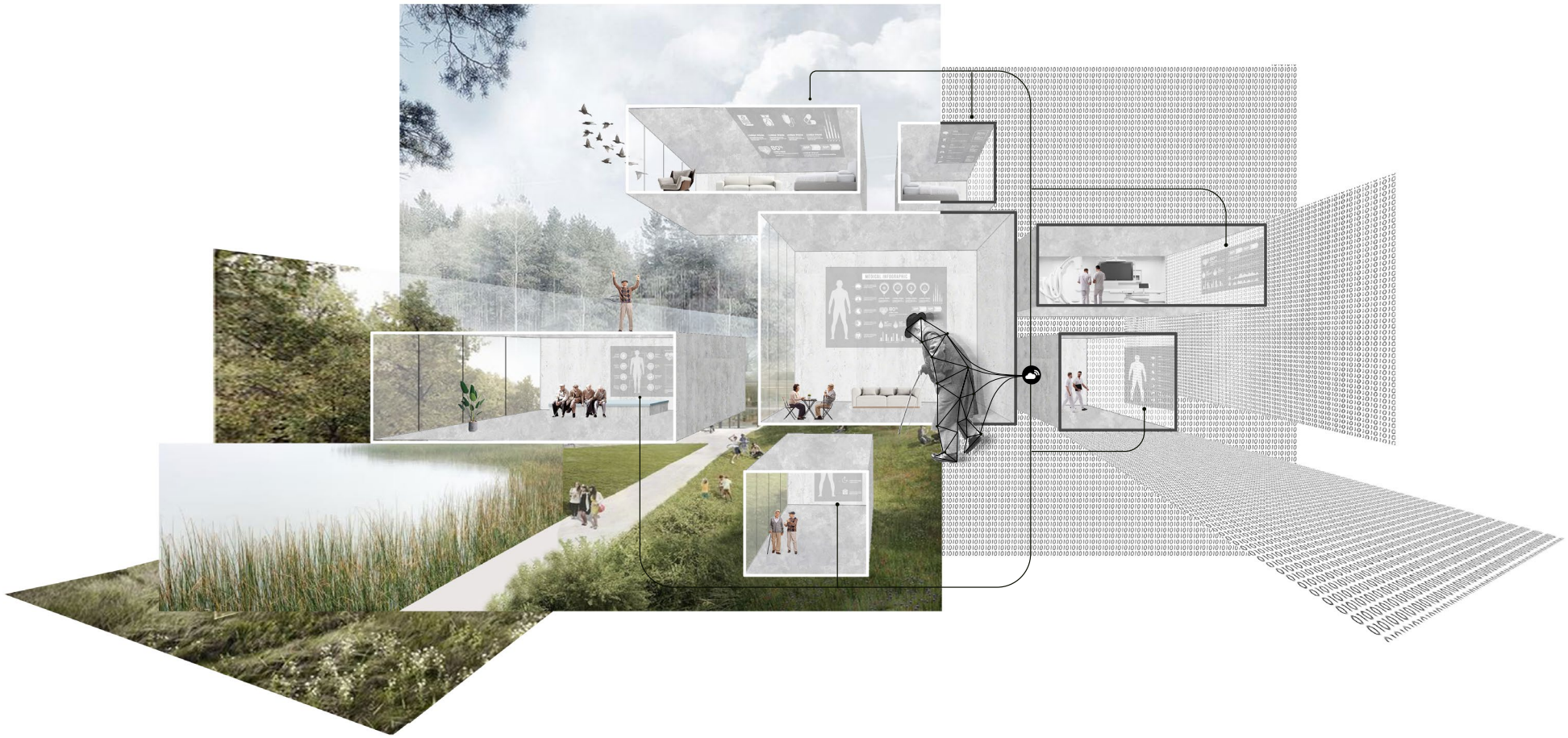


FROM HOSPITAL TO HOUSE

Elderly Healing Space in the Information Society

Liping Wei

07/07/2023

TU Delft MSc Architecture

HOSPITAL

What are we mainly focusing on when we talk about hospitals?

intro

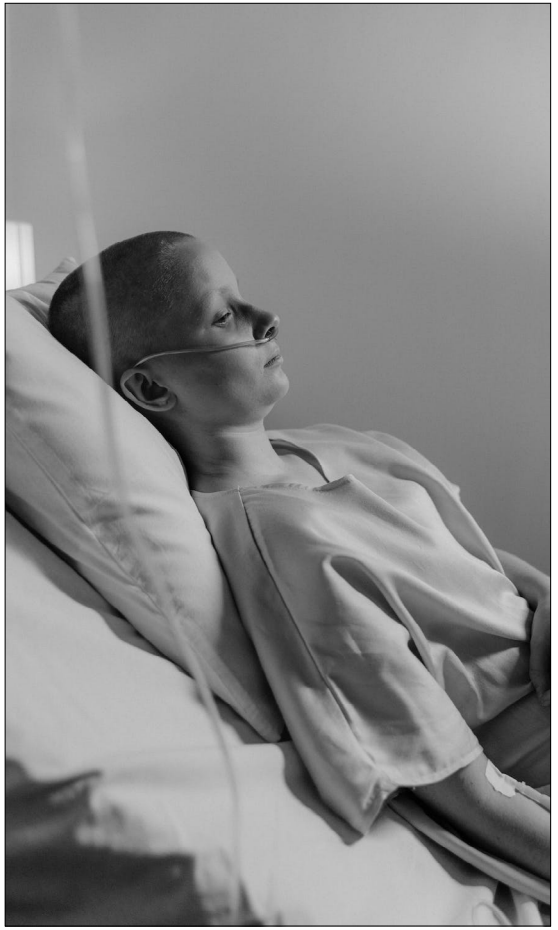
DOCTOR

intro

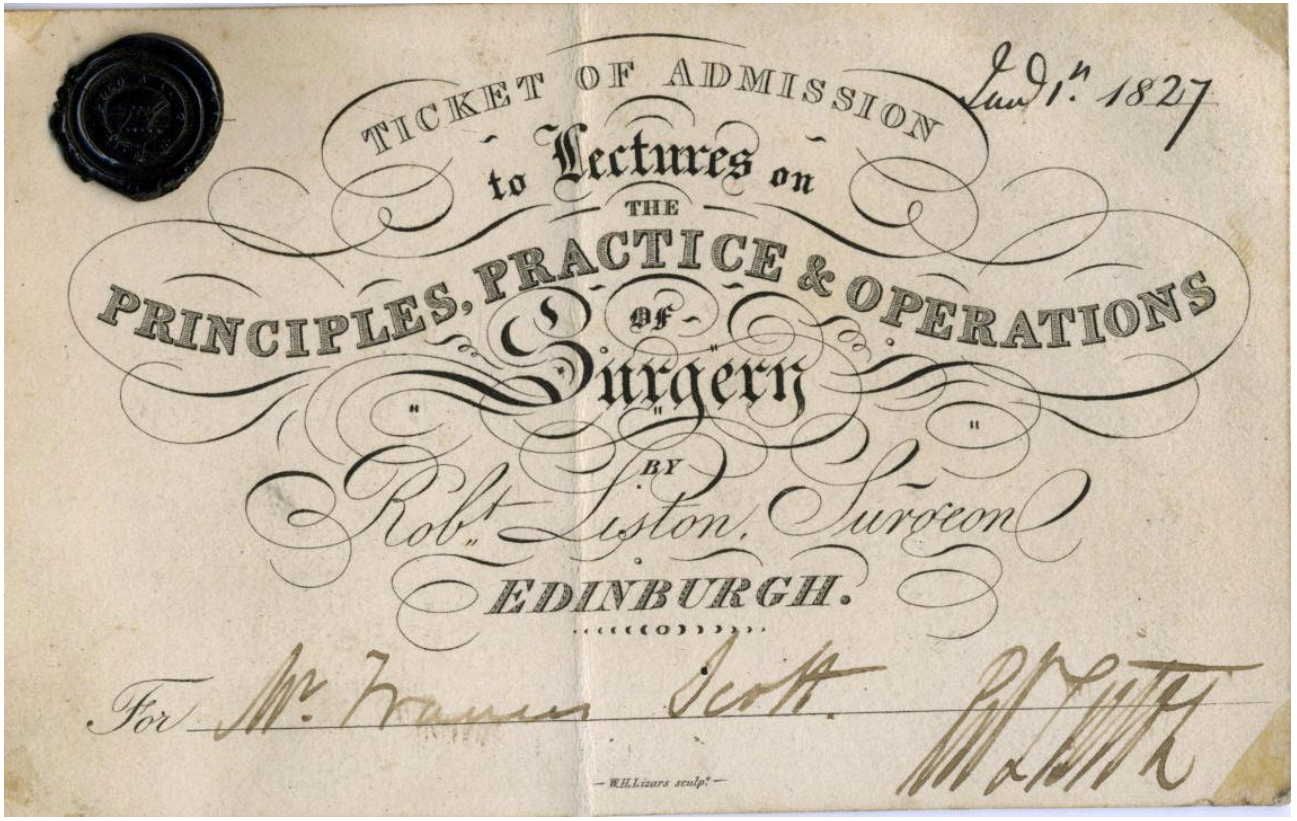
TECHNOLOGY

intro

PATIENT



DOCTOR-BASED



Medical license

doctor-based

HANDICRAFT

Adalbert F. Seligmann [1888-90]

doctor-based

BUILDING

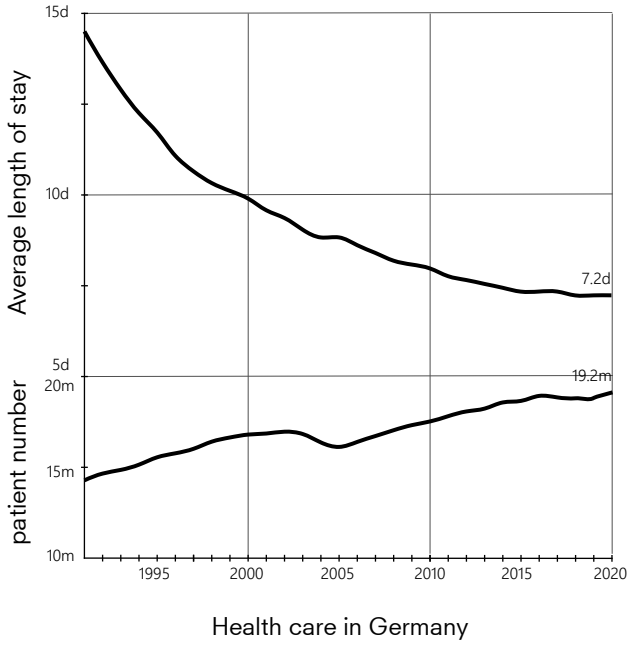
Ca' Granda Old Hospital

TECHNOLOGY-BASED

Godfrey Hounsfield, First CT Scan machine [1960s]

technology-based

EFFICIENCY

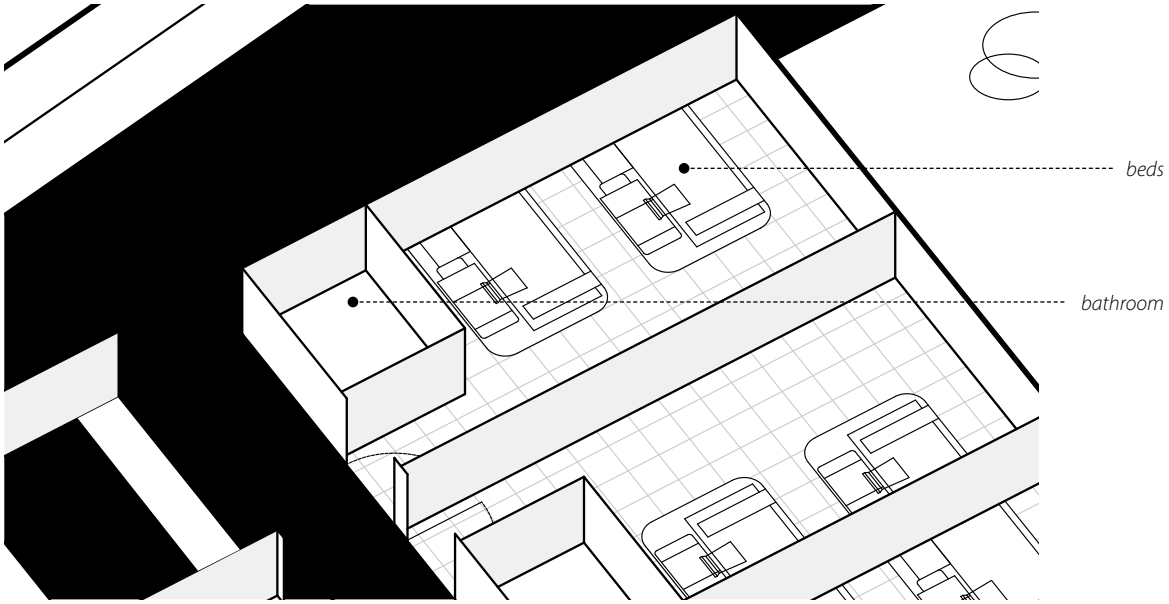


Health care in Germany

More patients, shorter stay

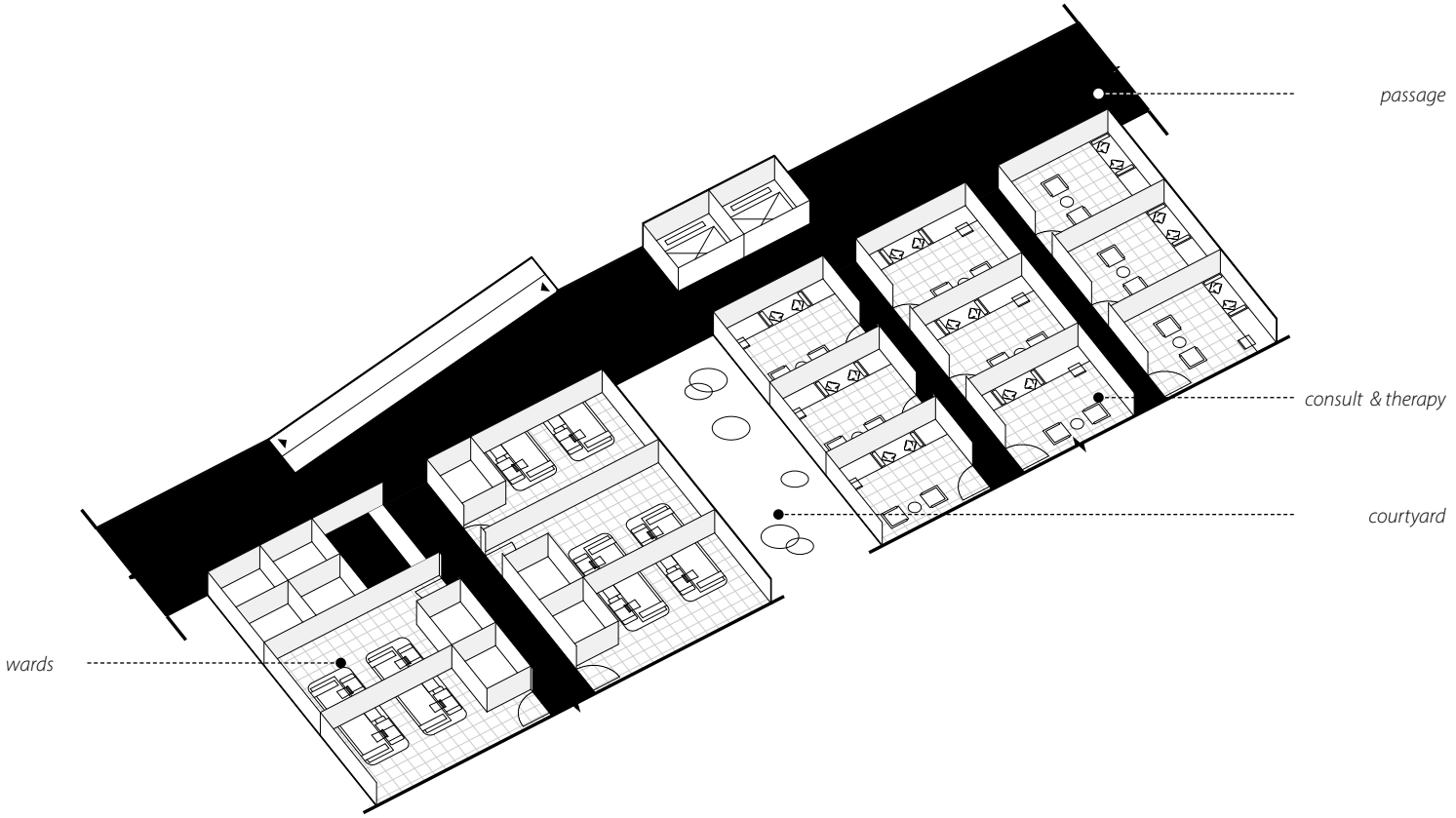
technology-based

BOX



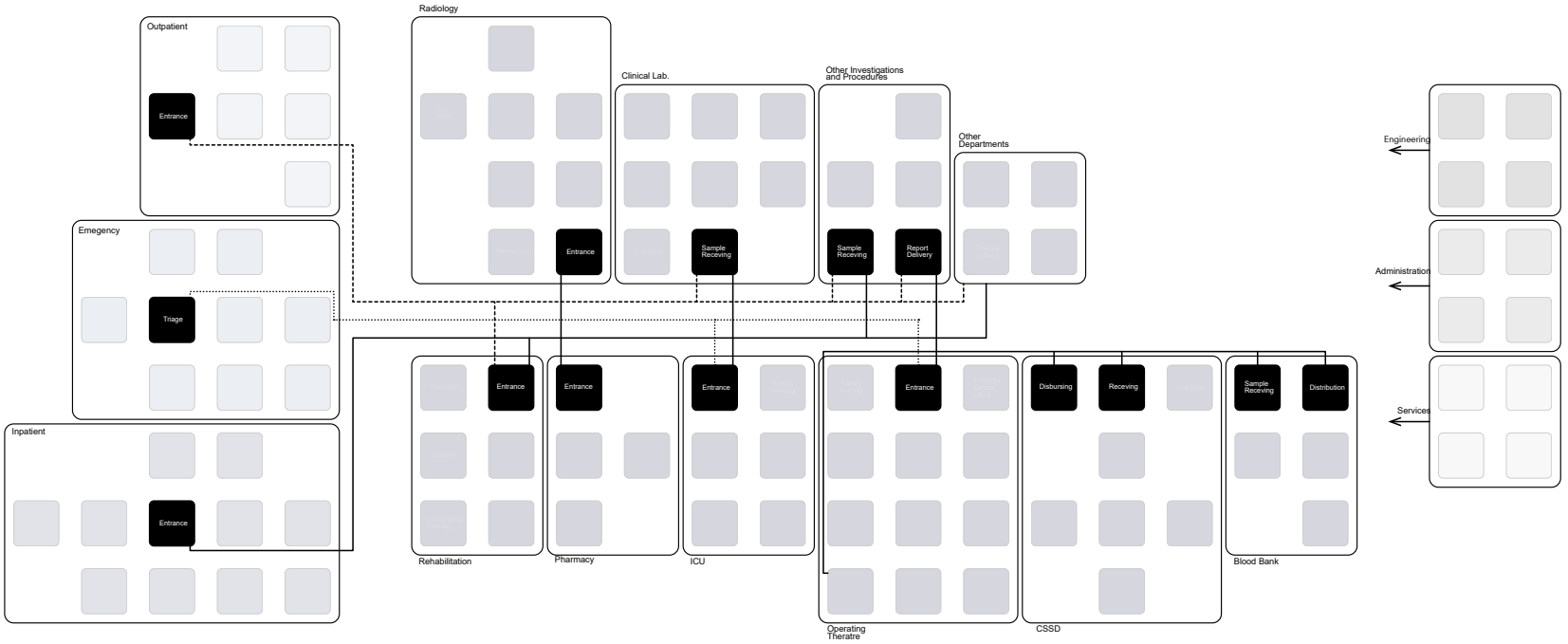
technology-based

BOXES



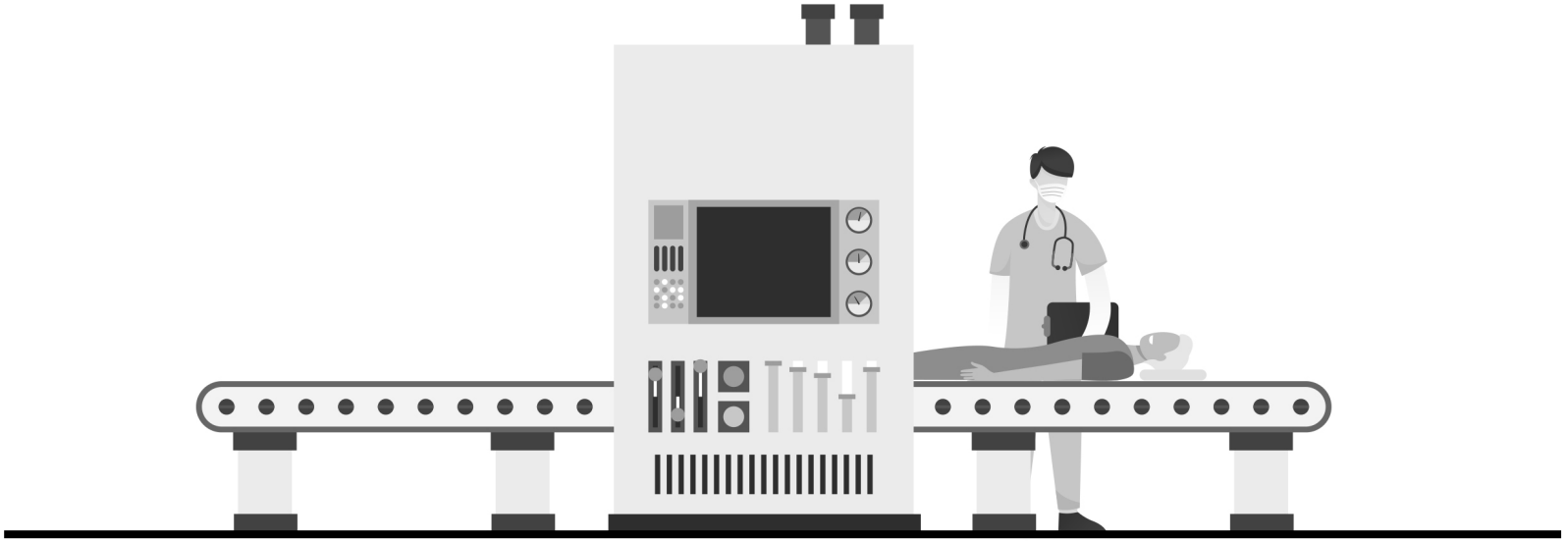
technology-based

PRODUCTION LINE



technology-based

BODY FACTORY



PATIENT PERSPECTIVE

What about the patient and experience?

patient perspective

FEELINGS

ANGER

Disgust:
Contempt, disgust, revulsion

Envy:
Envy, jealousy

Exasperation:
Exasperation, frustration

Irritation:
Aggravation, agitation, annoyance, grouchiness, grumpiness, irritation

Rage:
Anger, bitterness, dislike, ferocity, fury, hate, hostility, loathing, outrage, rage, resentment, scorn, spite, vengefulness, wrath

Torment:
Torment

FEAR

Horror:
Alarm, fear, fright, horror, hysteria, mortification, panic, shock, terror

Nervousness:
Anxiety, apprehension, distress, dread, nervousness, tenseness, uneasiness, worry

JOY

Cheerfulness:
Amusement, bliss, cheerfulness, delight, ecstasy, elation, enjoyment, euphoria, gaiety, gladness, glee, happiness, jolliness, joviality, joy, jubilation, satisfaction

Contentment:
Contentment, pleasure

Enthrallment:
Enthrallment, rapture

Optimism:
Eagerness, hope, optimism
Pride: Pride, triumph

Relief:
Relief

Zest:
Enthusiasm, excitement, exhilaration, thrill, zeal, zest

LOVE

Affection:
Adoration, affection, attraction, caring, compassion, fondness, liking, love, sentimentality, tenderness

Longing:
Longing

Lust:
Arousal, desire, infatuation, lust, passion

SADNESS

Disappointment:
Disappointment, dismay, displeasure

Neglect:
Alienation, defeat, dejection, embarrassment, homesickness, humiliation, insecurity, isolation, insult, loneliness, neglect, rejection

Sadness:
Depression, despair, gloom, glumness, grief, hopelessness, melancholy, misery, sadness, sorrow, unhappiness, woe

Shame:
Guilt, regret, remorse, shame

Suffering:
Agony, anguish, hurt, suffering

Sympathy:
Pity, sympathy

SURPRISE

Surprise:
Amazement, astonishment, surprise

**Emotion Knowledge: Further Exploration of a Prototype Approach --Dr. Phillip Shaver*

patient perspective

FOR THE ELDERLY

☰ CNN health Life, But Better Fitness Food Sleep Mindfulness Relationships

‘The older you are, the worse the hospital is for you’

By Anna Gorman, Kaiser Health News
Published 8:56 AM EDT, Mon August 15, 2016

Heidi de Marco/Kaiser Health News

The unique needs of older patients are not a priority for most hospitals, experts say.

STORY HIGHLIGHTS

Interrupted sleep, unappetizing food and days in bed can cause lasting damage to older patients

Elderly patients are a growing clientele for hospitals, a trend that will only accelerate

Janet Prochazka was active and outspoken, living by herself and working as a special education tutor. Then, in March, a bad fall landed her in the hospital.

Doctors cared for her wounds and treated her pneumonia. But Prochazka, 75, didn’t sleep or eat well at Zuckerberg San Francisco General Hospital and Trauma Center. She became confused and agitated and ultimately contracted a serious stomach infection. After more than three weeks in the hospital and three more in a rehabilitation facility, she emerged far weaker than before, shaky and unable to think clearly.

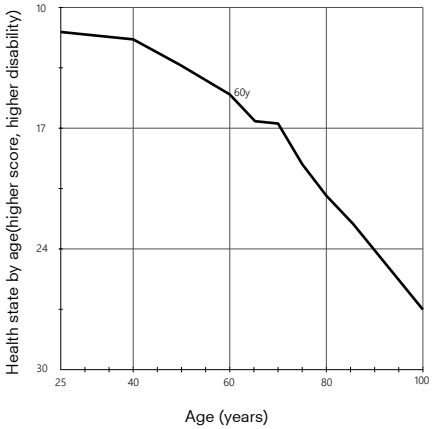
She had to stop working and wasn’t able to drive for months. And now, she’s considering a move to Maine to be closer to relatives for support.

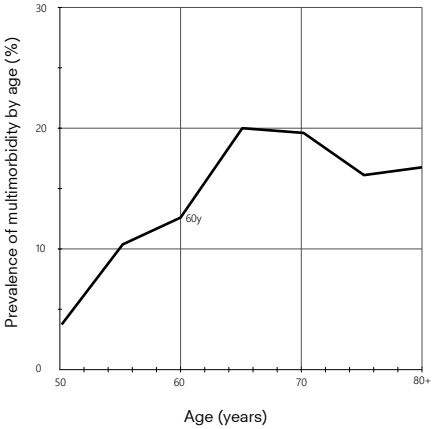
“It’s a big, big change,” said her stepdaughter, Kitty Gilbert, soon after Prochazka returned home. “I am hopeful that

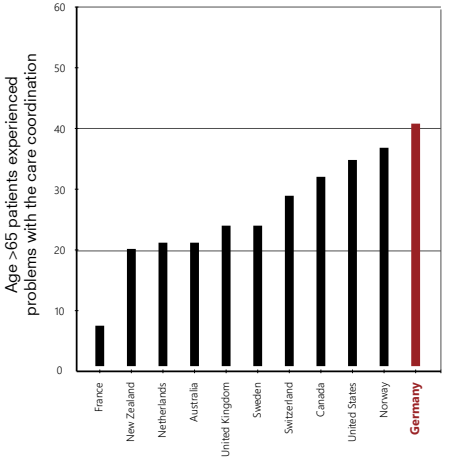
patient perspective

HEALTH CARE BARRIERS

A Physical







mobility ↓

multimorbidity ↑

care coordination problems ↑

patient perspective

HEALTH CARE BARRIERS

B Mental

Fear of change and treatment

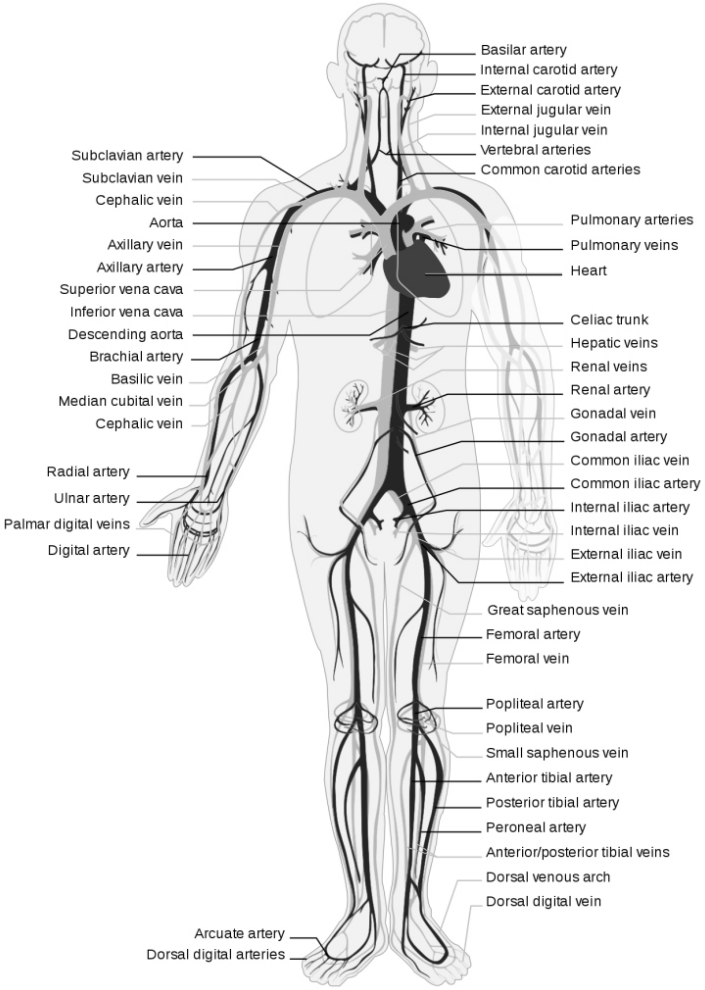
Lack of social well-being

patient perspective

CARDIOVASCULAR DISEASES

patient perspective

CARDIOVASCULAR DISEASES



Also called circulatory system disease.

ISSUES:

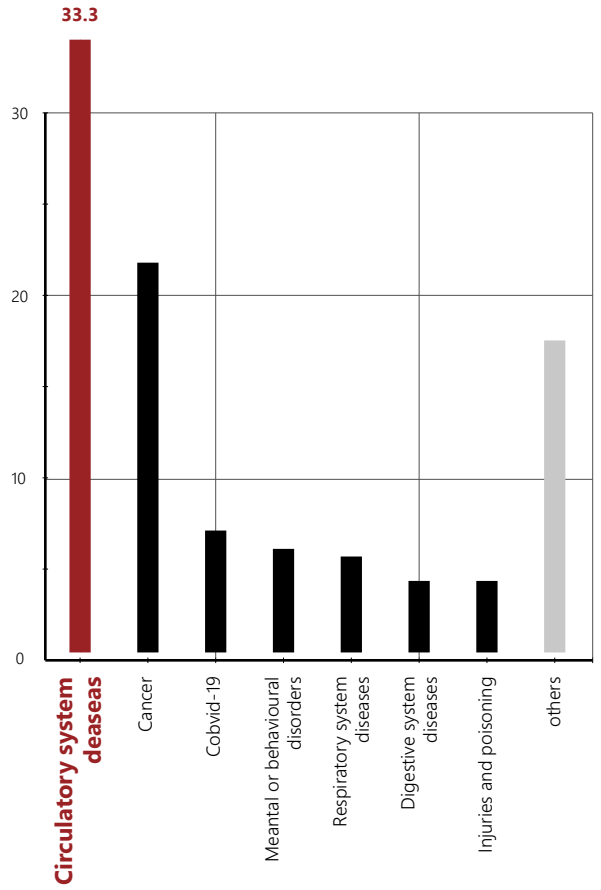
- Problems with your heart's pumping action.
- Changes to your heart's structure.
- Inefficient blood flow.
- Blocked or narrowed blood vessels.
- Weakened blood vessels.

CAUSES:

- High blood pressure,
- Smoking
- Diabetes
- Physical inactivity
- Obesity,
- High blood cholesterol
- Poor diet
- Excessive alcohol consumption

patient perspective

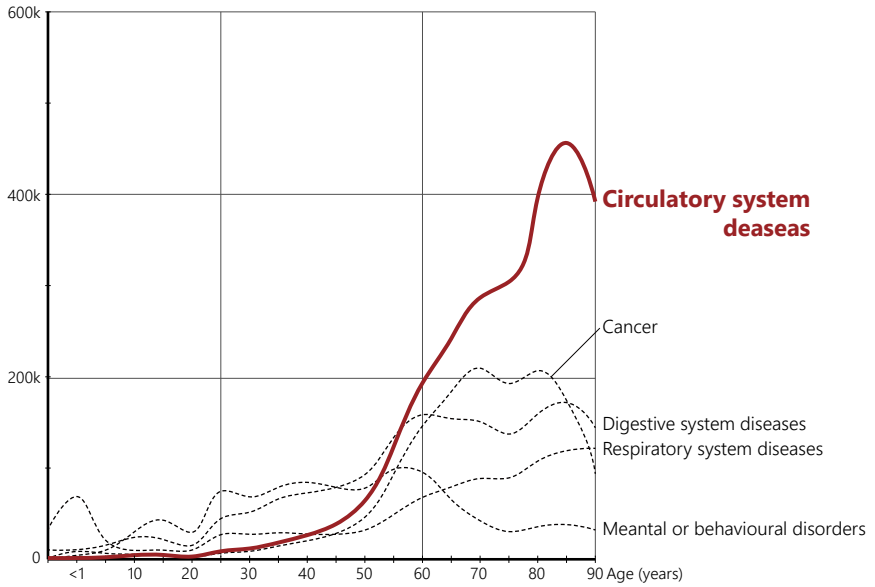
1.LARGE QUANTITY



Causes of death by types of diseases
in Germany in 2021

patient perspective

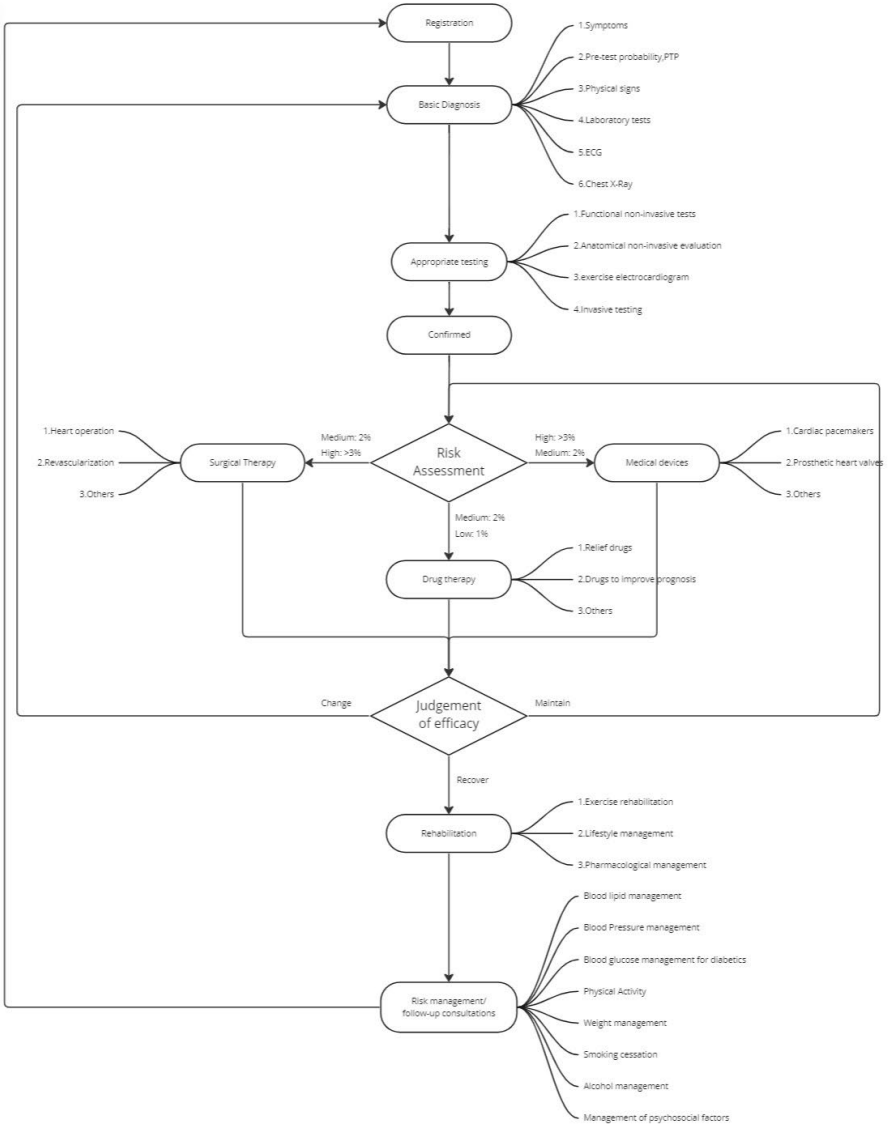
2.INFLUENCED BY AGE

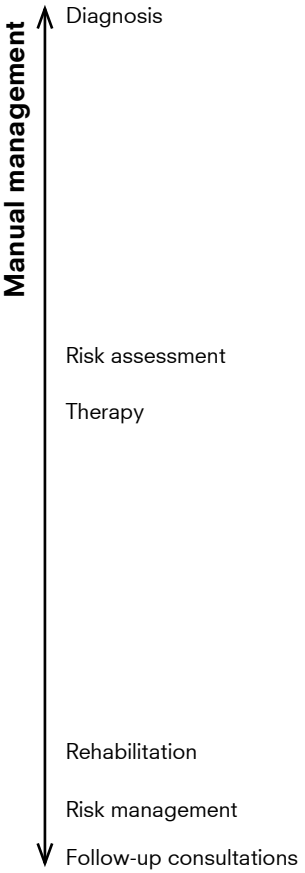


Number of patients by types of diseases and ages
in Germany in 2021

patient perspective

3.MANUAL COMPLEX PROCEDURES



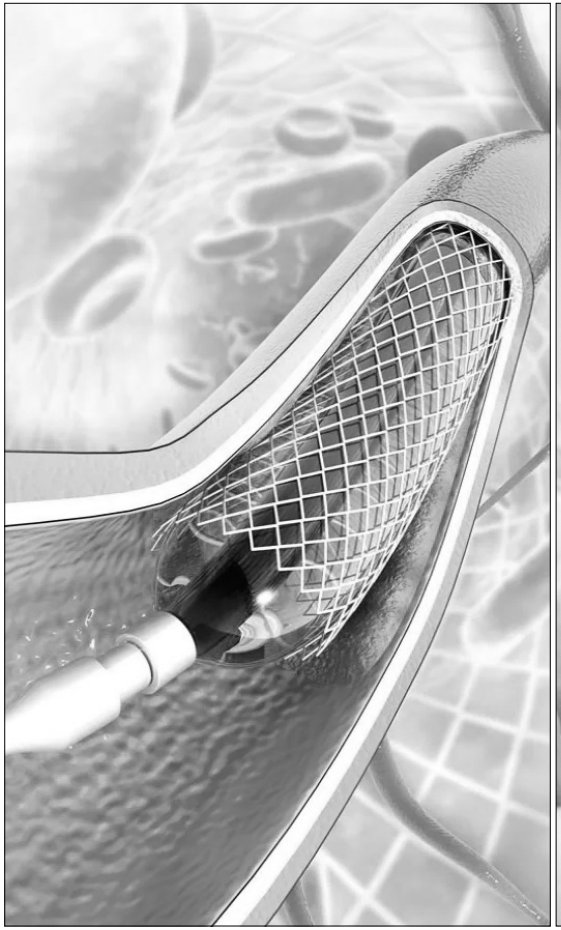


patient perspective

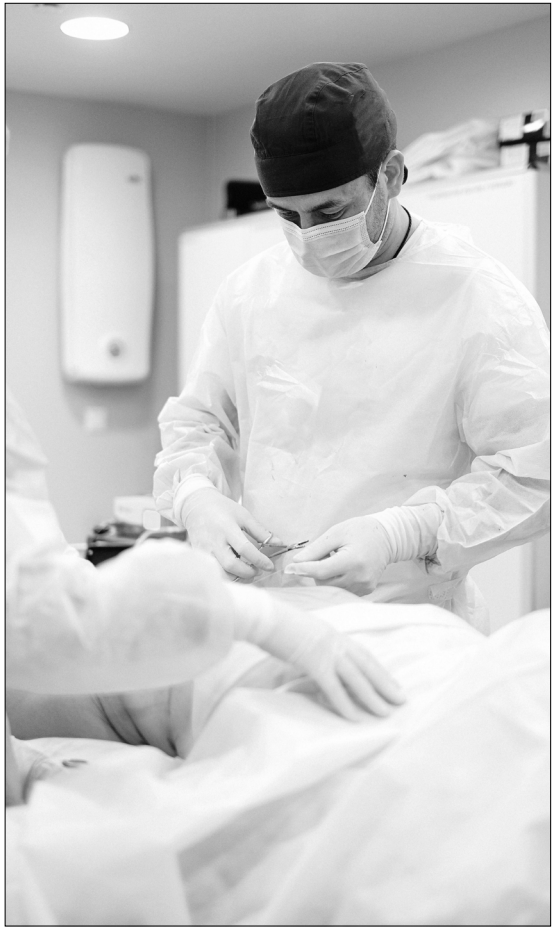
MAIN TREATMENTS

Drug

Device

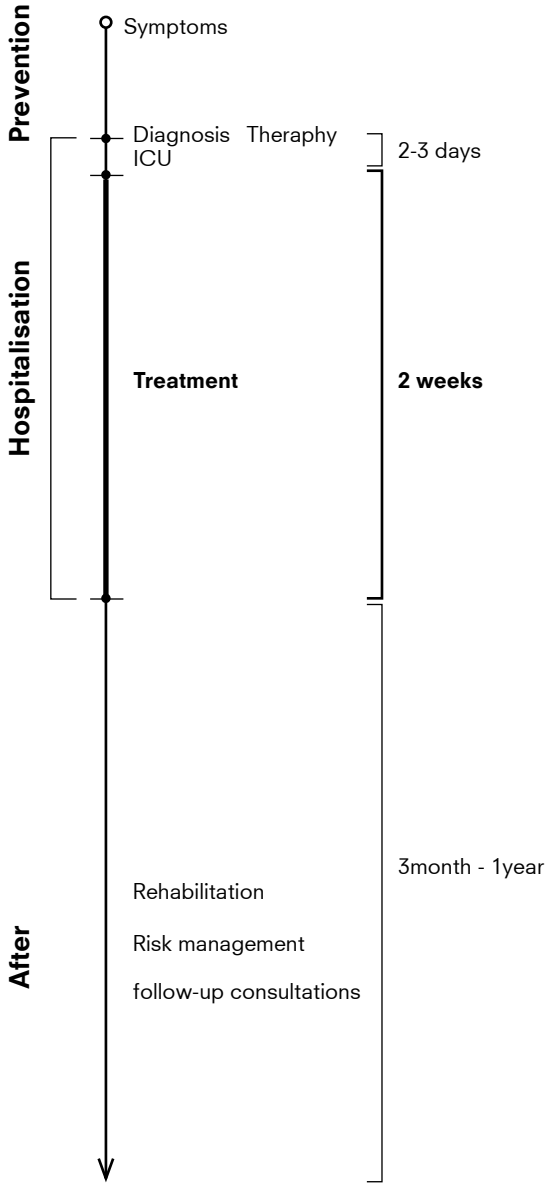


Surgery



patient perspective

4.LONG TREATMENT PERIOD



patient perspective

POOR EXPERIENCE

RESEARCH QUESTION

How to design a healing space that provides the elderly with both HEALTH CARE and SOCIAL WELL-BEING in the INFORMATION SOCIETY?

research question

PATIENT-BASD!

How to design a healing space that provides the elderly with

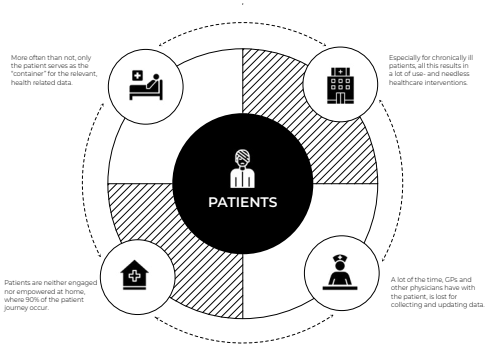
EFFICIENCY and EXPERIENCE

by using DATA

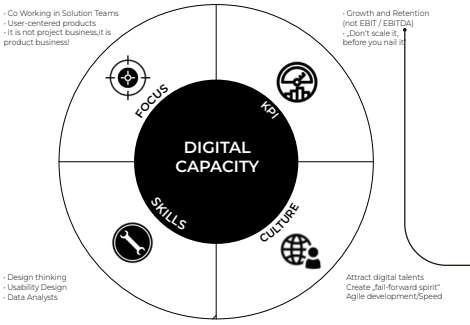
WHAT TO DO

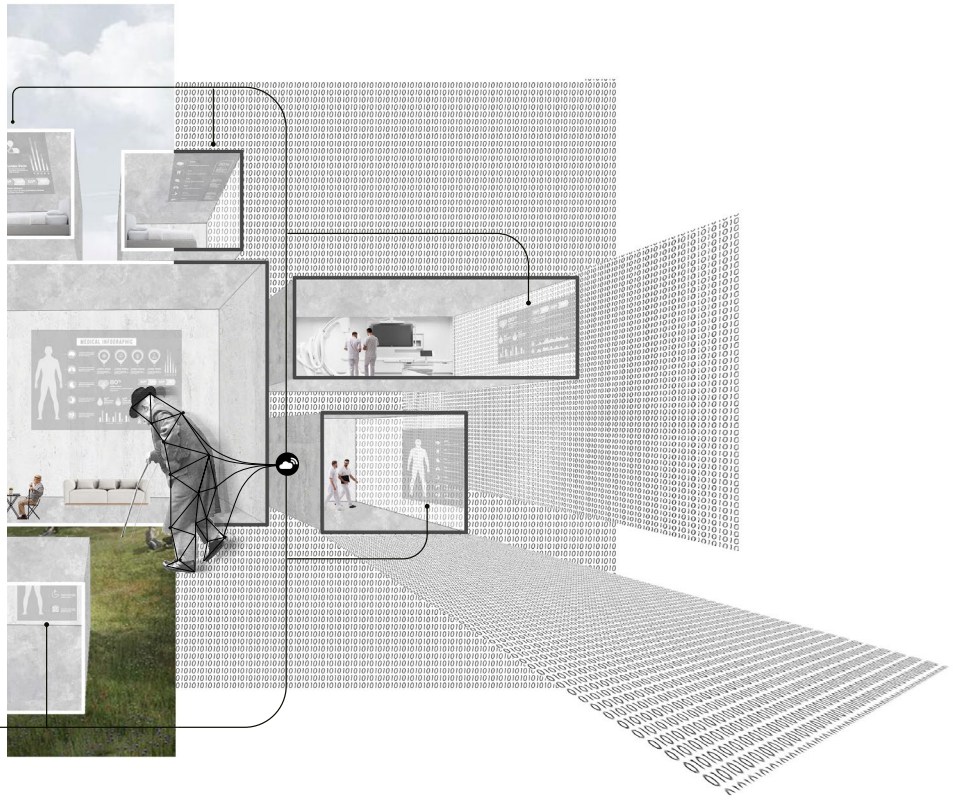
A. Data based healing sysyem

Integrated data platform



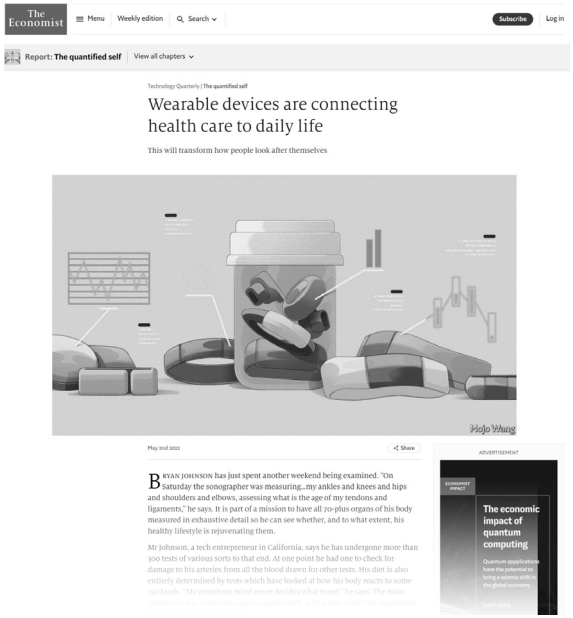
Digital capacity

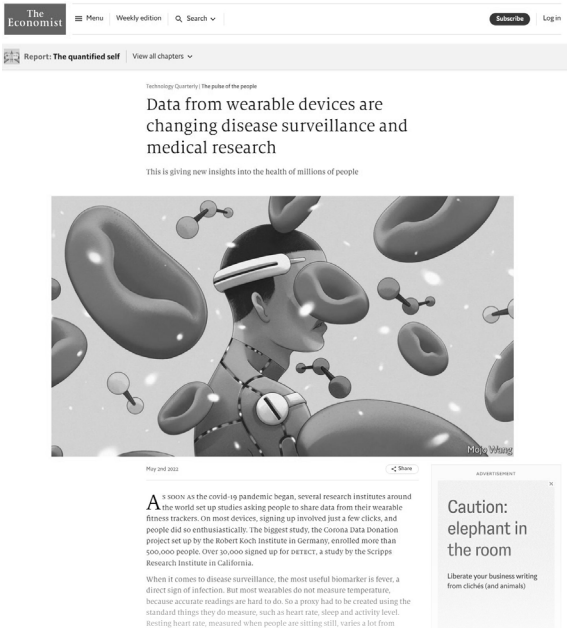




patient-based

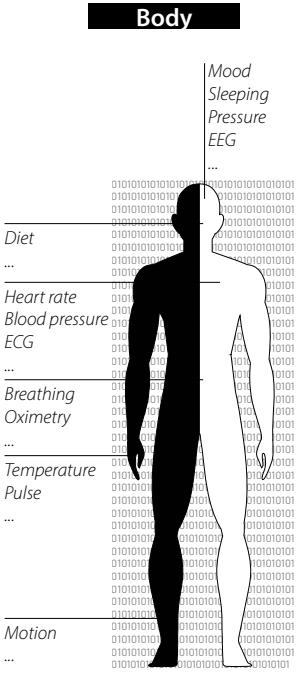
BODY DATA EVOLUTION





patient-based

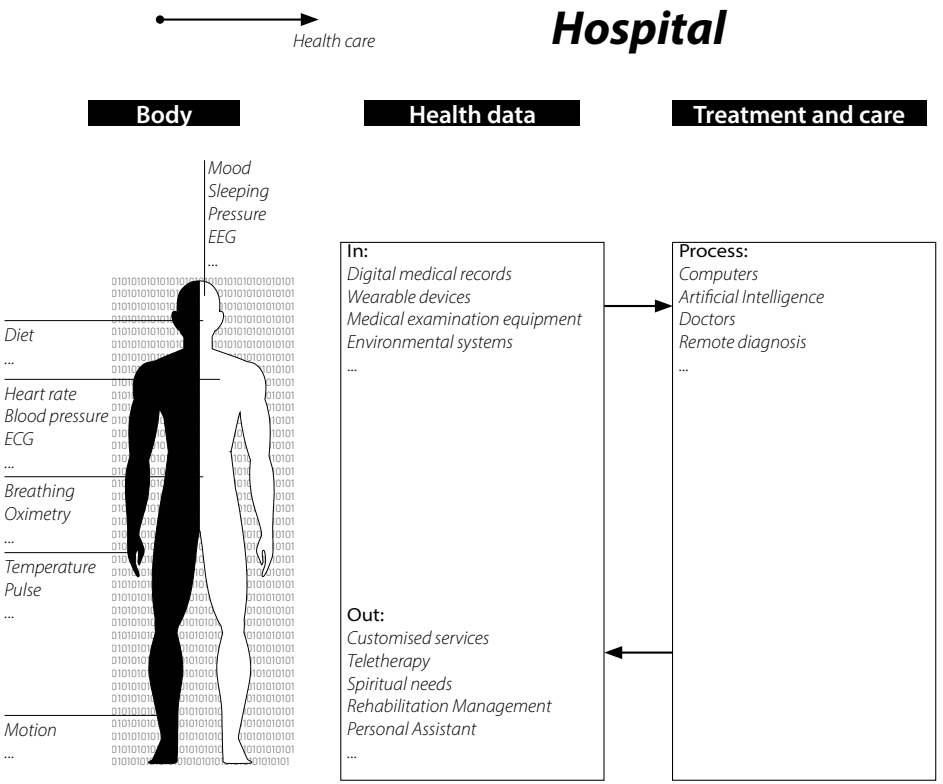
BODY



collection of data

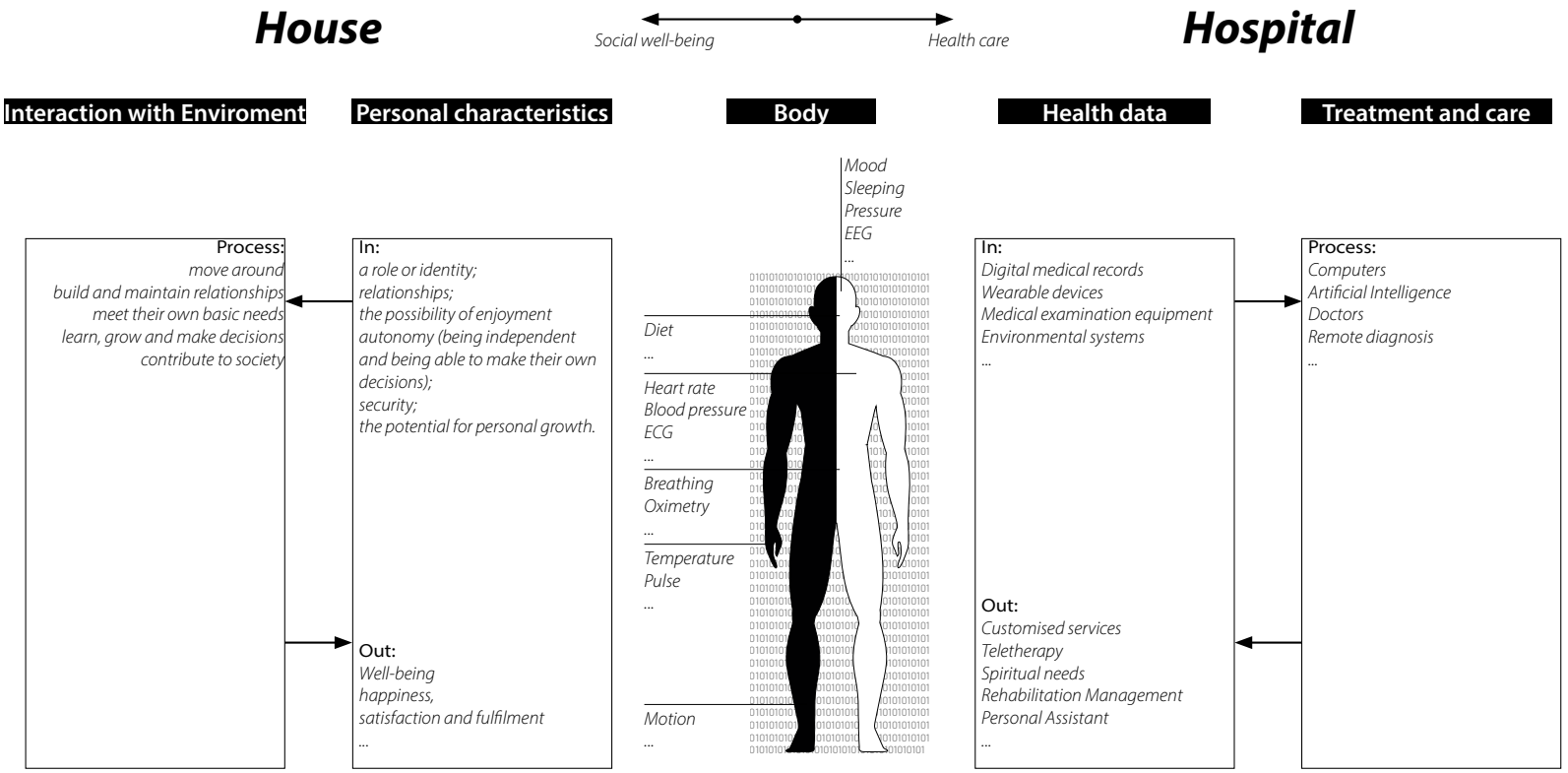
patient-based

BODY



patient-based

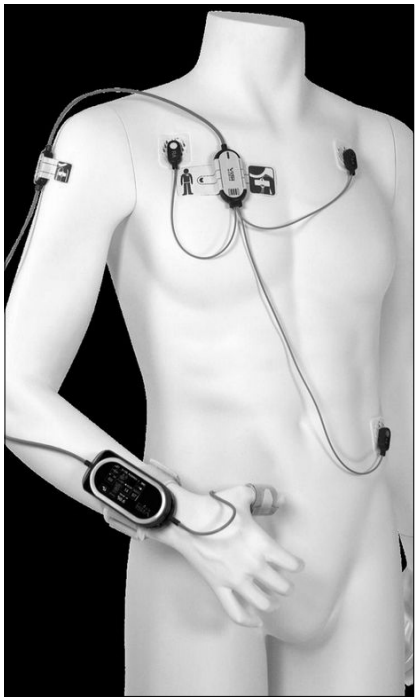
BODY



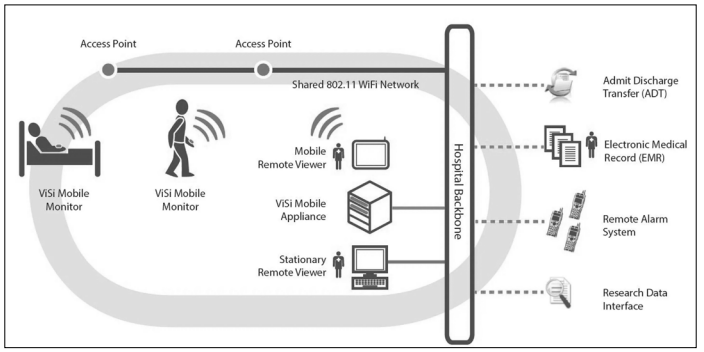
patient-based

INTERACTION

24h track



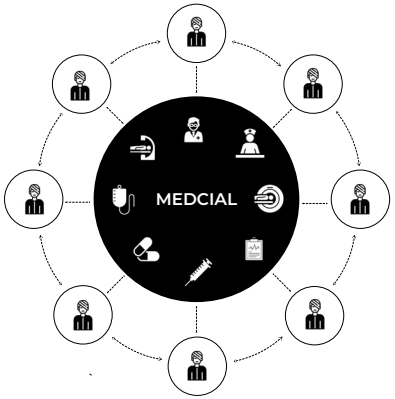
data & doctor system



comfortable healing

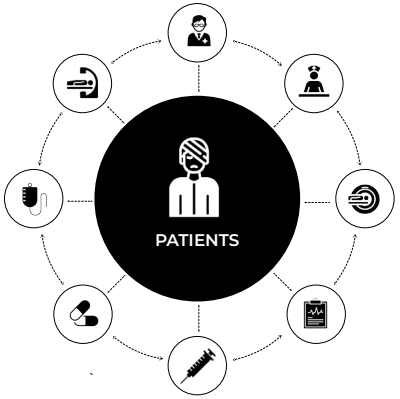
patient-based

INTERACTION



Patient comes to the doctor

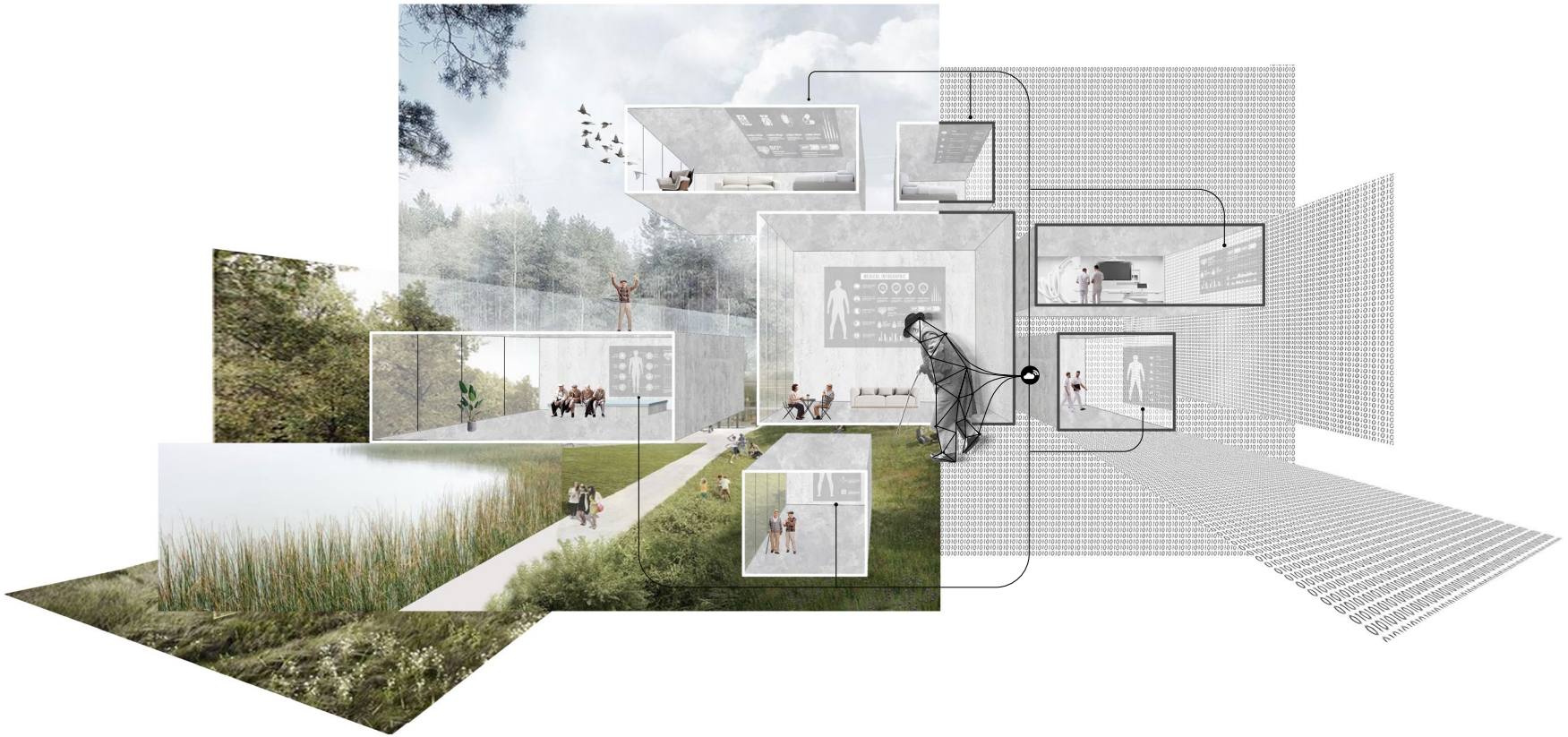
vs



Doctor comes to the patient (Medical & Life Services)

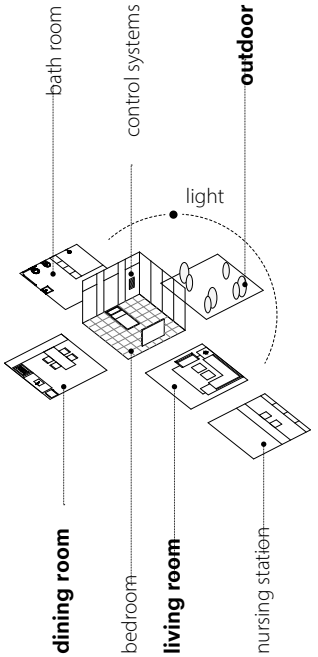
WHAT TO DO

B. Socail well-being



patient-based

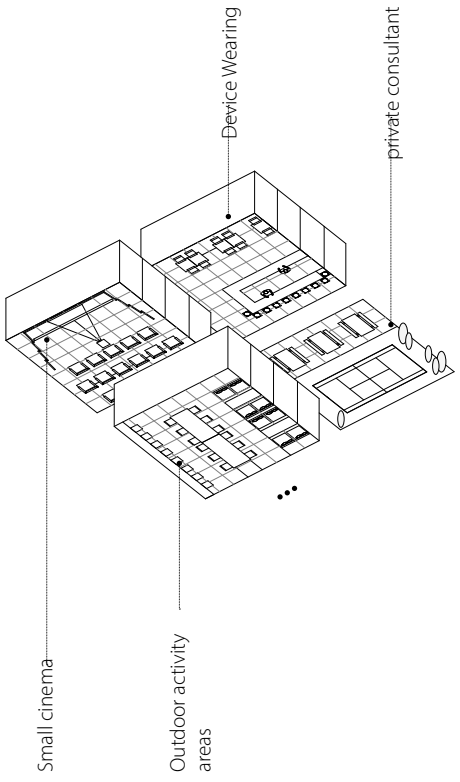
“HOUSE” STYLE



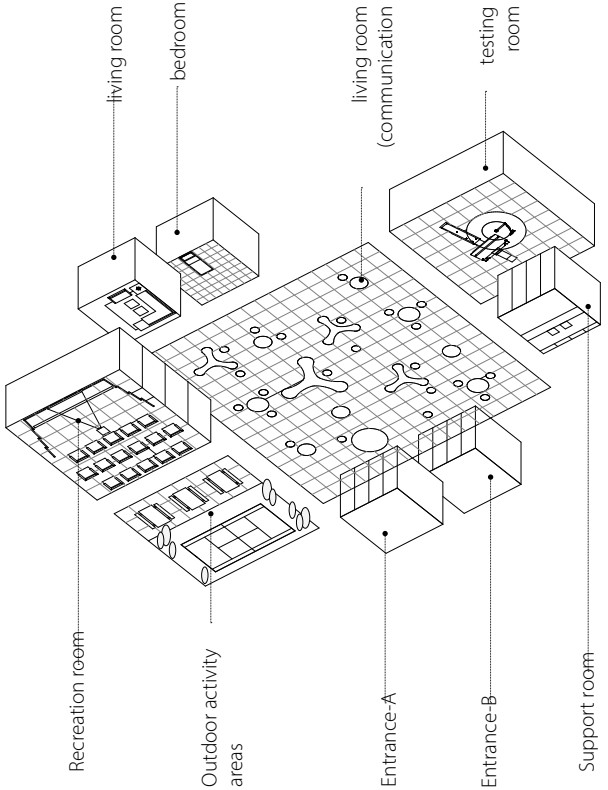
patient-based

SOCIAL

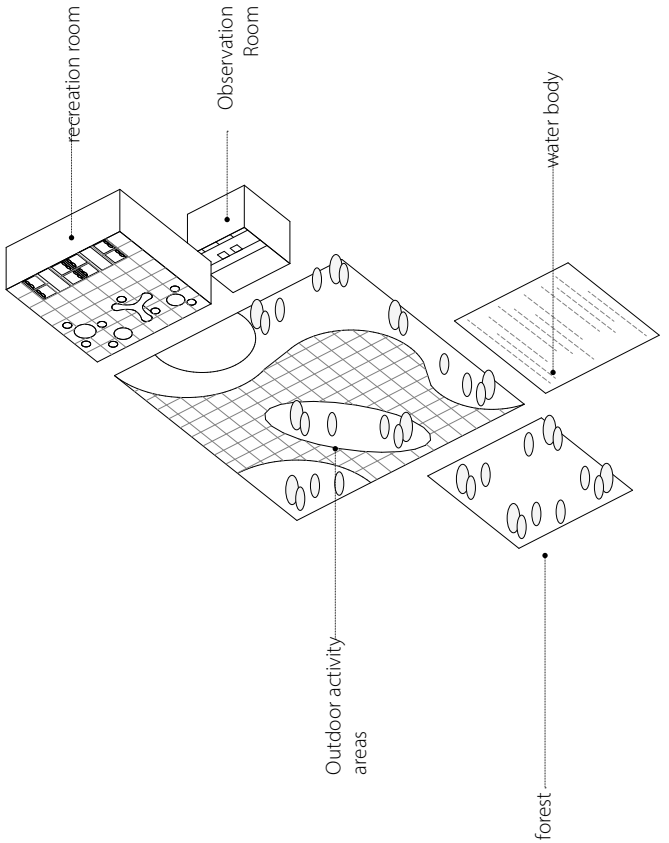
Social & Leisure



Living space

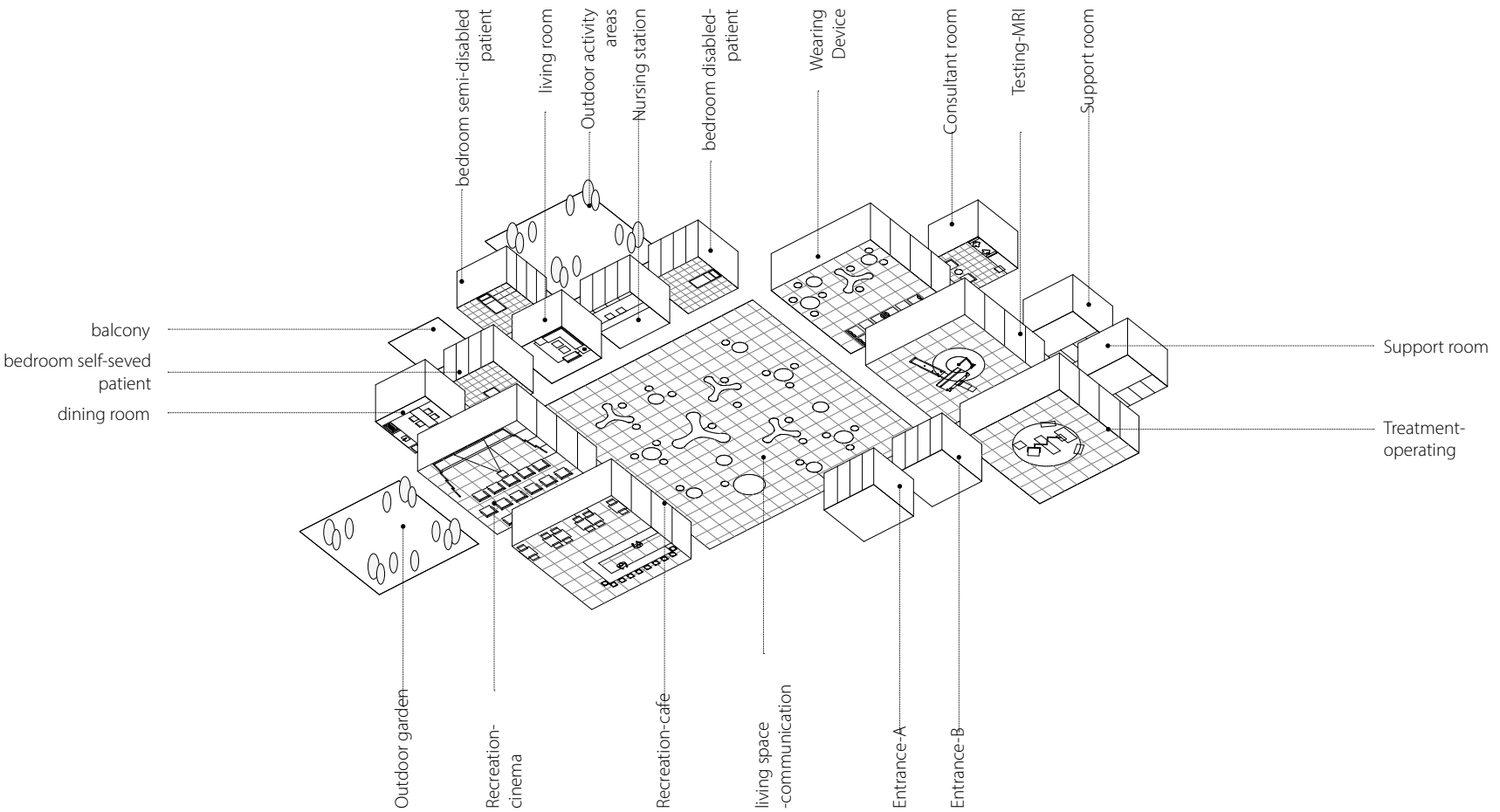


Outdoor activity area



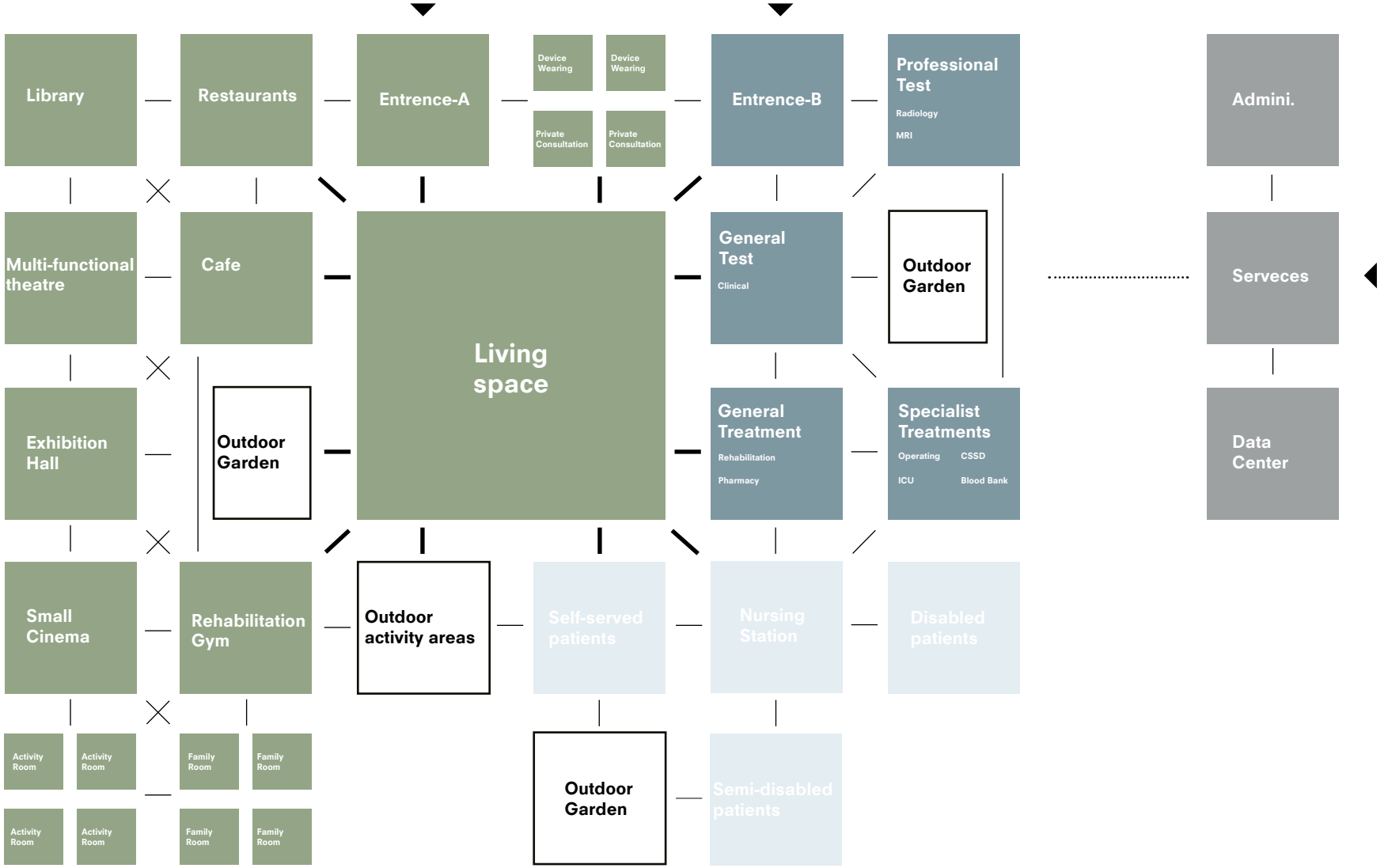
patient-based

LIVING SPACE AS THE CORE



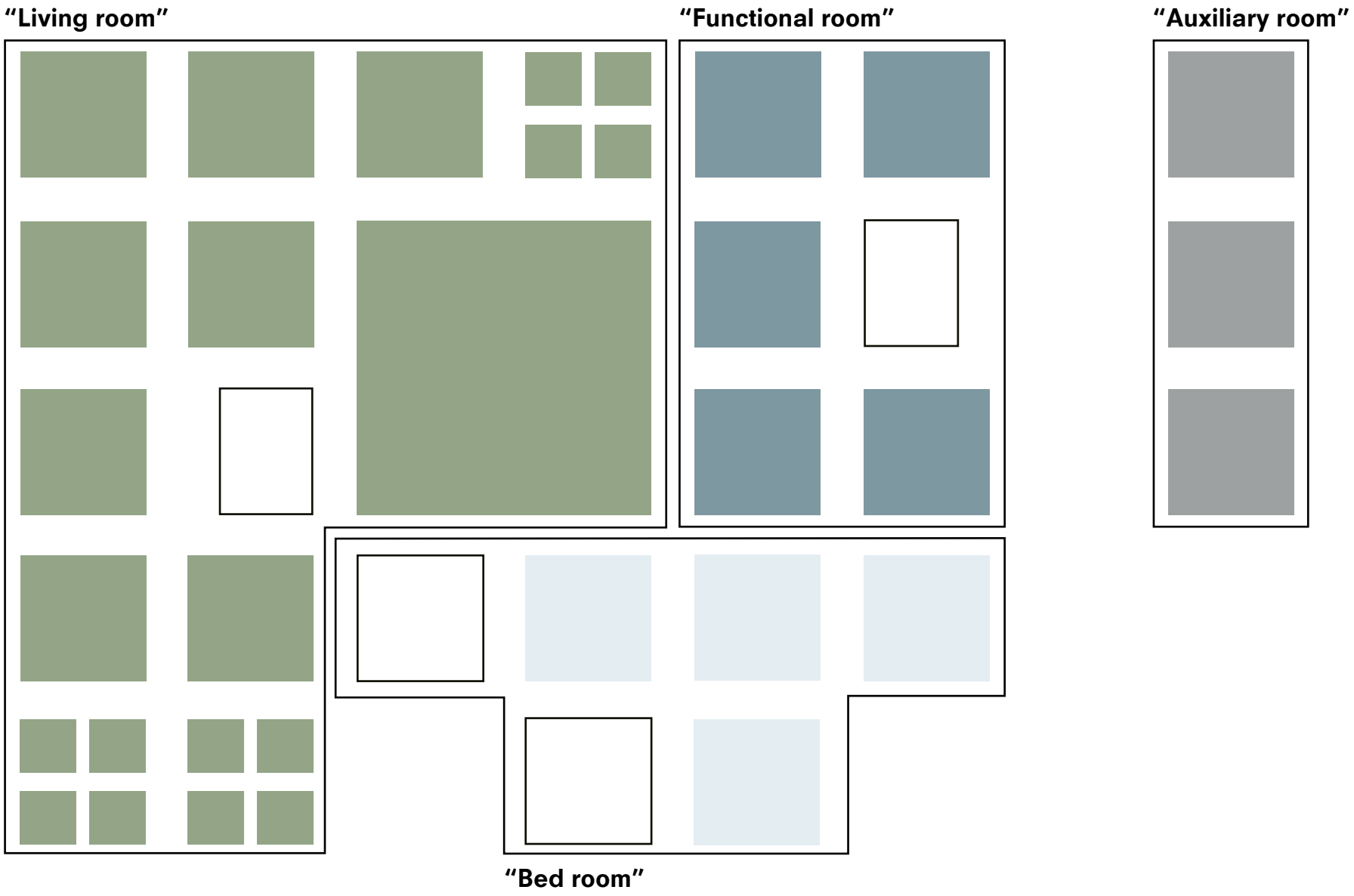
patient-based

RELATION SCHEME



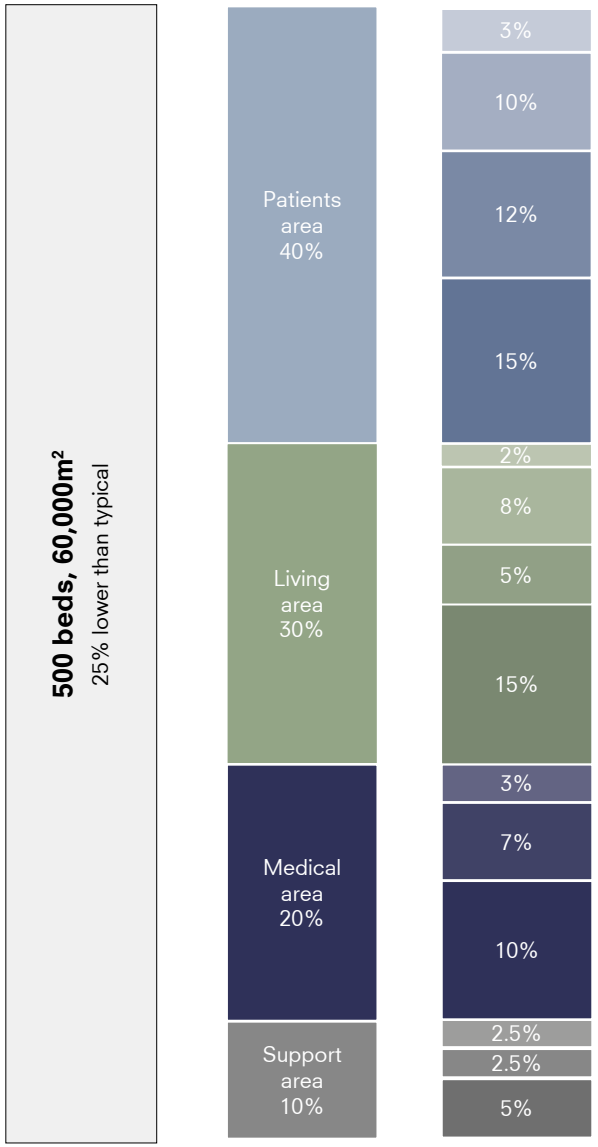
patient-based

FROM HOSPITAL TO HOUSE



patient-based

PROGRAM BAR



1. Nursing station:
   Small room space required,With intelligent room equipment
2. Disabled patients room:
   Small room space required,With intelligent room equipment

3. Semi-disabled patients room:
   Needs some space to move around

4. Self-served patients room:
   Need more space for their living requirements

5. Entrances:
   Connecting to the Communication center
6. Communication center:
   Composite space, connected to other functions
7. Private social recreation:
   Intimate event space for a few people or a single person（family room，activity room）
8. Public social recreation:

Restaurants	Exhibition
Cafe	Small theatre
Small cinema	Rehabilitation
Library	(with outdoor activity area)

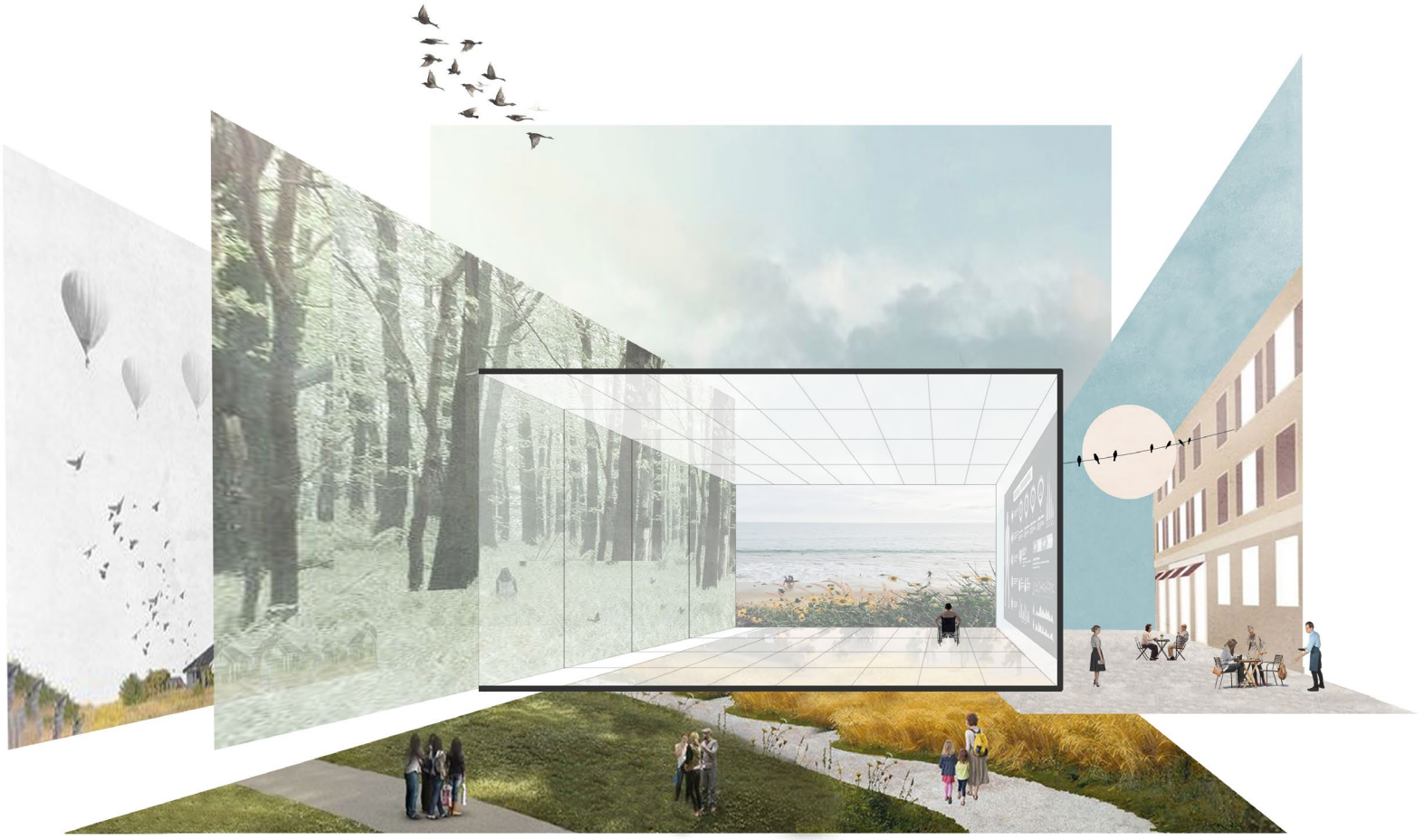
9. Consultation:
   Includes Device Wearing and Private consultation
10. Testing and Diagnostics:
    Includes testing of portable equipment and testing of large specialist instruments
11. Treatment:

Operating Theratre	ICU
CSSD	Pharmacy
Blood Bank	Rehabilitation

12. Administration department:
    administration officie
13. Hospital Services:
    indirectly help in the management and treatment - Kitchen, Laundry, etc.
14. Engineering Services:
    EMP, etc.

WHAT TO DO

C. Therapy environment



patient-based

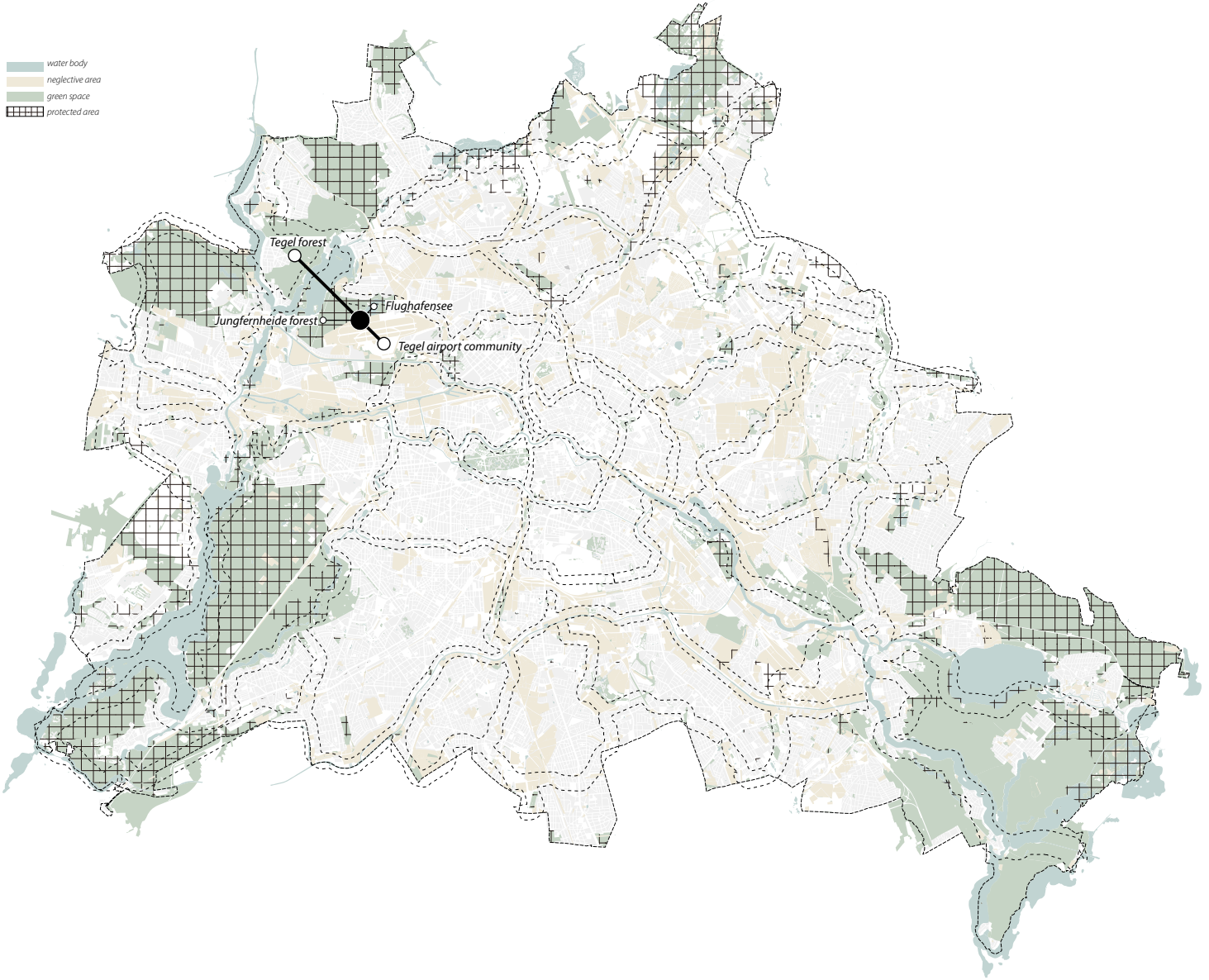
THERAPY ENVIRONMENT

Natural

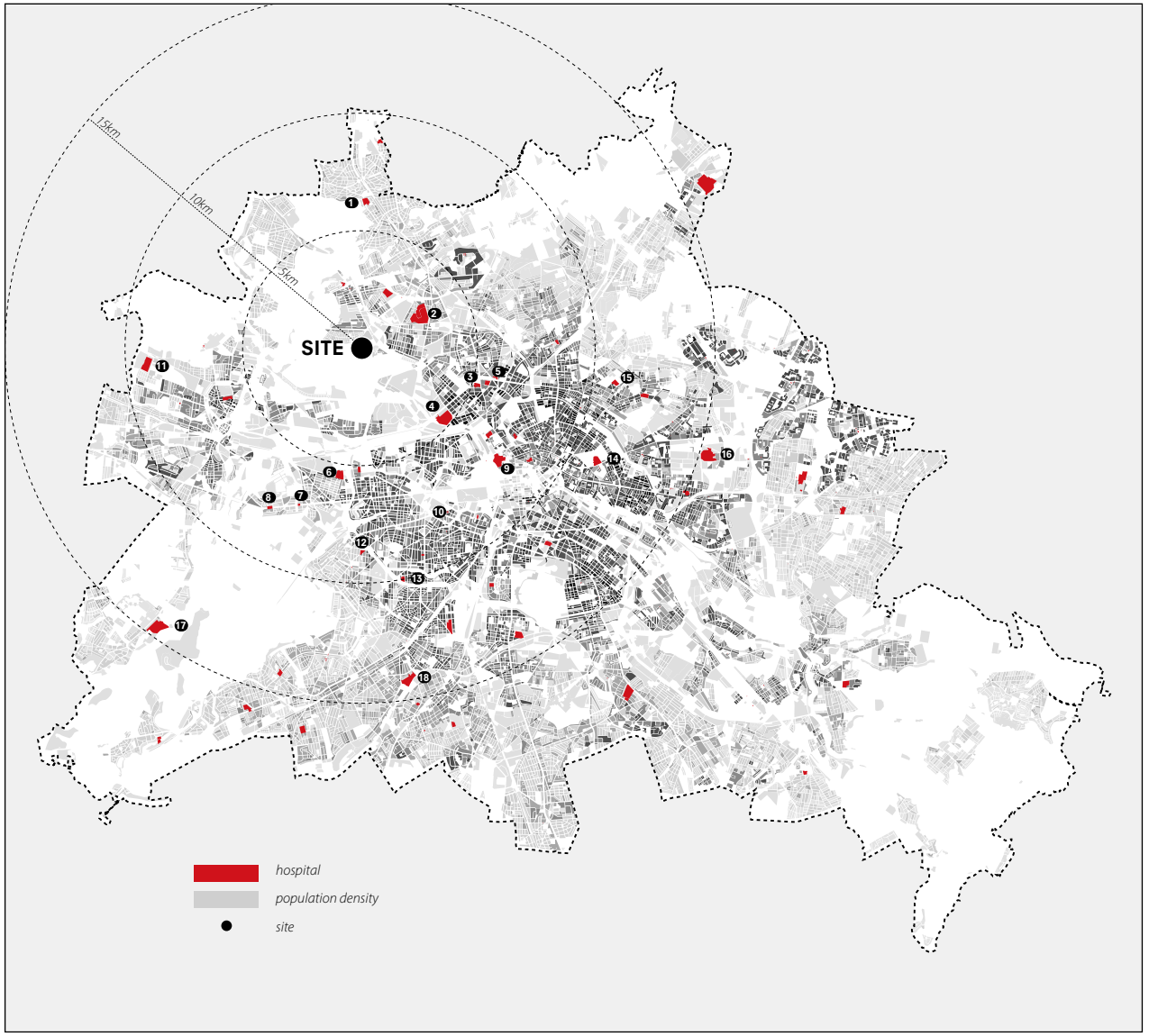
Artificial

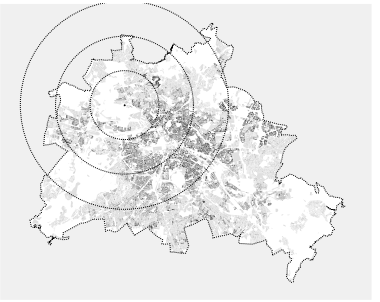
ENVIRONMENT GROUP

OVERVIEW

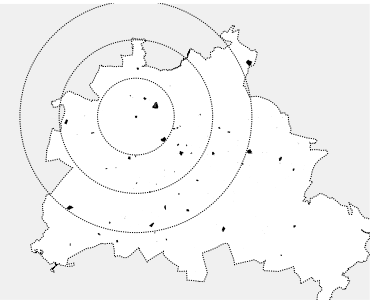

water body
neglective area
green space
protected area
Tegel forest
Flughafensee
Jungfernheide forest
Tegel airport community

HEALTH AND POPULATION





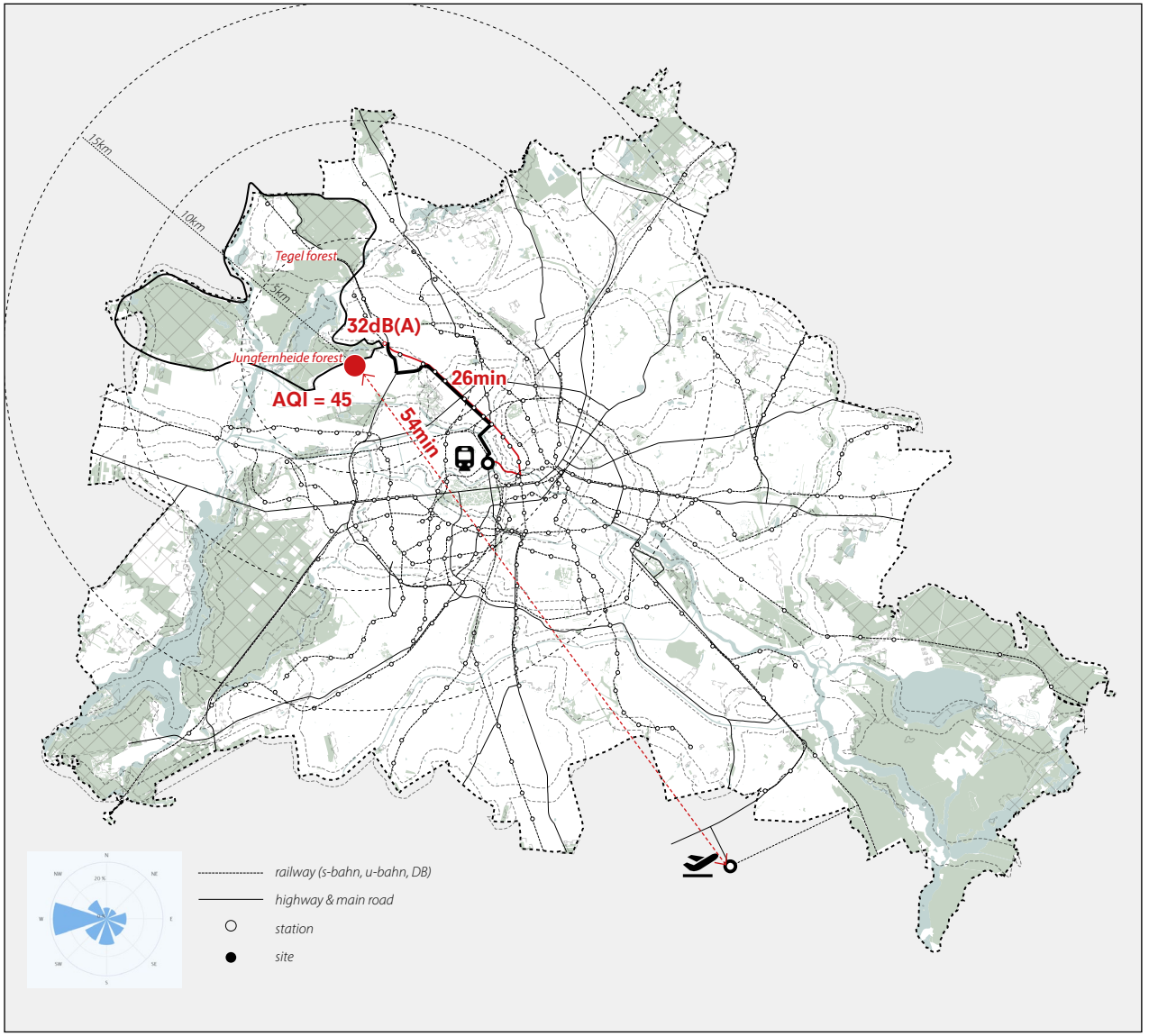
population density



hospital

1. Caritas-Klinik Dominikus
2. Vivantes Humboldt-Klinikum
3. Evangelisches Geriatriezentrum Berlin (EGZB)
4. Charité Campus Virchow-Klinikum
5. DRK Kliniken Berlin | Mitte
6. DRK Kliniken Berlin
7. Malteser-Krankenhaus Berlin-Charlottenburg
8. Paulinenkrankenhaus gGmbH
9. Charité
10. Franziskus-Krankenhaus
11. Evangelisches Waldkrankenhaus Spandau
12. Martin Luther Hospital
13. Sankt Gertrauden Hospital GmbH
14. Vivantes Clinic in Friedrichshain
15. Park-Klinik Weißensee
16. Evangelical Hospital Queen Elisabeth Herzberge
17. Gemeinschaftskrankenhaus Havelhöhe Klinik für Anthroposophische Medizin
18. Charité - Universitätsmedizin Berlin, Campus Benjamin Franklin

ANY HOSPITAL CRITERIA



- 26min to Berlin Hauptbahnhof

  54min to Berlin Airport(BER)

- 32dB(A) < 35 dB(A) (WHO recommended)

  AQI = 45 < 50 (Good)

- Connected to Tegel forest,

  Jungfernheide forest

  Tegel airport community

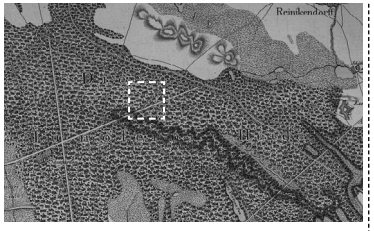
site

OLD AIRPORT

site

TIMELINE

Forest

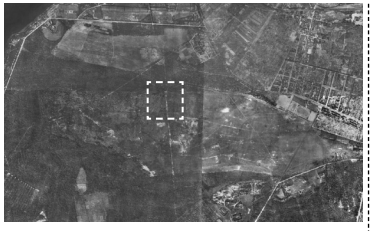


Before 1824

Part of Jungfernheide forest

Hunting ground for the Prussian nobility

Military area



1824-1948

Military training

World War I: military training of aerial reconnaissance crews

World War II: military training of Flak troops

Destroyed in Allied air raids

Military airport

1948-1960

Allotment gardens plan shelved by the Berlin Blockade

Individual, non-commercial gardening or growing food plants, so forming a kitchen garden away from the residence of the user

Military airport

Berlin Airlift: Tempelhof was not big enough

Base aérienne 165 Berlin Tegel

Commercial airport

1960-2021

Berlin main airport

1960s Built the terminal

Flughafensee

1953-1978: An artificial lake for mining gravel

A recreational lake with beaches and an angling club

Over 24 million passengers;
Handled over 60% of all airline passenger traffic in Berlin

Fourth busiest airport in Germany

Decommissioned

2021: Decommissioned

2022: COVID-19 vaccination centre; Temporary shelters for refugees fleeing Ukraine

to 2029: The separate minor military area (Tegel Nord) will still be used for governmental helicopter flights until 2029

Community & Landscape

After 2021

Urban Tech Republic

800 companies with some 17,500 employees

Berlin University of Applied Sciences and Technology with 2,500 students

Tegel city health

Tegeler Stadtheide landscape area as an area for nature and landscape protection

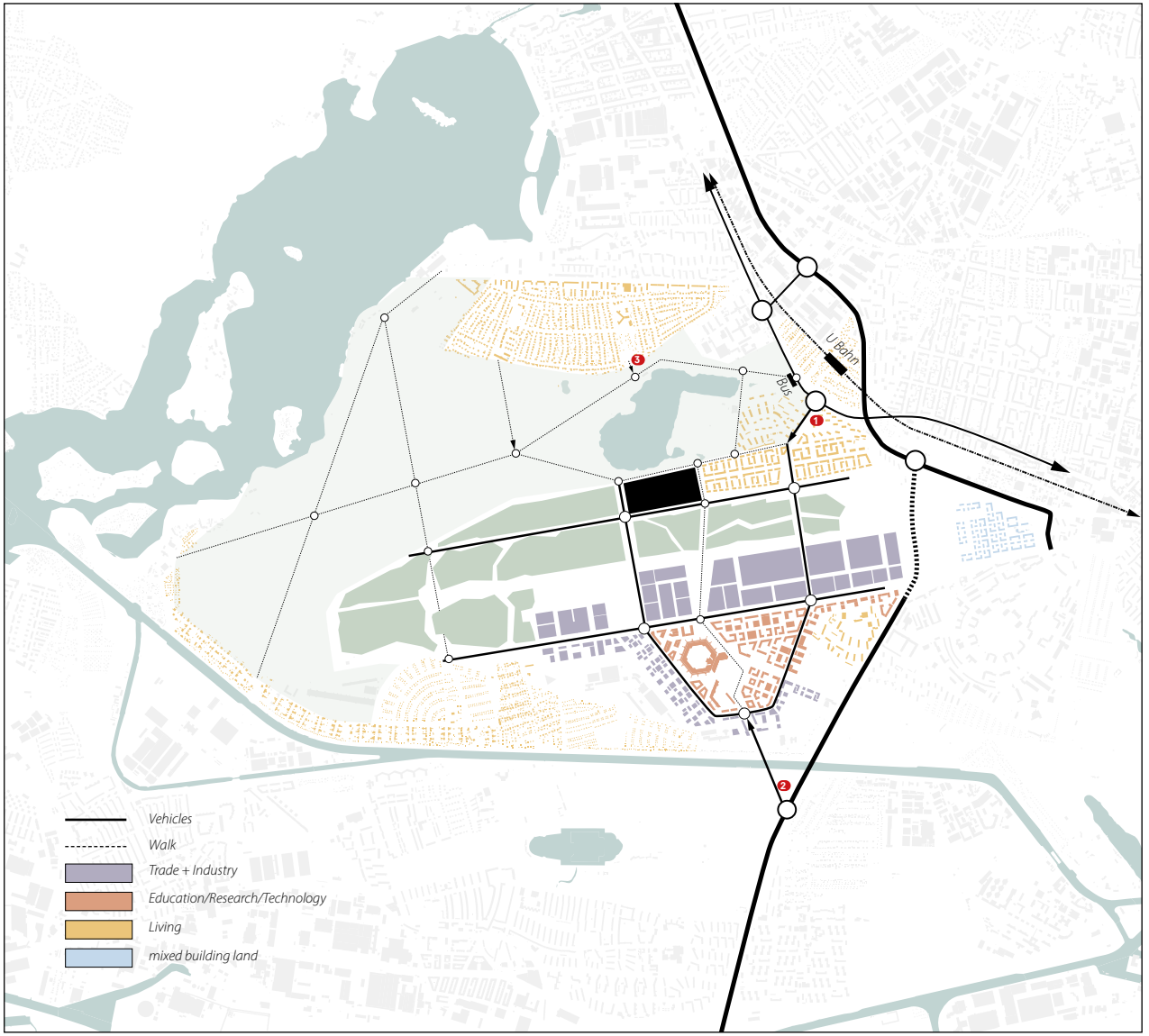
site

NATURAL & SOCIAL COMMUNITY

1. Education/Research/Technology
2. Tegel city heath
3. Jungfernheide forest
4. Trade + Industry
5. Living
6. mixed building land

site

CIRCULATION AND ACCESS



1 - Northeast entrance:

one metro station and one bus stop,

close to the motorway.

main patient entrance

2 - South entrance:

Tegel airport community entrance

The basis of the hospital's social connection

3 - Nouth entrance:

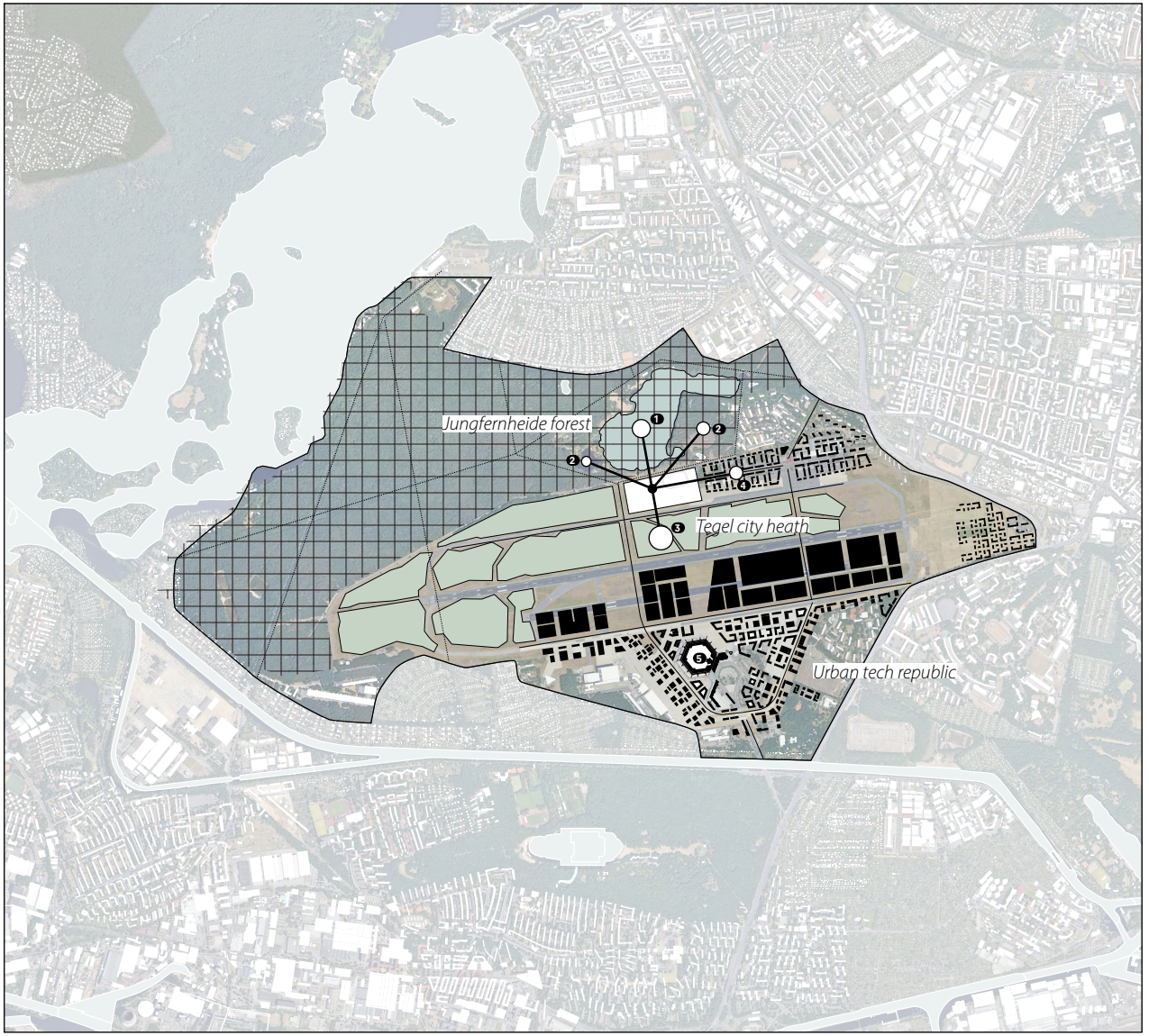
Entrance for surrounding residents

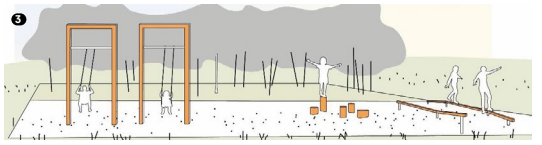
The basis of the hospital's residential connection

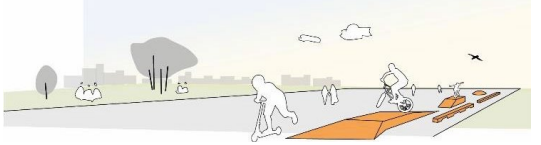
The hospital's main connection to nature

site

SURROUNDING

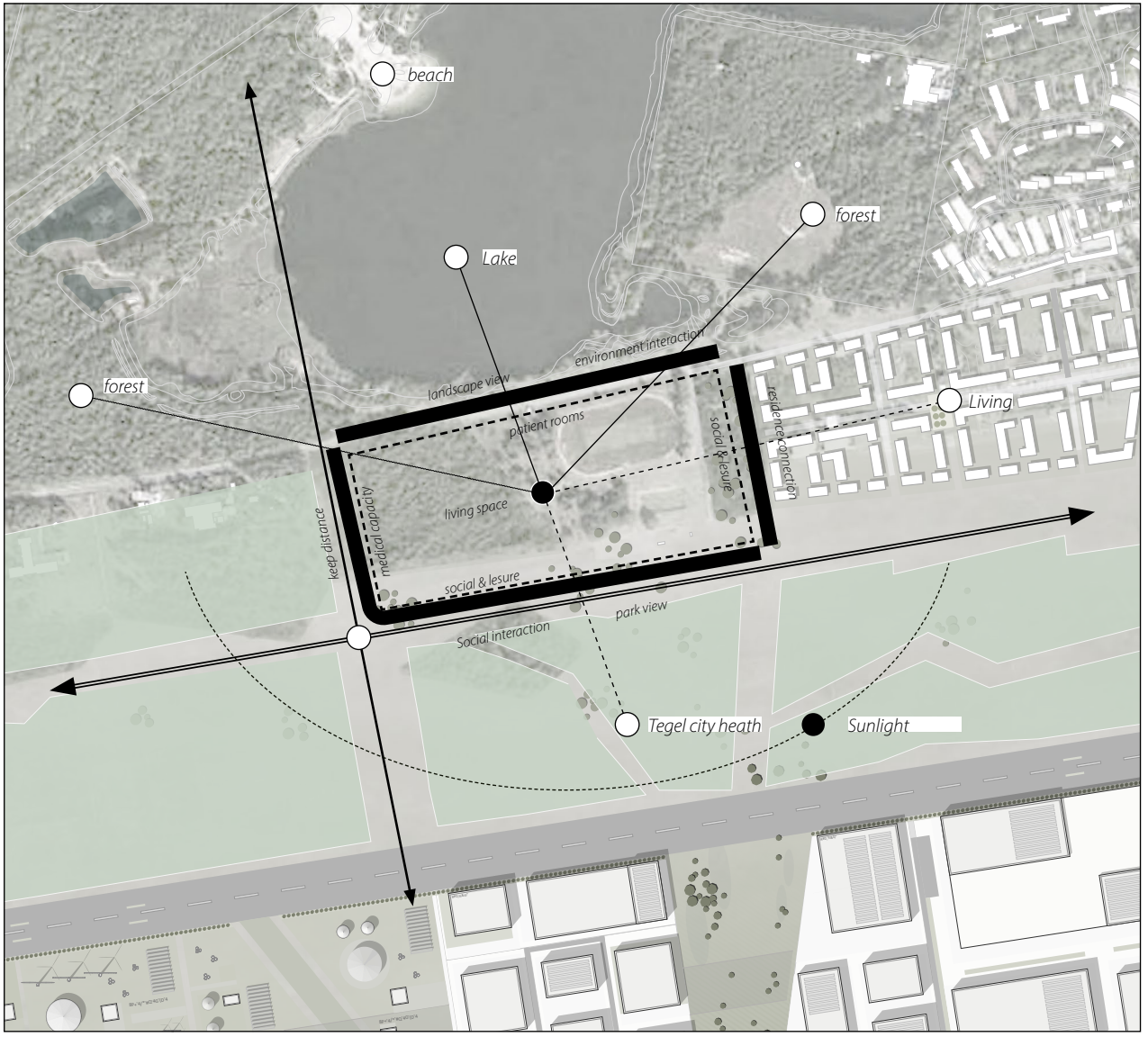






site

SURROUNDING STRATEGY



- North:

  orientation of the landscape view

  easy connection and access to nature

- East:

  community orientation

  community connection

  minimal disruption to neighbouring residents

- South:

  sunlight

  views and interactive with the park

  appropriate distance

  main socially functional areas

- West:

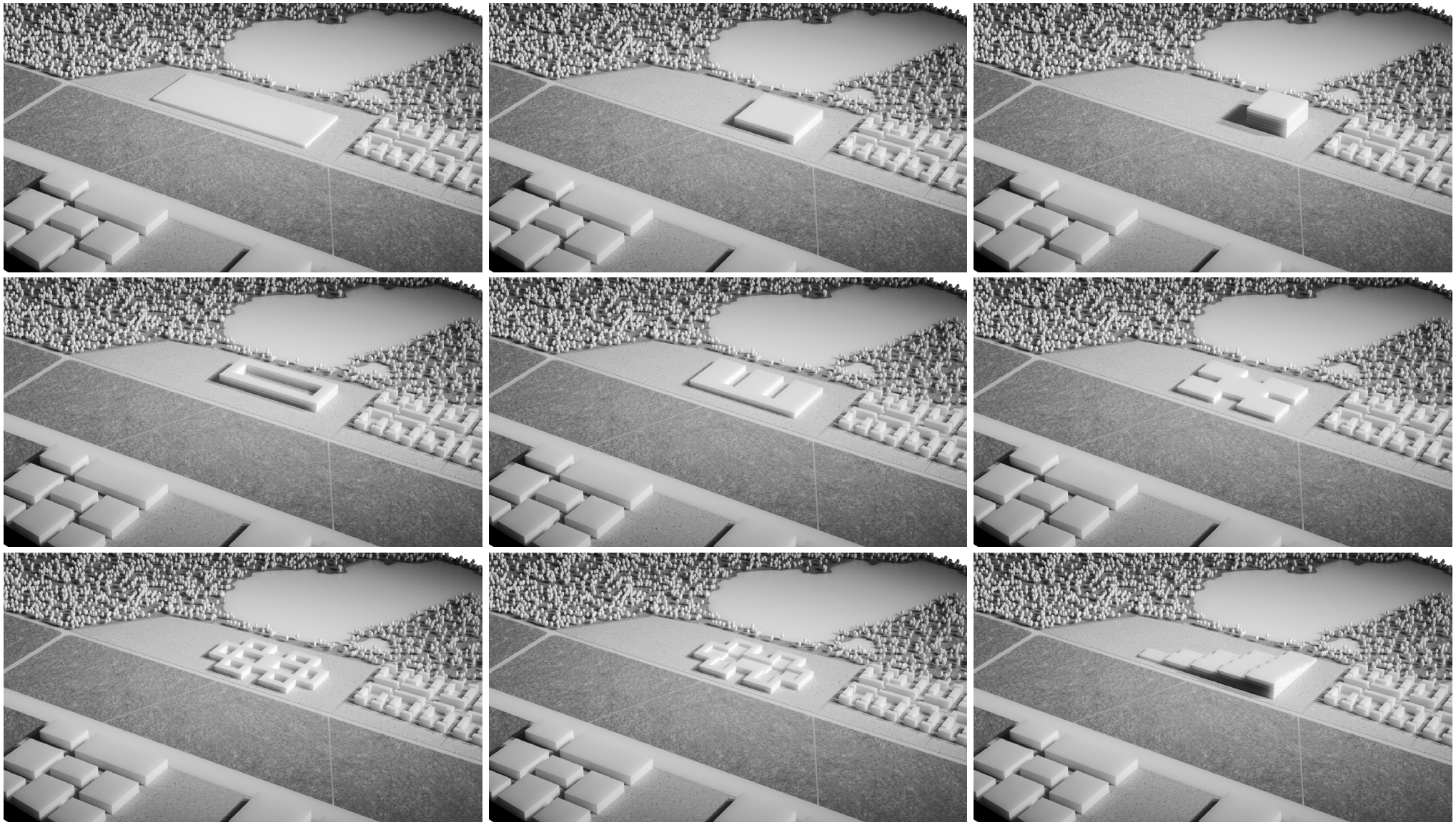
  as the main medical entrance

  appropriate distance

  convenient access

concept design

MASSING STUDY



concept design

PATIENT-BASD

How to design a healing space that provides the elderly with

EXPERIENCE and EFFICIENCY

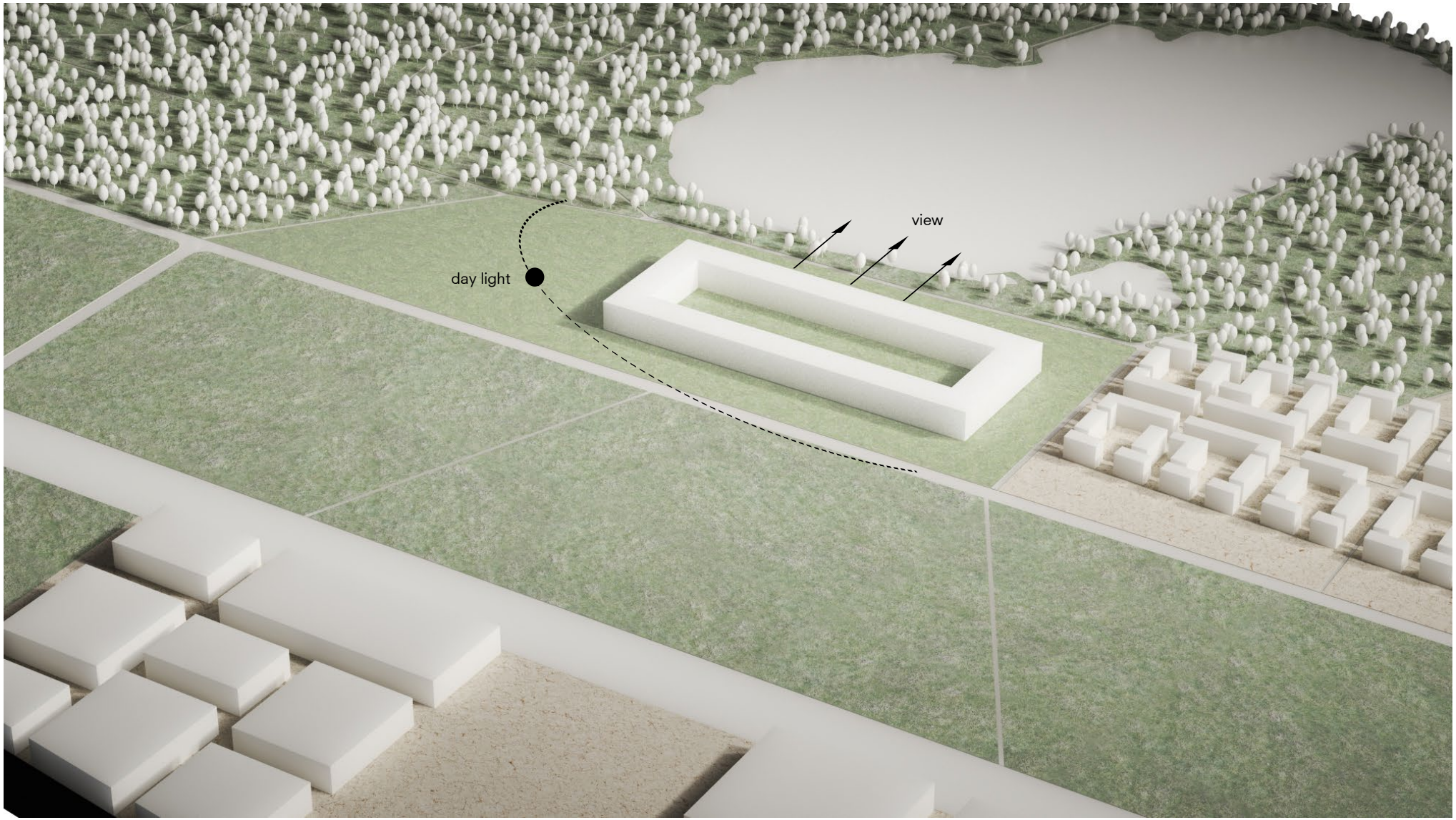
STRATEGY

Environment strategy

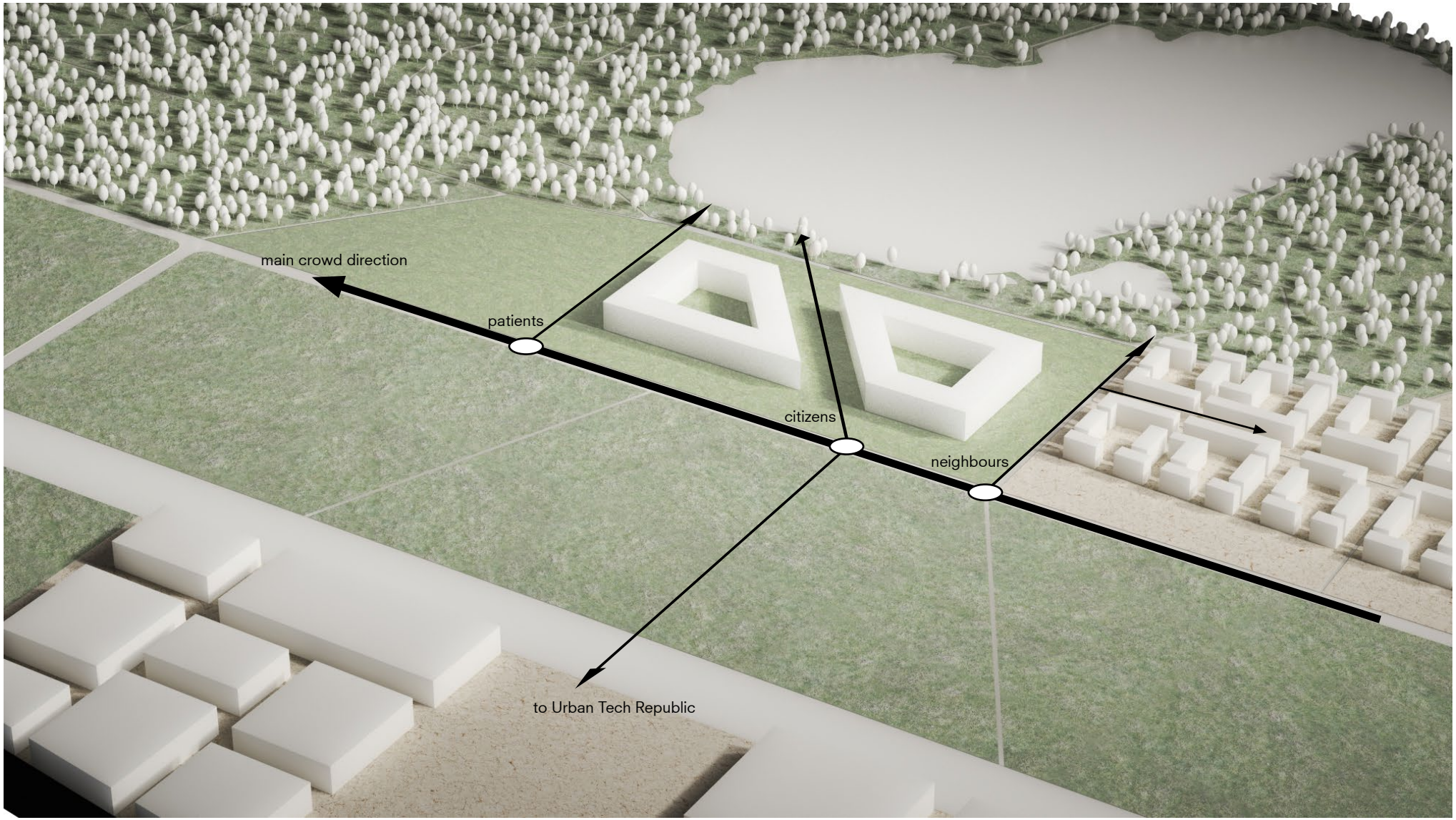
Patients - wards - worlds

Healthcare flows

ENVIRONMENT

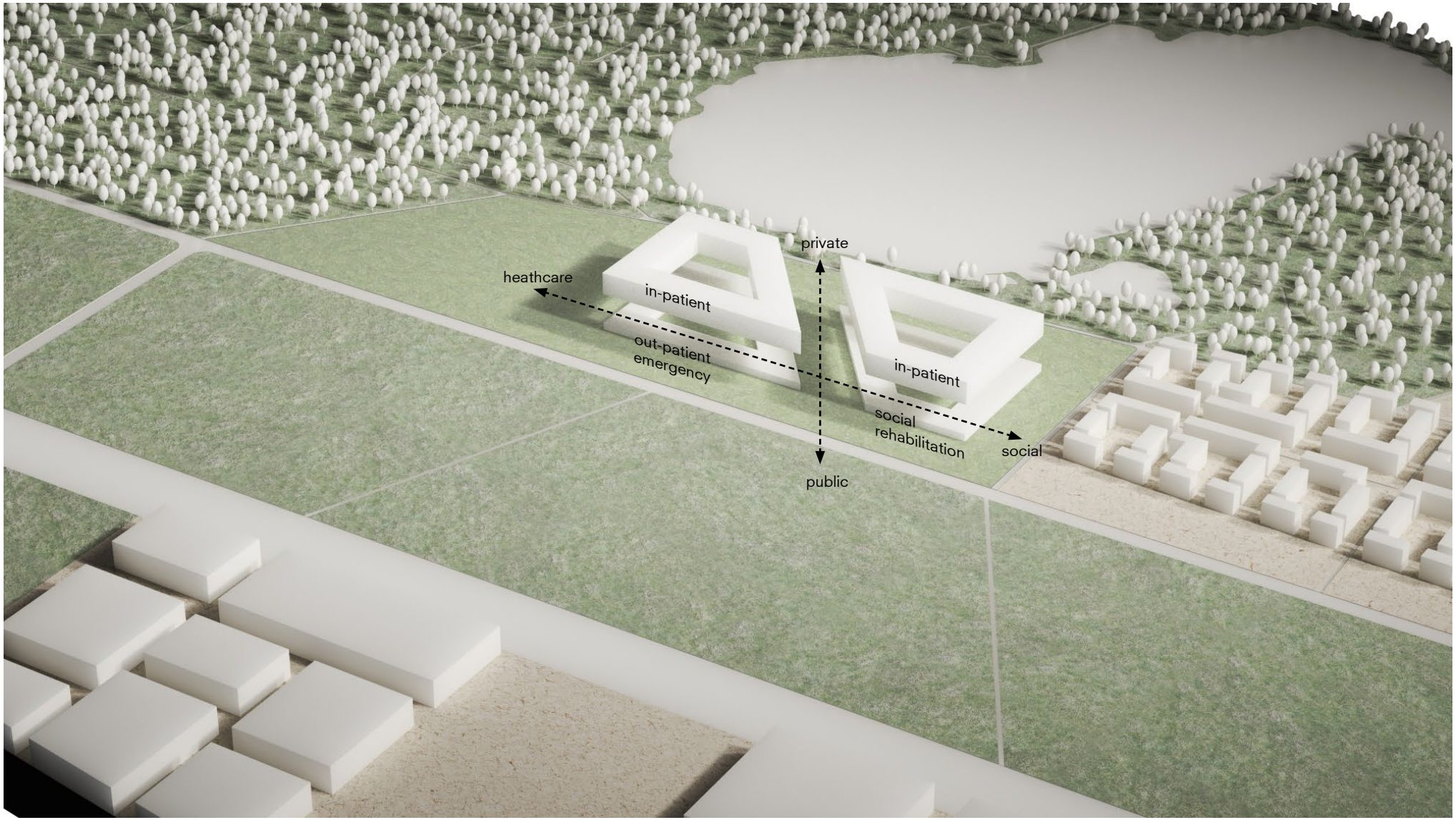


CROWD FLOWS

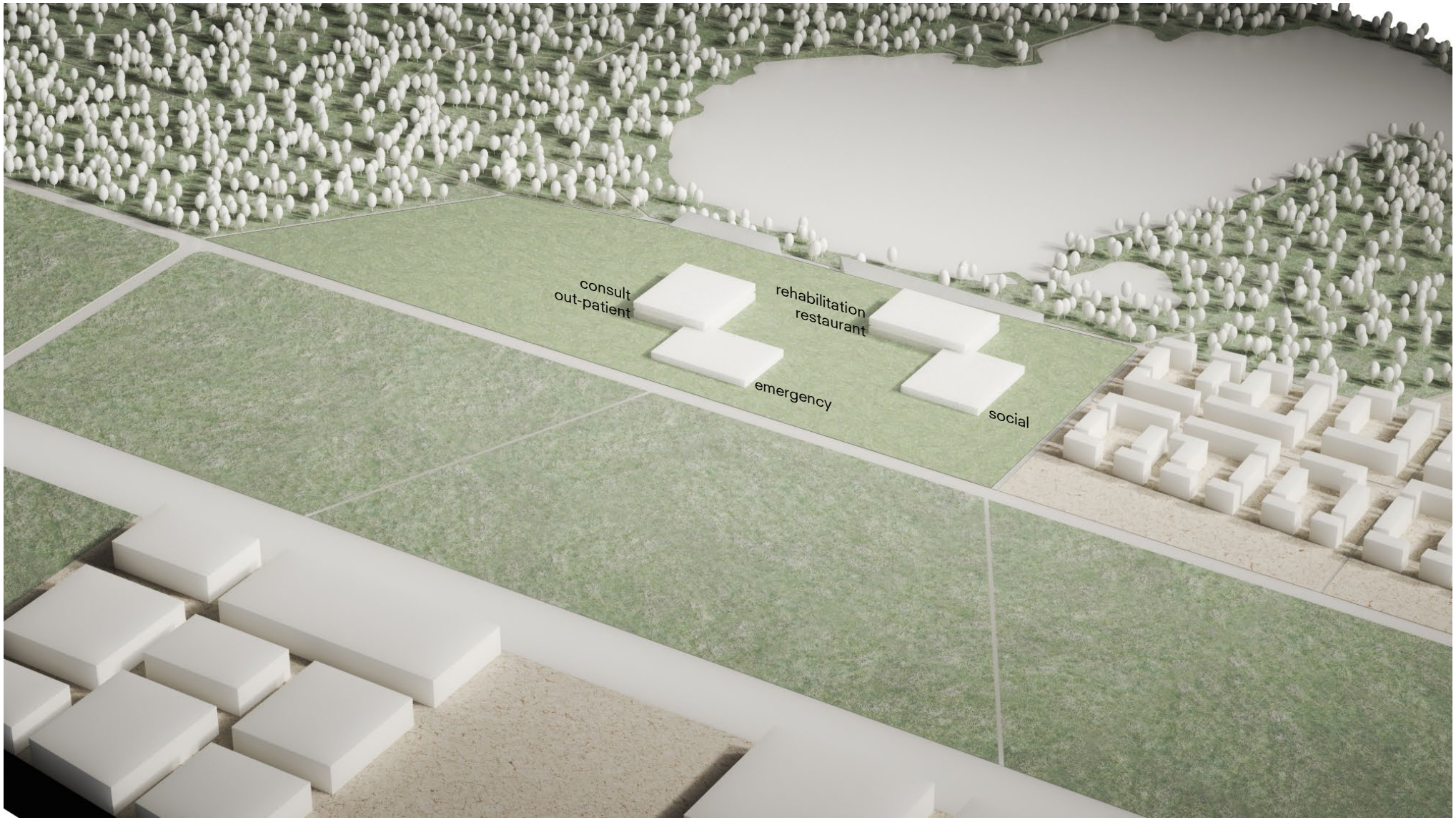

main crowd direction
patients
citizens
neighbours
to Urban Tech Republic

experience

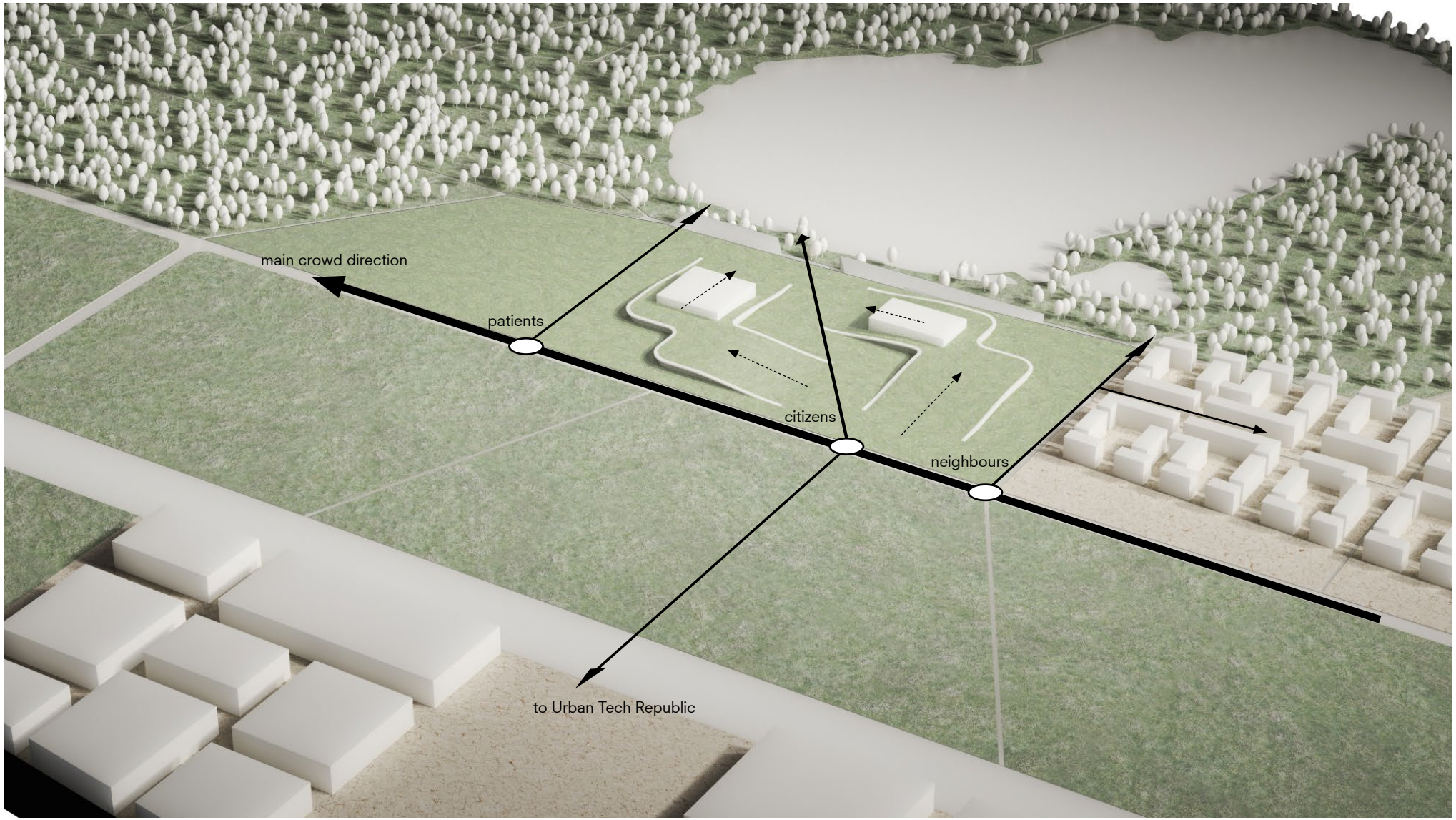
PUBLIC&PRIVATE



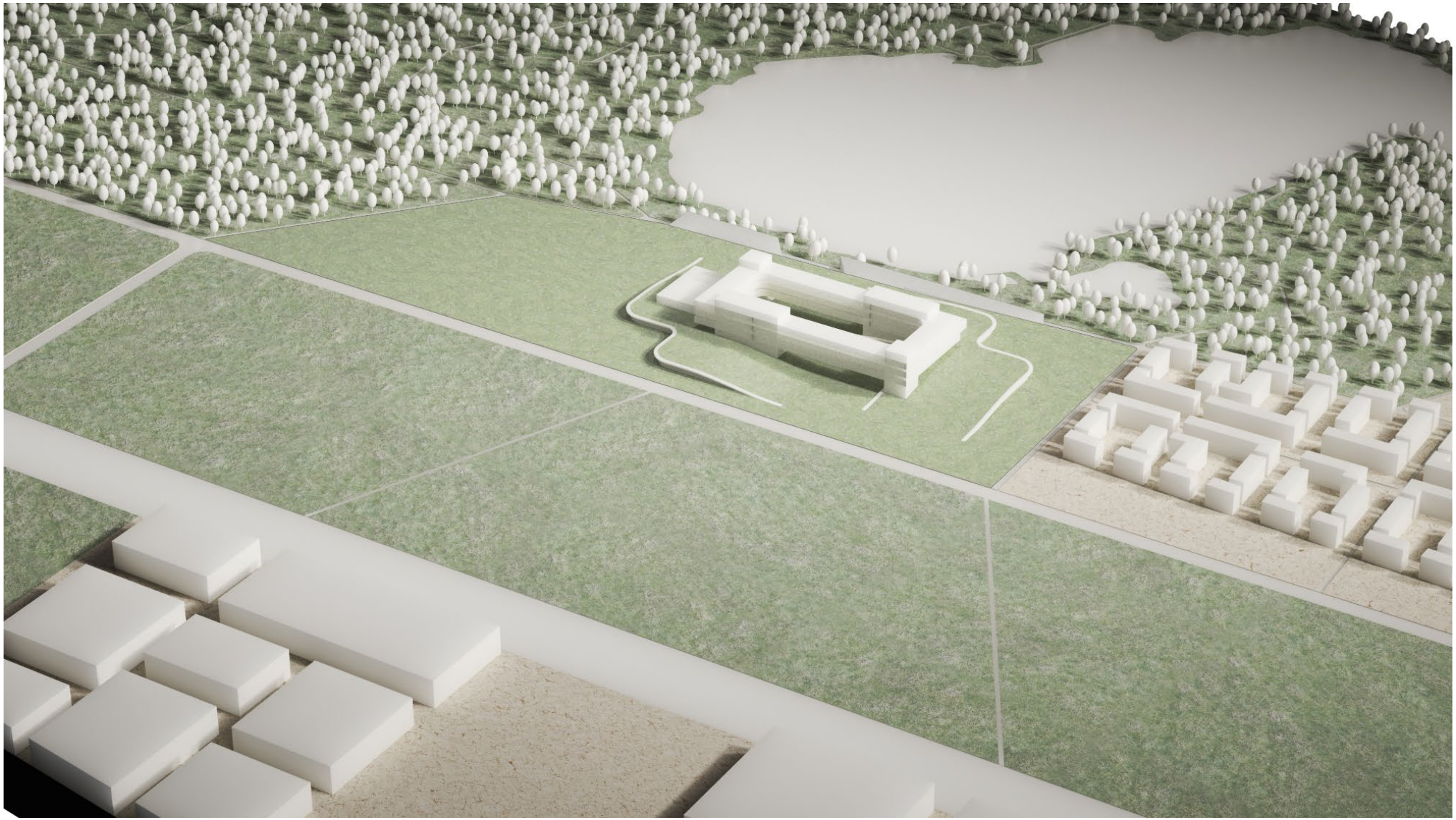
HEALTHCARE&SOCIAL



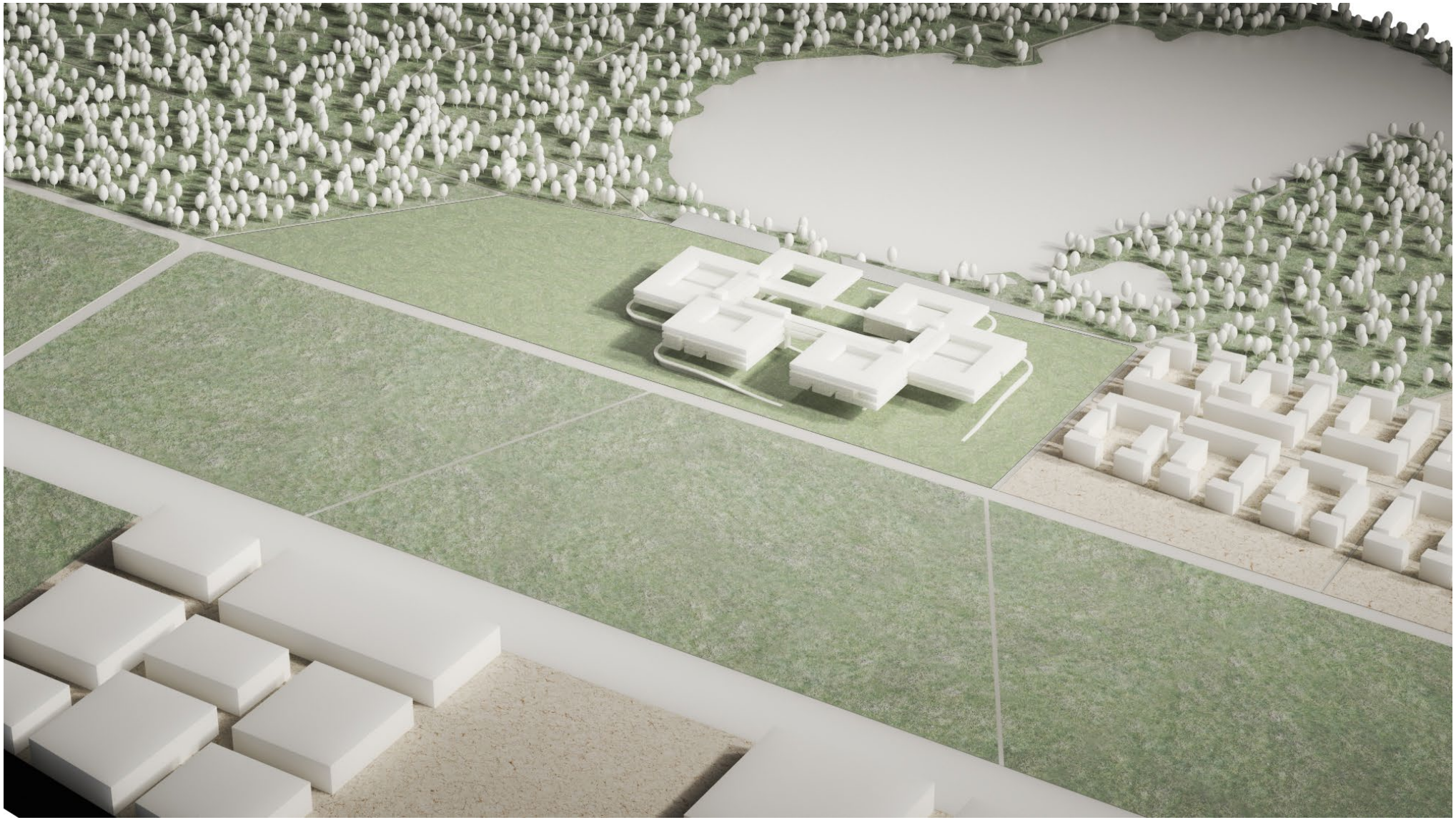
LANDSCAPE


main crowd direction
patients
citizens
neighbours
to Urban Tech Republic

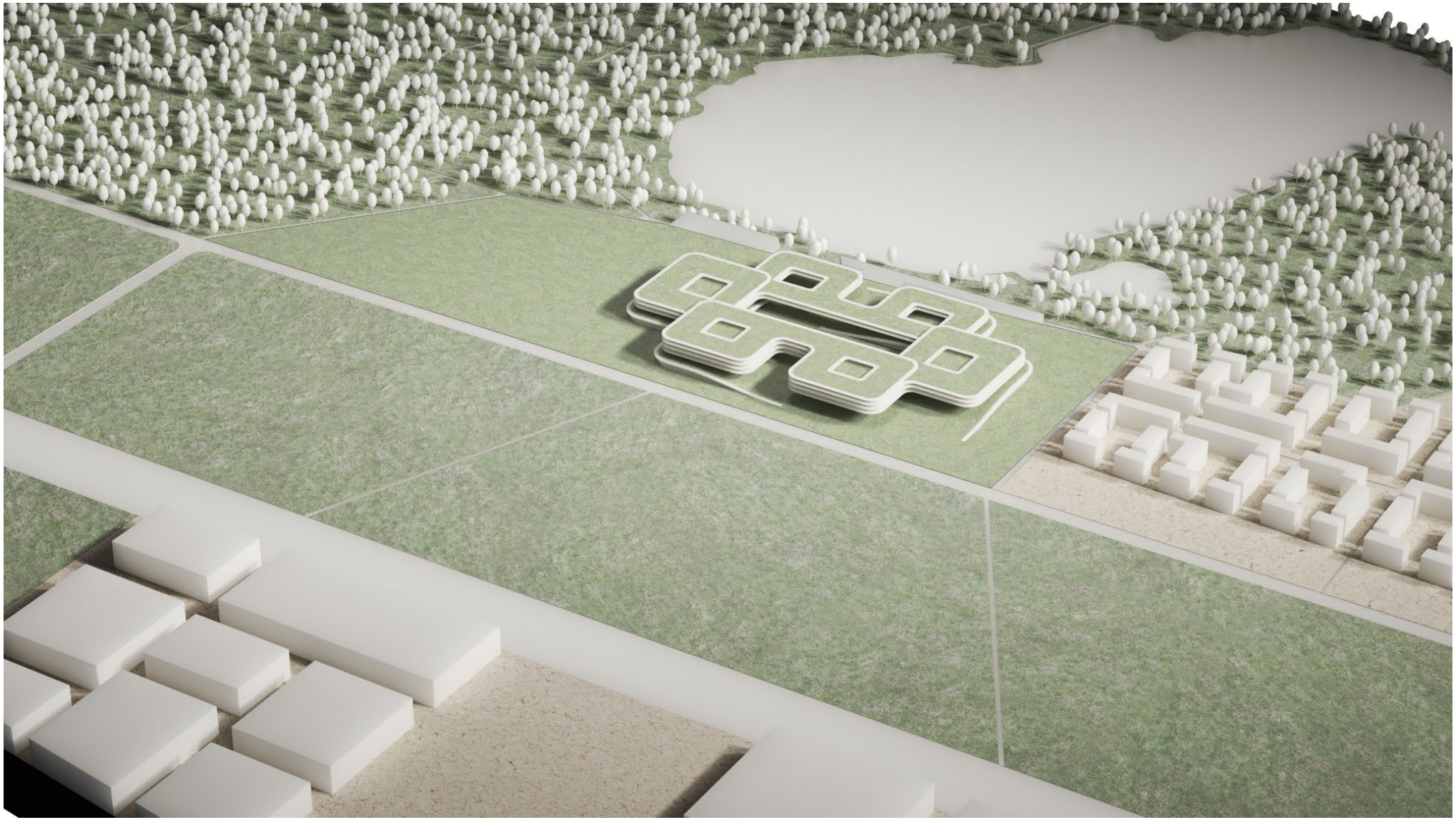
VERTICAL FLOW



MODULAR DEPARTMENTS



OVERVIEW



SITE PLAN

N
SITE PLAN 1:1500
RESTAURANT
REHABILITATION
OUT DOOR TESTS
IN PATIENT DEP.
LOGISTICS
PARKING
OUT PATIENT DEP.
LOGISTICS
TOWARDS CITY HEALH PARK
EMERGENCY

GROUND FLOOR

concept

PATIENT BASED

Patients - wards - worlds

concept

PATIENT TYPES

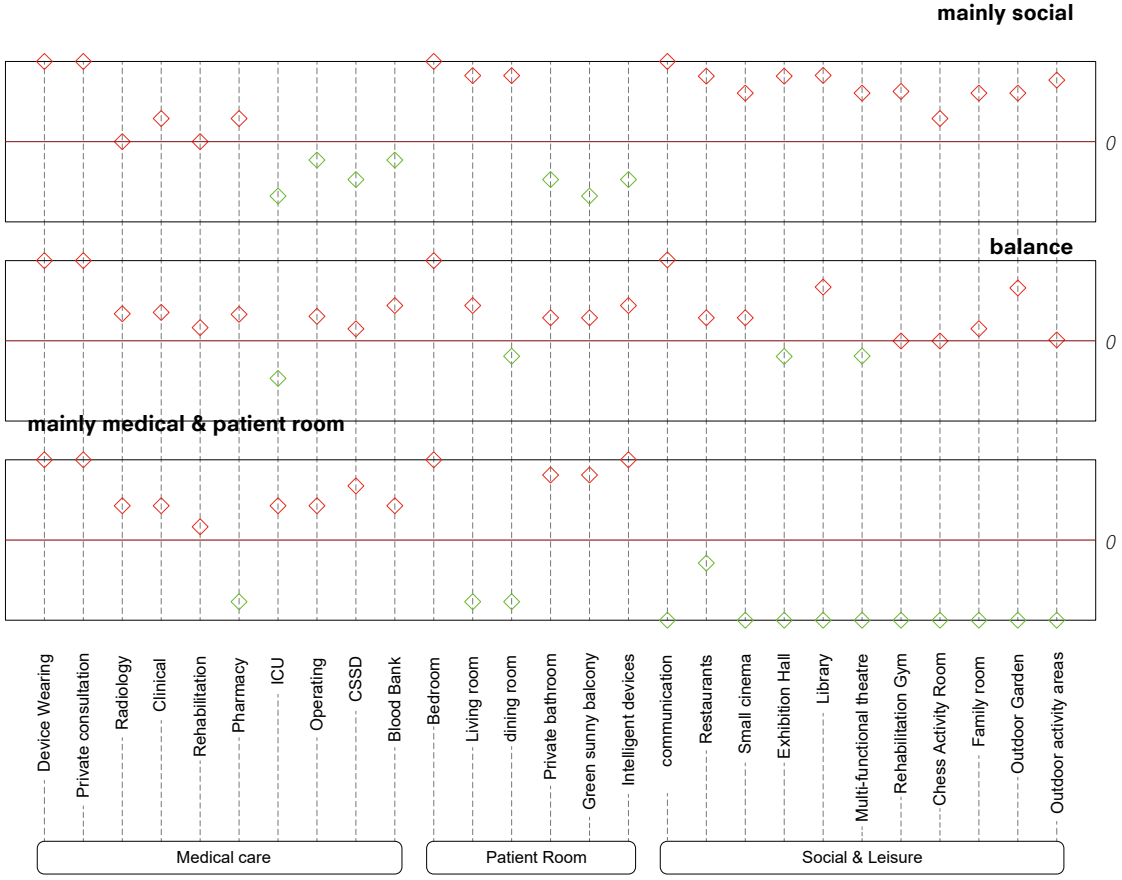
Self-care patients

Semi-disabled patients

Disabled patients

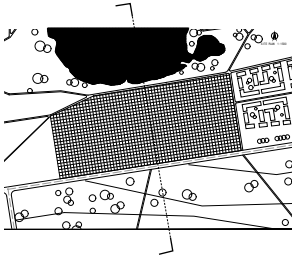
Mobility

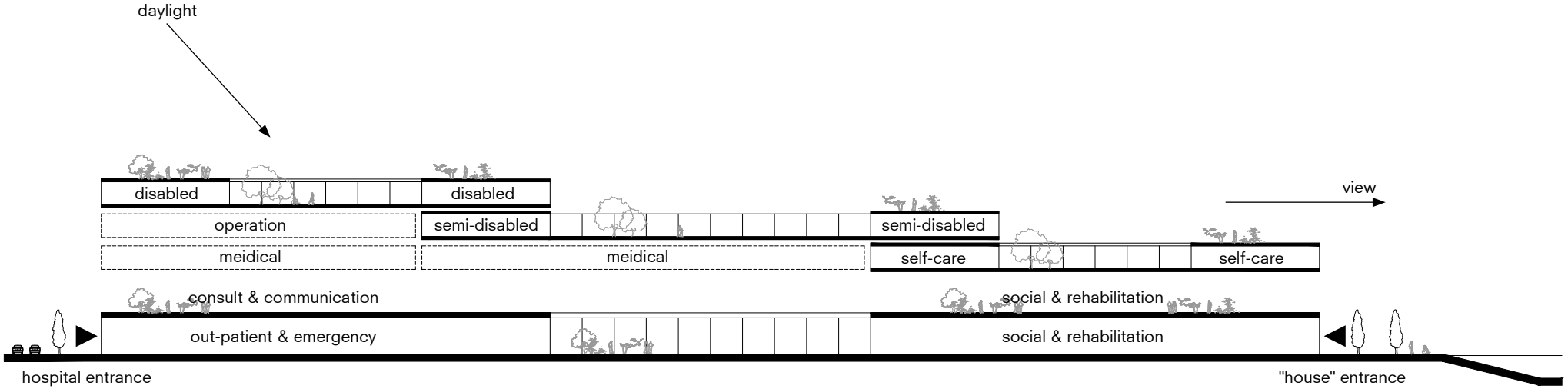
FREQUENCY OF ACTIVITIES



concept

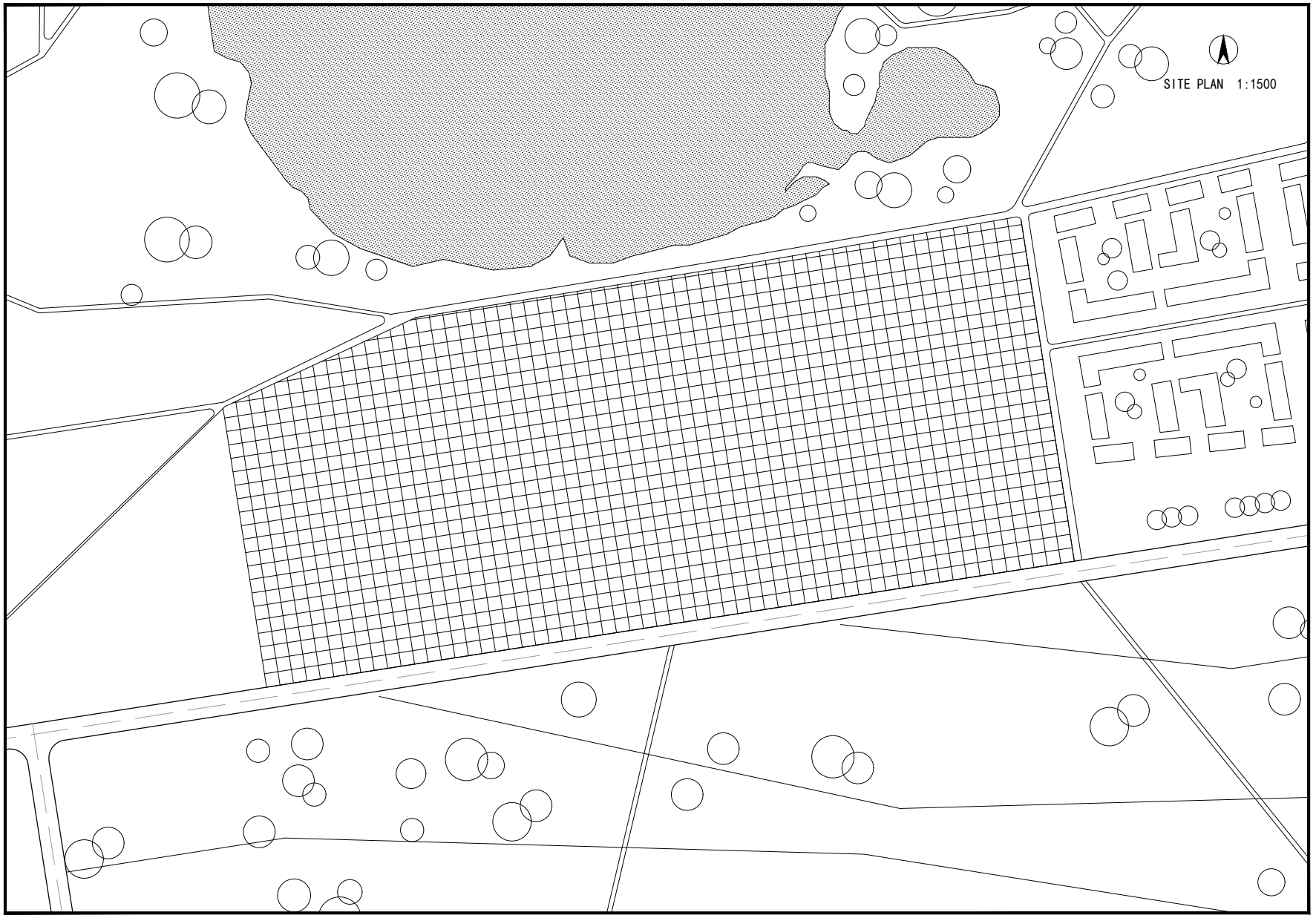
THREE TYPE OF WORLDS





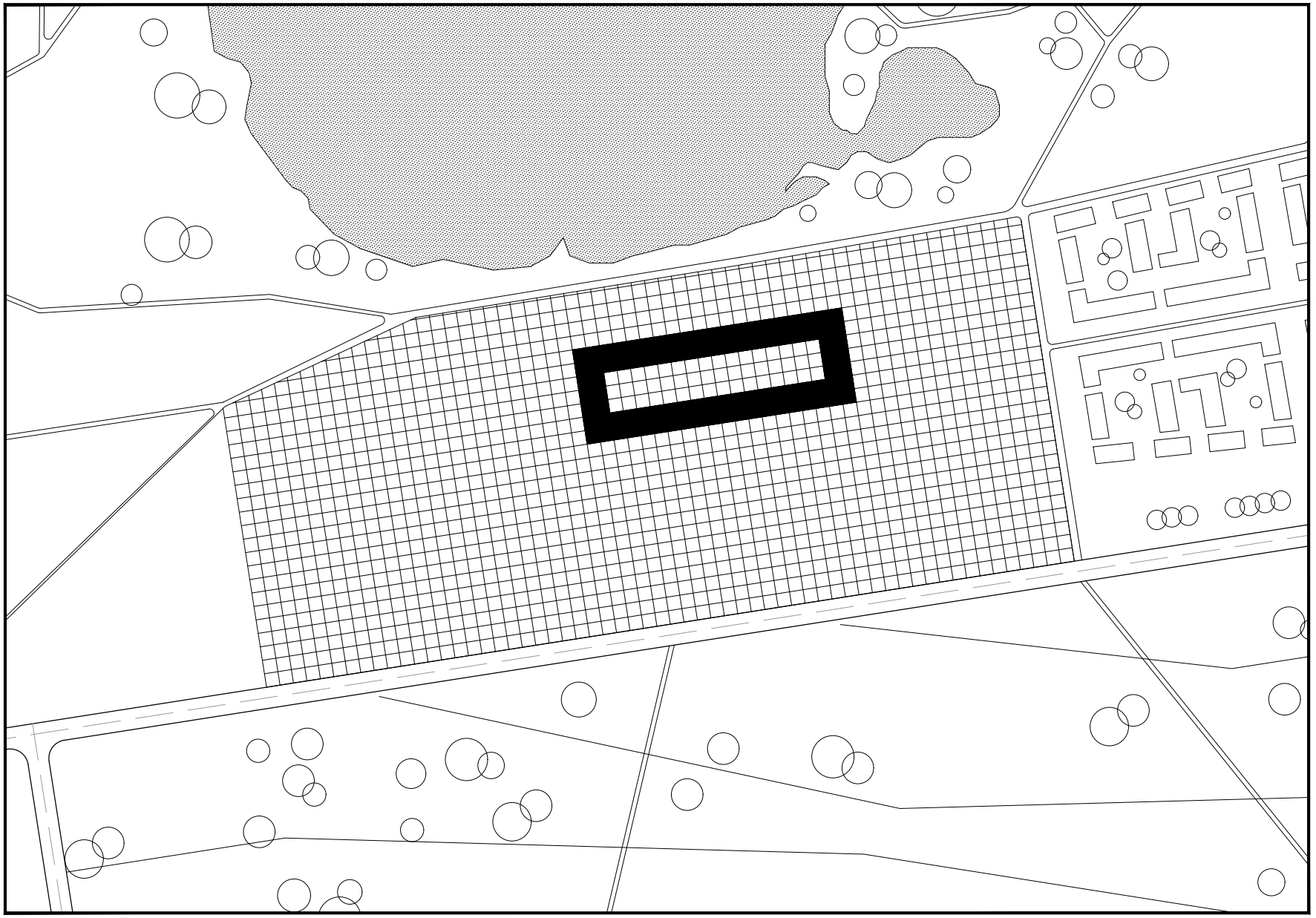
concept

GRIDS



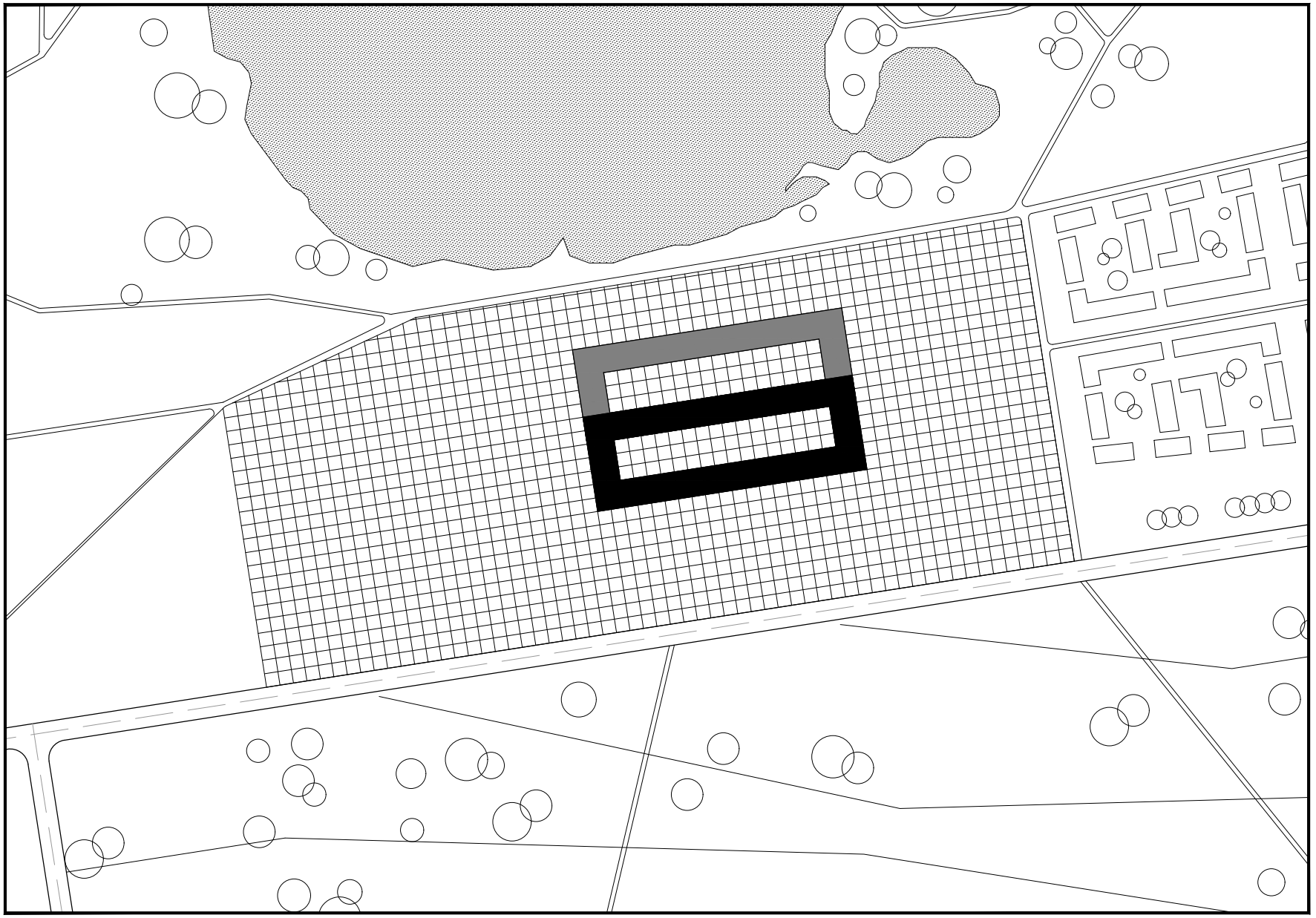
concept

SELFCARE



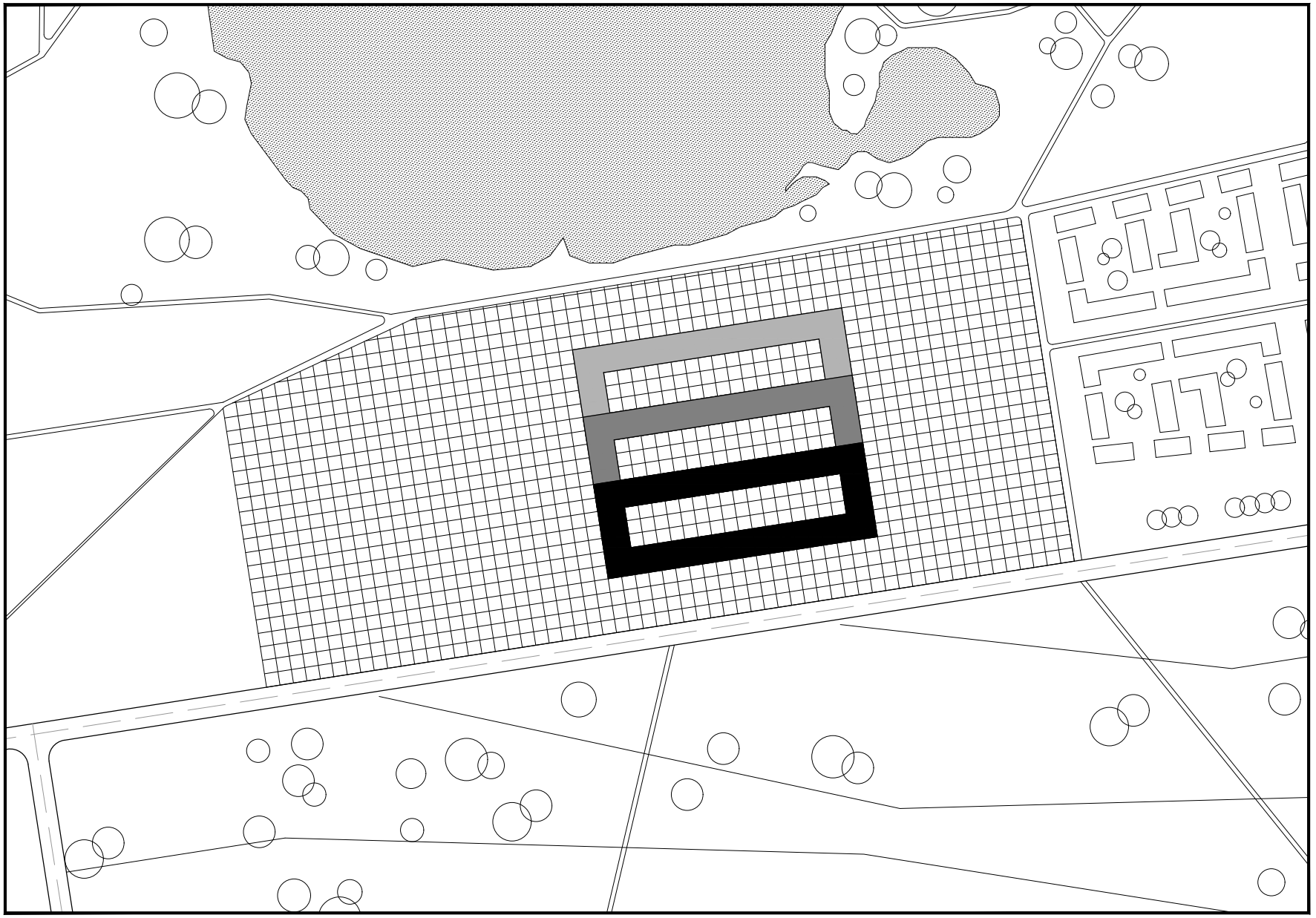
concept

SEMI-DISABLED



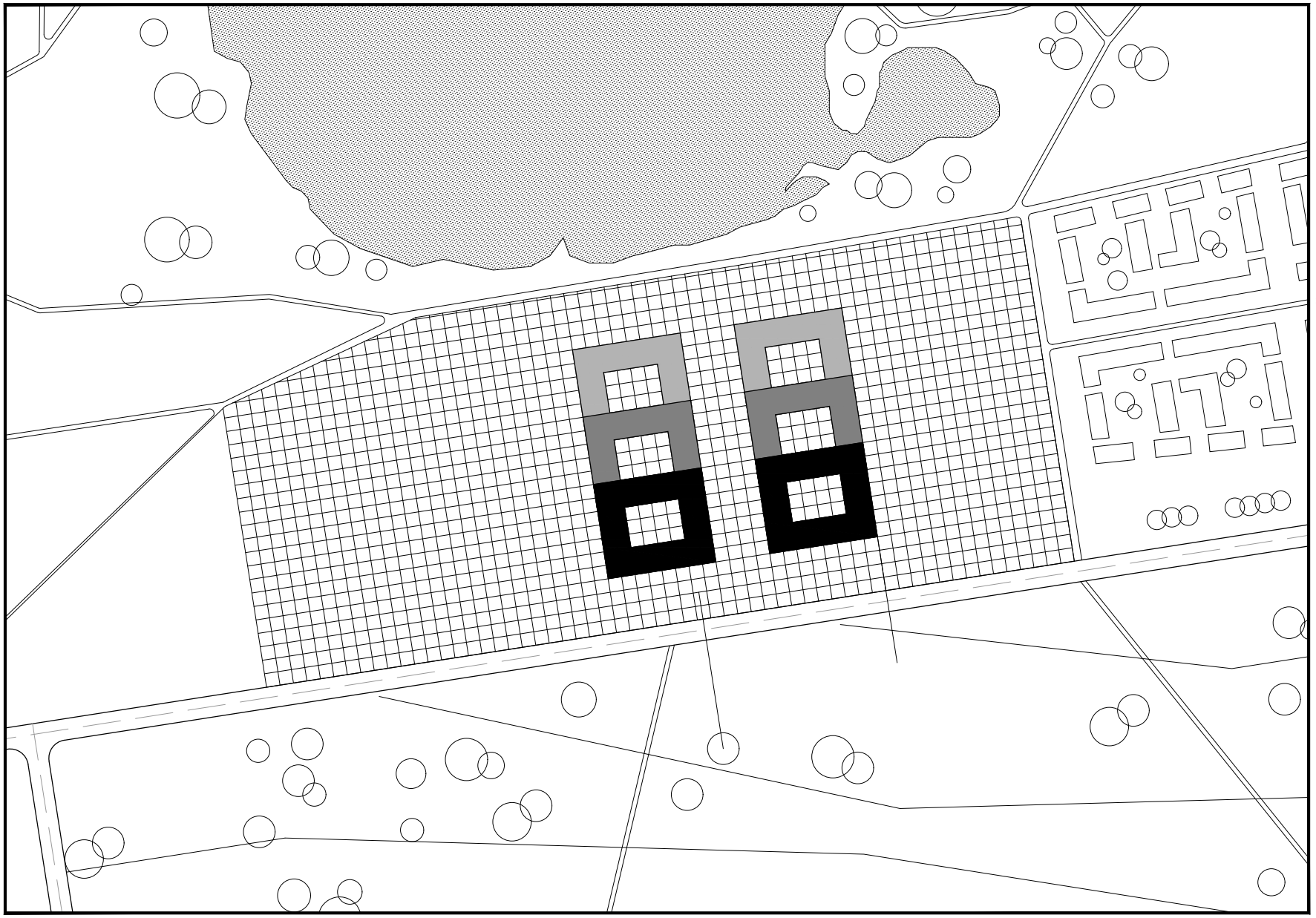
concept

DISABLED



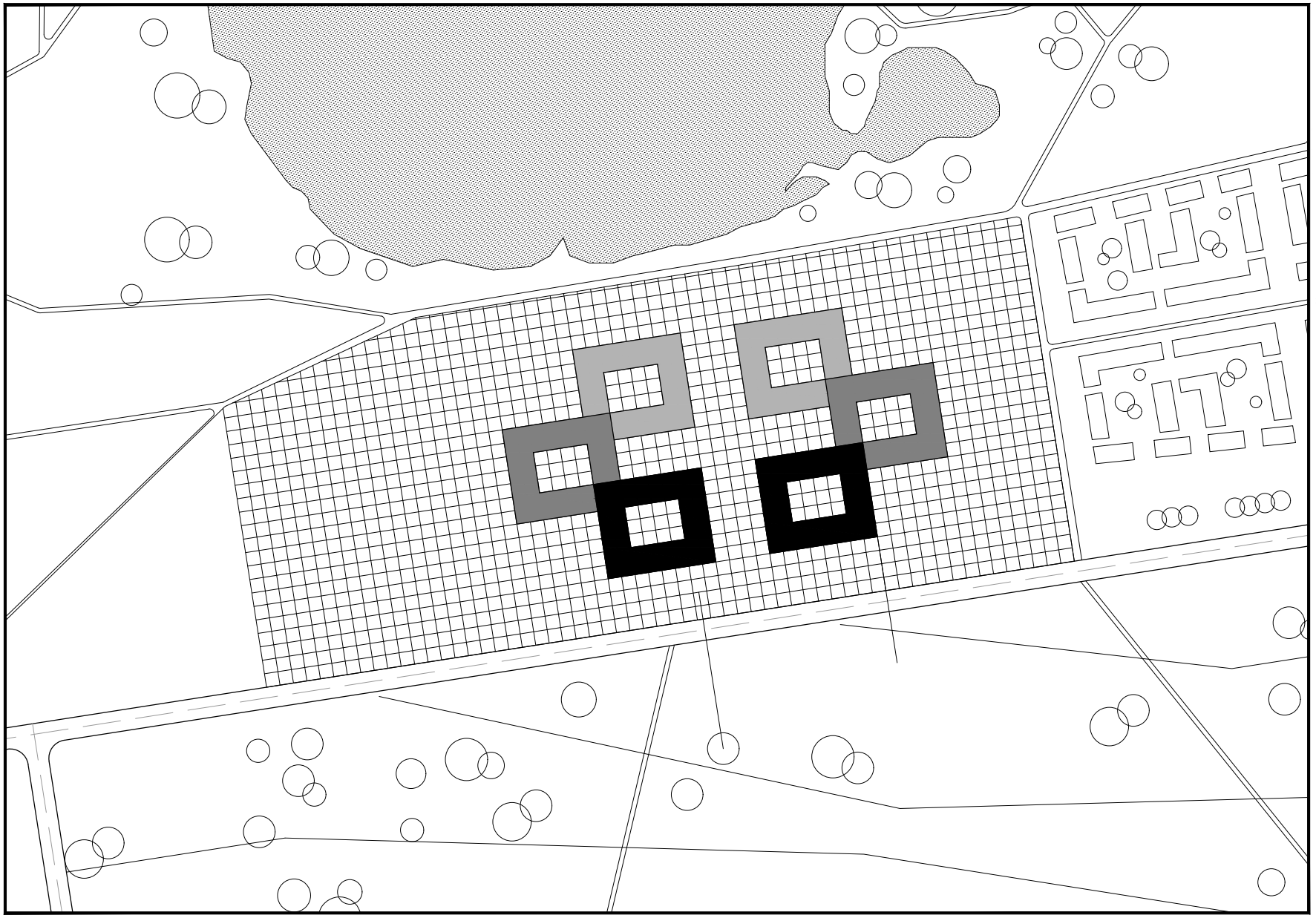
concept

MORE LIGHT



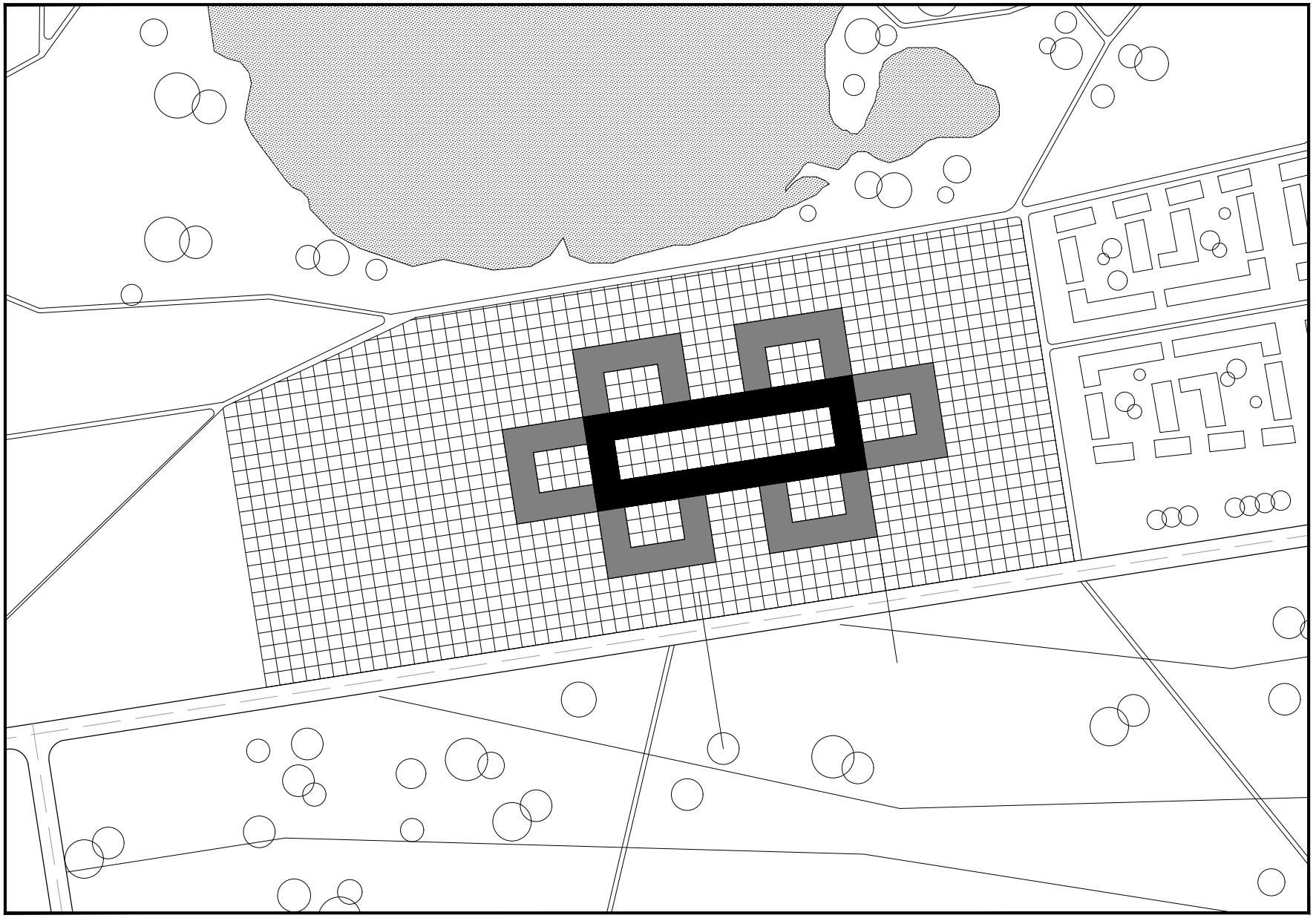
concept

MORE VIEW

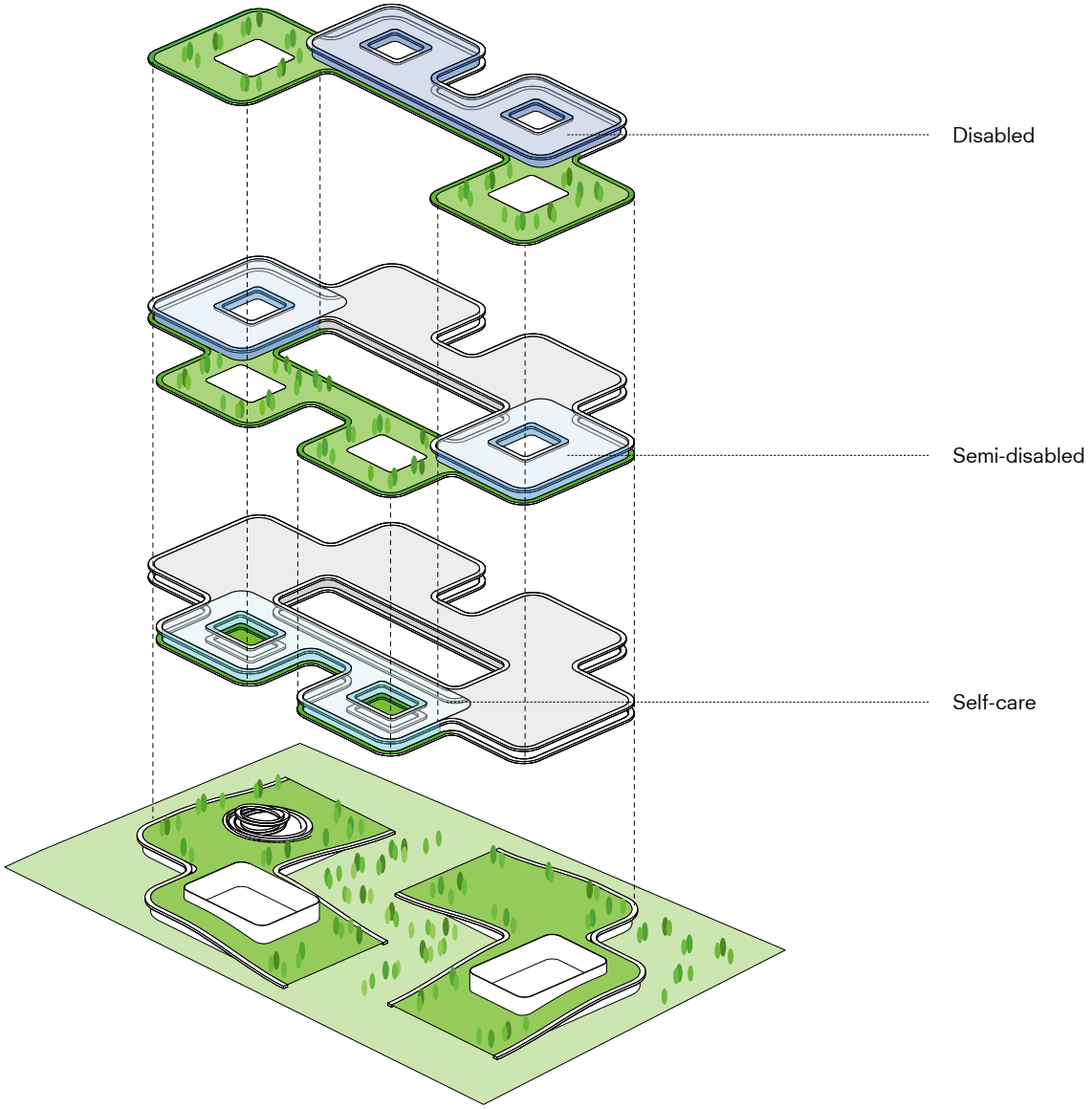


concept

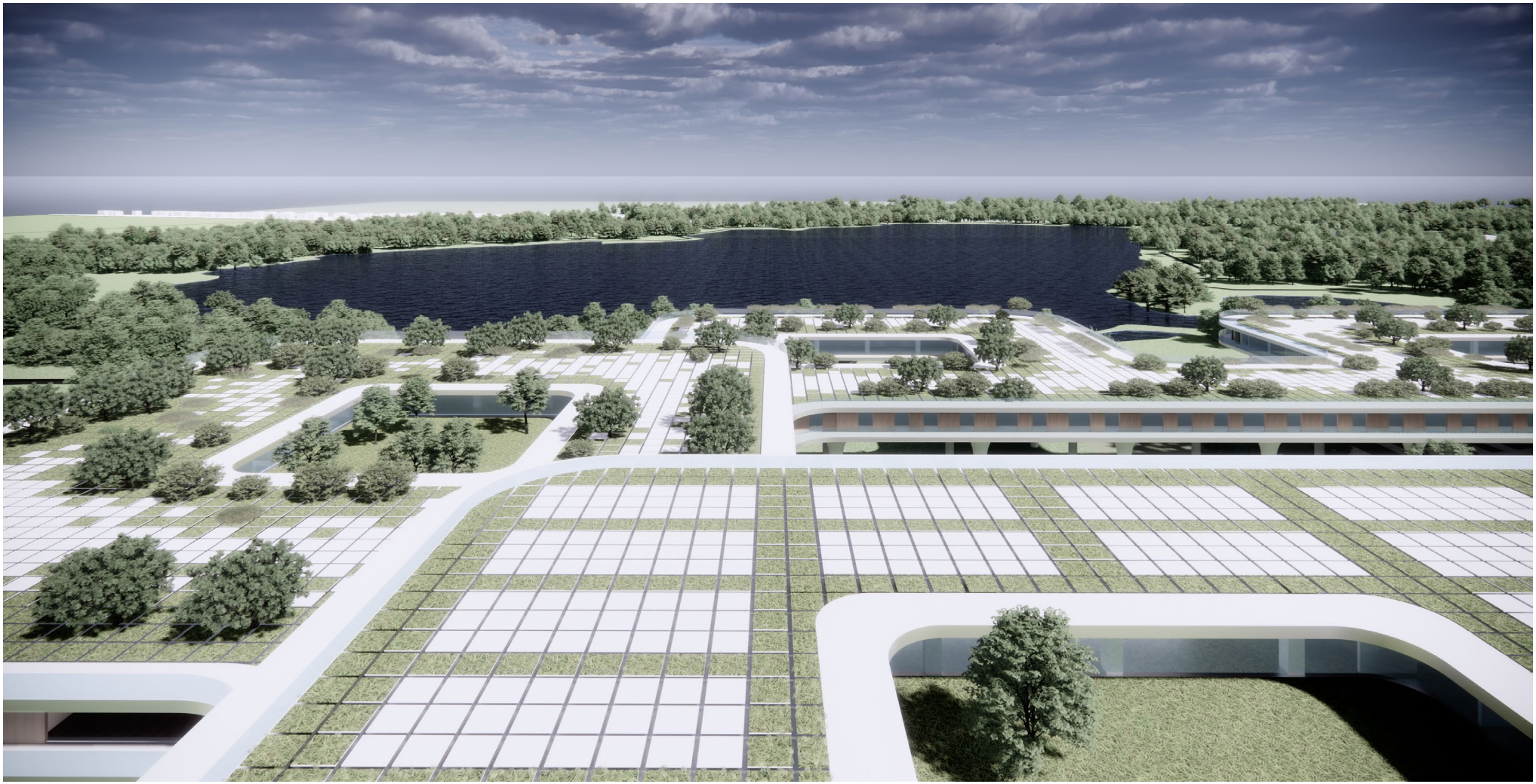
RING



THREE TYPE OF WORLDS



ROOF VIEW



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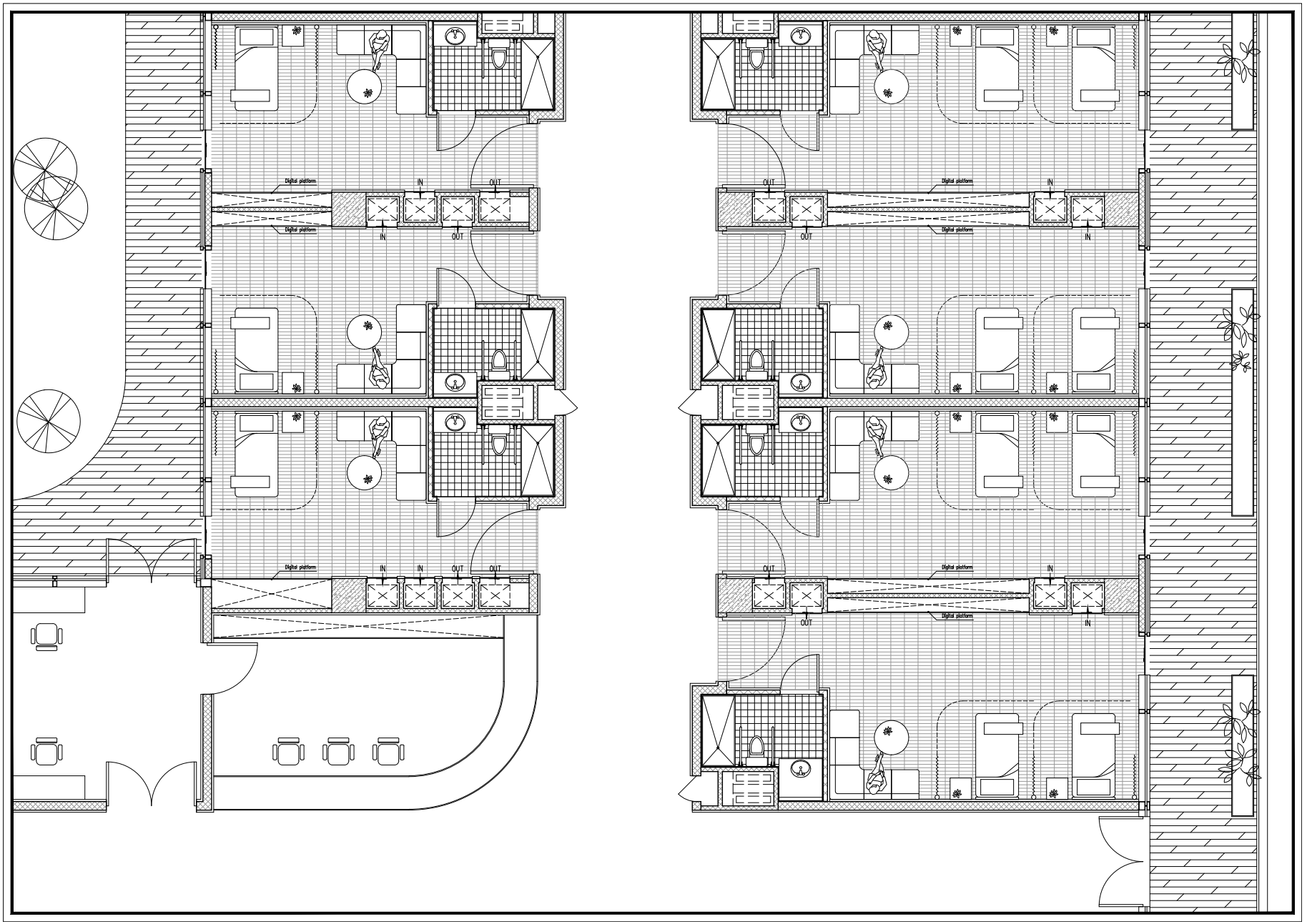
Digital platform
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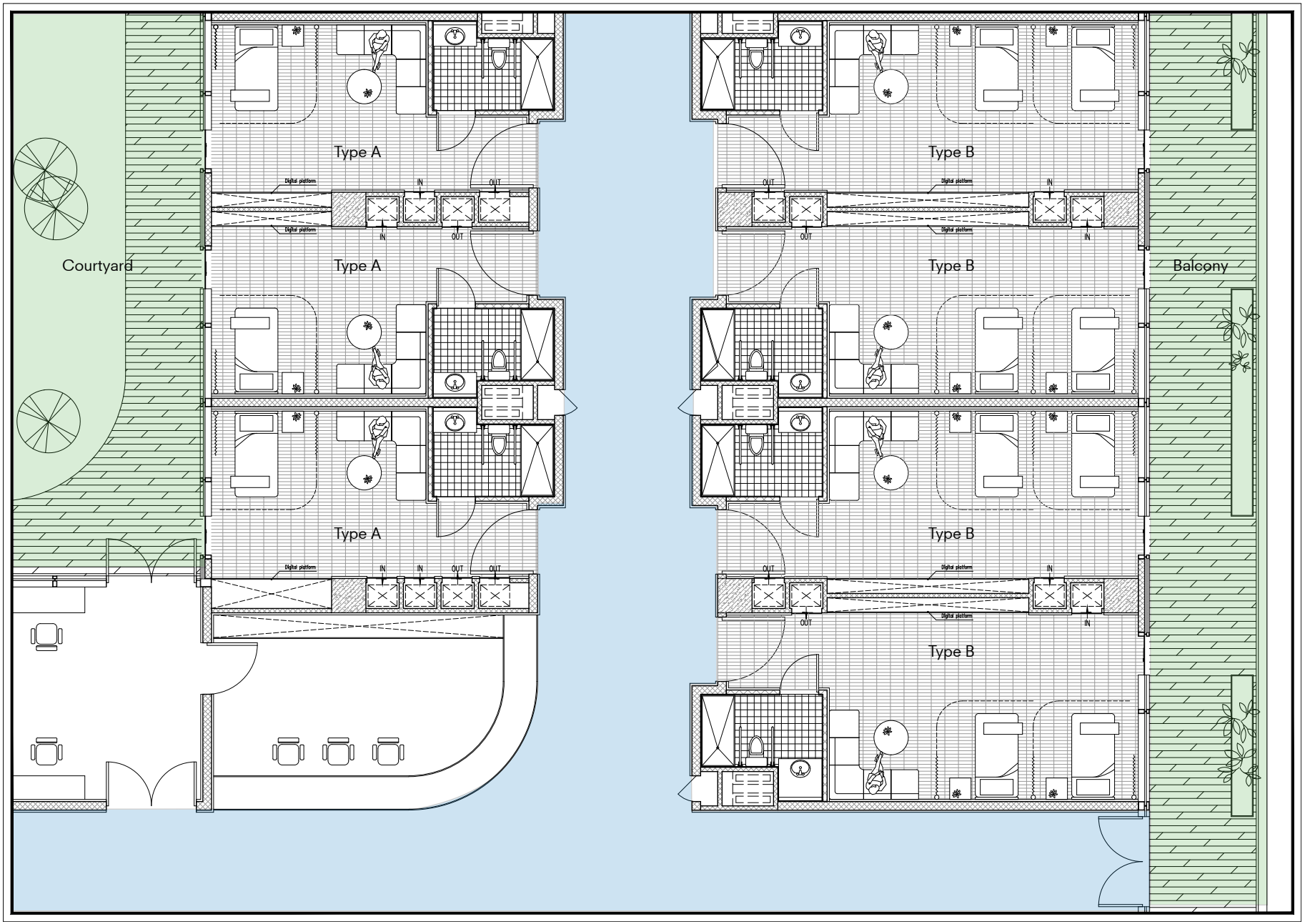
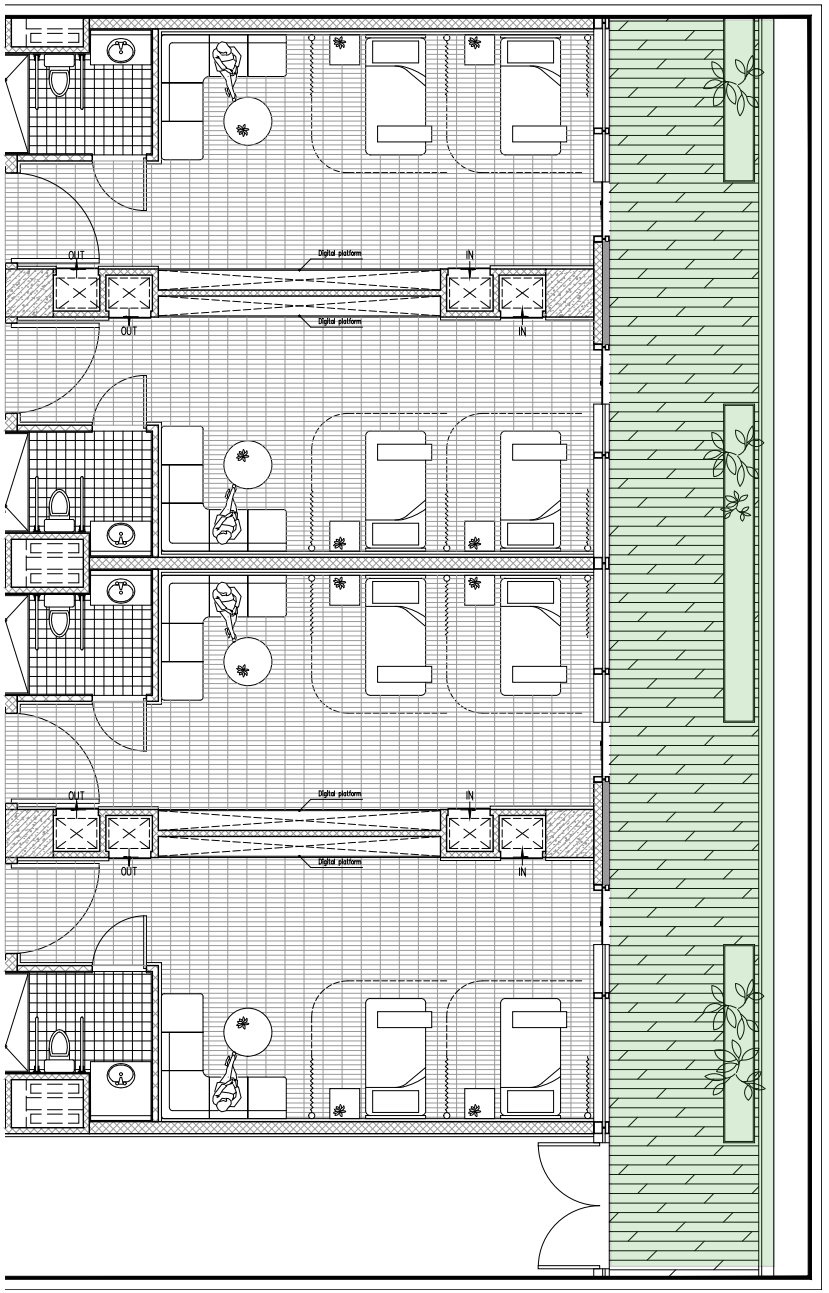

Courtyard
Type A
Type A
Type A
Type B
Type B
Type B
Balcony
Digital platform
IN
OUT

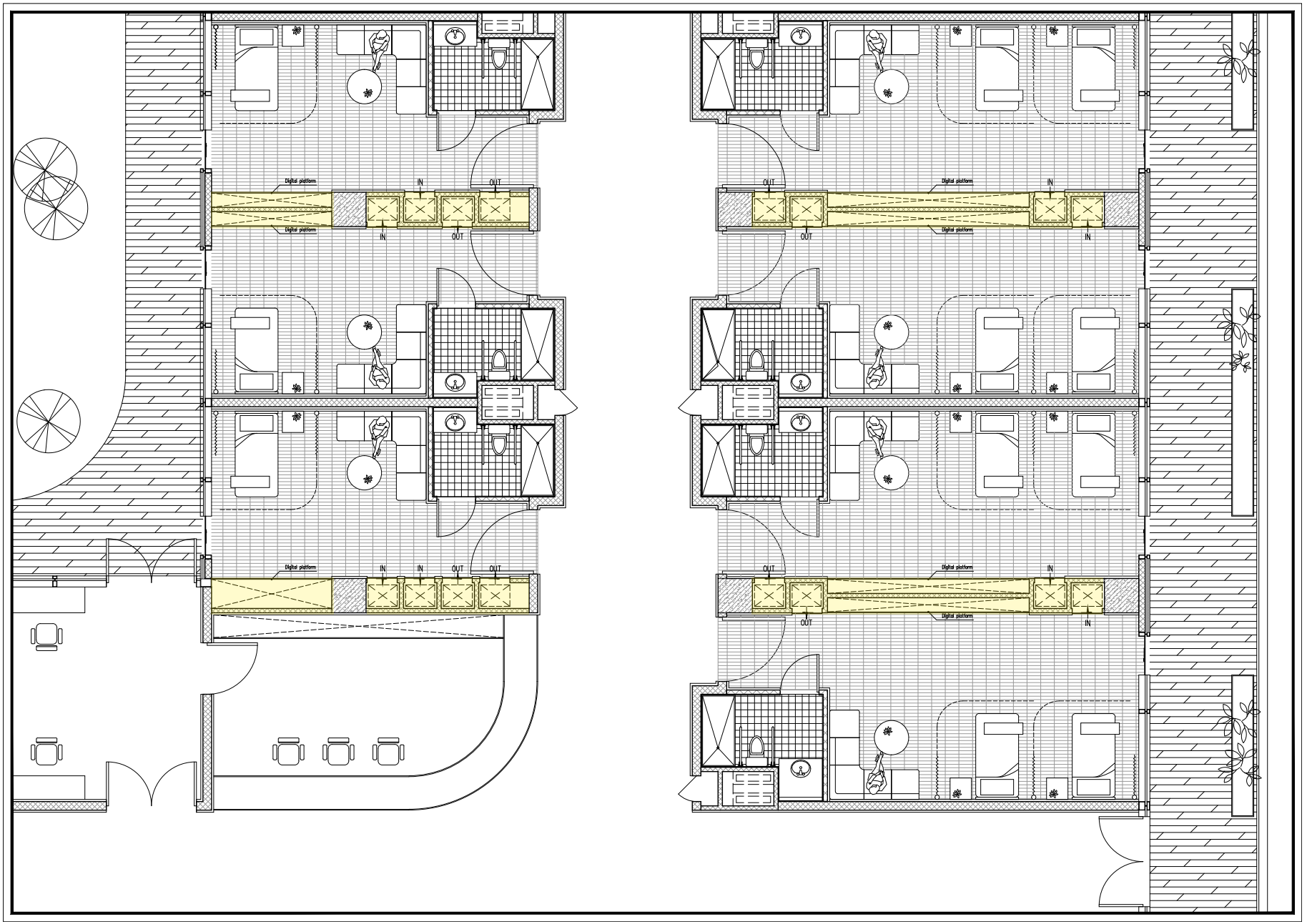
design

“HOUSE”



INTERIOR

DATA BASED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IN

program

AUTO LOGISTICS

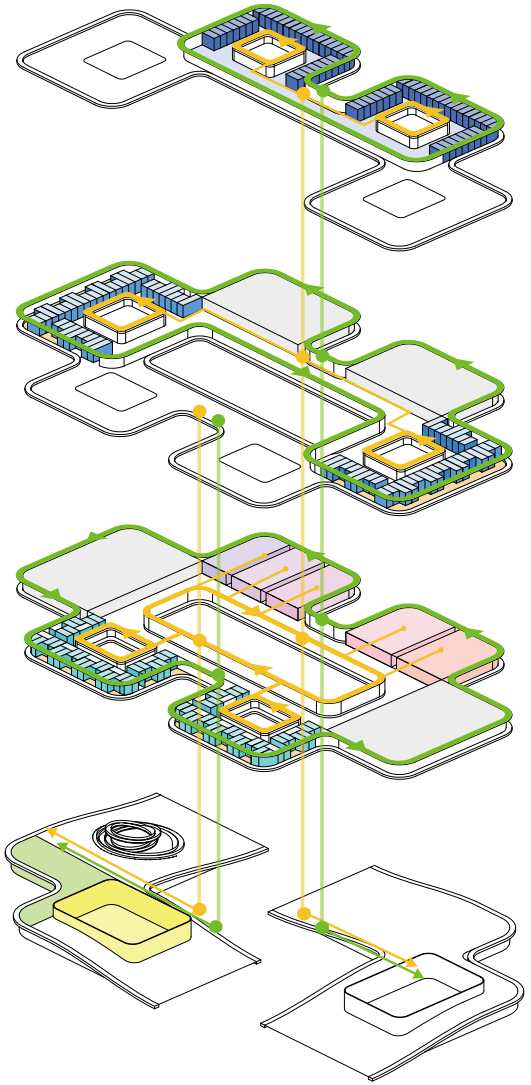
In/Out

Delivery

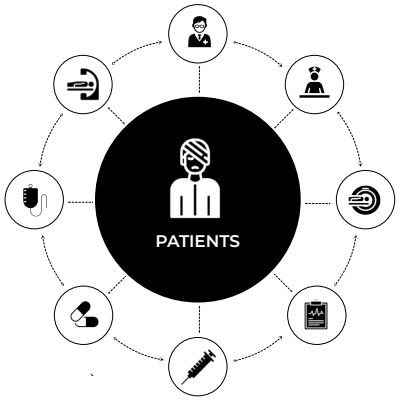
Management

program

AUTO LOGISTICS



Doctor comes to the patient
(Medical & Life Services)



Pharmacy

Laboratory

Rehabilitation Training Centre

Data Centre

Doctors office

Nurses station

...

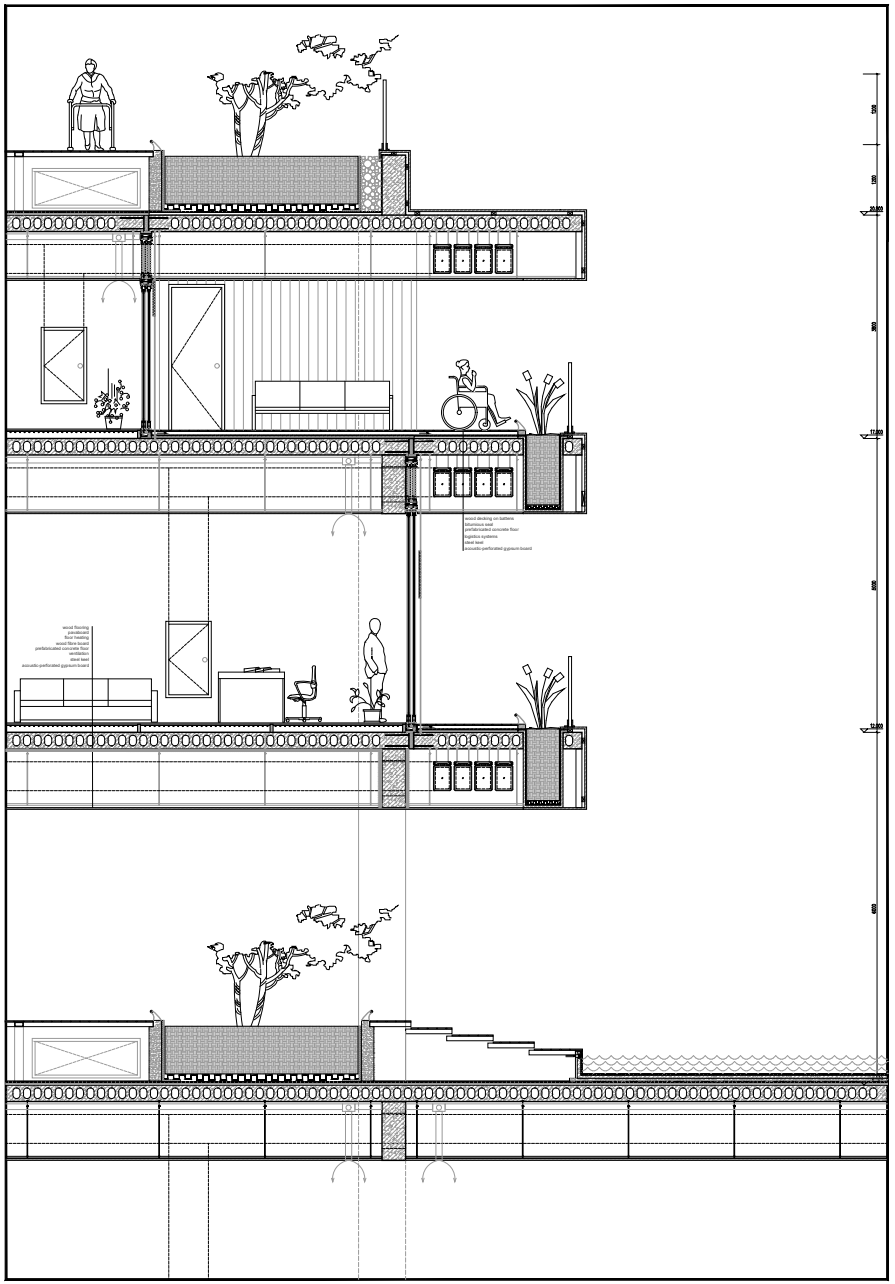
Laundry

Restaurant

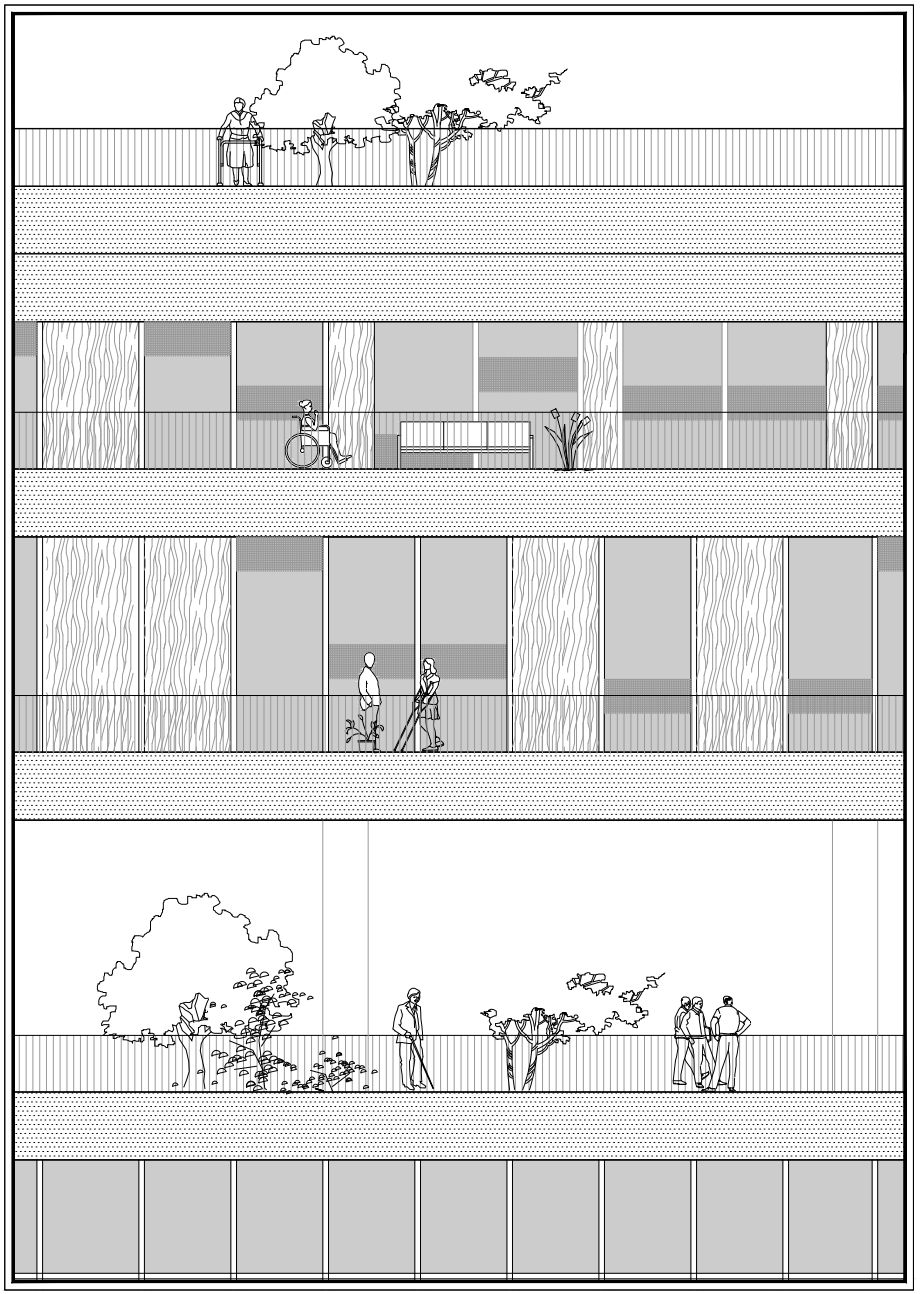
Shops

...

SECTION FRAGMENT

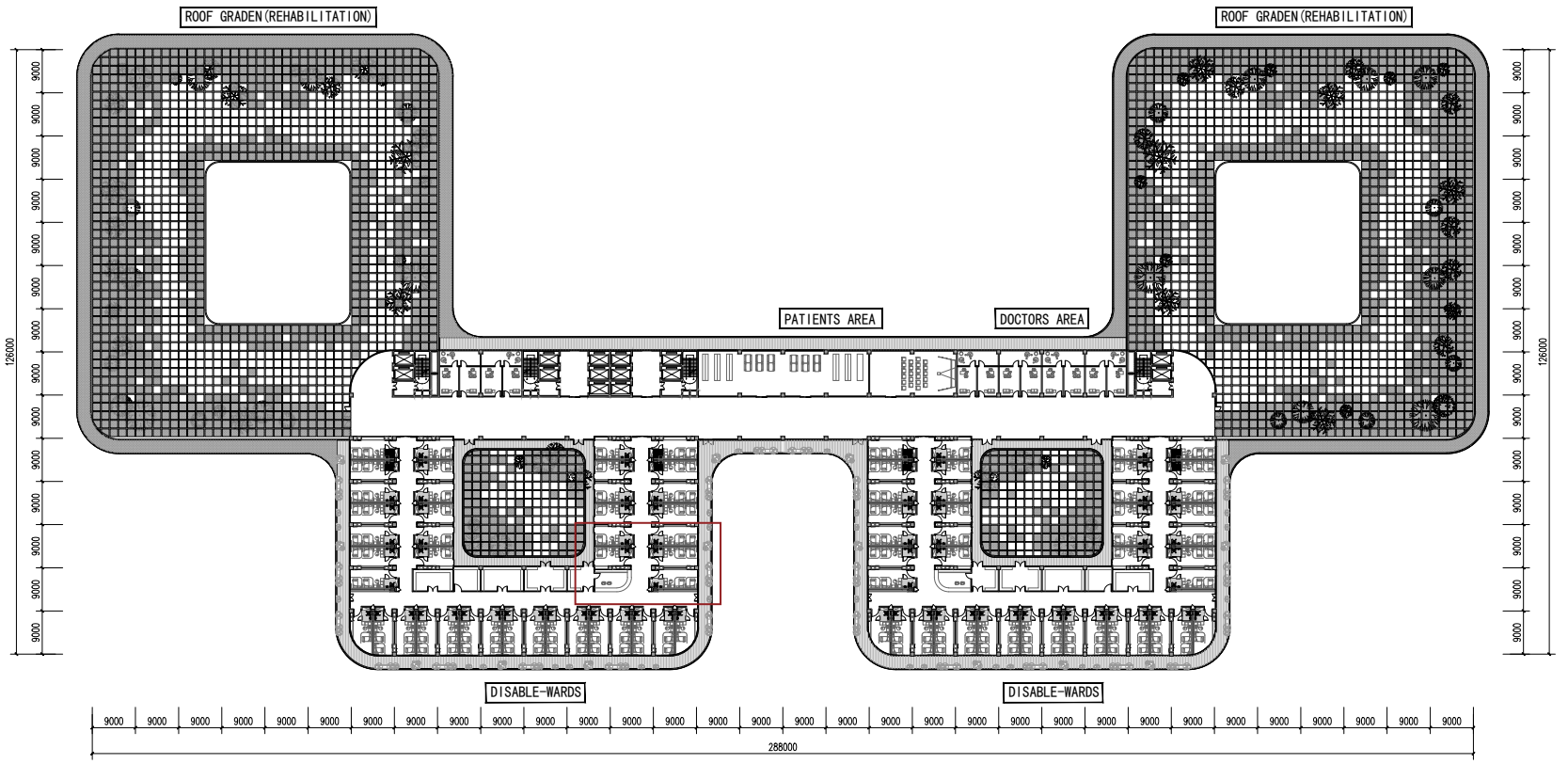


ENVELOPE FRAGMENT

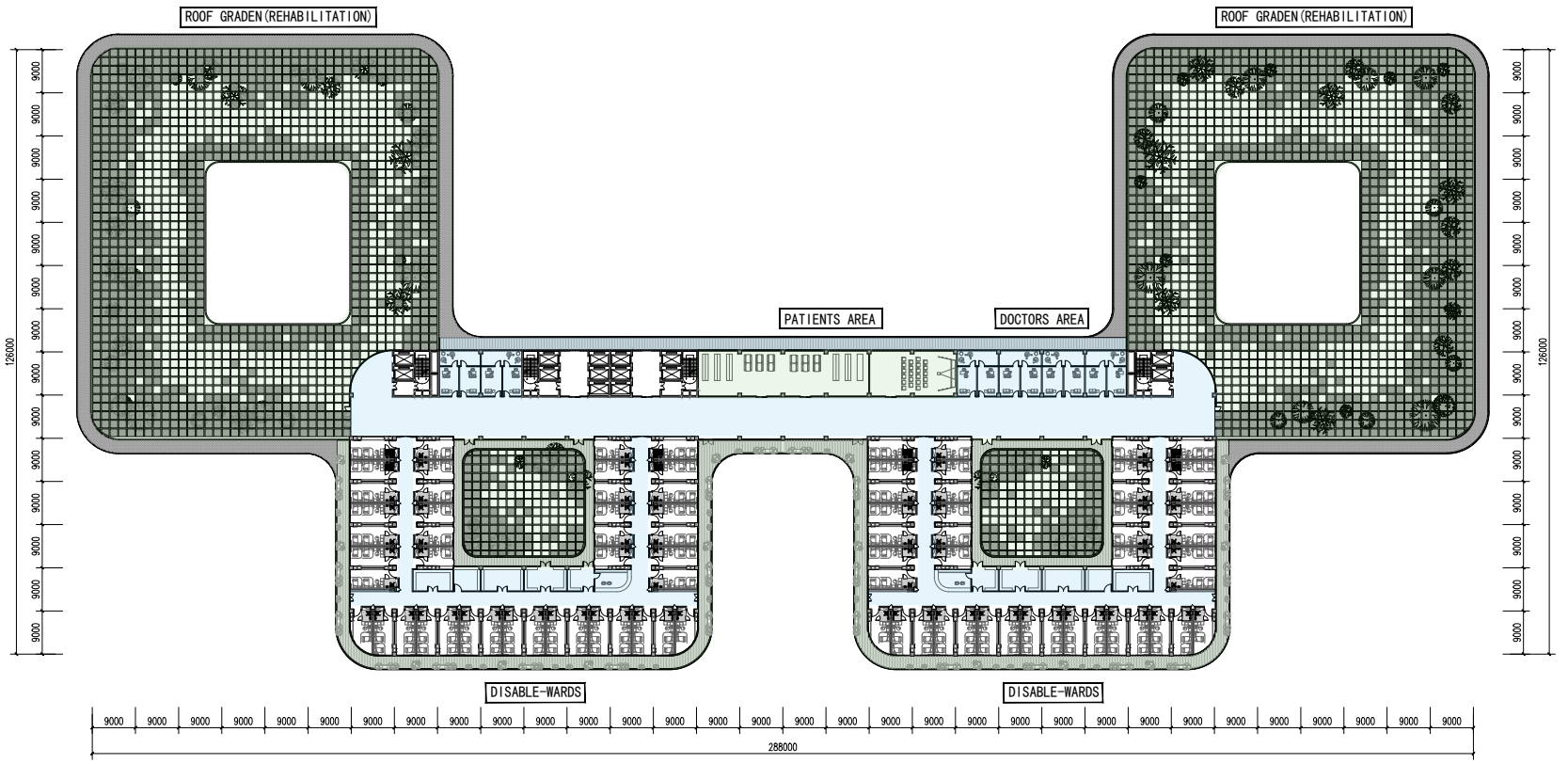


ENVELOPE FRAGMENT

3F


3F 1:600
ROOF GRADEN(REHABILITATION)
ROOF GRADEN(REHABILITATION)
PATIENTS AREA
DOCTORS AREA
DISABLE-WARDS
DISABLE-WARDS
126000
126000
288000

3F


3F 1:600
ROOF GRADEN(REHABILITATION)
ROOF GRADEN(REHABILITATION)
PATIENTS AREA
DOCTORS AREA
DISABLE-WARDS
DISABLE-WARDS
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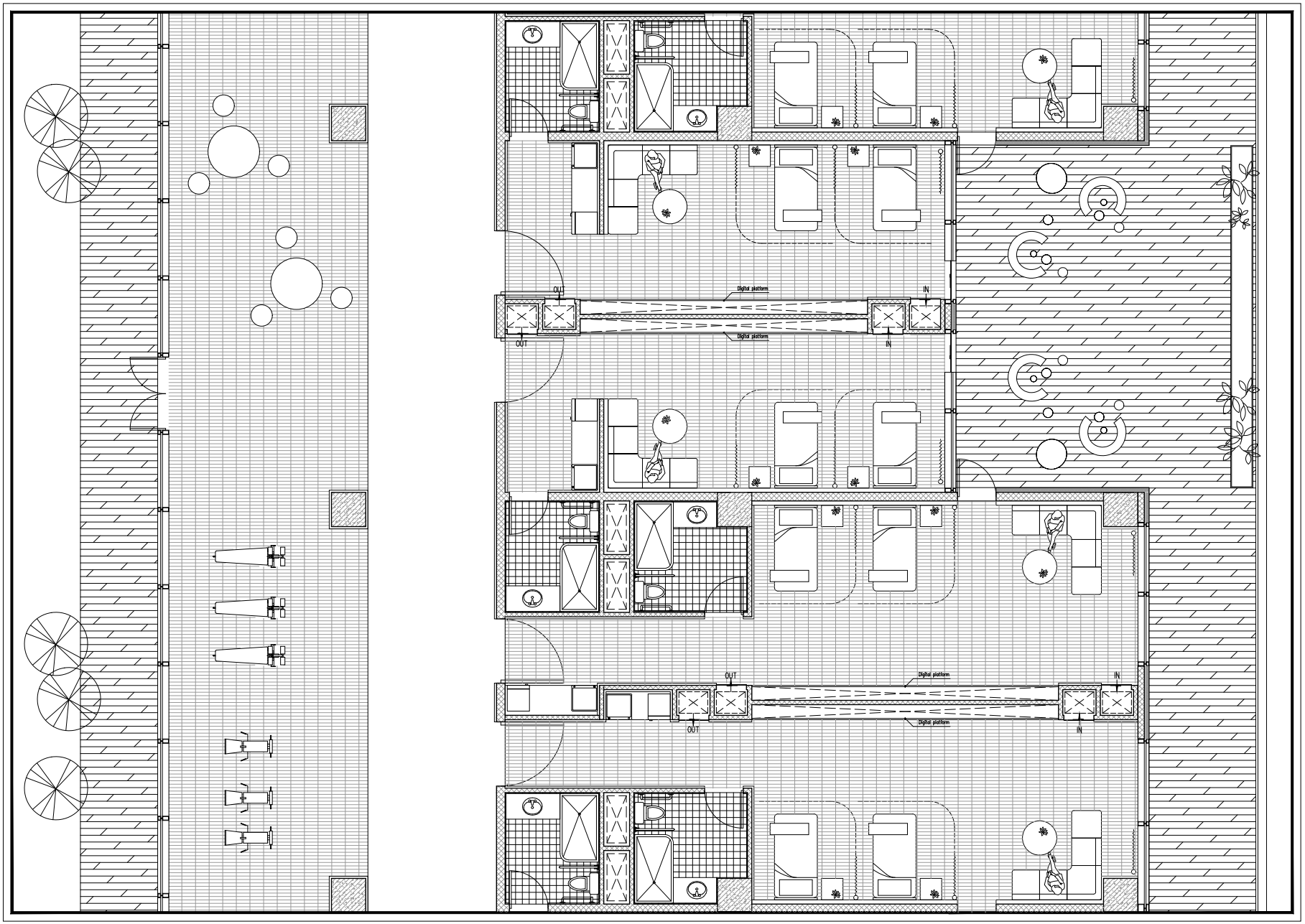
SEMI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Digital platform
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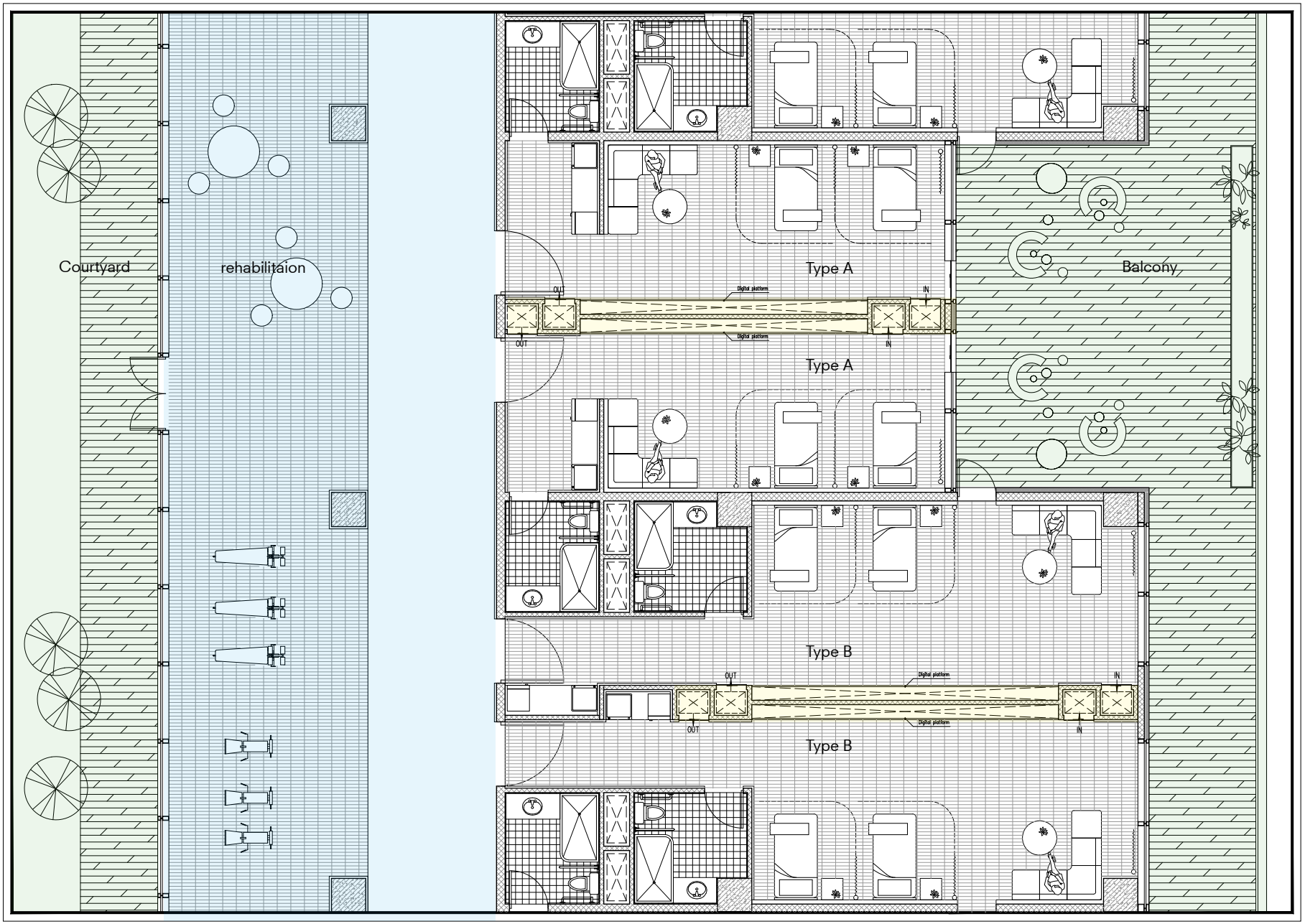
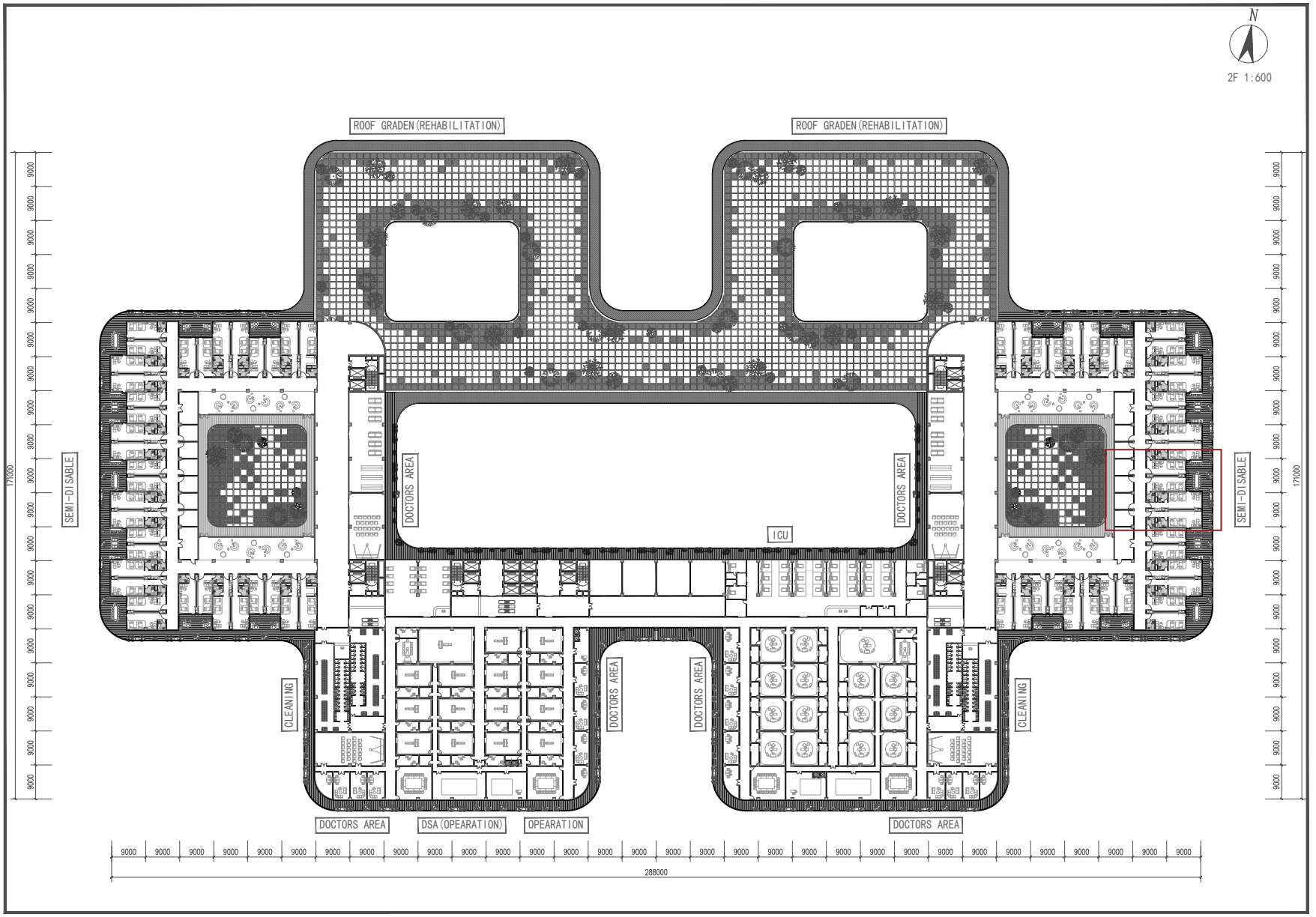
IN

SEMI


Courtyard
rehabilitaion
Type A
Balcony
Digital platform
OUT
IN
Type A
Type B
Digital platform
OUT
IN
Type B

2F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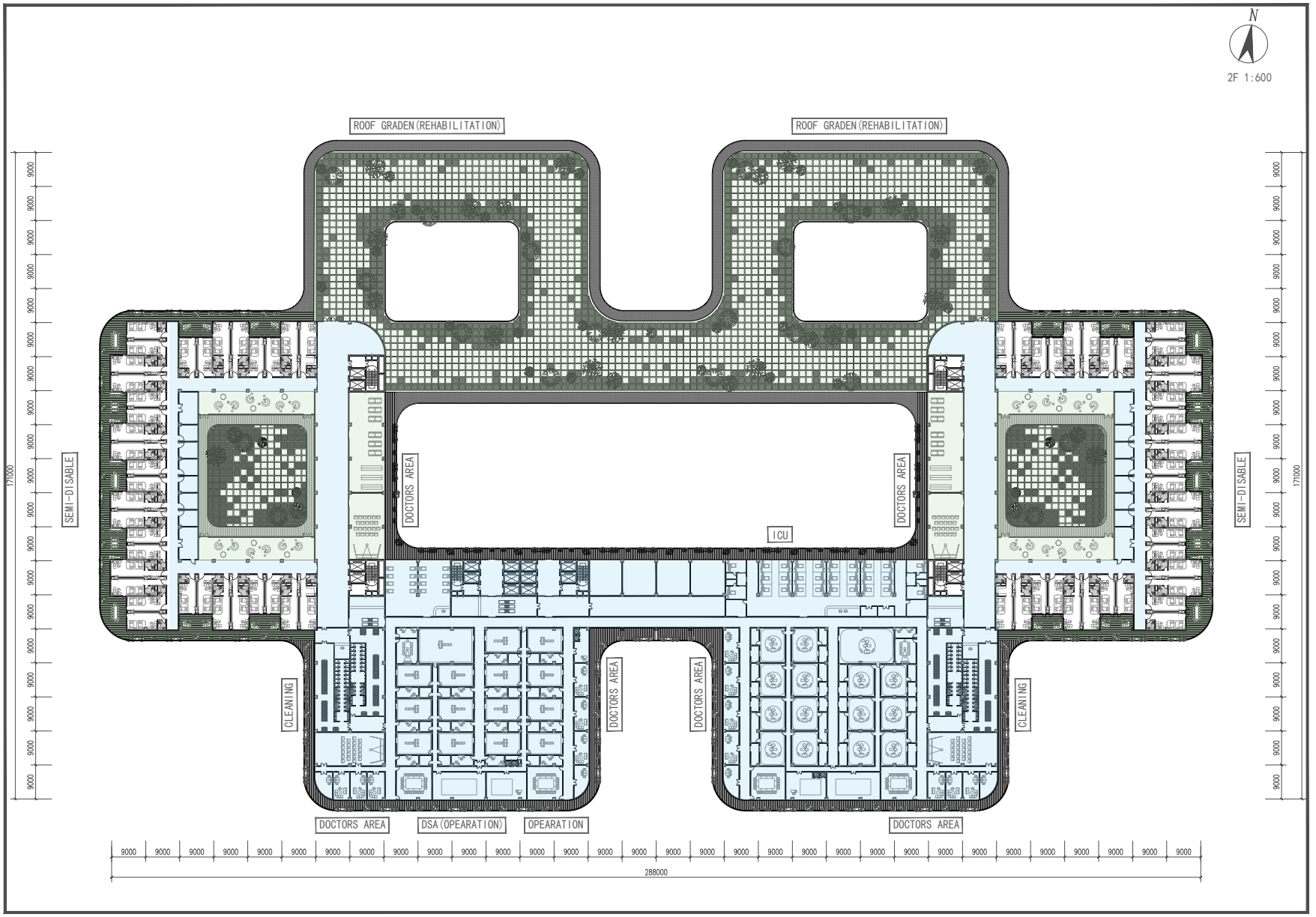
2F 1:600
ROOF GRADEN(REHABILITATION)
ROOF GRADEN(REHABILITATION)
SEMI-DISABLE
SEMI-DISABLE
DOCTORS AREA
DOCTORS AREA
ICU
CLEANING
CLEANING
DOCTORS AREA
DOCTORS AREA
DOCTORS AREA
DSA(OPEARATION)
OPEARATION
DOCTORS AREA
171000
171000
9000
288000

2F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ROOF GRADEN(REHABILITATION)
ROOF GRADEN(REHABILITATION)
SEMI-DISABLE
SEMI-DISABLE
DOCTORS AREA
DOCTORS AREA
ICU
CLEANING
CLEANING
DOCTORS AREA
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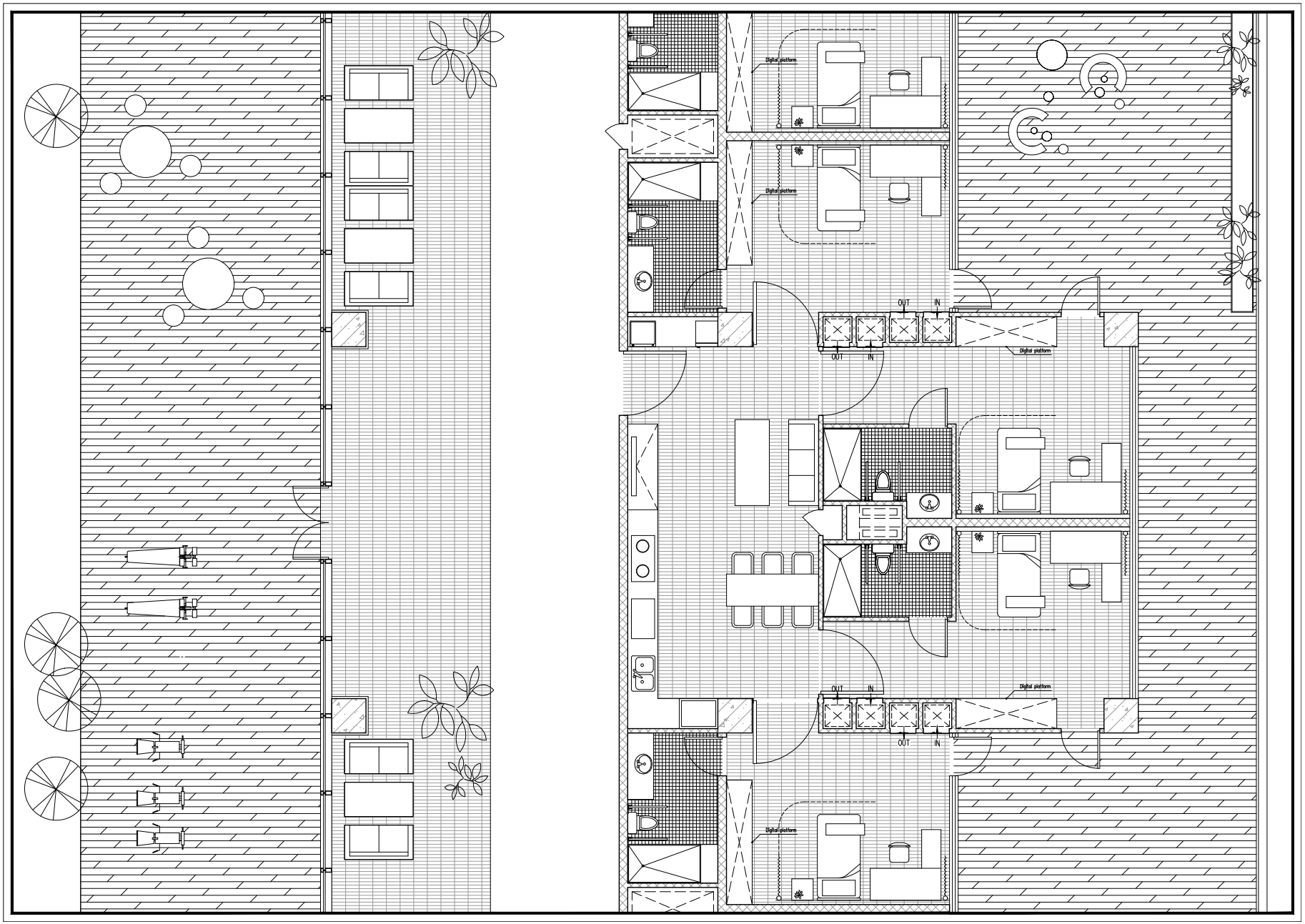
DSA(OPEARATION)
OPEARATION
DOCTORS AREA
171000
171000
9000
288000

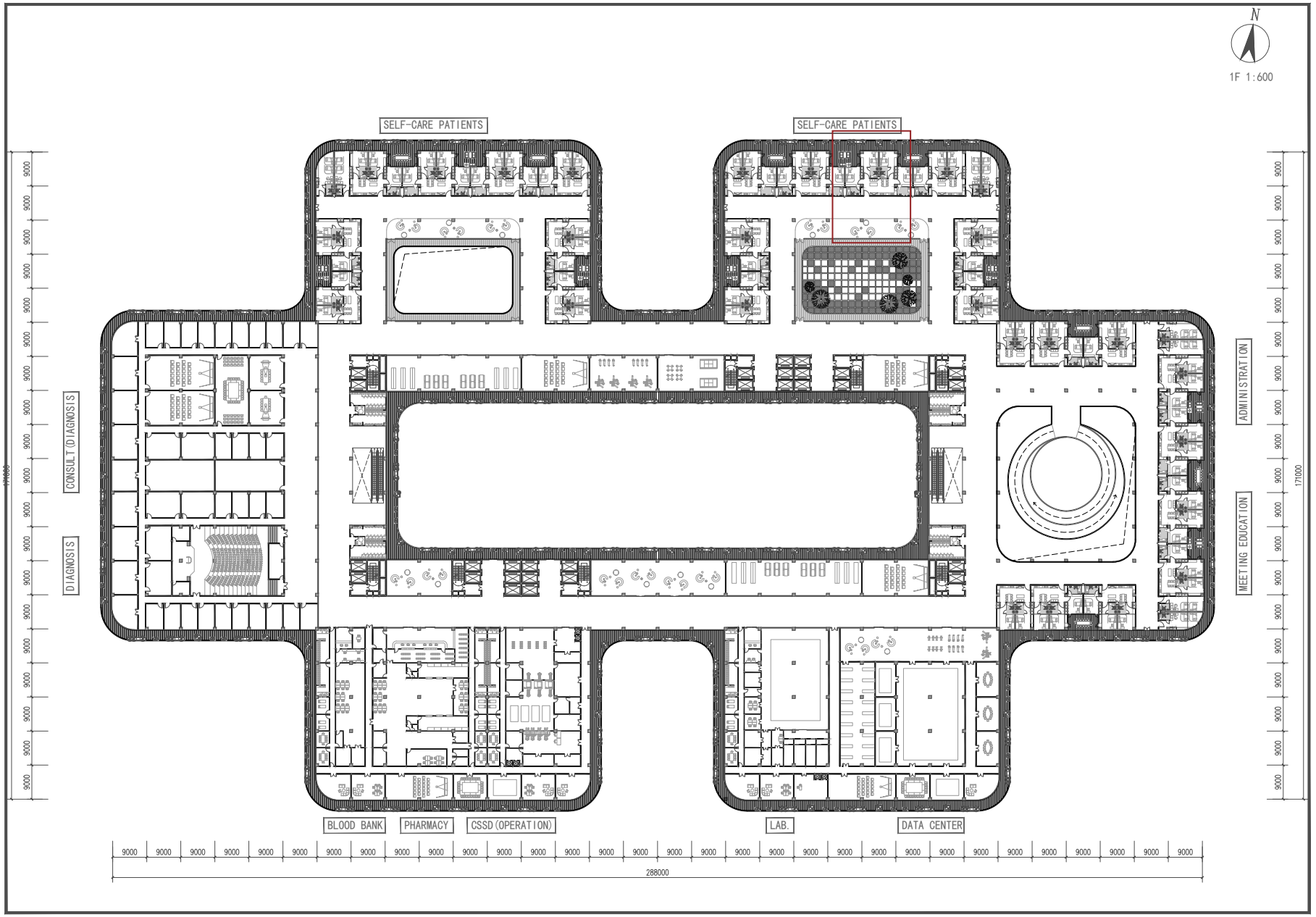
SELF


Digital platform
Digital platform
OUT
IN
OUT
IN
Digital platform
OUT
IN
OUT
IN
Digital platform

SELF

Courtyard
social
Type B
Balcony
Type A
living room
Type A
Type B
Digital platform
OUT
IN

SELF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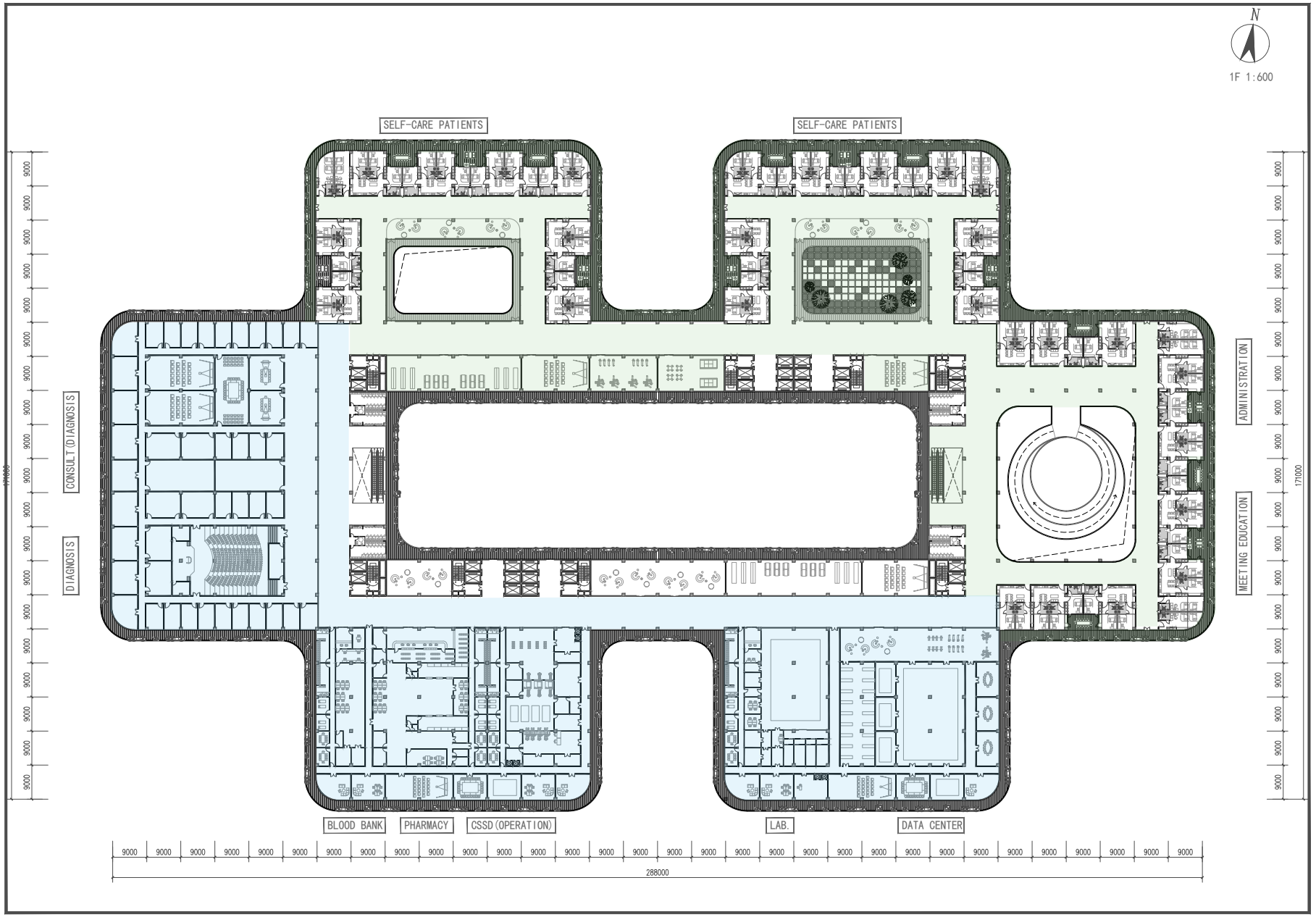
SELF-CARE PATIENTS
SELF-CARE PATIENTS
CONSULT(DIAGNOSIS
DIAGNOSIS
ADMINISTRATION
MEETING EDUCATION
BLOOD BANK
PHARMACY
CSSD(OPERATION)
LAB.
DATA CENTER
9000
288000
171000

SELF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SELF-CARE PATIENTS
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BLOOD BANK
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CSSD(OPERATION)
LAB.
DATA CENTER
9000
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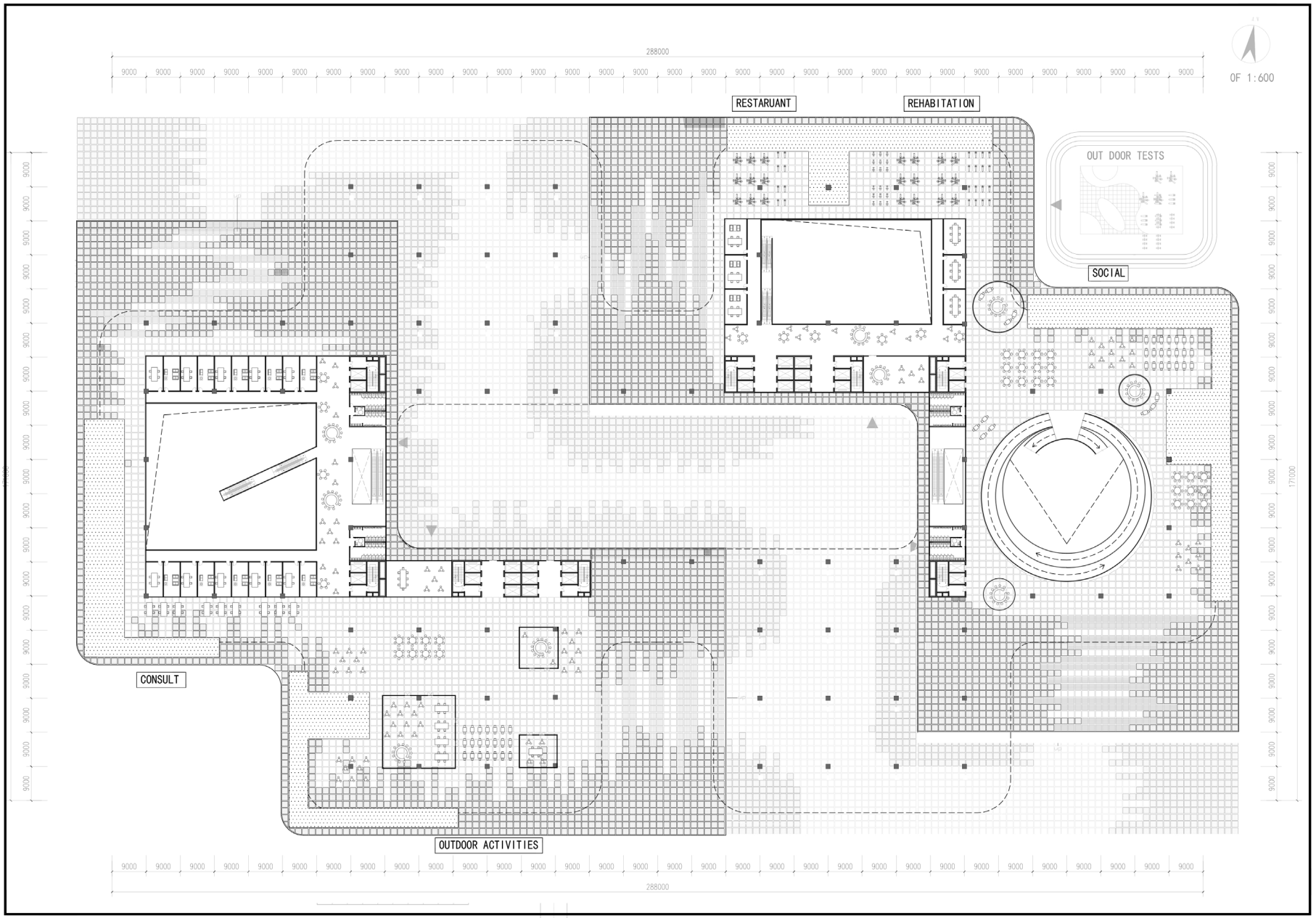
MF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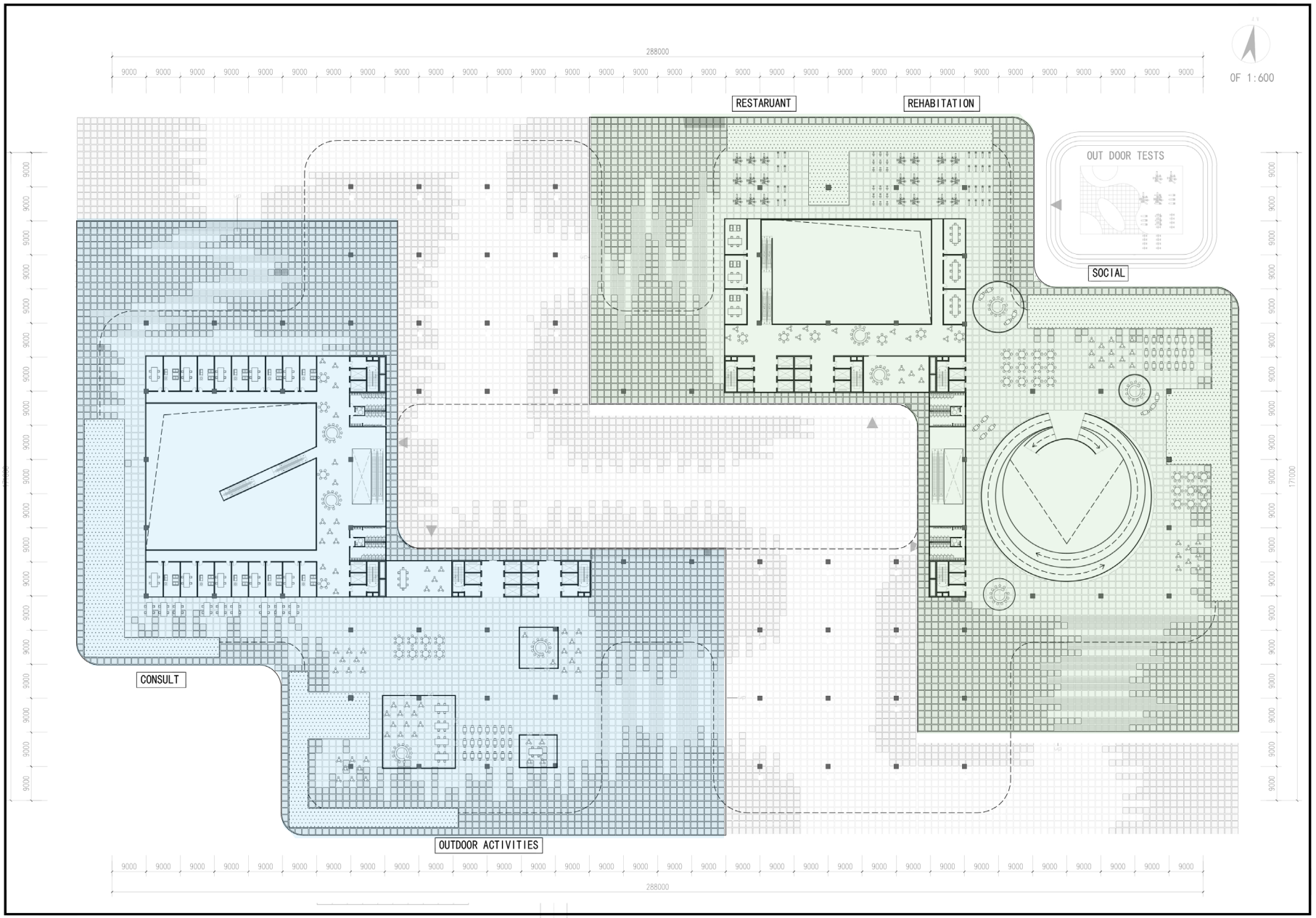
9000
OF 1:600
RESTARUANT
REHABITATION
OUT DOOR TESTS
SOCIAL
CONSULT
OUTDOOR ACTIVITIES
17000

MF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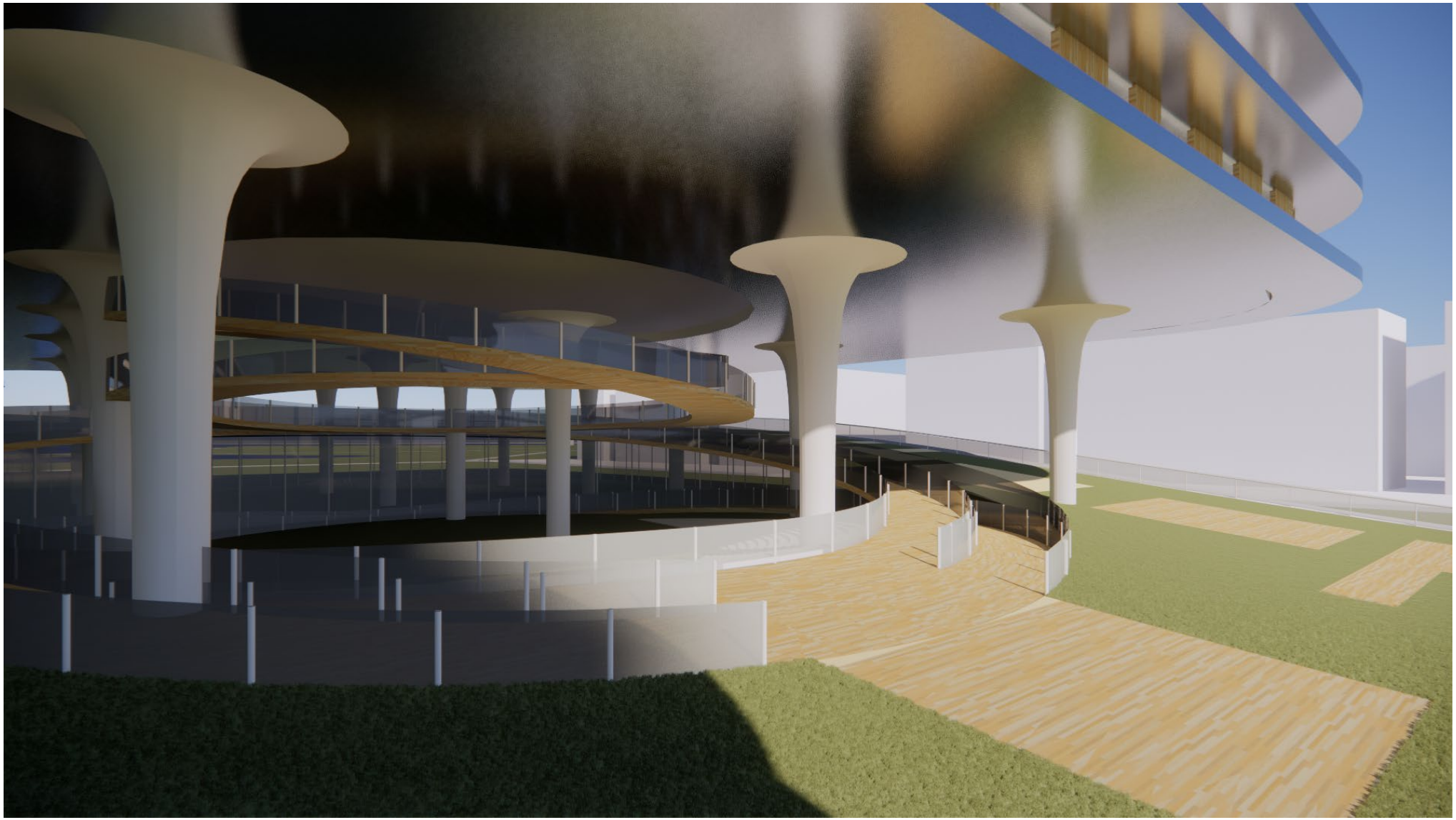
OF 1:600
RESTARUANT
REHABITATION
OUT DOOR TESTS
SOCIAL
CONSULT
OUTDOOR ACTIVITIES
17000

MF

MF



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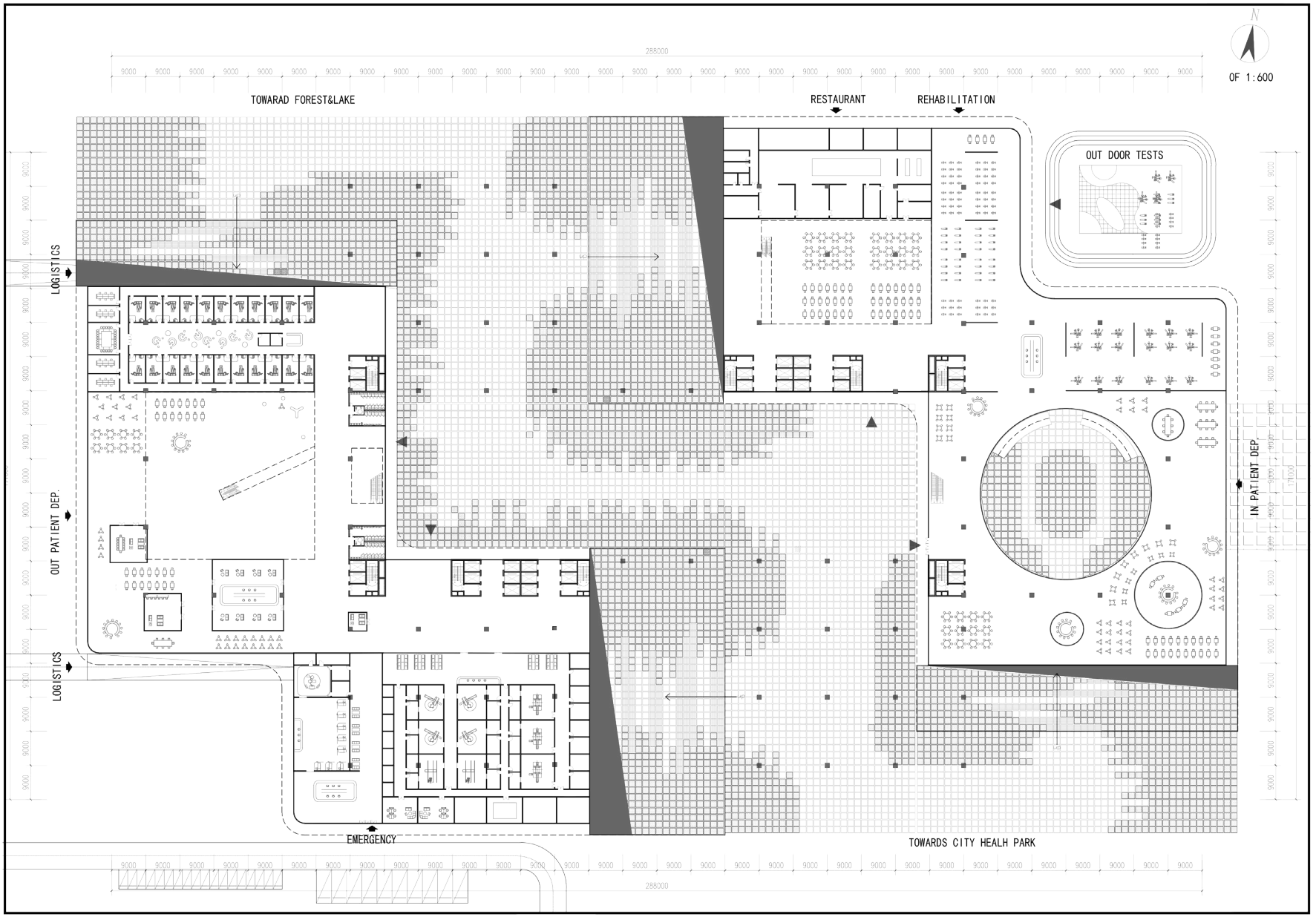
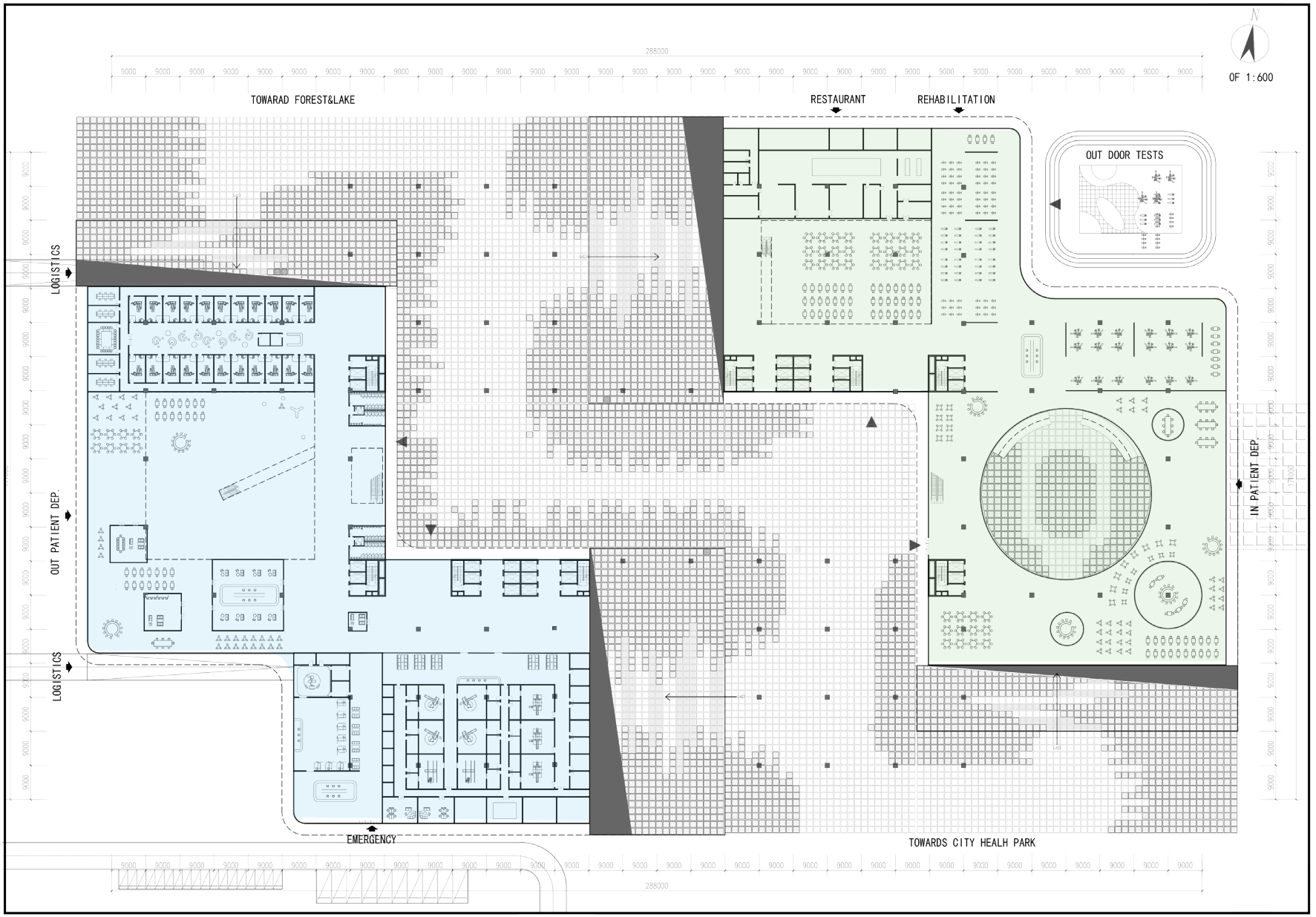
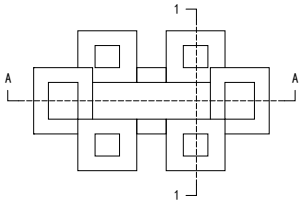
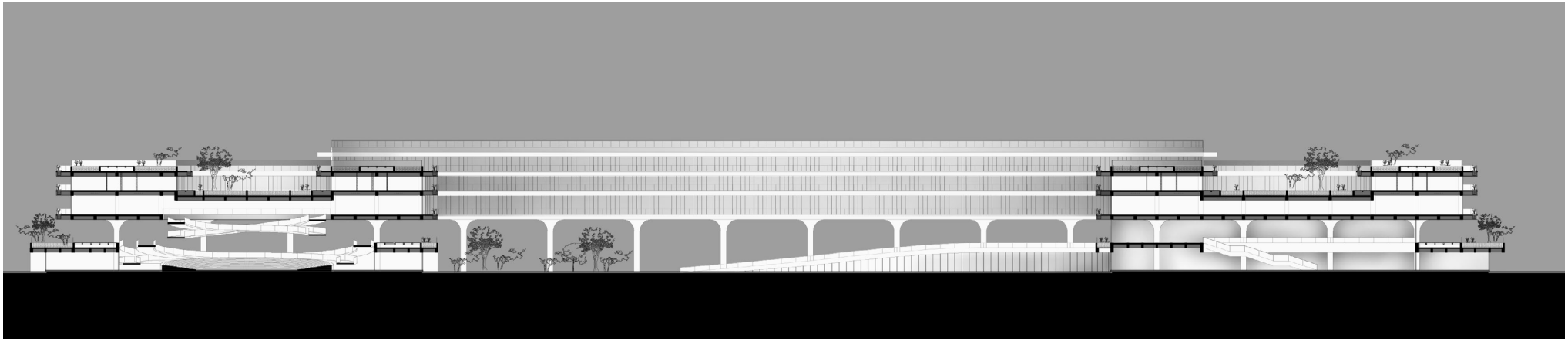

N
OF 1:600
TOWARAD FOREST&LAKE
RESTAURANT
REHABILITATION
OUT DOOR TESTS
LOGISTICS
OUT PATIENT DEP.
LOGISTICS
IN PATIENT DEP.
EMERGENCY
TOWARDS CITY HEALH PARK

GF

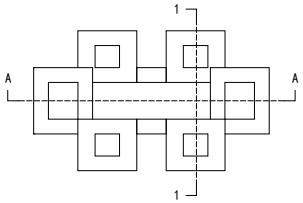

N
OF 1:600
TOWARAD FOREST&LAKE
RESTAURANT
REHABILITATION
OUT DOOR TESTS
LOGISTICS
OUT PATIENT DEP.
LOGISTICS
IN PATIENT DEP.
EMERGENCY
TOWARDS CITY HEALH PARK

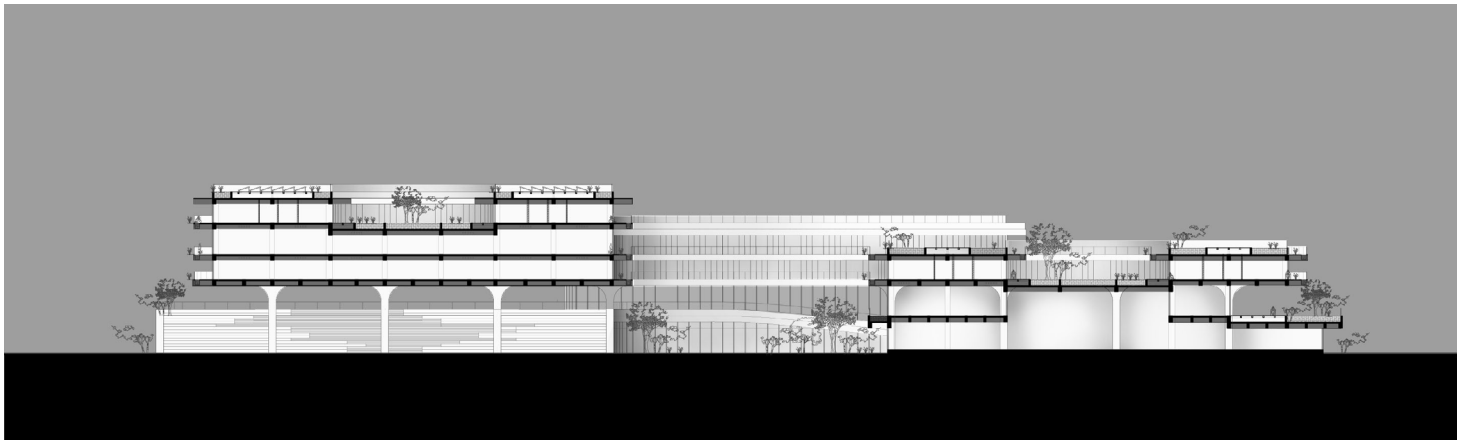
SECTION A





SECTION 1

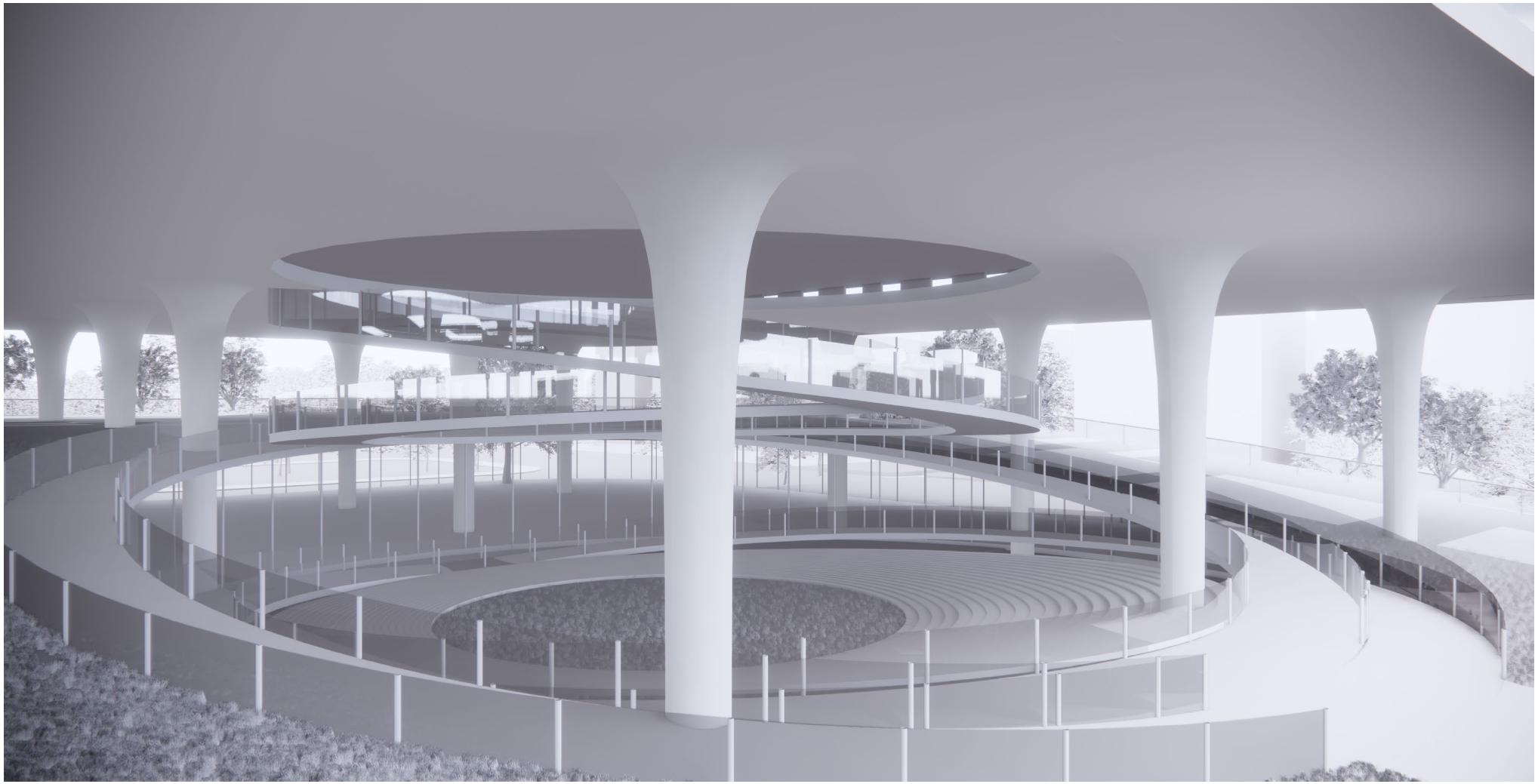




COURTYARD

MF

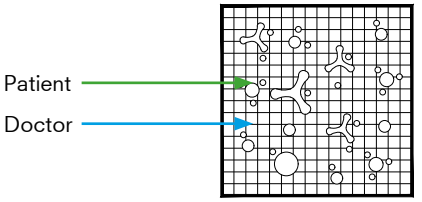
SOCIAL AREA



design

HEALTHCARE FLOWS

Communication



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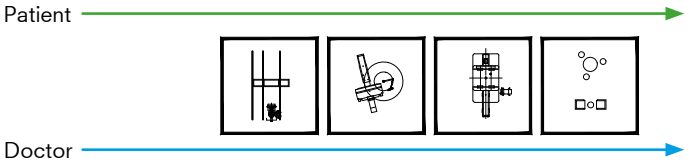

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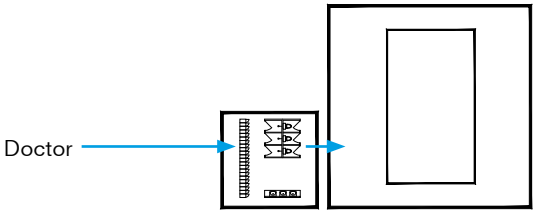
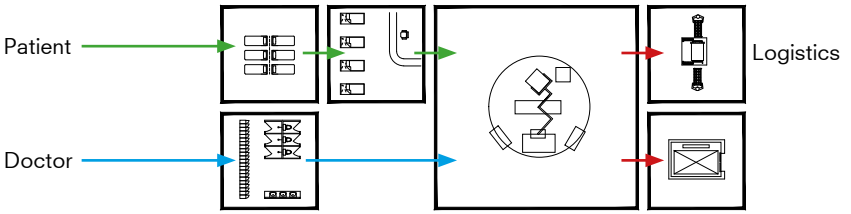
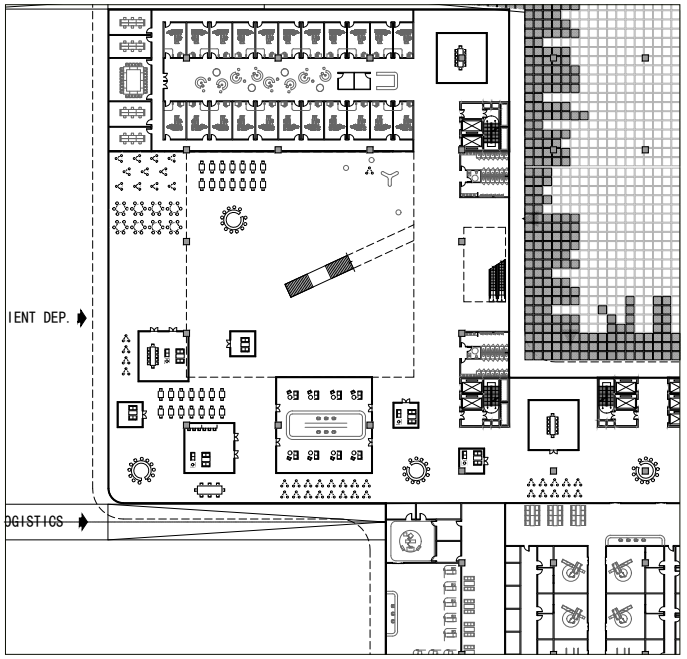


Operation



COMMUNICATION

GF



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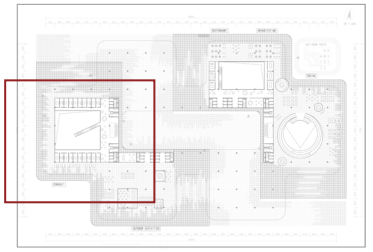
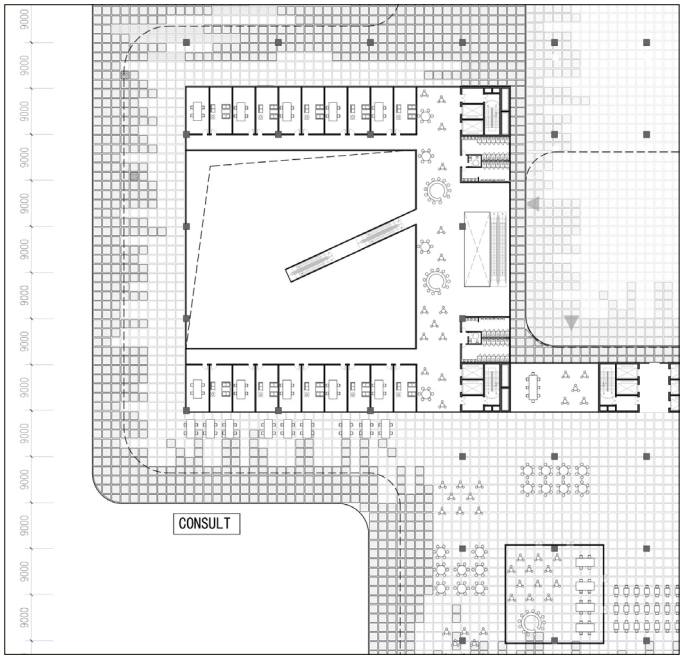
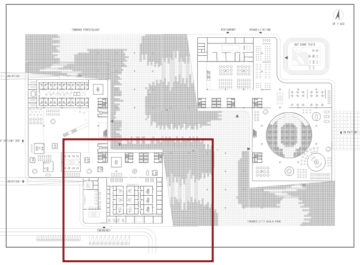
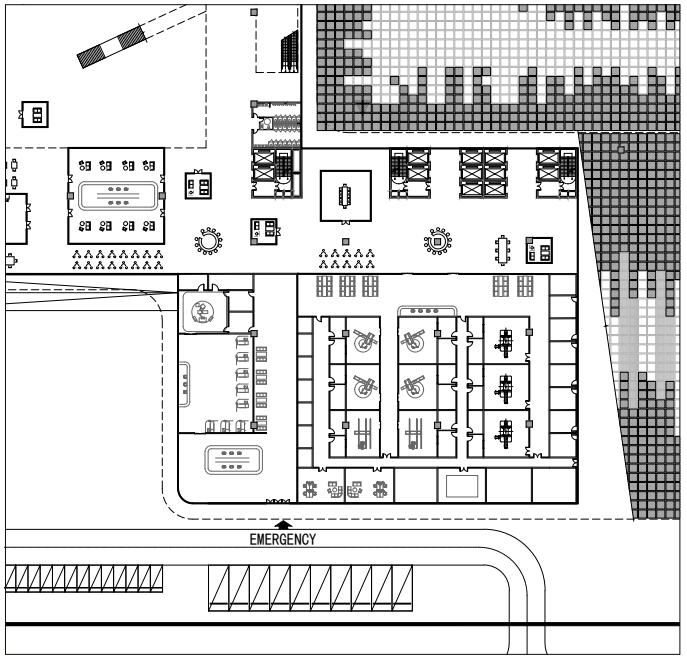




THERAPY

GF





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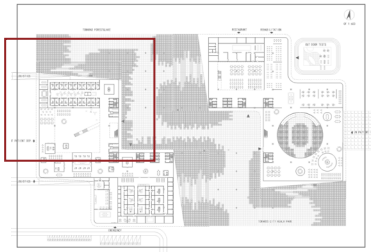
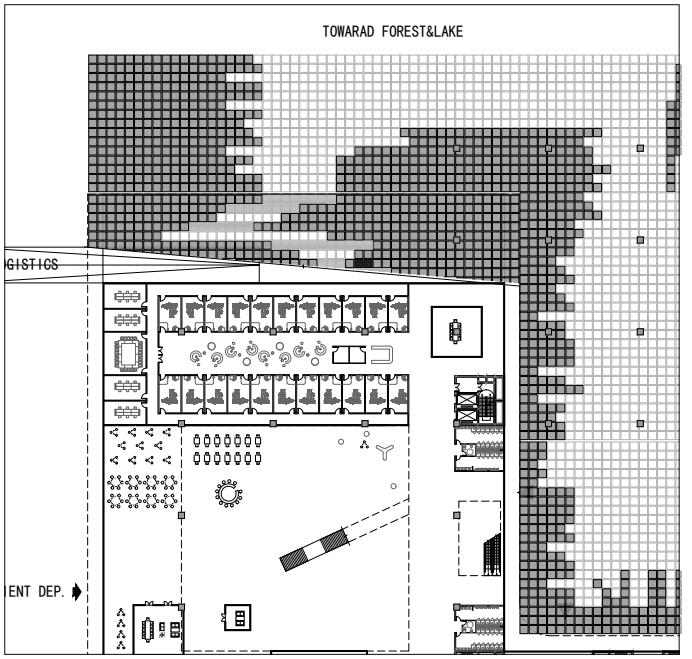
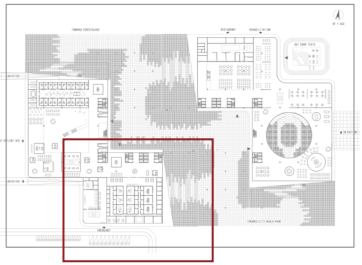
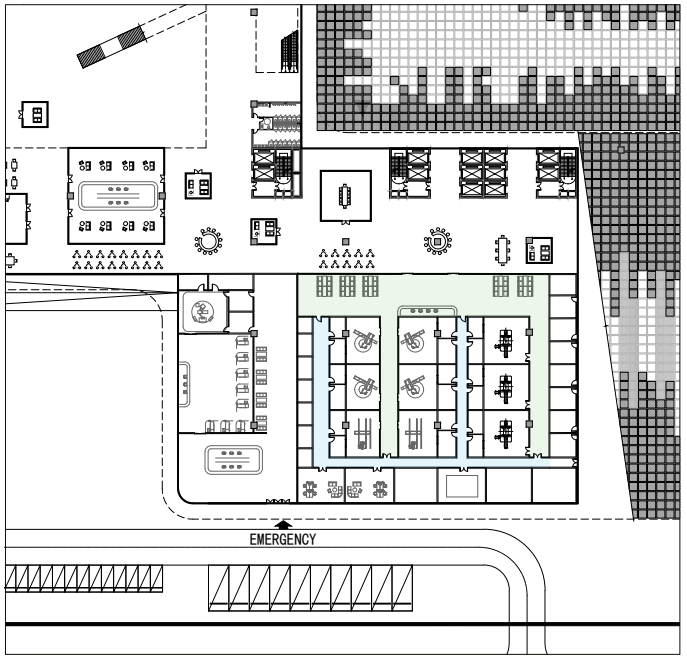




THERAPY

GF





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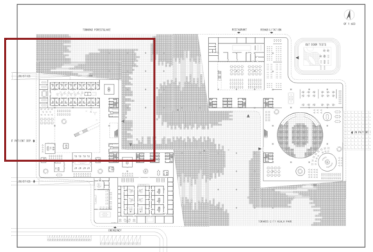
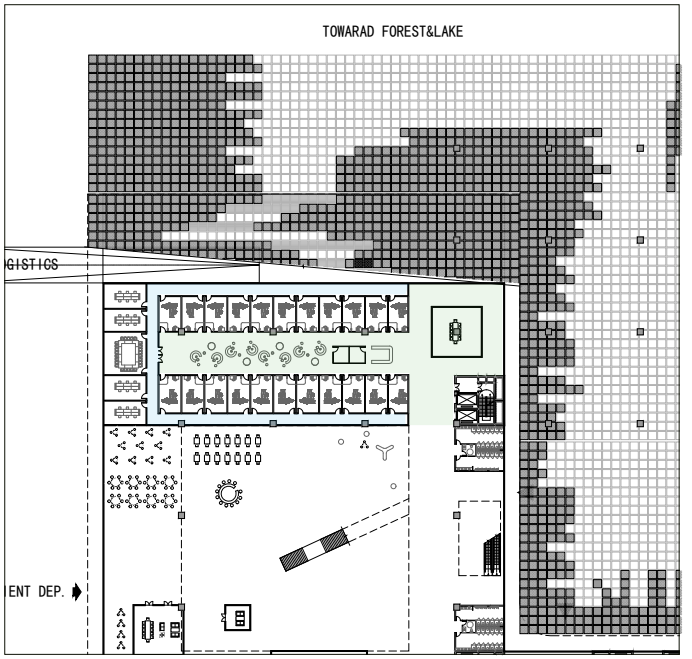
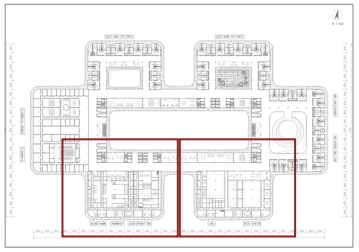
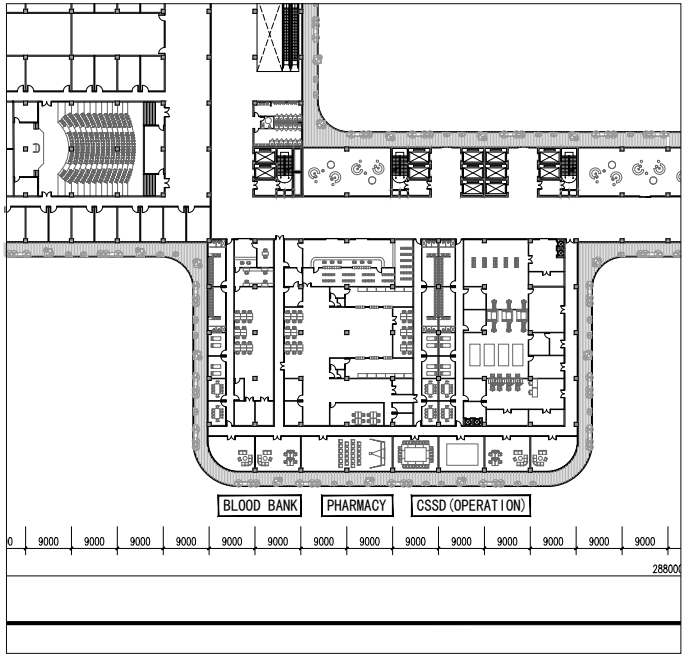


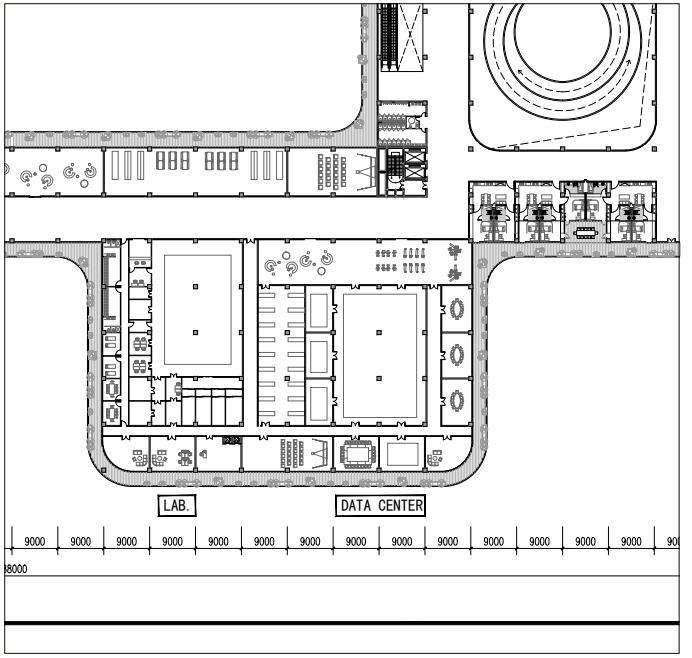


MEDICAL TECH

1F







MEDICAL TECH

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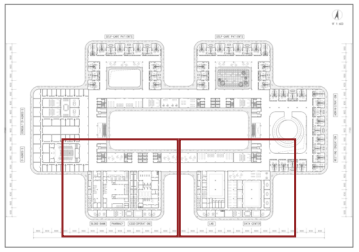
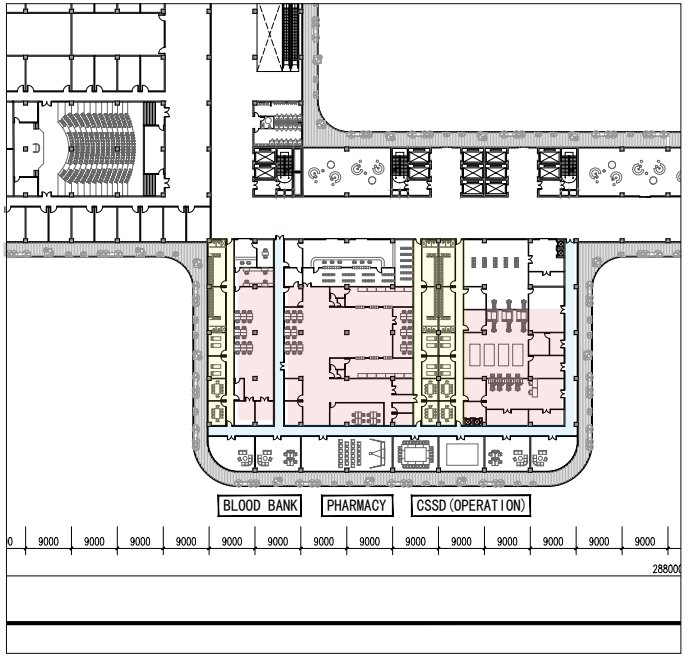
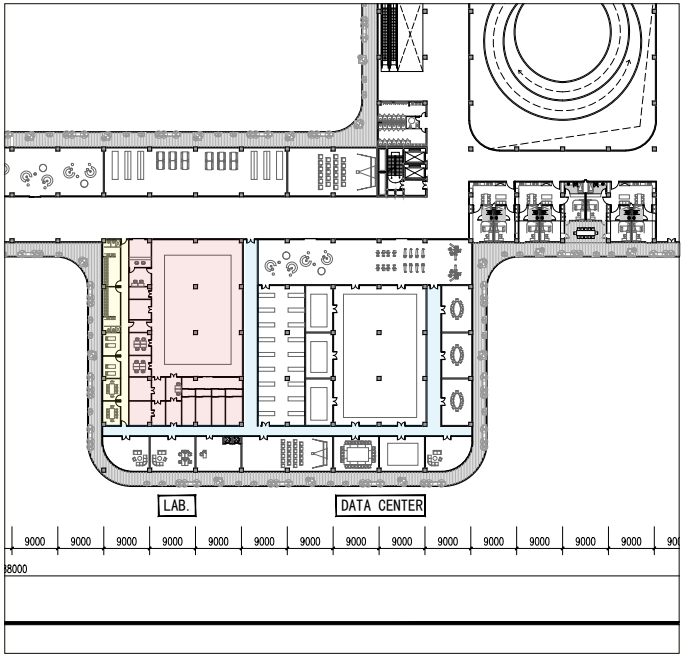
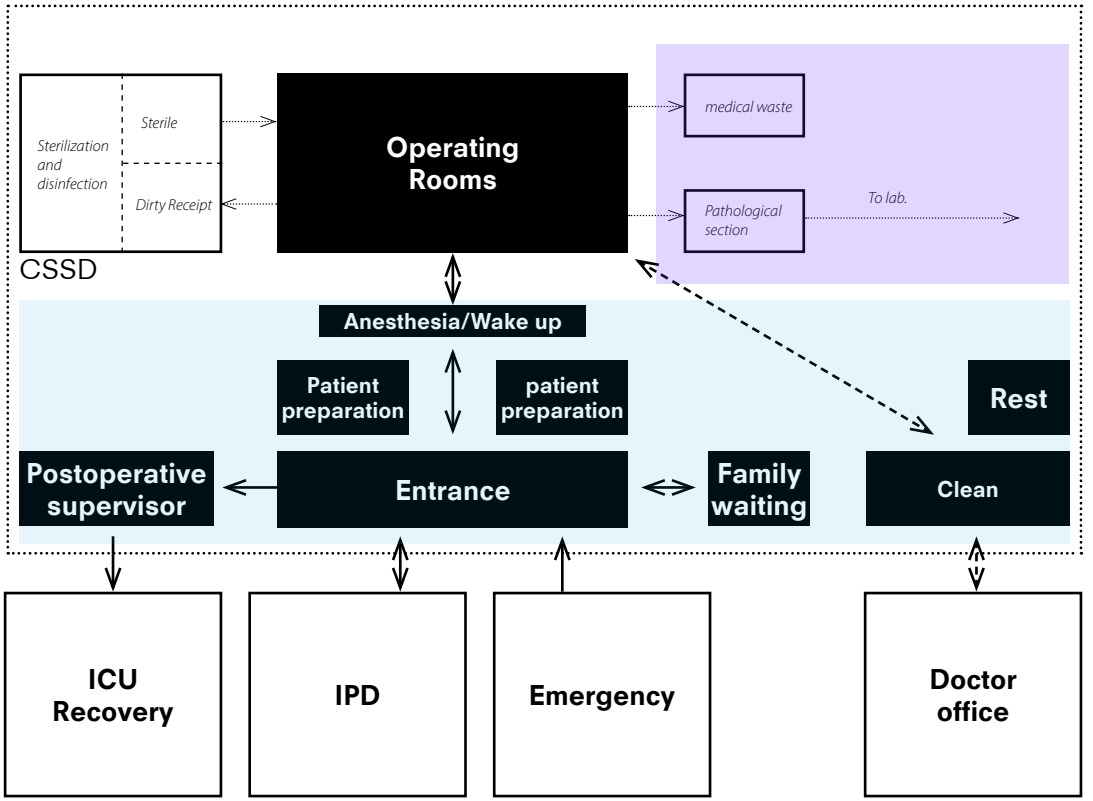




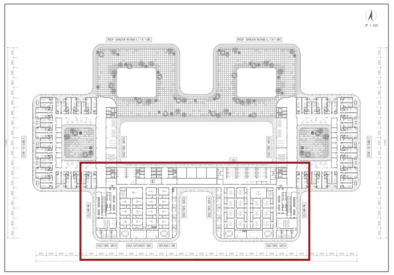


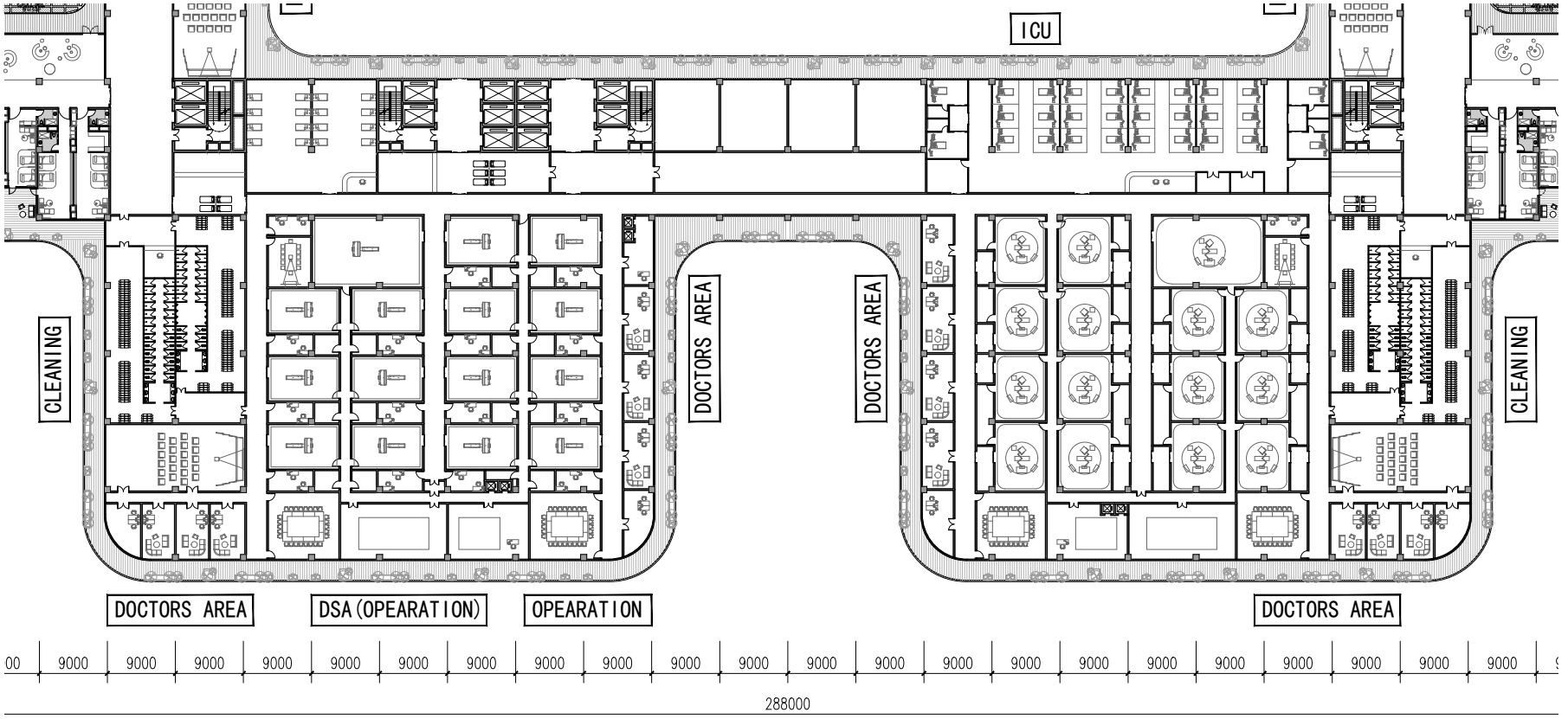
OPERATION

Operation Theatre Suite

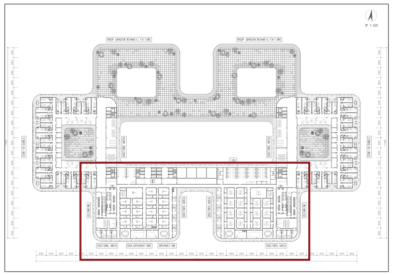


OPERATION




ICU
CLEANING
DOCTORS AREA
DOCTORS AREA
CLEANING
DOCTORS AREA
DSA(OPEARATION)
OPEARATION
DOCTORS AREA
9000
288000

OPERATION



ICU
CLEANING
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DOCTORS AREA
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OPEARATION
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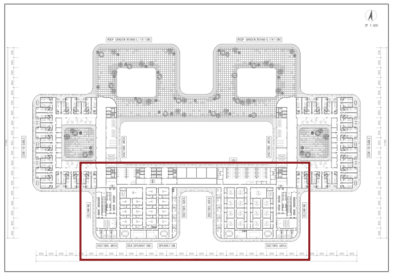
OPERATION



ICU
CLEANING
DOCTORS AREA
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OPEARATION
DOCTORS AREA
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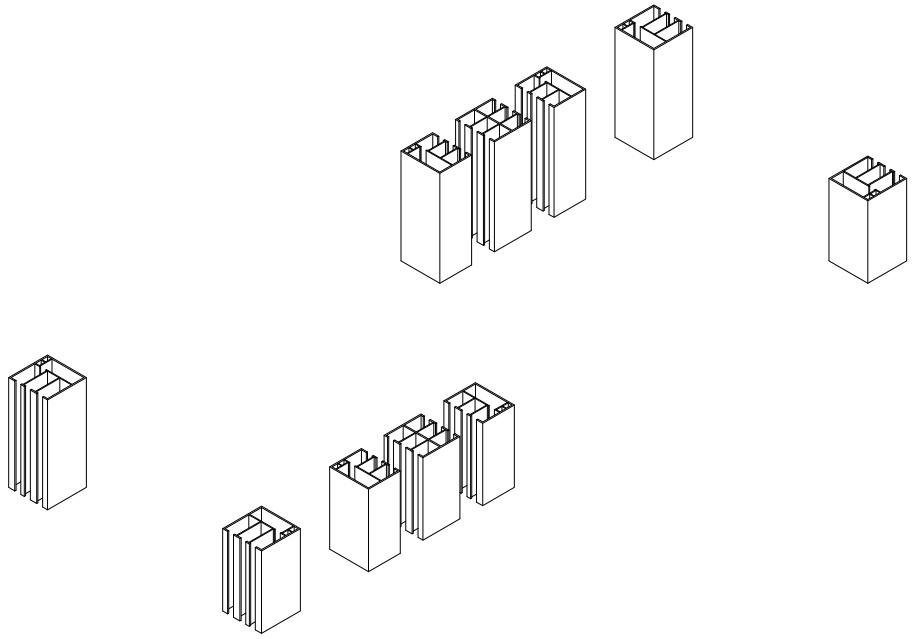
BUILDING TECH

STRUCTURE



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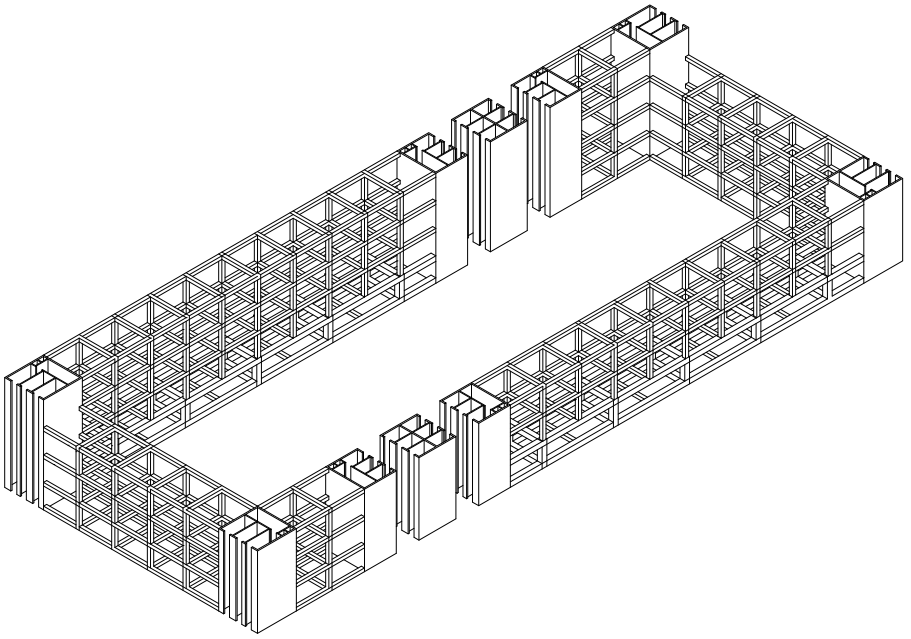

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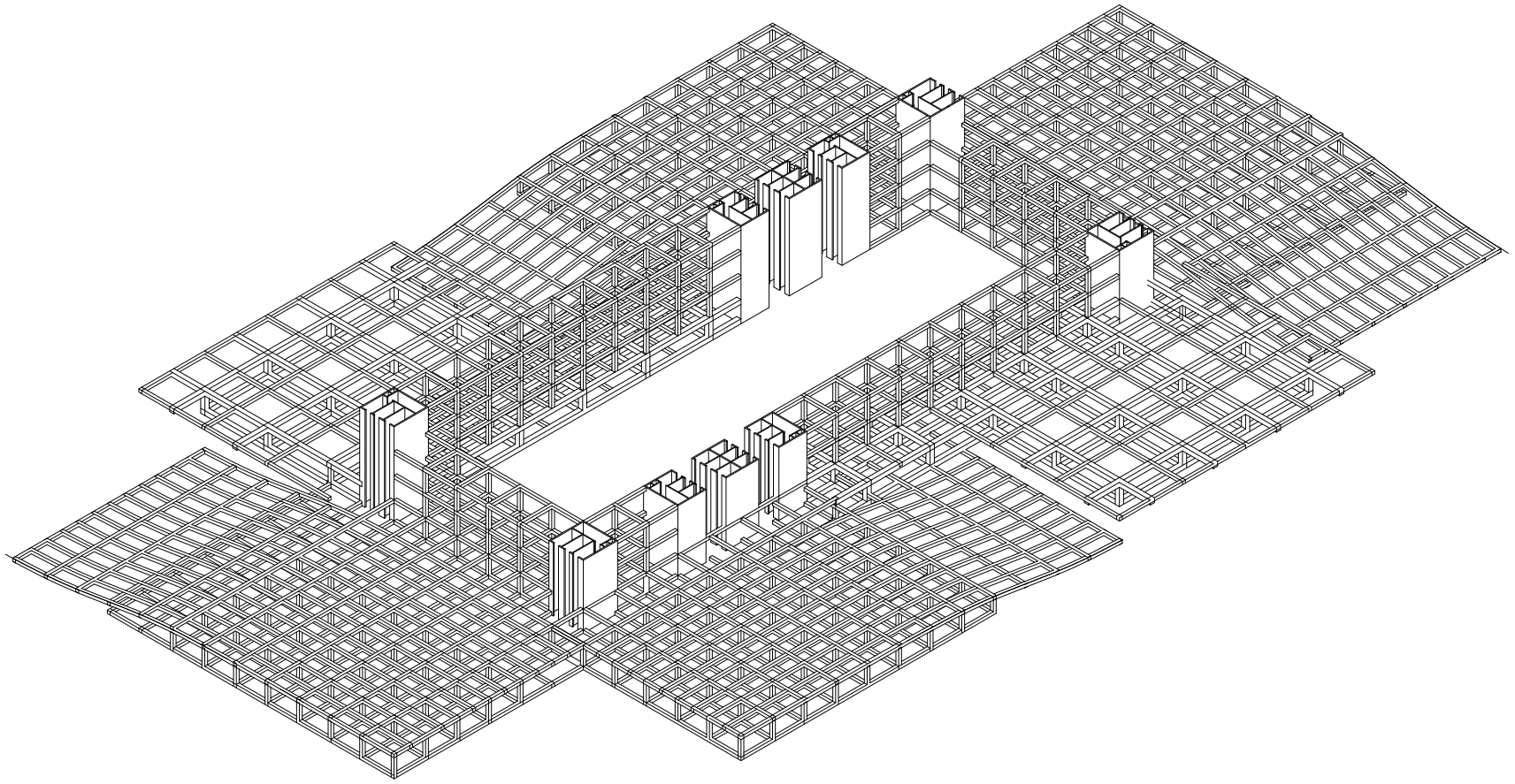

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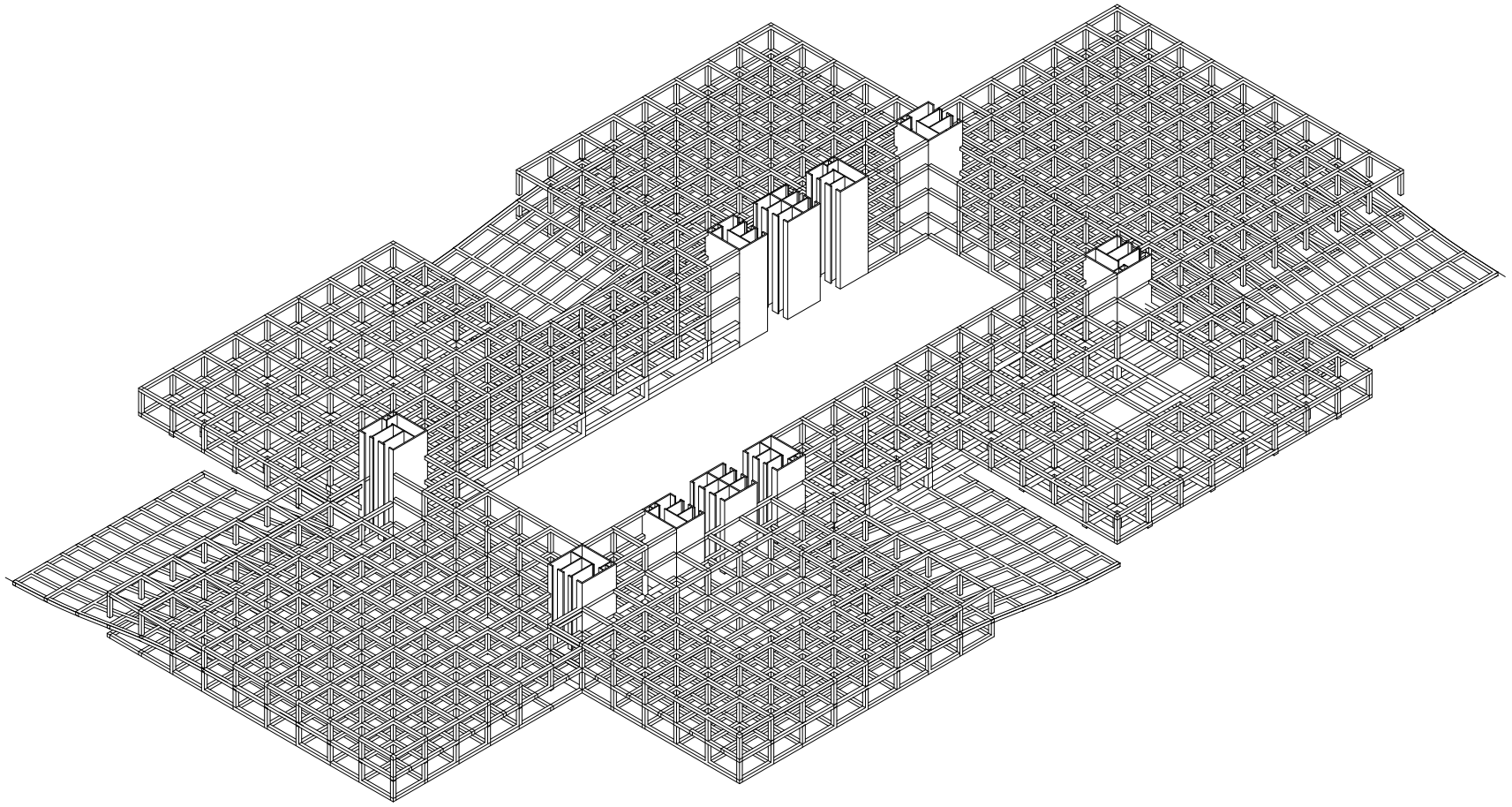
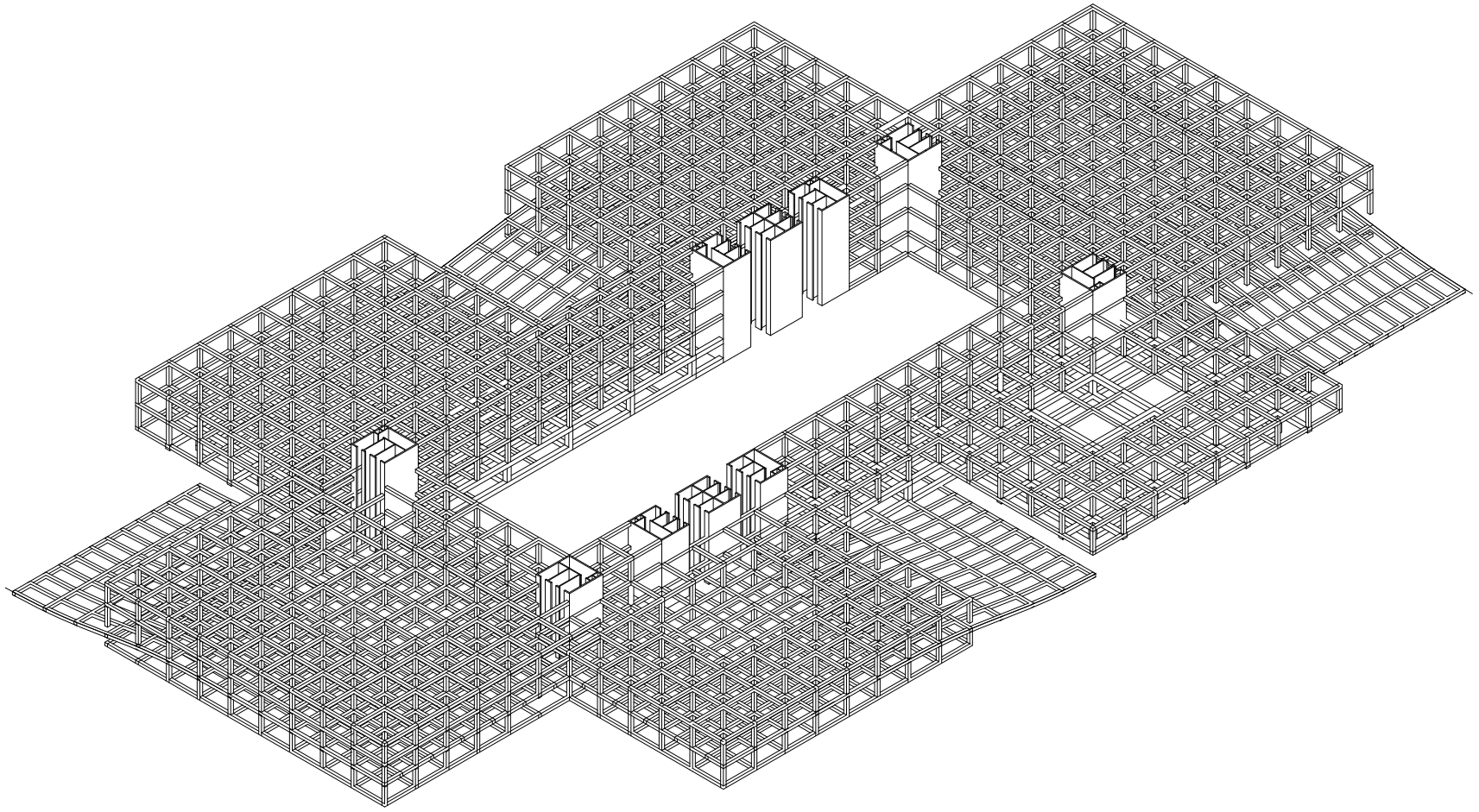
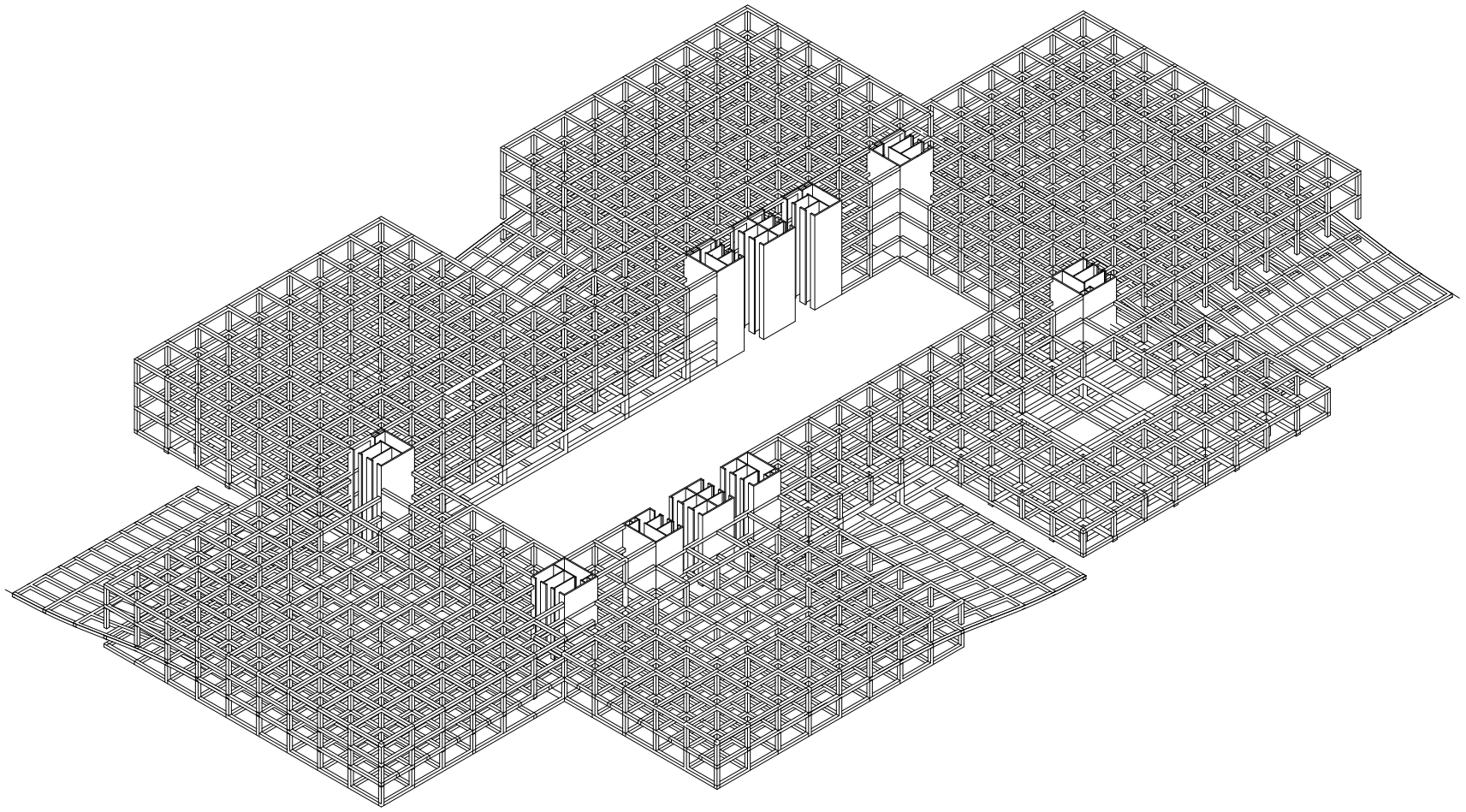


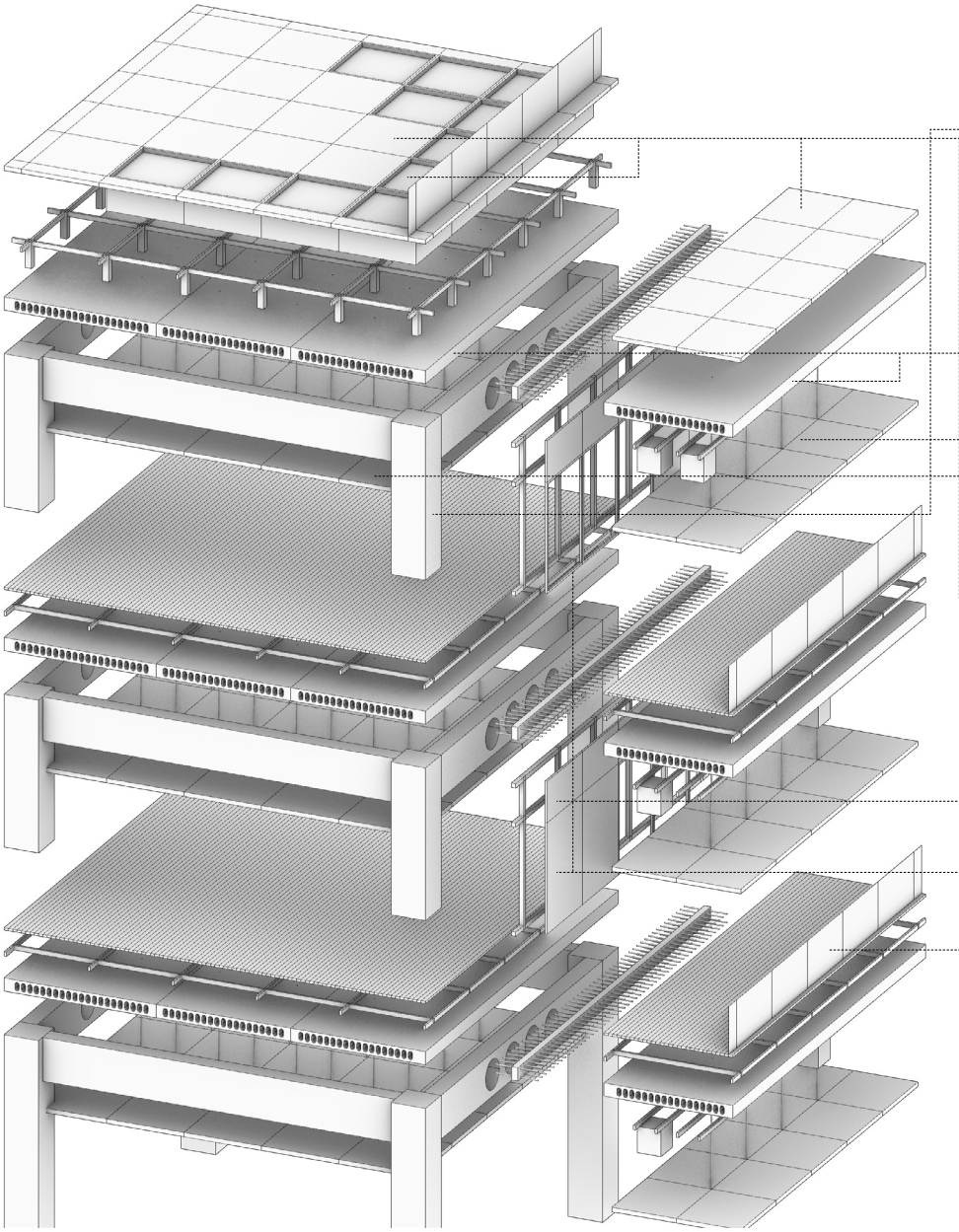
STRUCTURE



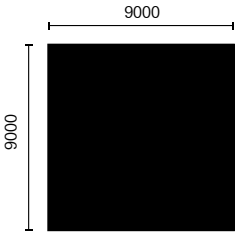
STRUCTURE



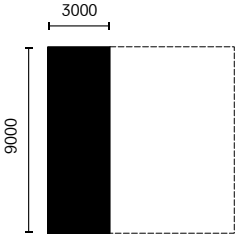
FLEXIBILITY



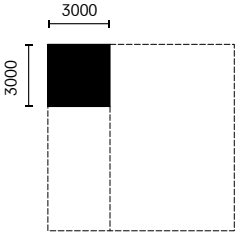
Grids



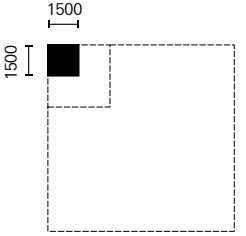
Prefabricated-
concrete slabs



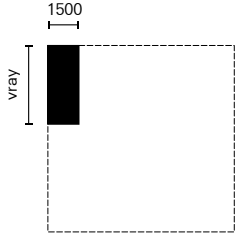
Roof panels
Roof planters
Facade metal plates
Acoustic plasterboard
Gypsum board



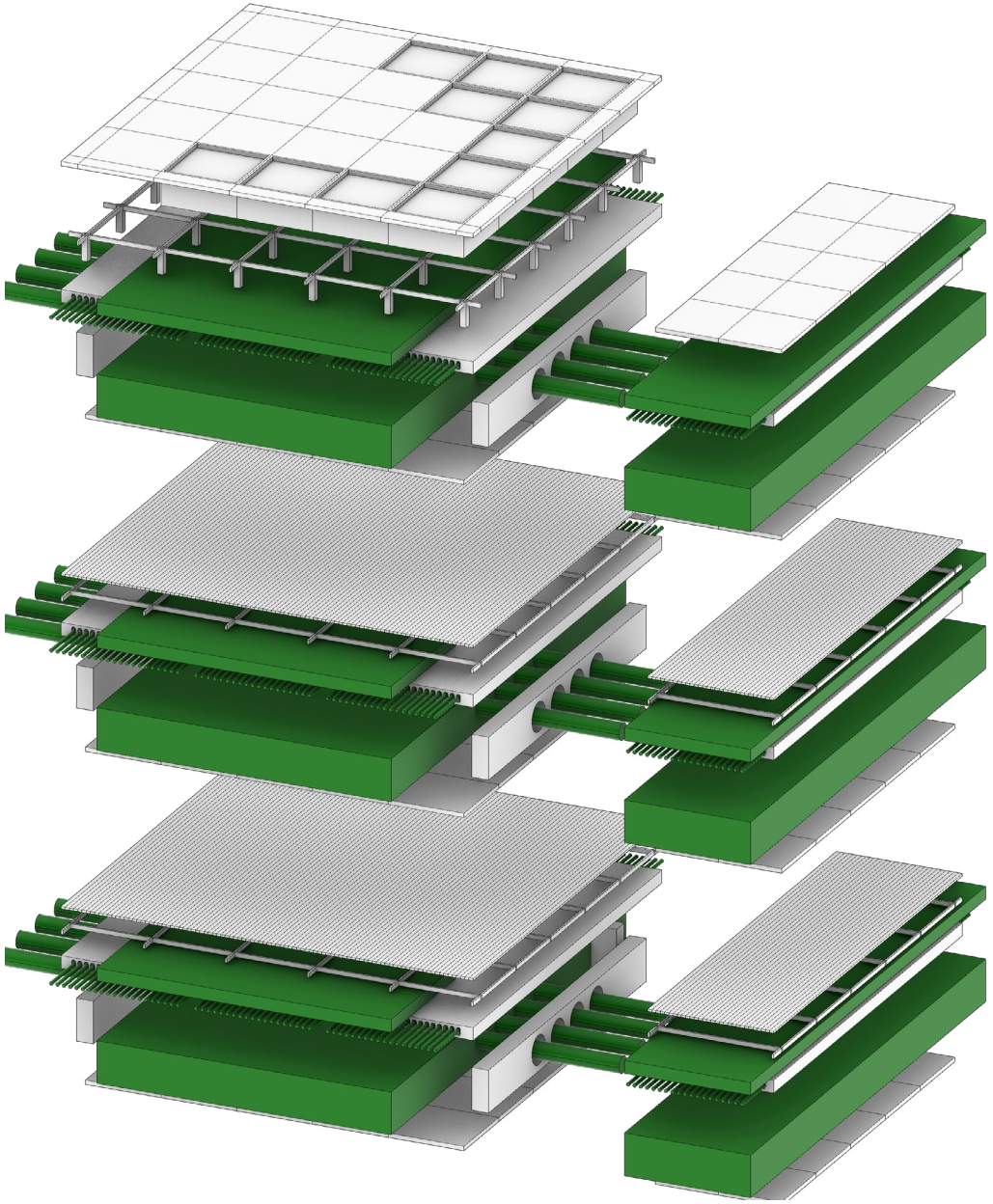
Metal plates
Automatic metal gates



Metal plates
Facade wood plates
Curtain wall
Doors
Glass handrail



FLEXIBILITY



Maintenance and extension

Power Systems

Water supply systems

Ventilation systems

Heating systems

...

Medical control systems

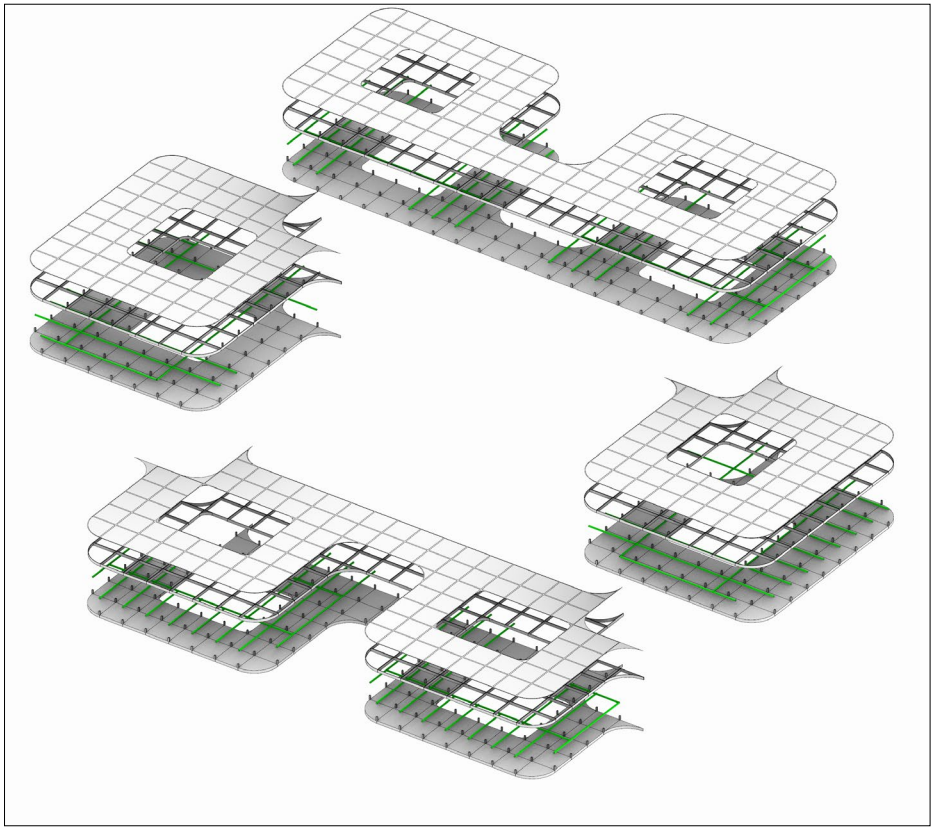
Oxygen supply systems

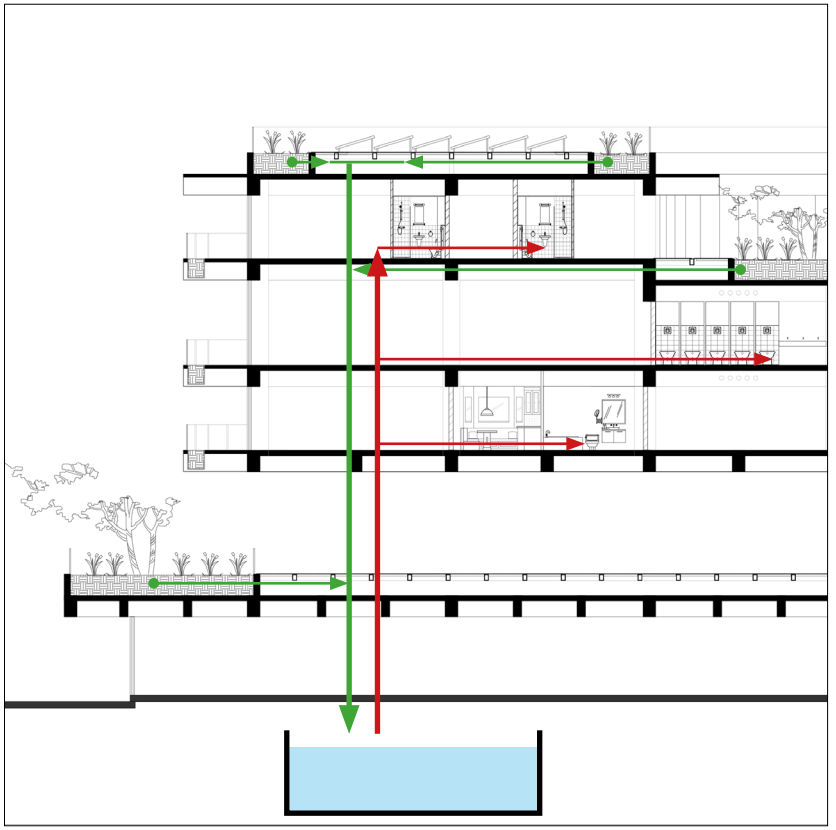
Logistics systems

...

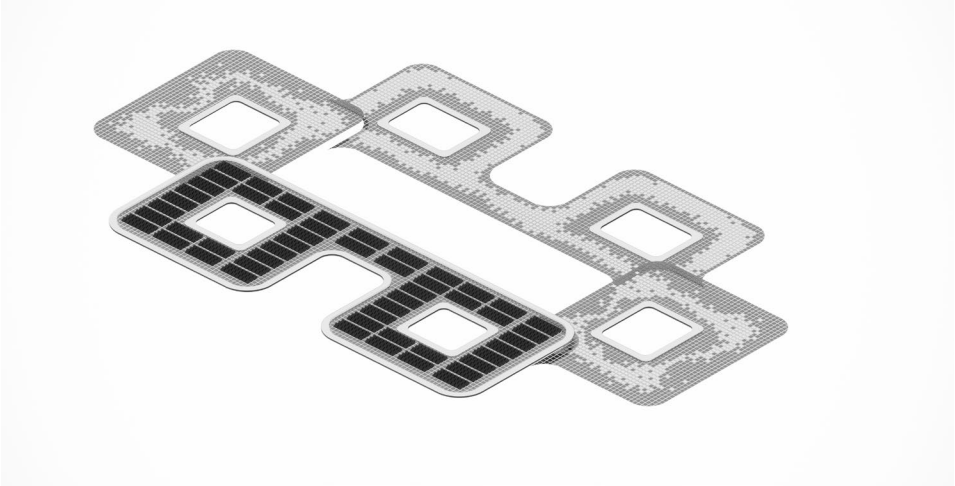
RAINWATER RECYCLING

Per year: 24,300 m^2 x 0.6 m = 14,580 m^2





ENERGY



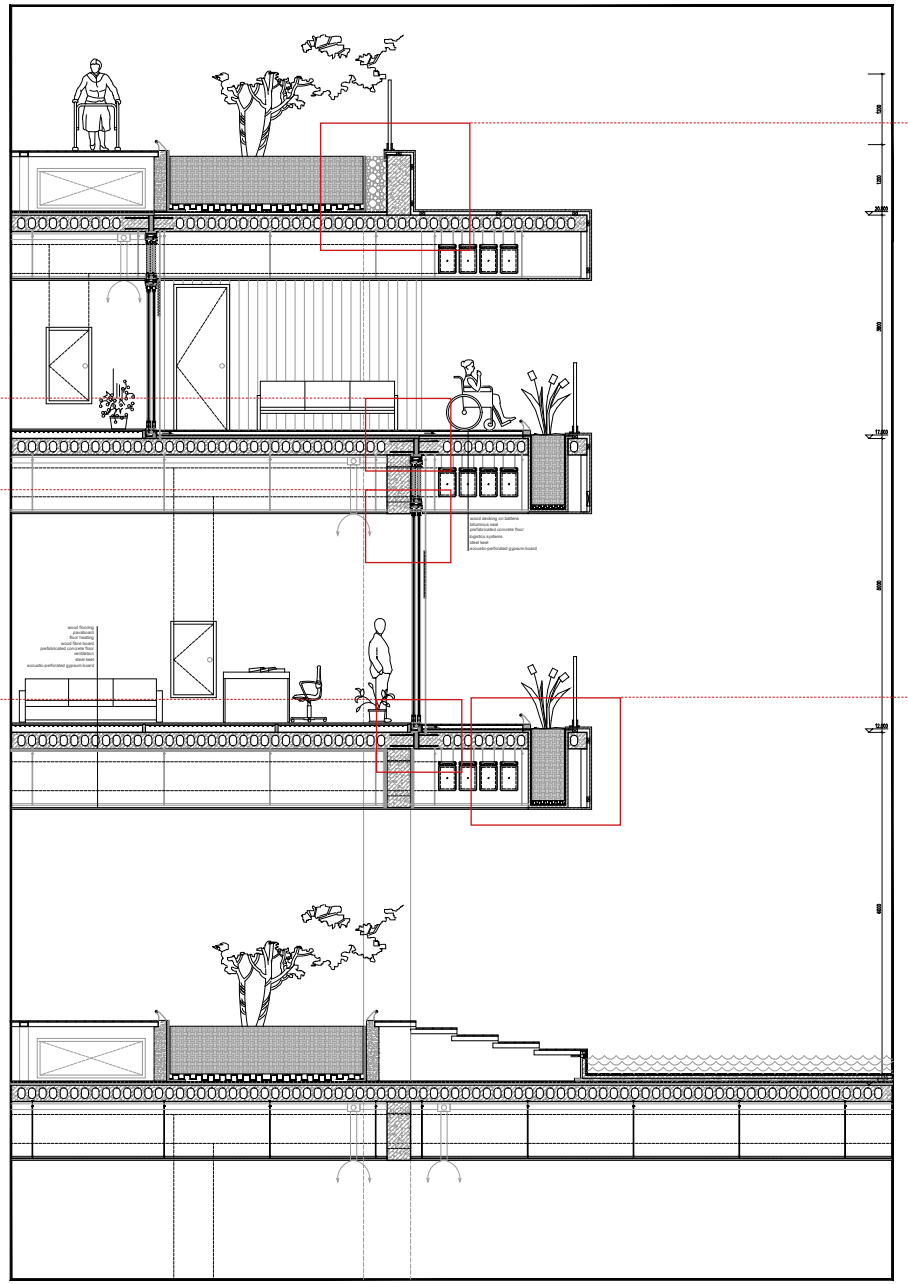
Per year:

CO_2: 15,600 x 7.3 = 113,880 kg

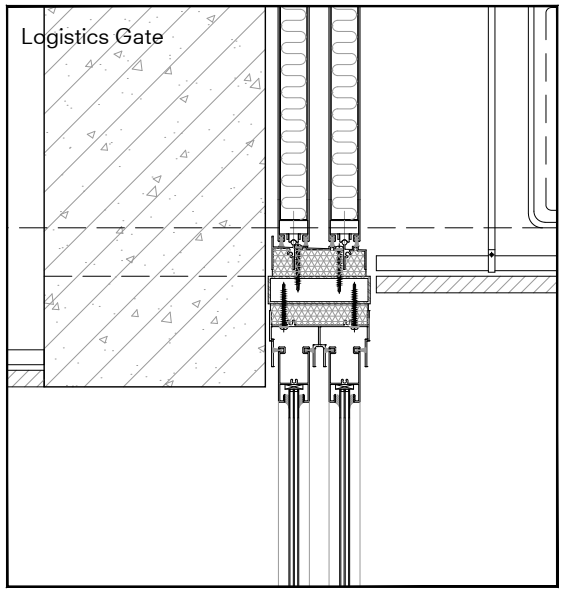
$O_{2:}$: 15,600 x 5.5 = 85,800 kg

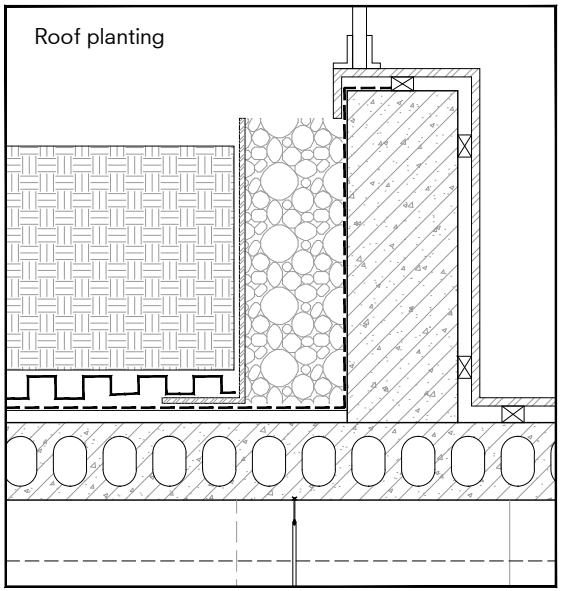
Power: 5,800 x 280 = 1,624,000 kWh

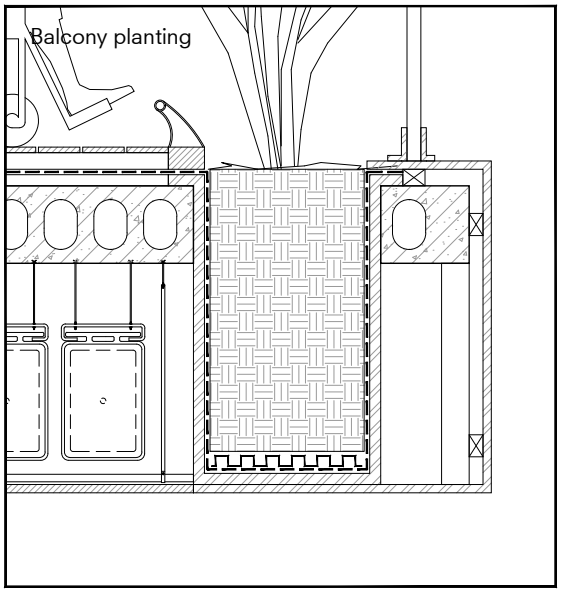
SECTION FRAGMENT

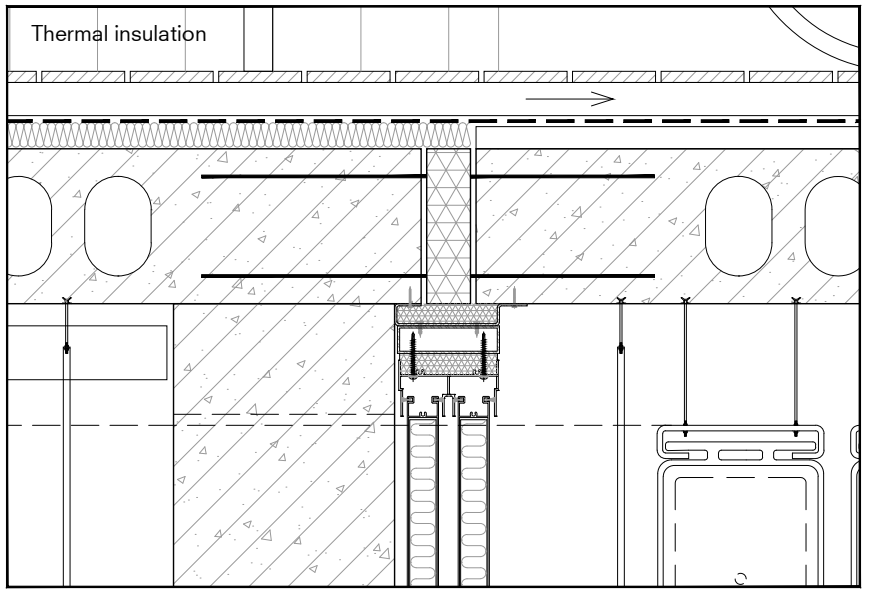


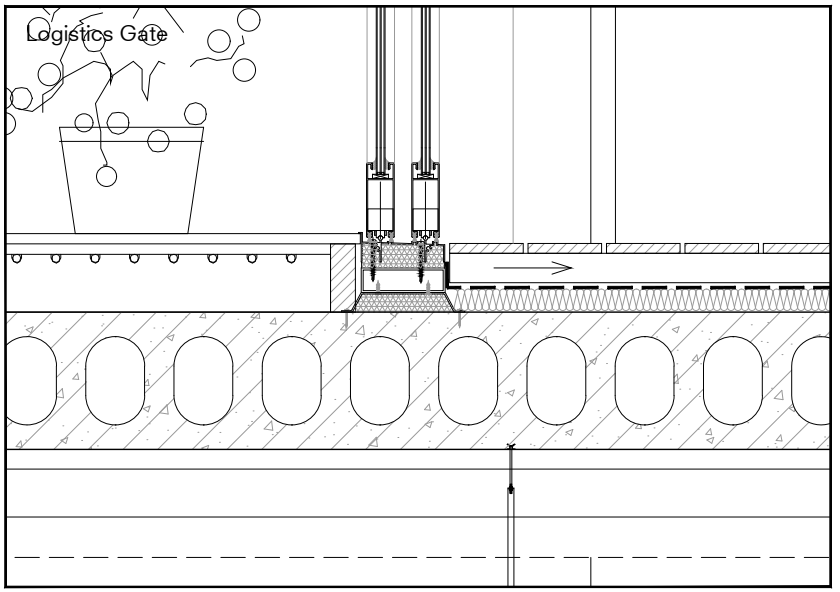
1:20 SECTION


Logistics Gate

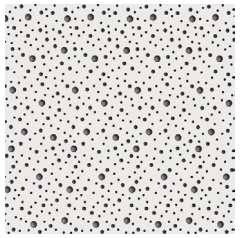
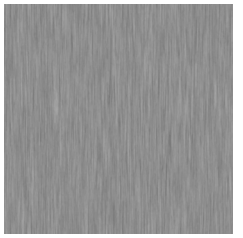
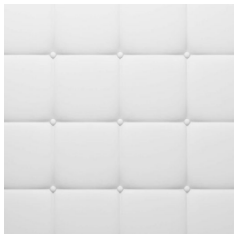
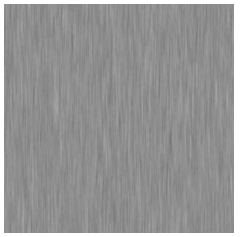

Roof planting


Balcony planting


Thermal insulation


Logistics Gate

MATERIAL

	Interior			Outside		
Celling	 Acoustic plasterboard	Plasterboard		Wooden panel	 Metal panel	
wall	Wooden panel	Stone panel	 Soft organic material	Wooden panel	Glass	 Metal panel
Floor	Wooden panel	Stone panel	PVC	Wooden panel	Terrazzo	
Others	Curved skirting	Barrier-free handrails	Anti-impact rubber strips	Plastic		

OVERVIEW

THANK YOU