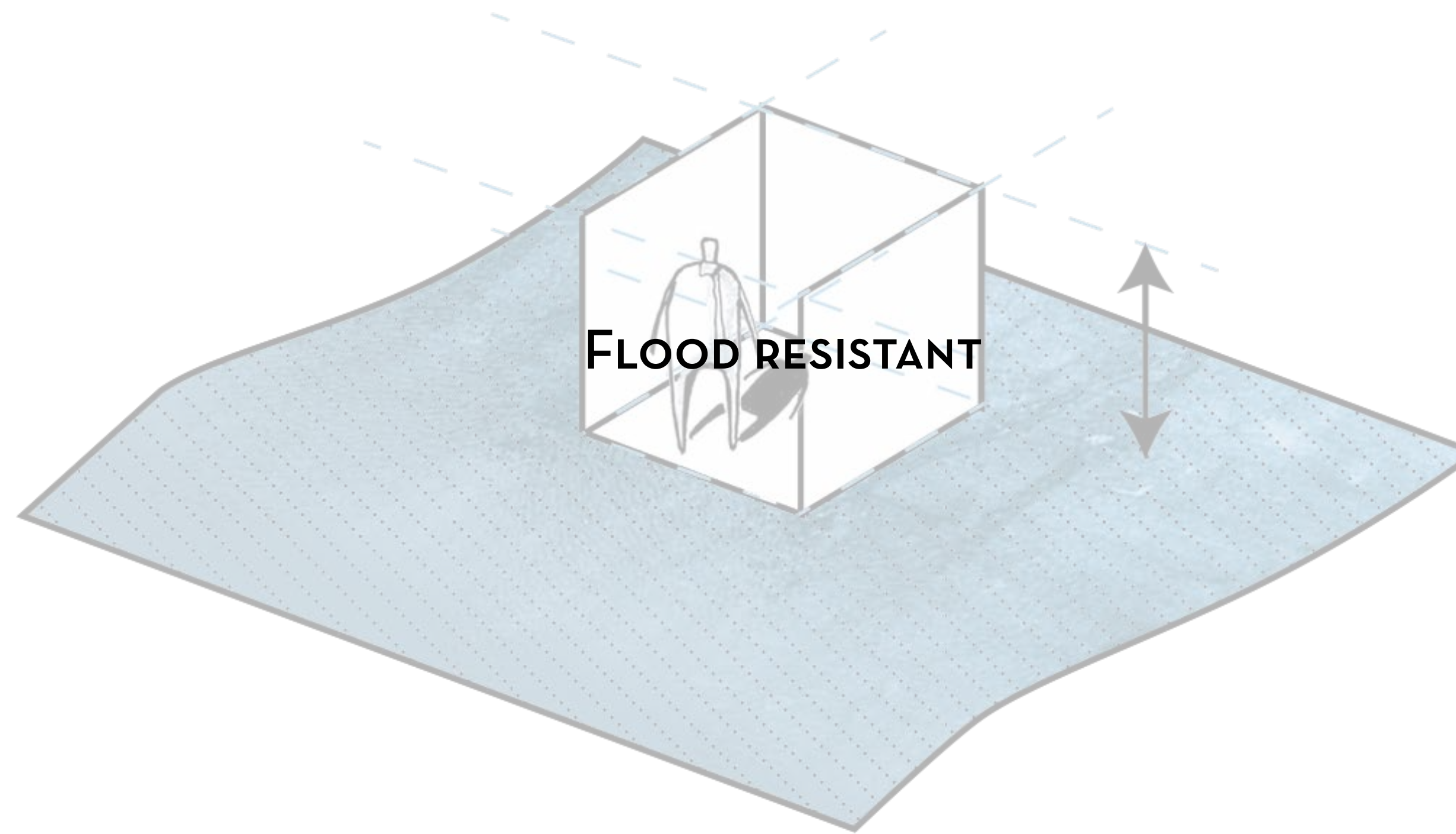
EASY CONSTRUCTION



MODULAR SETUP

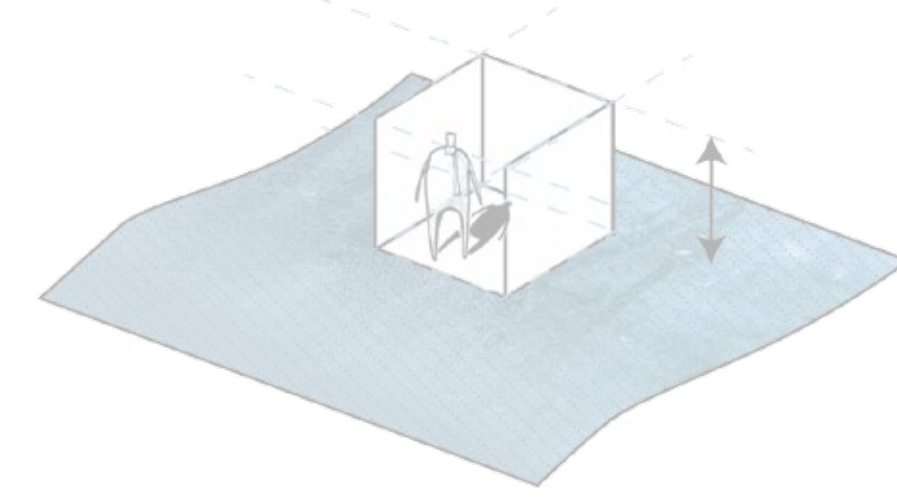


REQUIREMENTS



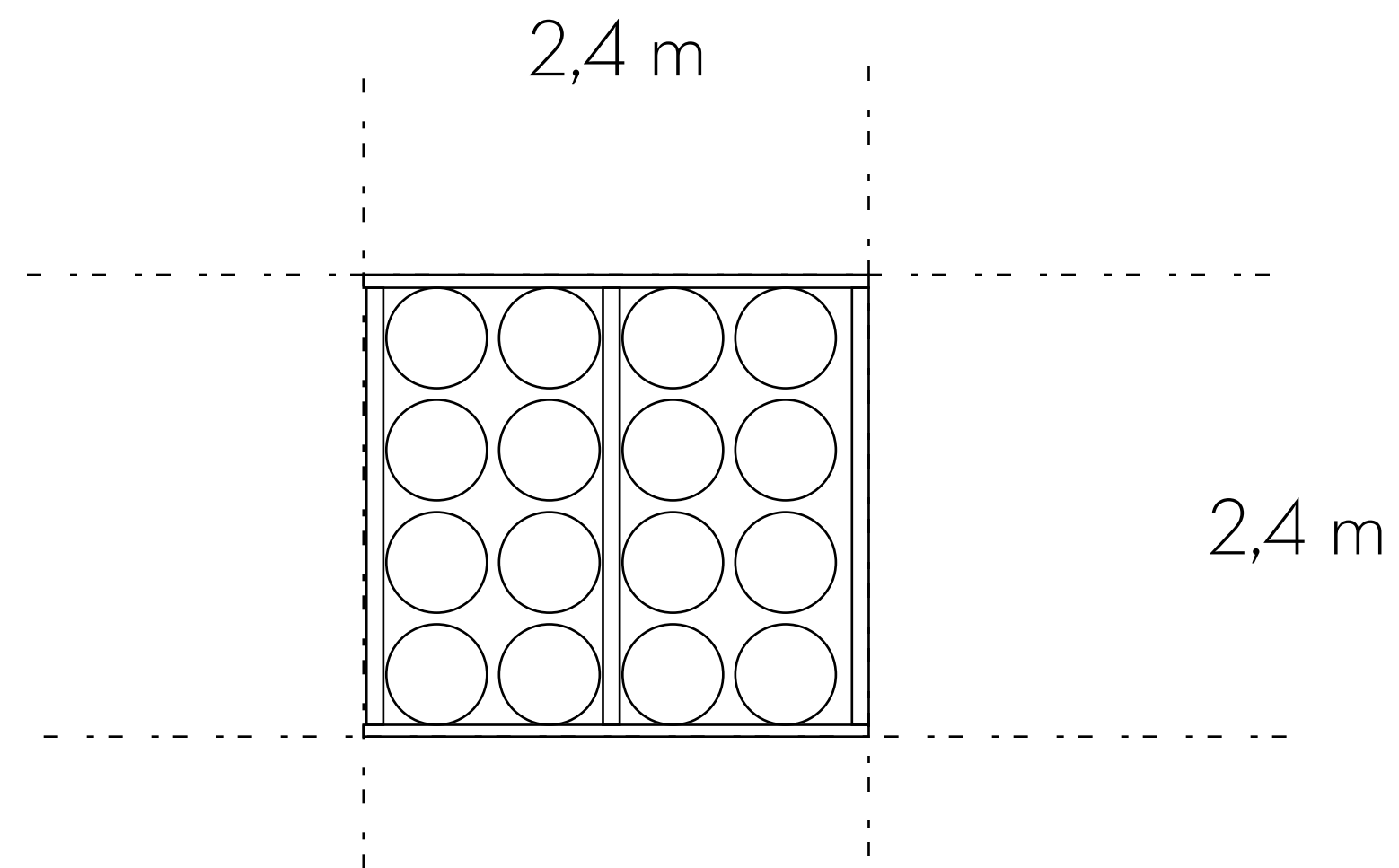
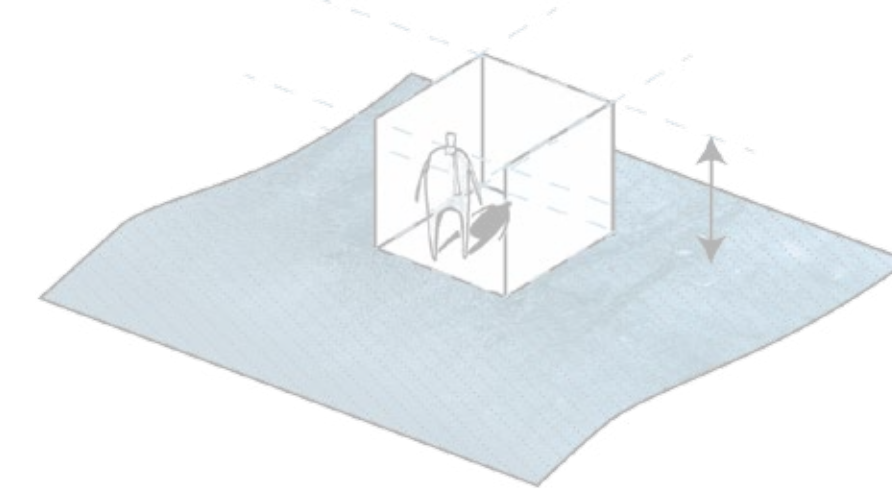
BUILDING SYSTEM

Floating

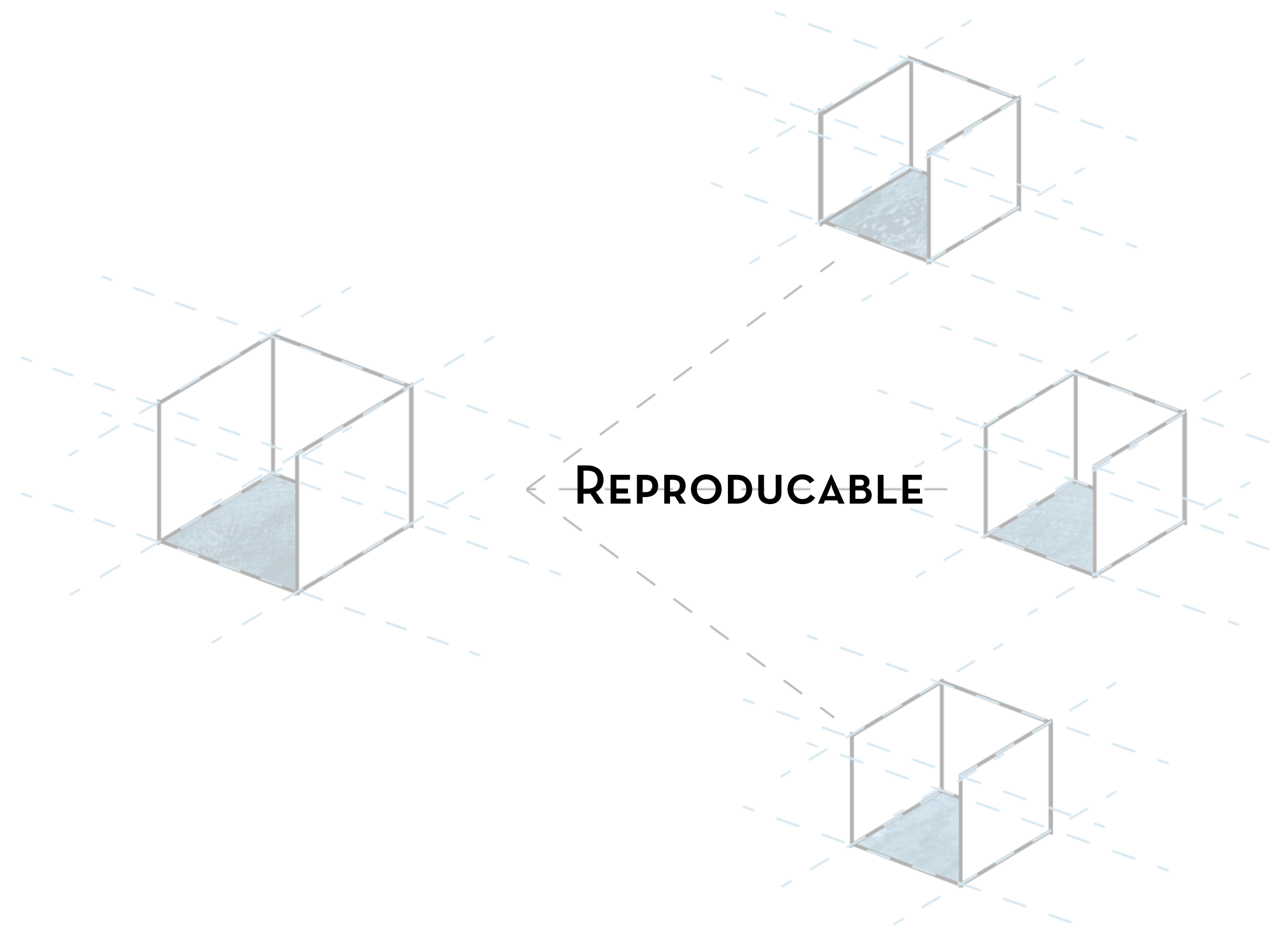


BUILDING SYSTEM

Grid

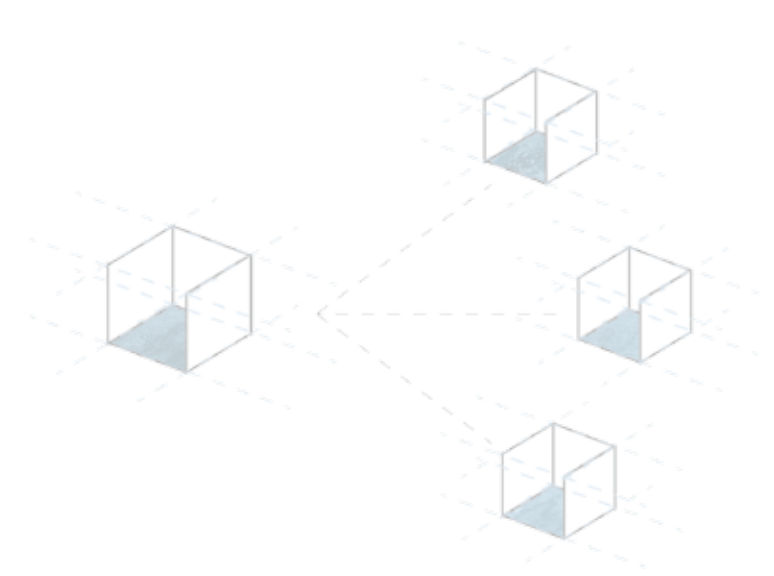


FLOATING STRUCTURE

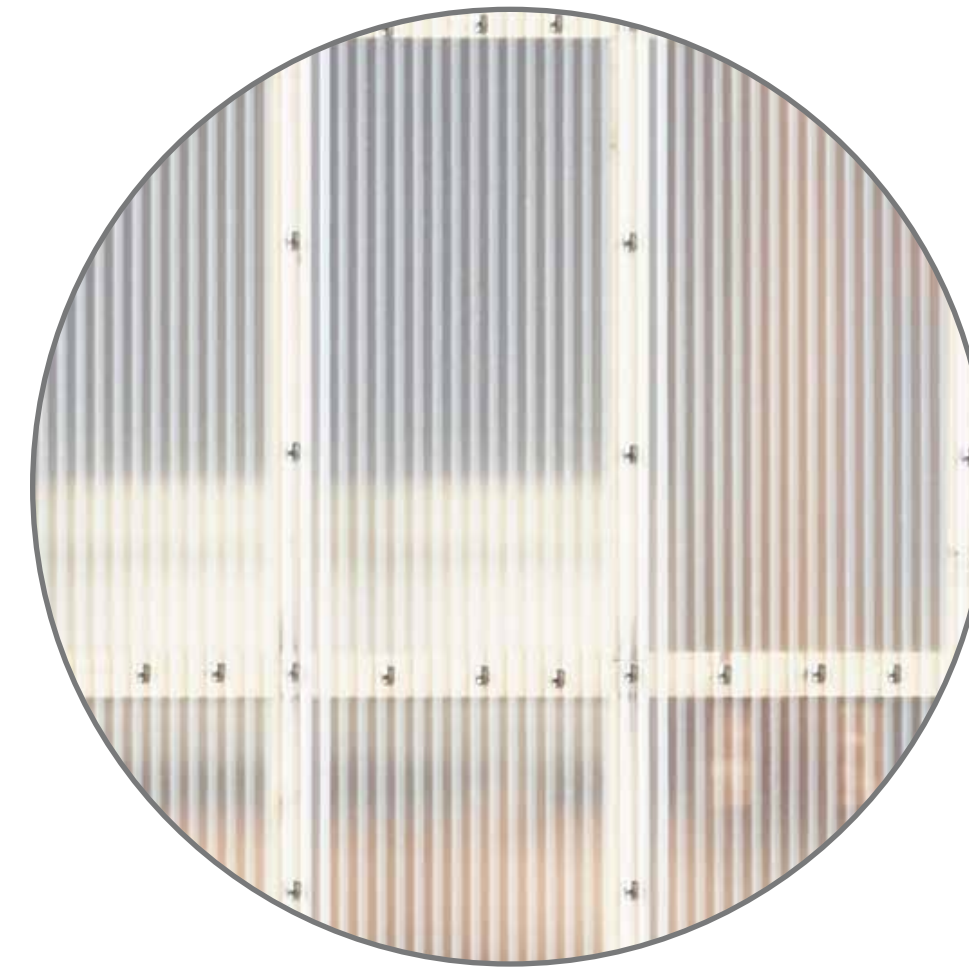


BUILDING SYSTEM

Material



*Globally available/
relatively cheap/
easy to process/
standardized dimensions*

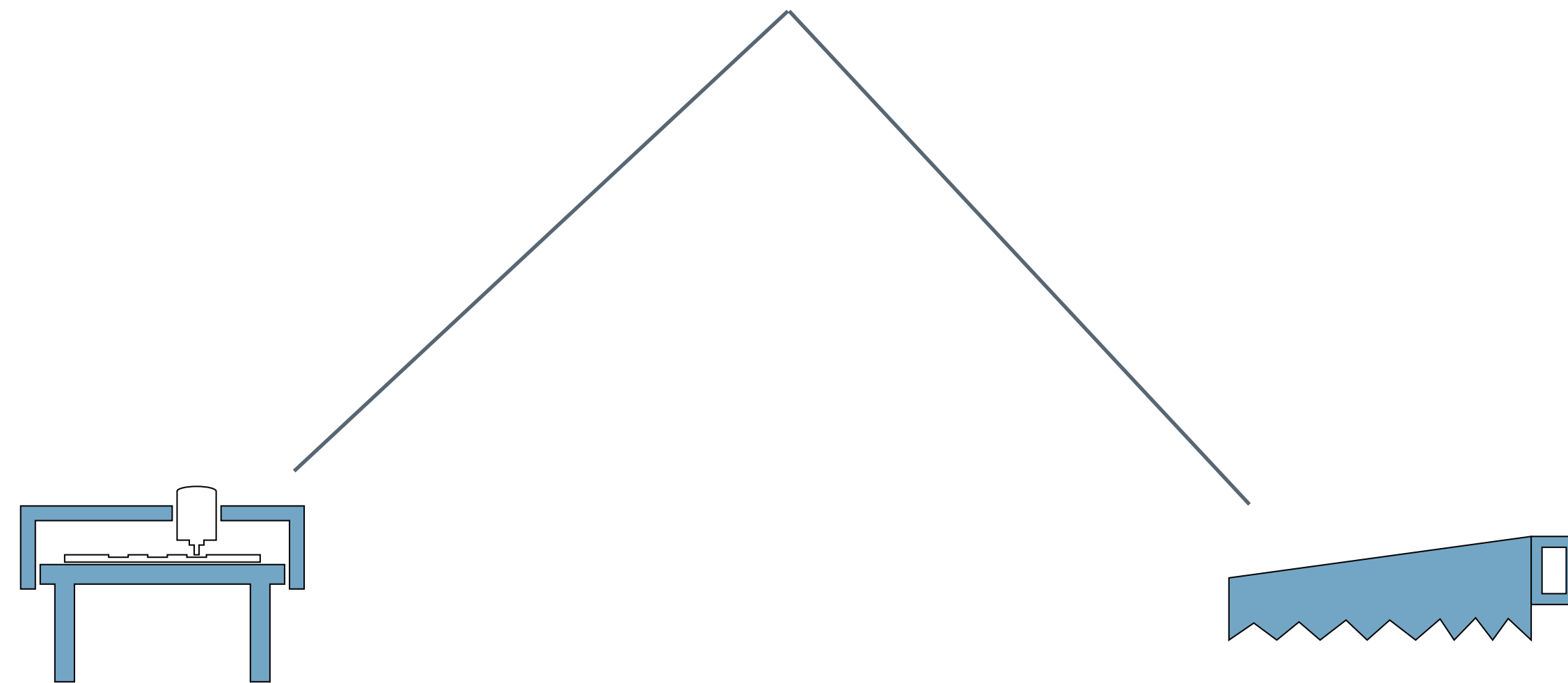
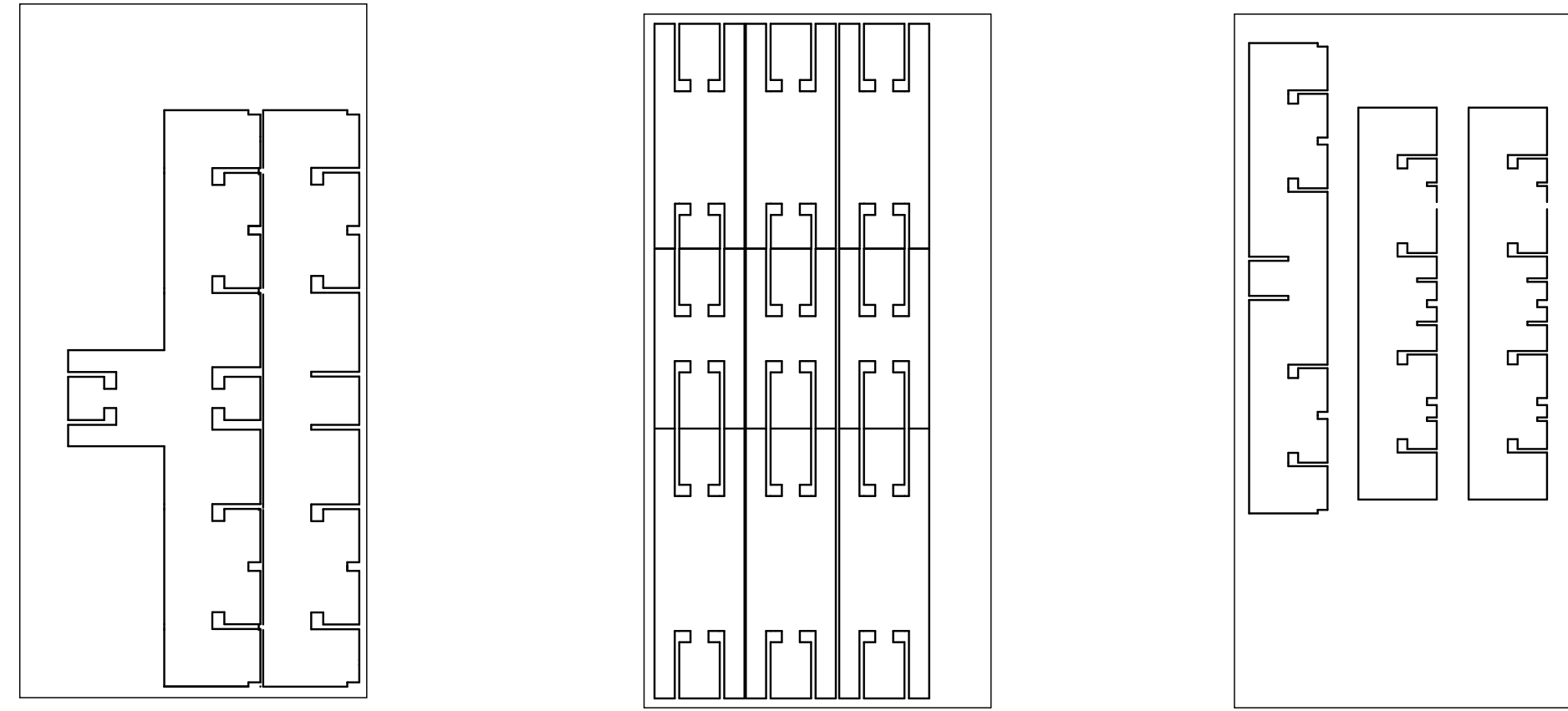
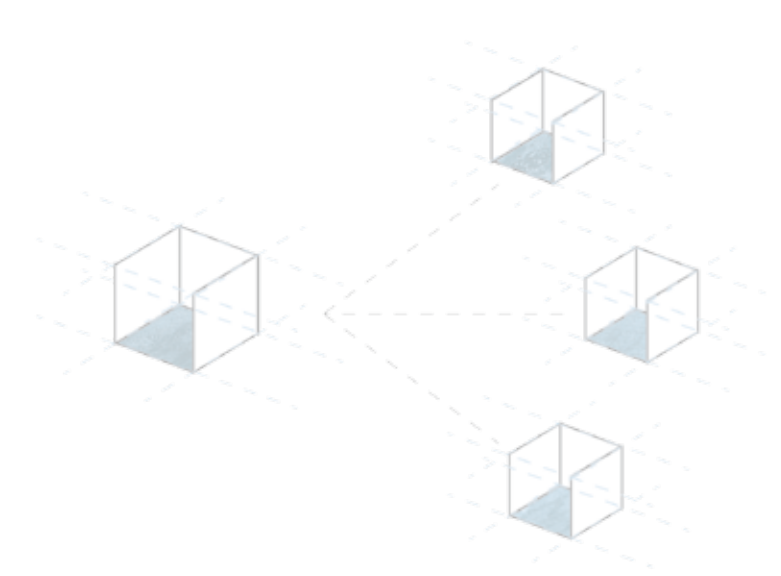


*Durable /
Standardized dimensions/
Simple connections*

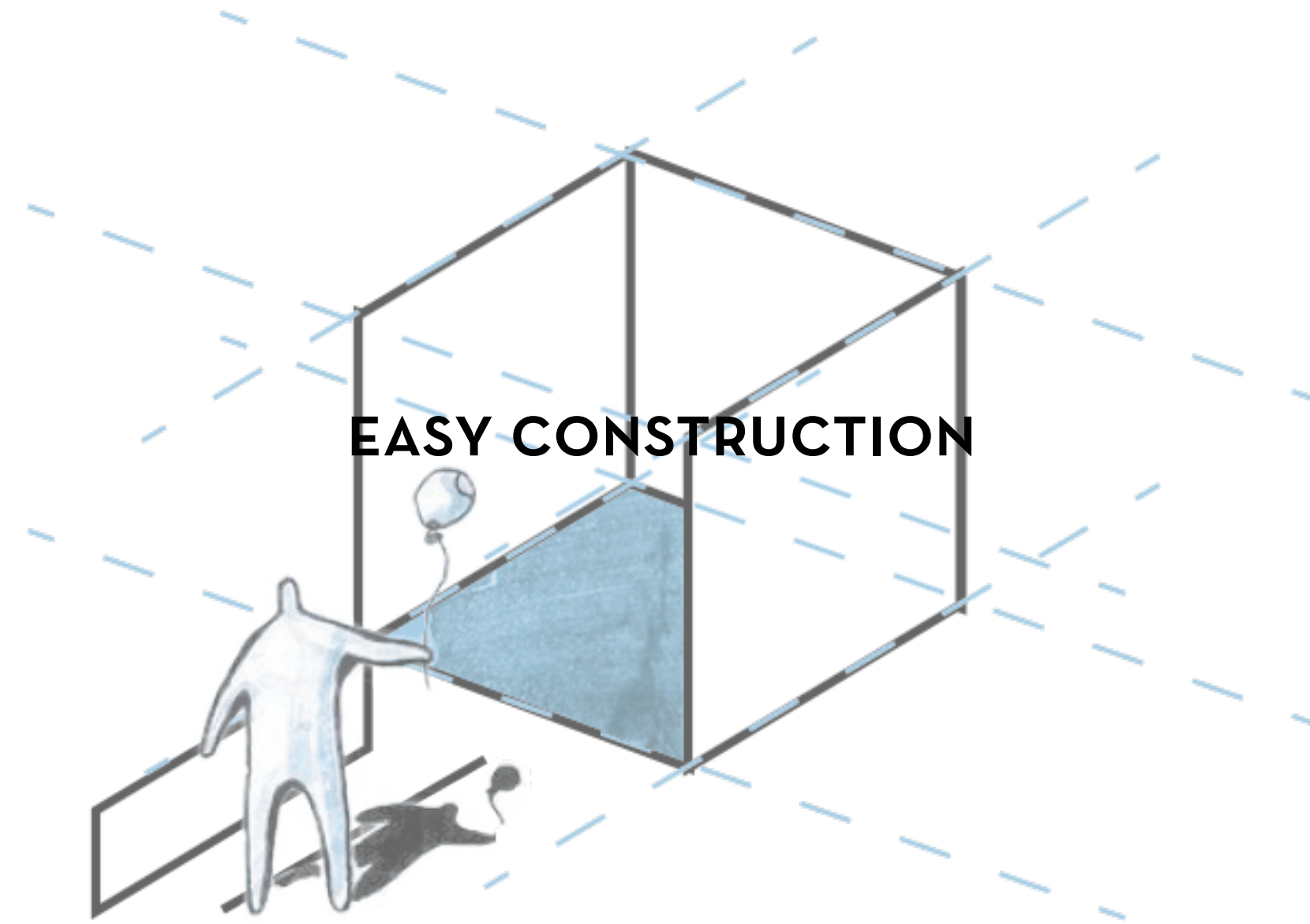
MATERIALS

PROGRAM

Layout

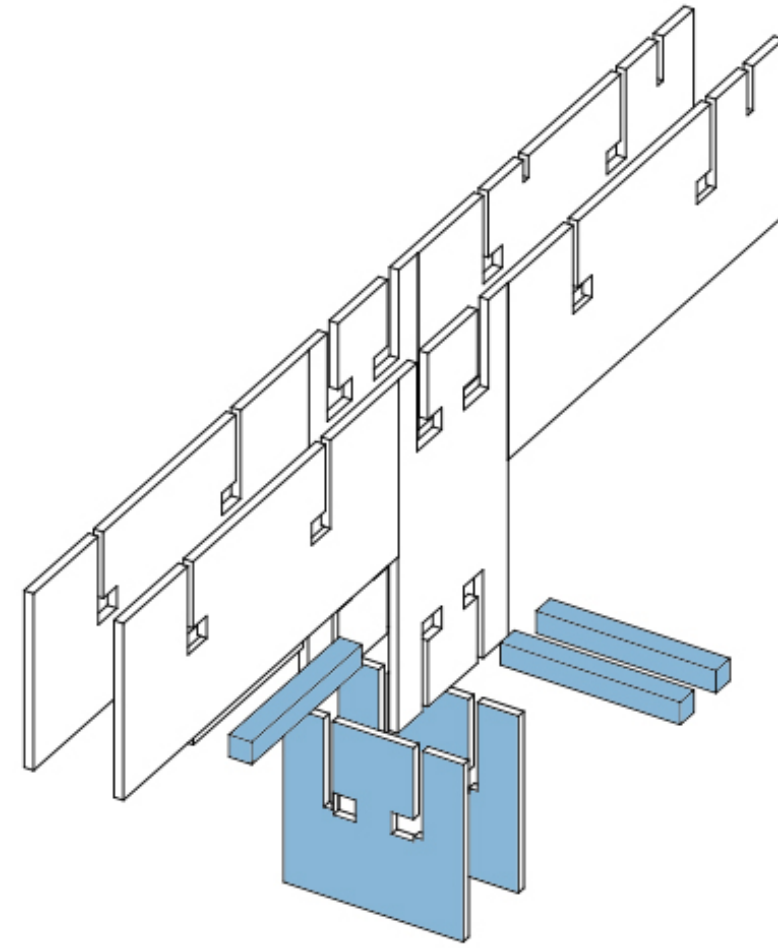
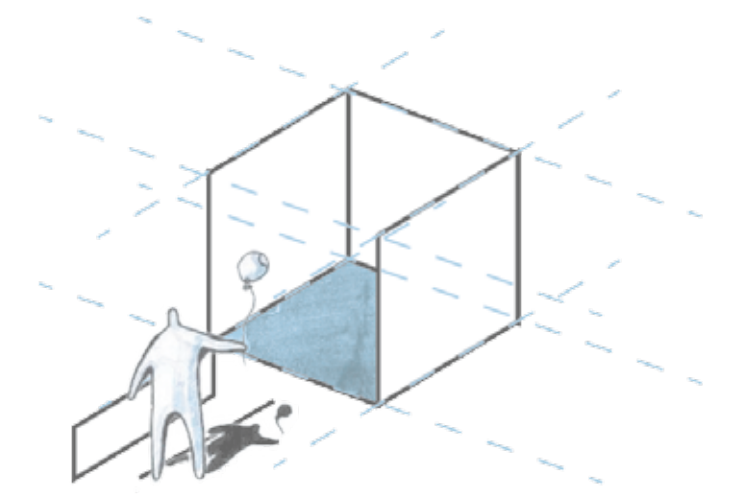


TECHNIQUE



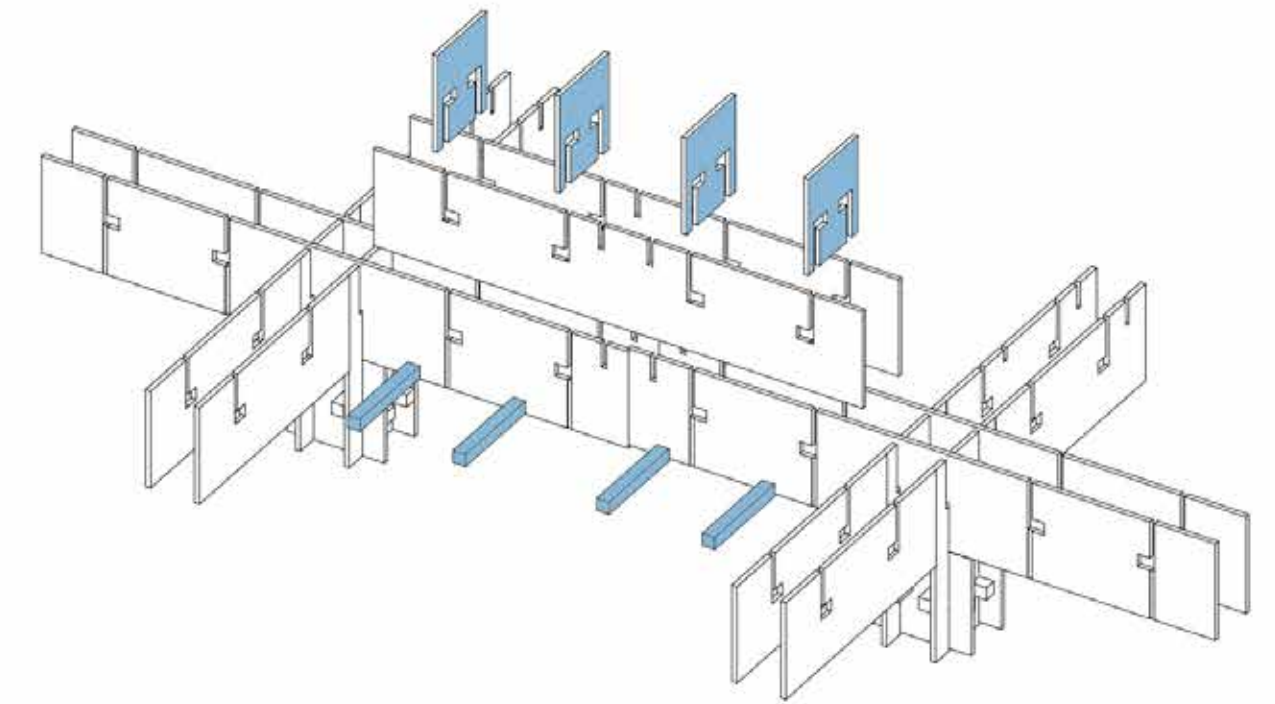
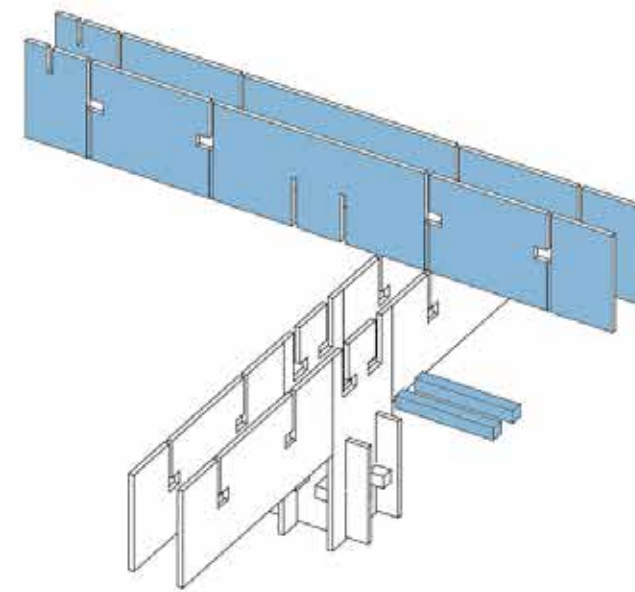
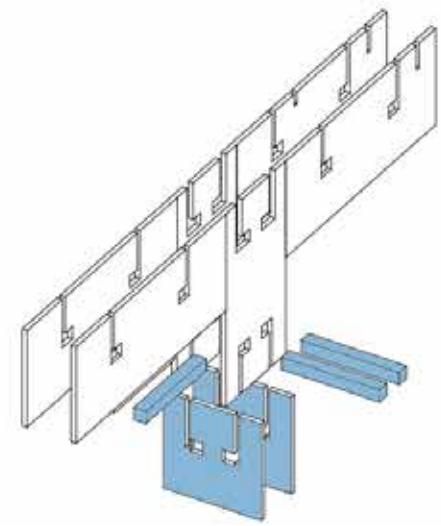
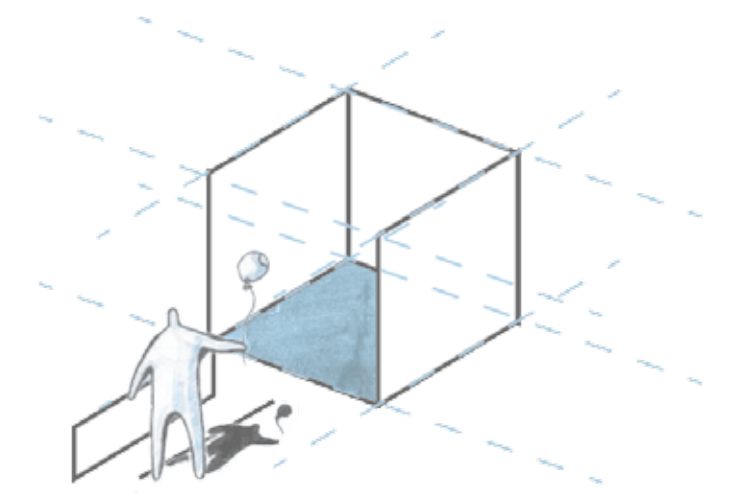
BUILDING SYSTEM

System



BUILDING SYSTEM

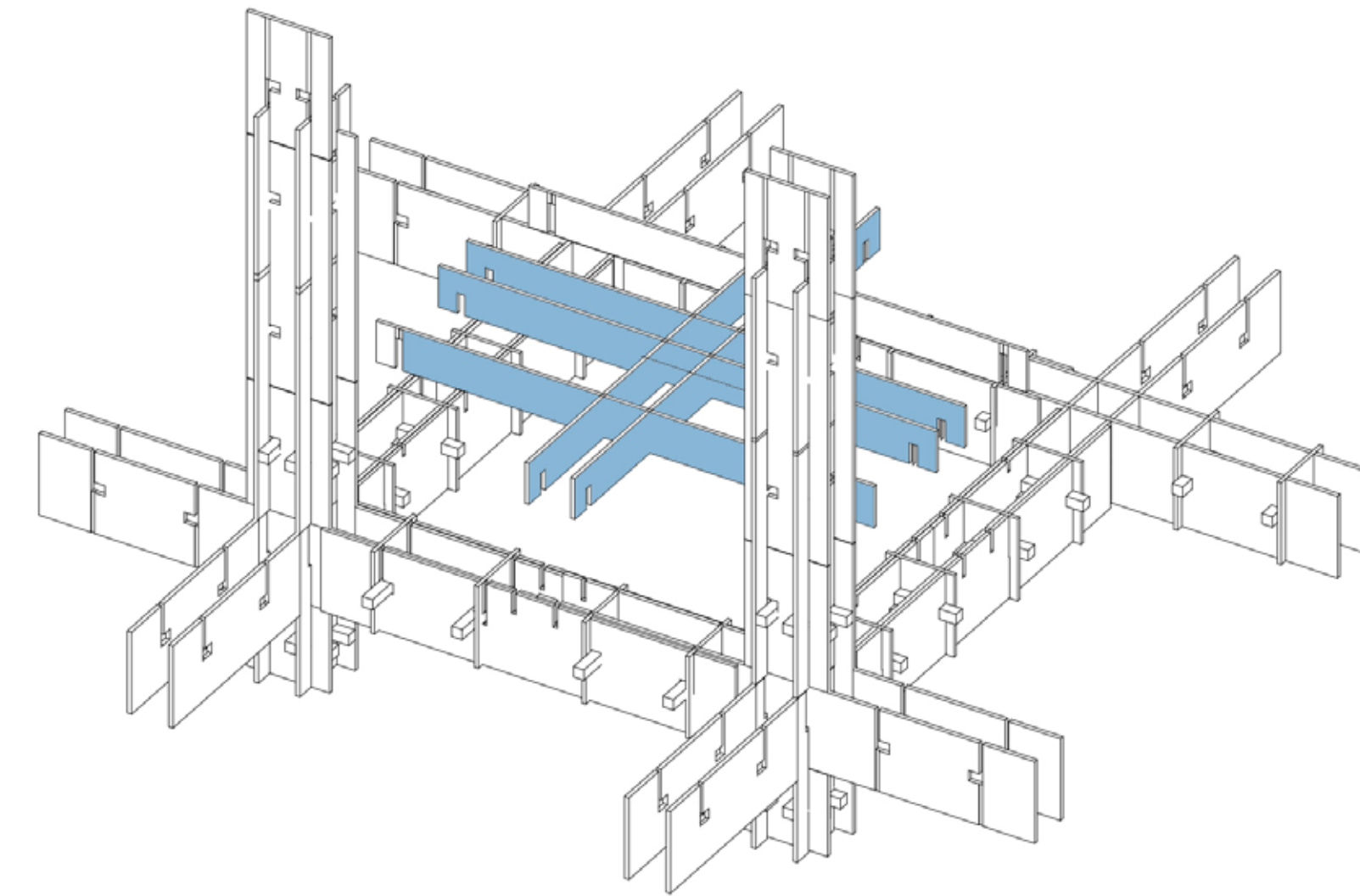
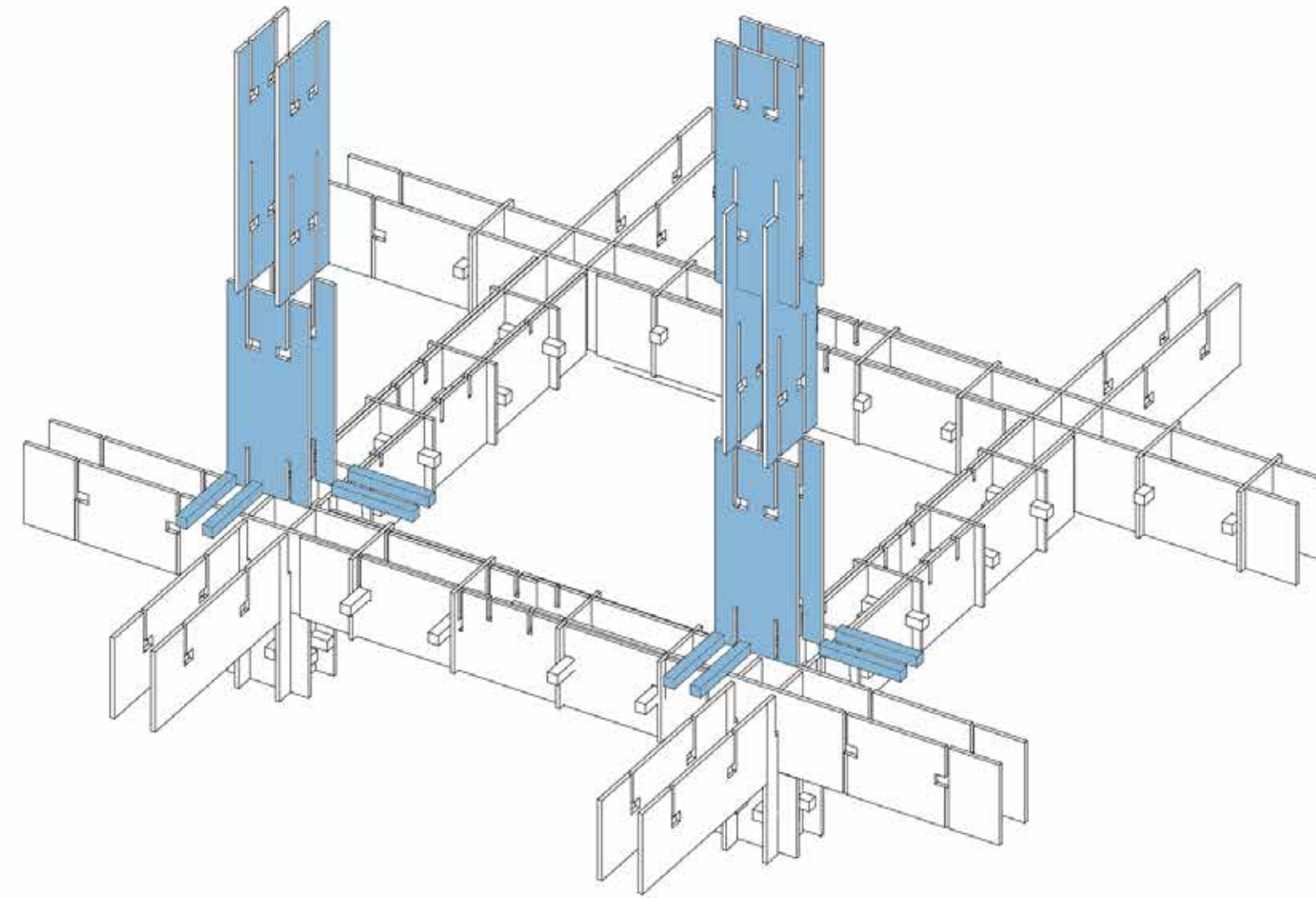
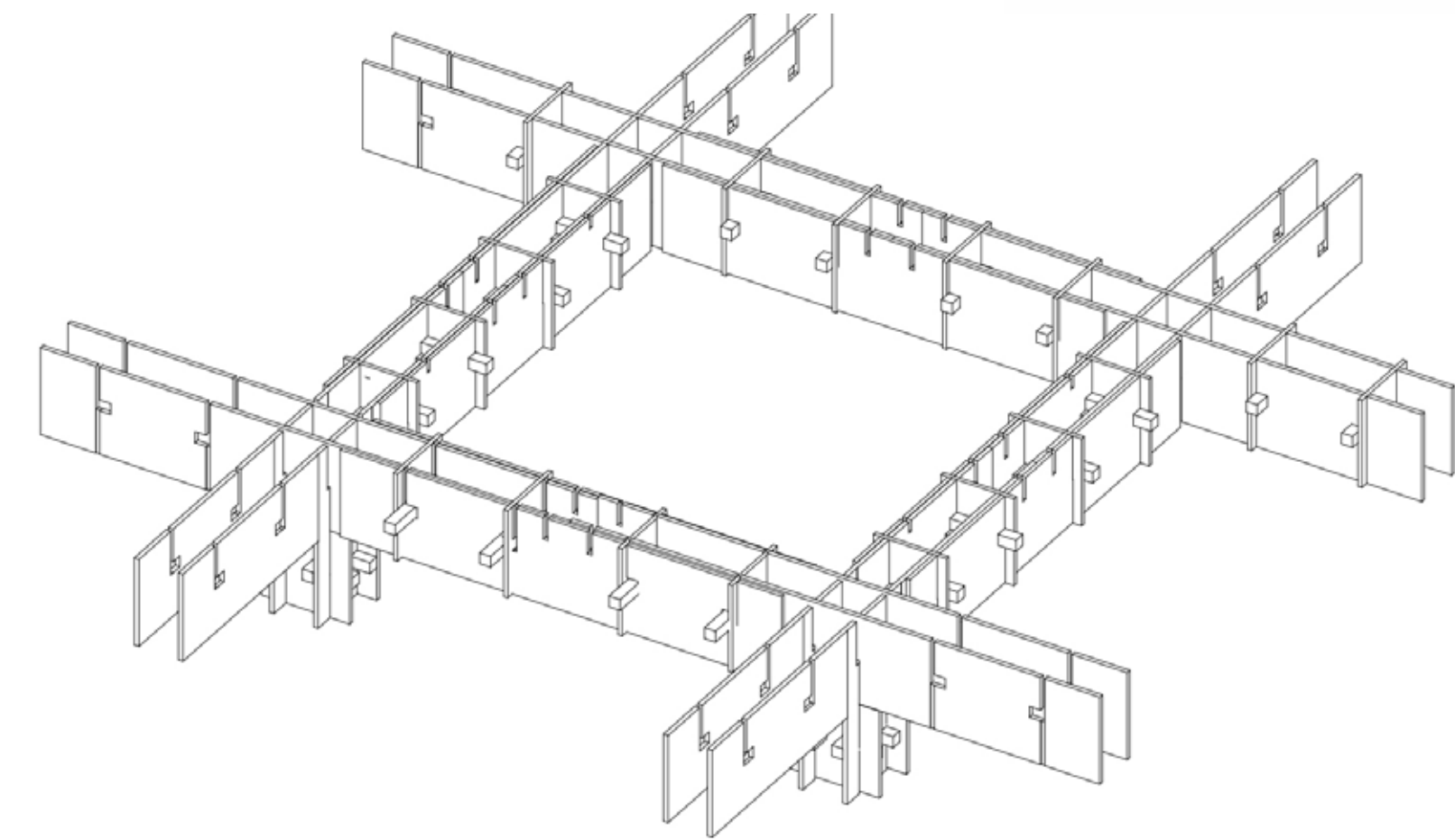
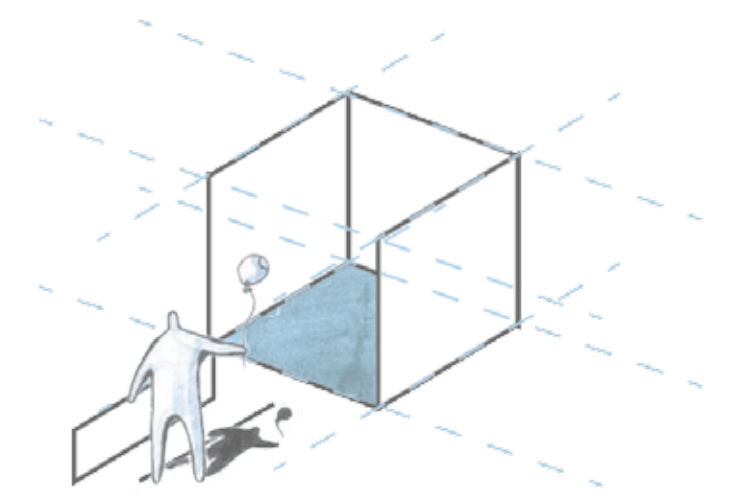
Building sequence



TECHNIQUE

BUILDING SYSTEM

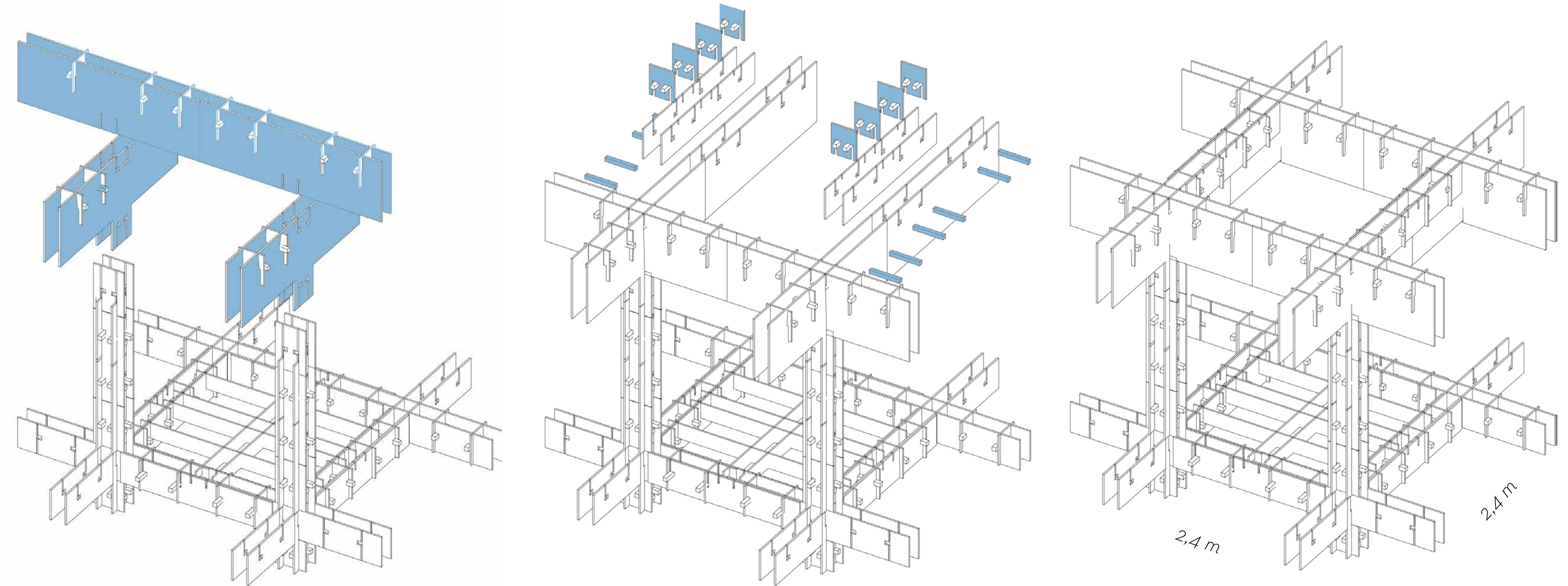
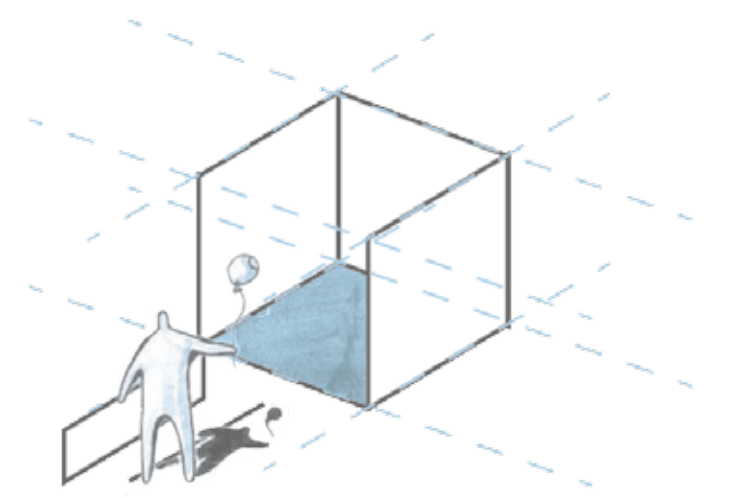
Building sequence



TECHNIQUE

BUILDING SYSTEM

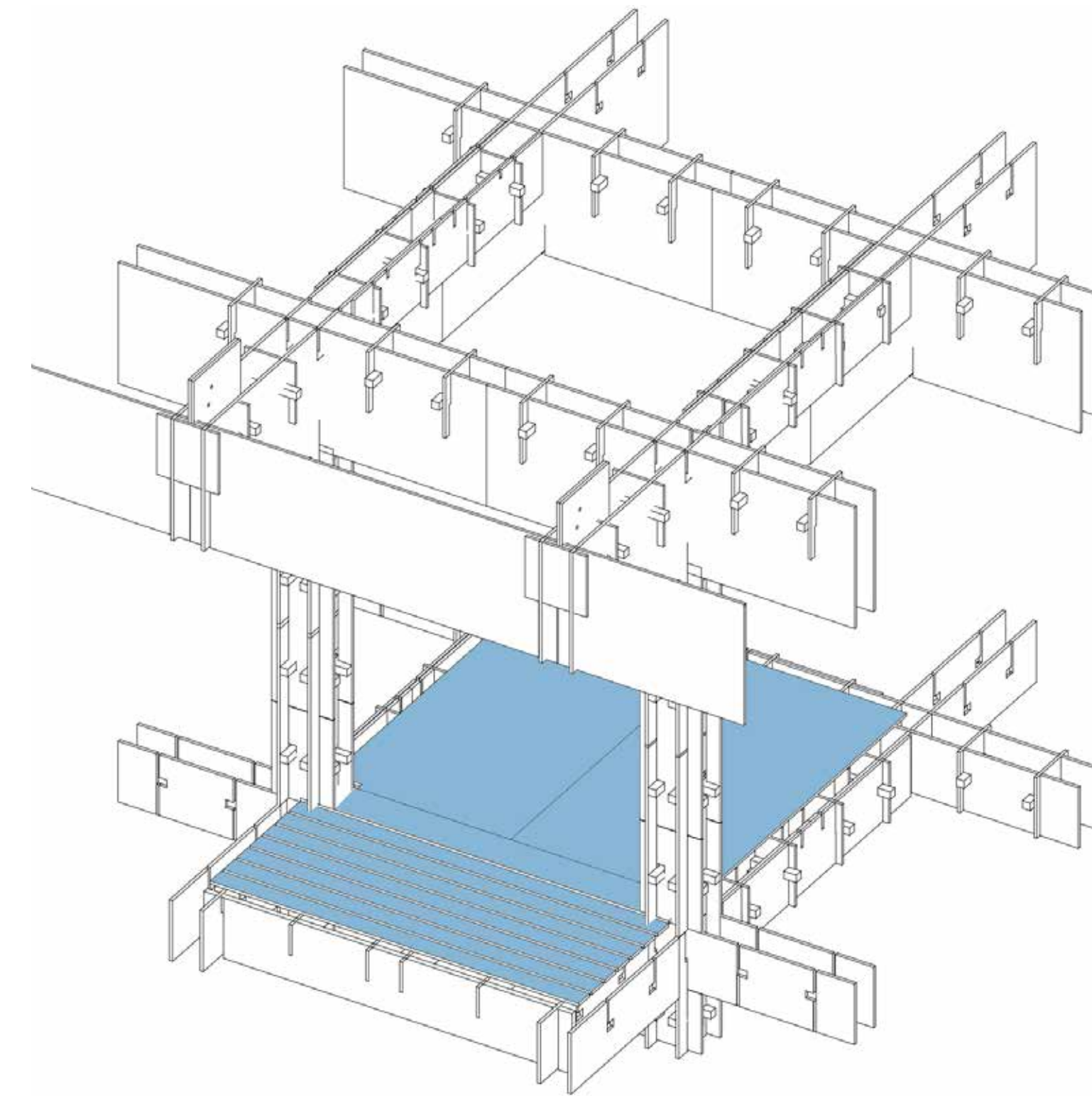
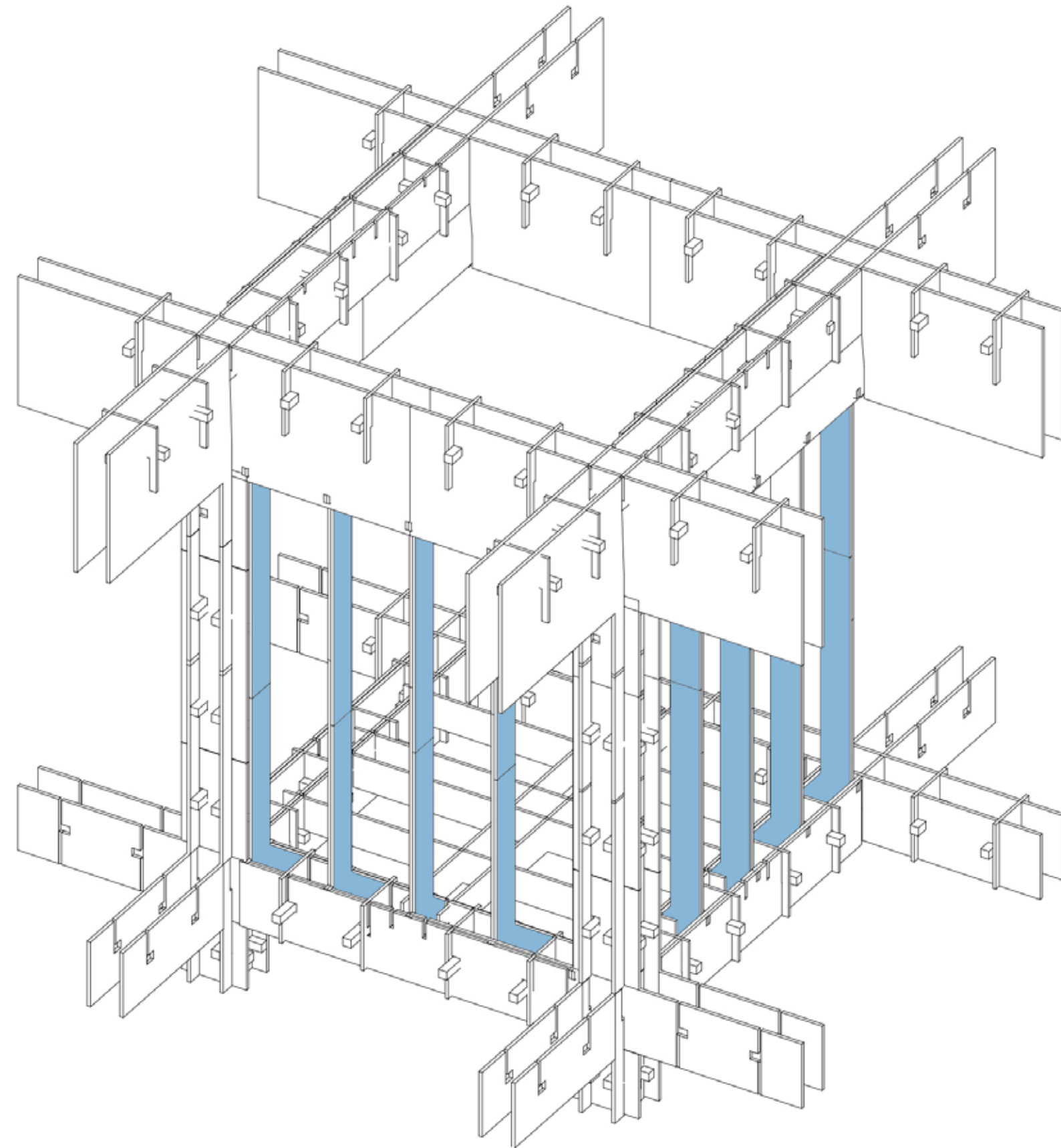
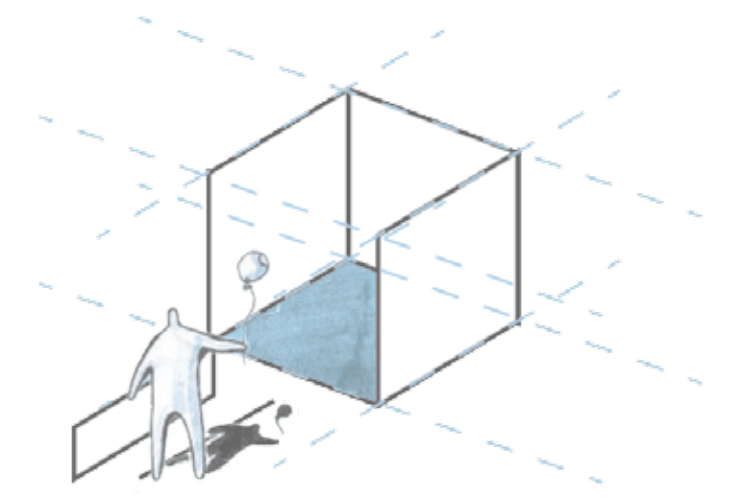
Building sequence



TECHNIQUE

BUILDING SYSTEM

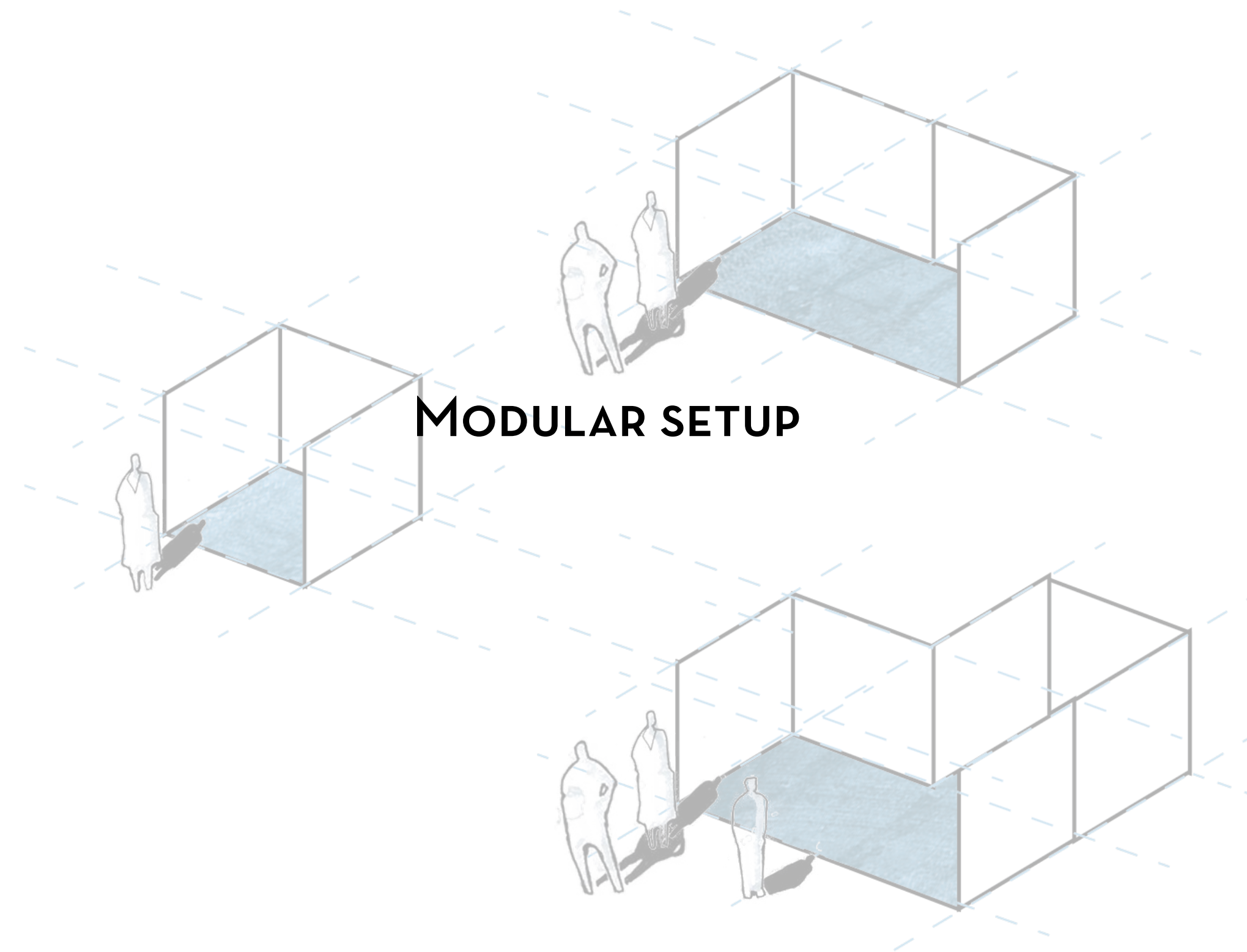
Building sequence



TECHNIQUE

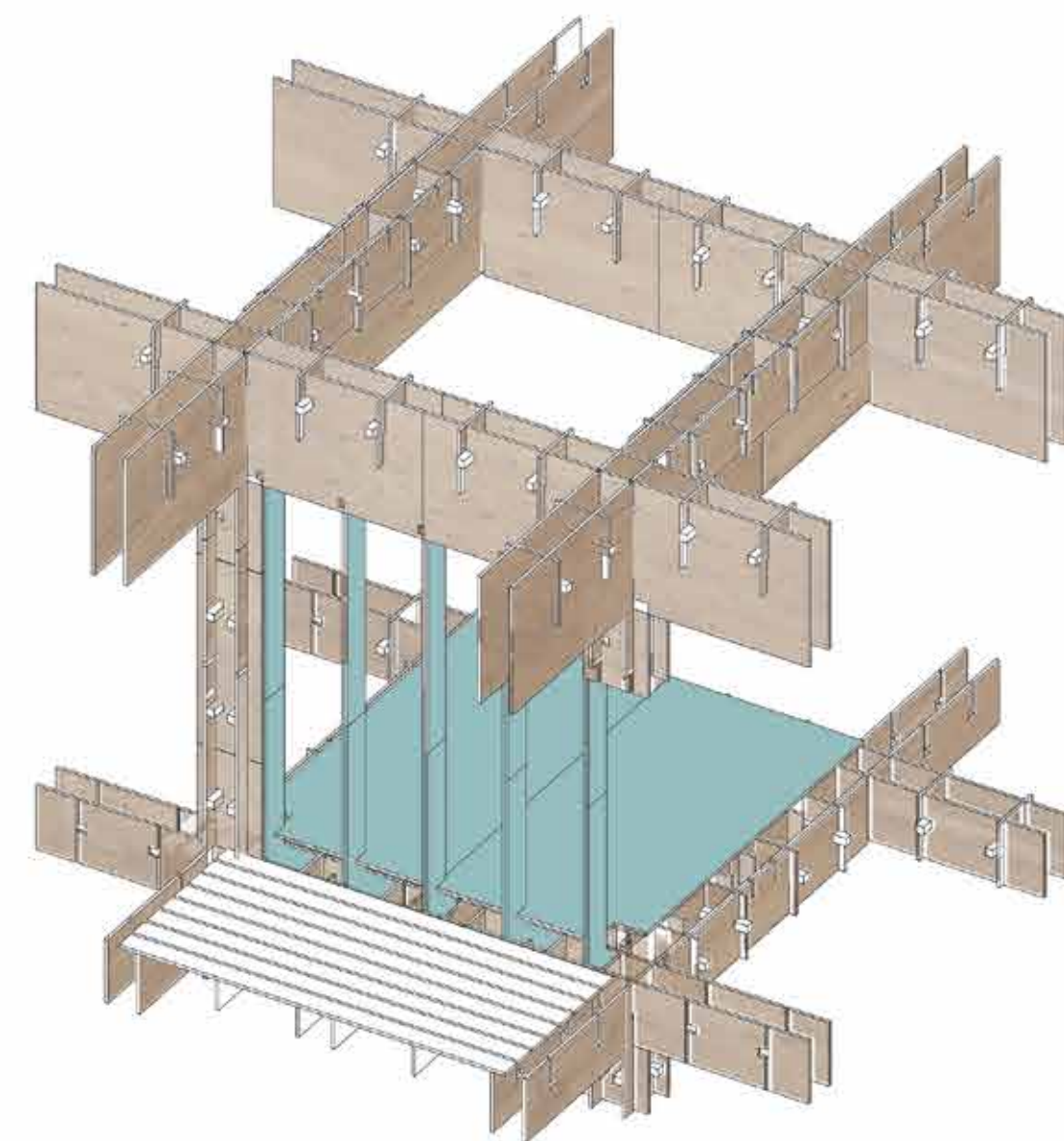
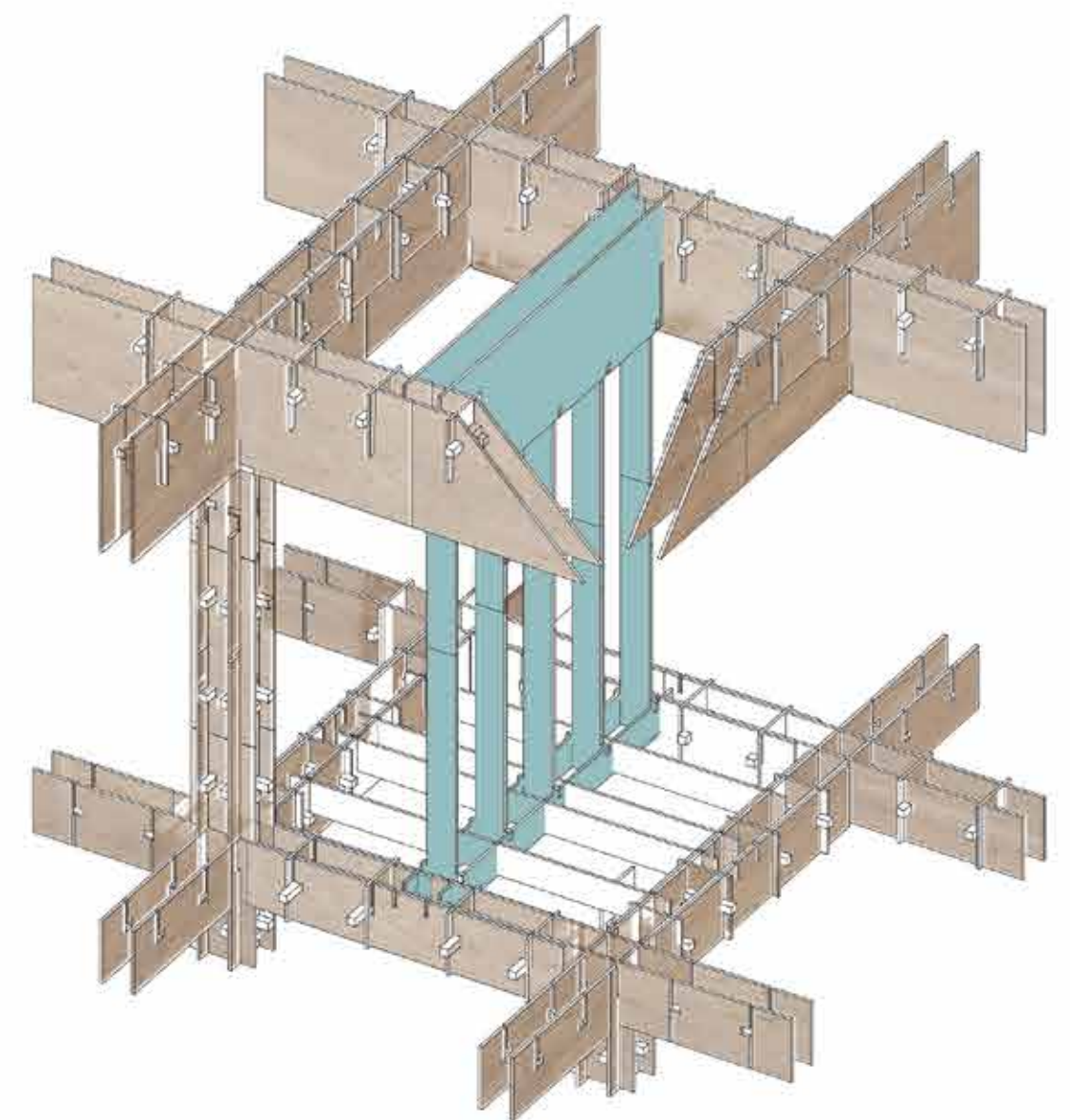
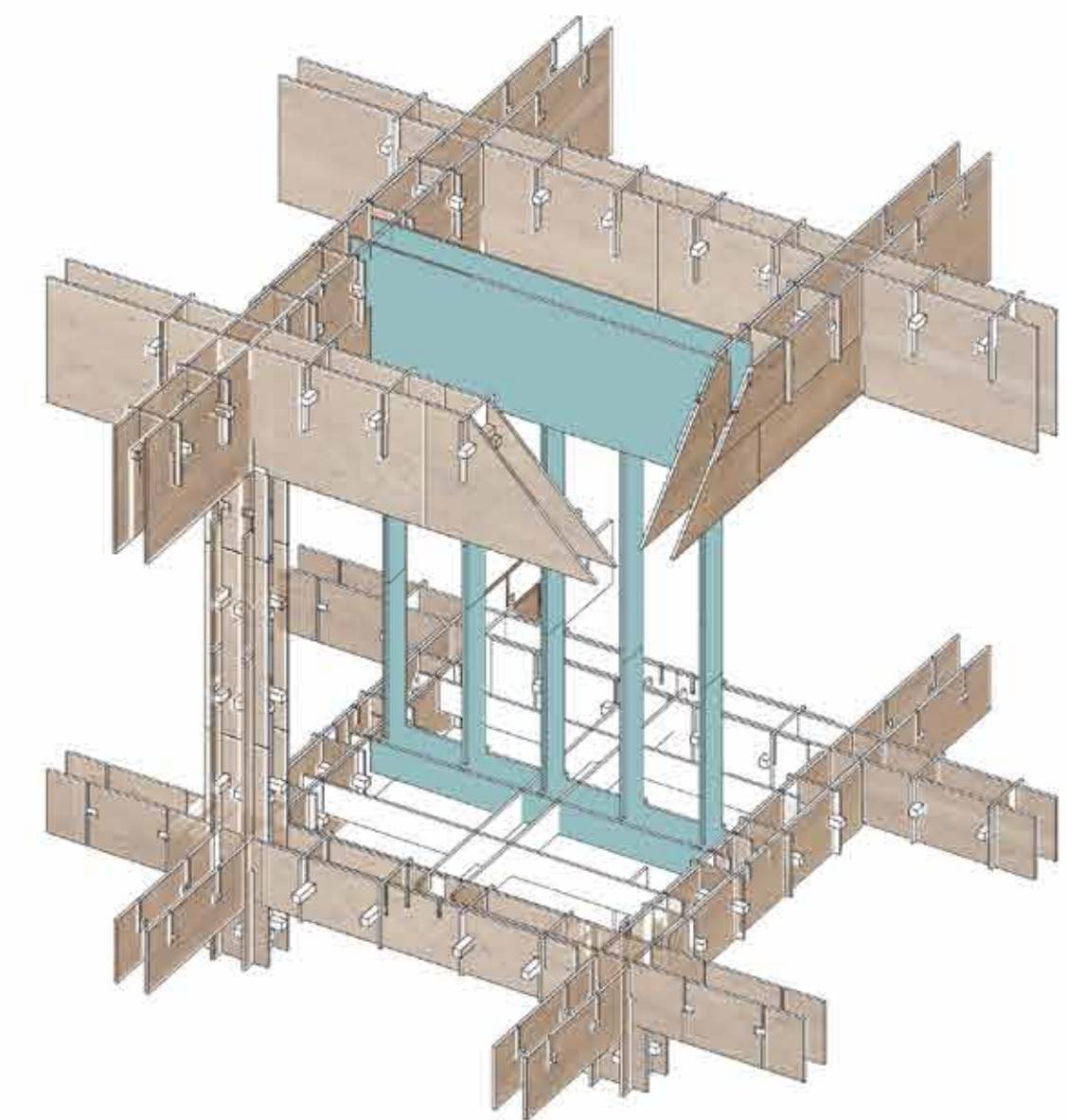
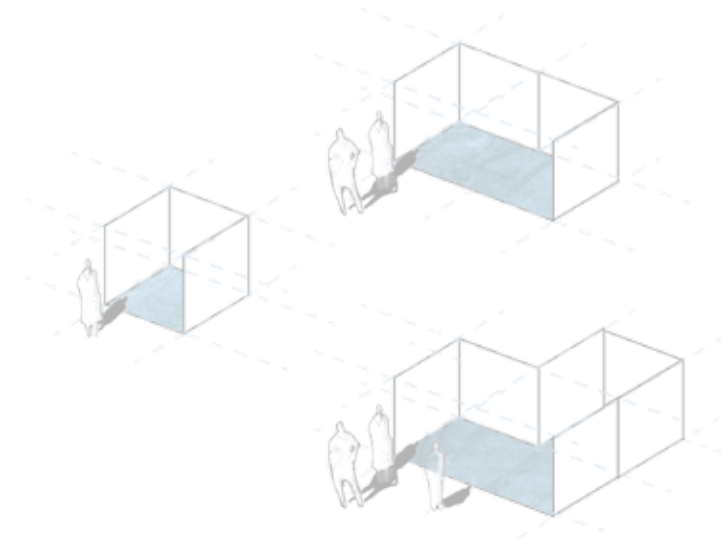
BUILDING SYSTEM

Analysis



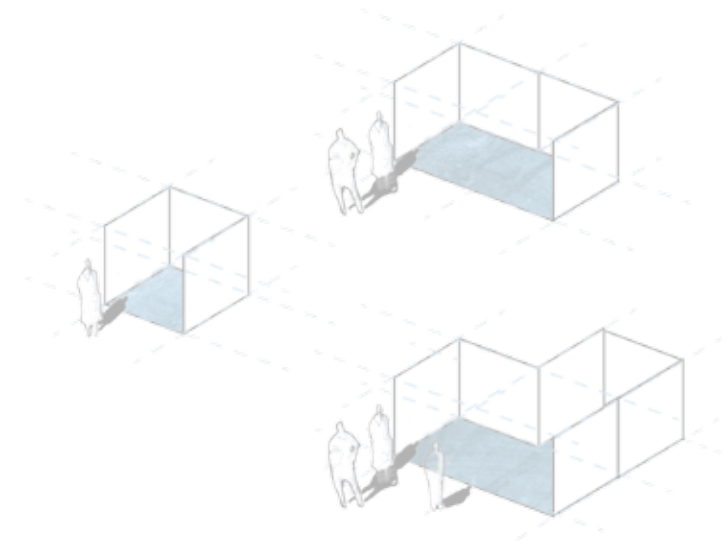
BUILDING SYSTEM

Analysis



BUILDING SYSTEM

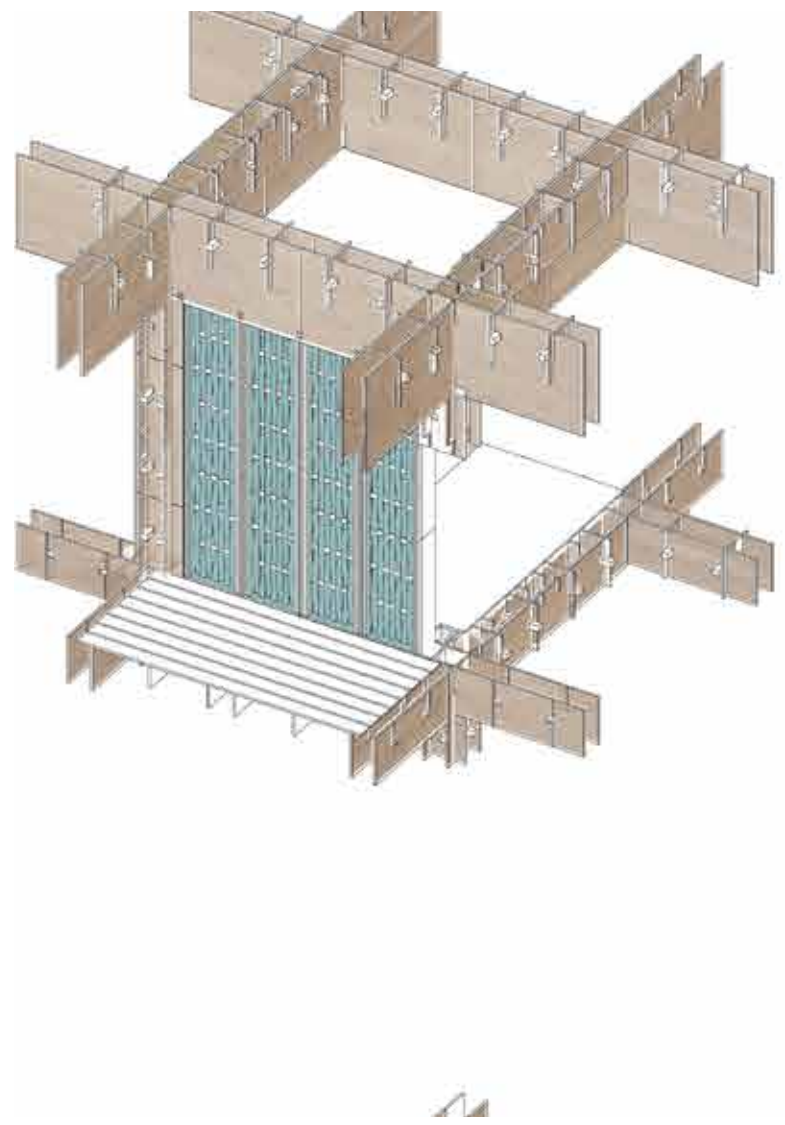
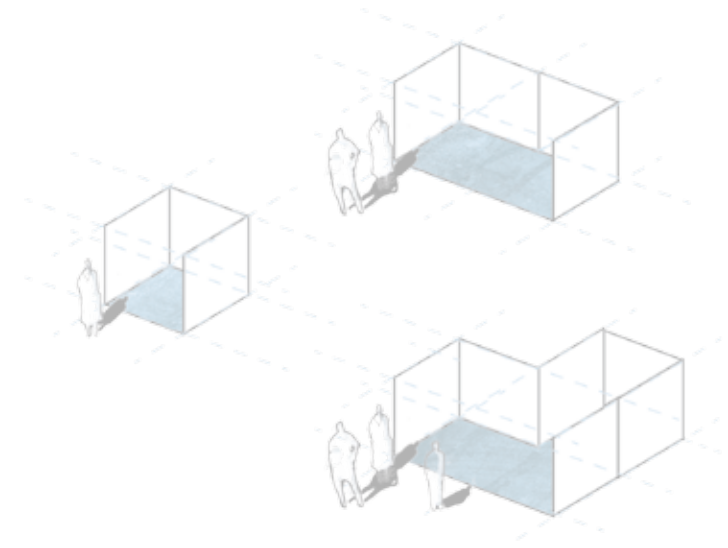
Local additions



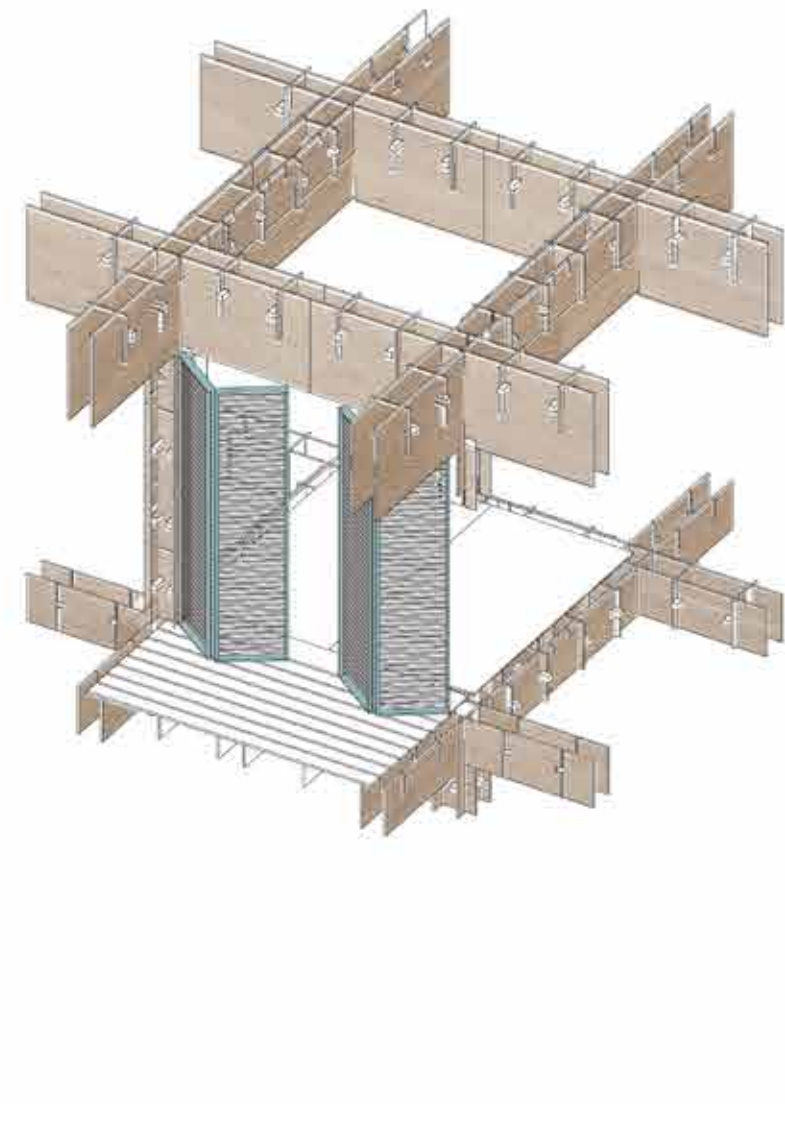
Local Craftmen can contribute by weaving the panels for the second facade.

BUILDING SYSTEM

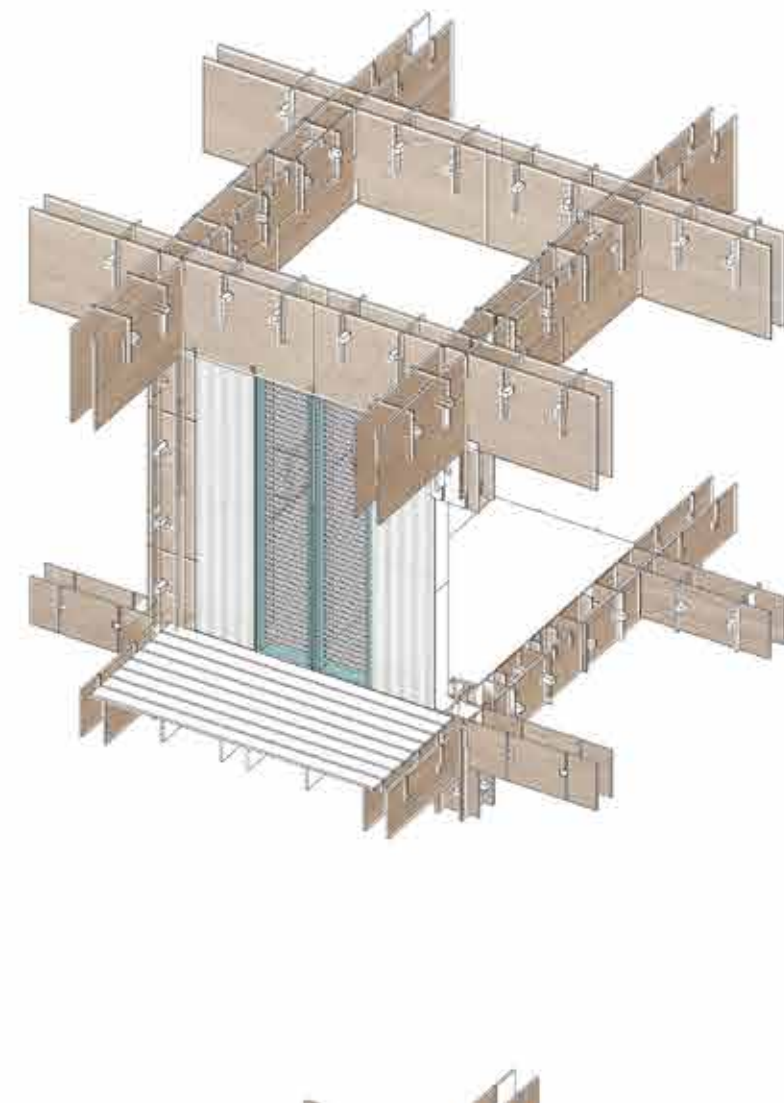
Variation facade



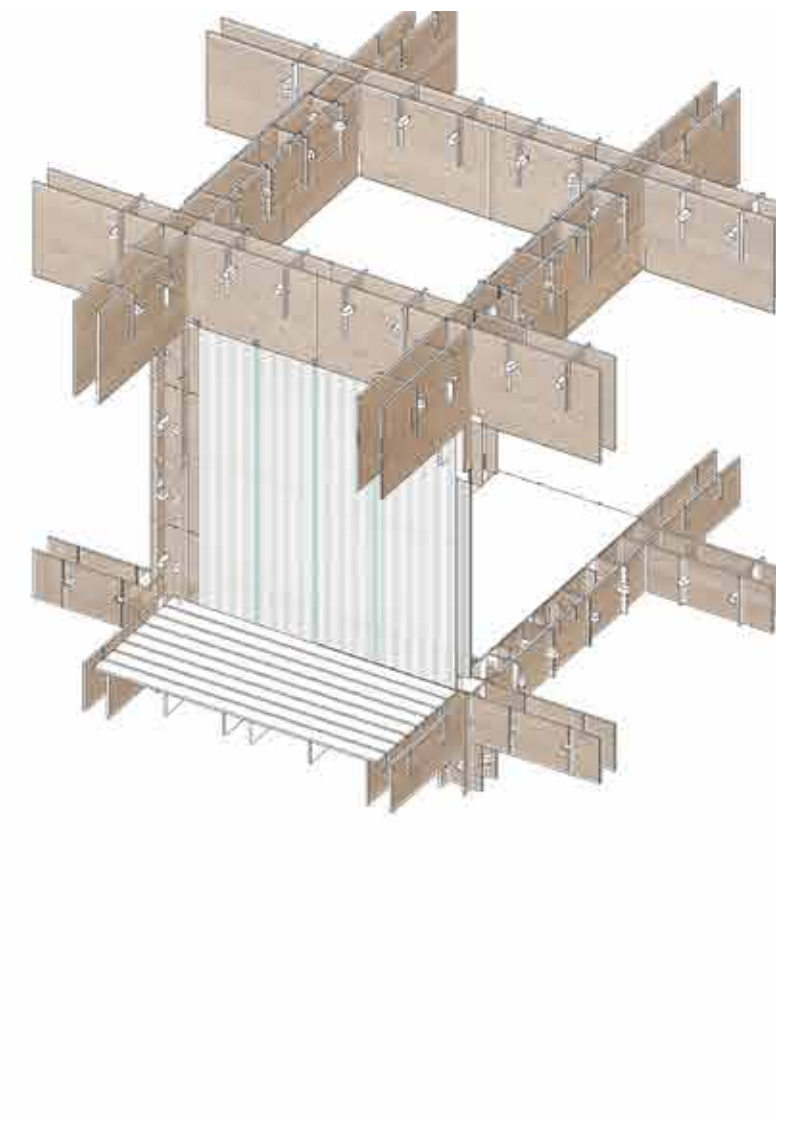
Woven bamboo panel



Bamboo sliding door



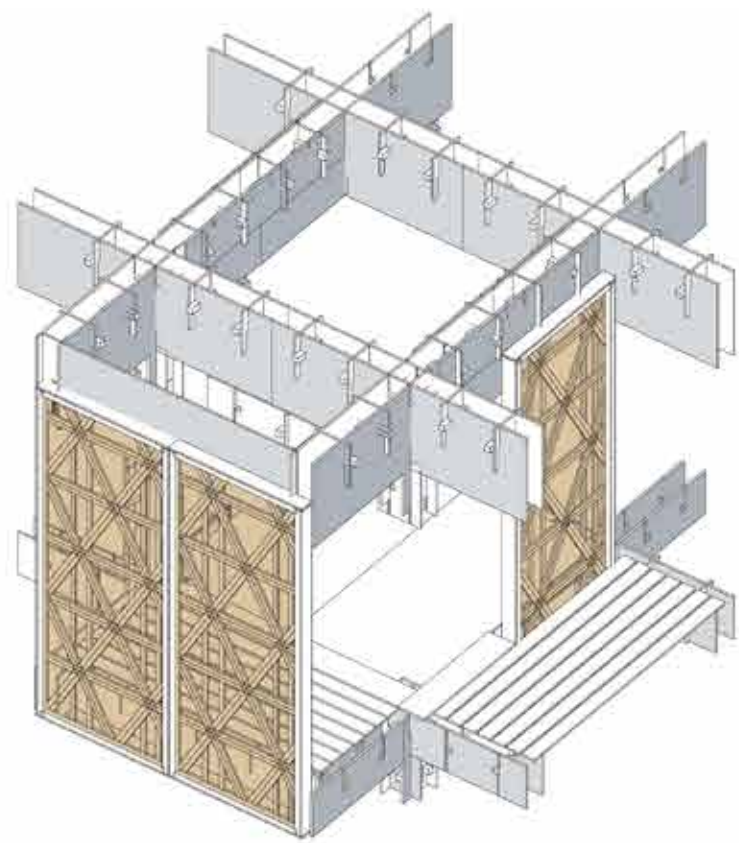
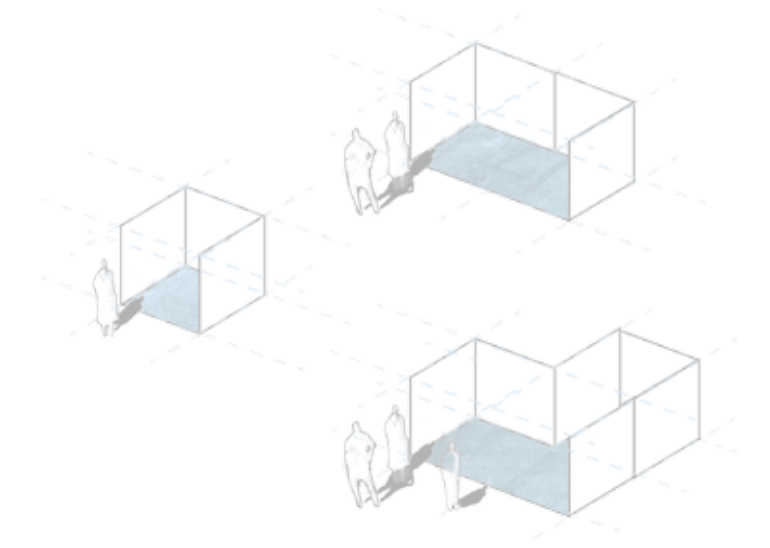
Fixed bamboo shade panel



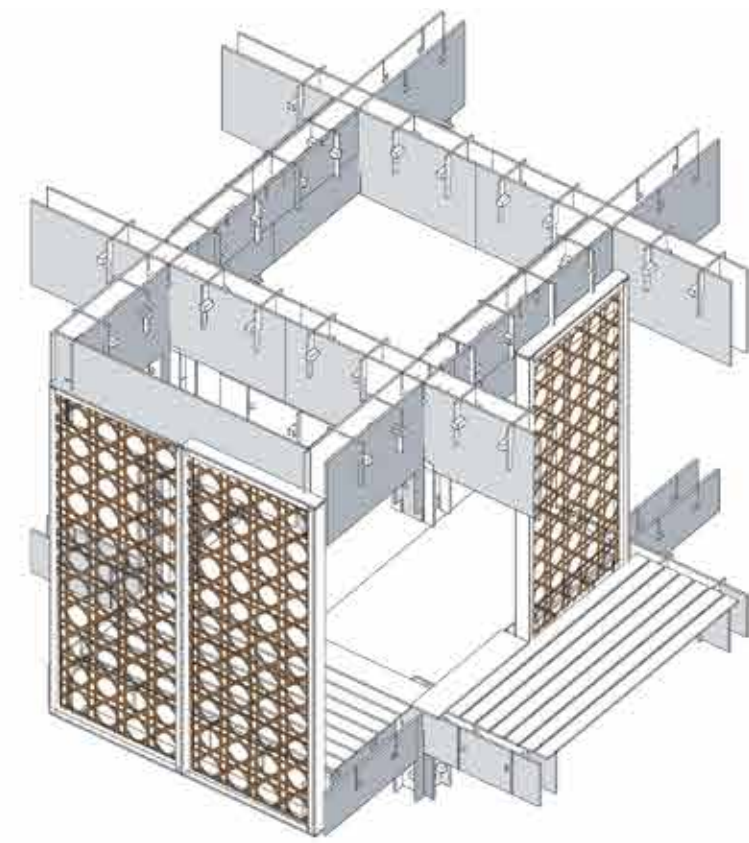
Translucent polycarbonate panel

BUILDING SYSTEM

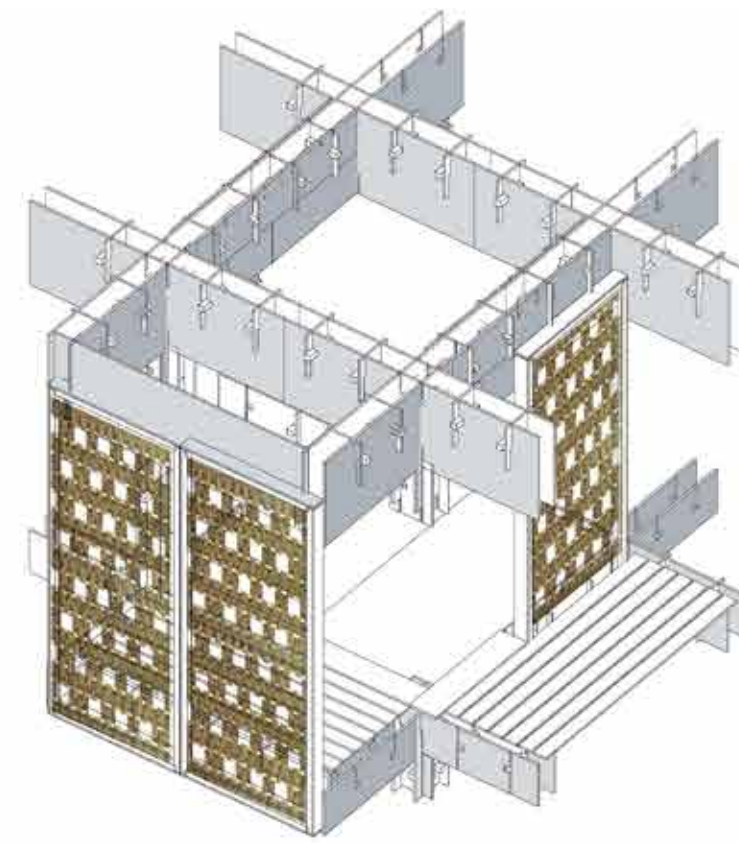
Second facade pattern



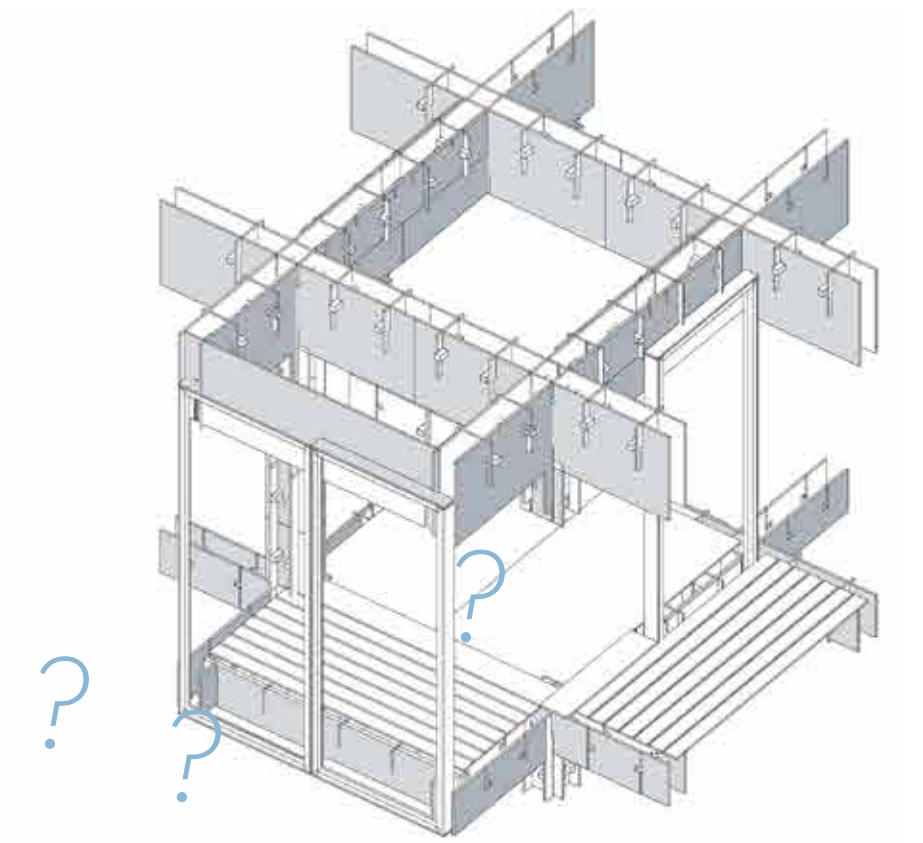
Woven bamboo panel



Traditional West Bengalese patterns



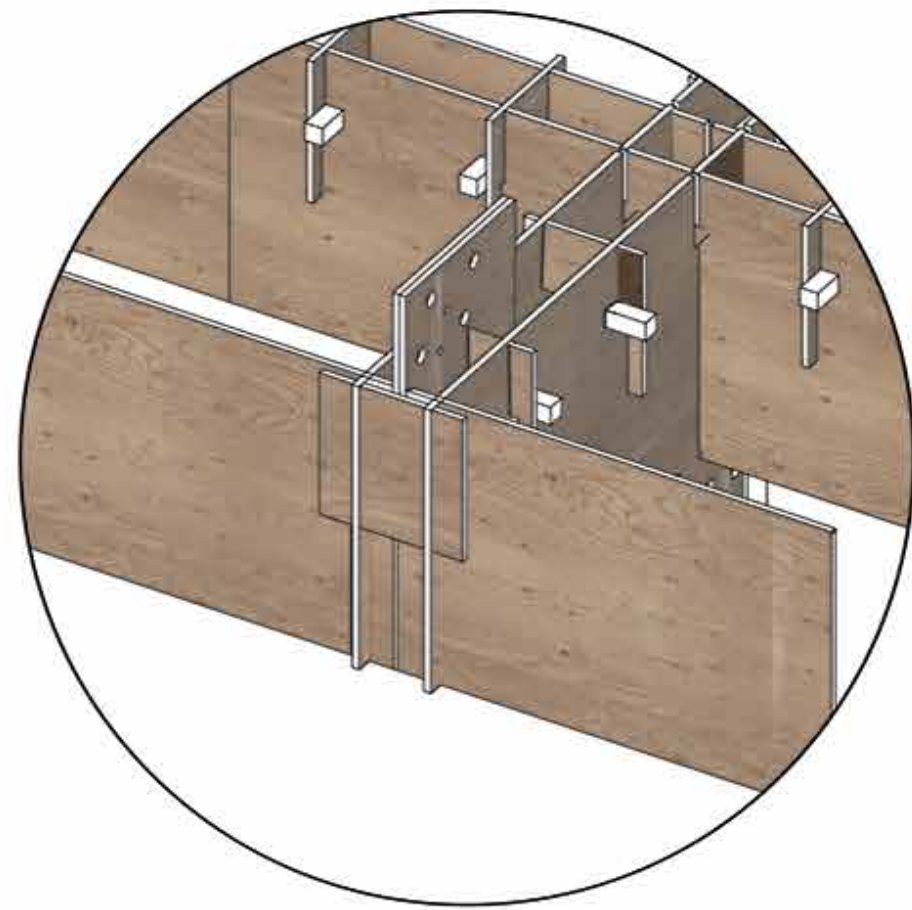
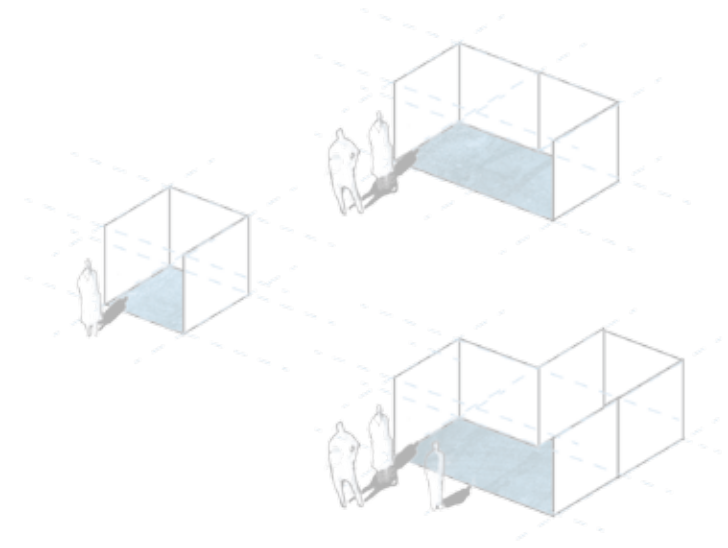
Thicker woven straw panel



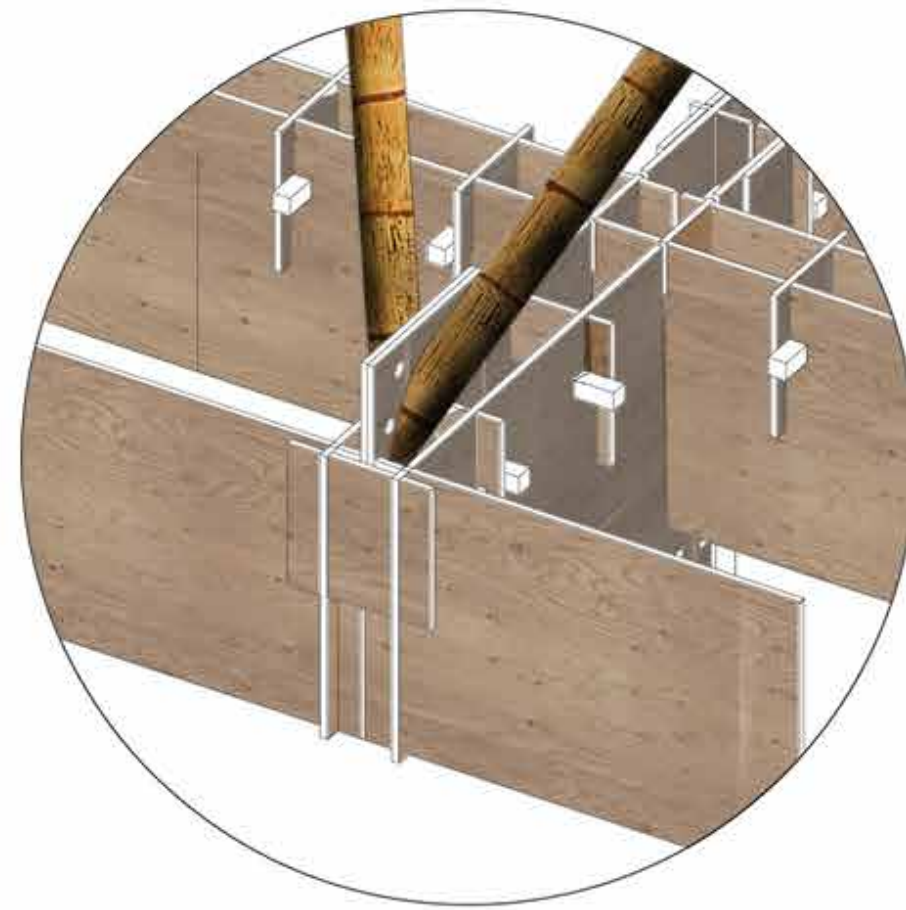
Possibility for local craftsman to contribute

BUILDING SYSTEM

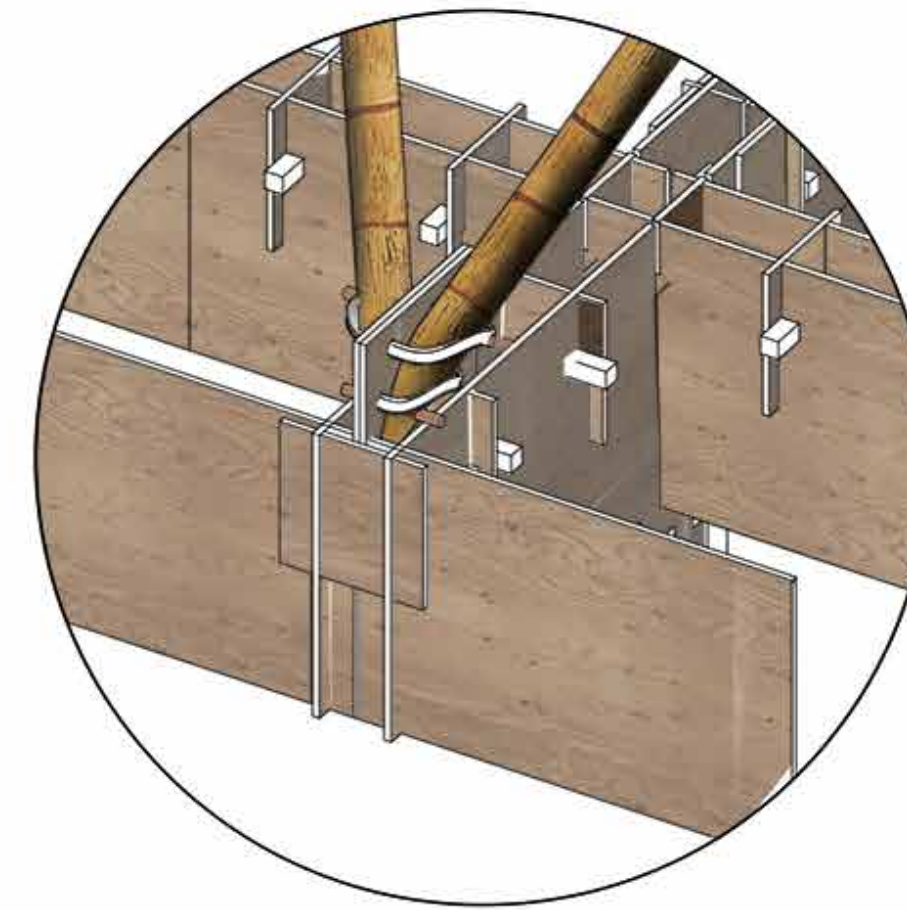
Roof addition



Connection point for roofing



Tapered bamboo slide on plate

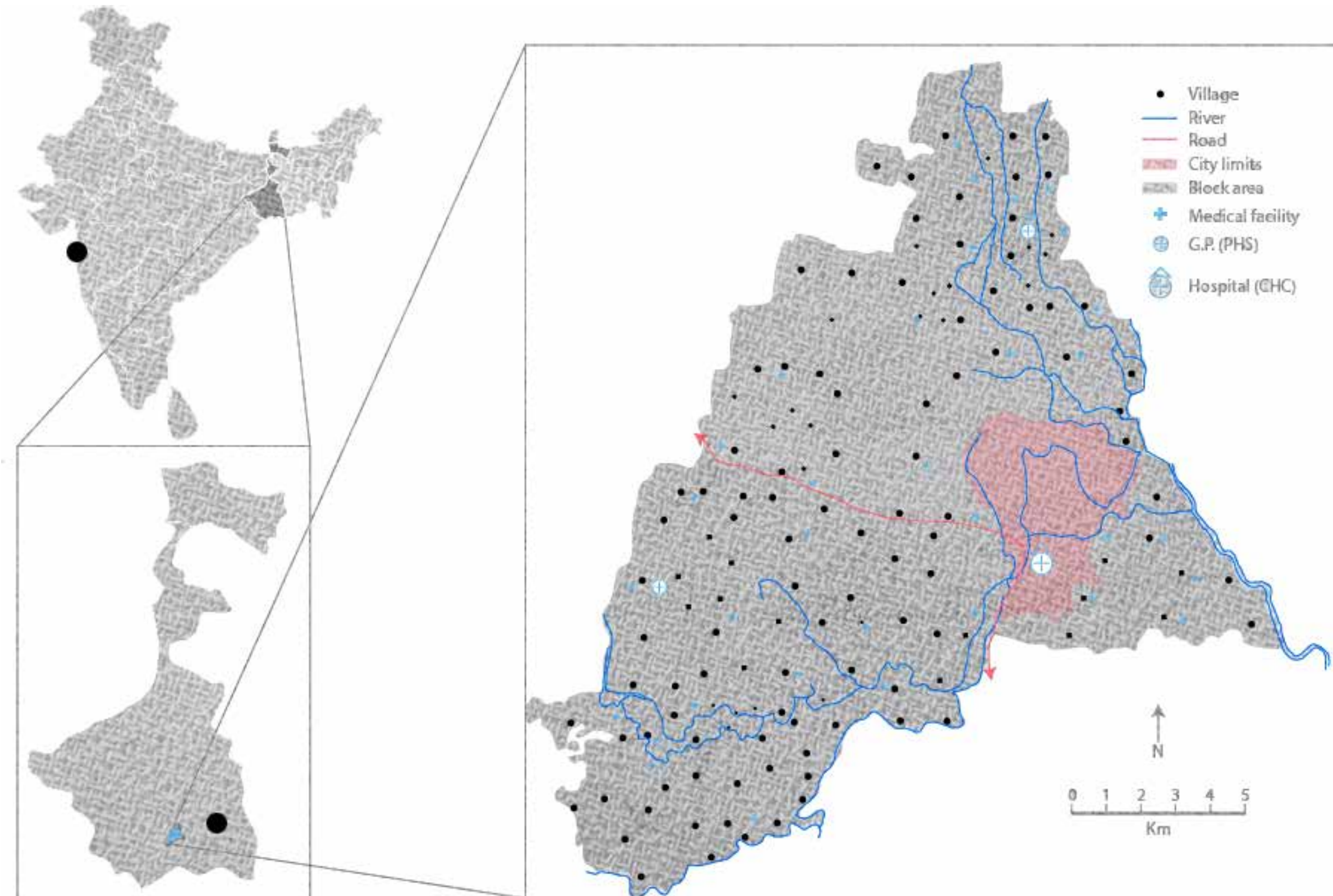


Pinned and lashed at 2 points to attach

IMPLEMENTATION

CONTEXT

Context



GHATAL AREA,
WEST BENGAL, INDIA

CONTEXT

Overview

Inhabitants
219,555

Children
25564 age 0-6

Primary occupation
Farming

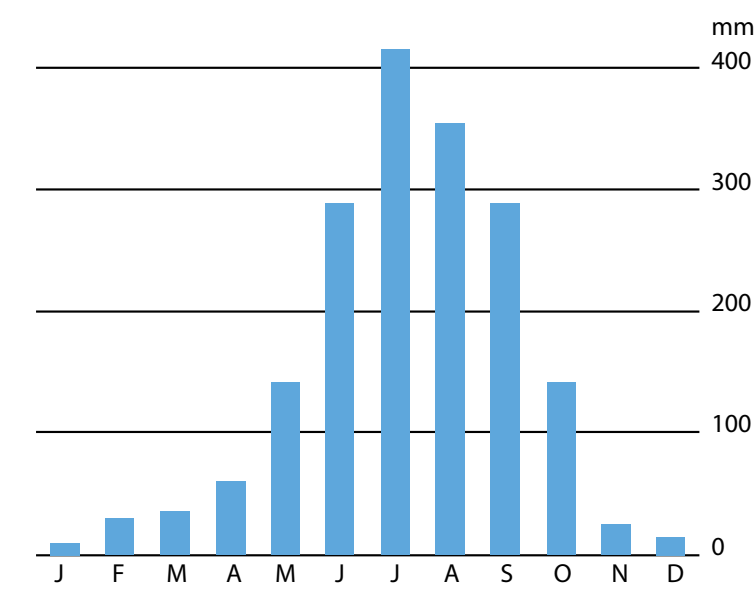
Land area
216 km²

Literacy
81%

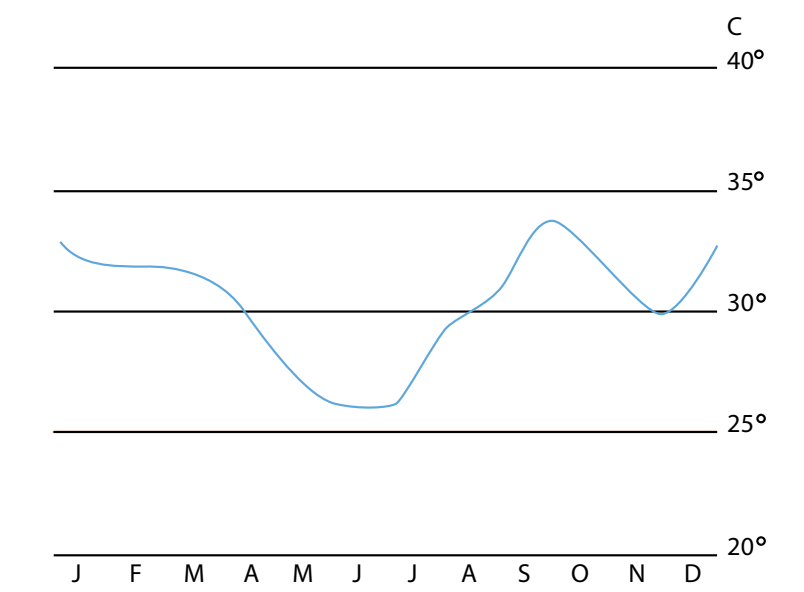
Income average
15,200 Rp (€ 189,86)

Religion

Tropical Region



Rainfall



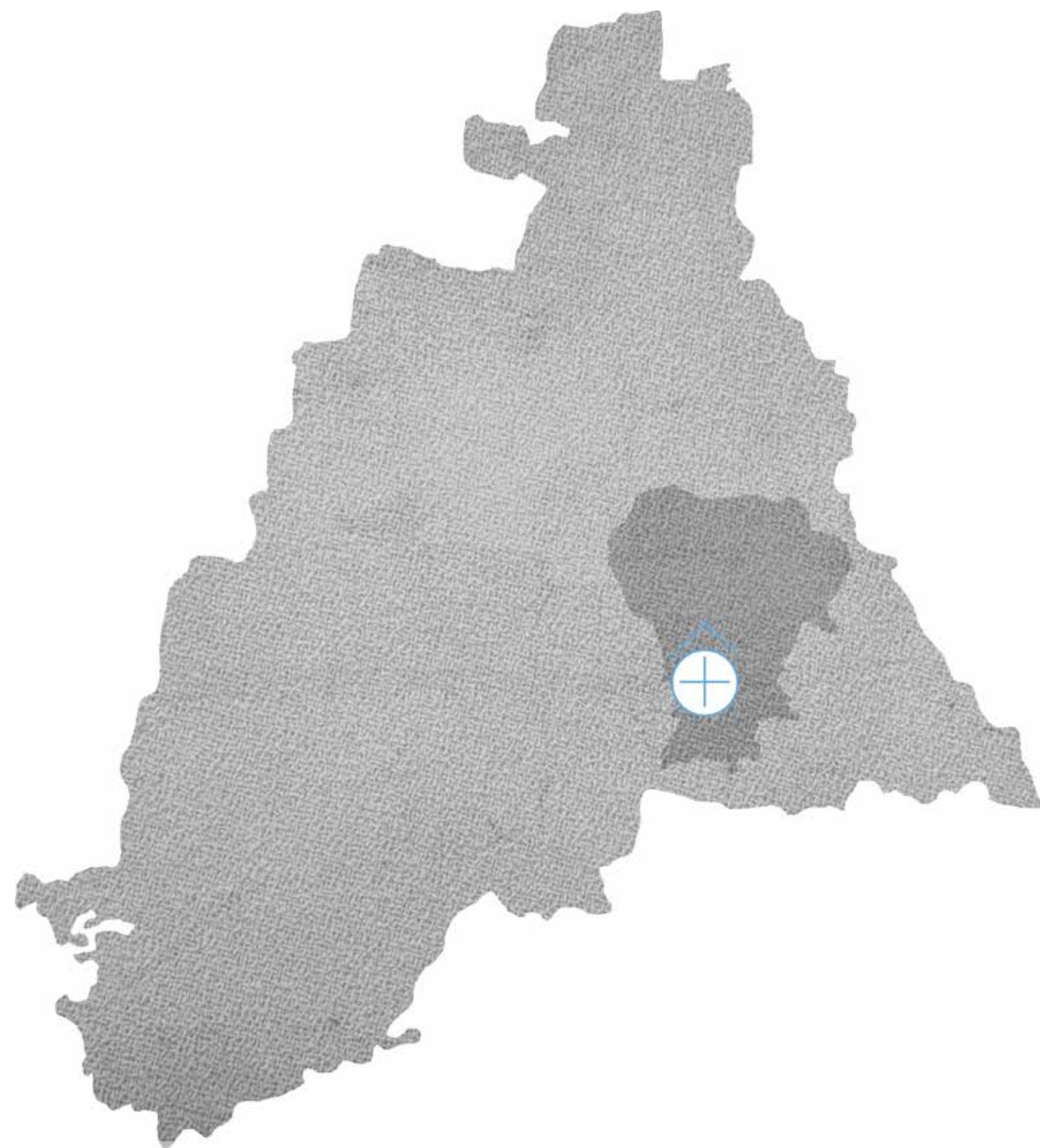
Temperature

FACTS

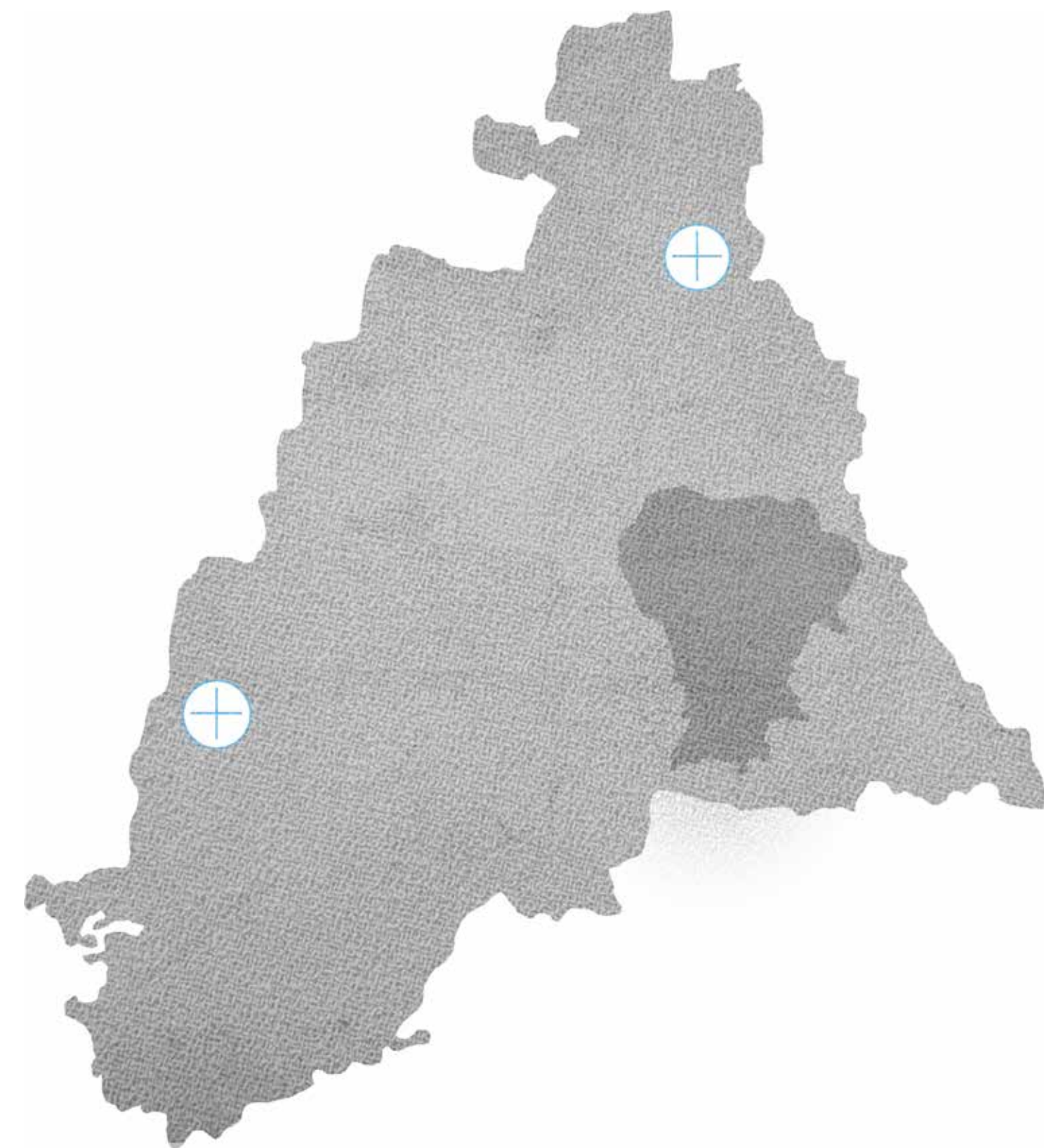
CLIMATE

CONTEXT

Needs - facilities



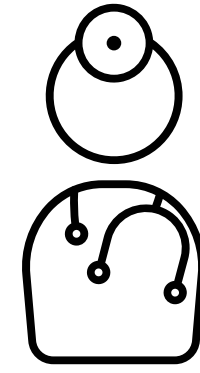
SUBDIVISION HOSPITAL



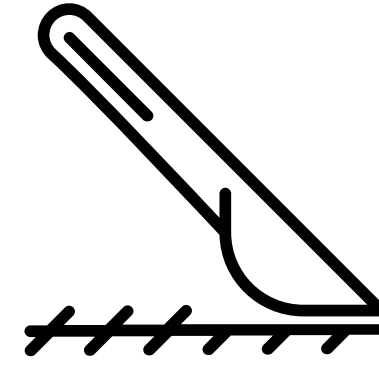
GENERAL PRACTITIONERS

CONTEXT

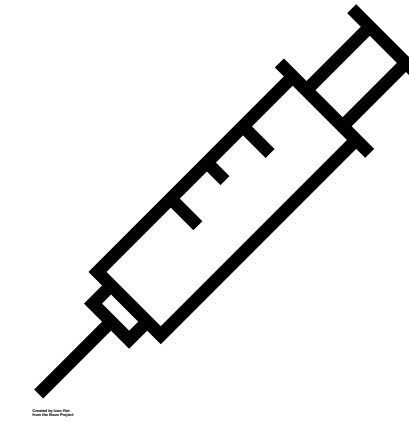
Needs - medical care



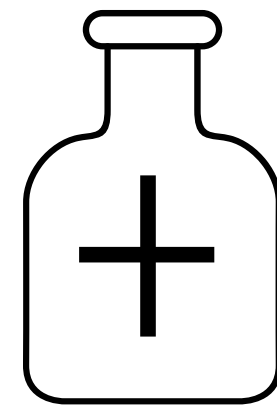
*General
care*



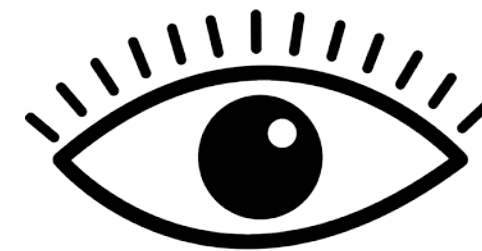
*Small
Procedures*



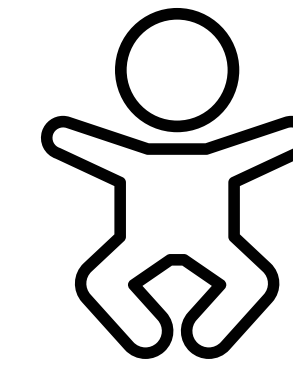
Immunization



Basic medicines



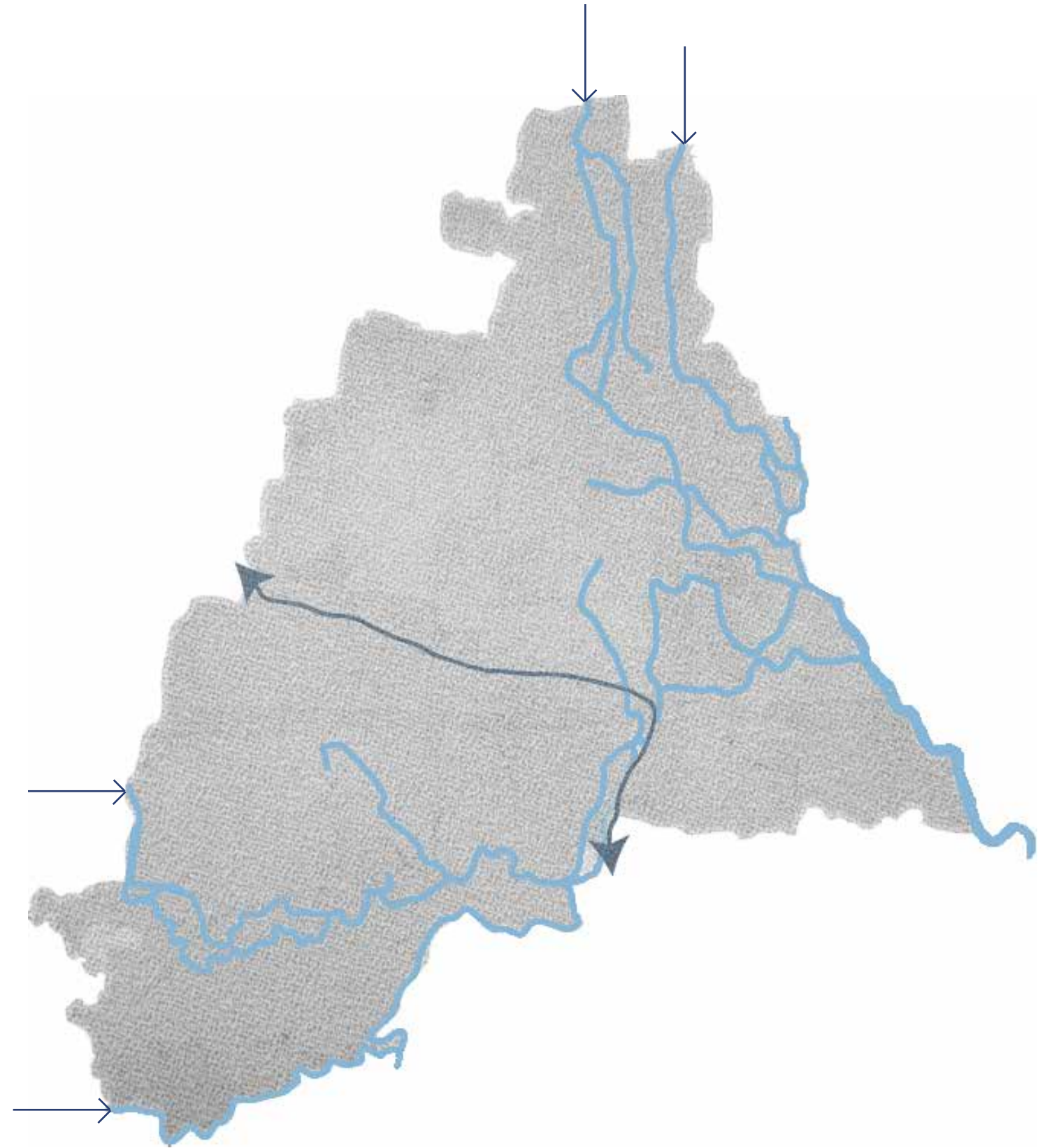
Eye care



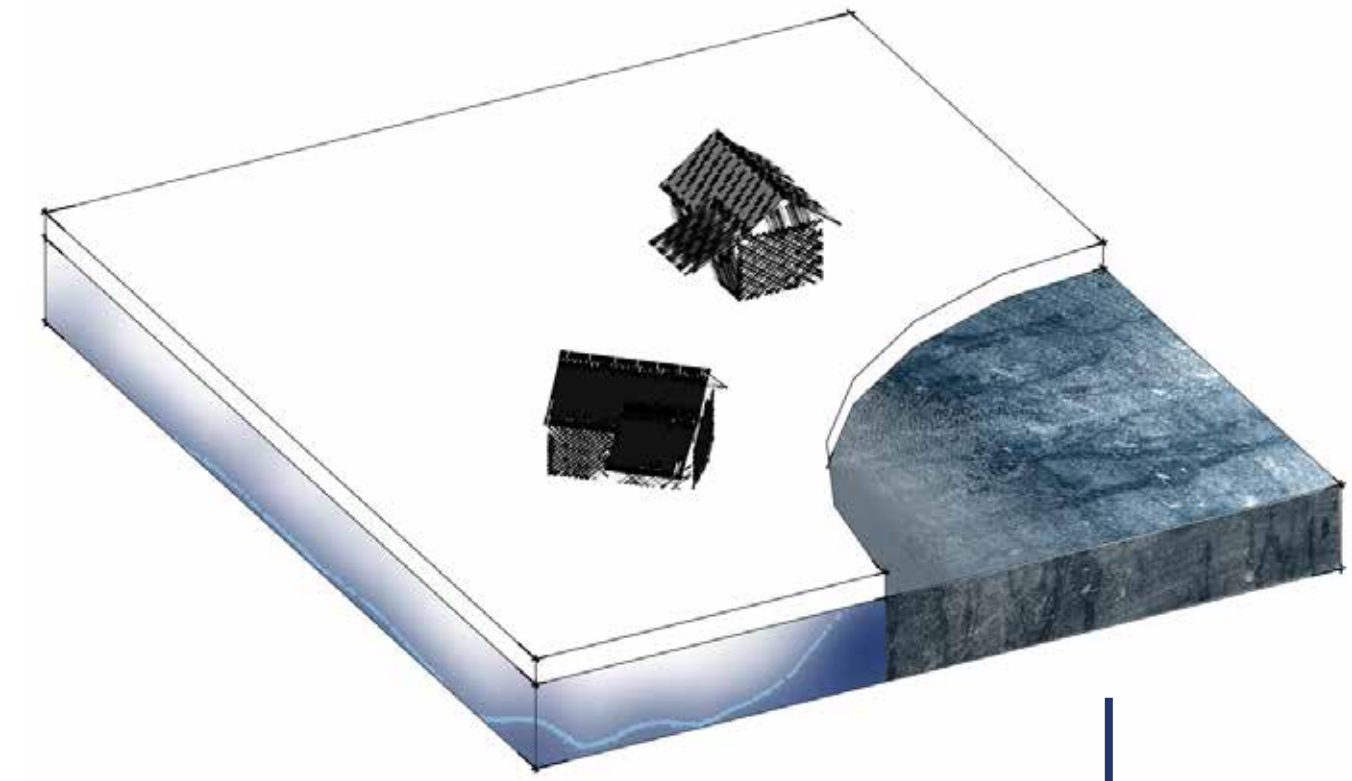
*Birth control /
Maternity*

CONTEXT

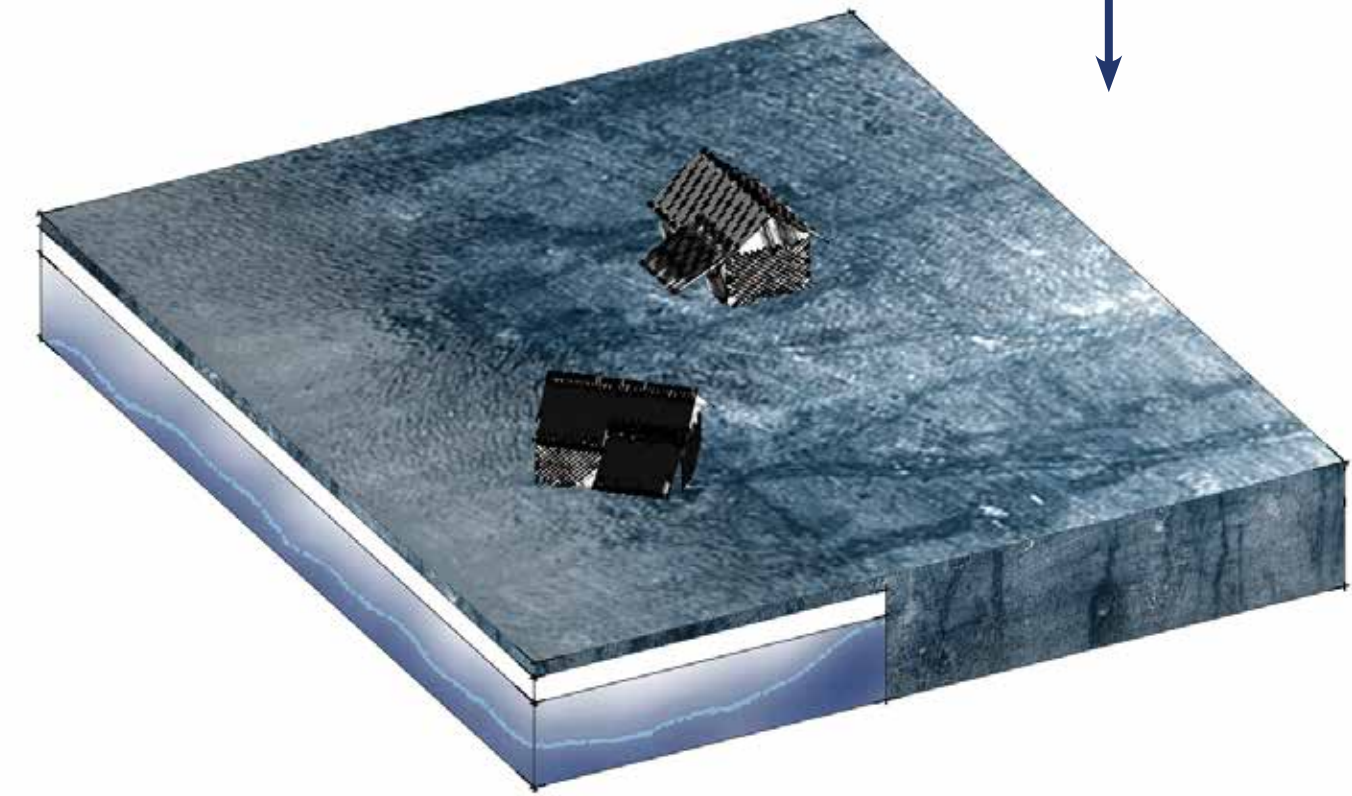
flooding



Dry Season



Monsoon



CONTEXT

flooding

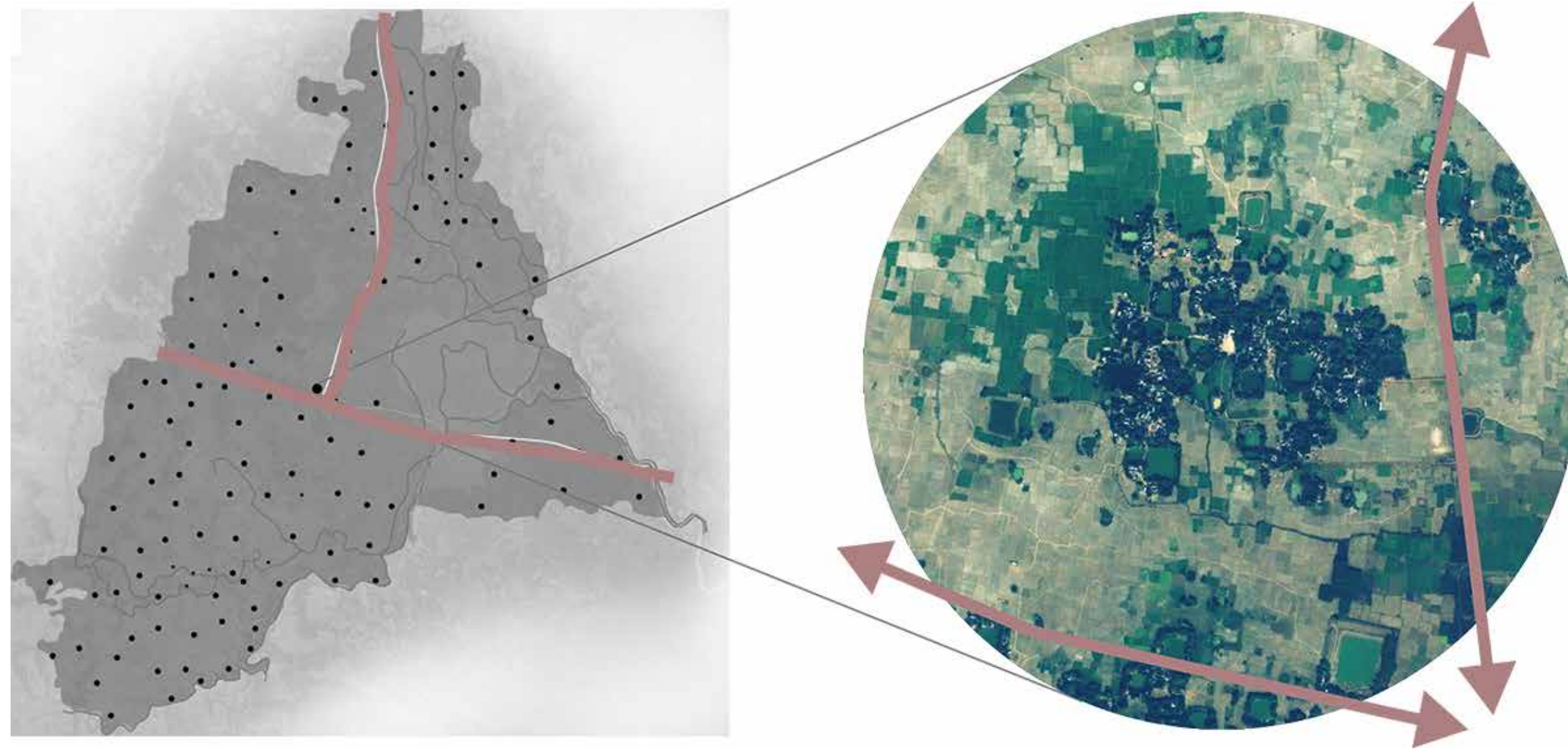


FLOODING RESULT

EXAMPLE SITE

EXAMPLE SITE

Analysis



Village Marichya

Population: 10.500
Main profession: Agriculture
School: No
Medical facility: No

EXAMPLE SITE

Analysis



HOUSING SITUATION



DOCTORS VISIT

RESEARCH

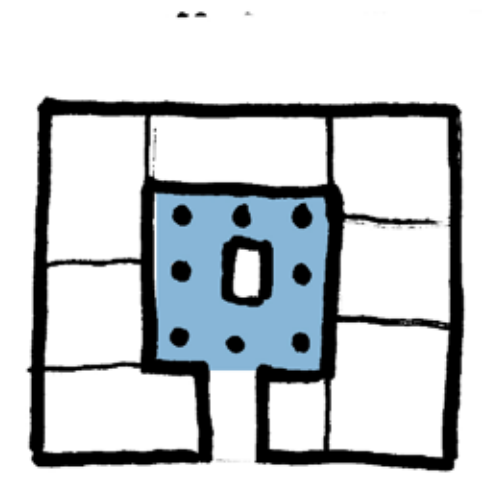
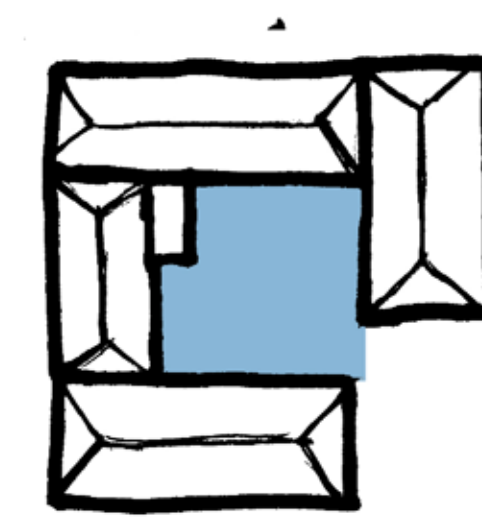
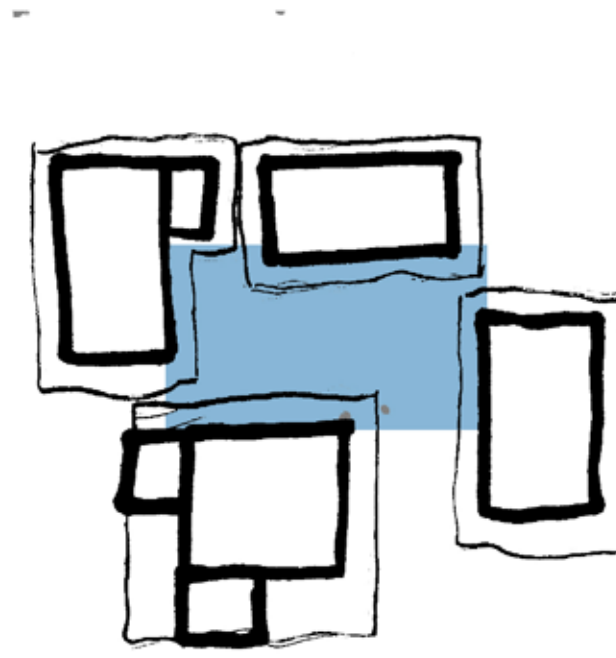
Context - vernacular



Houses



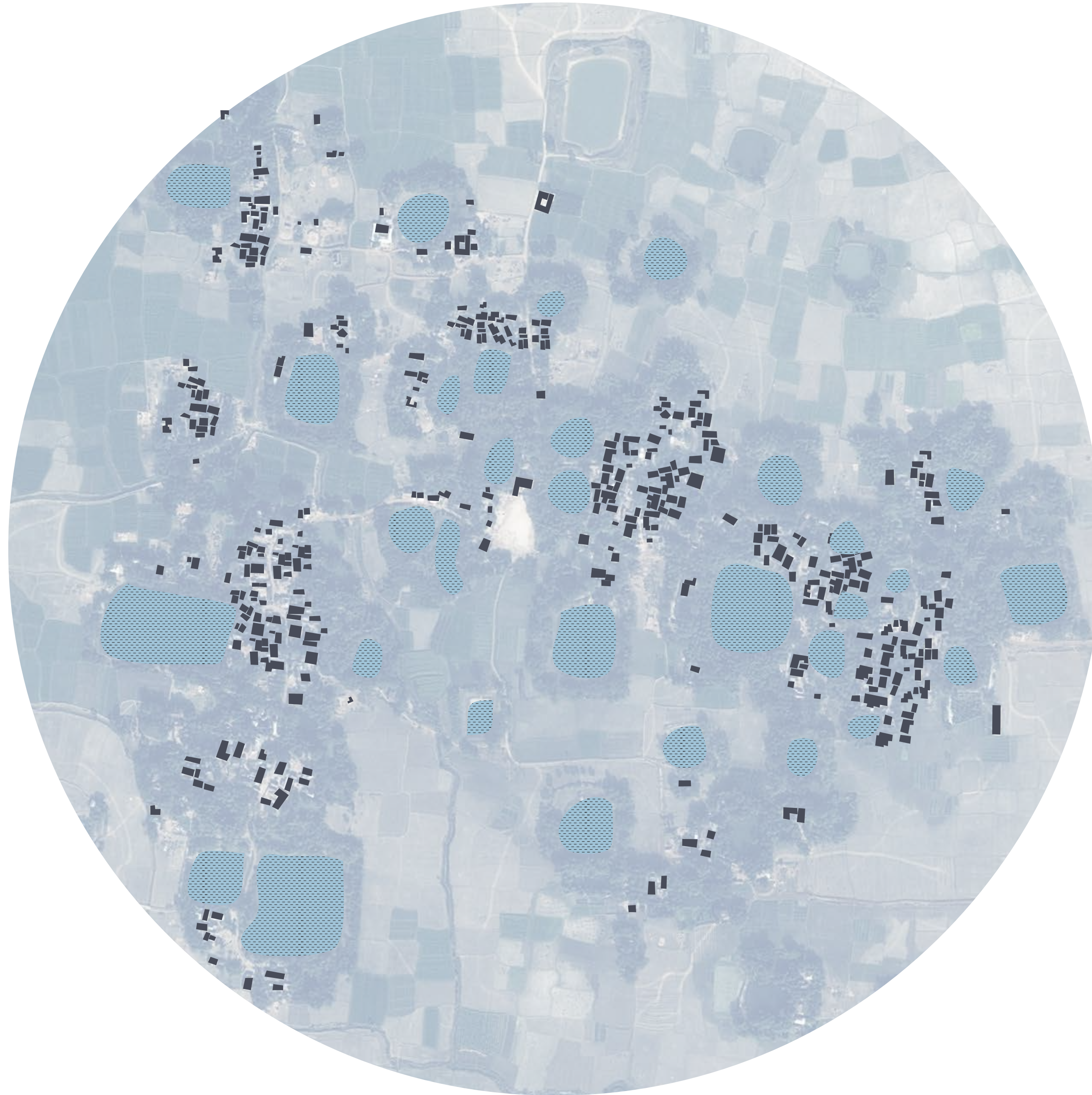
Clusters



Courtyards

EXAMPLE SITE

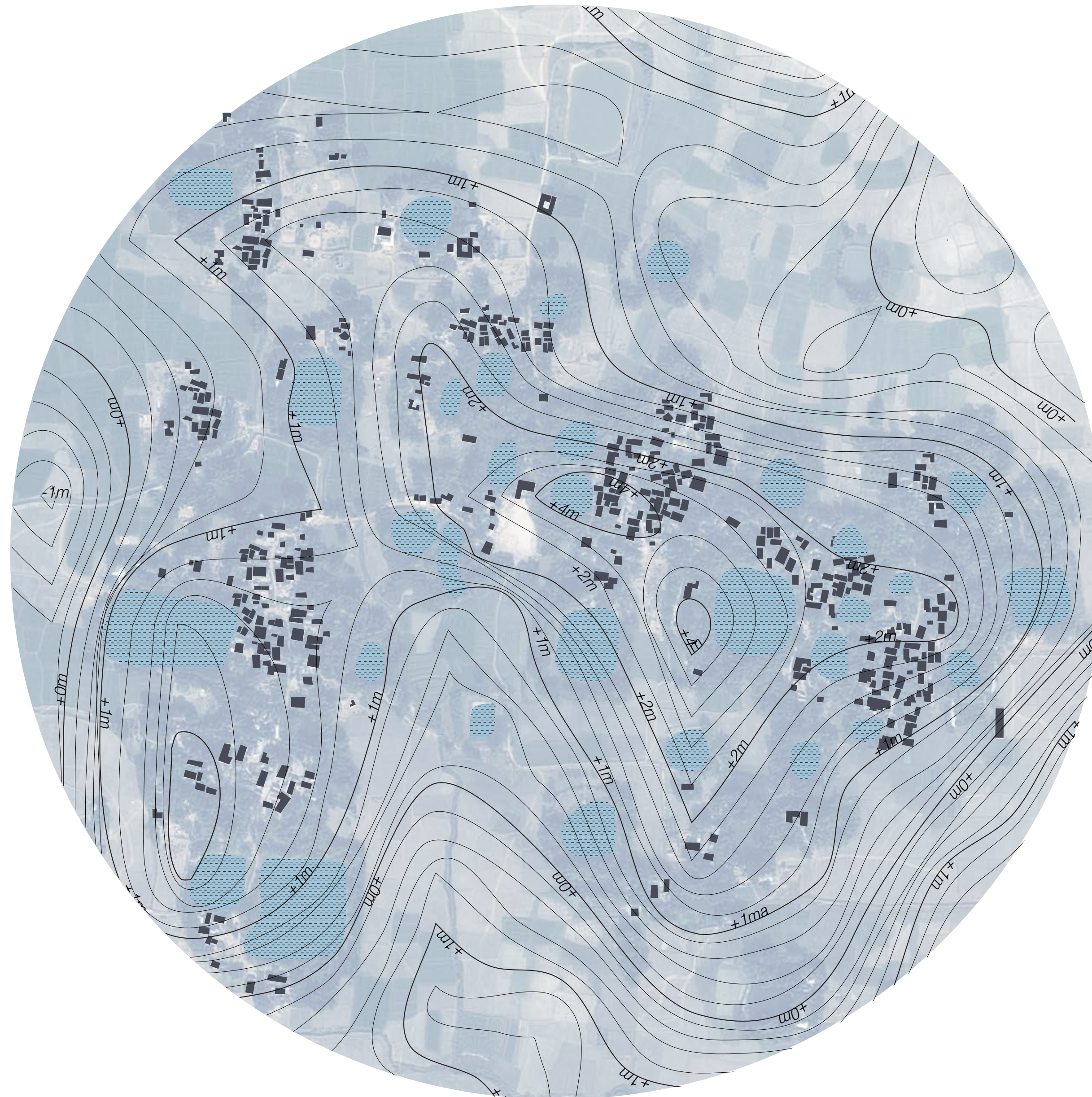
Analysis



VILLAGE LAYOUT

EXAMPLE SITE

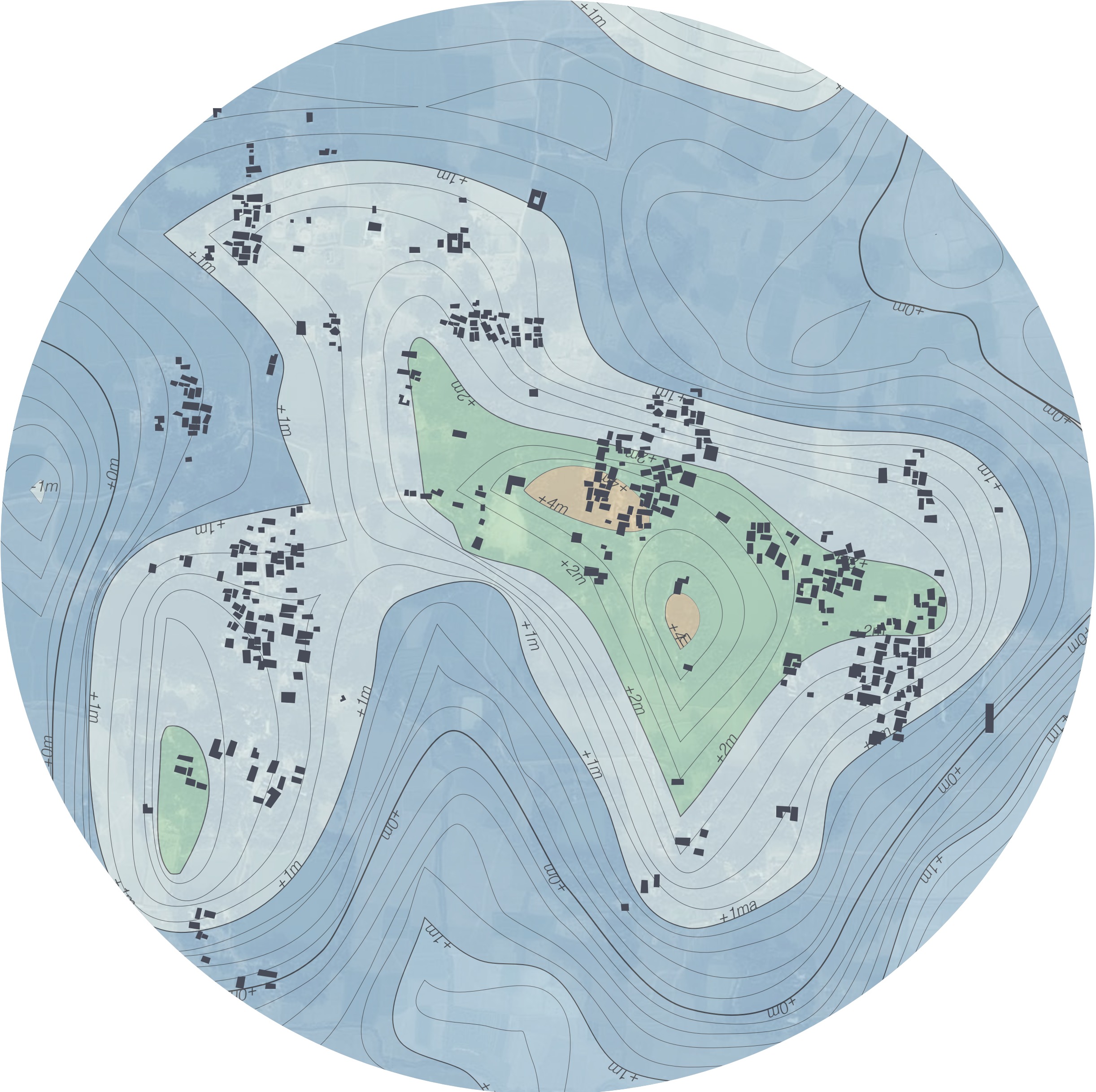
Analysis



CLUSTERS ON HIGHER GROUND

EXAMPLE SITE

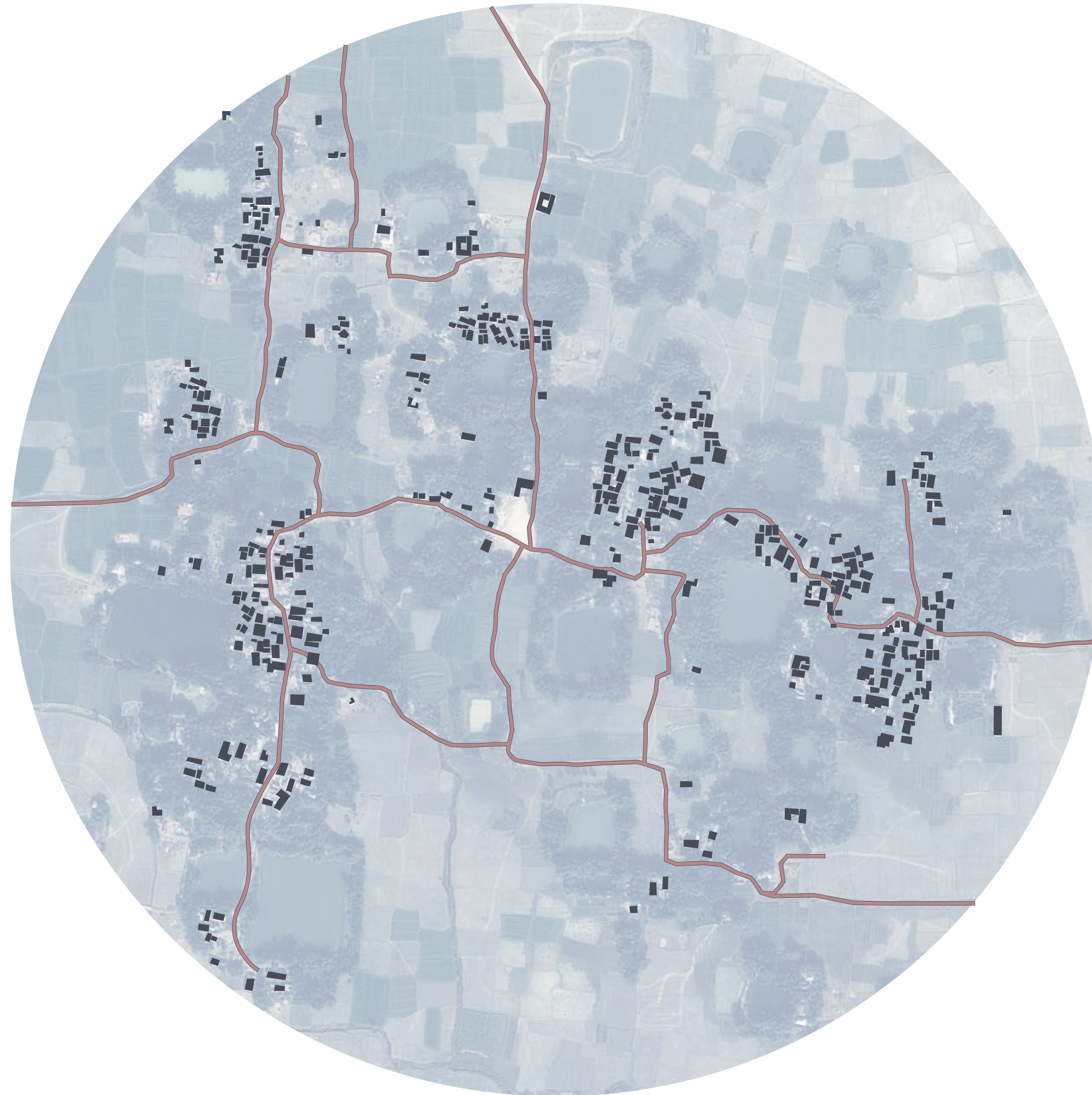
Analysis



OUT OF REACH OF FLOOD

EXAMPLE SITE

Analysis



INFRASTRUCTURE

EXAMPLE SITE

Analysis



CENTRAL SQUARE

EXAMPLE SITE

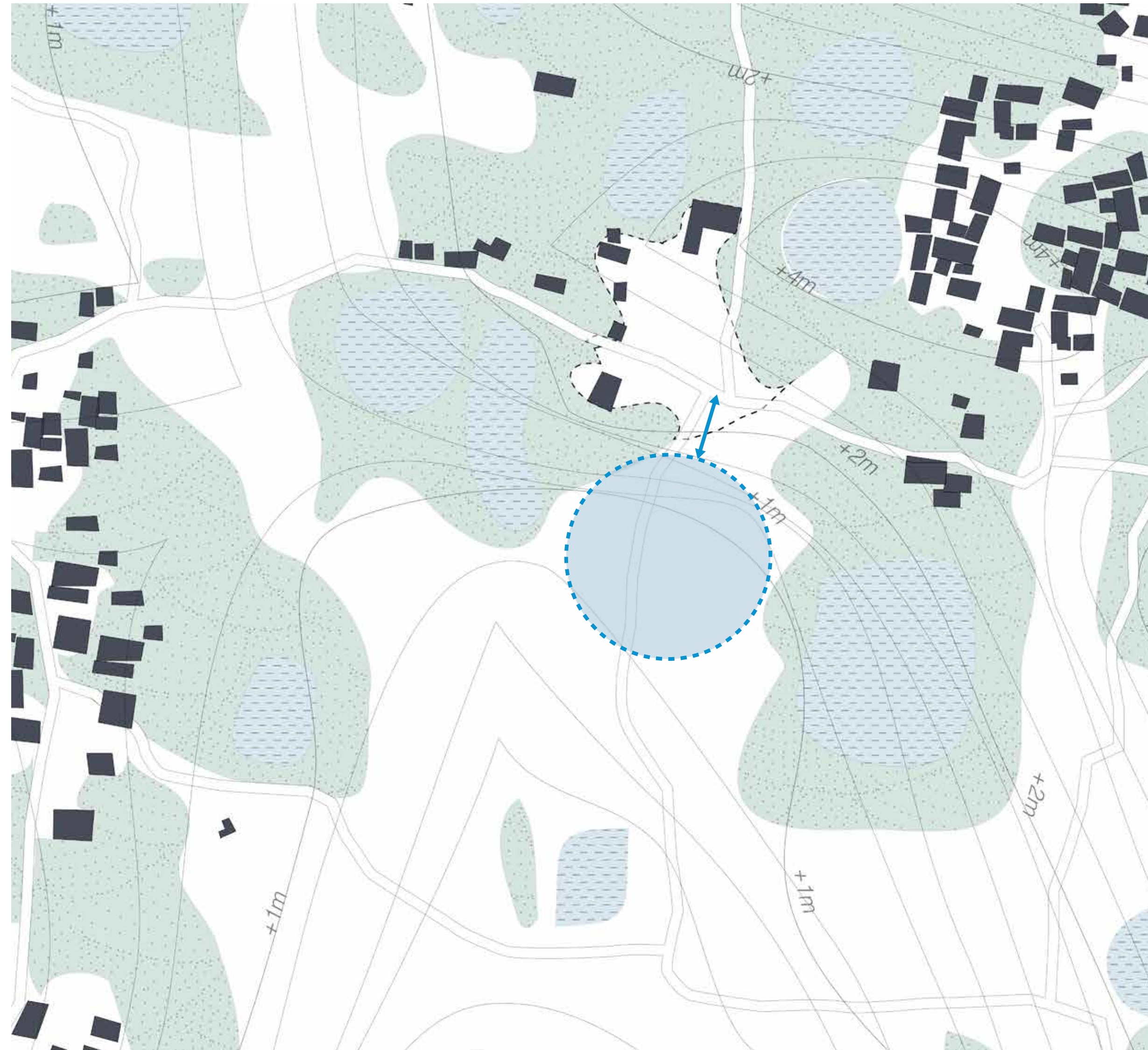
Analysis



LOCATION

DESIGN MOTIVES

SITE
Location



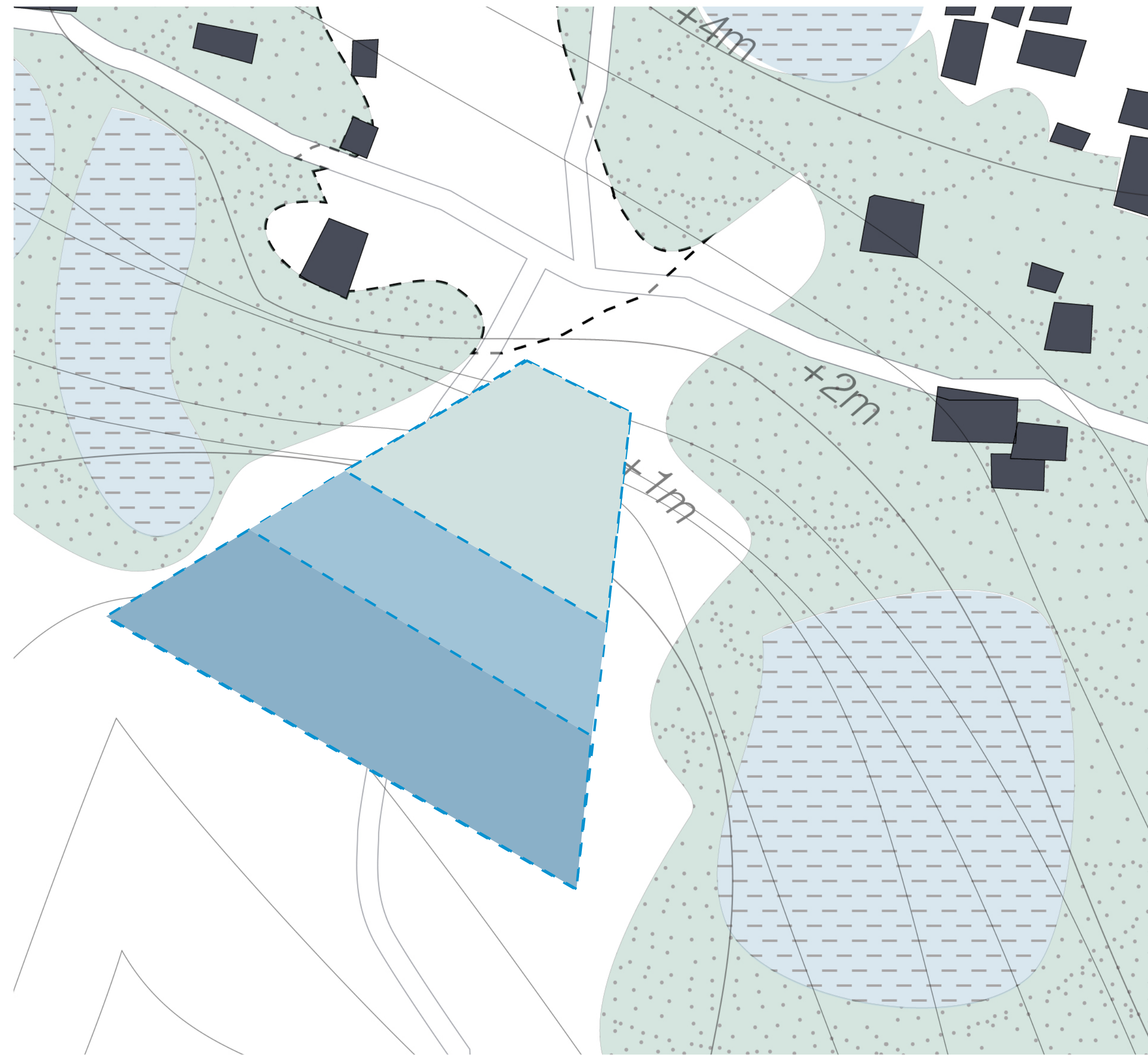
CONNECTION WITH MAIN SQUARE

SITE
Boundary



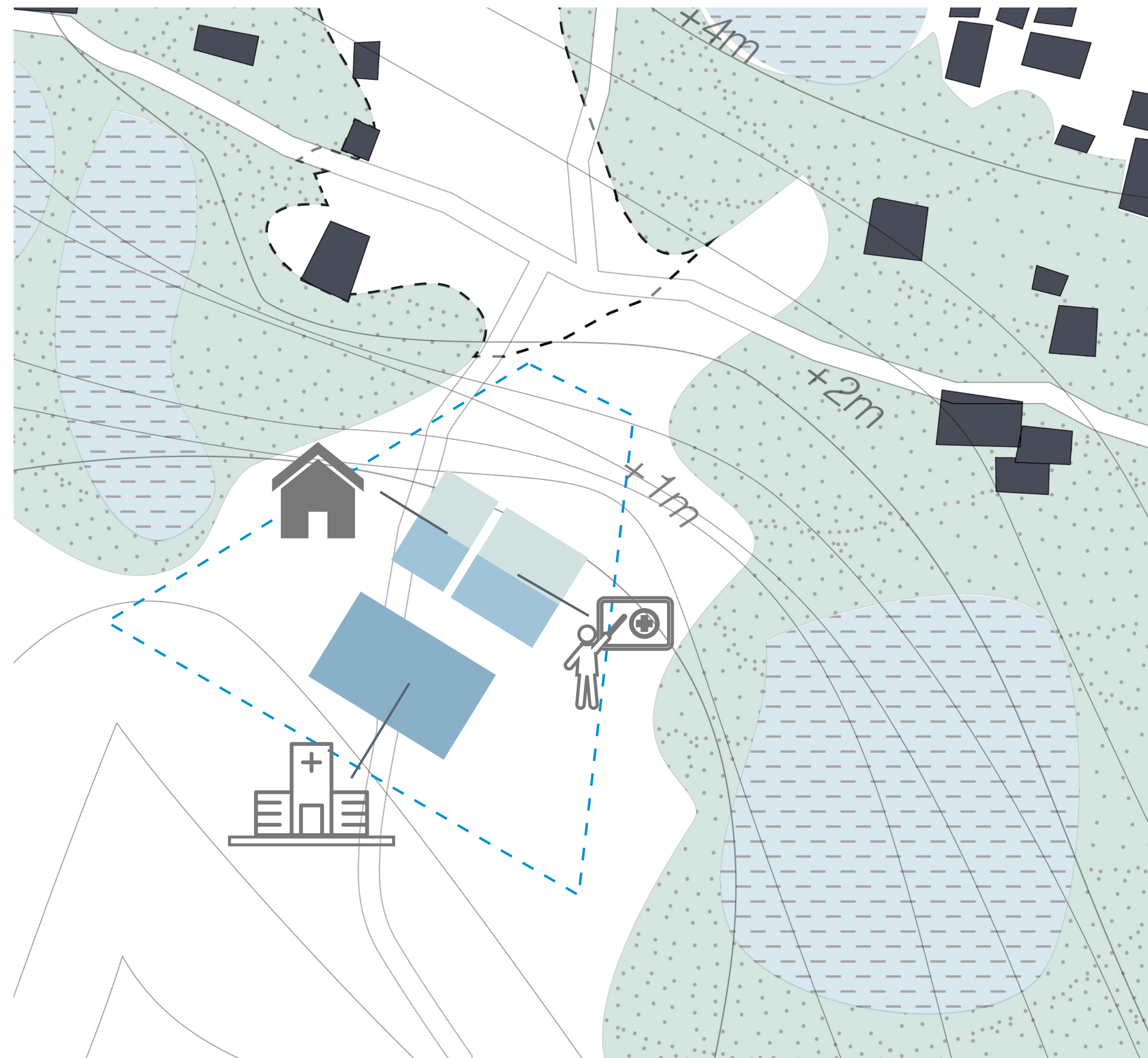
BOUNDARY OF BUILDABLE AREA

SITE
Configuration



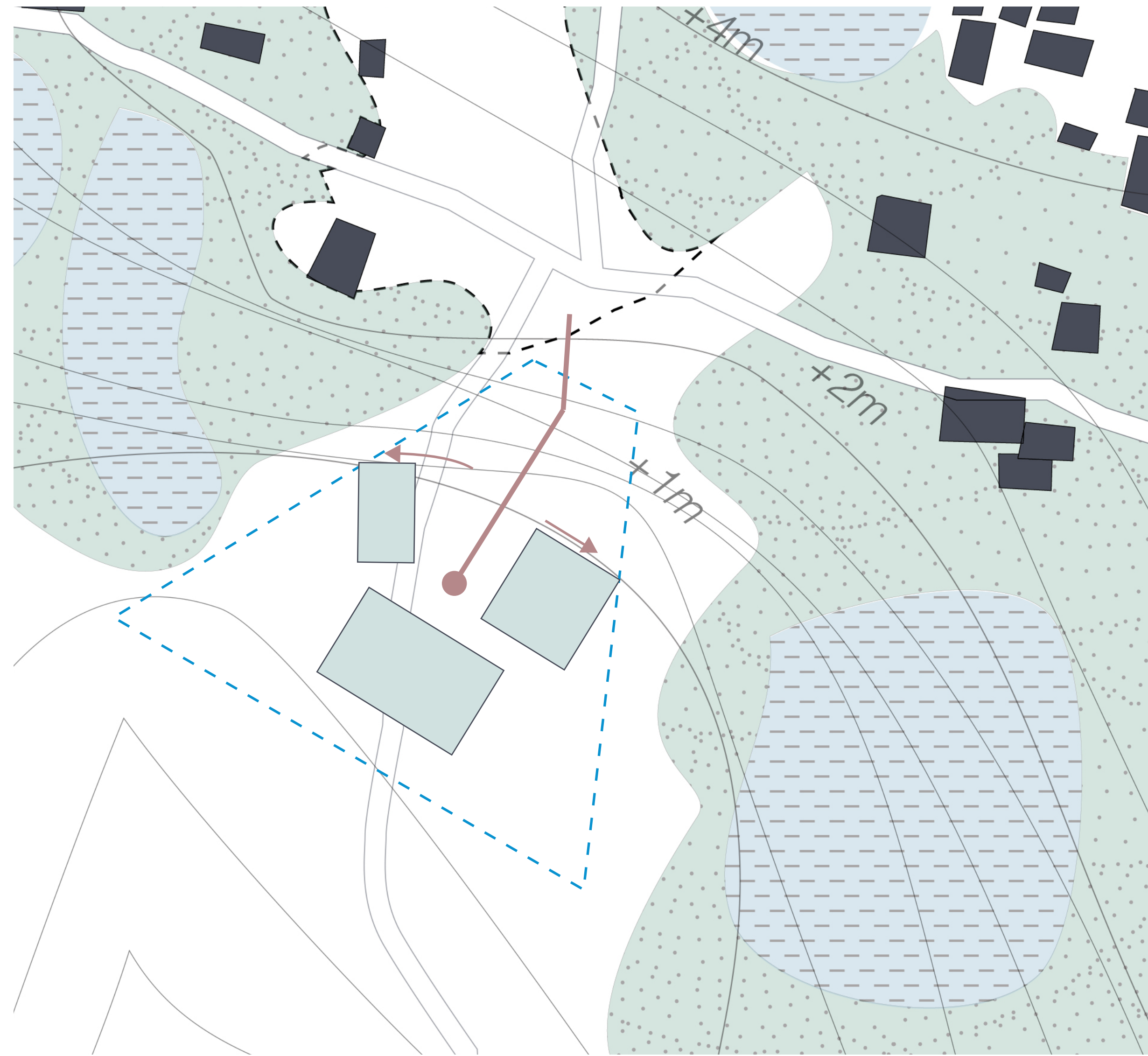
PUBLIC TO PRIVATE

SITE
Concept Mass



3 OBJECTS FOR THE 3 FUNCTIONS

SITE
Concept Mass



OPENING MASS TO THE SQUARE

SITE
Concept Mass



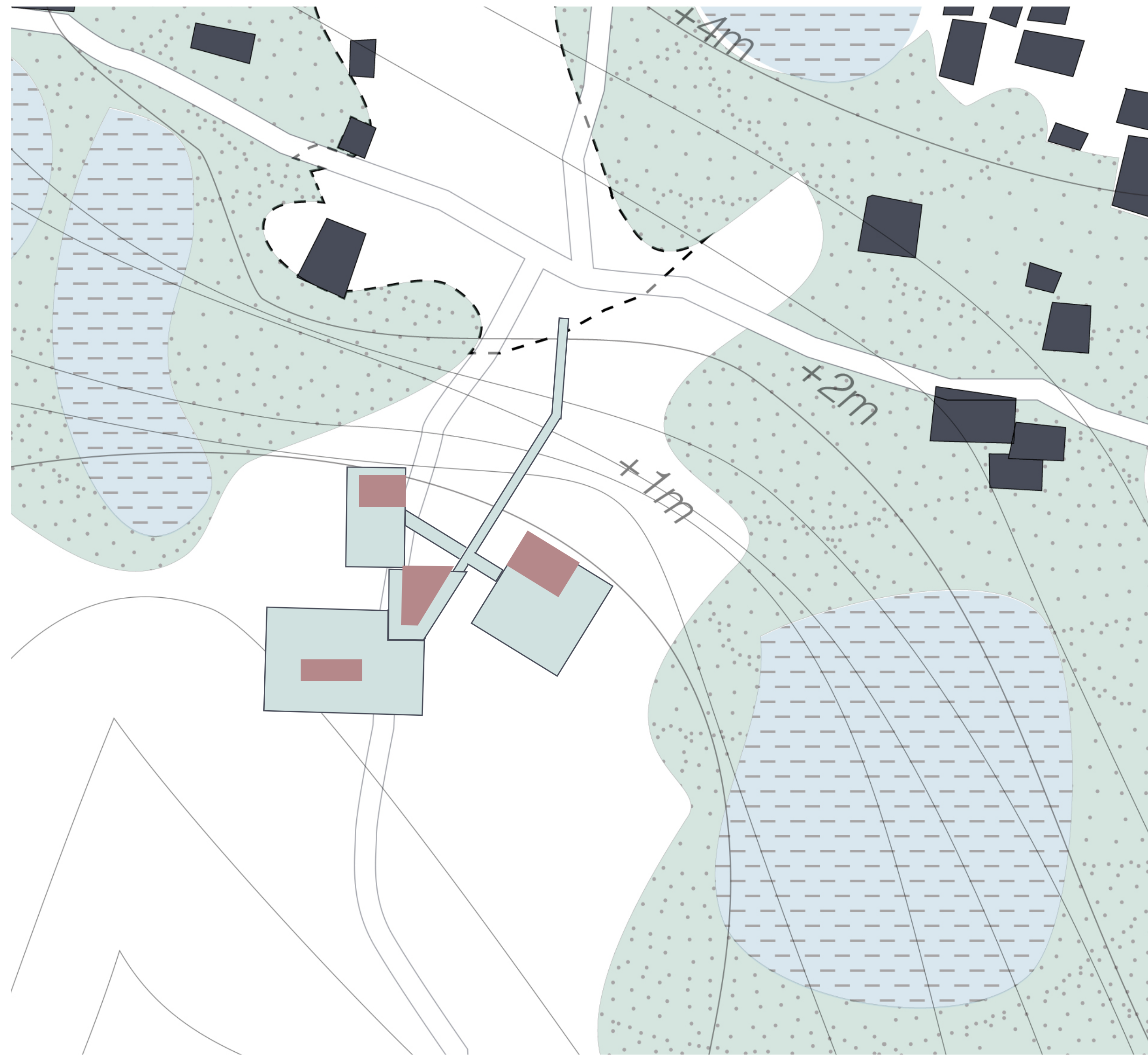
CREATING OPENING FOR AIR FLOW

SITE
Concept Mass



CONNECTION BETWEEN THE OBJECTS

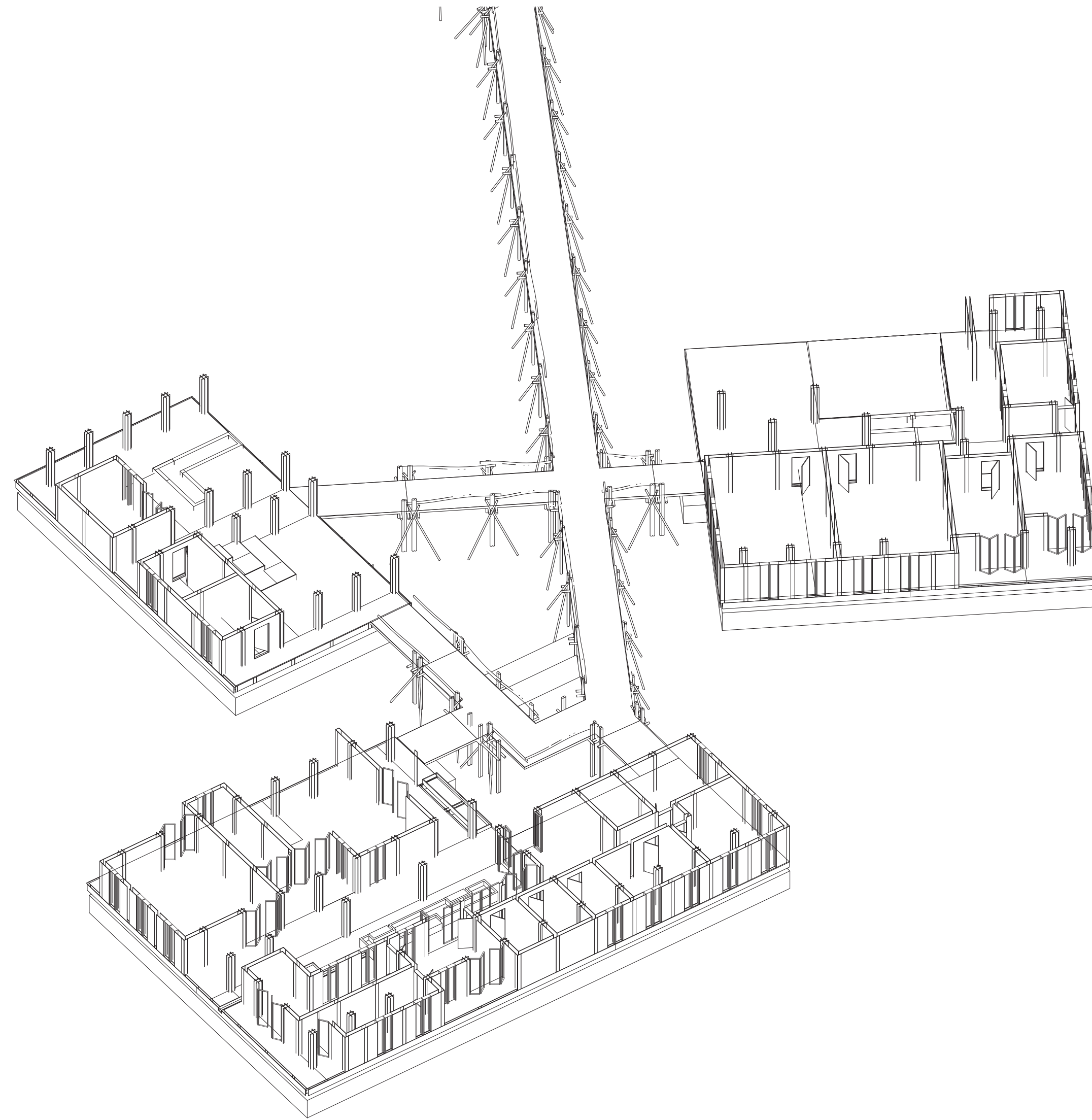
SITE
Concept Mass



WATER COURTS

PROGRAM

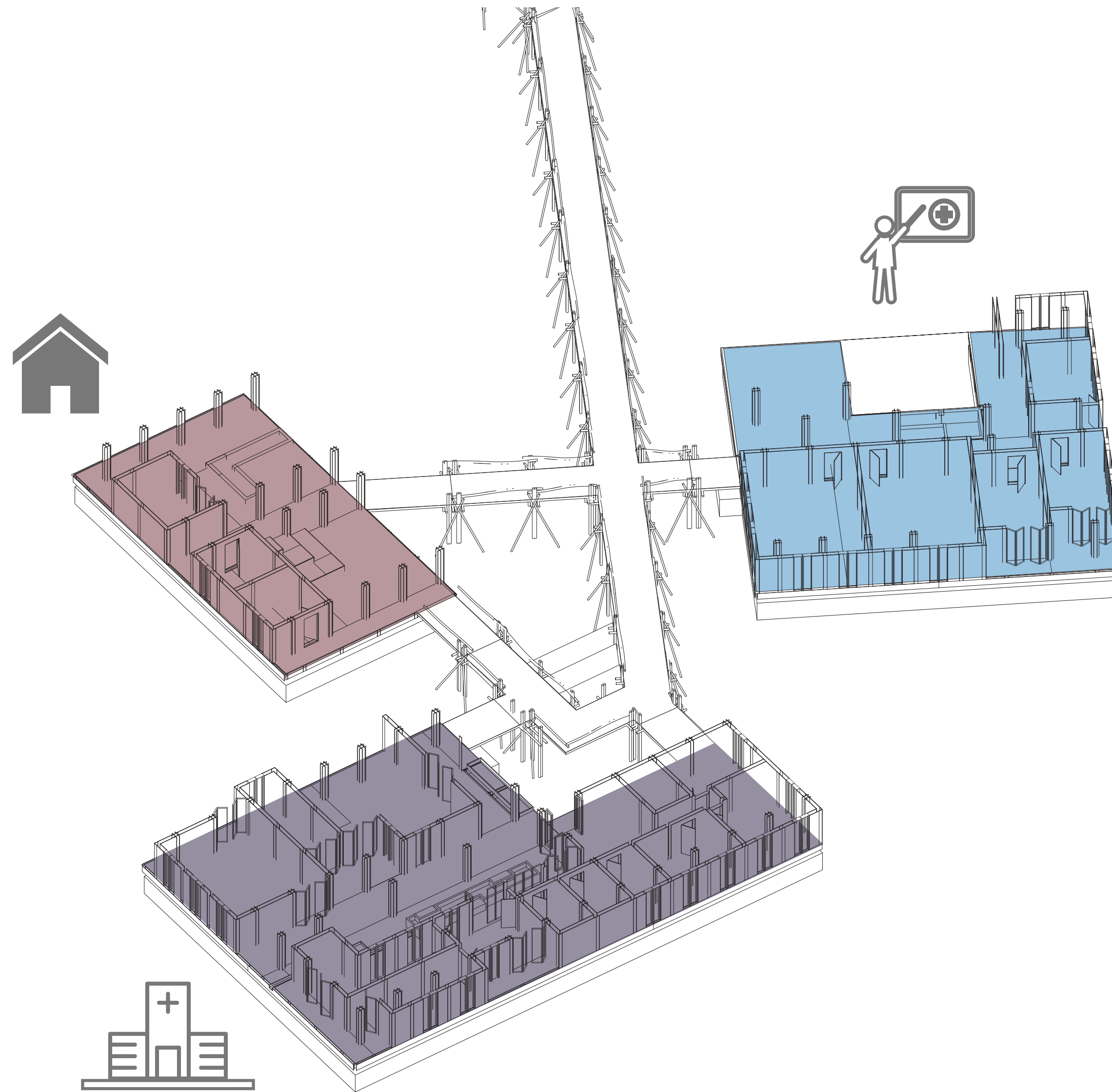
Concepts



Axonometric view

PROGRAM

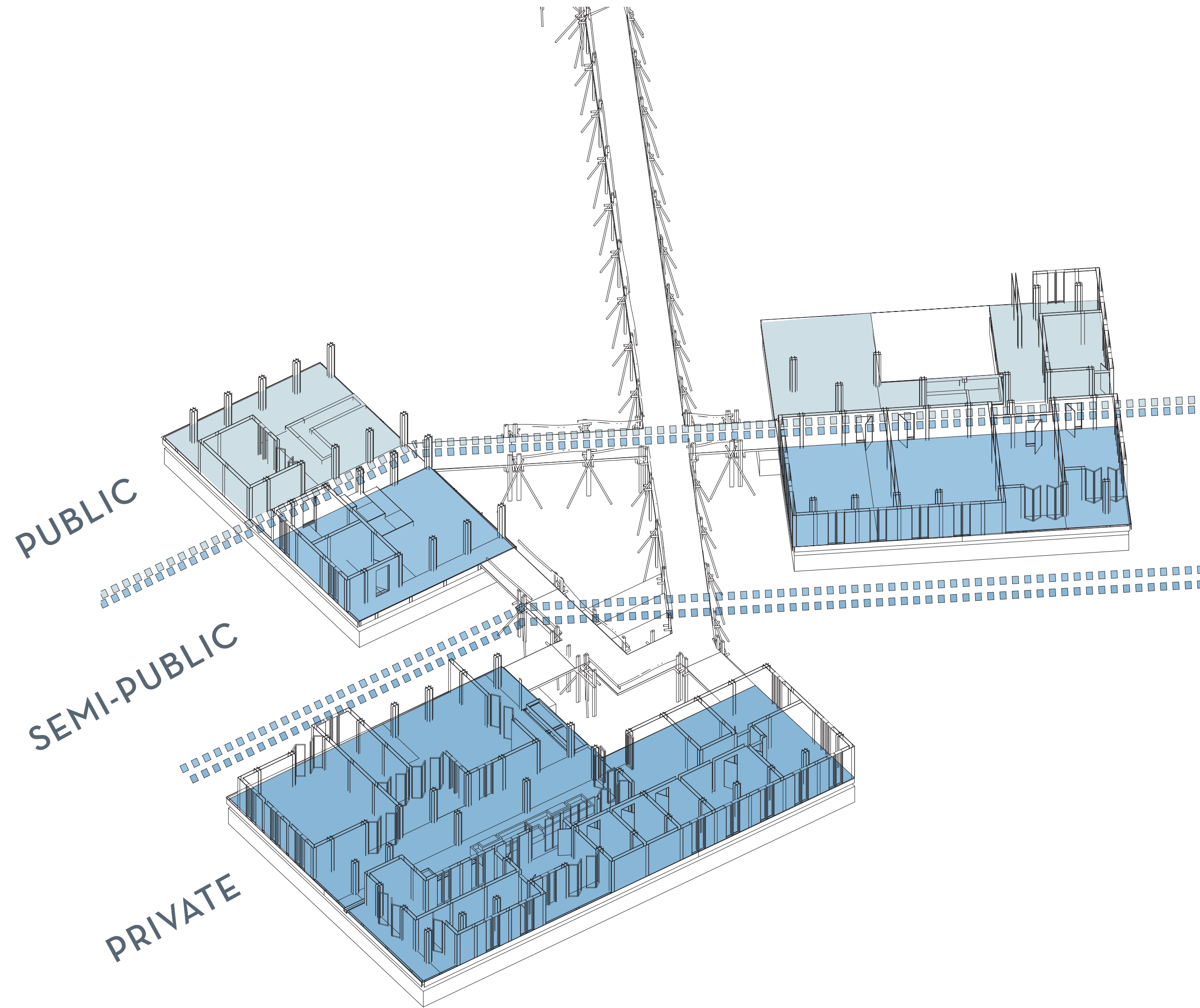
Concepts



Main functions per building

PROGRAM

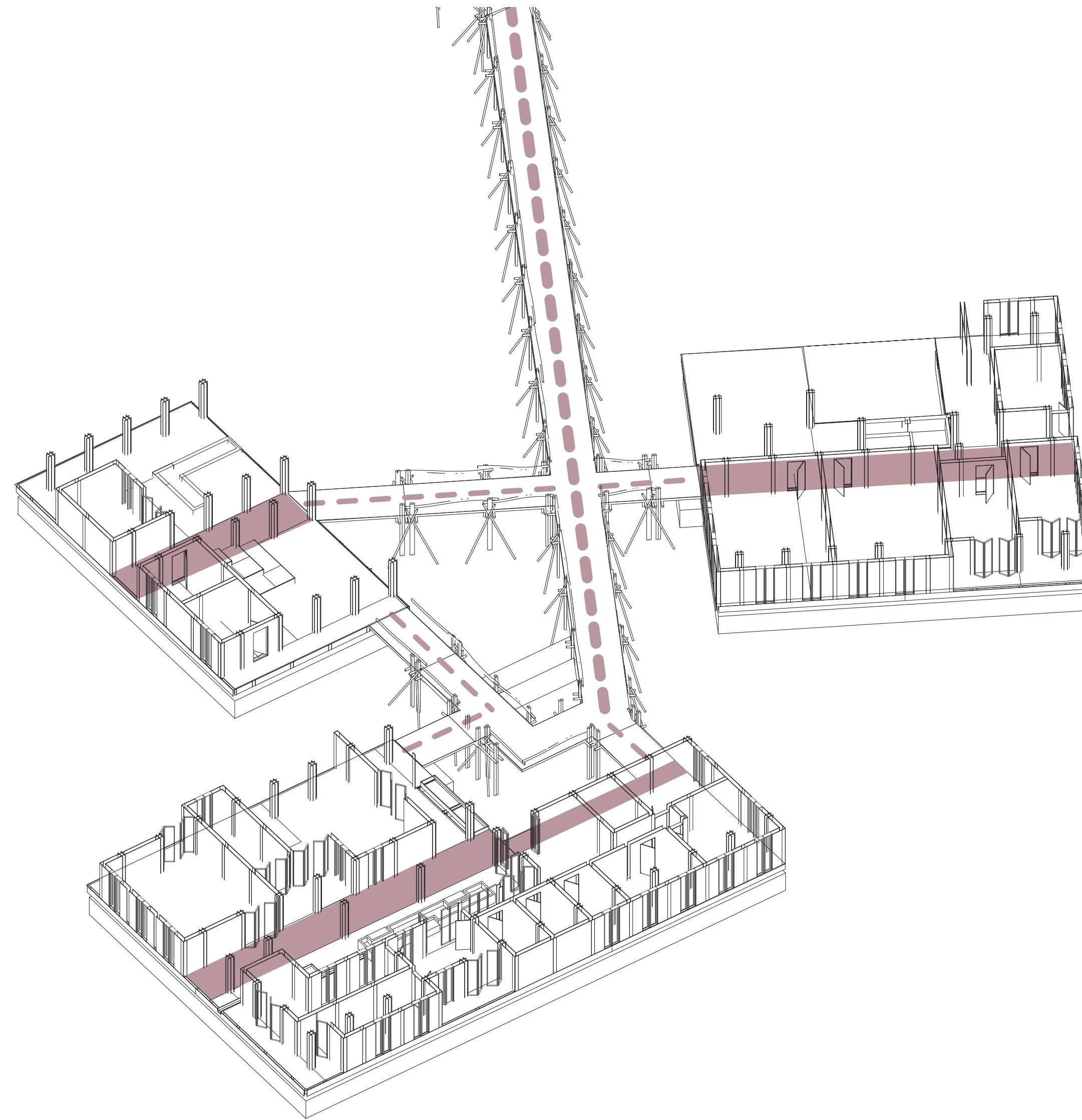
Concepts



Organization spaces from public to private

PROGRAM

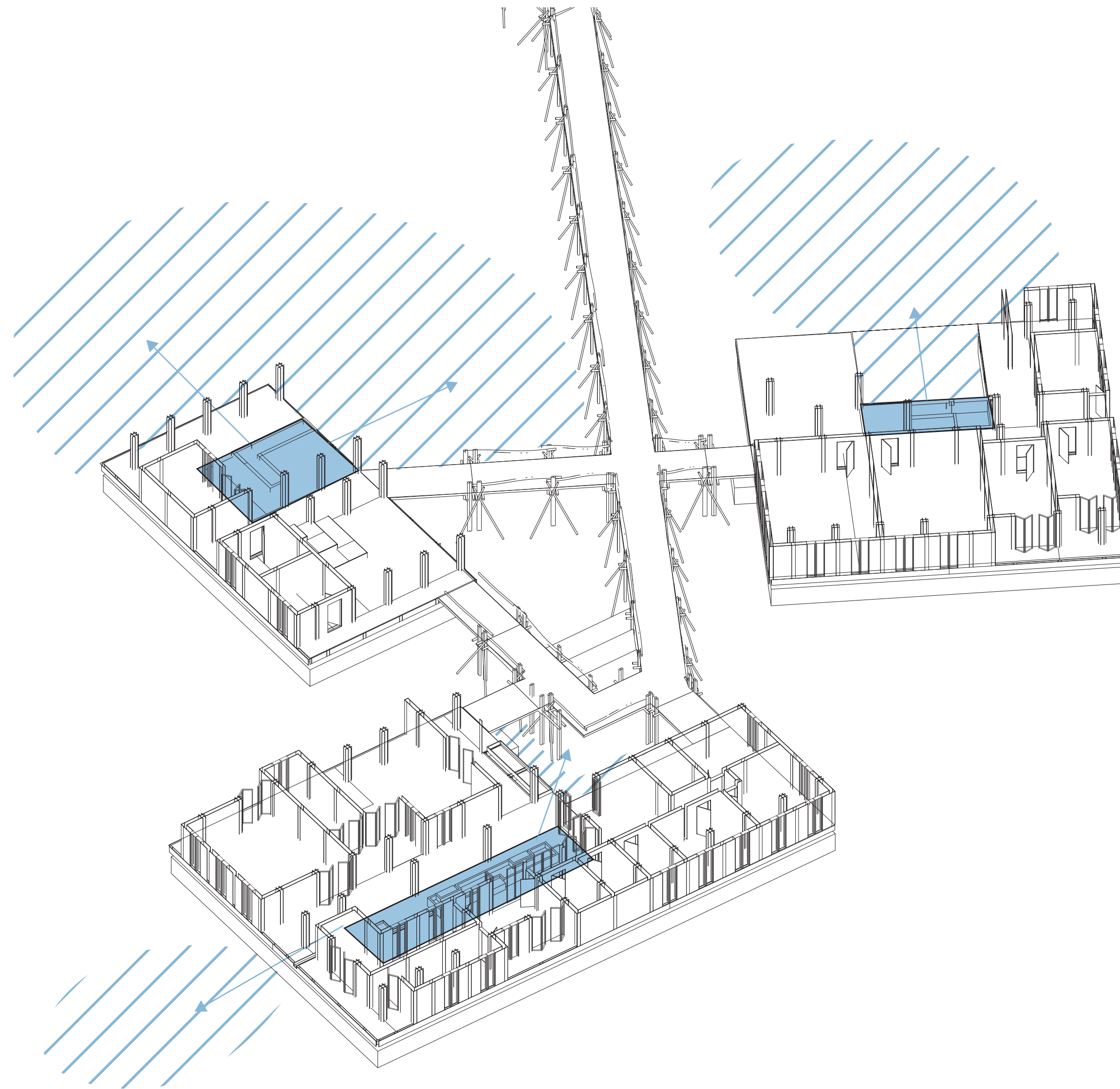
Concepts



Central corridors interlinking
buildings and spaces within

PROGRAM

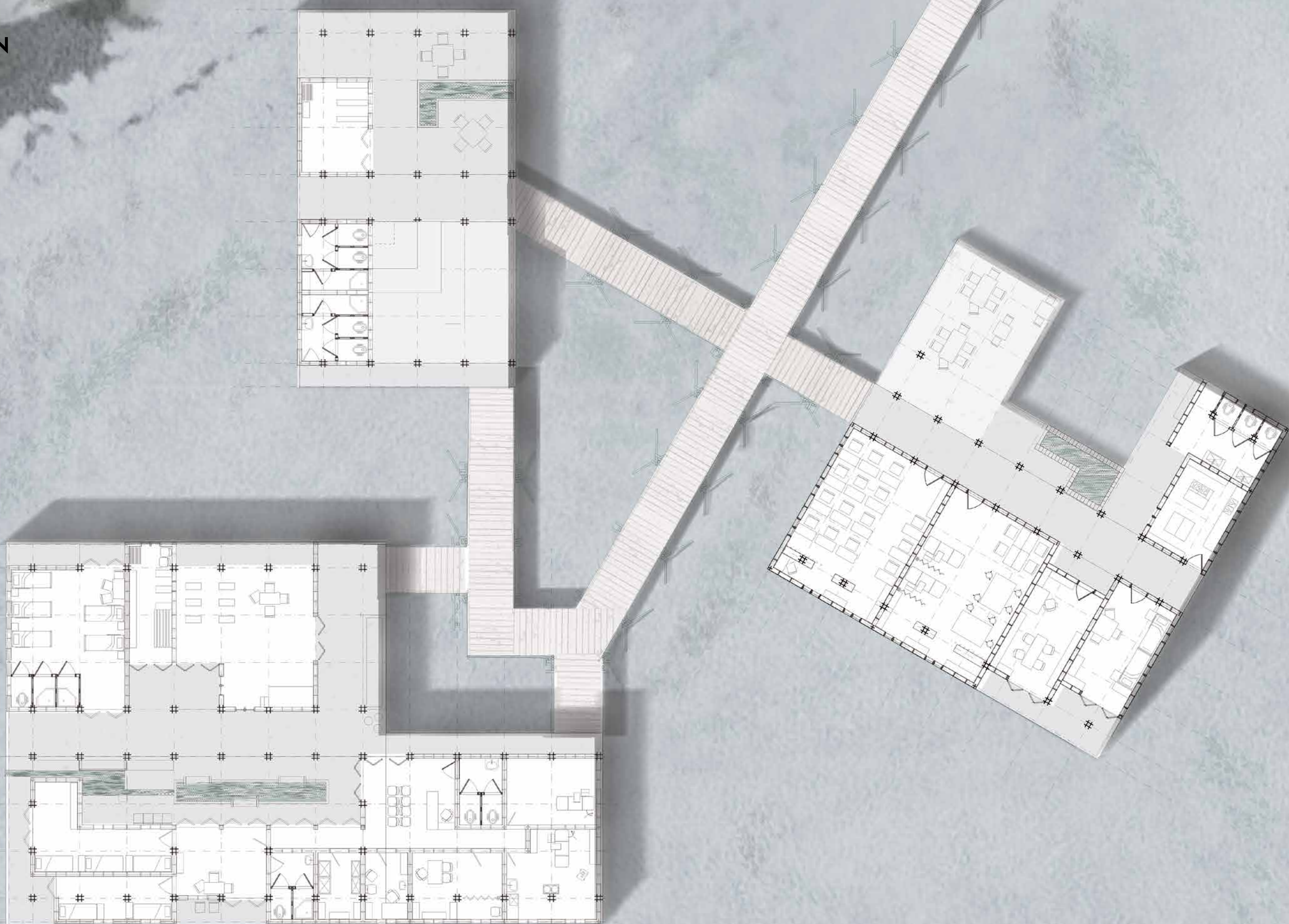
Concepts



Watercourts contrasting clean water
with floodwater

FLOORPLAN

Total



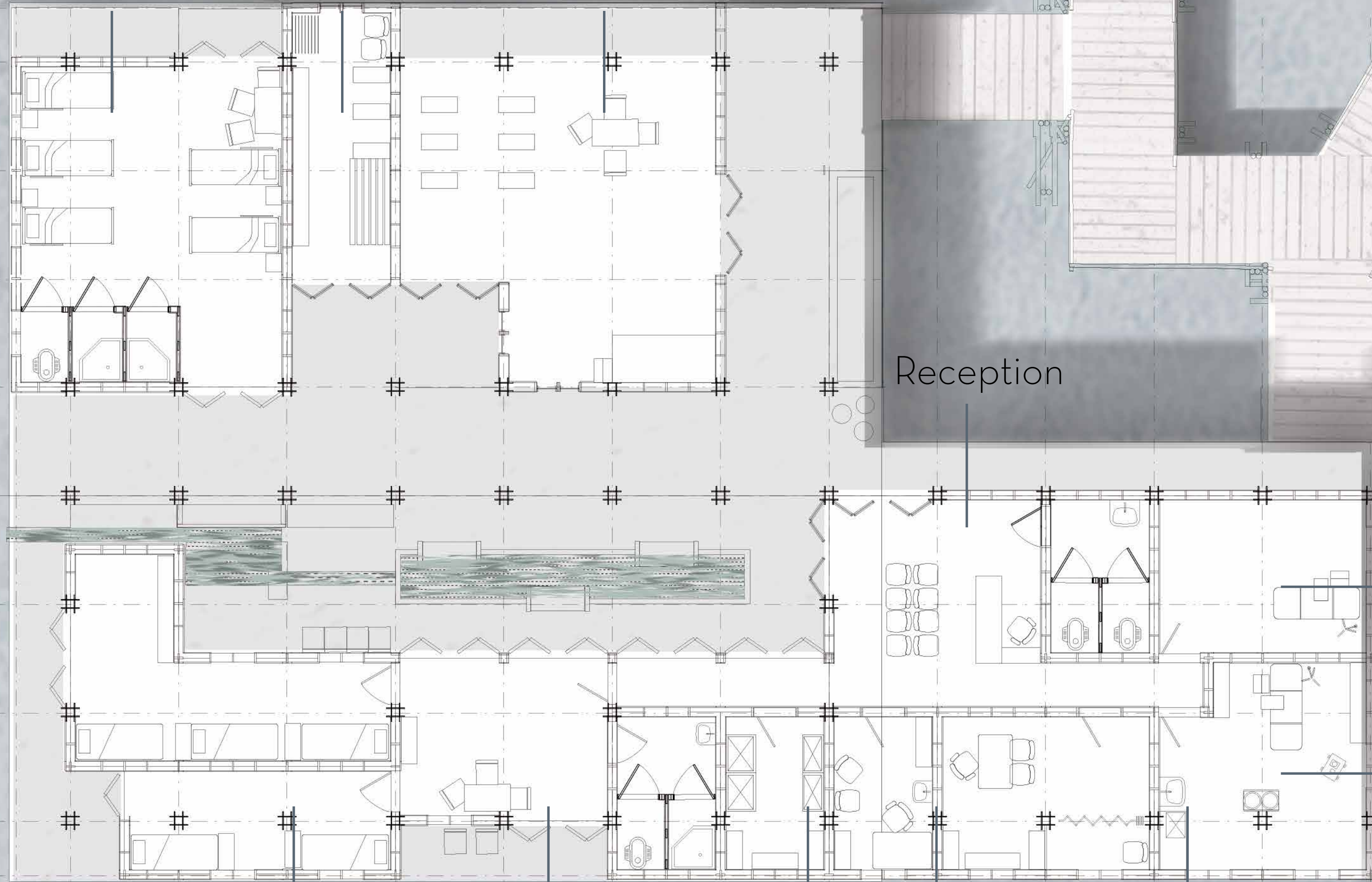
FLOOR PLAN

Clinic

Overnight stay

Storage

Extra over-night stay /
Emergency



Reception

Examina-
tion
room

Treatment

Staff
Bedrooms

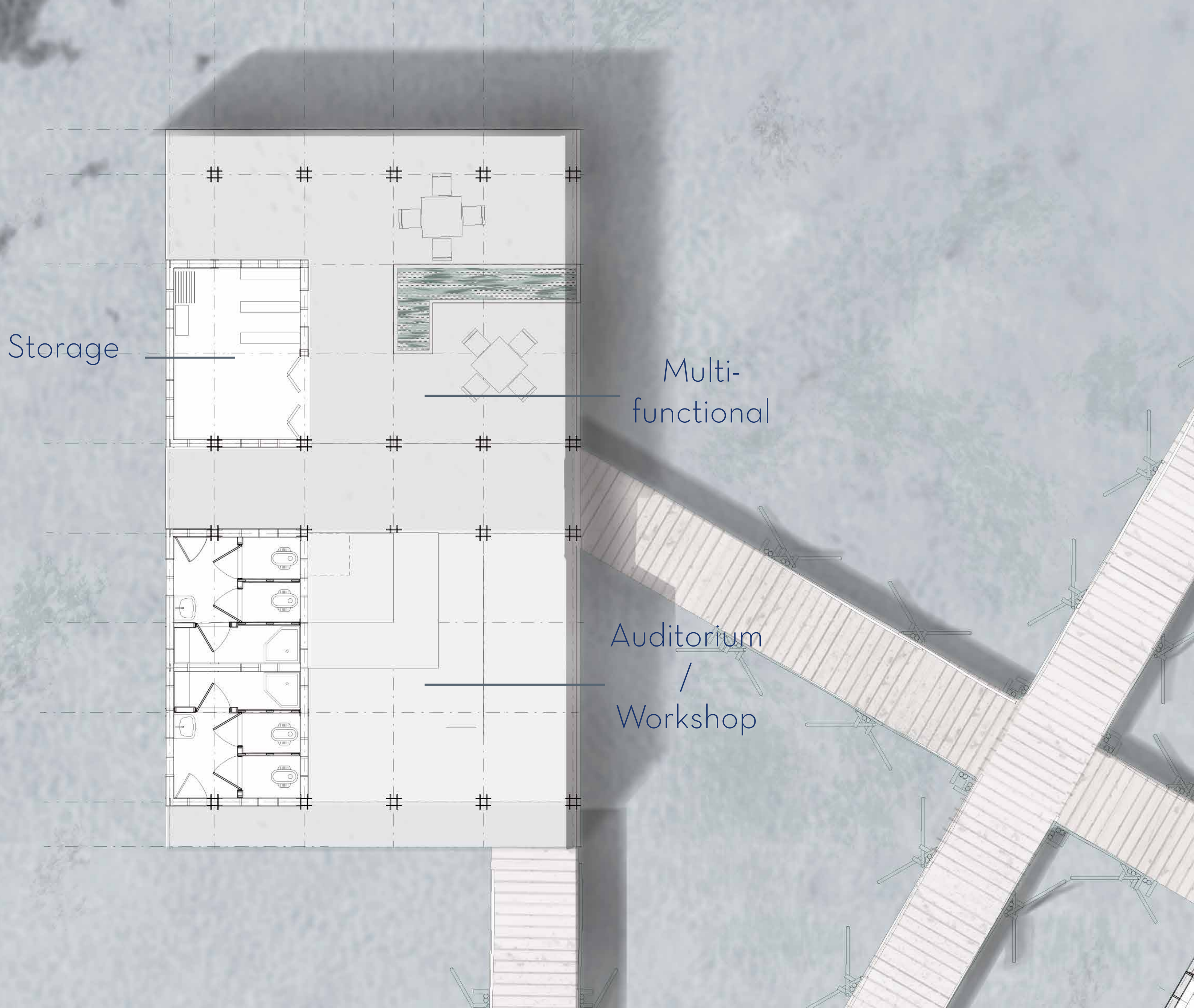
Staff break
room

Storage
Medical
Assistants

Office /
Examina-
tion

FLOOR PLAN

Community



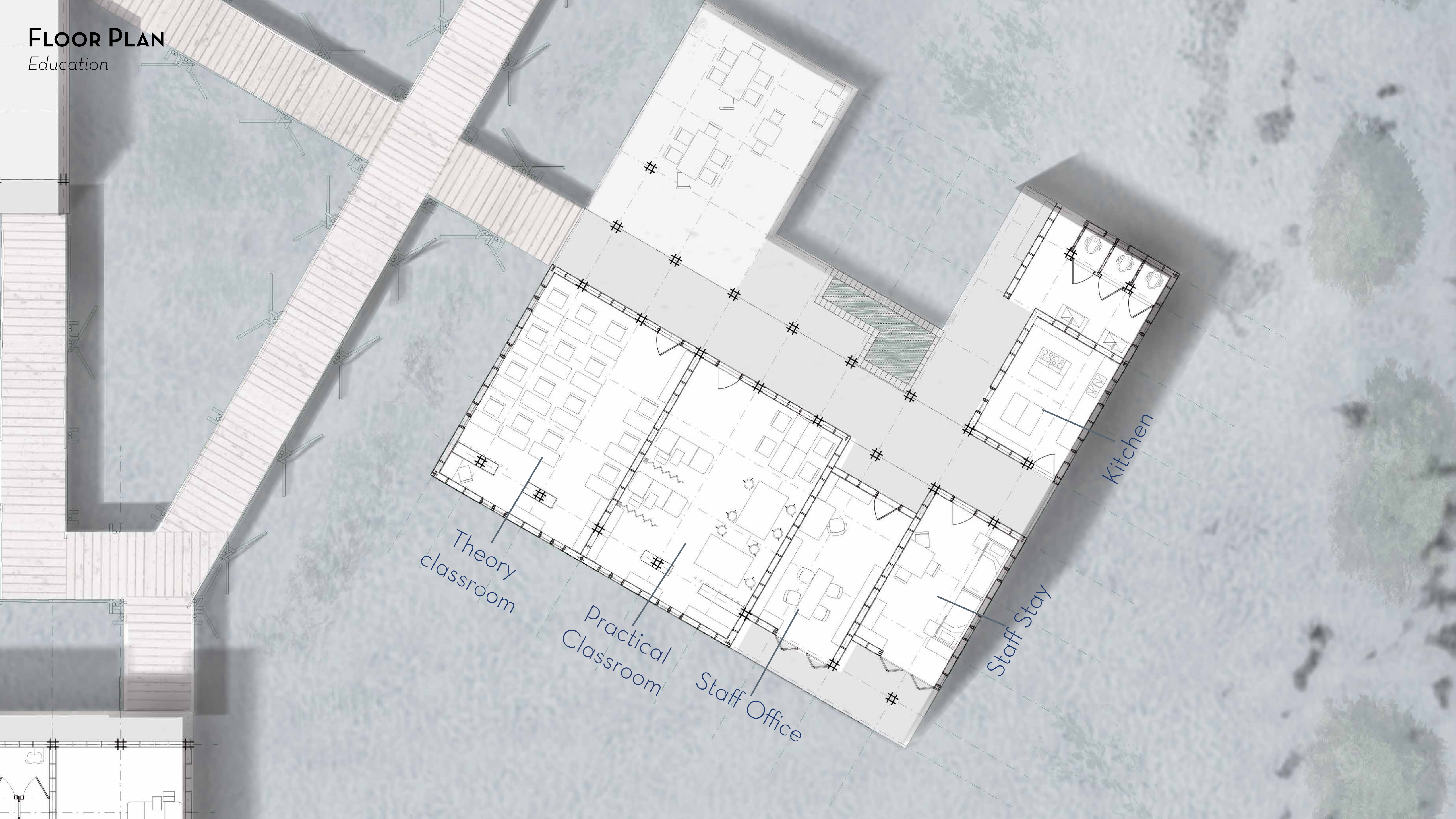
Storage

Multi-functional

Auditorium / Workshop

FLOOR PLAN

Education



Theory
classroom

Practical
Classroom

Staff Office

Staff Stay

Kitchen

ROOF

DESIGN

Roof



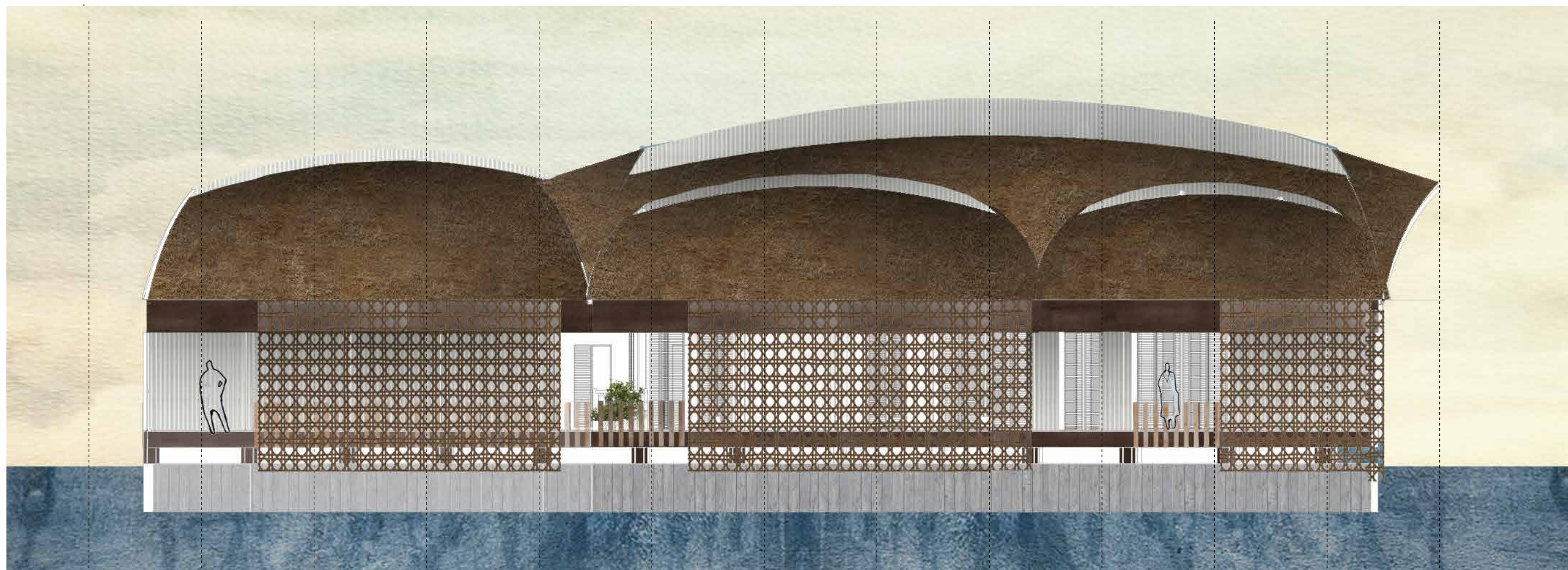
DESIGN

Roof

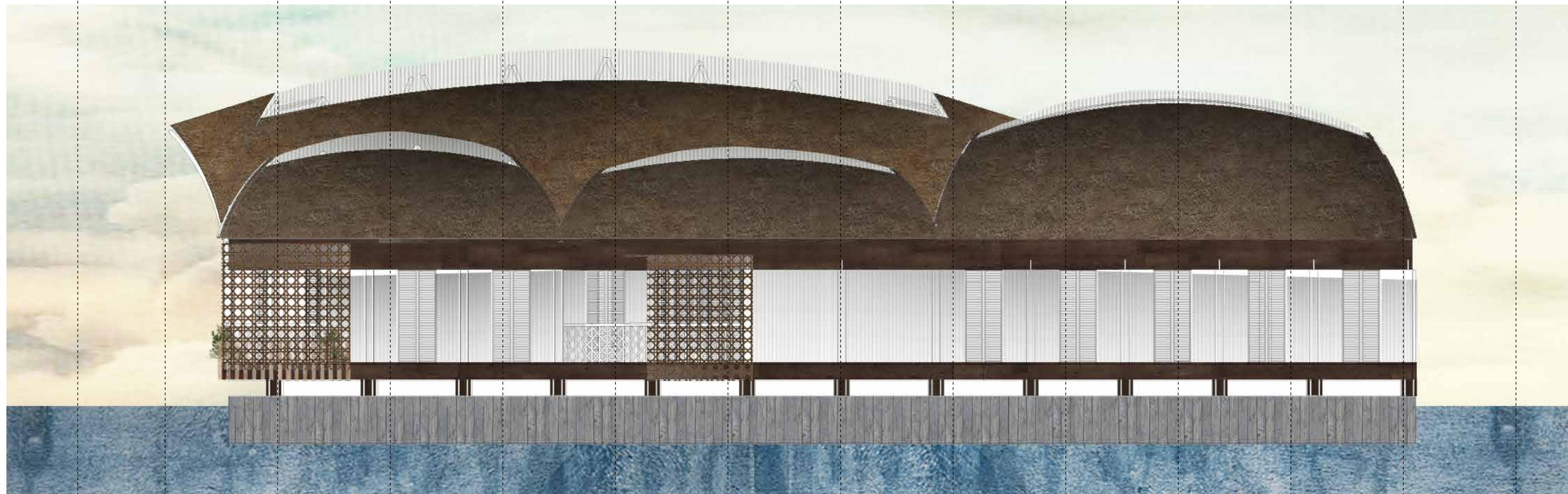


DESIGN

Facades



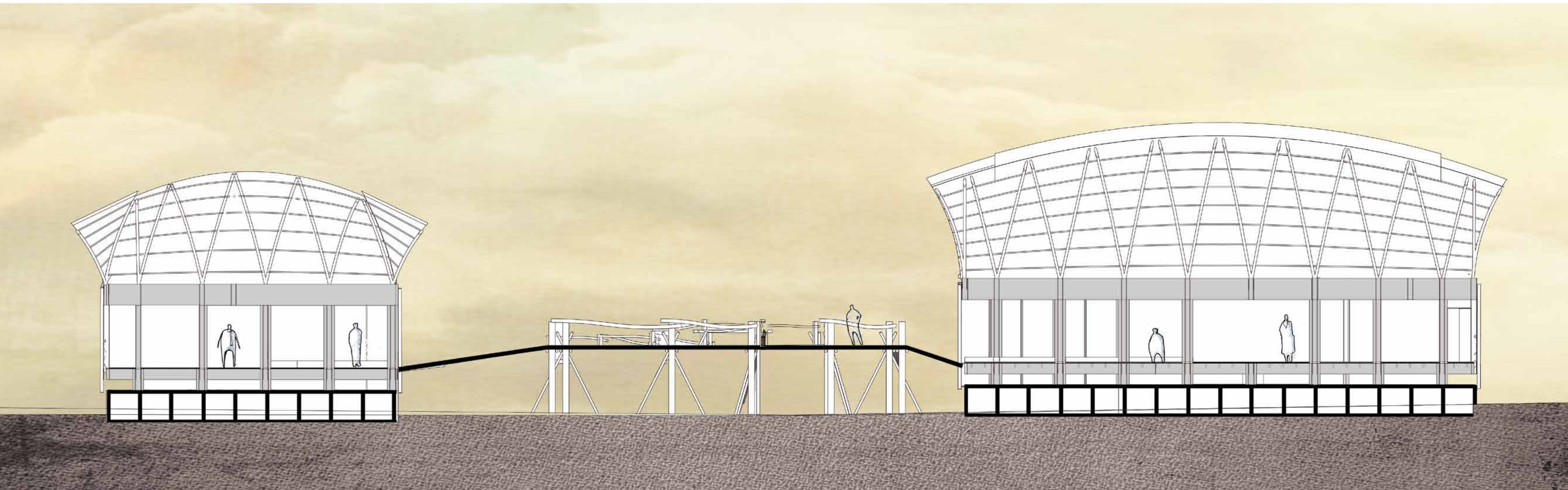
2400 2400 2400 2400 2400 2400 2400 2400 2400 2400 2400 2400 1200



1200 2400 2400 2400 2400 2400 2400 2400 2400 2400 2400 2400

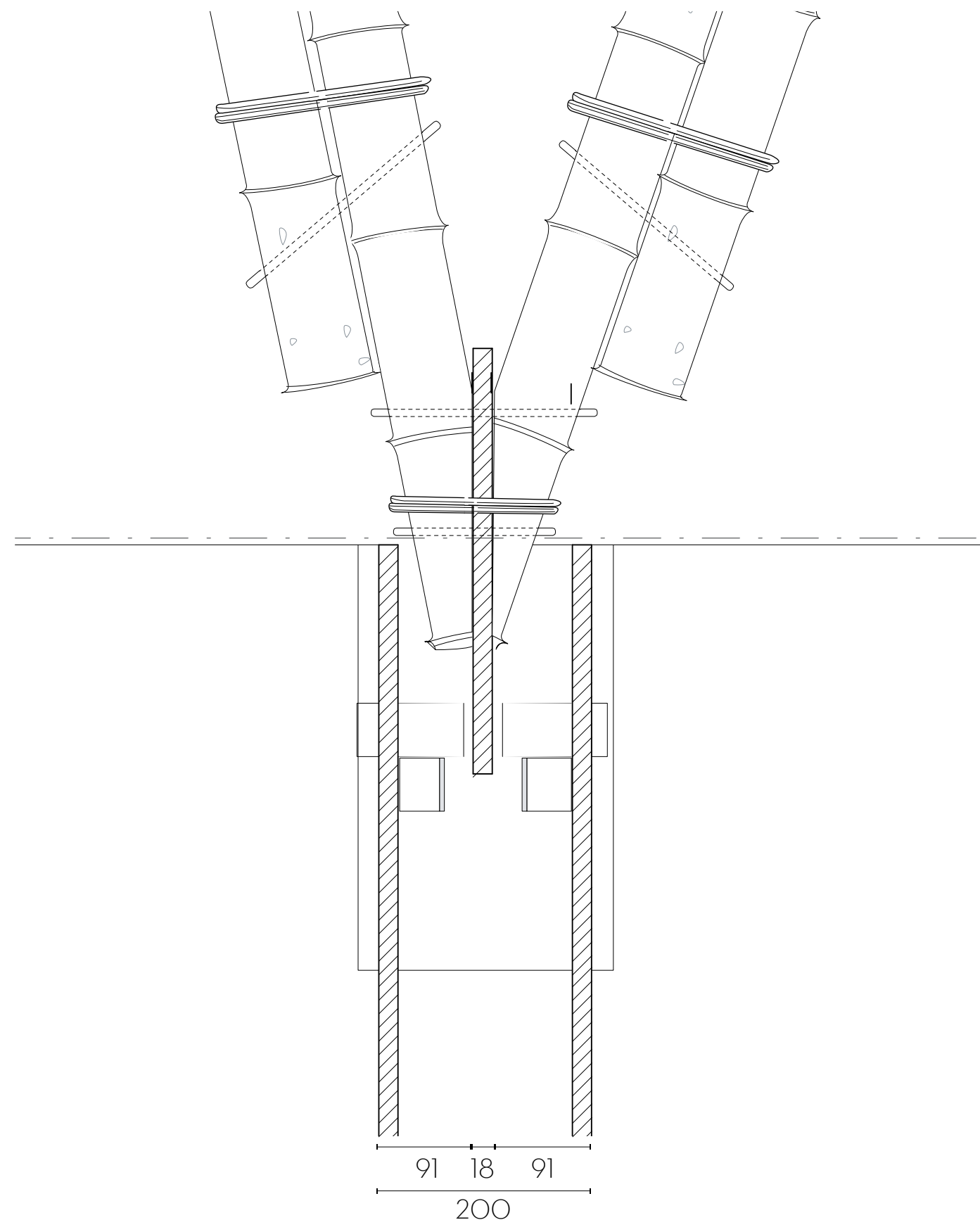
DESIGN

Section

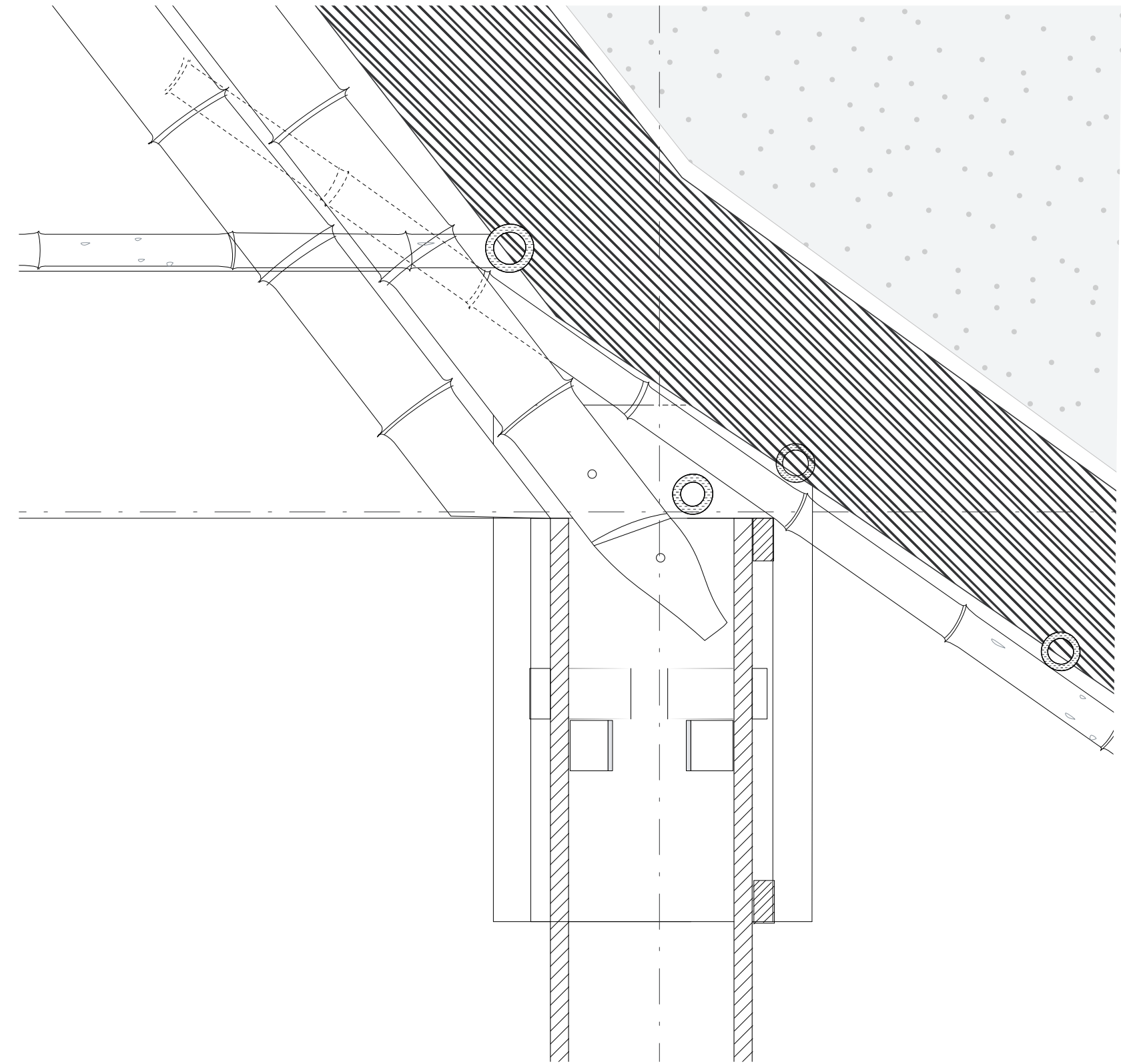


BUILDING SYSTEM

Roof detail 1:5



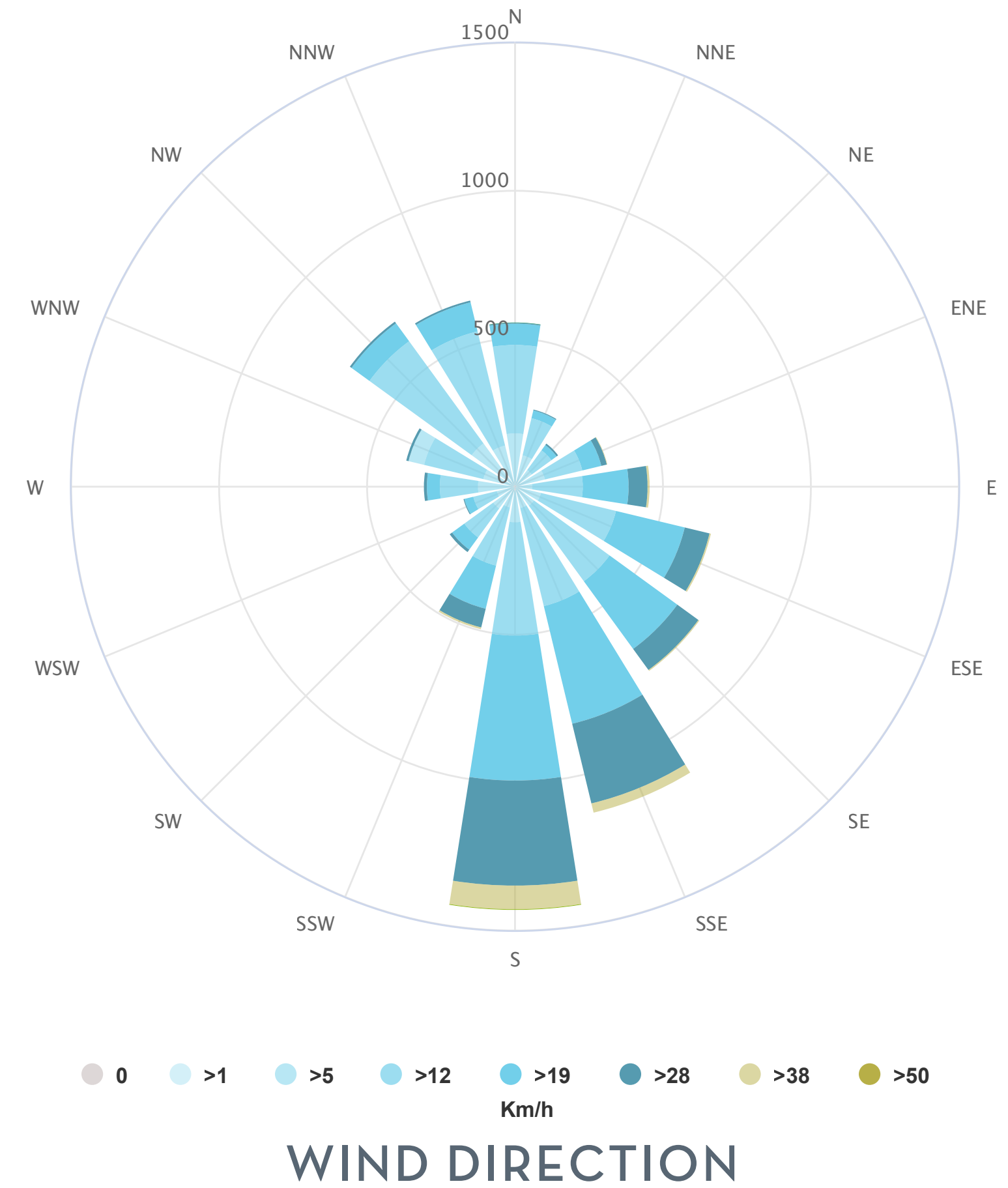
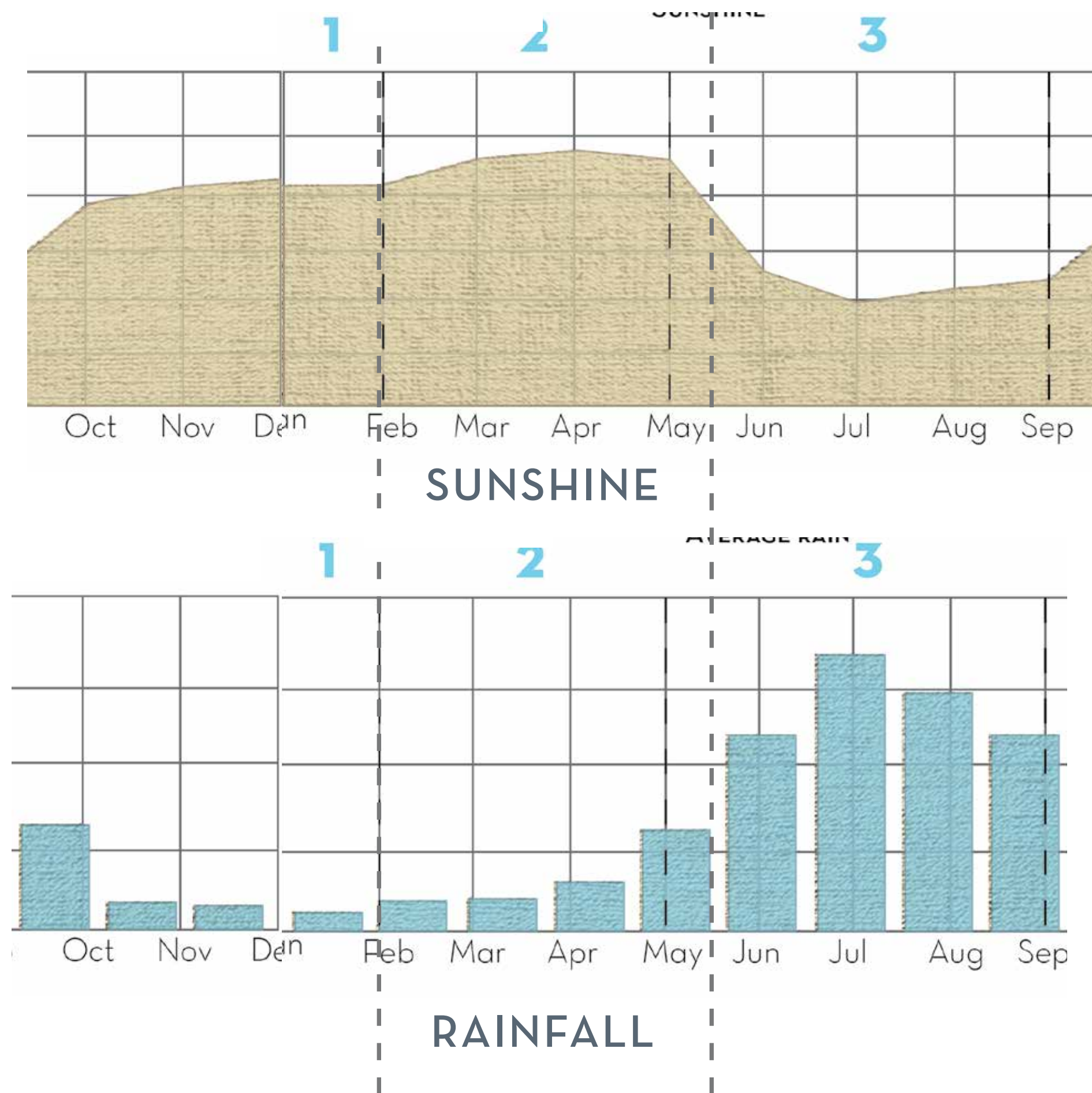
*one plate to connect two
roofbeams*



*Extra bamboo supports the
outer roof edge*

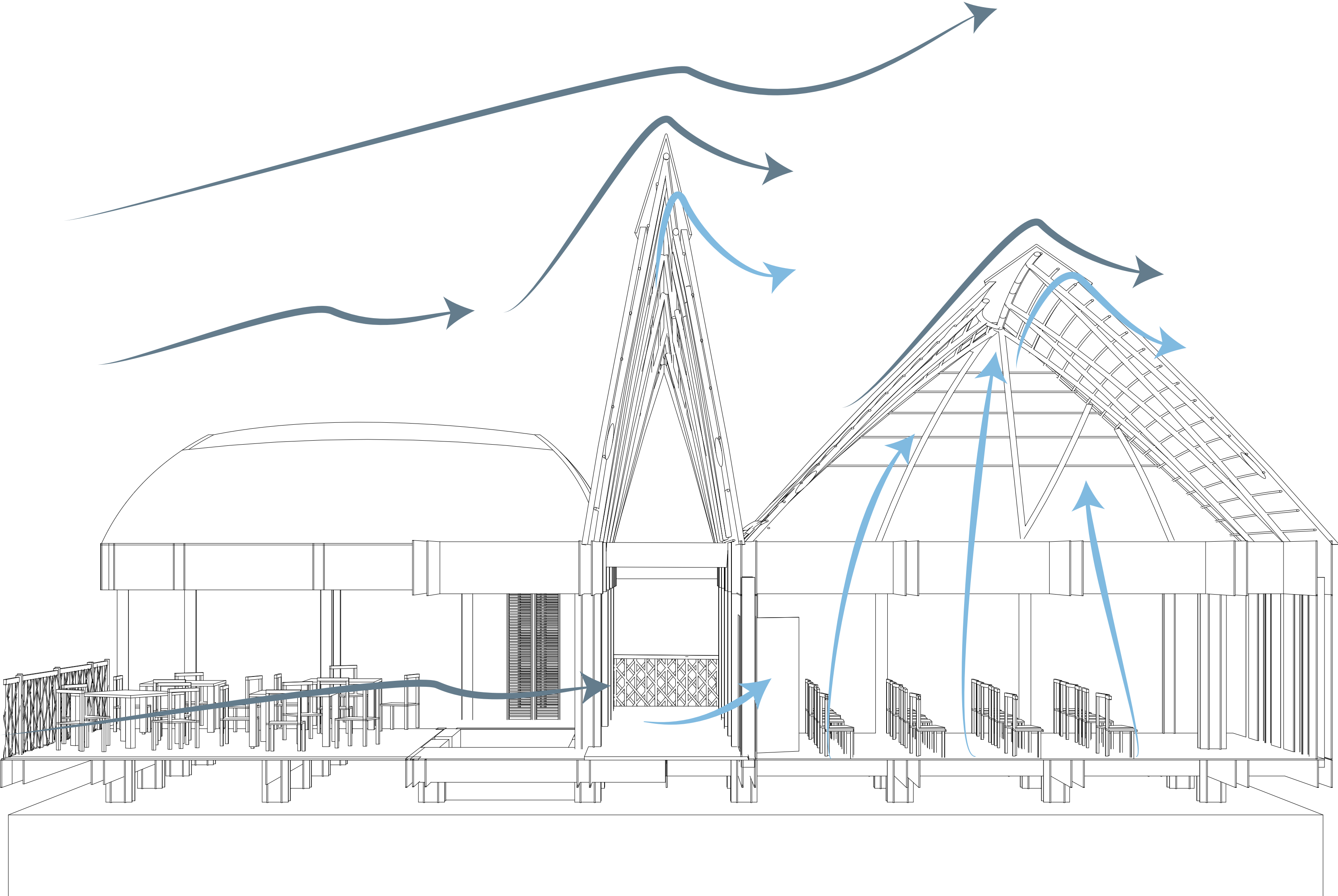
CLIMATE

Conditions in West Bengal



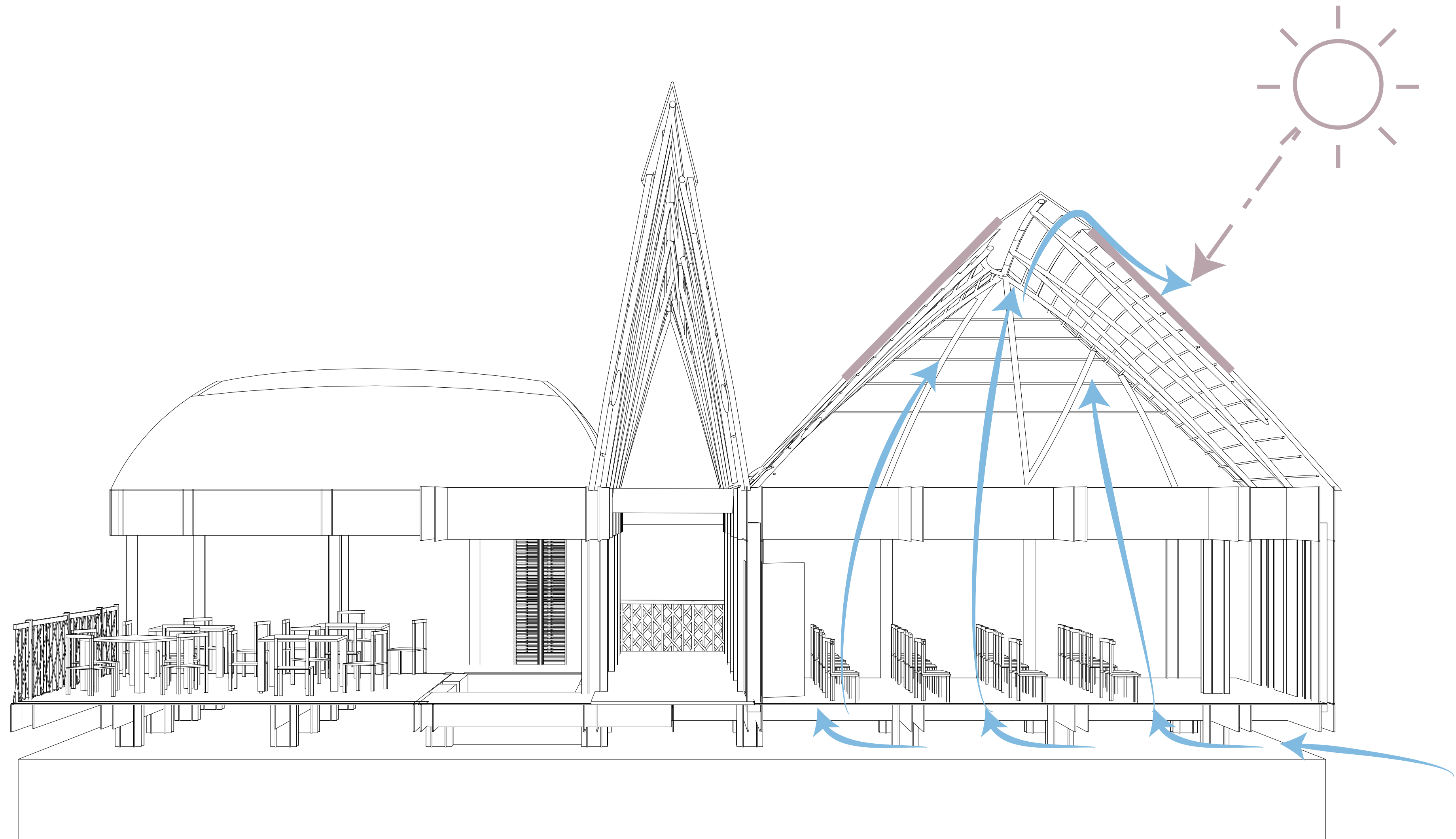
CLIMATE

Ventilation with wind

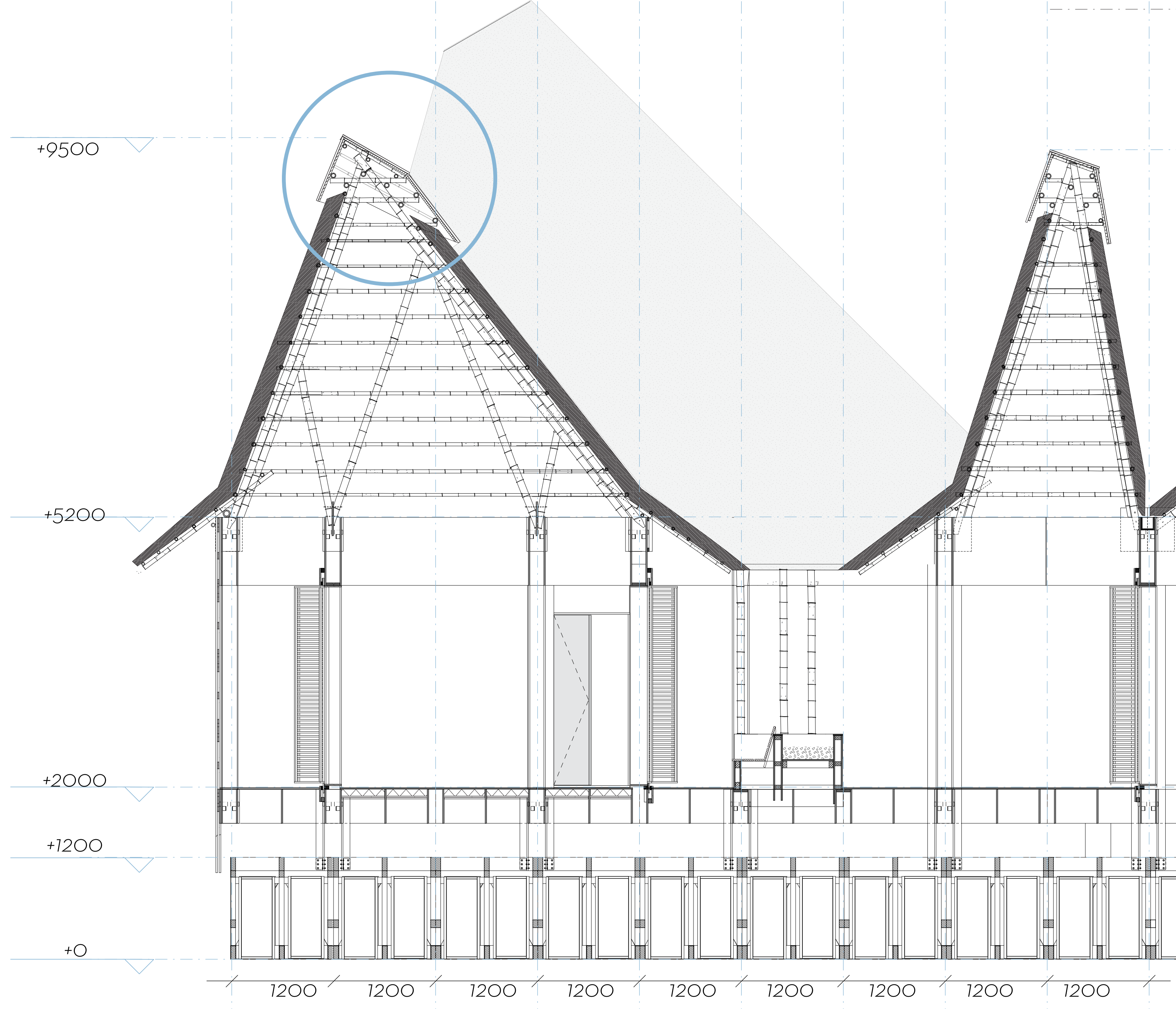


CLIMATE

Ventilation without wind



CLIMATE
1 - 20 section

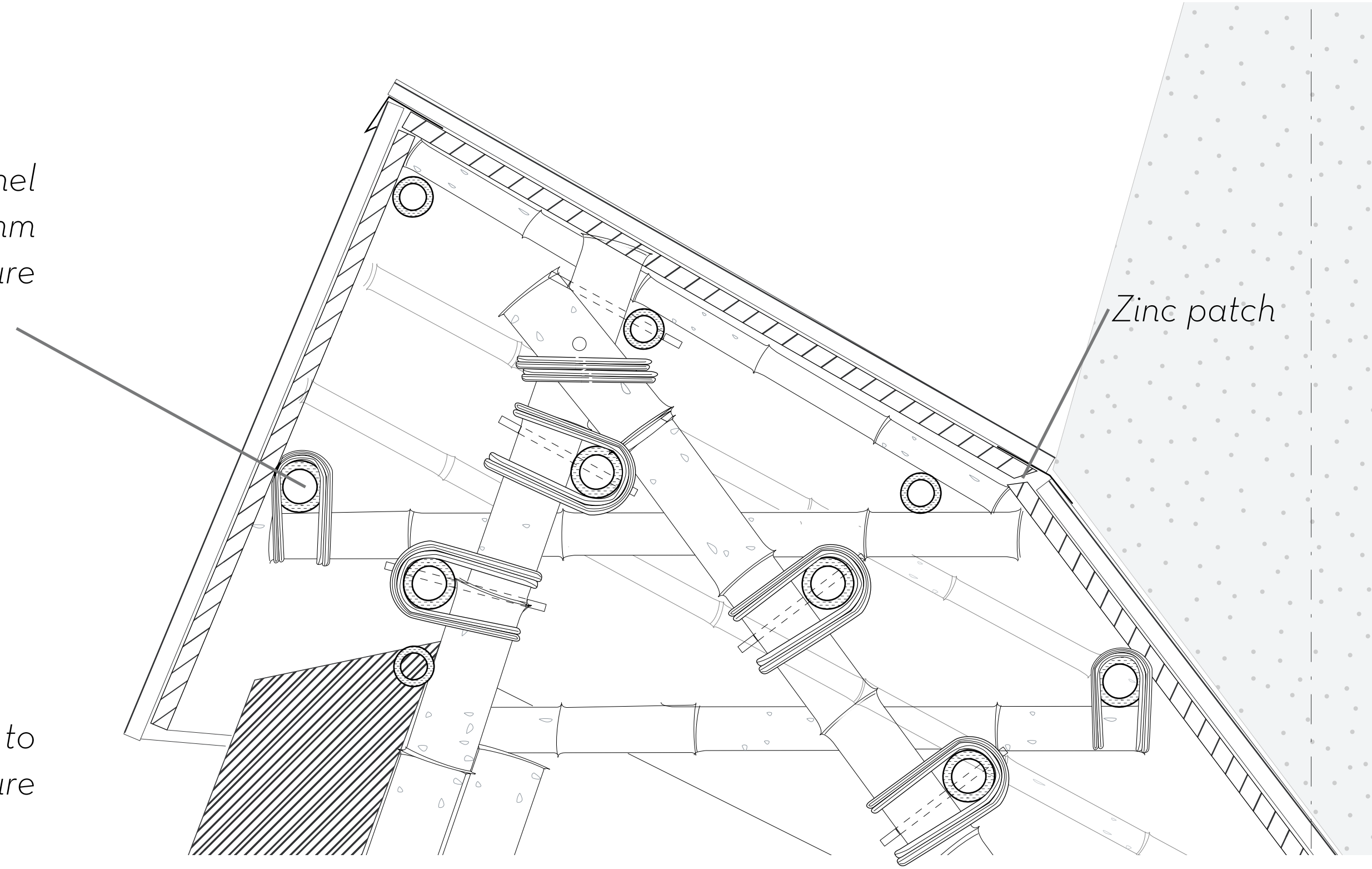


CLIMATE
Rooftop detail

Polycarbonate corrugated panel
Wooden batten 50 x 20 mm
Bamboo sub-structure

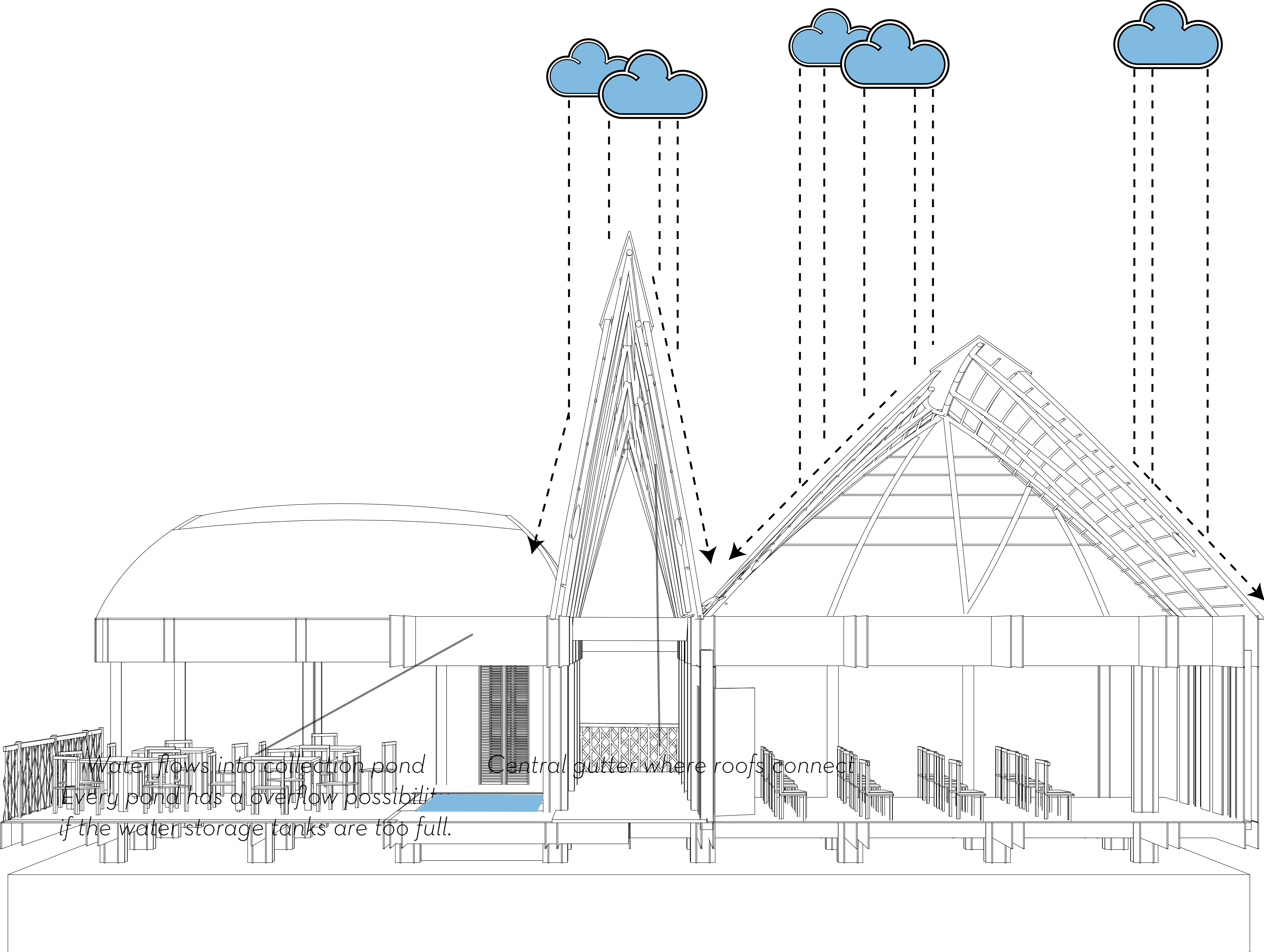
Zinc patch

Thatch roof tied off to bamboo substructure



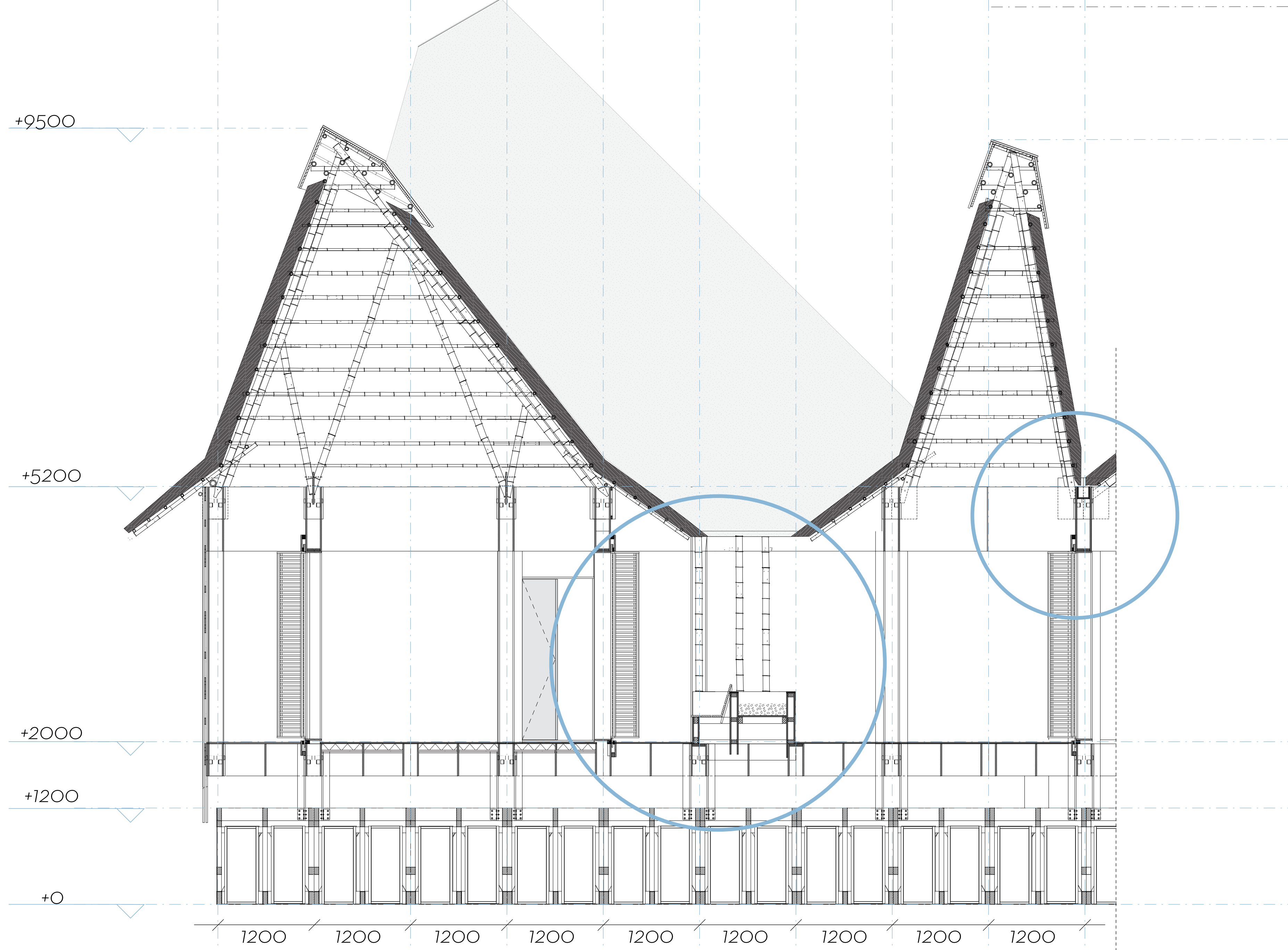
CLIMATE

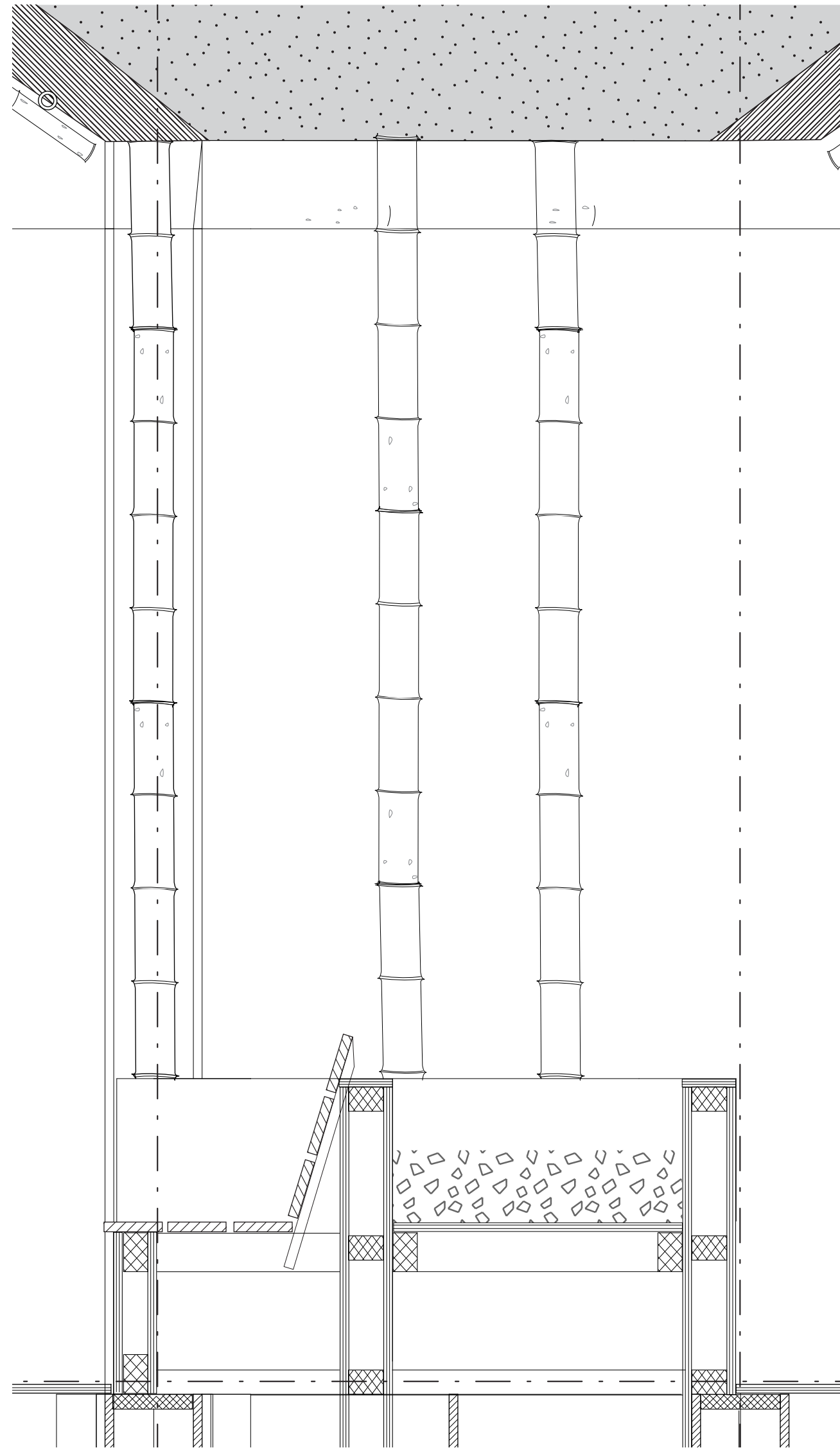
Rain collection



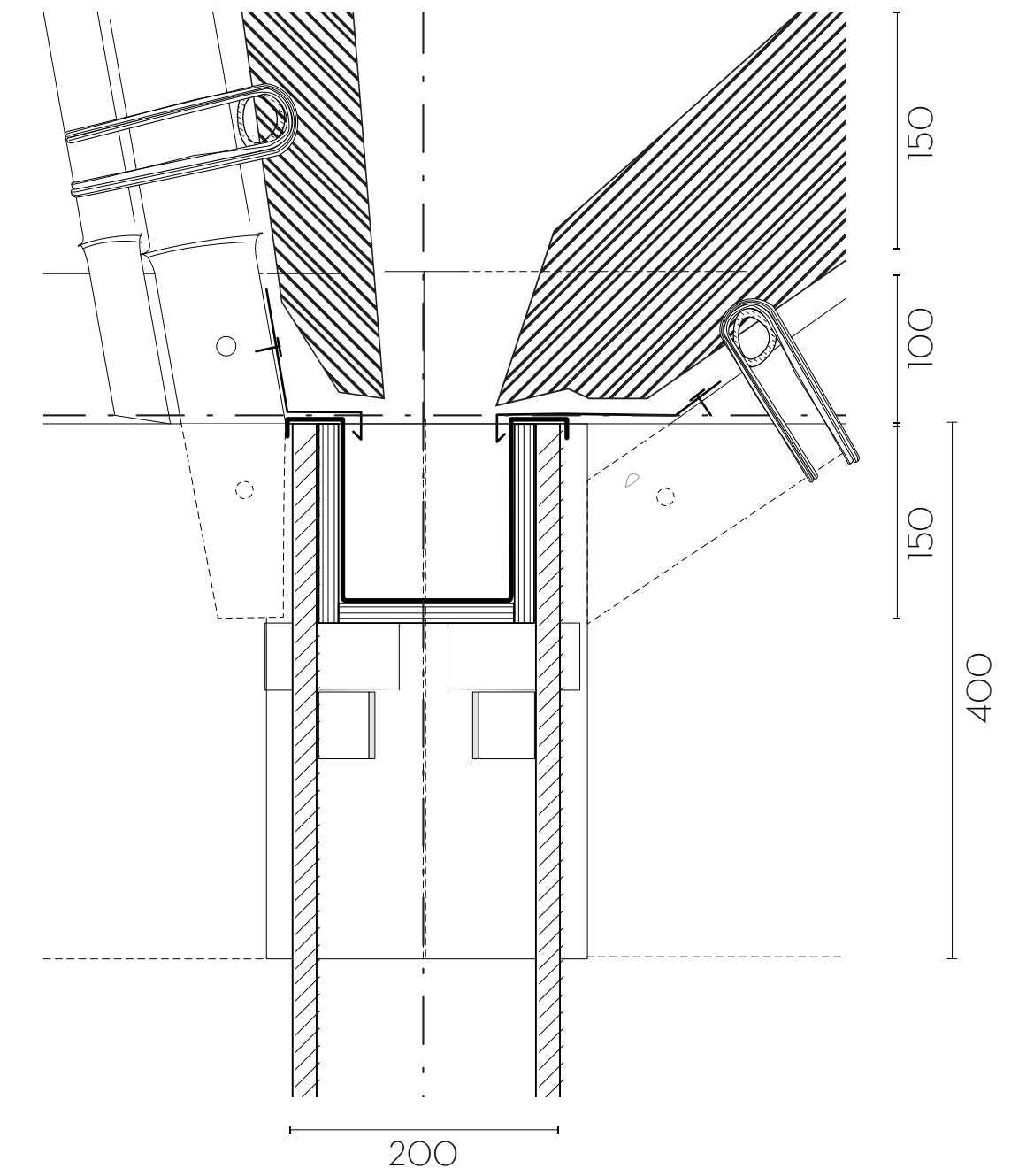
CLIMATE

1 - 20 section



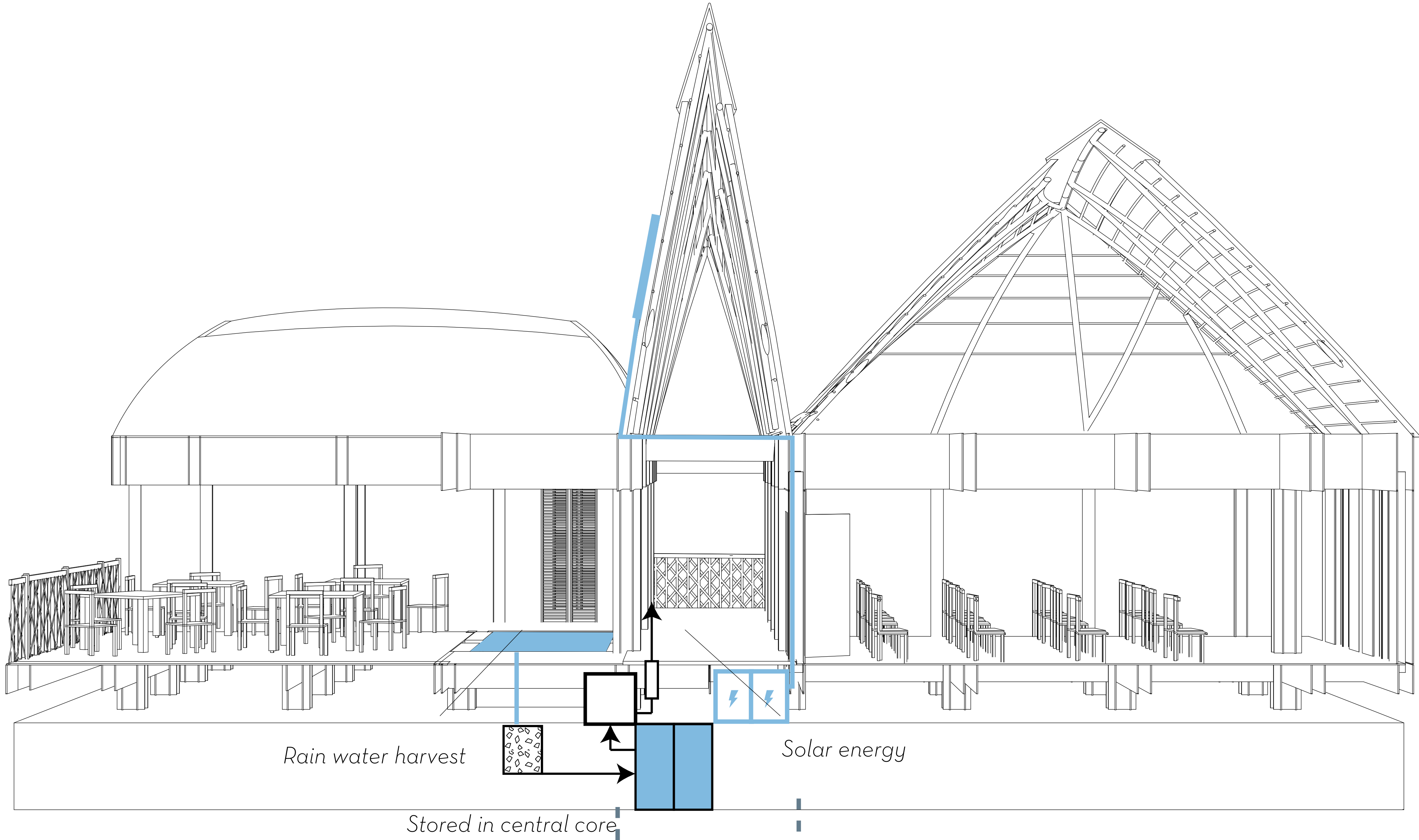


Roof next to courtyard directs rain water into the central pond.

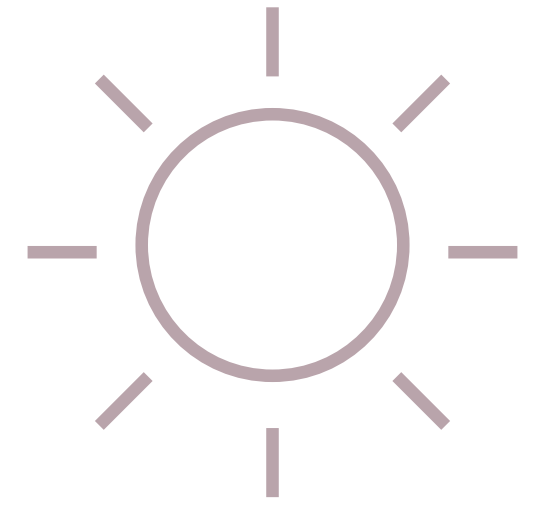


Central gutter detail

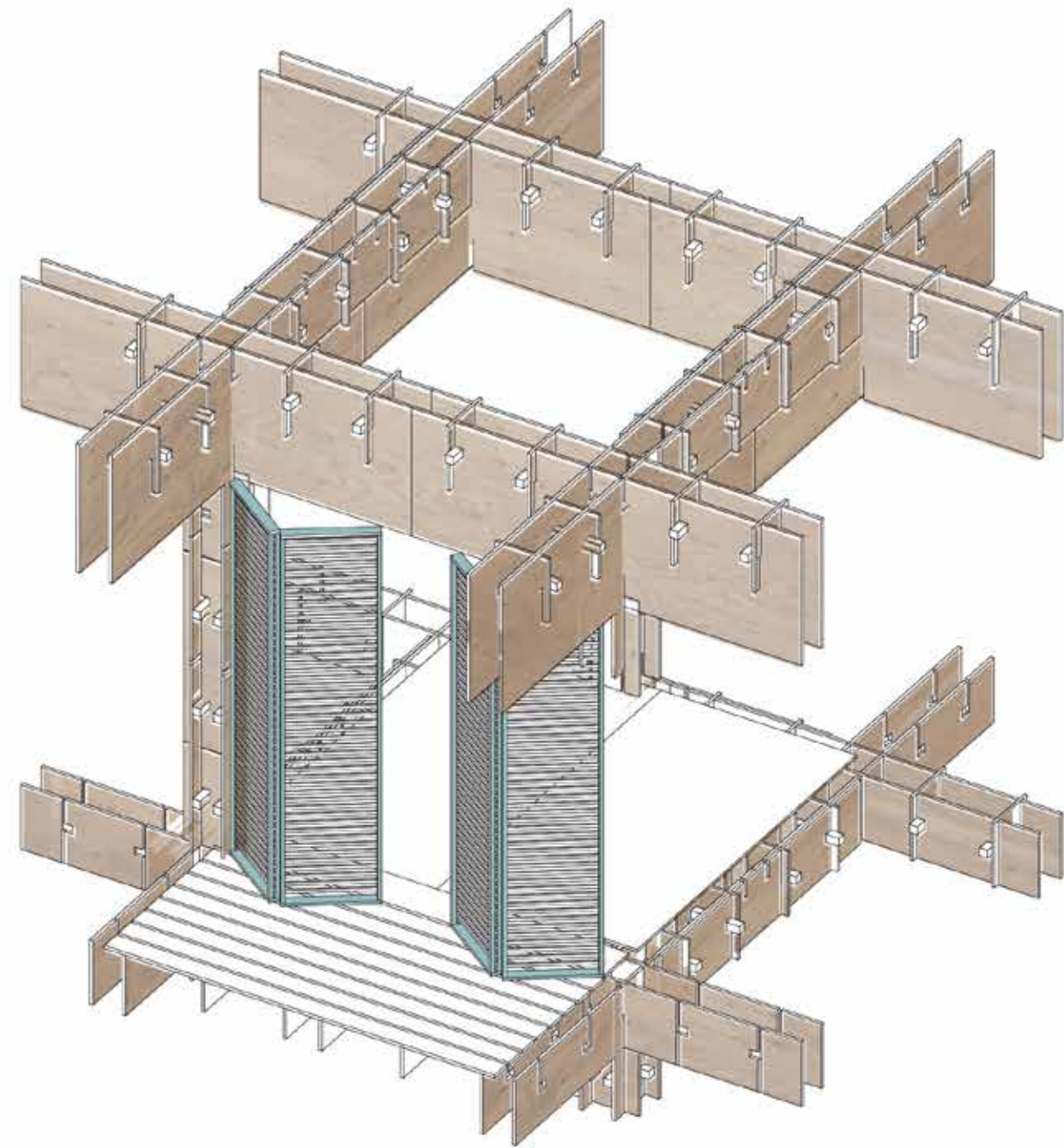
CLIMATE
Water and Energy



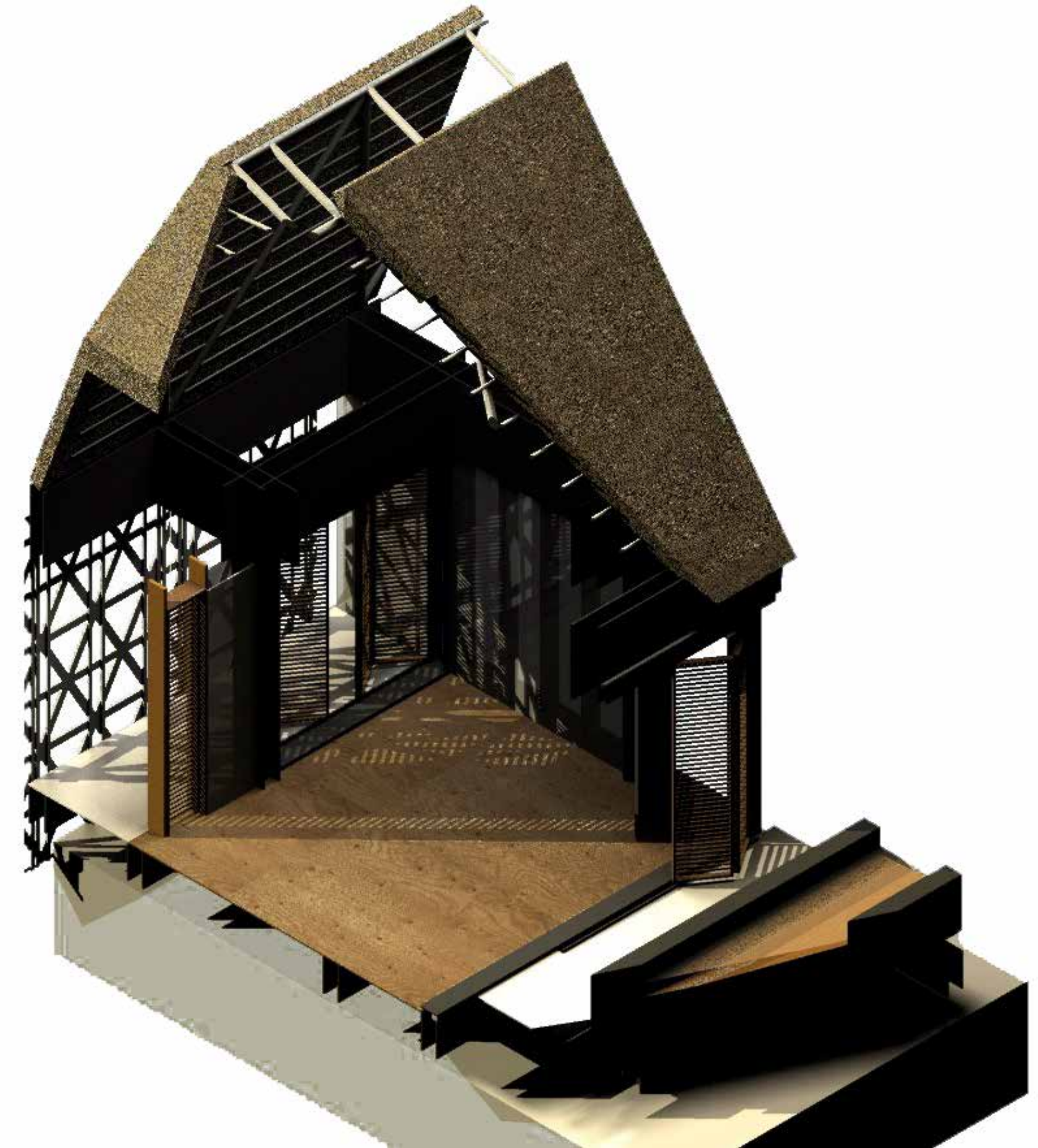
CLIMATE
Daylight concept



CLIMATE
Daylight entry



Bamboo shade doors



*Doors function as the shade panels
and allow movement to terraces*

EXAMPLE SITE

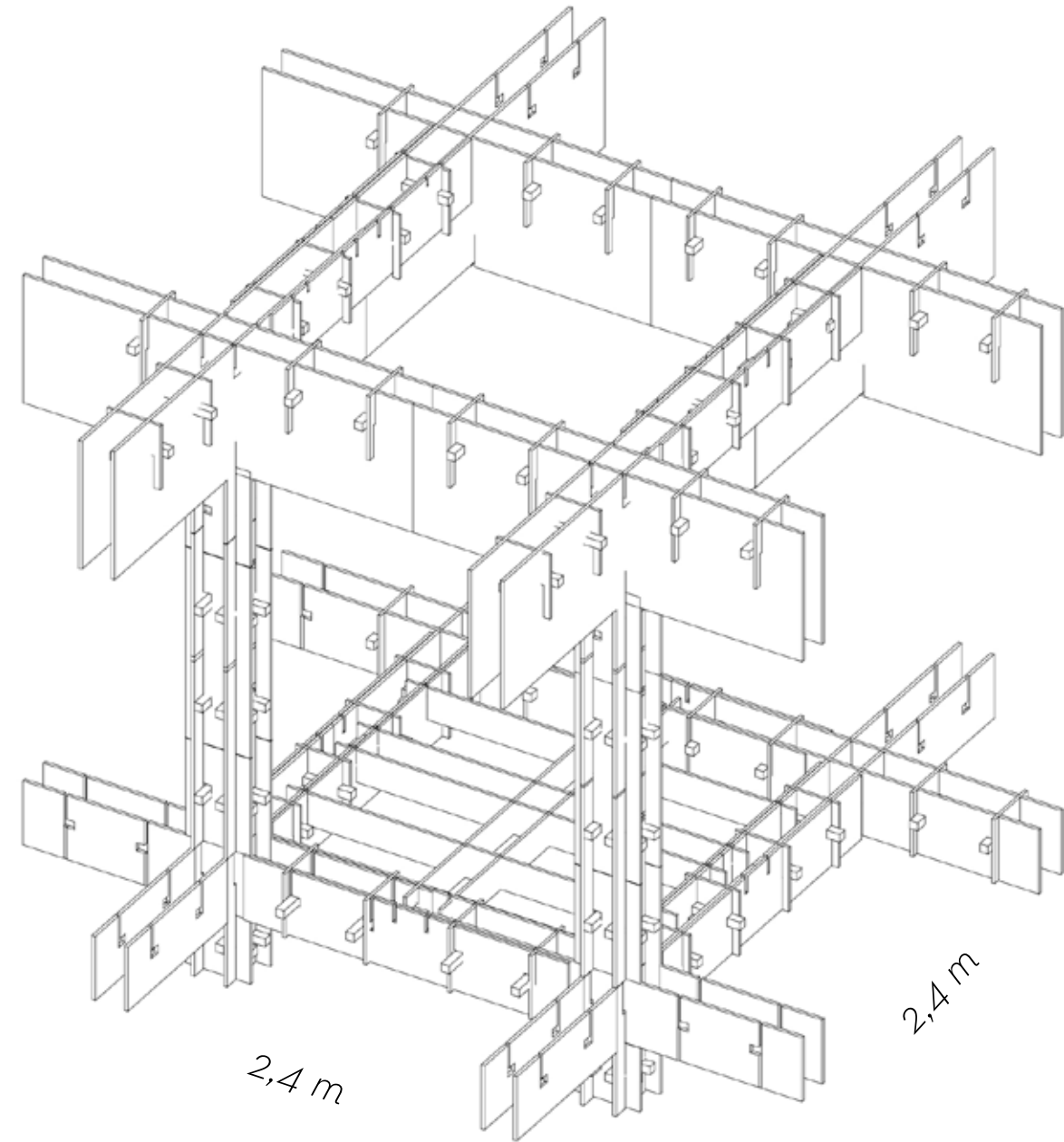
Analysis



DESIGN
Central Hall



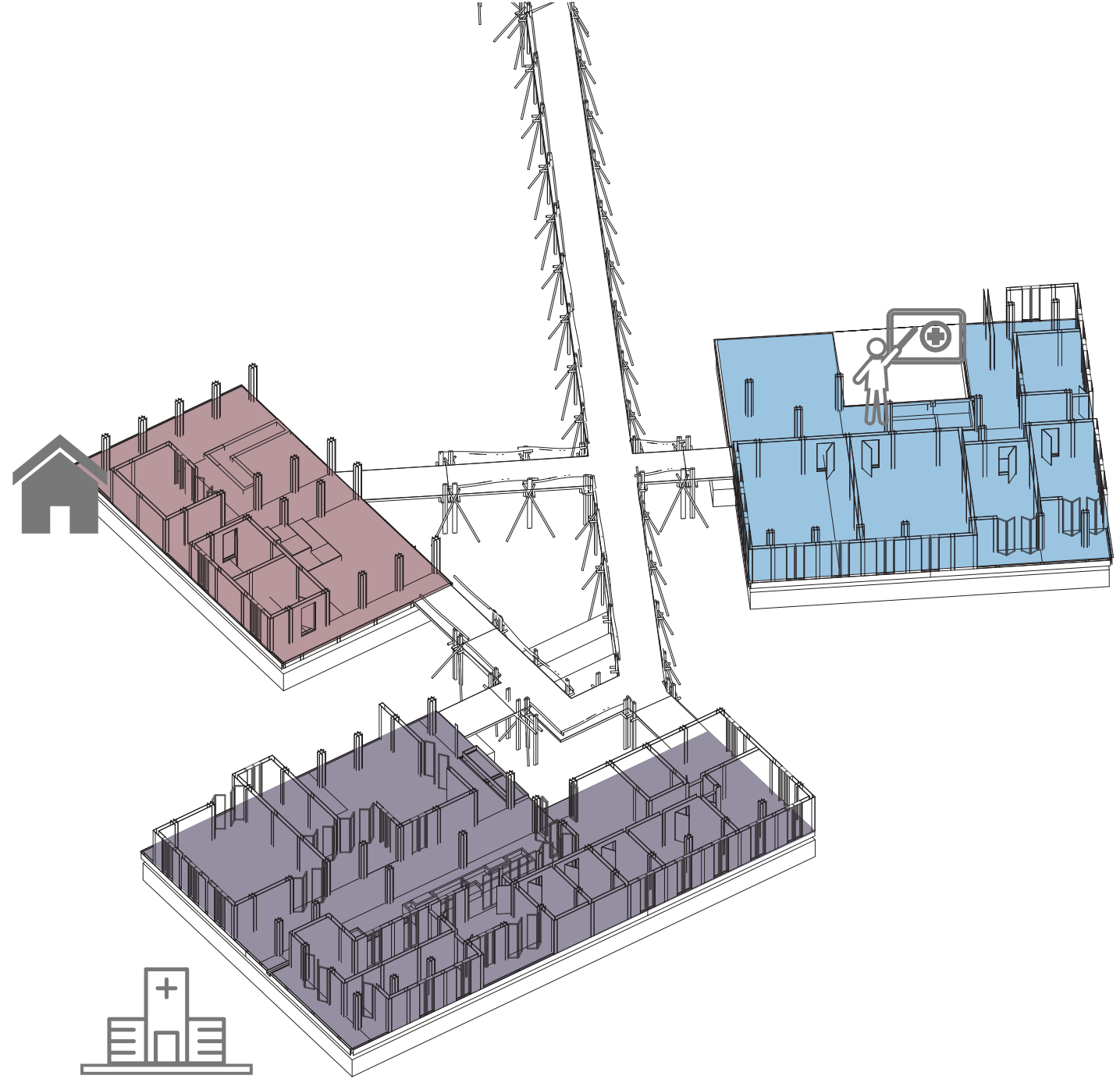
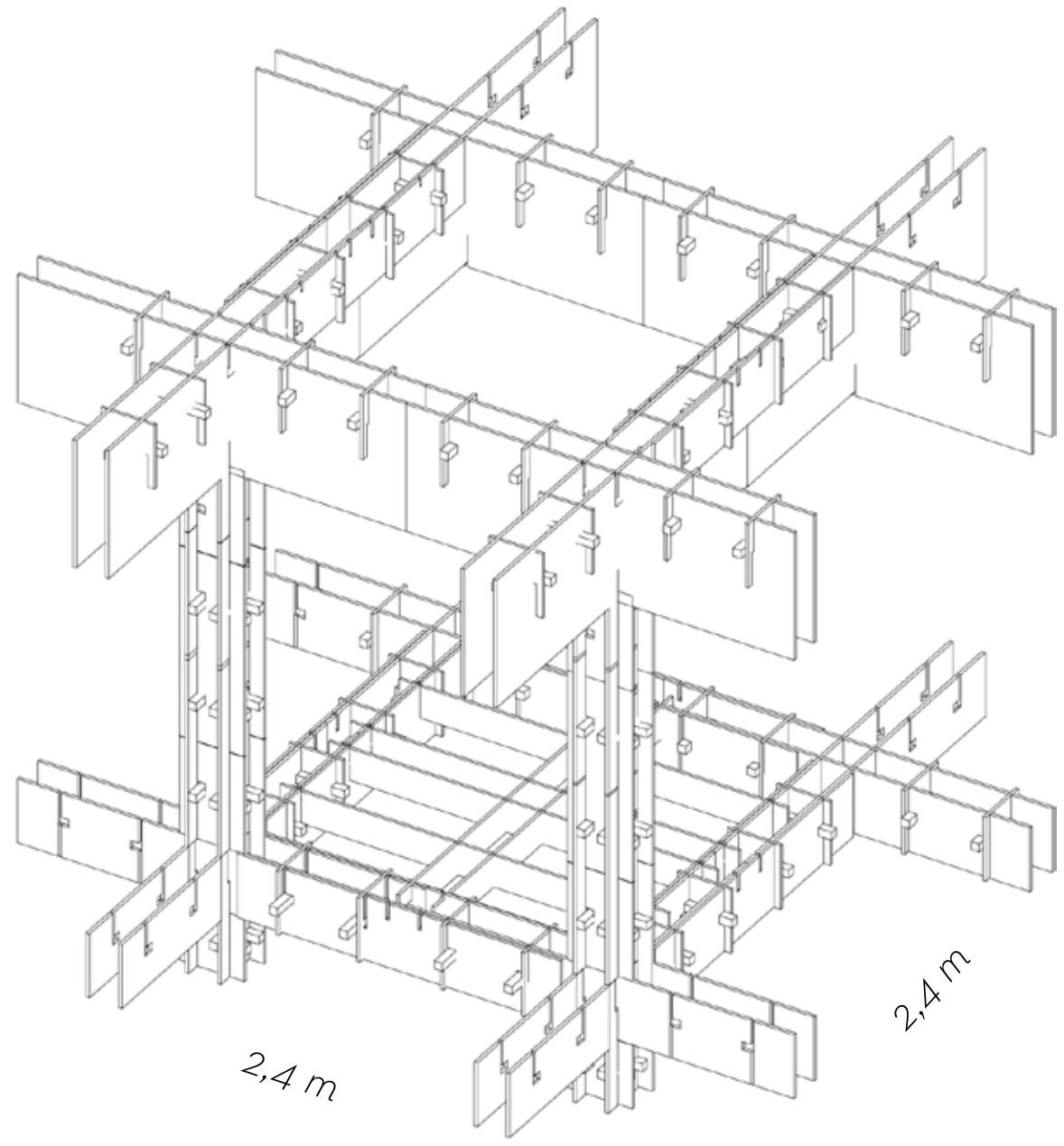
CONCLUSION



DEVELOP A *PERMANENT* SOLUTION FOR LOW INCOME, FLOOD PRONE AREAS BY OFFERING *FLOATING* HEALTHCARE AND MEDICAL TRAINING FACILITIES.

TO CREATE REAL SELF-RESILLIENCE, THE STRUCTURE SHOULD BE *BUILD* AND *OWNED* *LOCALLY*.

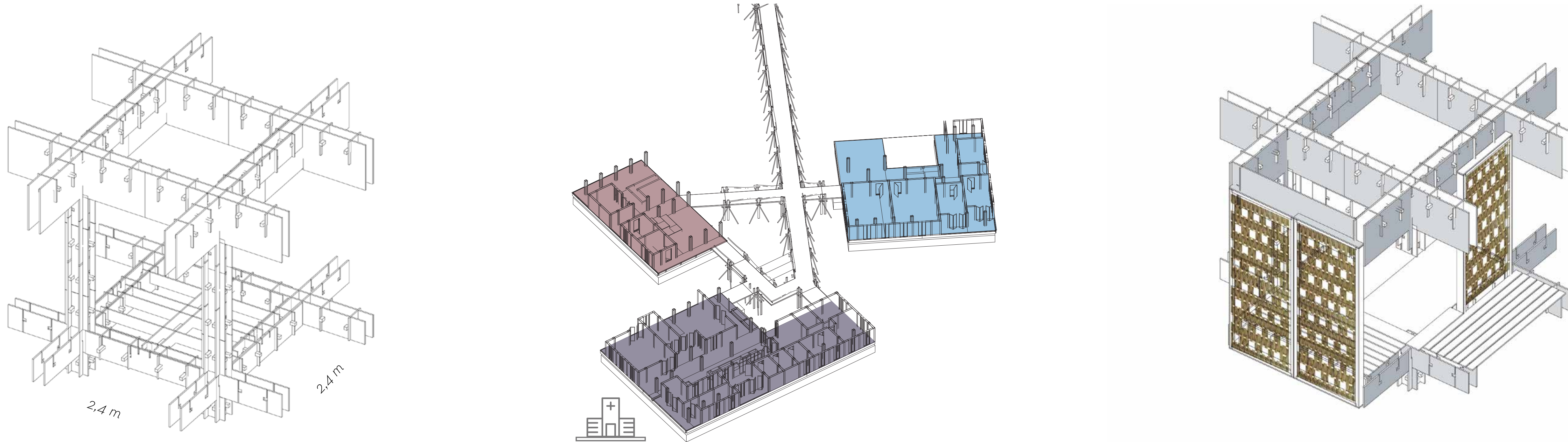
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CONCLUSION

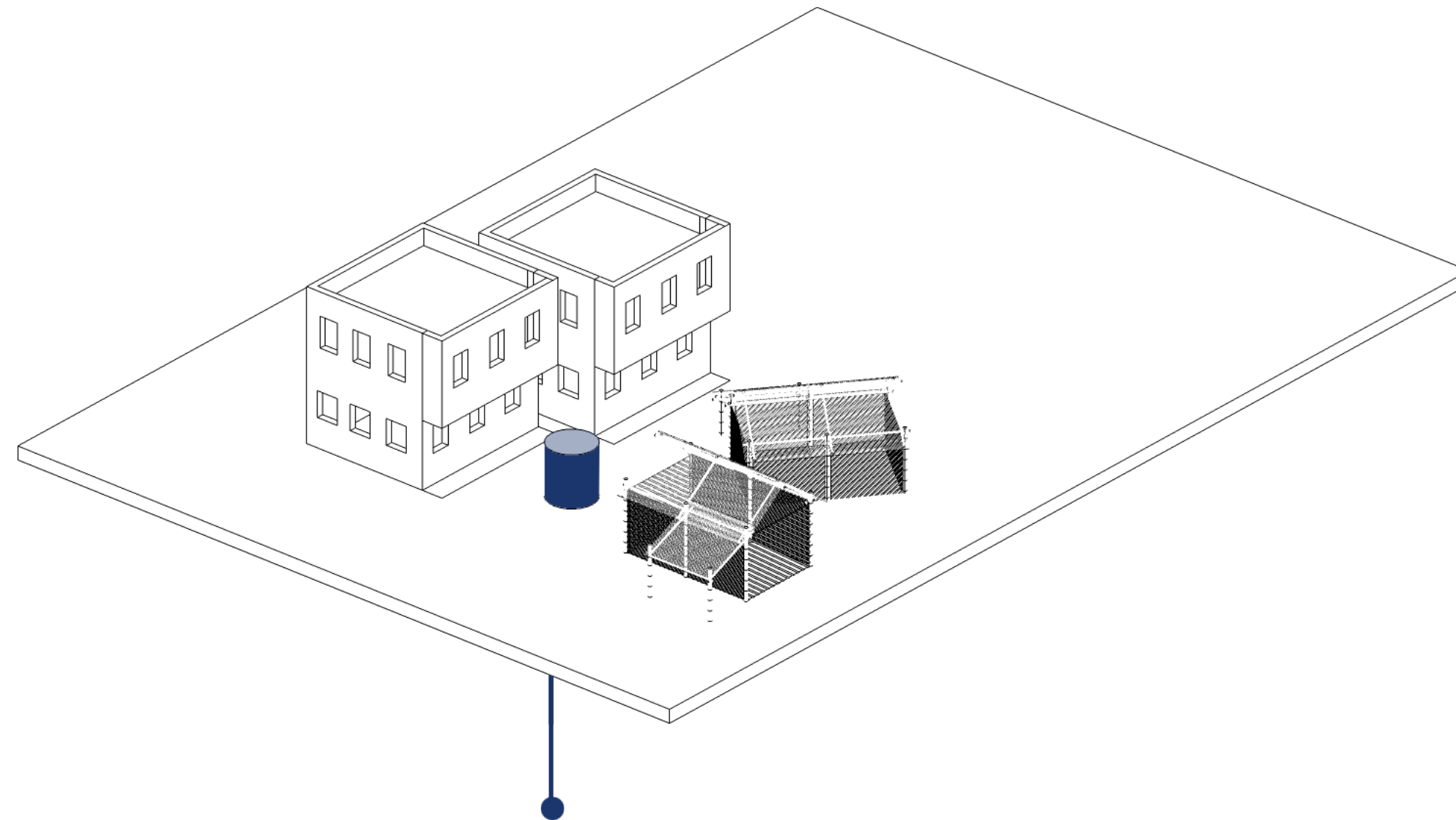


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TO CREATE REAL SELF-RESILLIENCE, THE STRUCTURE SHOULD BE *BUILD* AND *OWNED* *LOCALLY*.

THANK YOU





Clean Water demand

- “the daily average water consumption for the village was found to be 117.0 l per person per capita per day”

- “86 % do not have awareness about rainwater harvesting technology. This needs to be addressed immediately by changing public perception through media and by organizing public awareness programs.”

Source: Singh, O. (2012). A survey of household domestic water consumption patterns in rural semi-arid village, India

School Demand

- 1,5 Liter a day per student

- 40 students = 60 L a day = 1800 L a month

- Average = 300 mm per month in monsoon season
= 300 Liter / square meter
= **6 m²** needed to supply

Health clinic Demand

- 200 Liter a day

- Average = **20 m²** needed to supply

CURATIVE CARE

GENERAL CHECKUPS

MALARIA AND OTHER VECTOR BORNE DISEASES

Early detection of TB, Leprosy, Kala-Azar and other locally endemic communicable diseases and non-communicable diseases such as diabetes and cataract cases

JAPANESE ENCEPHALITIS (JE) VACCINE AND OTHER EPIDEMIC PRONE COMMUNICABLE DISEASES

MINOR SURGICAL PROCEDURES AND SUTURING

REPRODUCTIVE AND CHILD CARE

ANTE - NATAL CHECK UP AND RELATED SERVICES E.G. INJECTION - TETANUS TOXOID, IRON AND FOLIC ACID TABLETS

Referral for complicated pregnancies

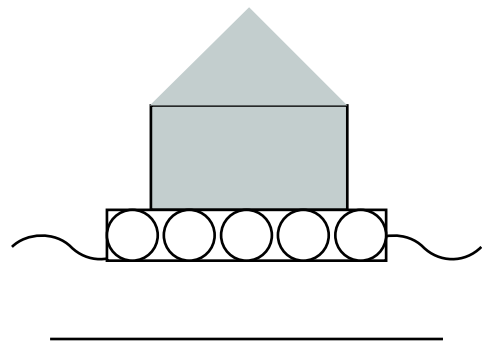
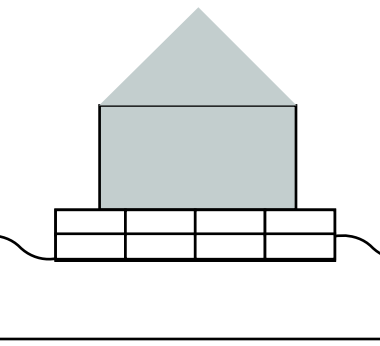
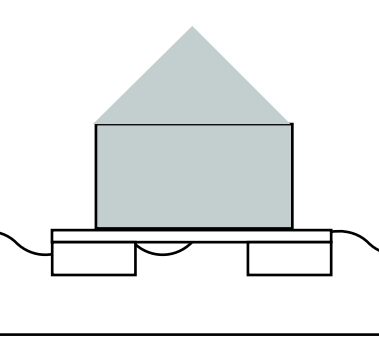
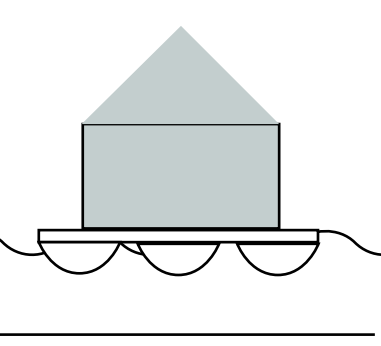
Promotion of institutional deliveries

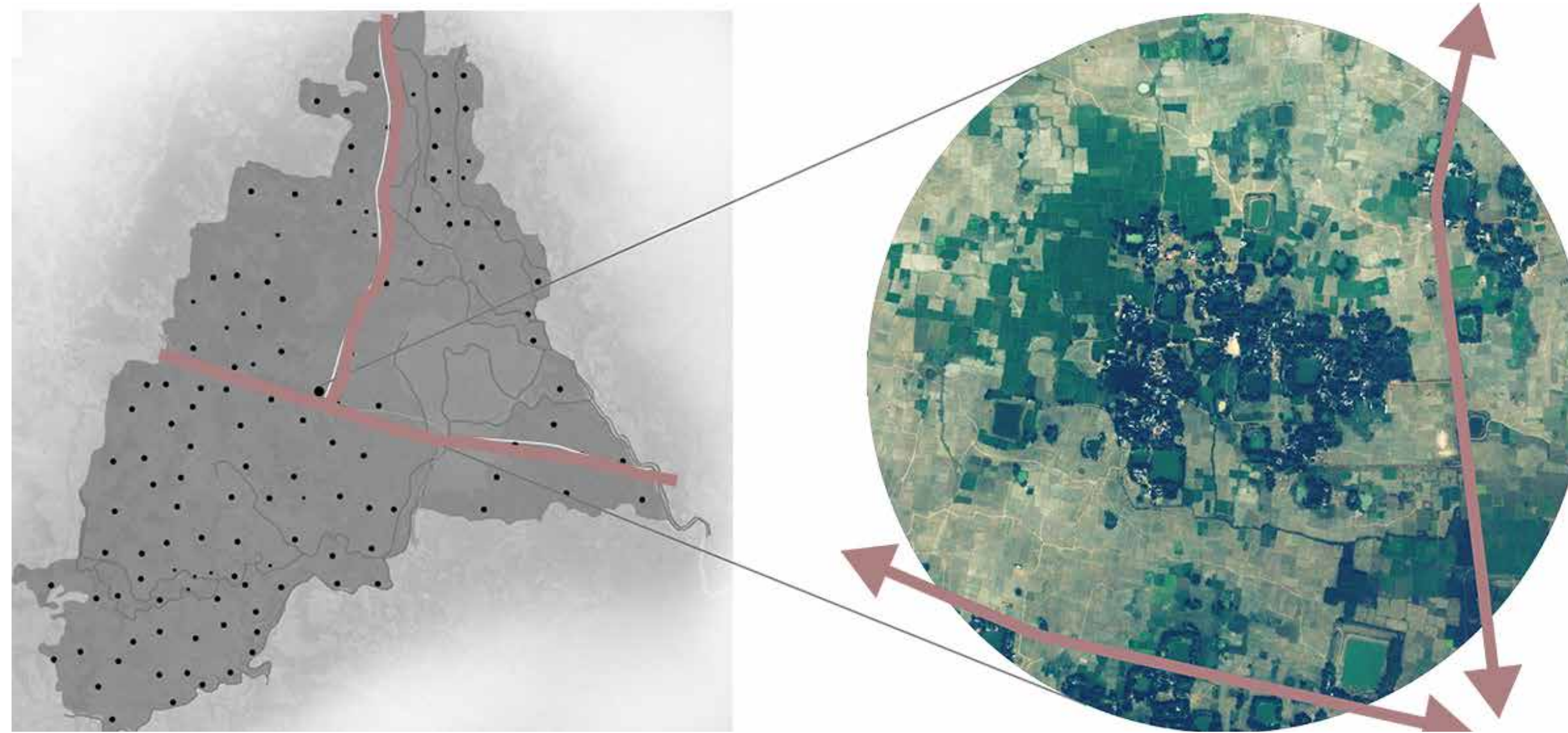
POST - NATAL CHECK UP

IMMUNIZATION CLINICS

Pulse polio

TREATMENT OF COMMON CHILDHOOD ILLNESS SUCH AS DIARRHEA,

 <p>Floating Barrels</p>	 <p>Floating EPS-blocks</p>	 <p>Floating Barges</p>	 <p>Floating Local boats</p>	
+	-	-	+	Local availability
+	-	-	+	Local technology
+	-	-	+/-	Cost
+/-	+	-	+/-	Construction time
+/-	+	+	-	Durability
+	+/-	+	-	Maintenance
+	+	-	+/-	Weight



Village Marichya

Population: 4500
Main profession: Agriculture
School: No

EXTRA
Location

