



COMPLEX PROJECTS
GOOGLE CS FACULTY

Education Space of Fluidity

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July/07/2023

**The
university
is
now on air,**



**broadcasting
modern
architecture**

The
university
is
now on air,



broadly
modern
architect

**Do we really need a physical campus for
higher education?**

Introduction
BACKGROUND



UNIVERSITY

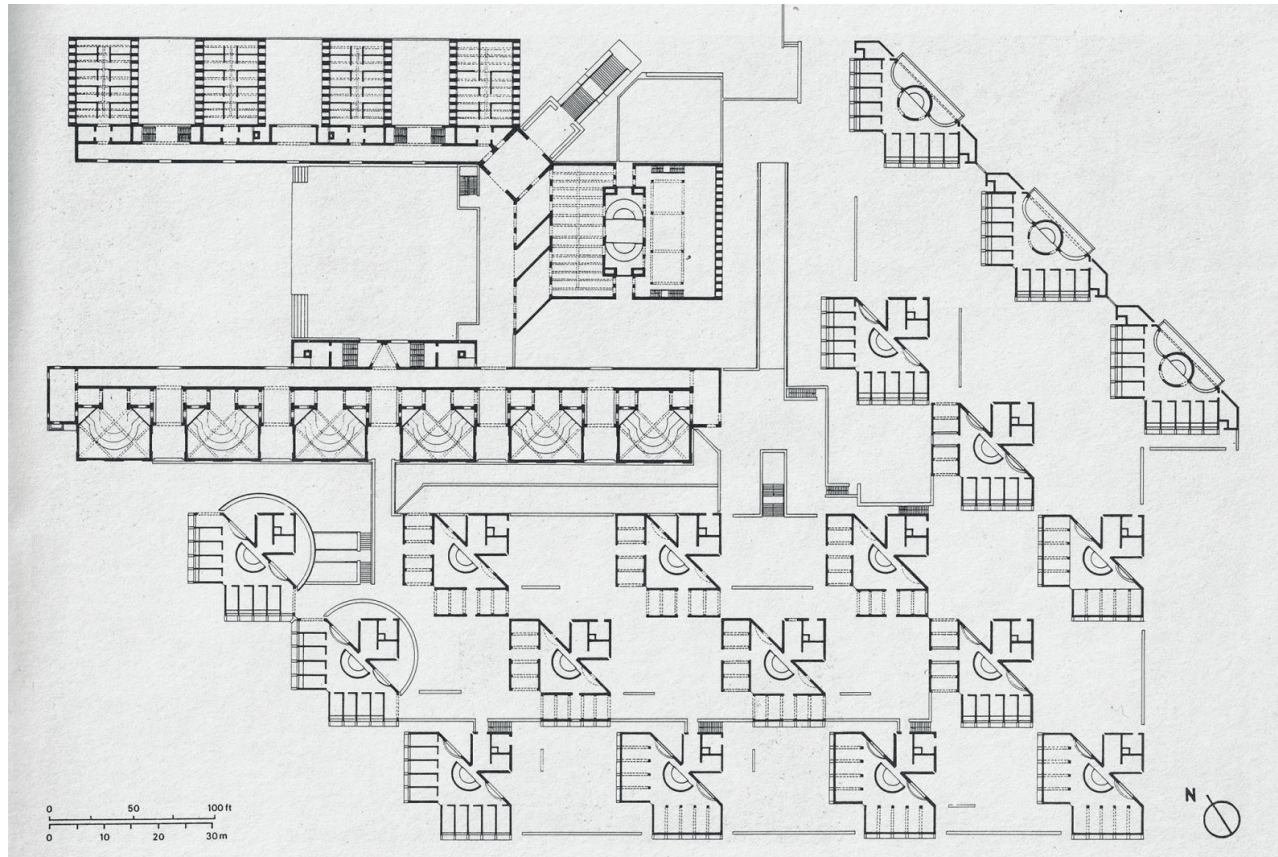
A high-level educational institution in which students study for degrees and academic research is done.

UNIVERSITY IN THE AGRARIAN ERA



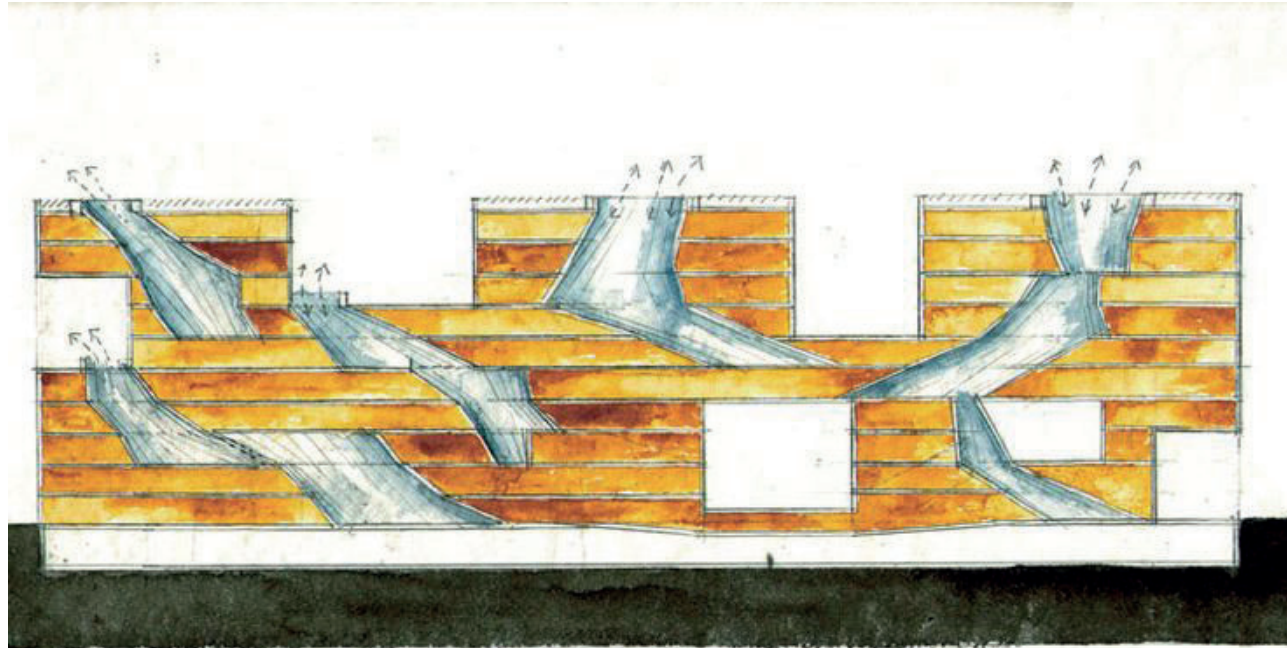
Merton College, University of Oxford from David Loggan's Oxonia Illustrate (1675)

UNIVERSITY IN THE INDUSTRIAL ERA



Louis Kahn and others: Site plan of Indian Institute of Management , 1962-1974

UNIVERSITY IN THE INFORMATION ERA



M.I.T. 2001 (Porosity) SPONGE

LIGHT & AIR VENTILATION: (AIR DRAWN UP THROUGH MAIN 'LUNGS' VIA SLOW RPM FANS OPERATED BY ROOF TOP PHOTOVOLTAIC CELLS)

Gallery of Simmons Hall at MIT/ Steven Holl. Diagram - Section

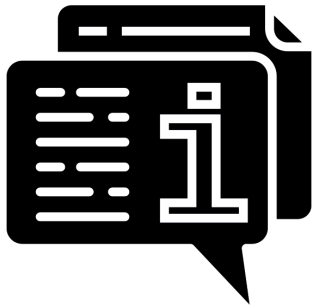
Introduction

CLIENT



Louis Kahn and Jonas Salk

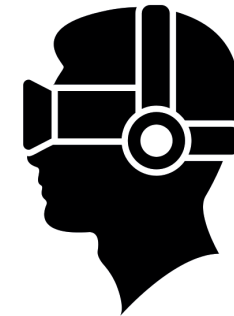
Introduction
NEW QUESTION



Informatization

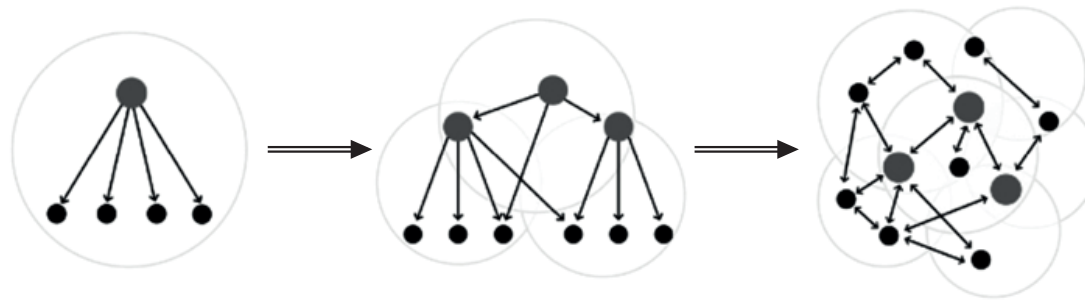


Interactivity



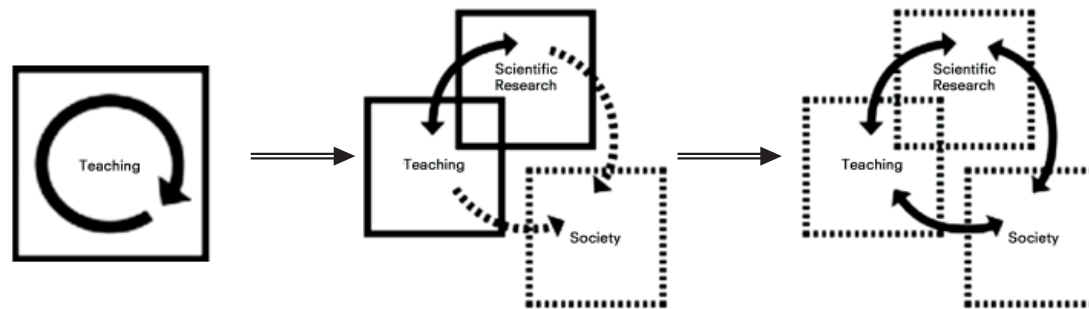
New Technology

EVOLUTION IN TEACHING & LEARNING



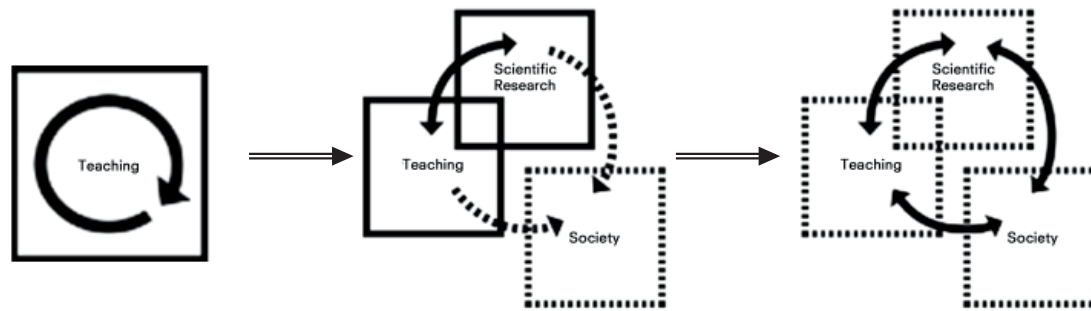
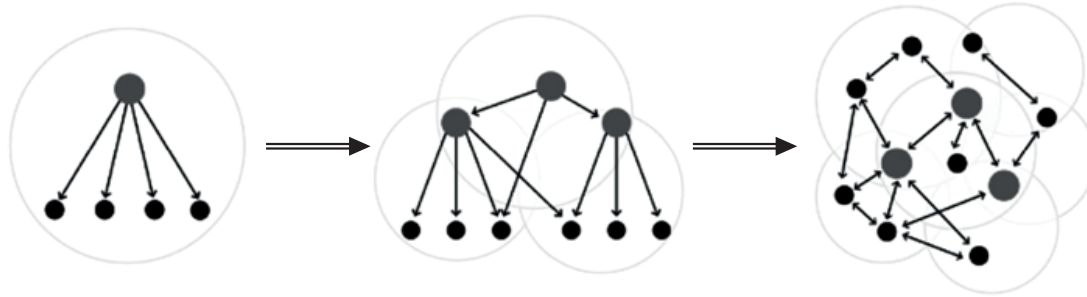
With the development of information technology, **students' access to knowledge become far richer than before**: it may be a group of random events, a discussion audience, a teaching project, and a special research.

A NEW EDUCATIONAL ECOLOGY



At this time, education will present a new ecology that can be learned everywhere and all the time. The physical **boundaries** of peer communication, work, and learning become **blurred** or even disappear completely. **Students can learn everywhere and all the time...**The fluidity of educational space arises at a historic moment.

Introduction "FLUIDITY"

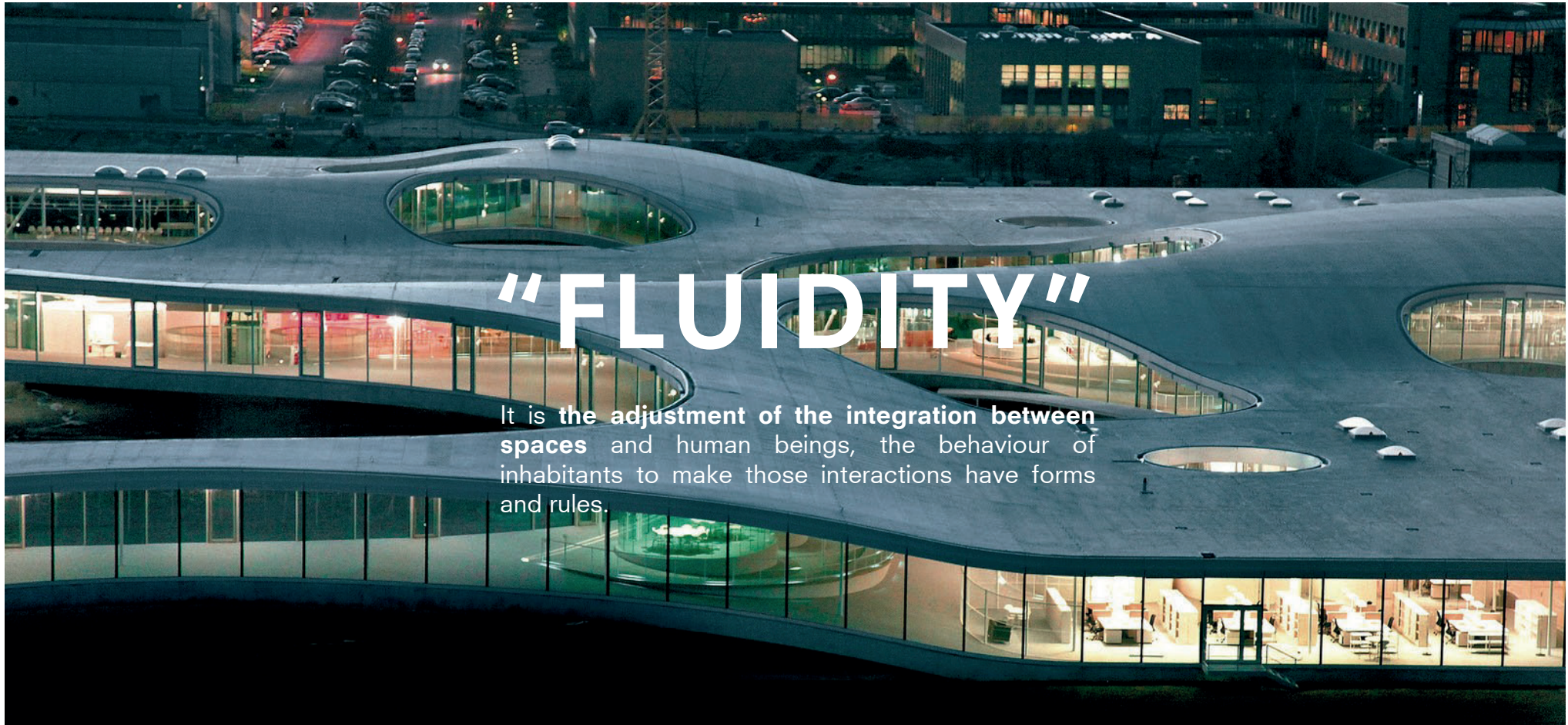


Homogeneity

Connection

Cohered to a meaning domain

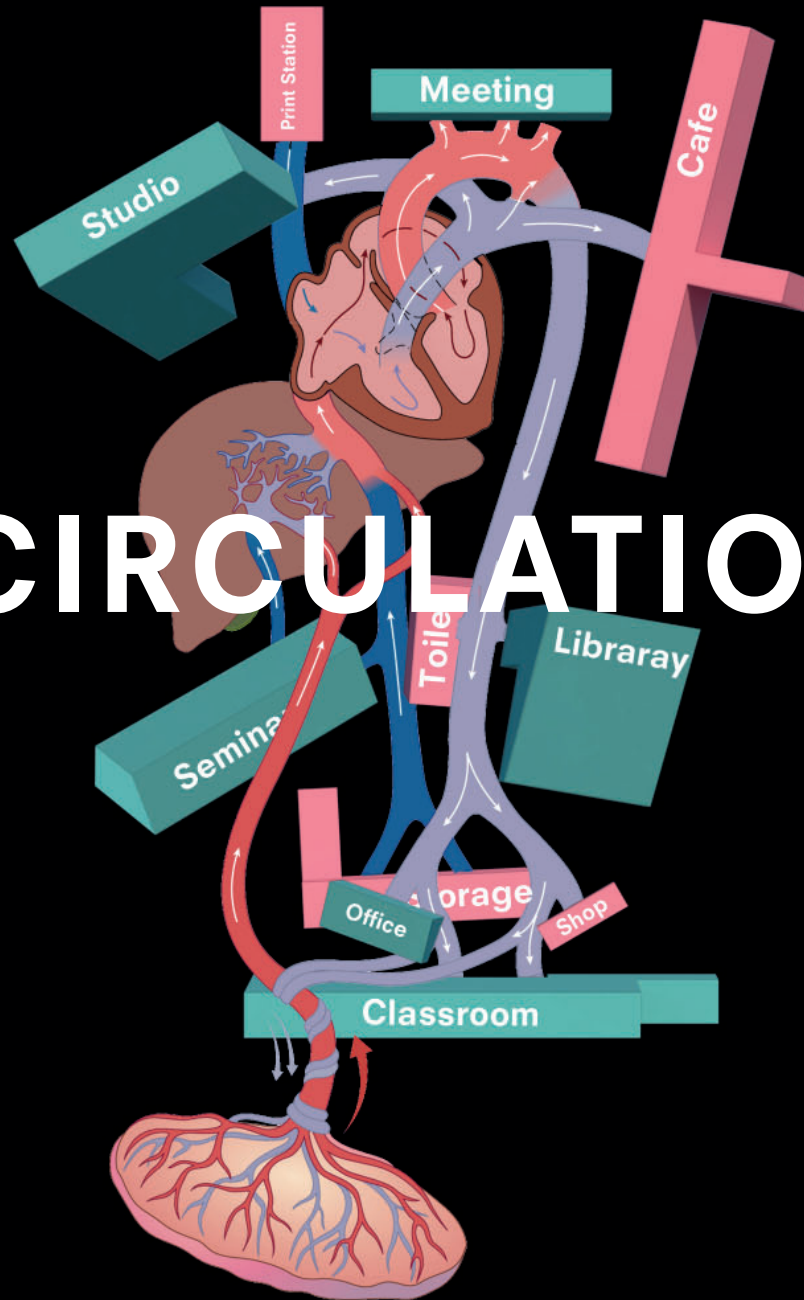
Introduction
DEFINITION



"FLUIDITY"

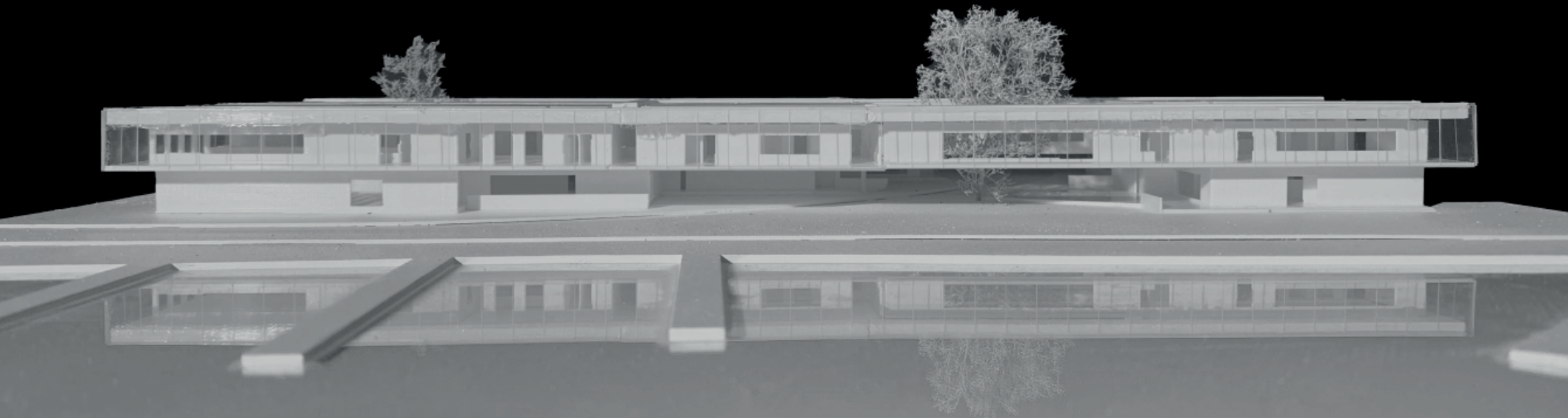
It is the **adjustment of the integration between spaces** and human beings, the behaviour of inhabitants to make those interactions have forms and rules.

CIRCULATION





What's the role of the circulation in creating the fluidity of university buildings for a better learning experience?

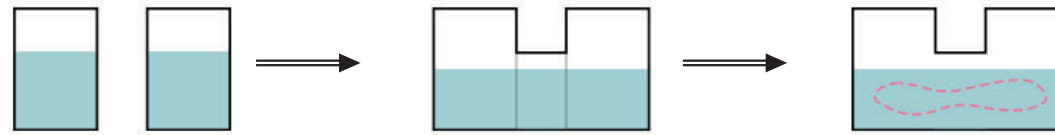


**School of Computer Science for Google University in
Treptower Park, Berlin**

DESIGN BRIEF

Client

GOOGLE: FLUIDITY ON SEARCH ENGINE



Homogeneity

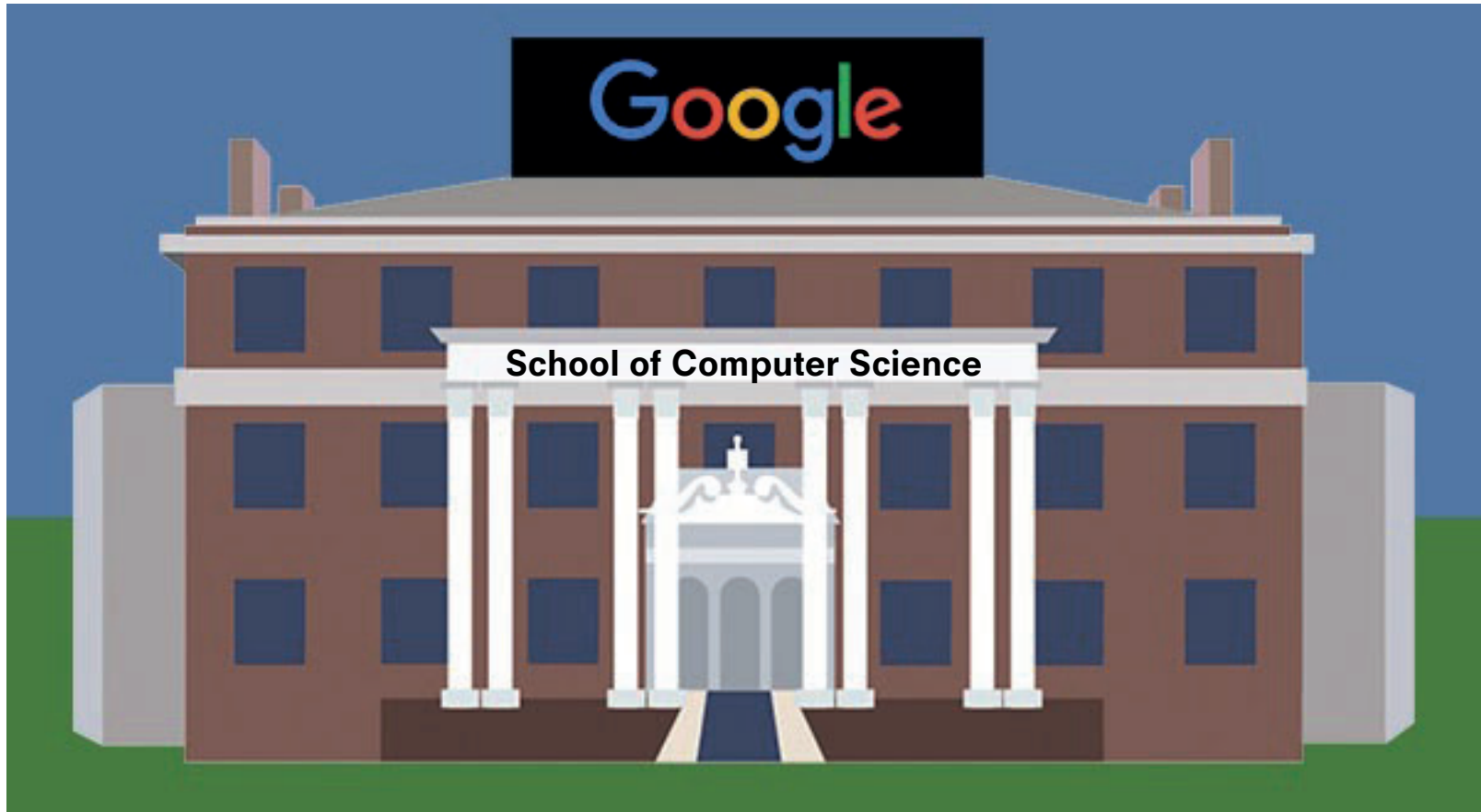
Connection

Cohered to a meaning domain



Client

NEXT STEP: A REAL GOOGLE SCHOOL



3 programs, including project management, data analysis, UX design, 100k+ needs-based scholarships on offer, 130+ corporate partners ready to hire graduates

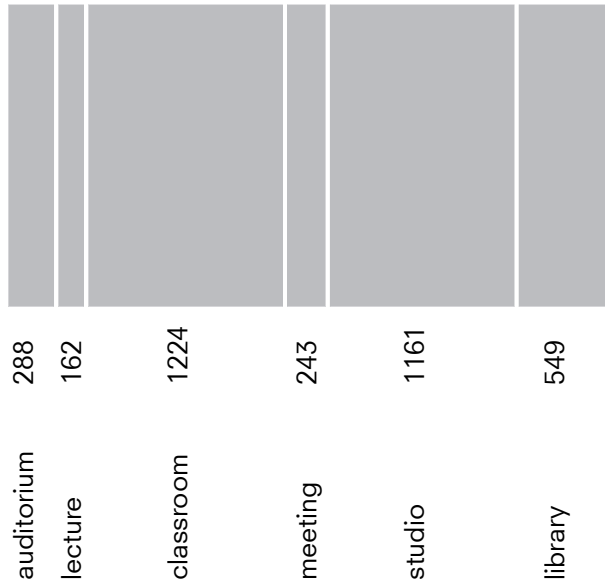
Google's **School of Computer Science** is loading...



Google University

FUNCTION PROGRAM PROPORTION

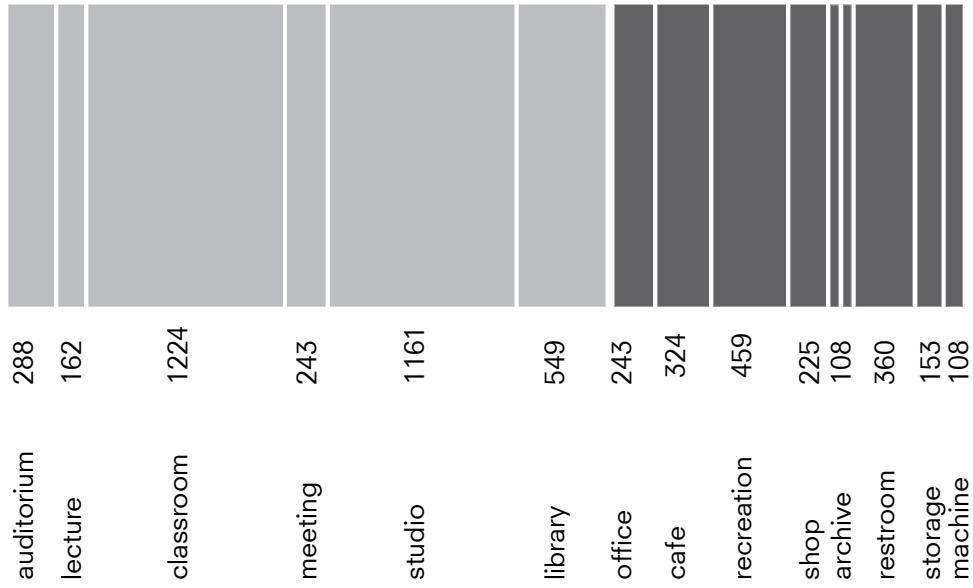
Teaching & Learning
3870 sqm



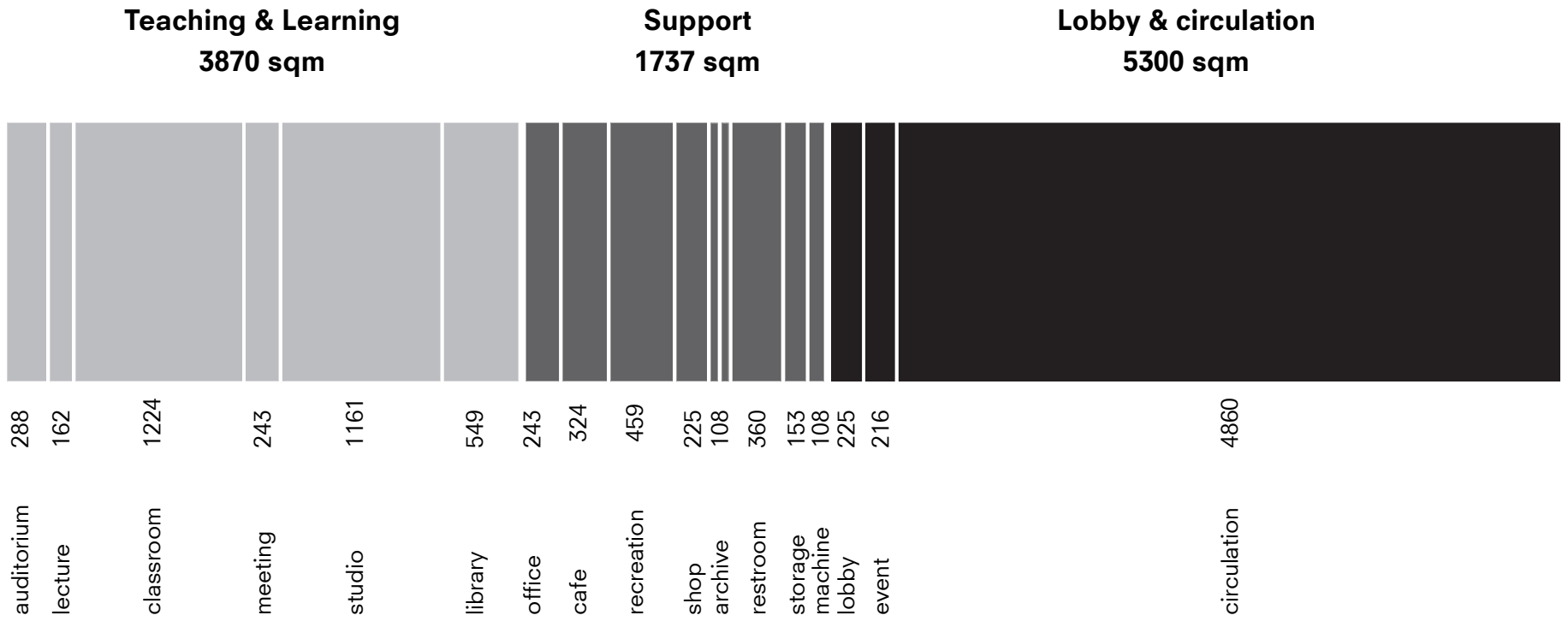
FUNCTION PROGRAM PROPORTION

Teaching & Learning
3870 sqm

Support
1737 sqm

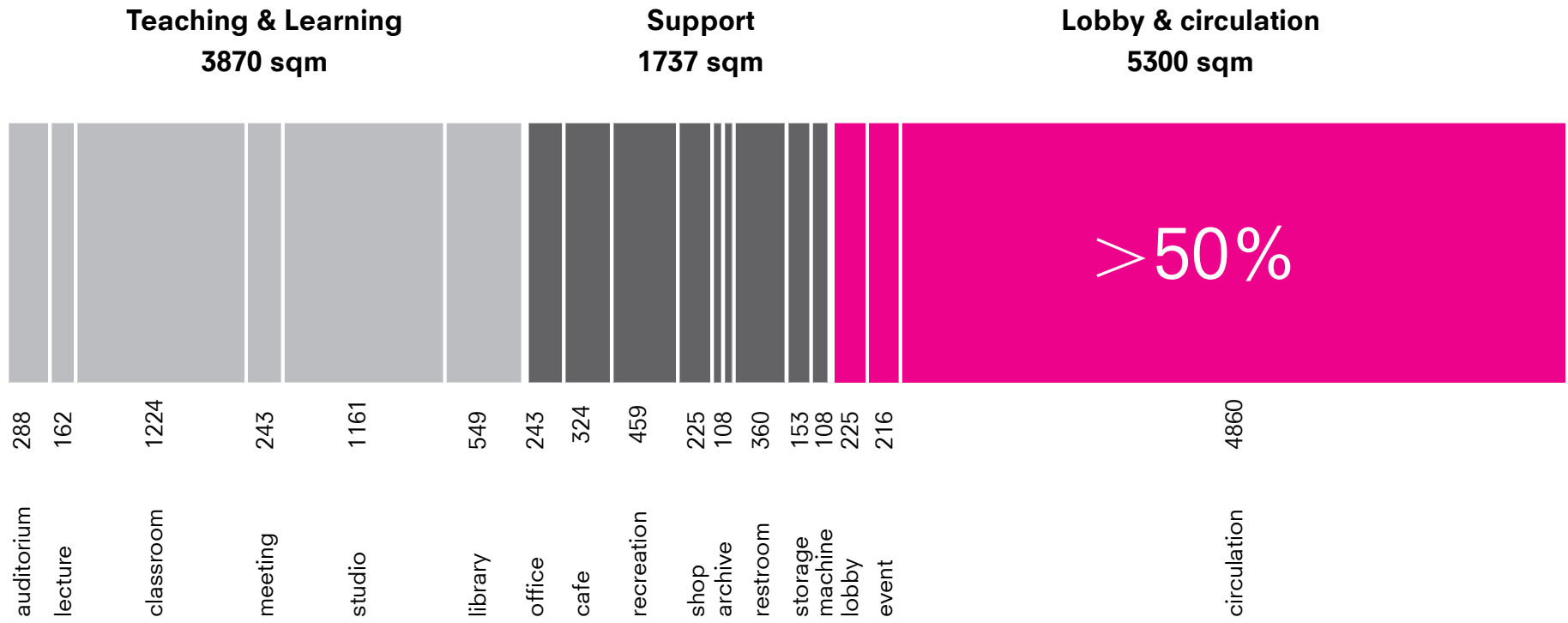


FUNCTION PROGRAM PROPORTION

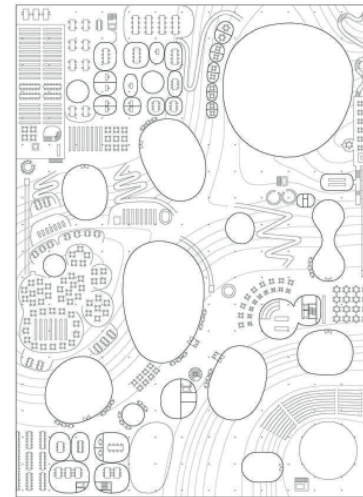
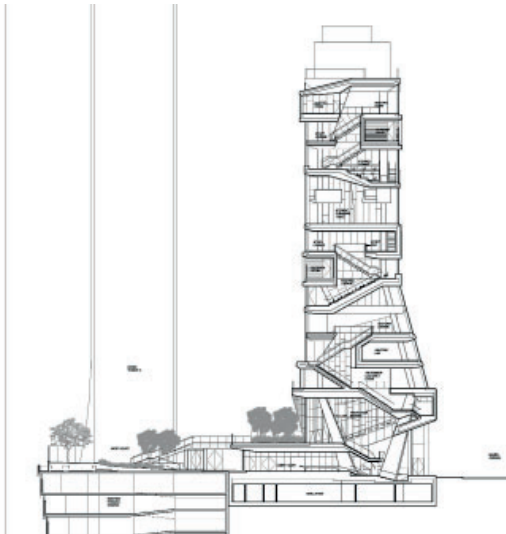
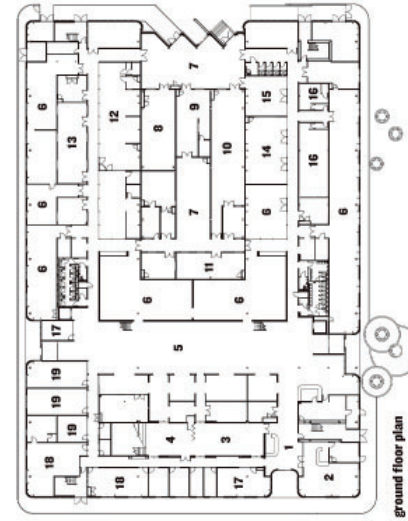
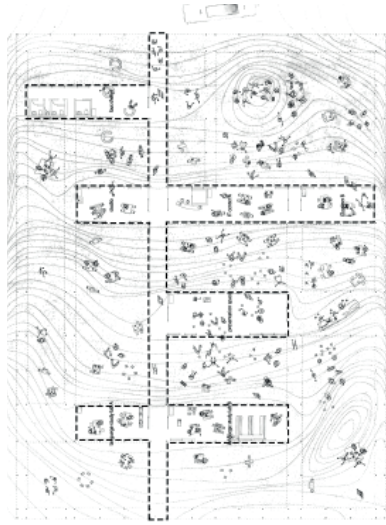


Program

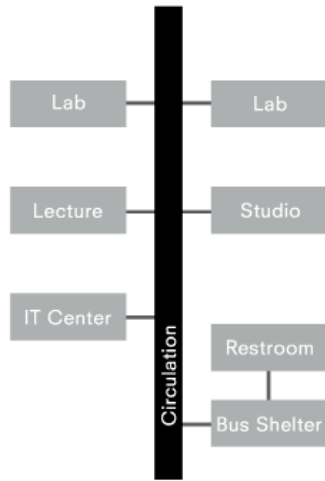
CIRCULATION PROPORTION



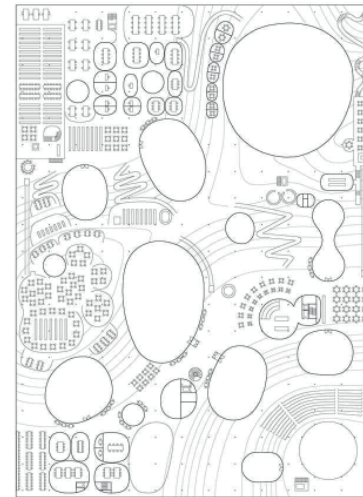
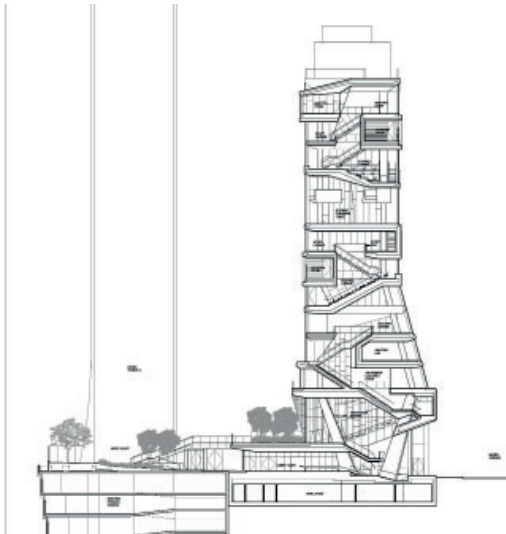
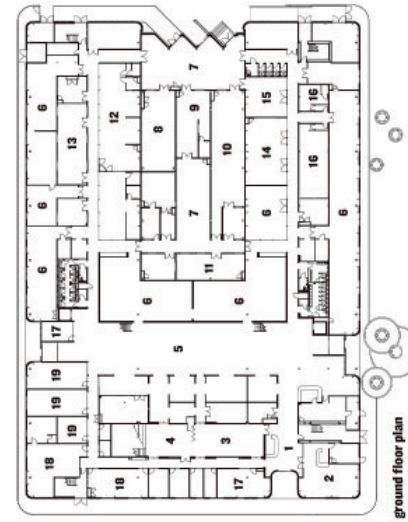
REFERENCES ON EDUCATIONAL BUILDINGS



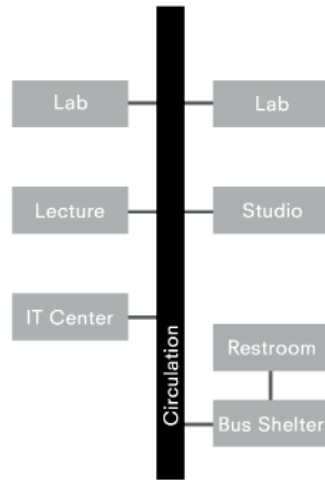
SPATIAL PROTOTYPES OF CIRCULATION ORGANIZATION



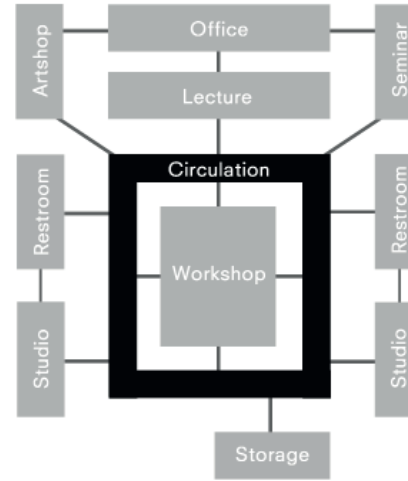
Fish Bone



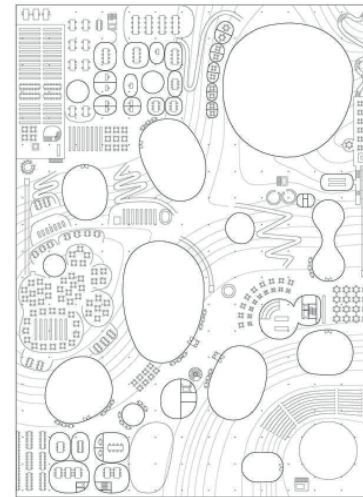
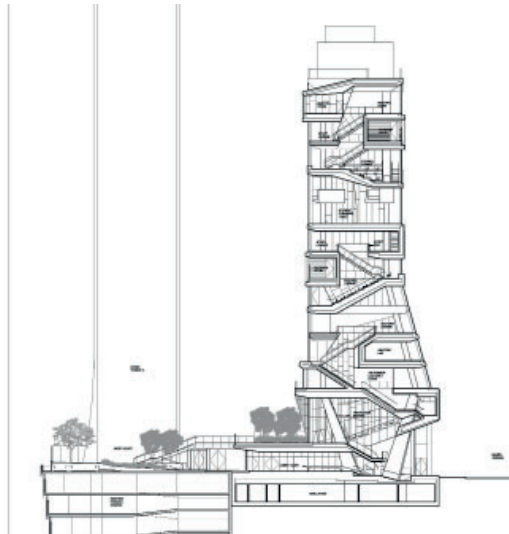
SPATIAL PROTOTYPES OF CIRCULATION ORGANIZATION



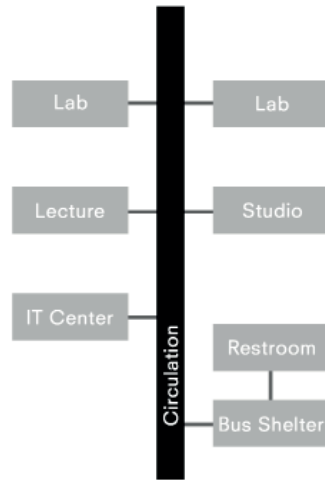
Fish Bone



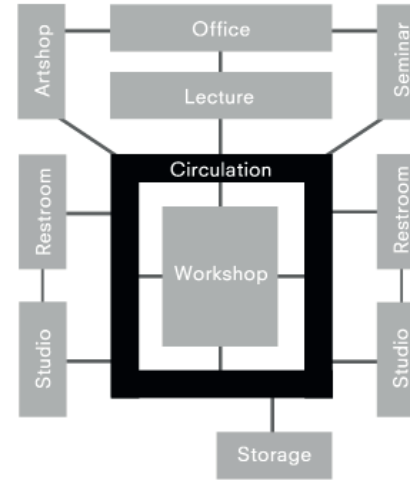
Donut



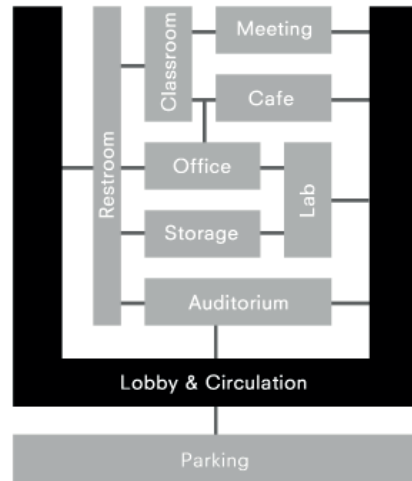
SPATIAL PROTOTYPES OF CIRCULATION ORGANIZATION



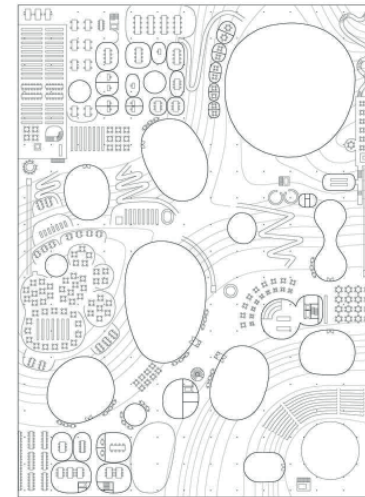
Fish Bone



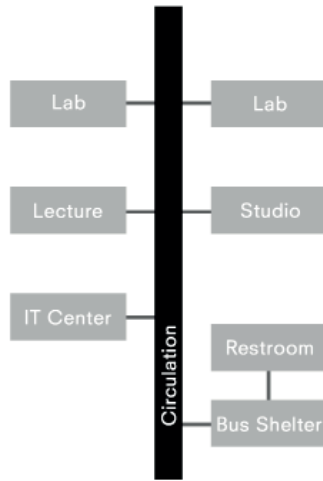
Donut



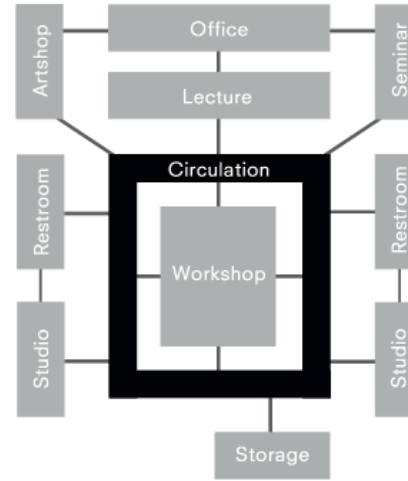
Wine Glass



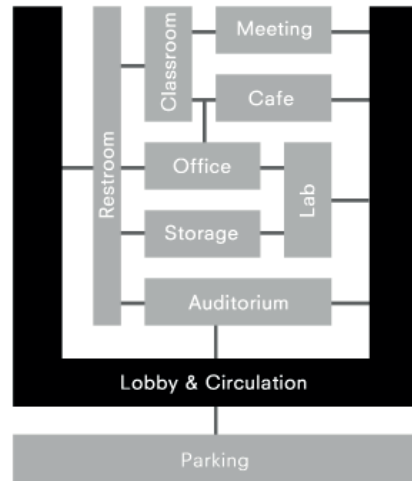
SPATIAL PROTOTYPES OF CIRCULATION ORGANIZATION



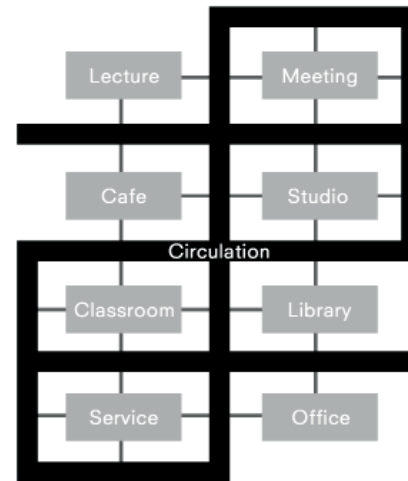
Fish Bone



Donut

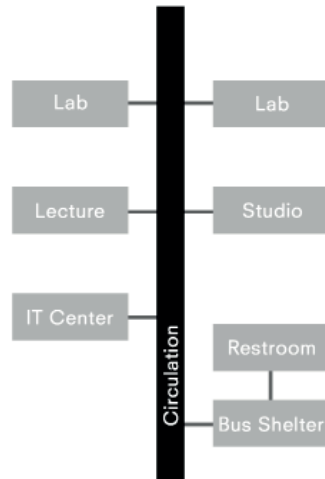


Wine Glass

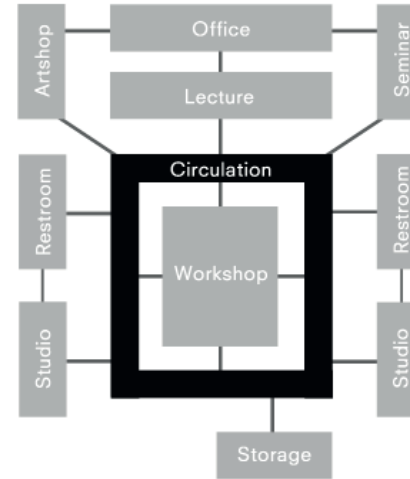


Net

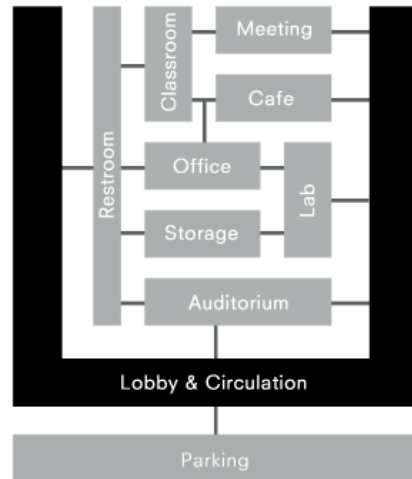
NET: OFFERS CONNECTIONS & PROVIDES OPPOTUNITIES



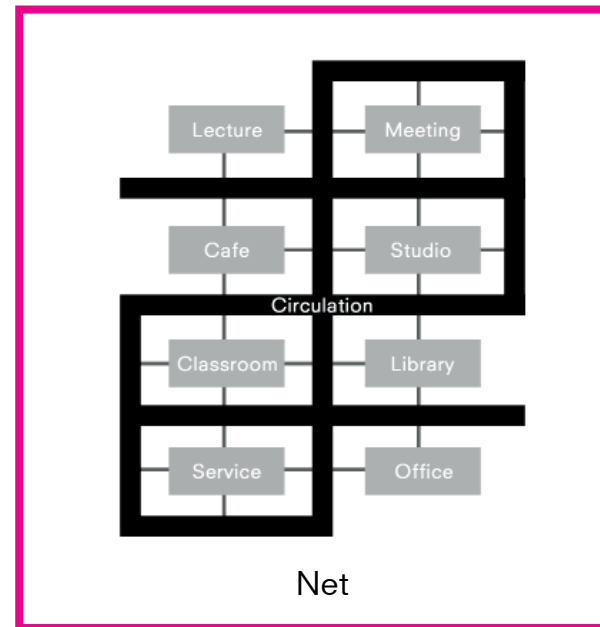
Fish Bone



Donut



Wine Glass



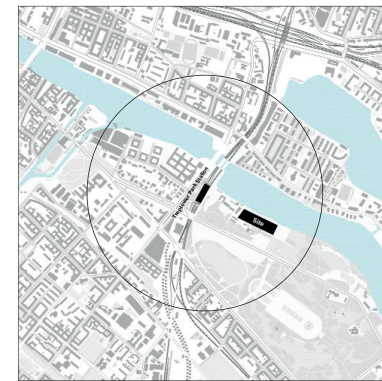
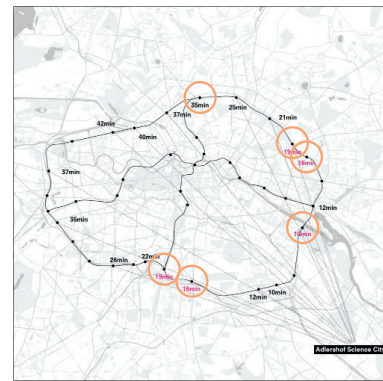
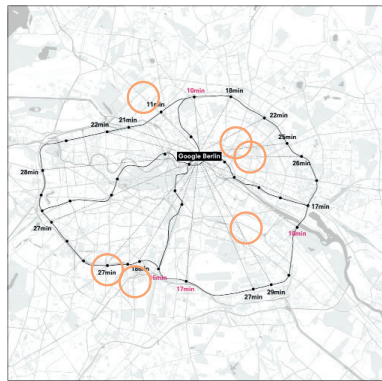
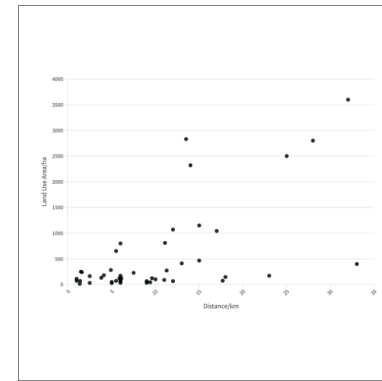
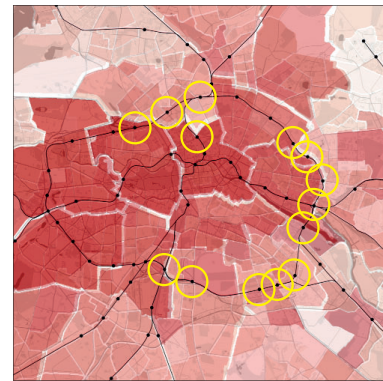
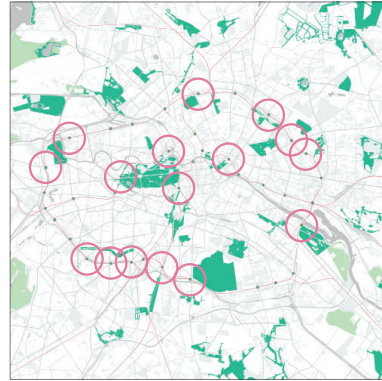
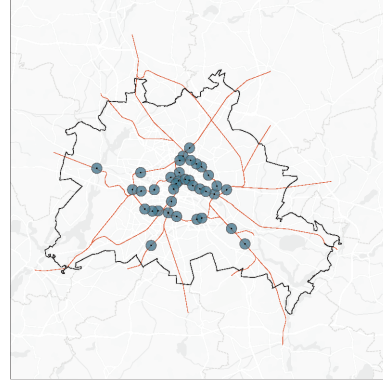
Net

Site
TREPTOWER PARK



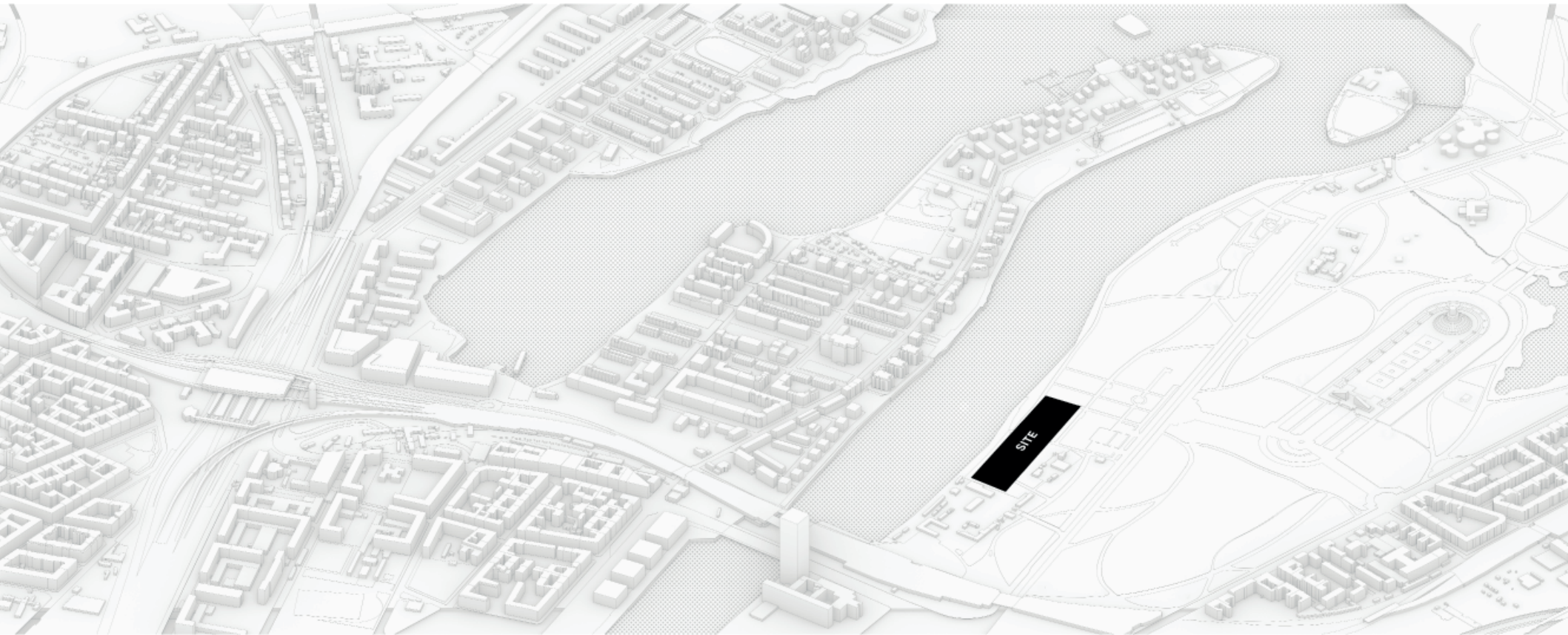
Site

SITE REQUIREMENTS OF MOBILITY, UNIVERSITY, GOOGLE



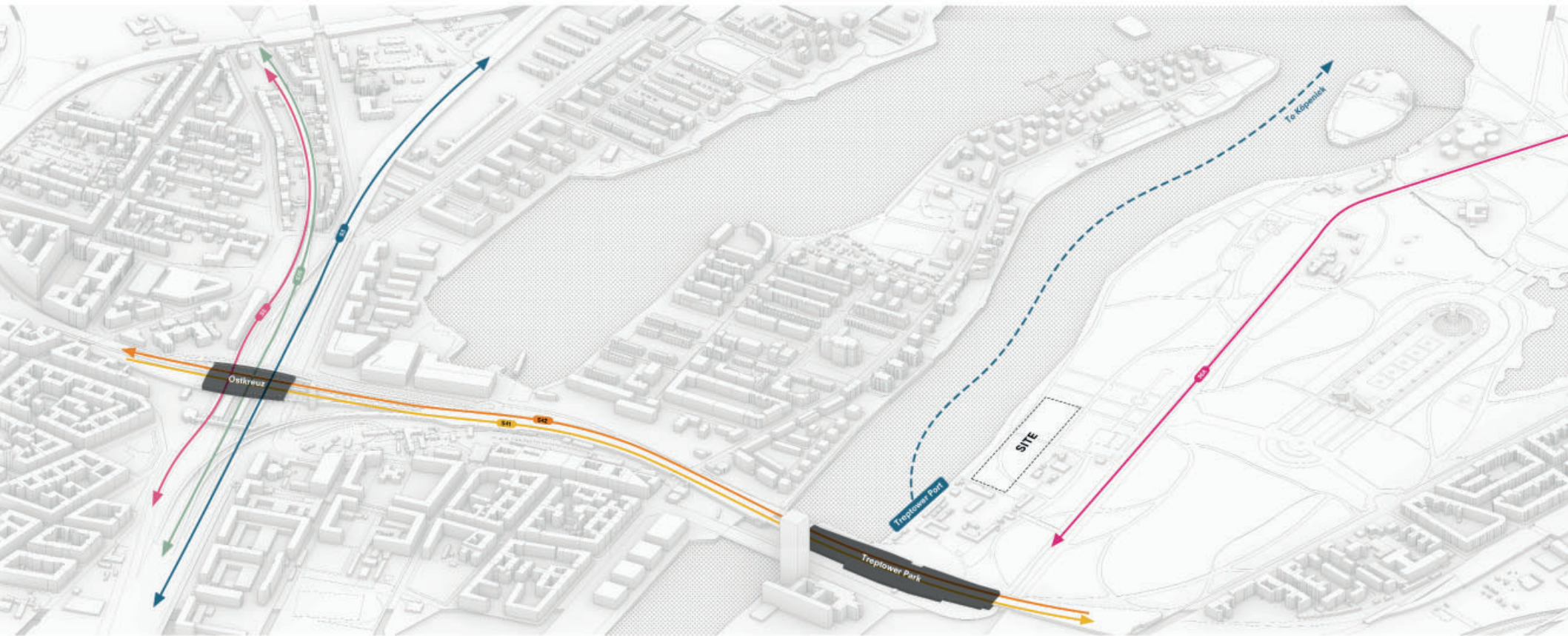
Site

LOCATION: SOUTH BANK OF SPREE, TREPTOWER PARK



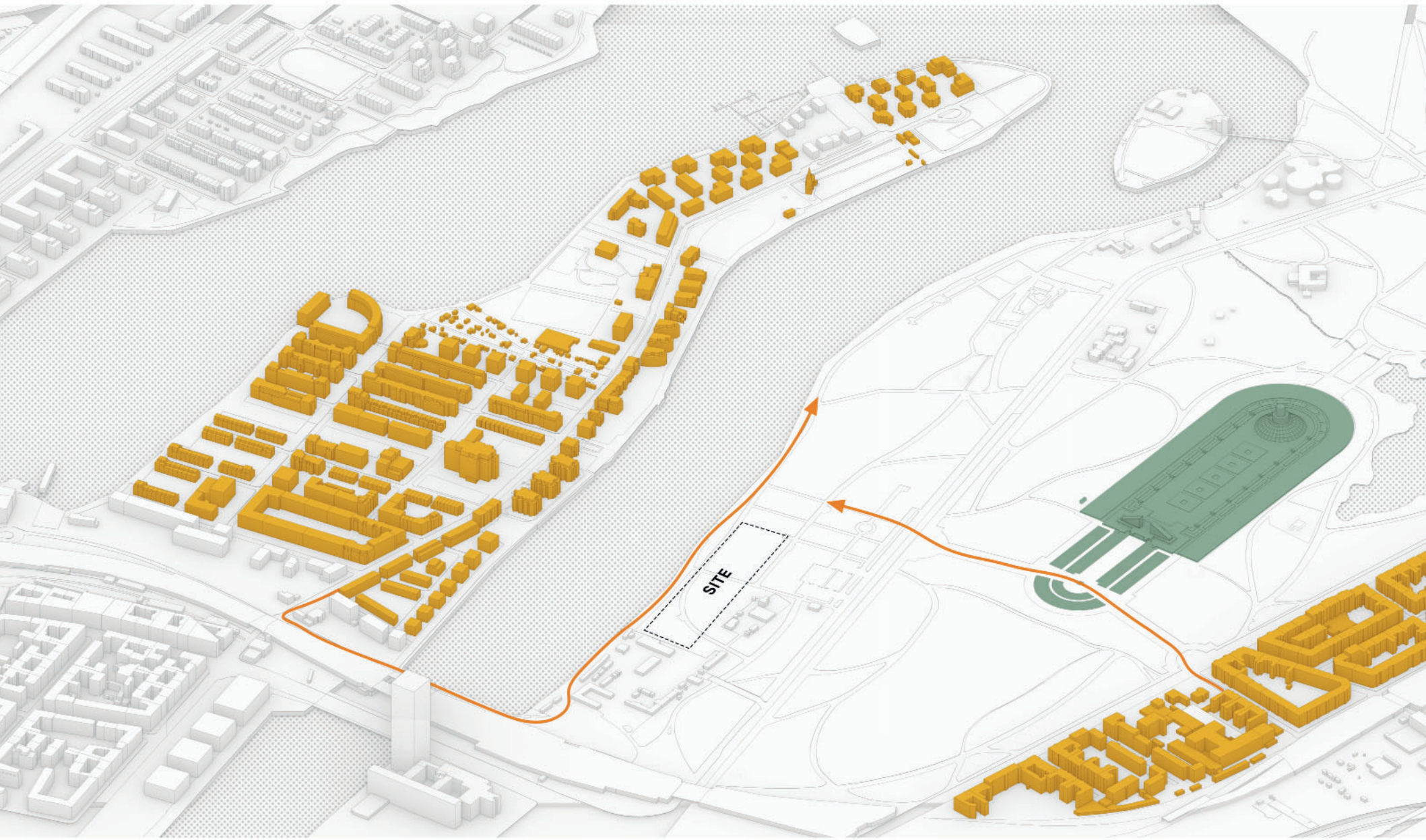
Site

MOBILITY: SURROUNDED BY DIFFERENT PUBLIC TRANSPORTATION

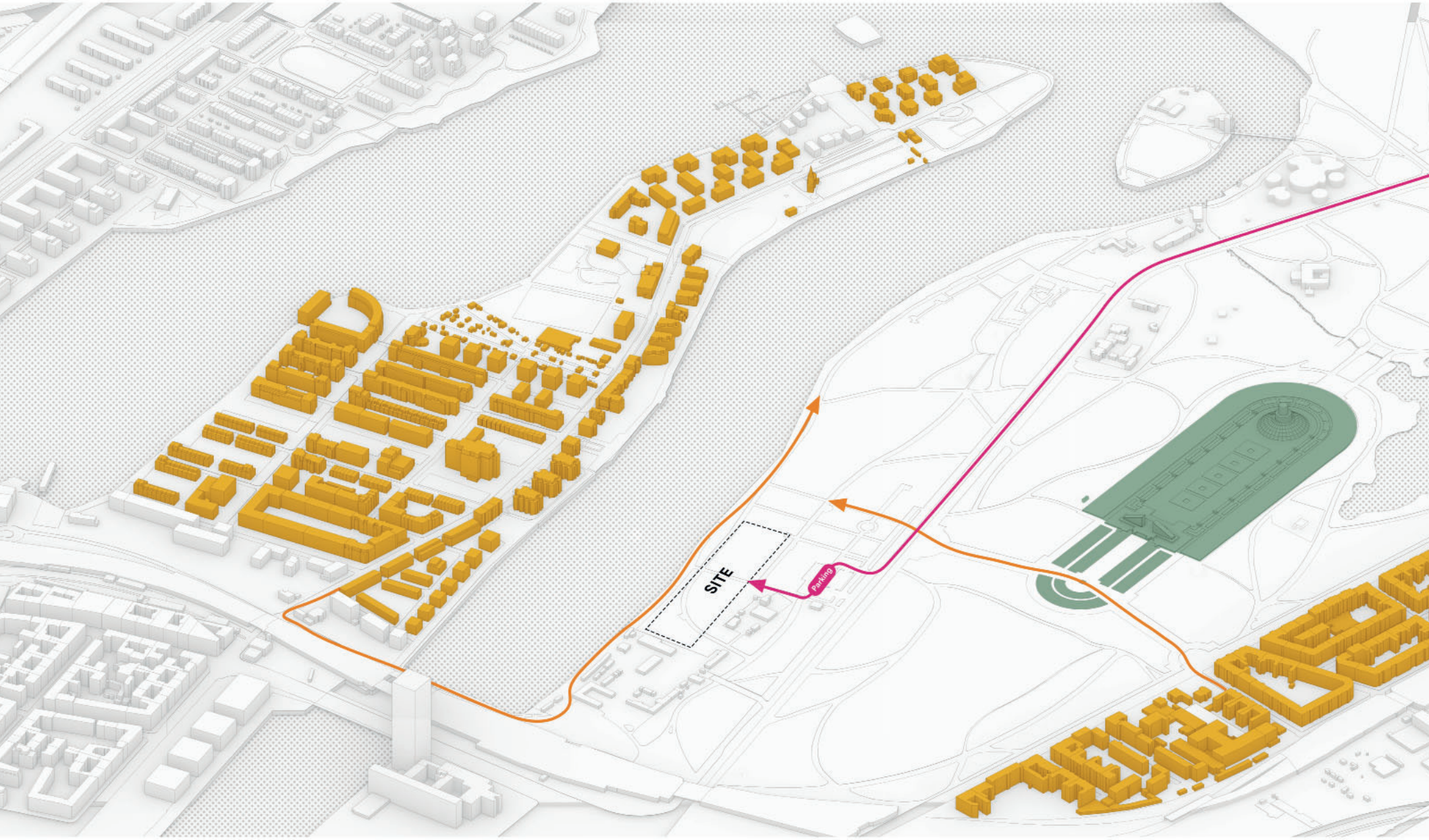


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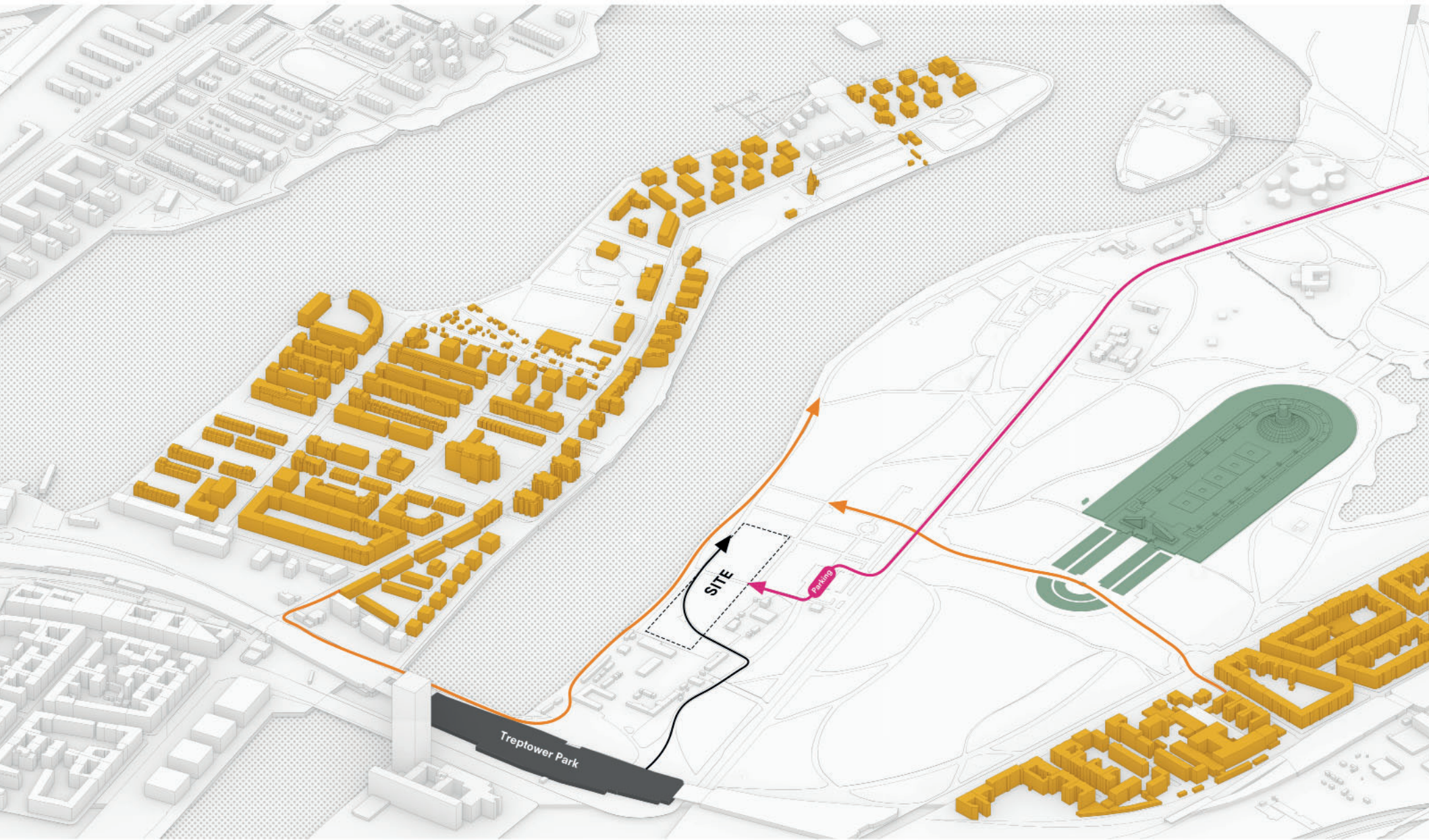
NEARBY RESIDENTS



Site
DRIVING VISITORS

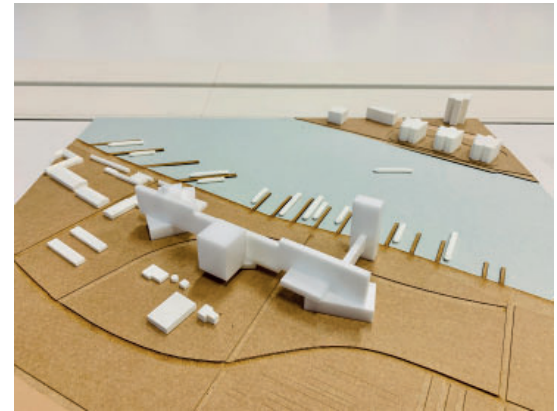
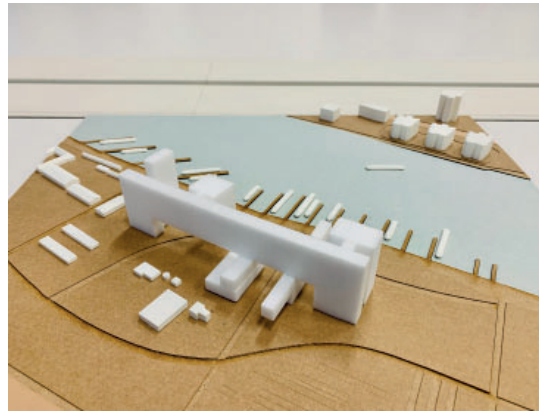
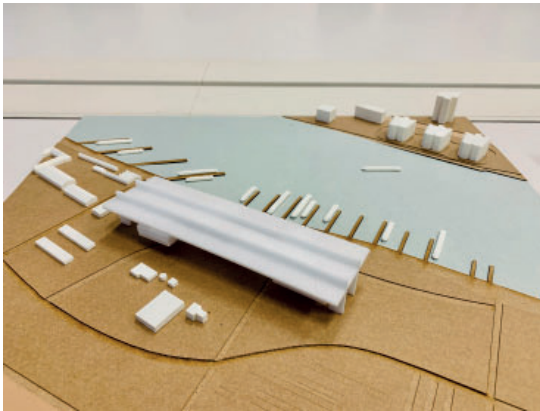
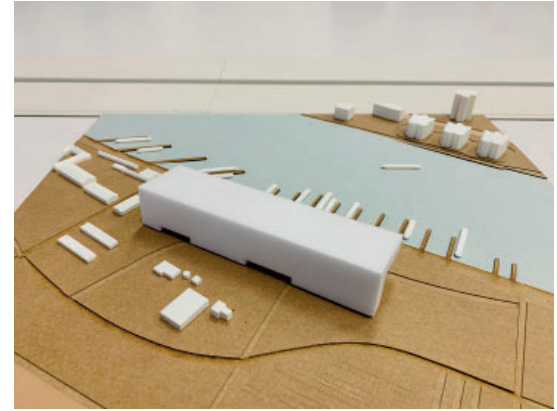
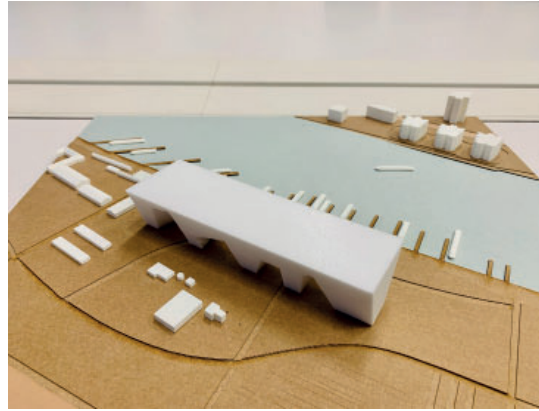
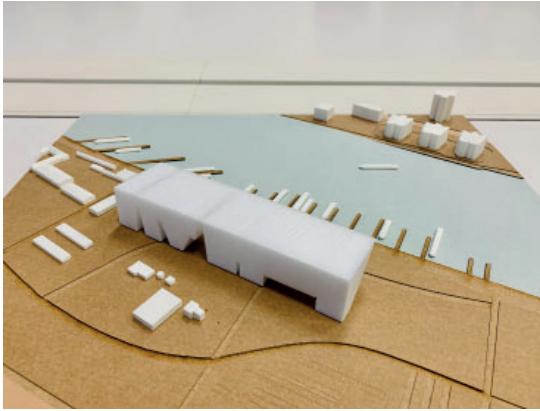


Site
VISITORS BY S-BAHN



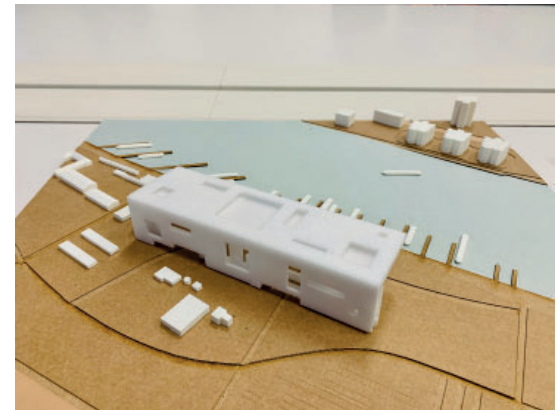
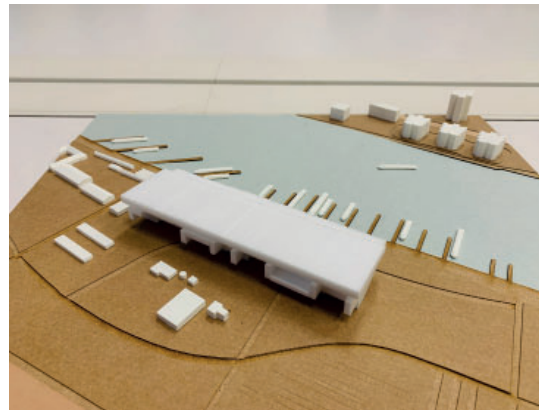
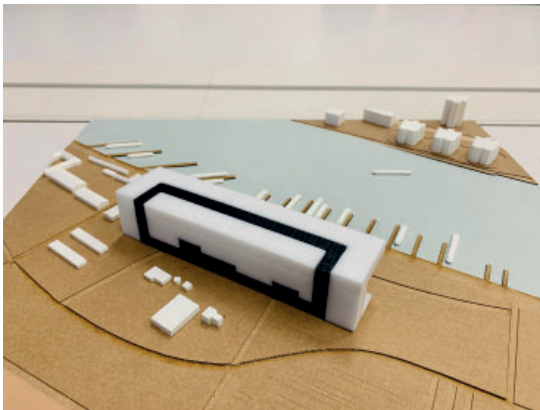
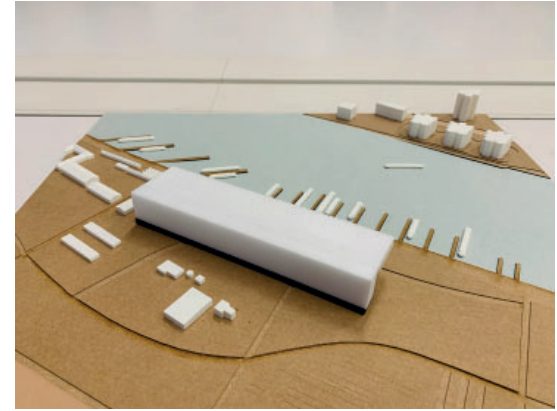
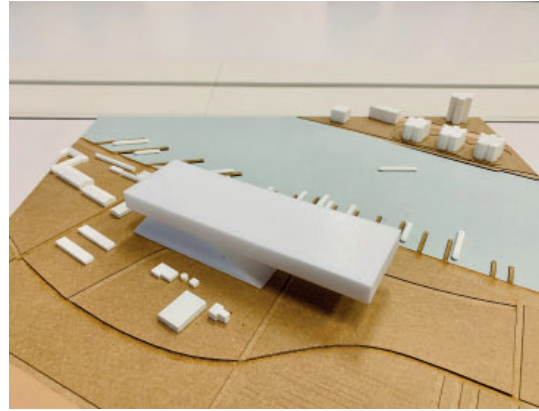
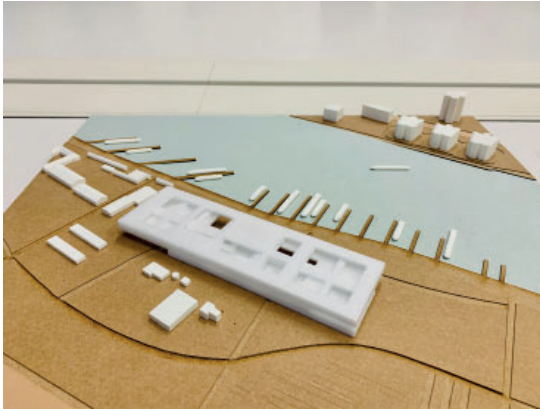
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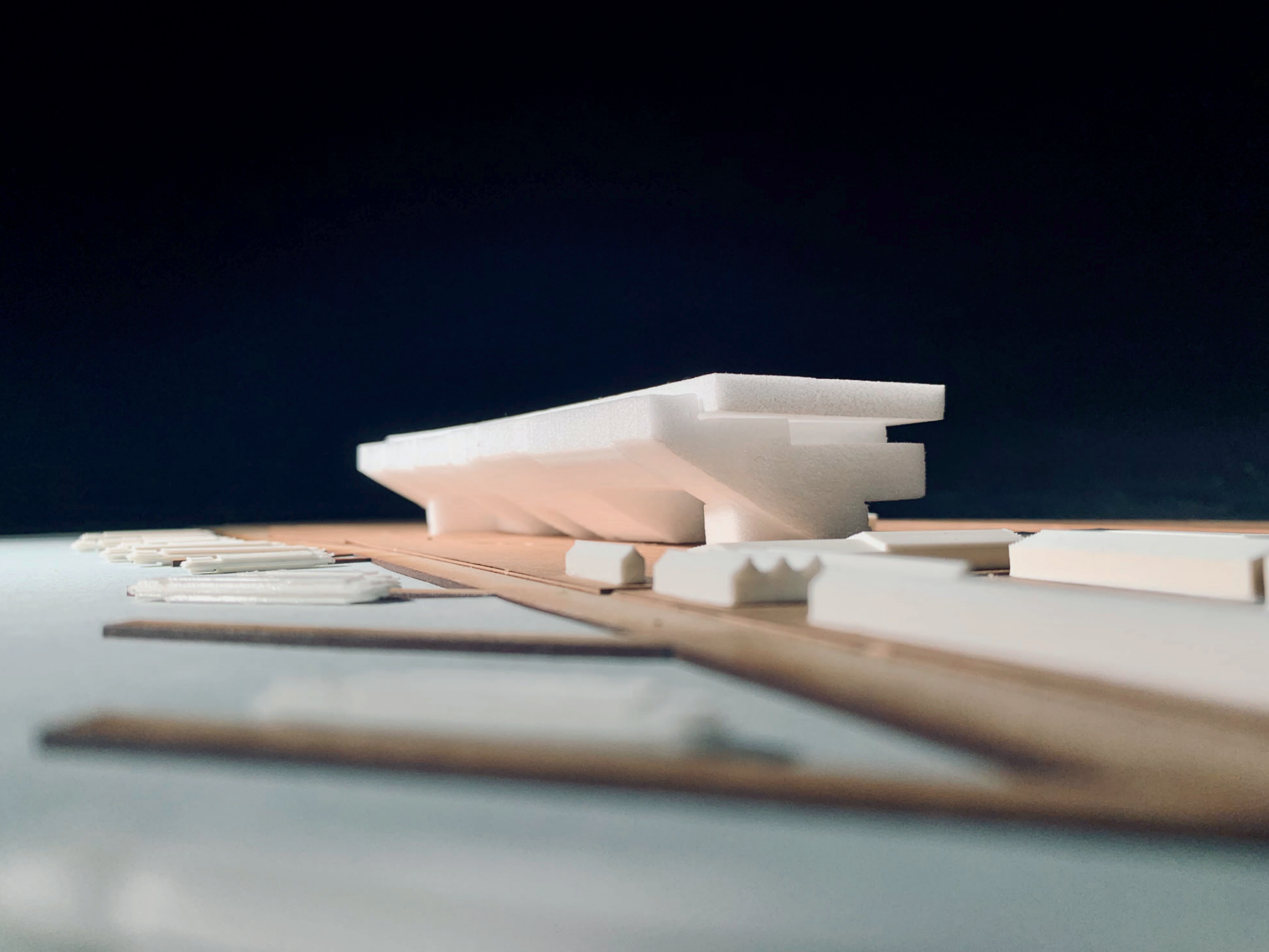
MASSING SCENARIOS MATRIX



Site

MASSING SCENARIOS MATRIX





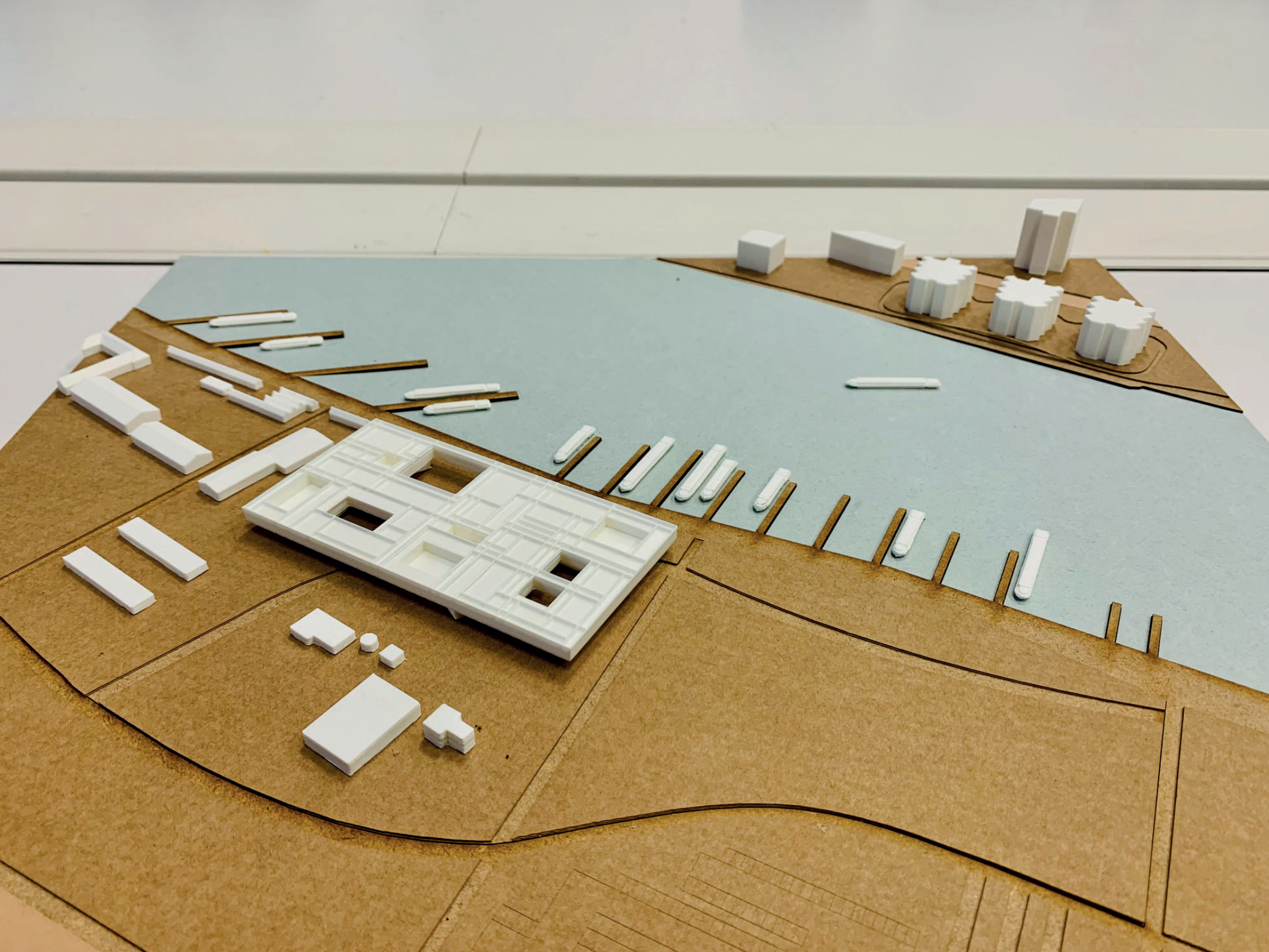


“TOO HIGH, TOO LONG”



"NO SPACESHIP"



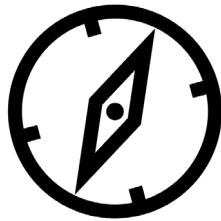


An architectural model of a building complex. The central feature is a large, white, multi-story building with a complex, stepped facade and a central courtyard. This central building is surrounded by various other white blocks of different sizes and shapes, representing smaller structures or wings. The model is set on a brown cardboard base with a light blue area representing a body of water or a courtyard. The text "MODEST COMPACT COMPRESSED" is overlaid in the center in a bold, black, sans-serif font.

**MODEST
COMPACT
COMPRESSED**

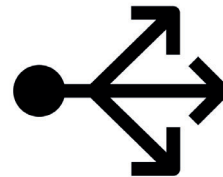
CONCEPT & IMPLEMENTATION

SPACIAL FLUIDITY RULES



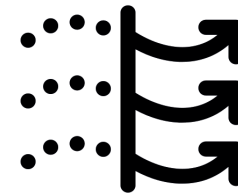
CLEAR ORIENTATION

awareness of self with regard
to position and place



MULTIPLE ROUTES

lead to different functions
and spaces



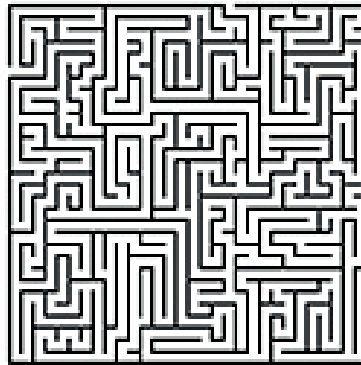
HIGH PERMEABILITY

connections between private
and public



"MAZE"
FACULTY OF COMPUTER SCIENCE



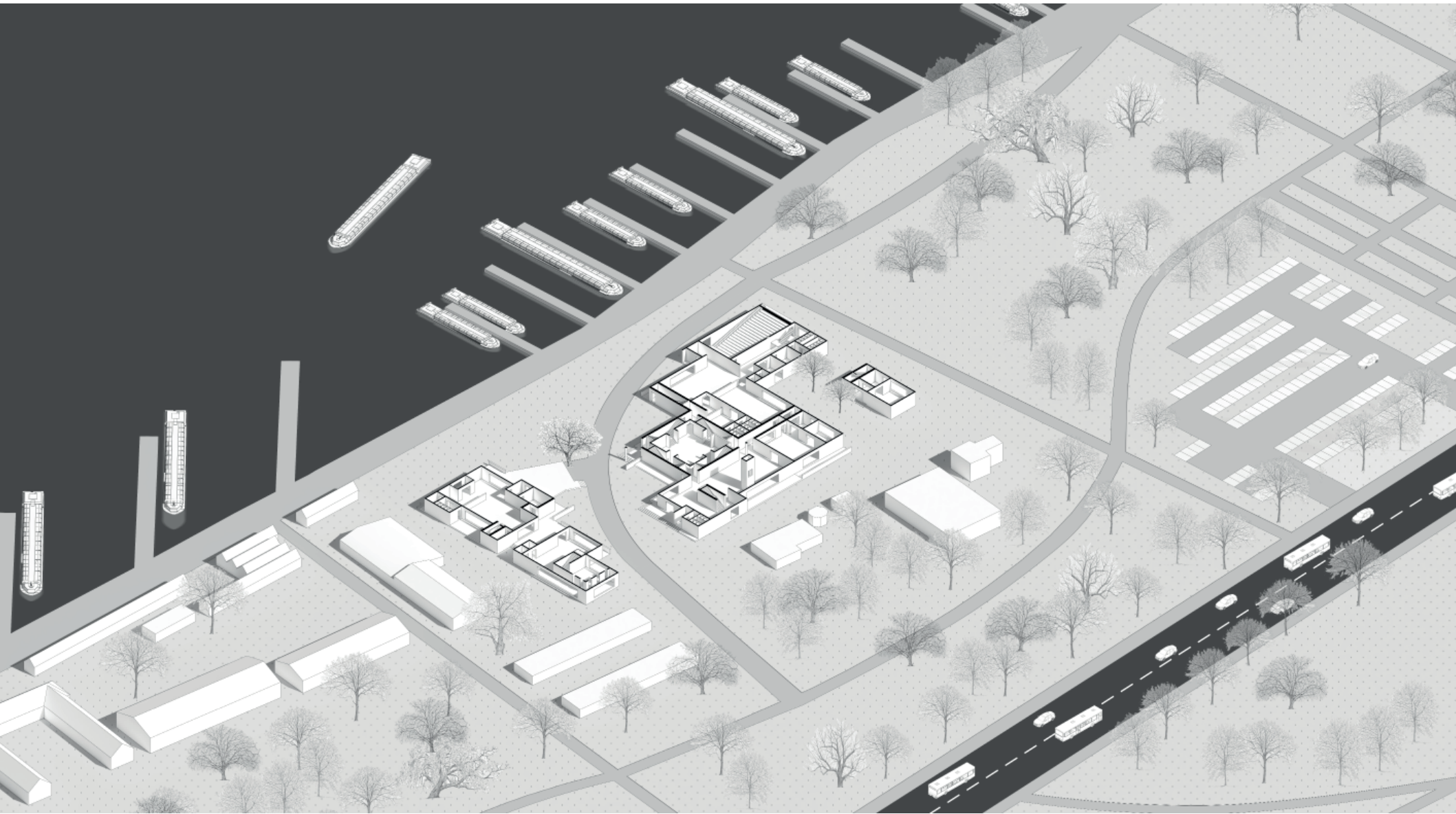


A SPECIAL MAZE

A maze with a proper orientation which attracts people to flow around, explore different routes, and play inside.

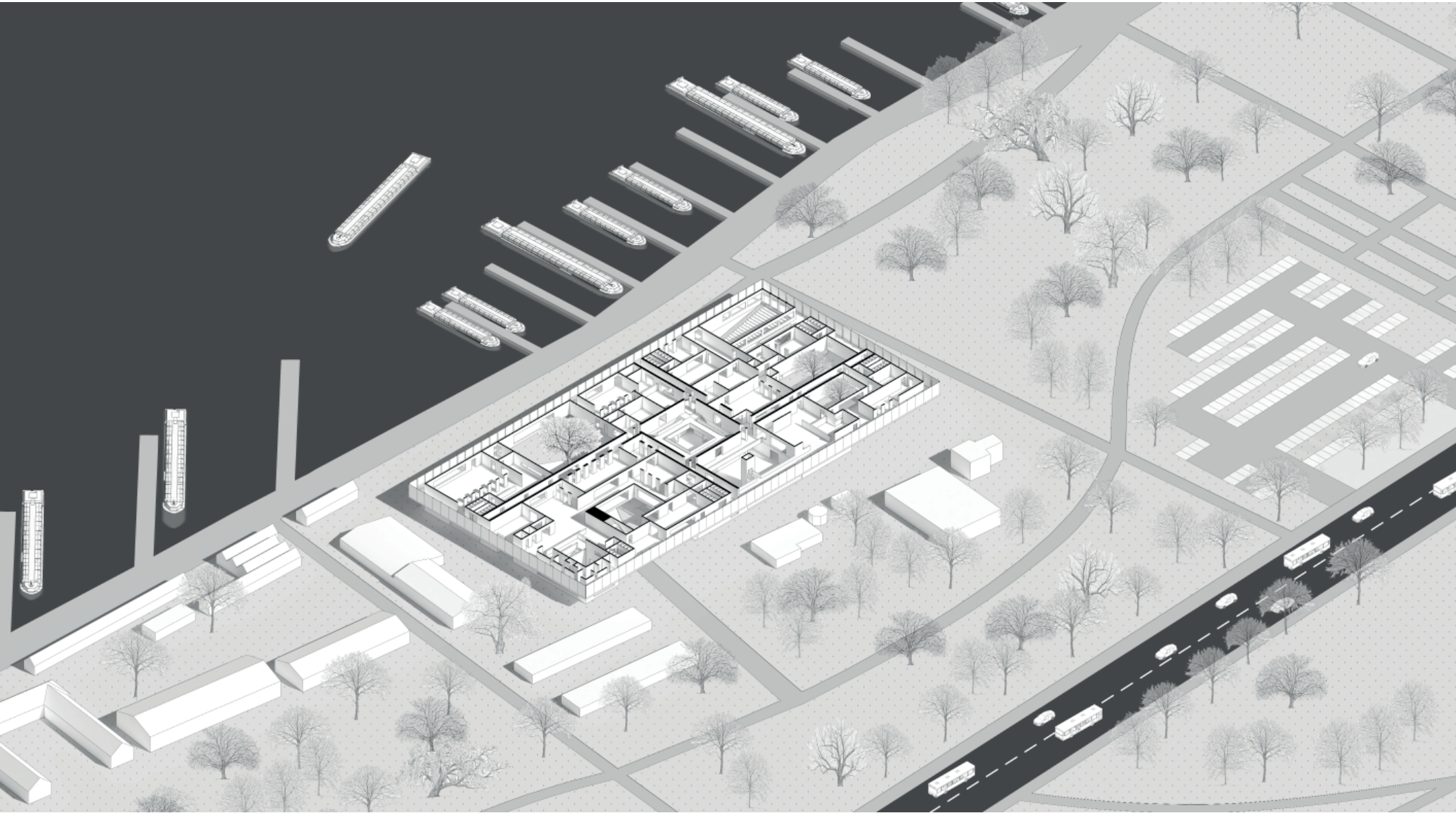
Maze

WITH A PROPER ORIENTATION



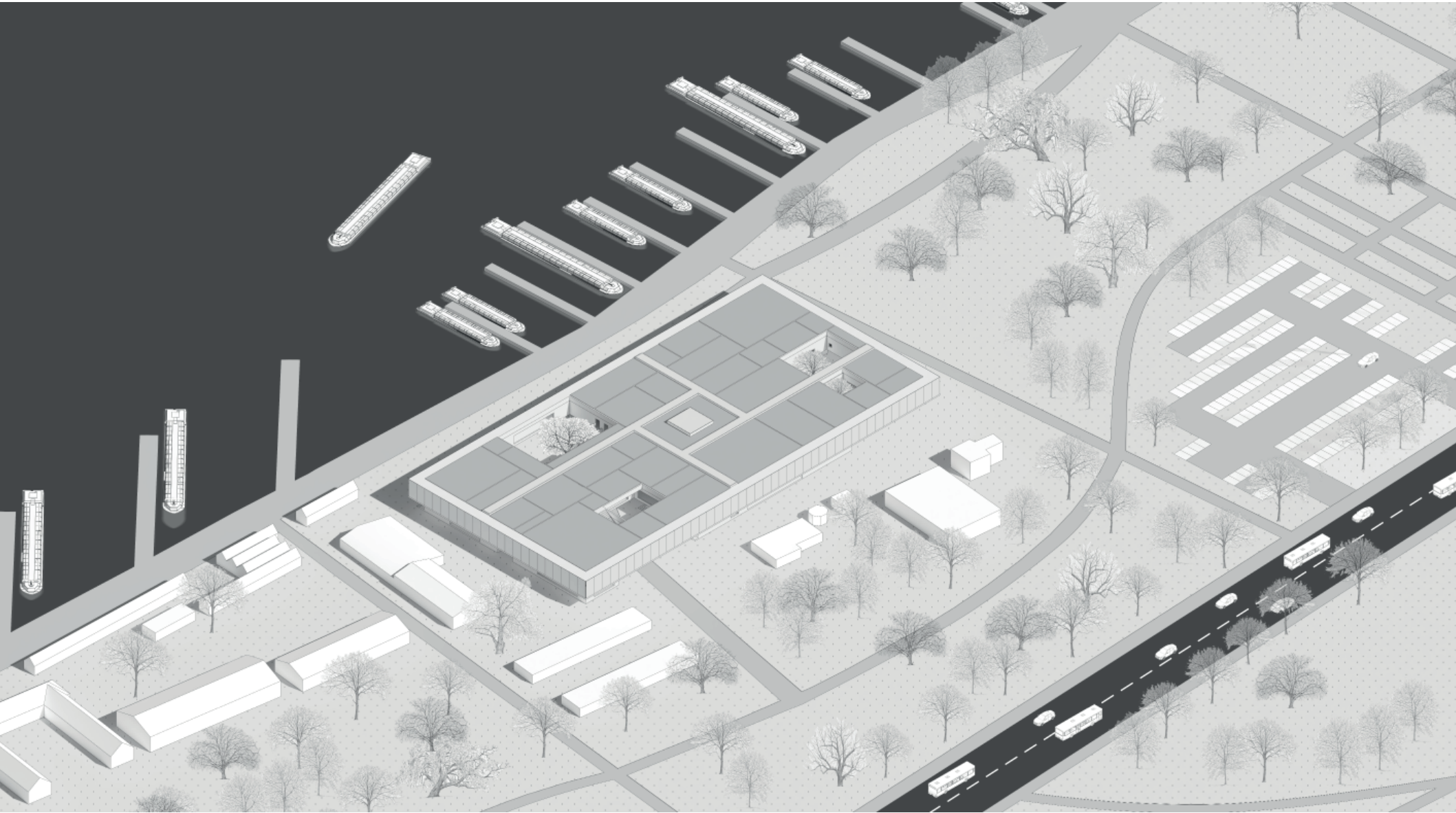
Maze

ATTRACTS PEOPLE TO FLOW INSIDE



Maze

EXPLORE DIFFERENT ROUTES





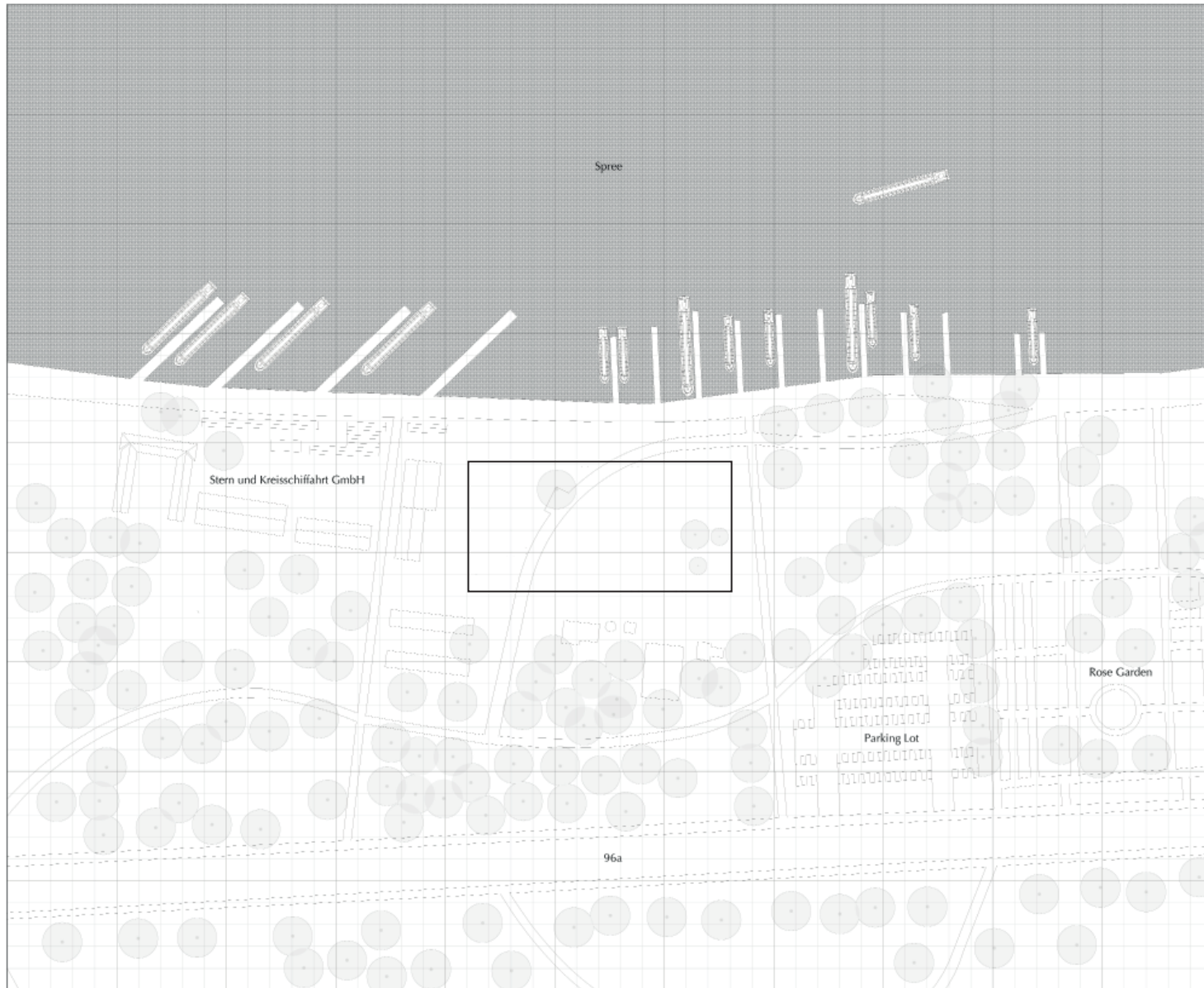
ORIENTATION

FACULTY OF COMPUTER SCIENCE



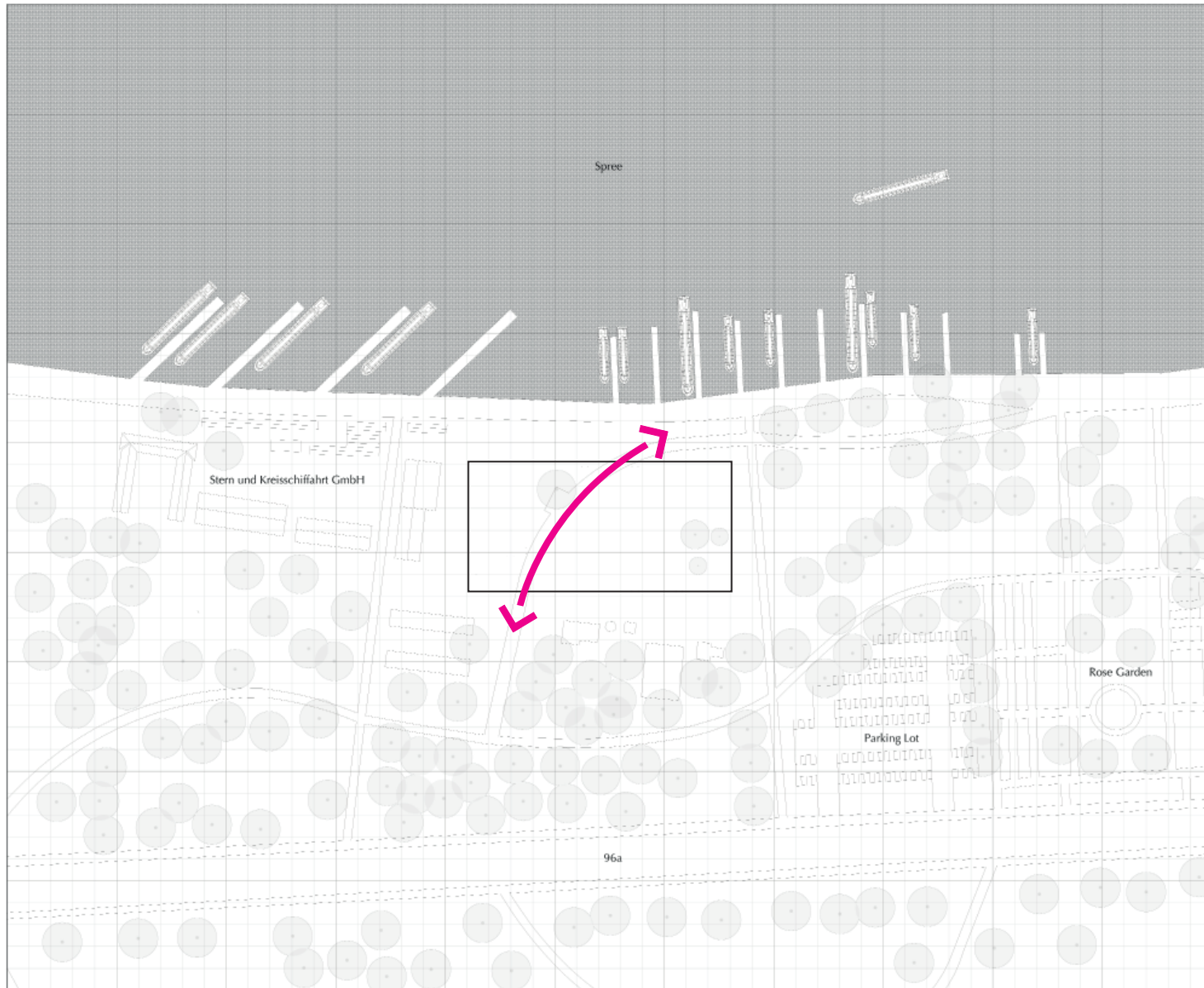
Site

CURRENT SITE SITUATION



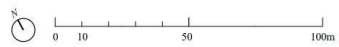
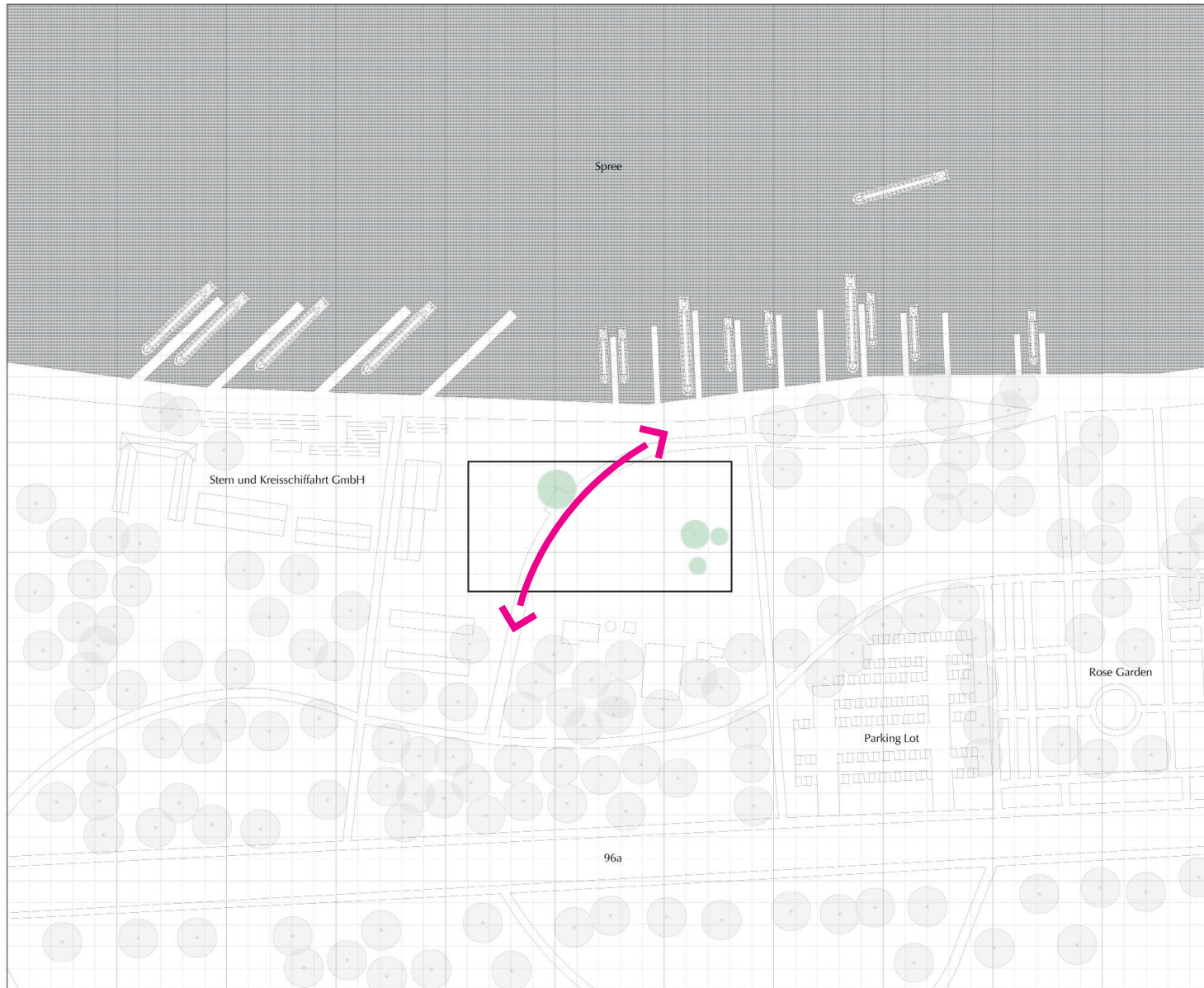
Site

EXISTING CURVED PATH

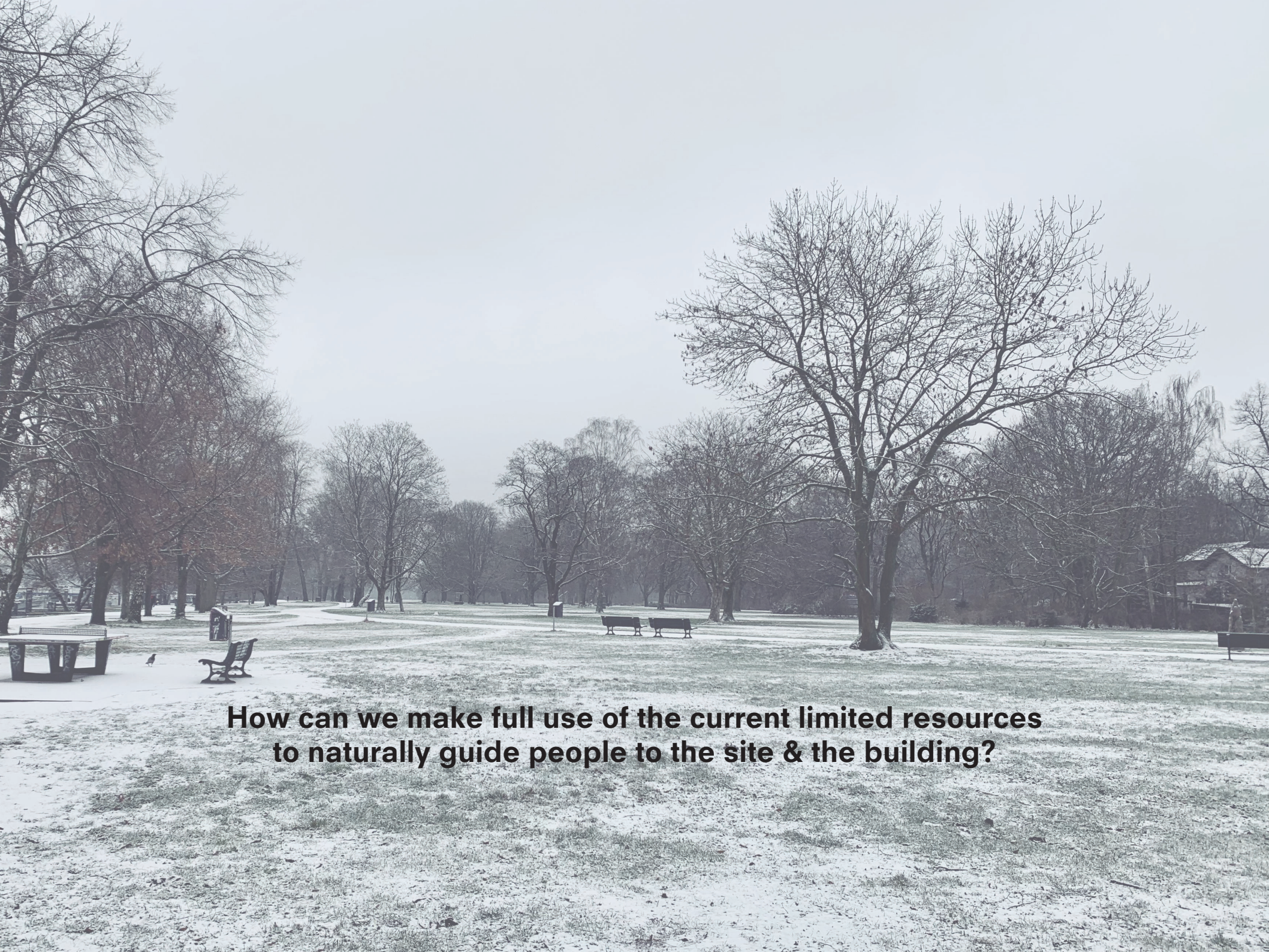


Site

CURRENT FOUR TREES



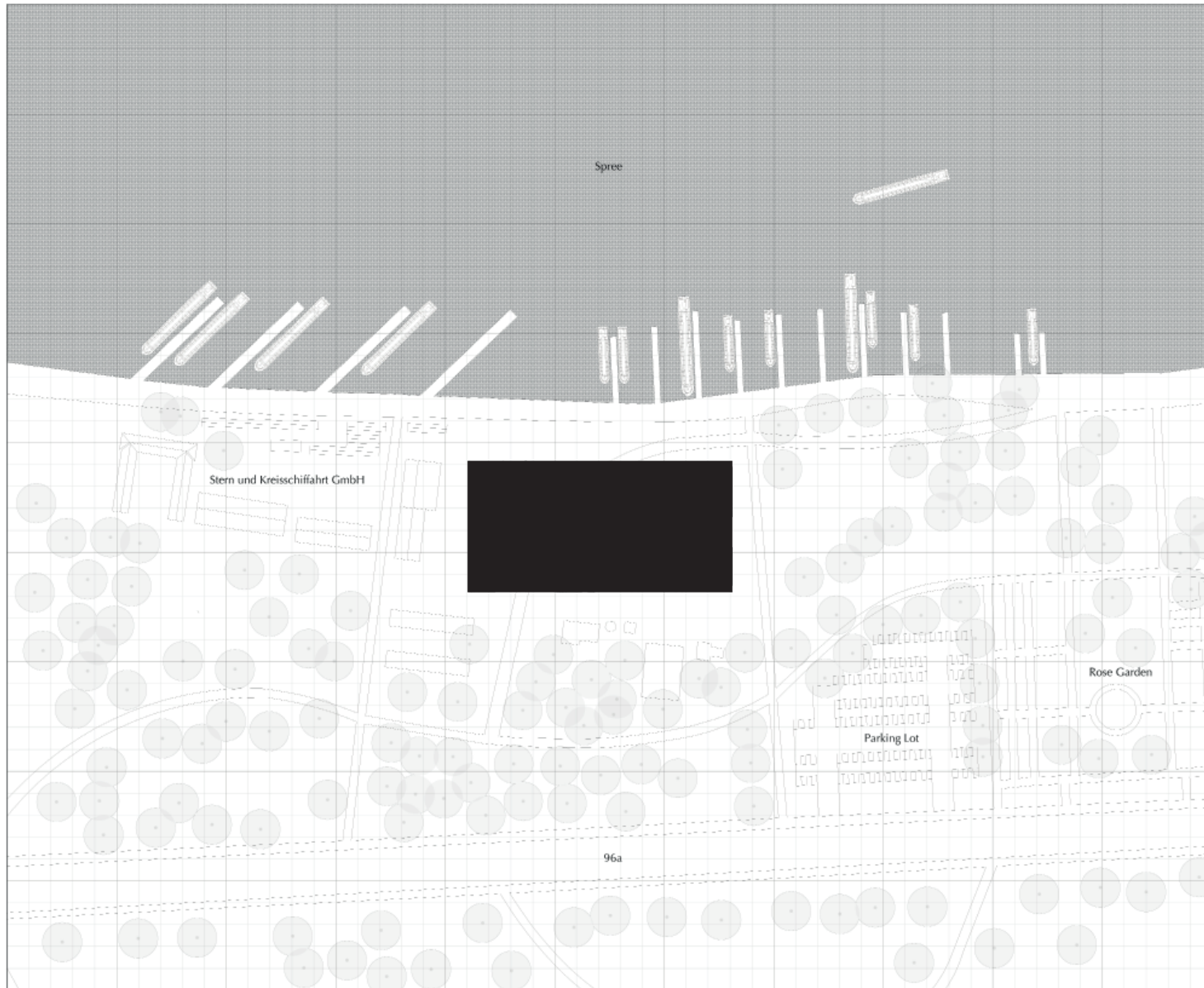




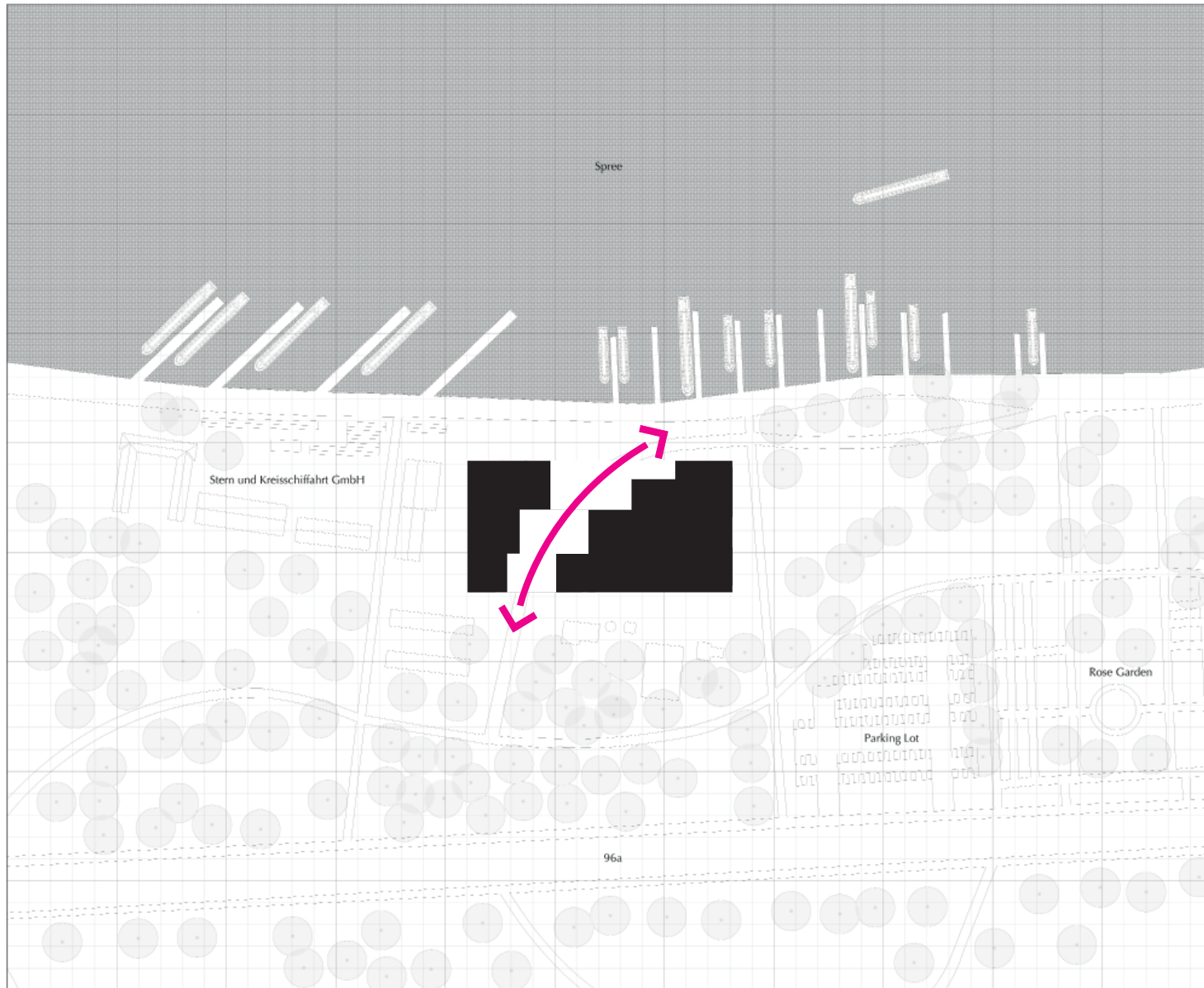
How can we make full use of the current limited resources to naturally guide people to the site & the building?

Site strategy

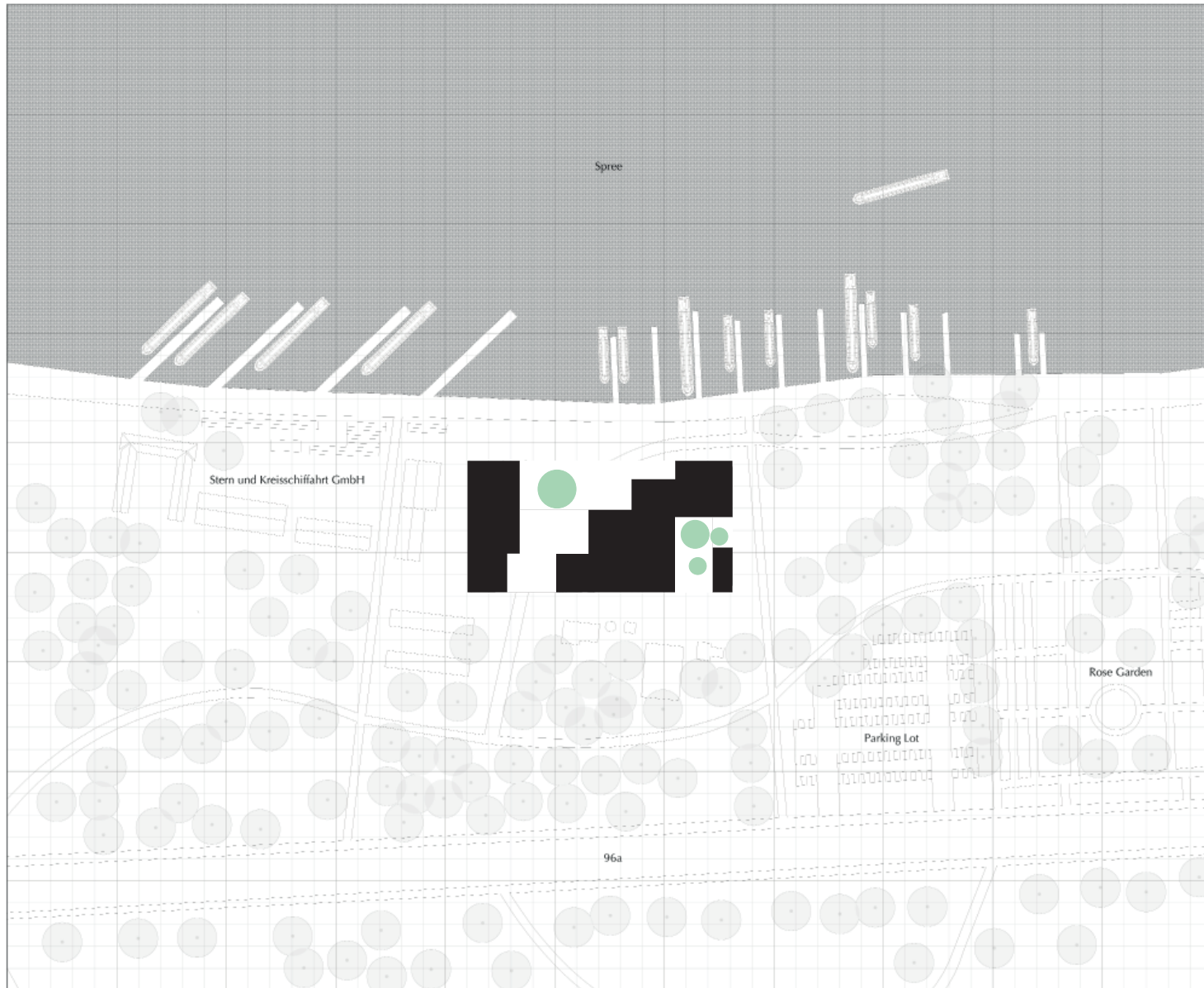
BUILDING FOOTPRINT



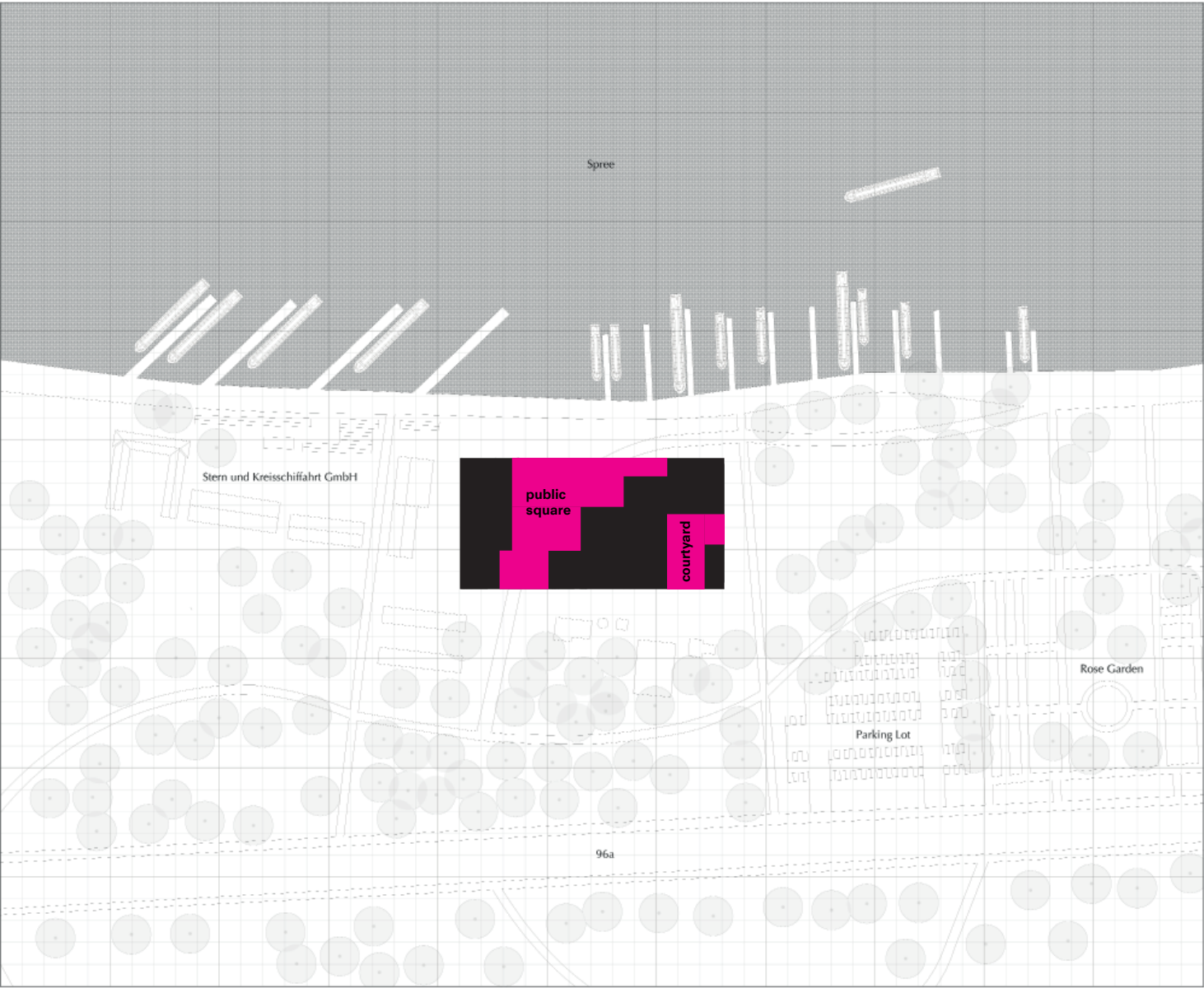
CUT ACCORDING TO THE CURVED PATH



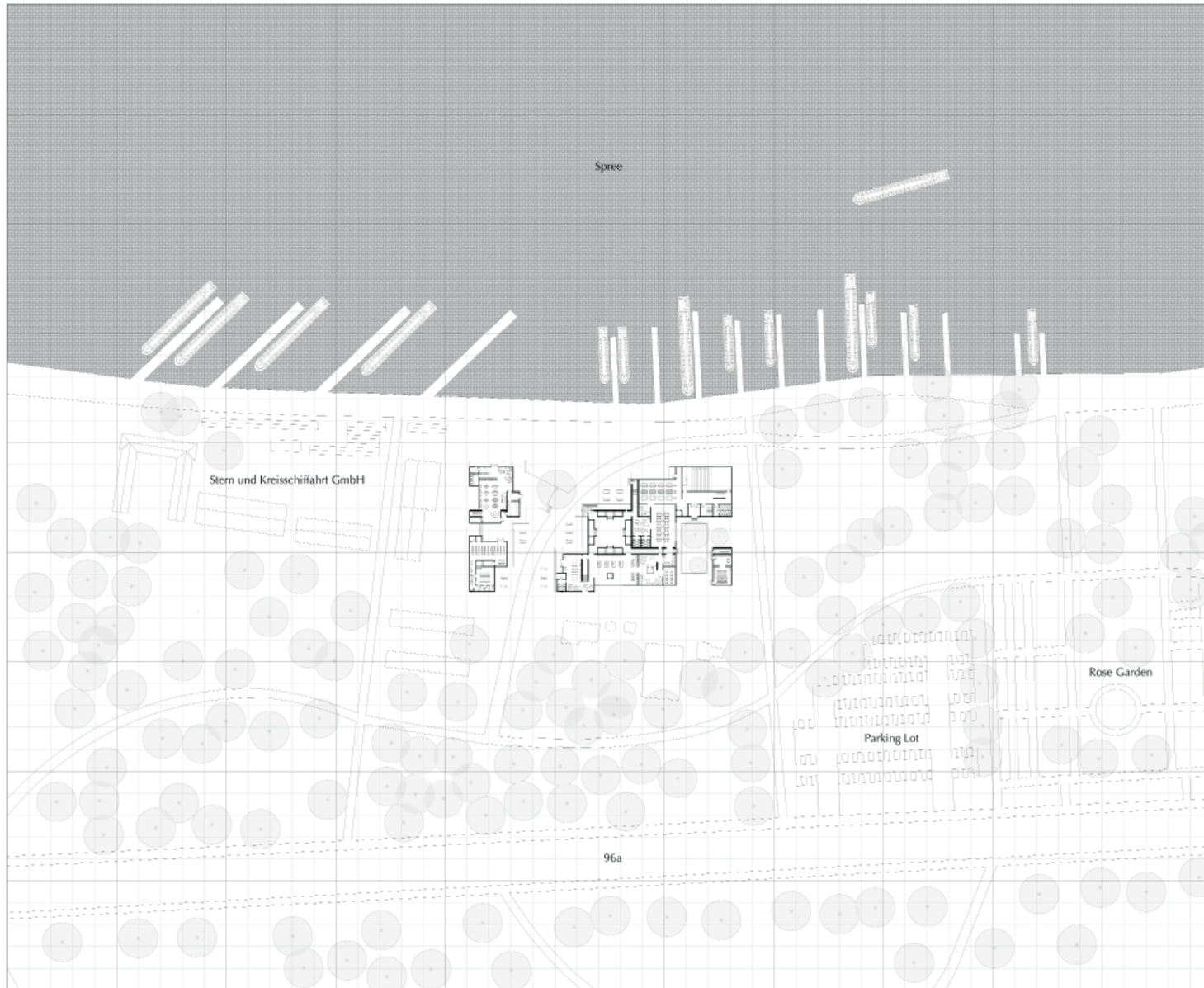
LEAVE SPACE FOR THE TREES



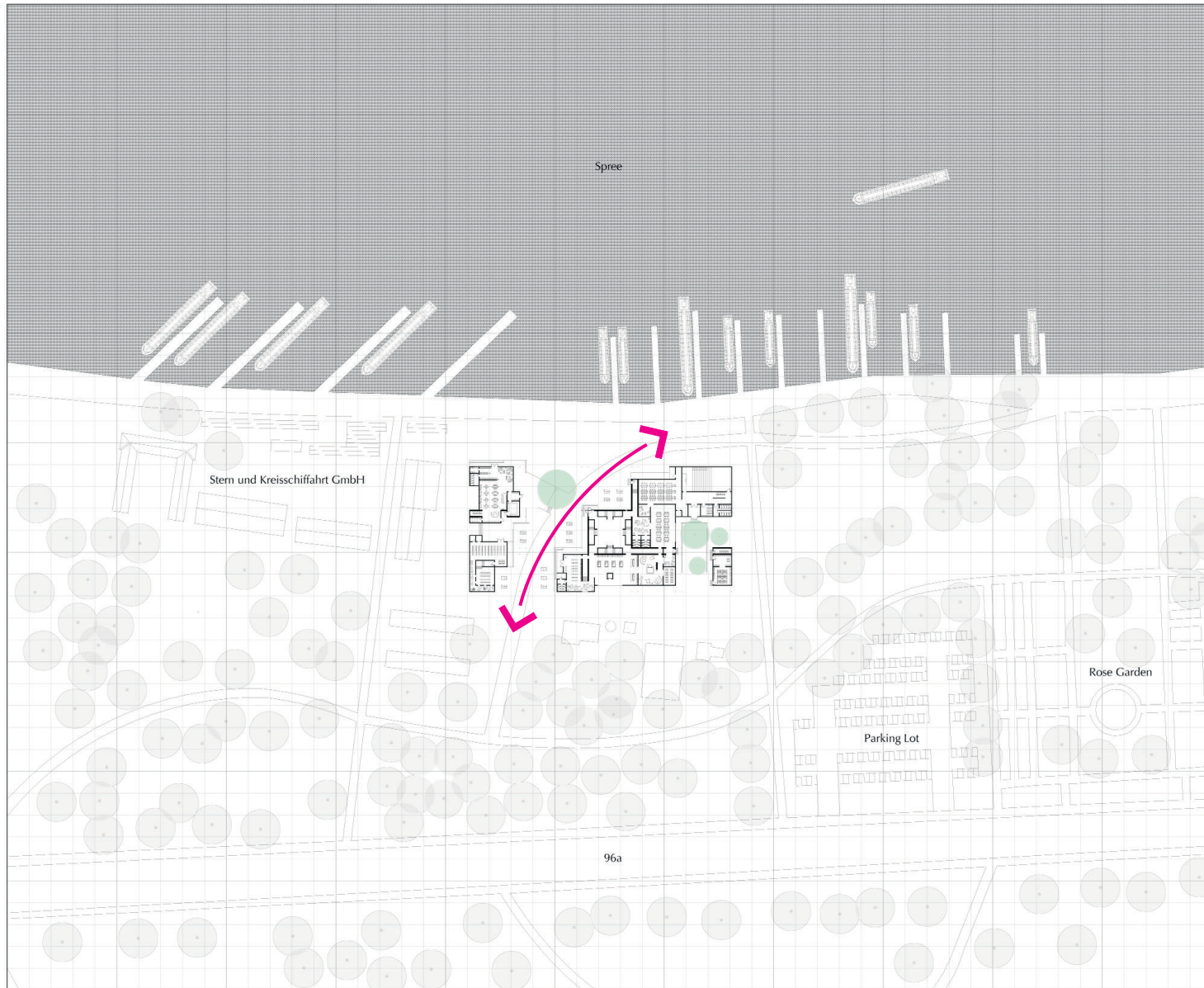
Site strategy
SQUARE AND COURTYARD



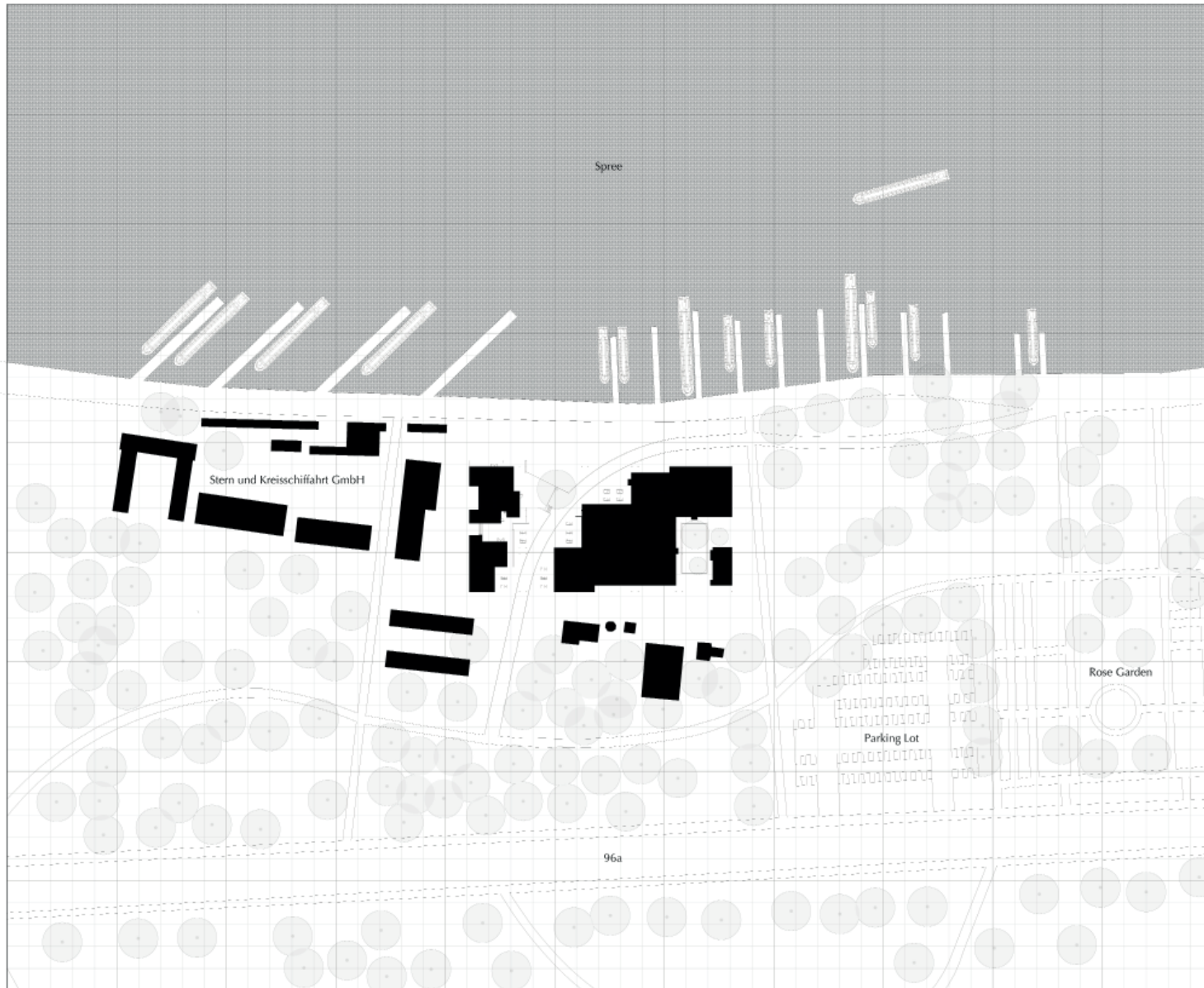
Site strategy
GROUND FLOOR PLAN...



MAKES FULL USE OF THE CURRENT RESOURCES

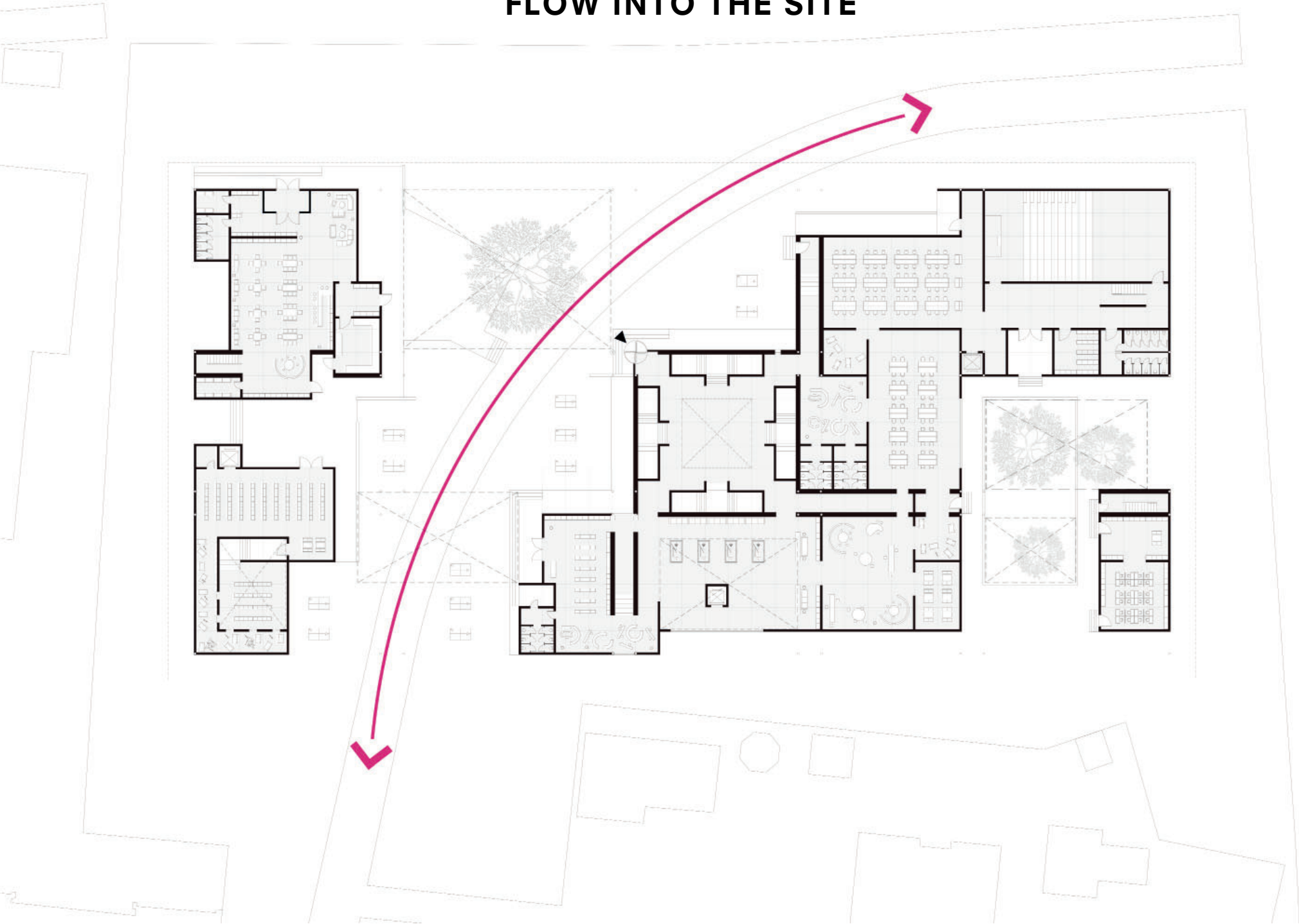


RESPONDS TO SURROUNDINGS

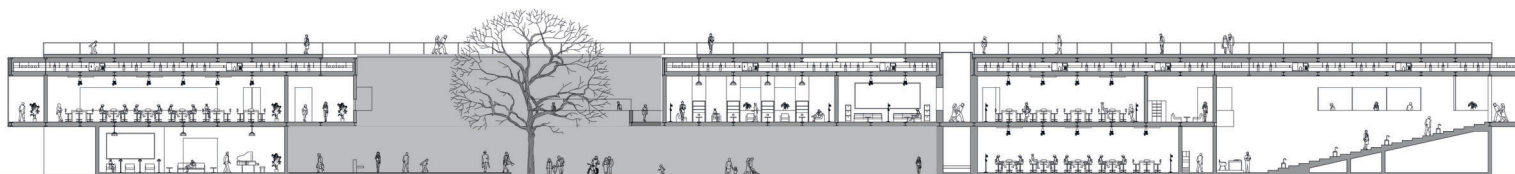
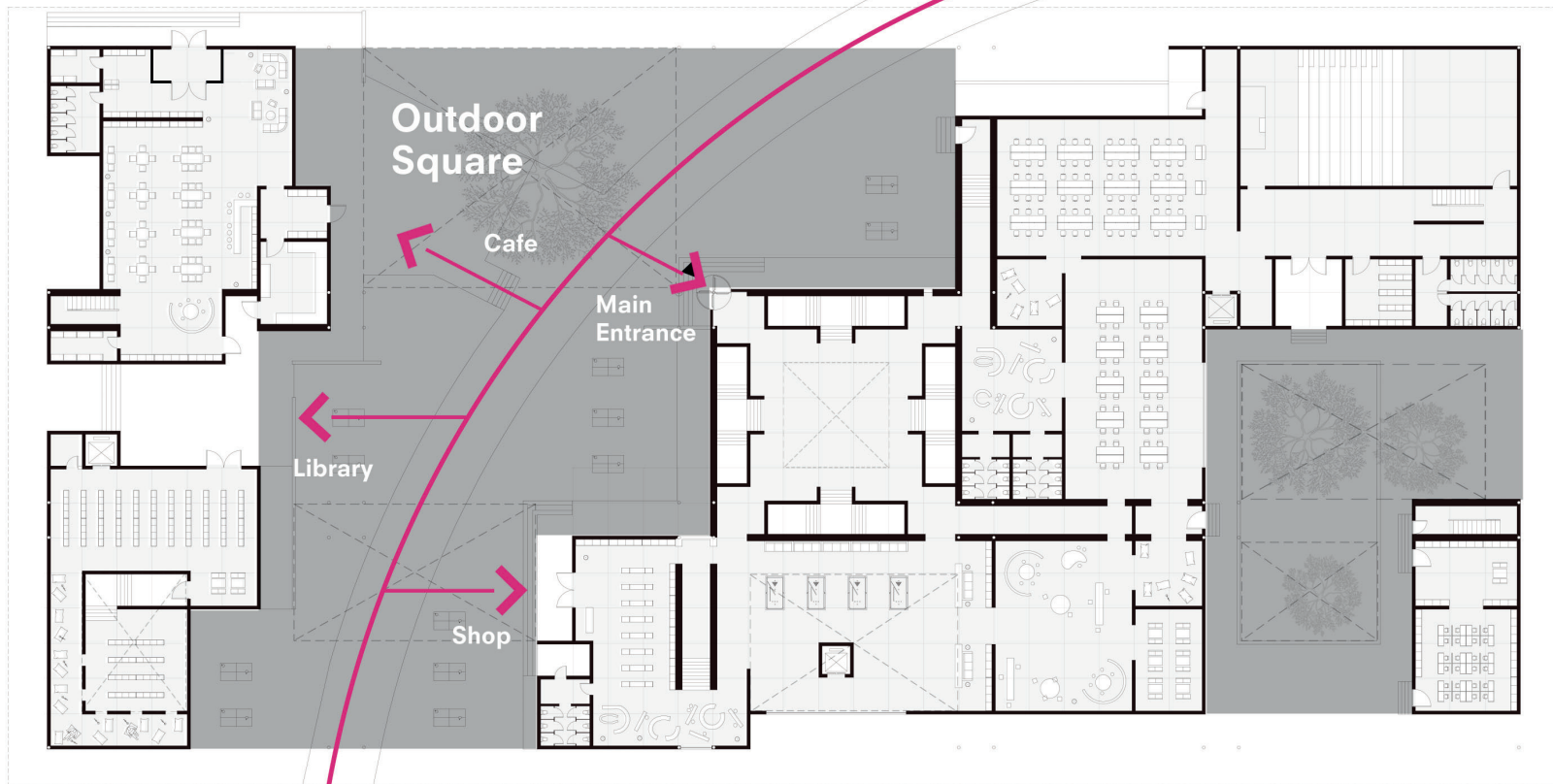


Orientation

FLOW INTO THE SITE

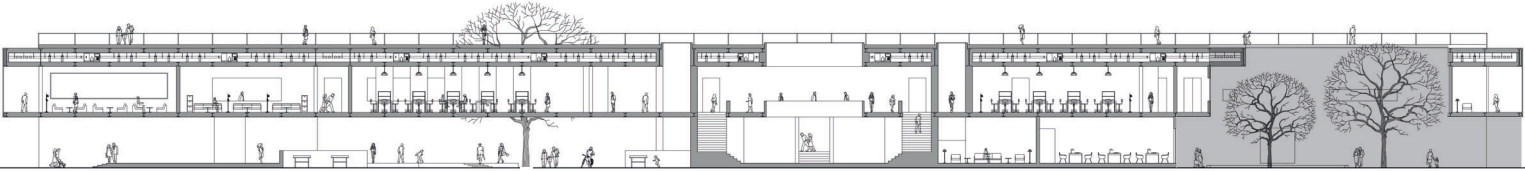
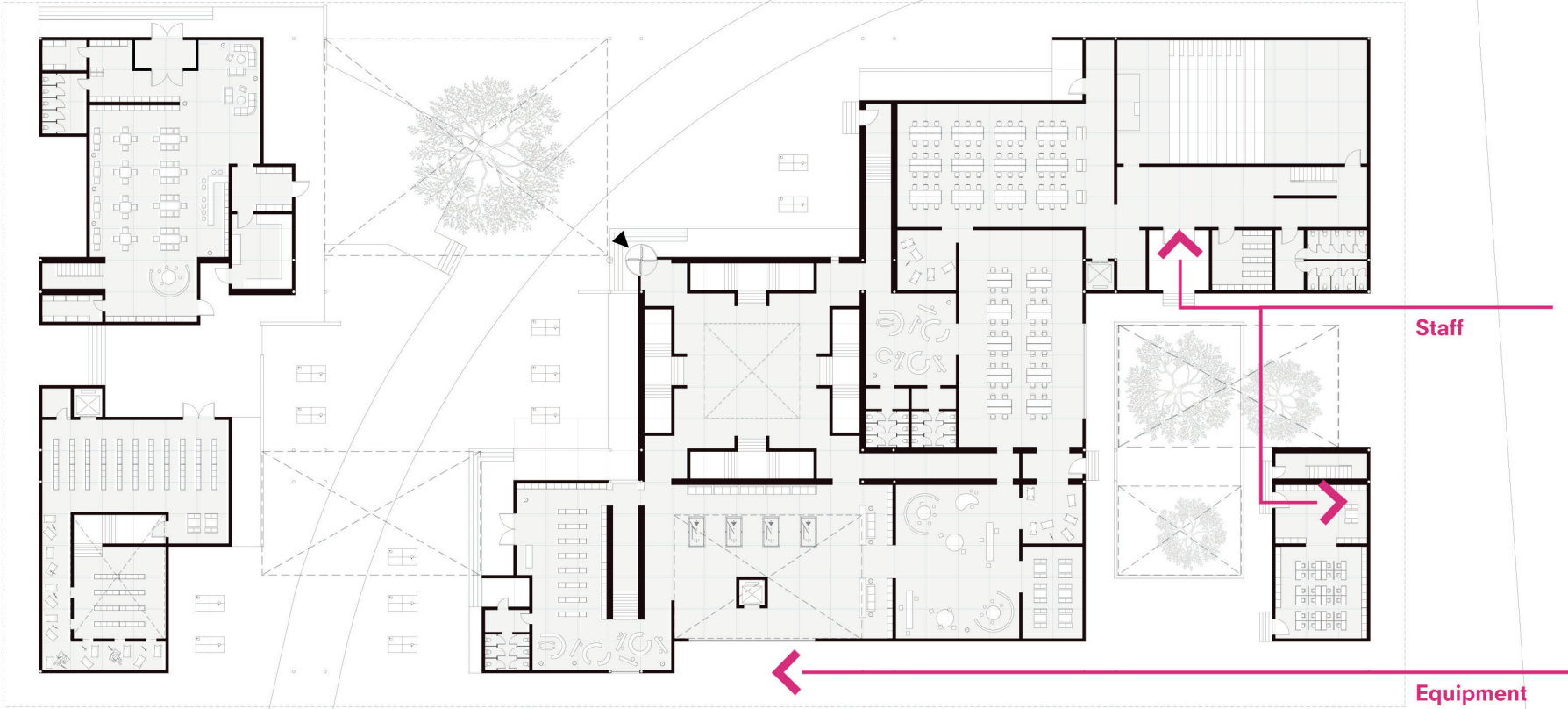


Orientation SUB-FLOW

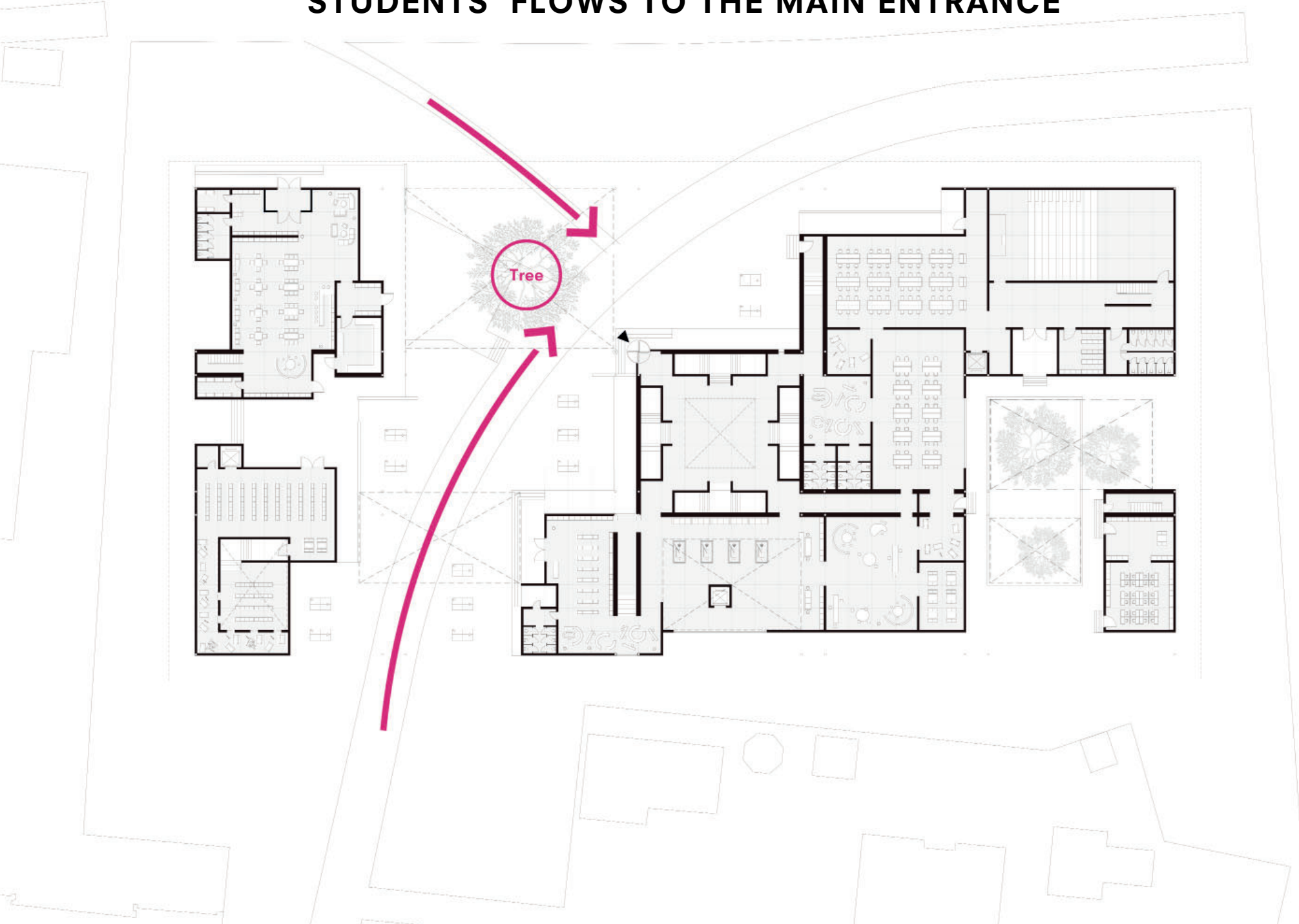


Orientation

STAFF & EQUIPMENT



STUDENTS' FLOWS TO THE MAIN ENTRANCE





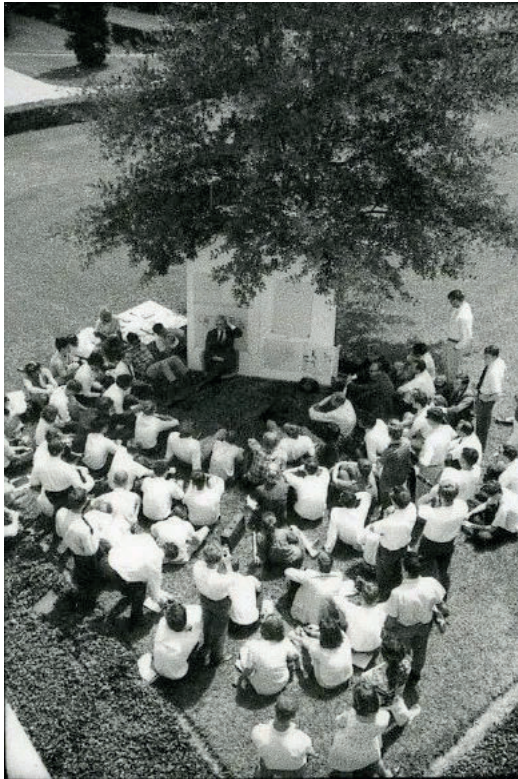
From the south...



From the north...meet under the tree

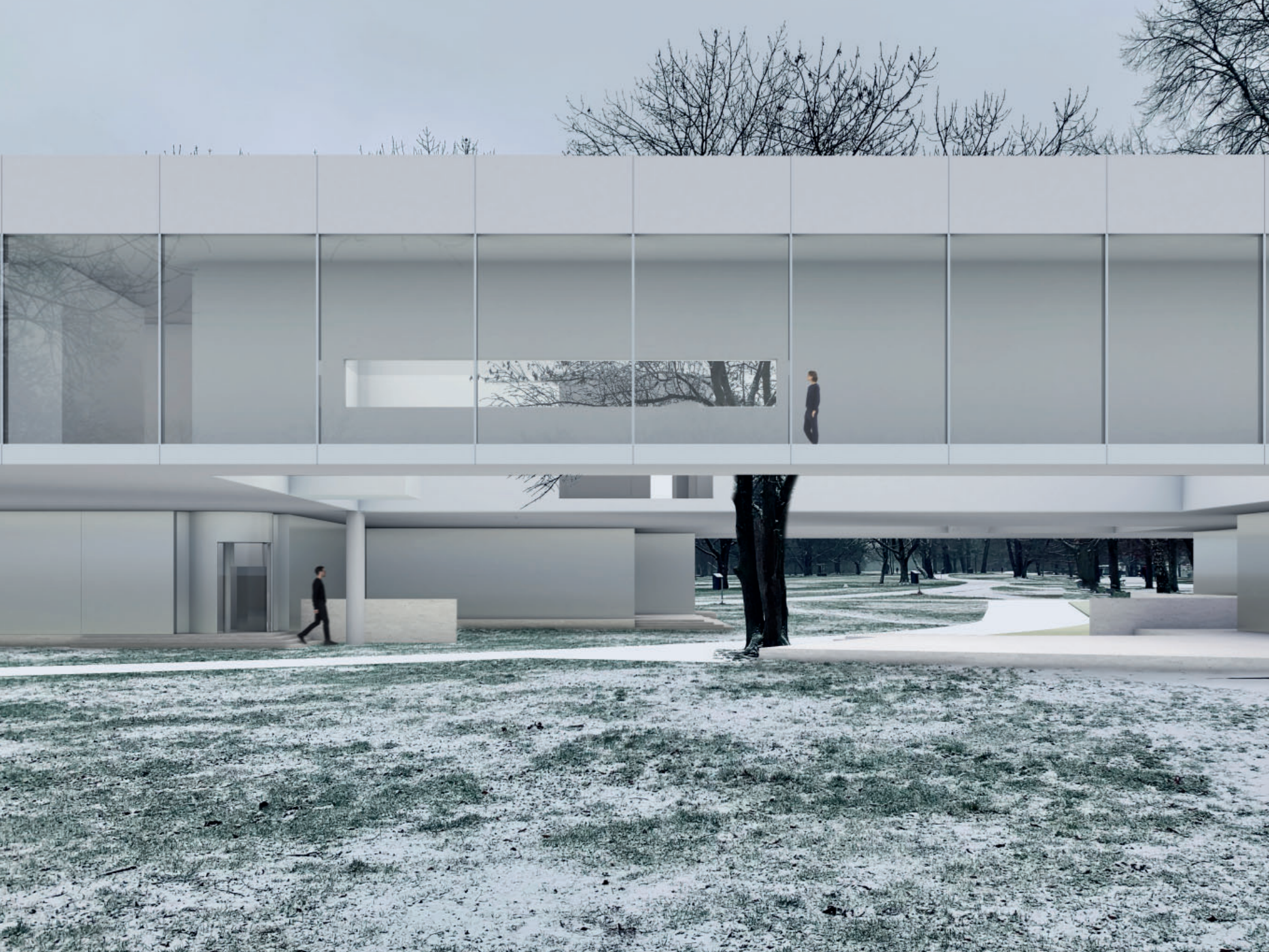
Orientation

A LANDMARK ALSO A SYMBOL



**“The first school probably started with a man under a tree,
and around him the listeners to the words of his mind.”**

Louis Kahn



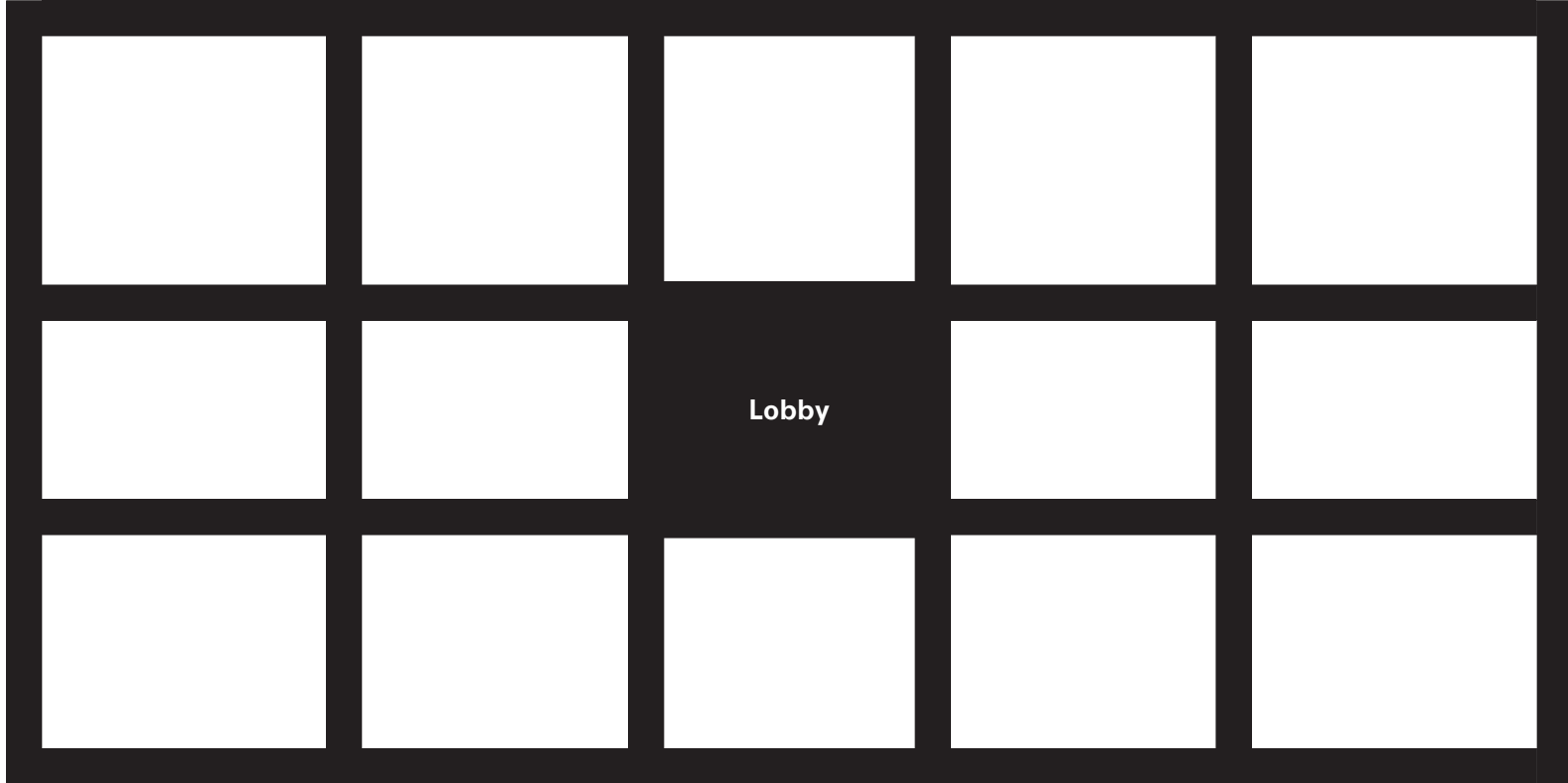


**How can we give people a clear orientation
inside the building?**

Orientation

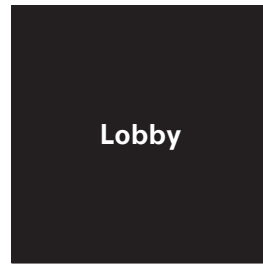
NET CIRCULATION

Orientation
START POINT



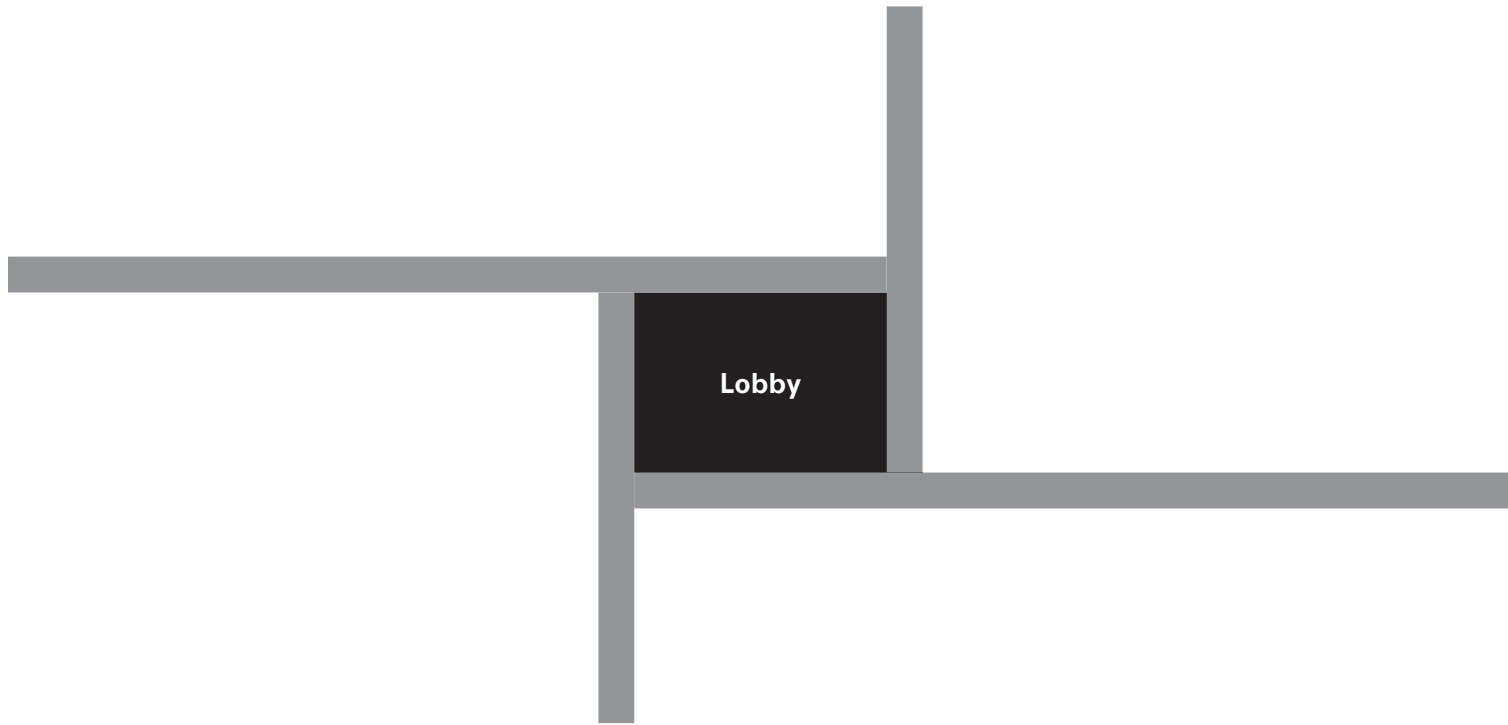
Orientation

PUBLIC LOBBY



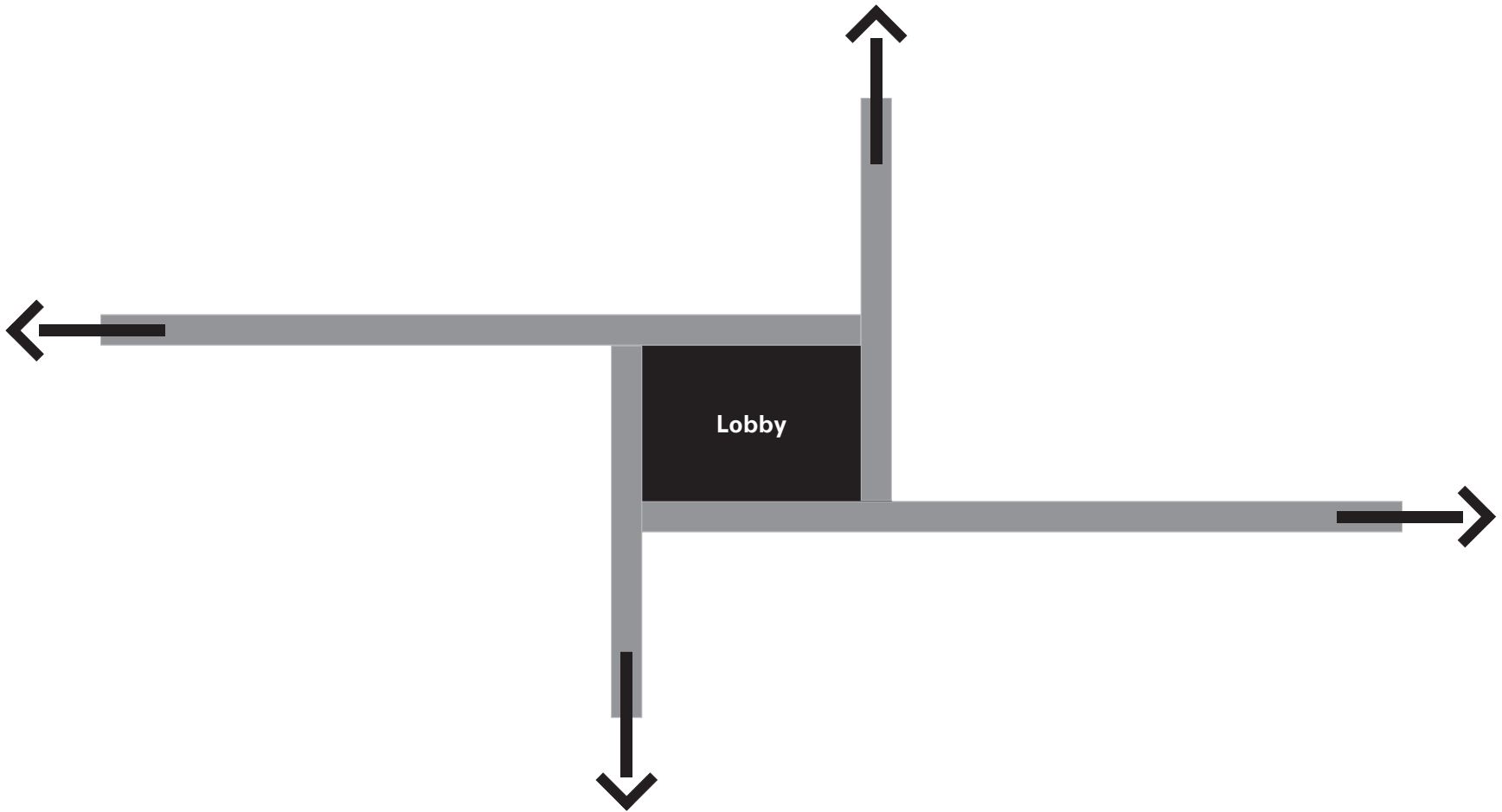
Orientation

FOUR CORRIDORS



Orientation

SPREAD OUT IN FOUR DIRECTIONS



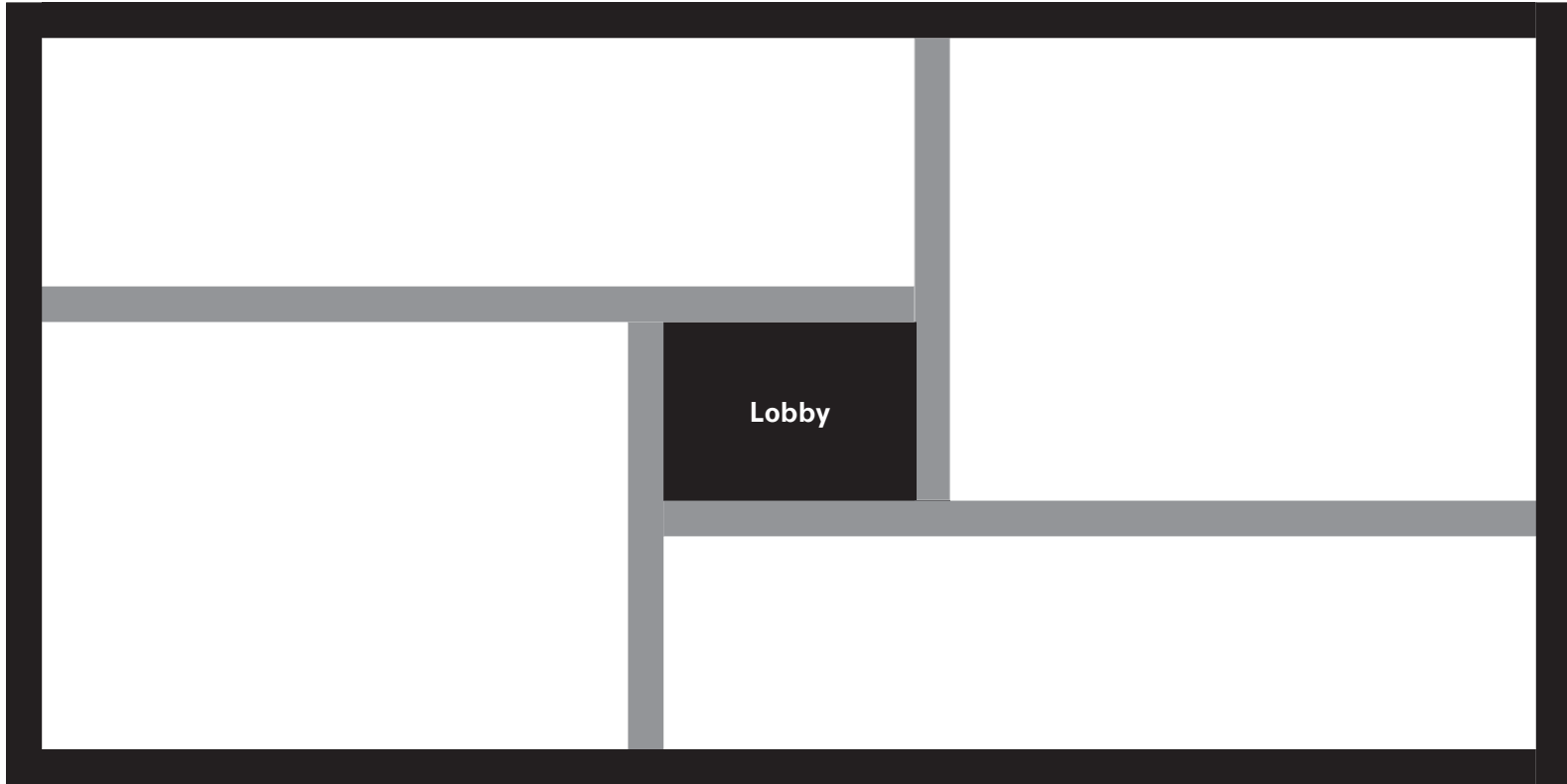
Orientation

GUIDE PEOPLE TO DIFFERENT FUNCTIONS



Orientation

CIRCULAR CORRIDOR



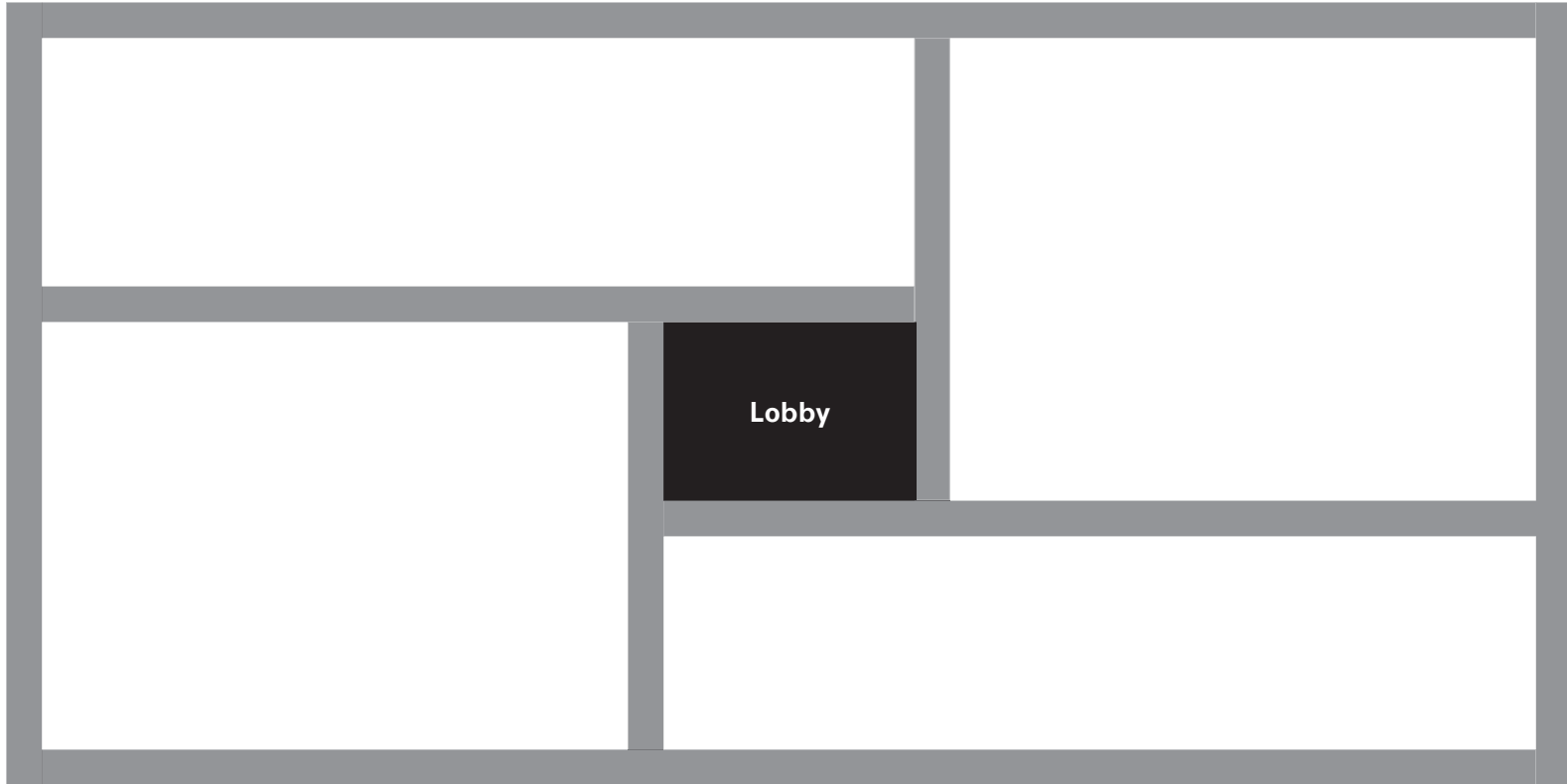
Orientation

IN BETWEEN THE NATURE AND THE LEARNING AREA

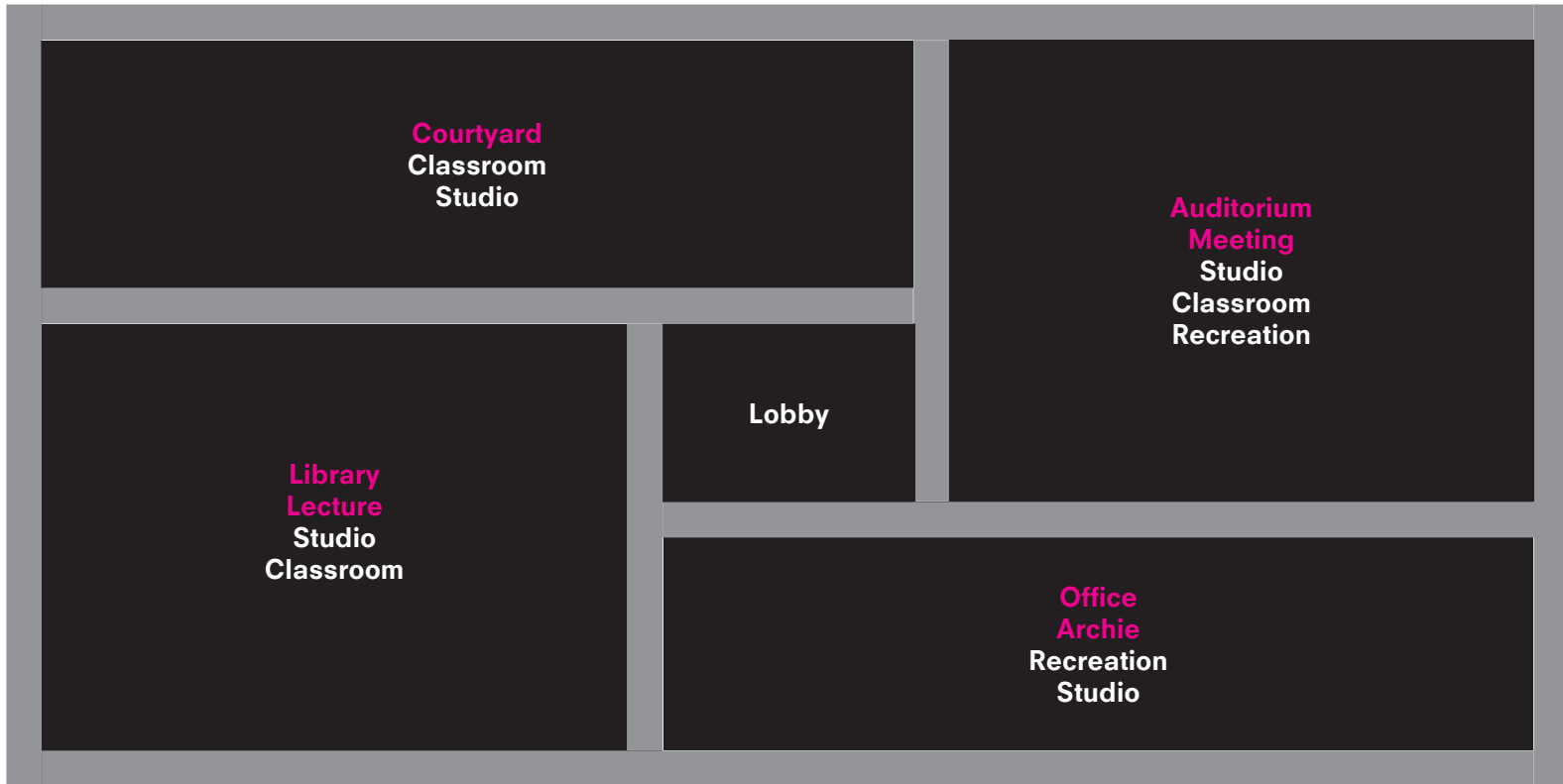


Orientation

TO KEEP THE CONTINUITY OF FLOWS

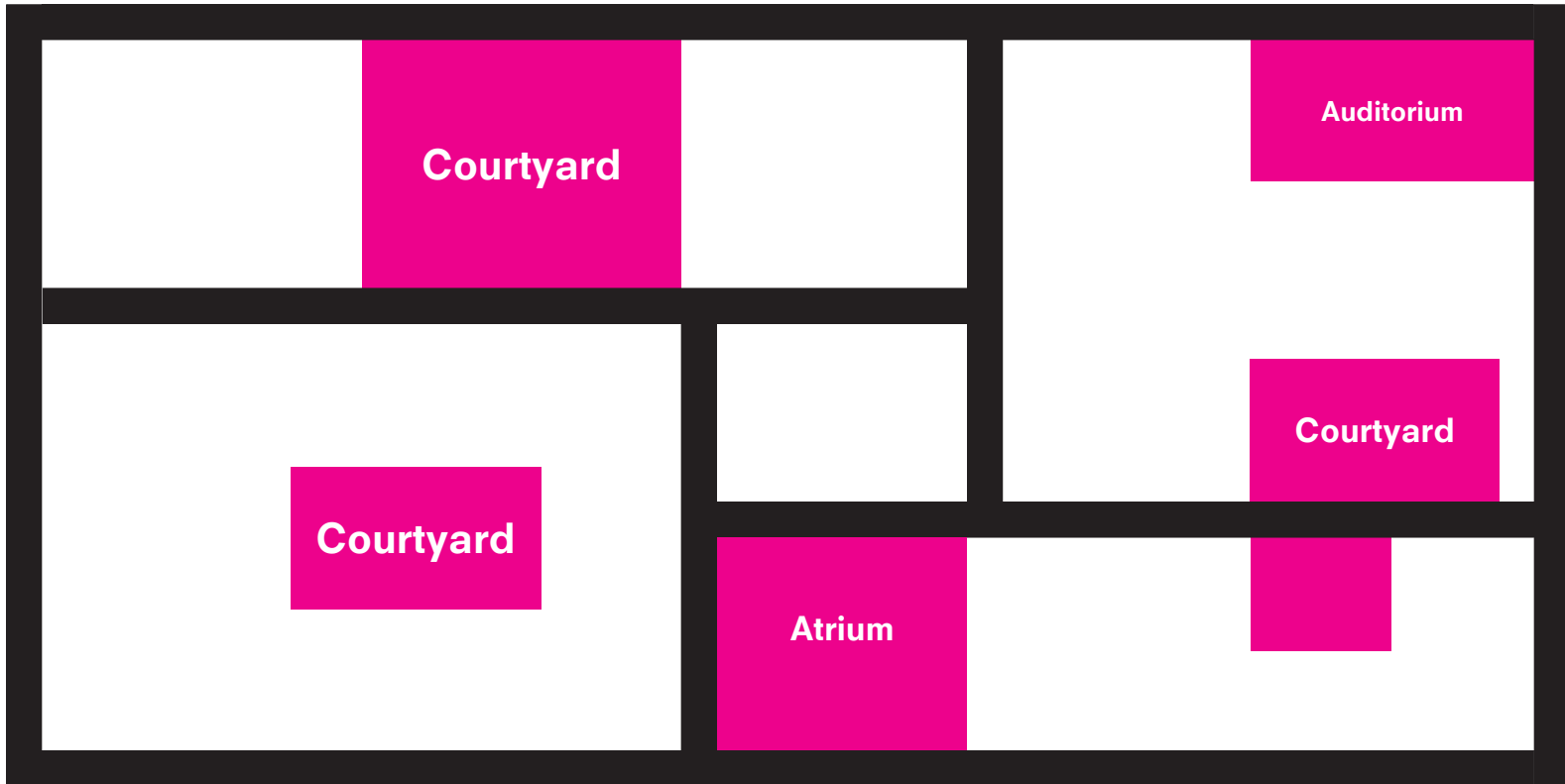


FOUR ZONES DEFINED BY THE MAIN CIRCULATION



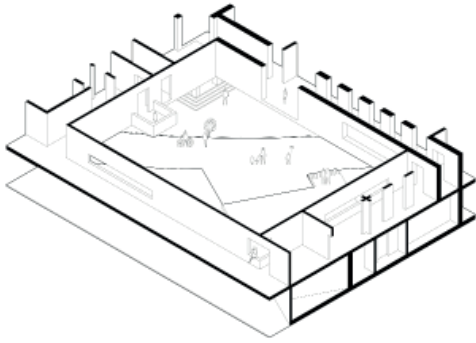
Orientation

COURTYARD AND ATRIUM

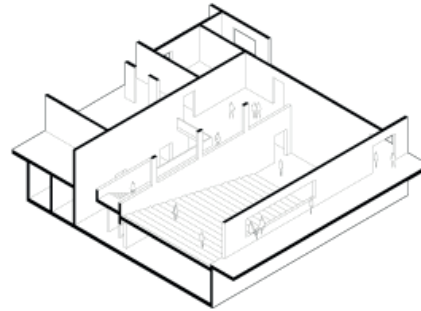


Orientation

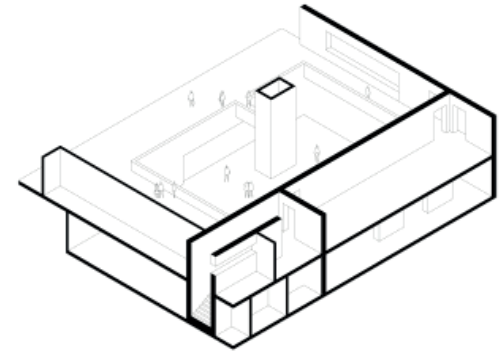
COURTYARD AND ATRIUM



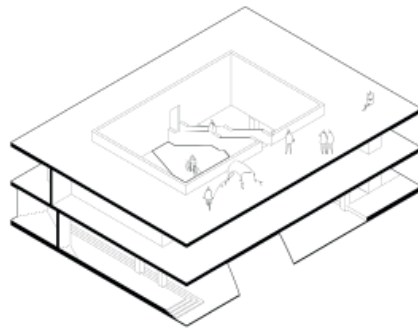
GARDEN OF FORKING PATHS



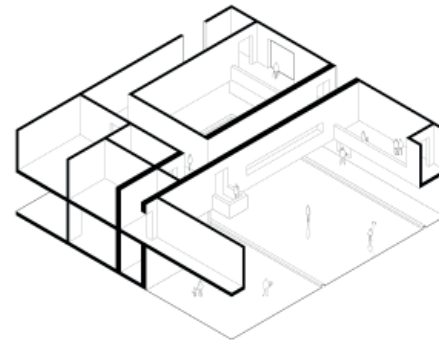
AUDITORIUM



TOWER HALL



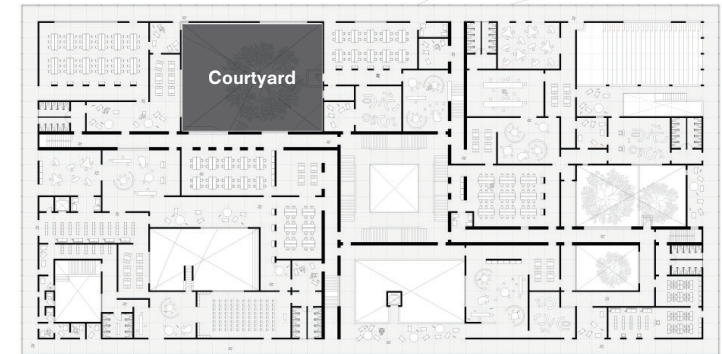
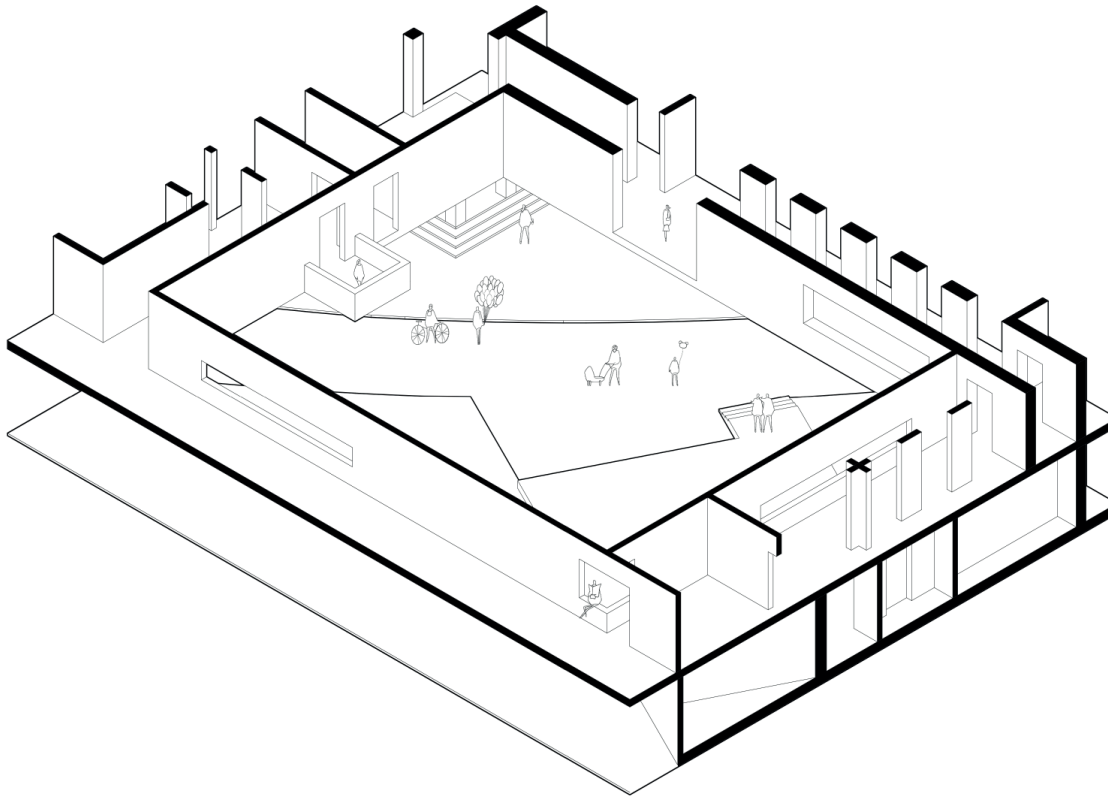
STAIR YARD



BRIDGE YARD

Orientation

GARDEN OF FORKING PATHS



Garden of Forking Paths A natural gathering space

The square at the centre of the courtyard was a natural gathering space, perfect for impromptu meetings, group discussions, or even outdoor classes. **The forking paths, leading off in different directions, encouraged exploration and movement.** As students ascend to the upper floors of the building, they are greeted with a view of the courtyard below. The windows and balconies that line the perimeter of the upper floors provide opportunities to perceive what is happening outside.

Orientation

GARDEN OF FORKING PATHS



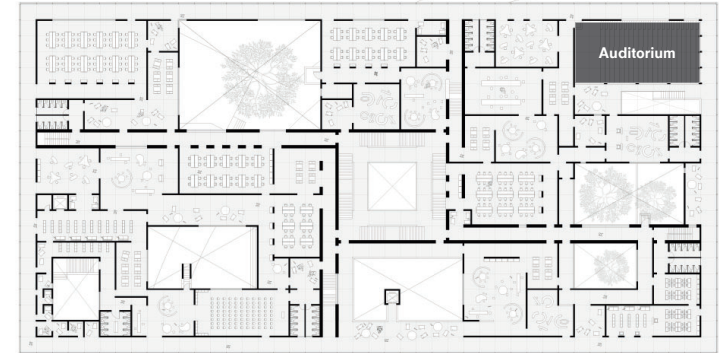
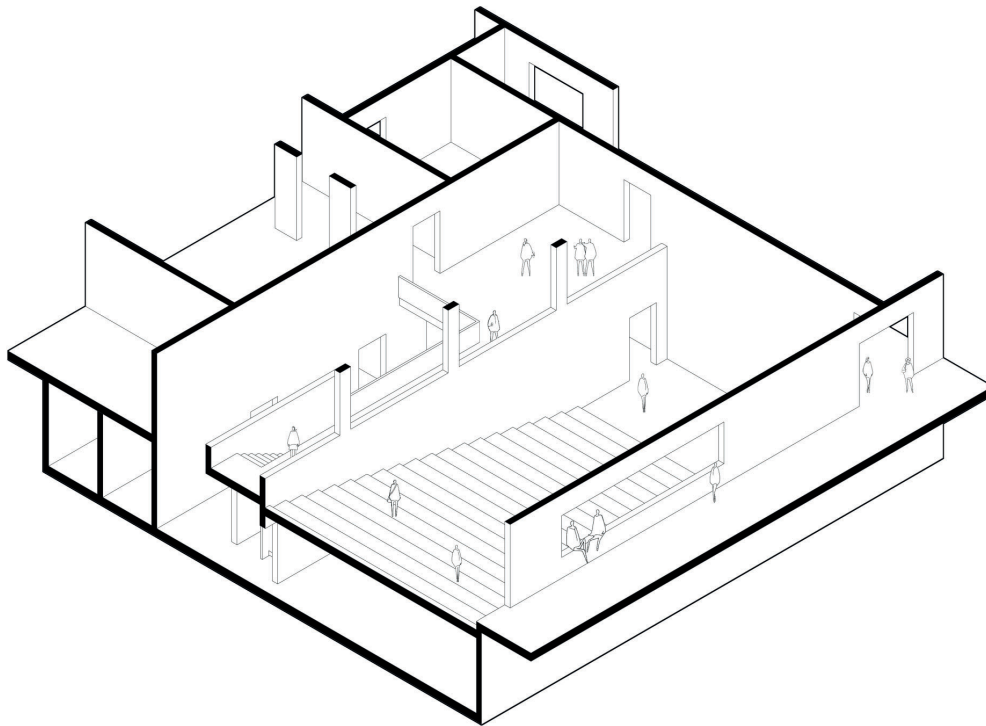
Orientation

GARDEN OF FORKING PATHS



Orientation

COURTYARDS & ATRIUMS

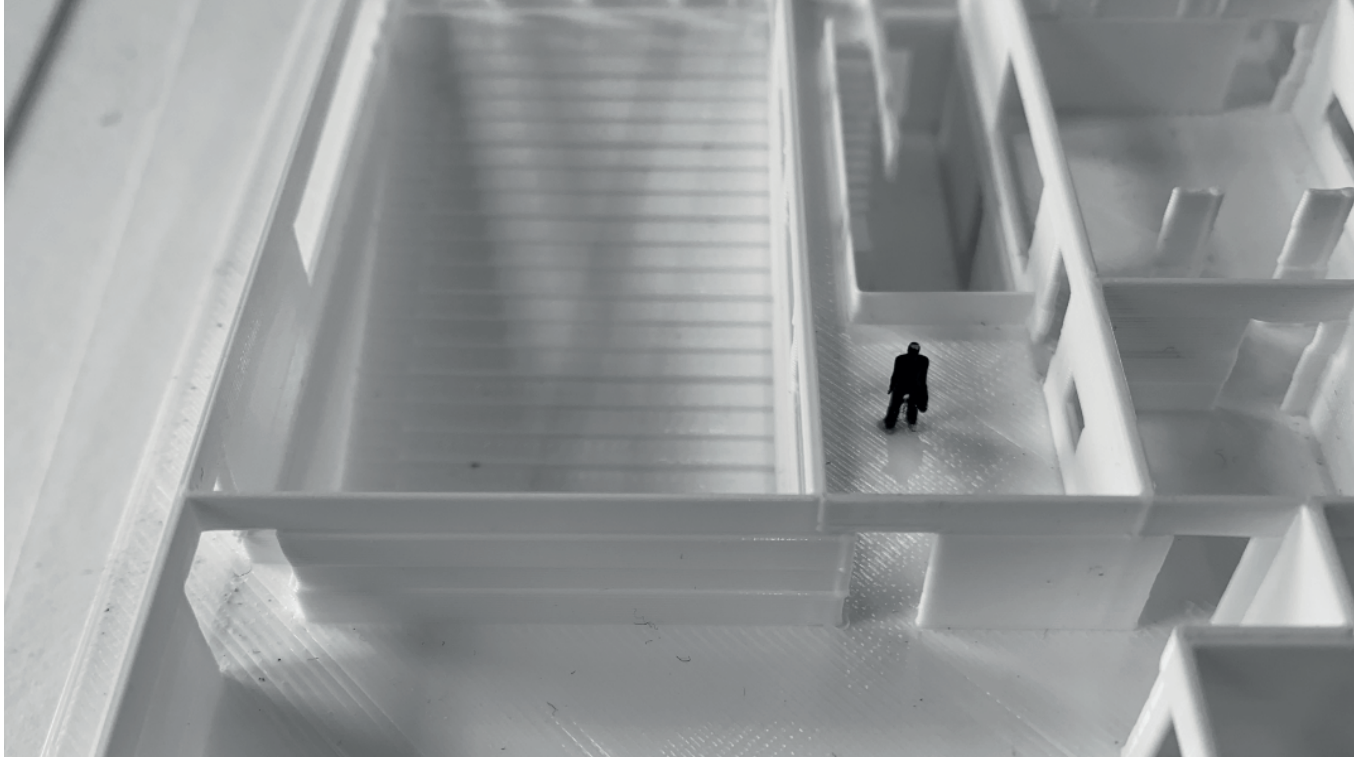


Auditorium
provide a clear view of the events happening inside

As students walk through the corridors surrounding the auditorium, they are able to catch a glimpse of the activity taking place within. The large glass windows lining the walls of the auditorium allow for natural light to pour in and provide a clear view of the events happening inside. This creates an atmosphere of transparency, allowing students to feel connected to the events taking place within the faculty.

Orientation

CORRIDORS AROUND

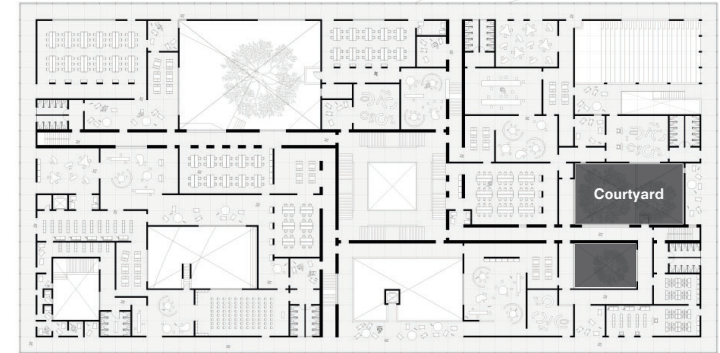
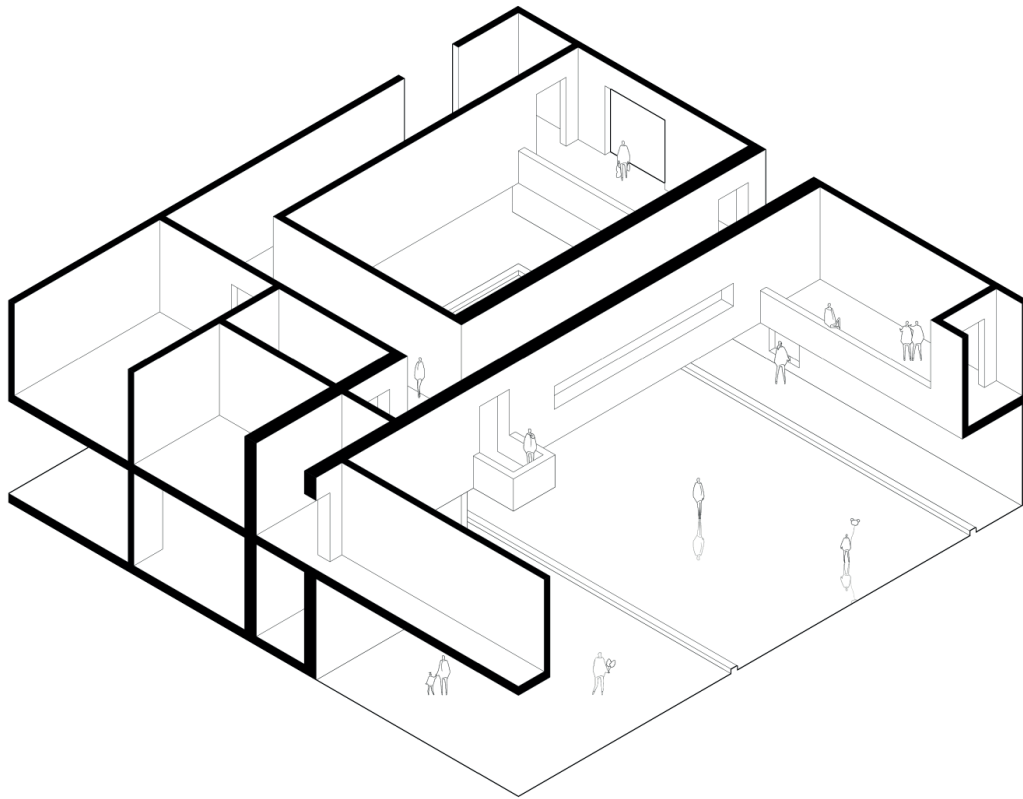


Orientation

OPENNINGS AND BALCONIES



Orientation
BRIDGE YARD



Bridge Yard
Span over the courtyard and connect the space

The centrepiece of the courtyard is a bridge that spans between the staff offices and the classrooms. **As students and staff moved across the bridge, they were treated to stunning views of the outside world, bringing a sense of openness to the space.**

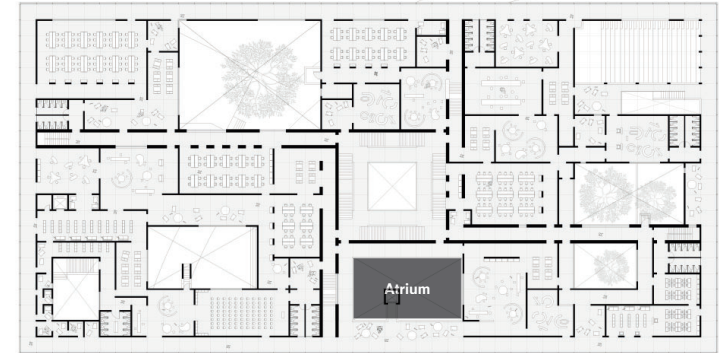
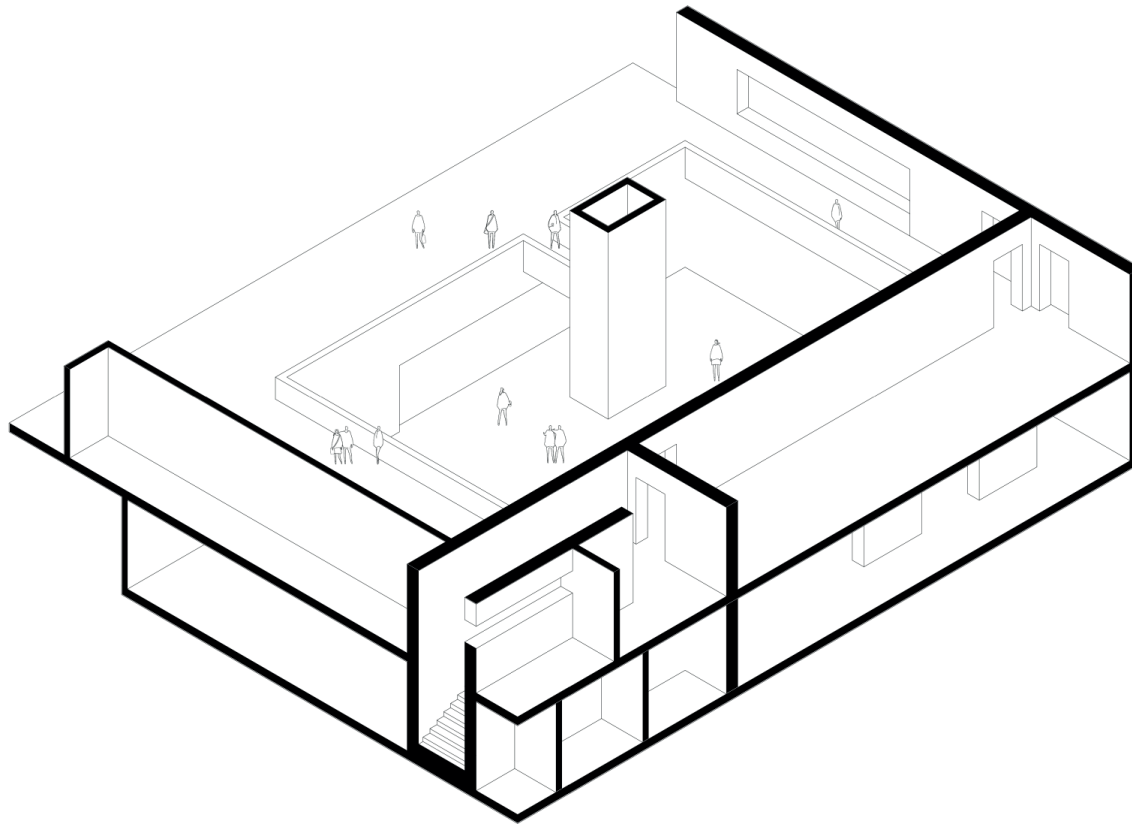
Orientation

SPANS BETWEEN THE OFFICE AND THE CLASSROOM



Orientation

HALL OF THE TOWER



Hall of The Tower
Provides vertical transportation

At its centre, a surprising feature reveals itself: **a mysterious tower.** **The tower is not only a visual spectacle, but also an elevator that provides efficient vertical transportation** throughout the building. As students explore the hall, the hidden tower adds an element of mystery to the space.

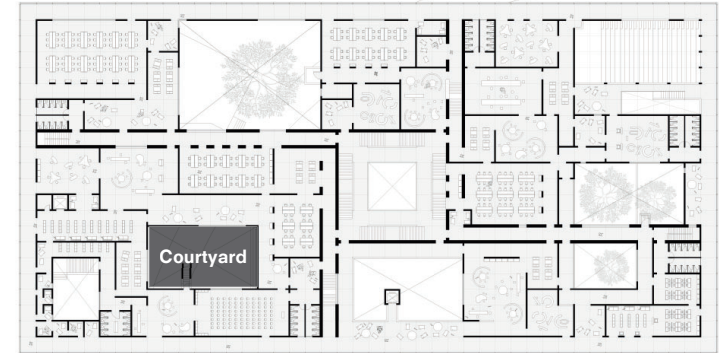
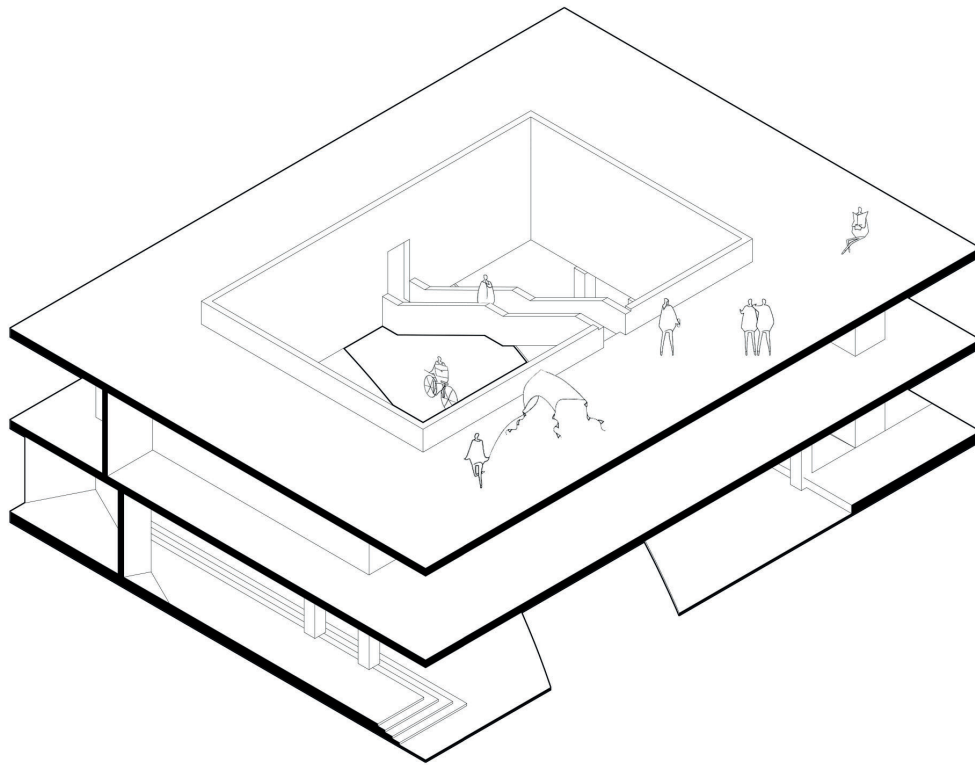
Orientation

VERTICAL TRANSPORTATION



Orientation

STAIR YARD



Stair Yard

Inviting students to go upwards to roof garden

The stair's design encouraged movement and exploration, inviting students to go upward towards the roof where they could enjoy breathtaking views of the courtyard. The combination of the stair and courtyard created an experience that was both functional and beautiful, enhancing the daily lives of the students who used it.

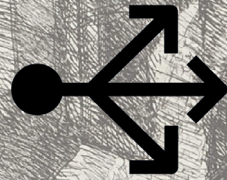
Orientation
STEP UPWARDS



Orientation

GRASS, WATER AND SKY



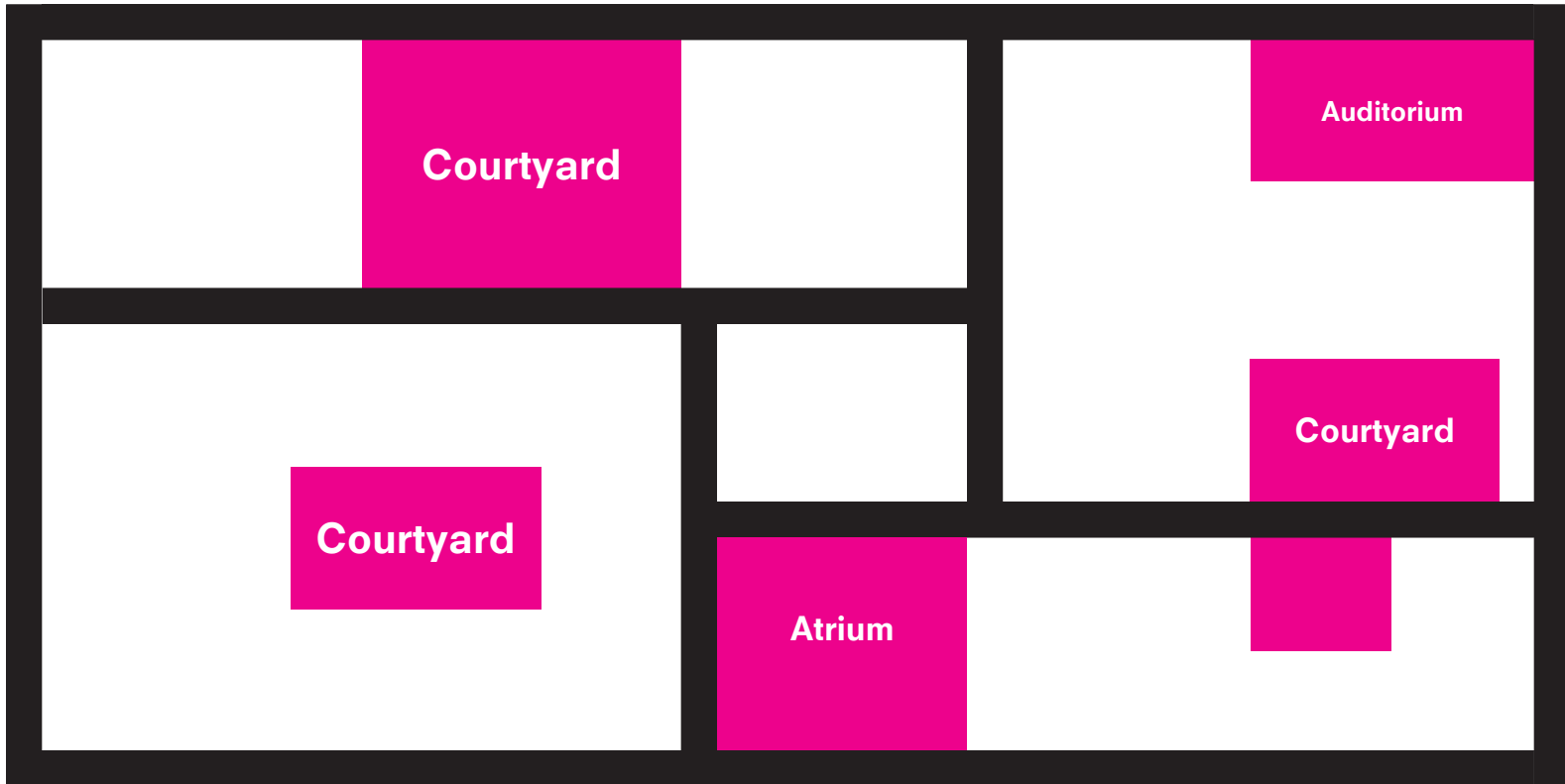


MULTIPLE ROUTES

FACULTY OF COMPUTER SCIENCE

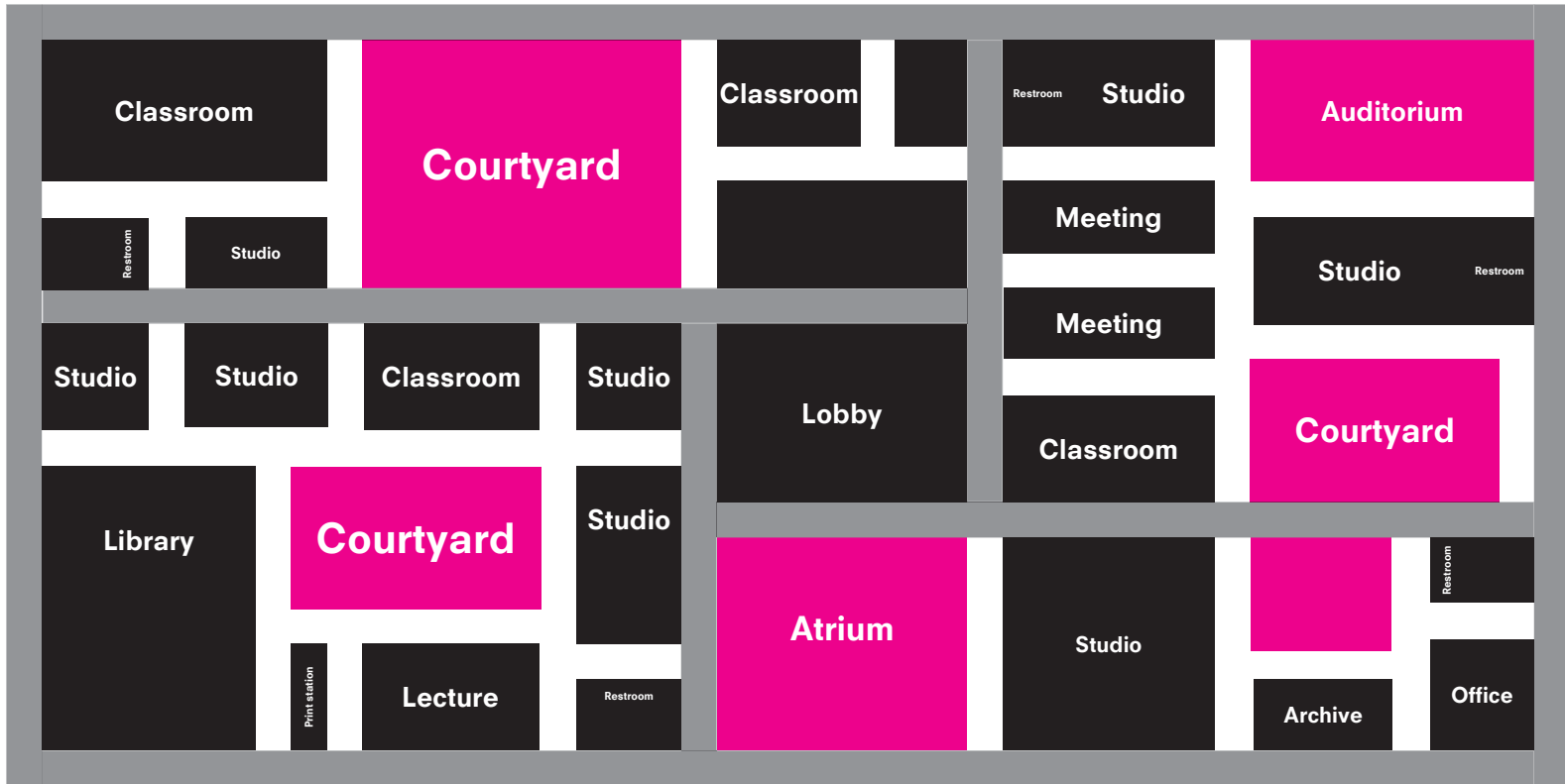
Multiple routes

COURTYARD AND ATRIUM

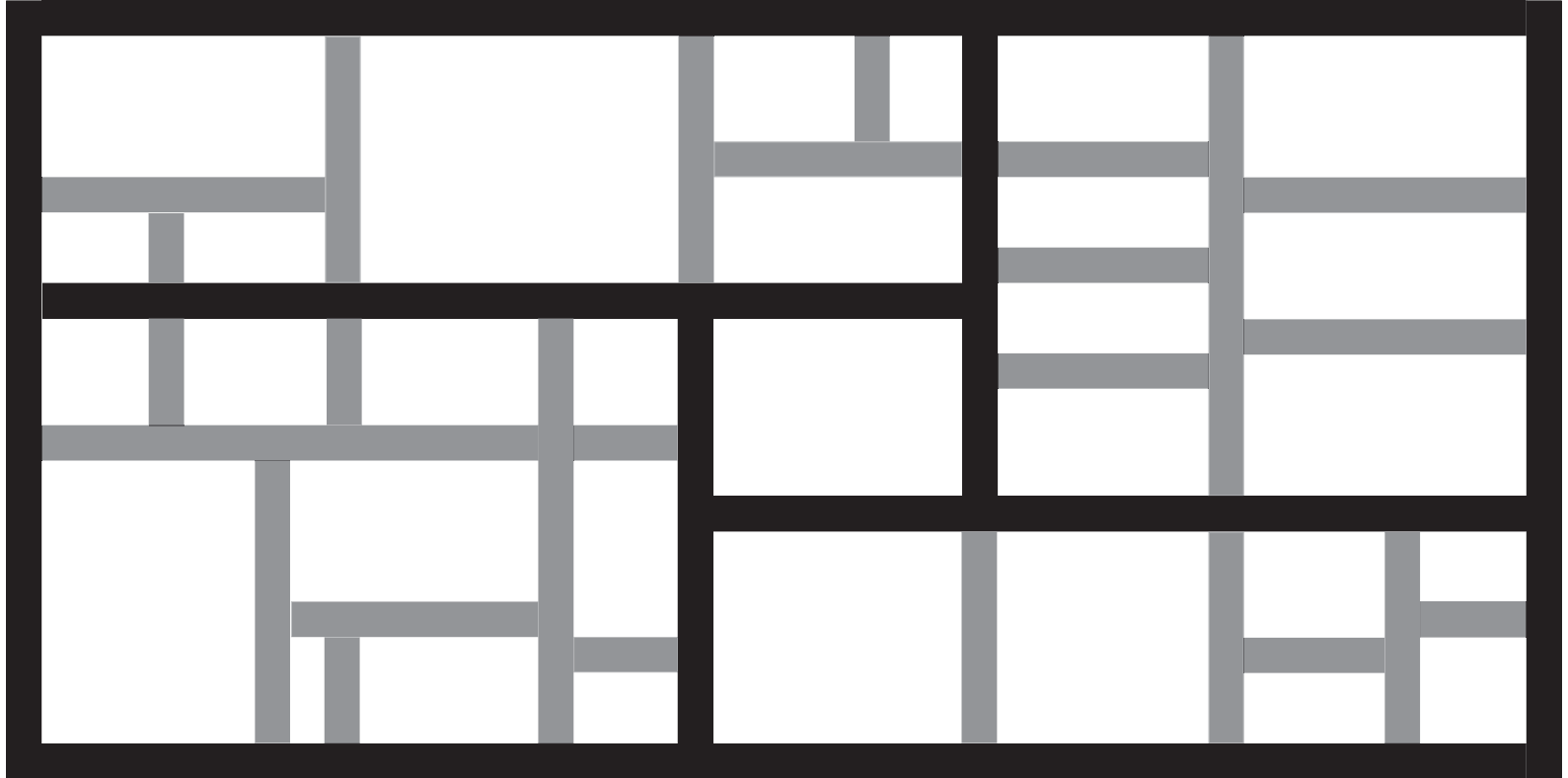


Multiple routes

APPLY THE FUNCTION PROGRAM



Multiple routes
NET CIRCULATION SYSTEM

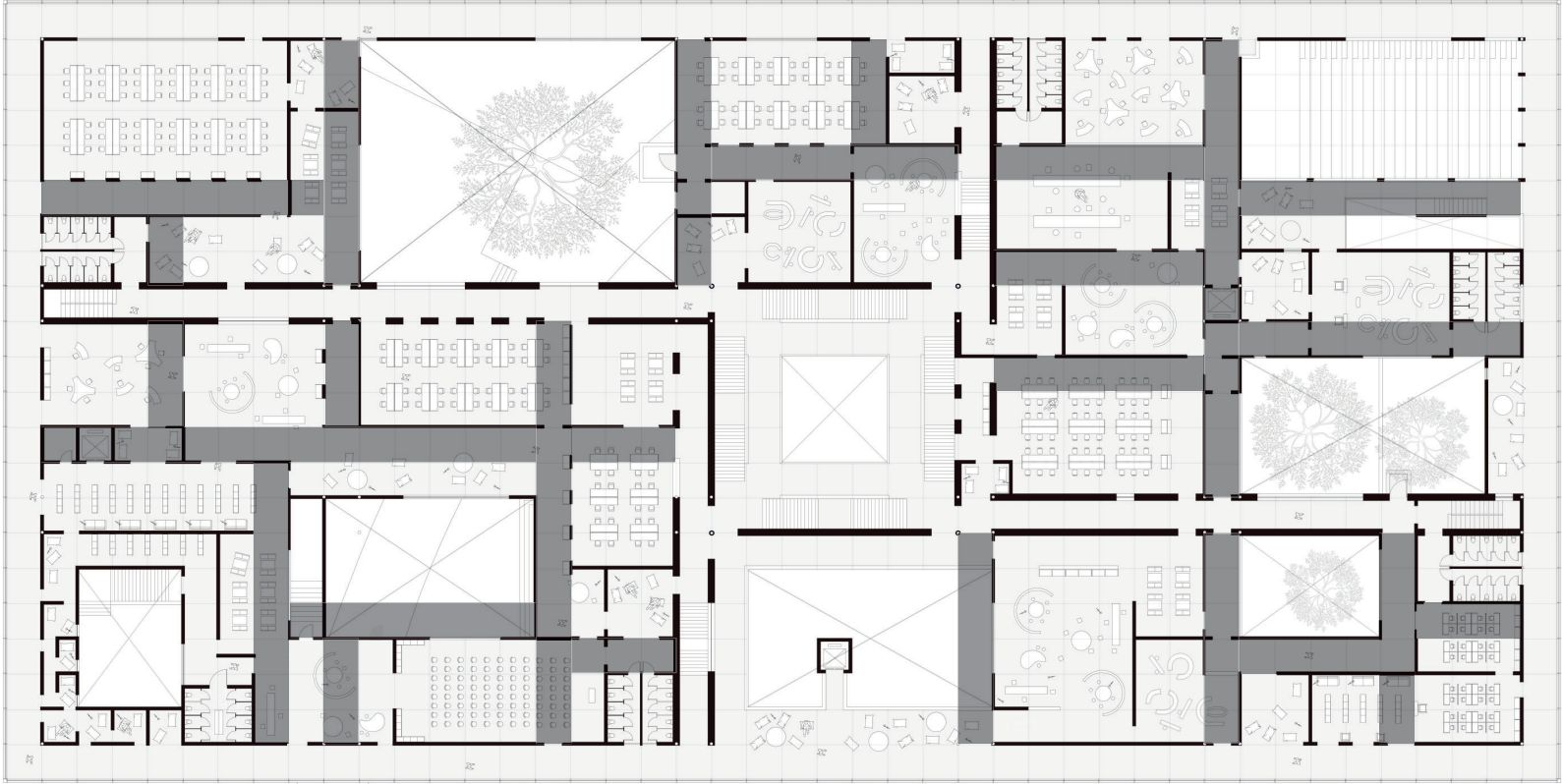


Multiple routes

MAIN CIRCULATION

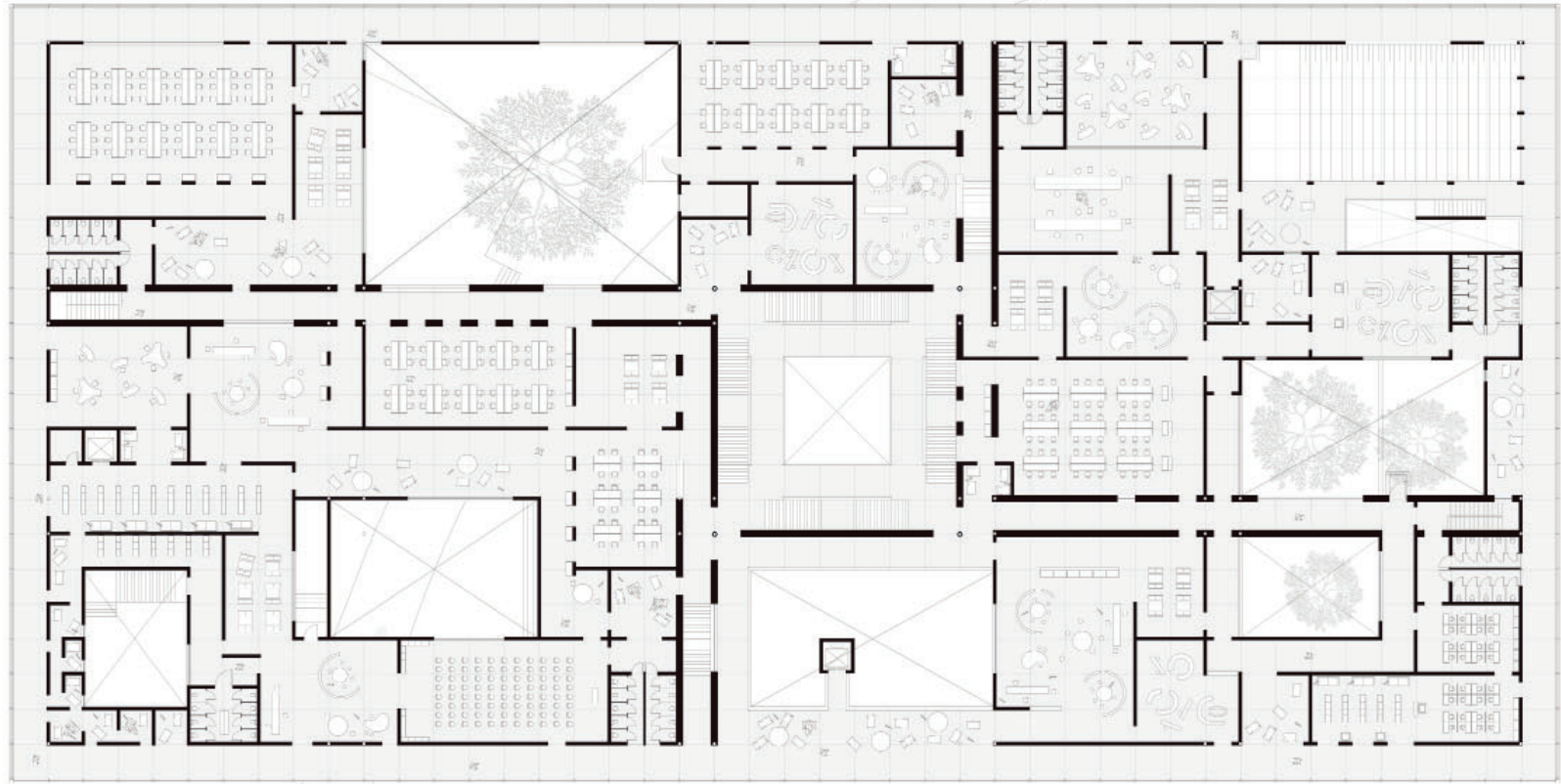


Multiple routes
SUB CIRCULATION



Multiple routes

NET: OFFERS CONNECTIONS & PROVIDES OPPOTUNITIES

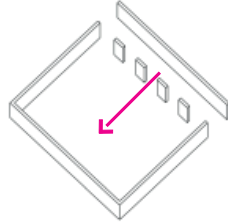




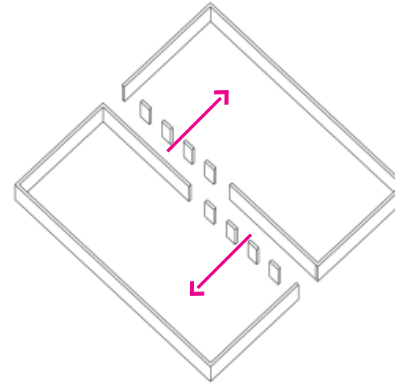
PERMEABILITY

FACULTY OF COMPUTER SCIENCE

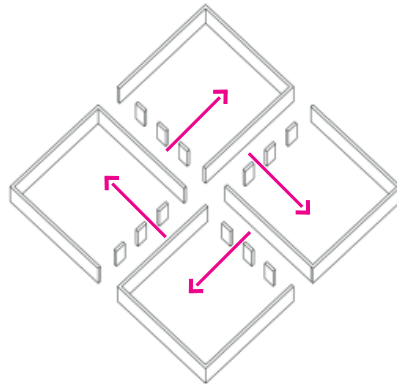
HIGH PERMEABILITY: 4 PROTOTYPES OF CIRCULATION



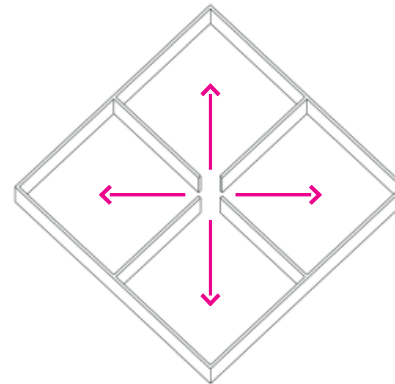
Colonnade



Long colonnade



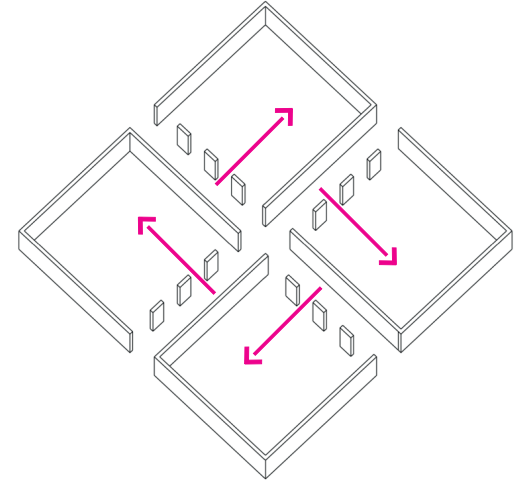
Windmill



Cross

Permeability

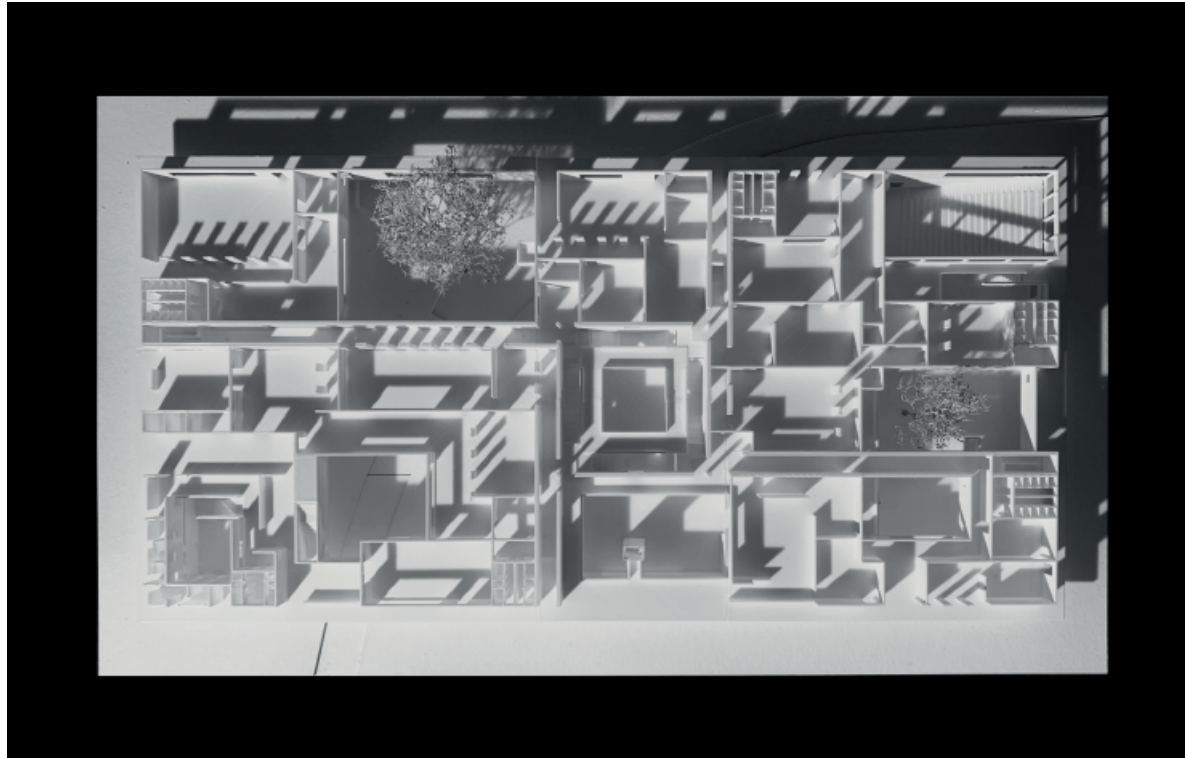
WINDMILL PROTOTYPE



**WINDMILL
MAIN CIRCULATION STRUCTURE**

Permeability

OPENNINGS ON THE BOUNDARIES



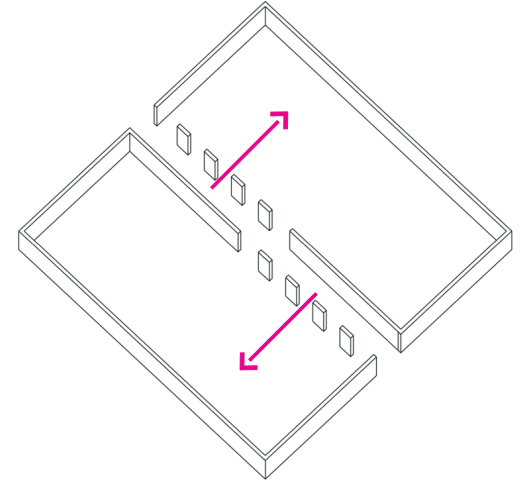
Permeability

CONTROL PEOPLE'S VISION



Permeability

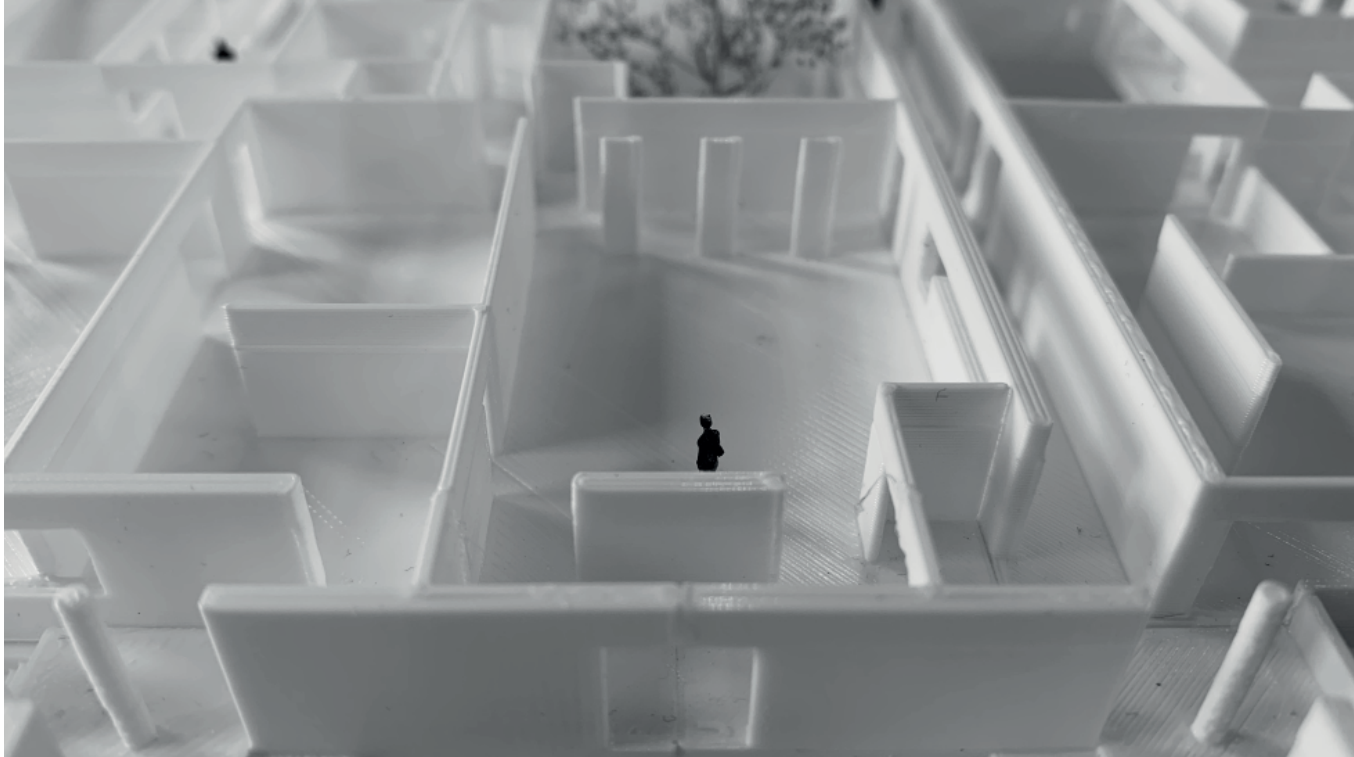
COLONNADE PROTOTYPE



**COLONNADE
CIRCULATION BRANCHES**

Permeability

COLONNADE BESIDE A CLASSROOM



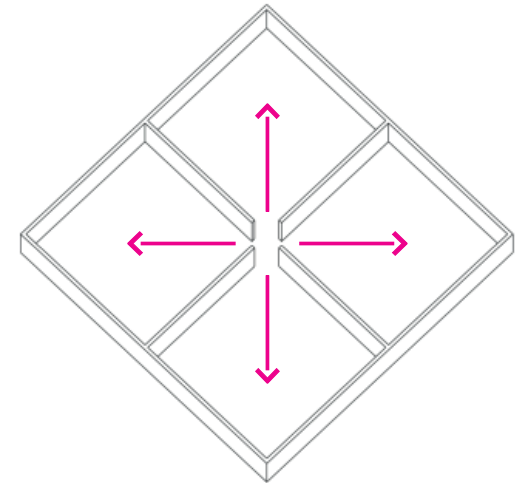
Permeability

ENGAGE OR KEEP FLOWING



Permeability

CROSS PROTOTYPE



**CROSS
TRANSITION SPACE**

Permeability
CROSS

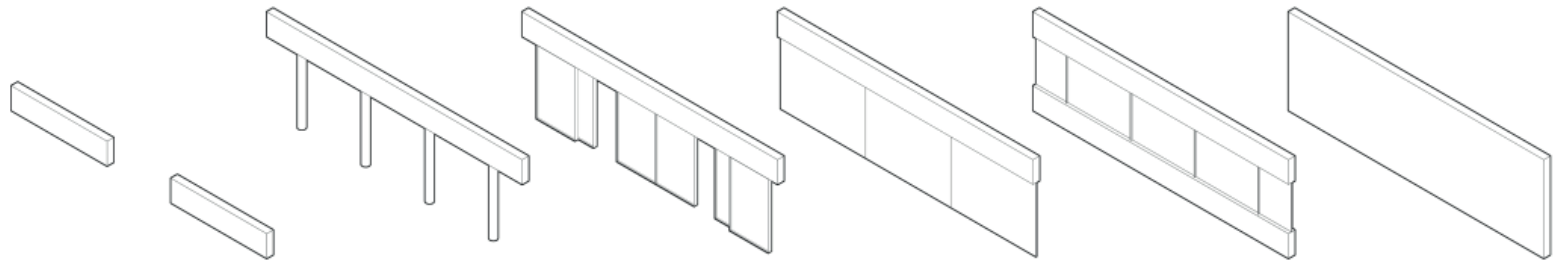


Permeability

PERCEIVE FOUR SPACES AROUND



BOUNDARIES OF THE CIRCULATION



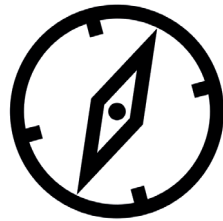
	Low wall	Colonnade	Movable screen	Glass curtain wall	Windows	Wall
View	+	+	+/-	+	+	-
Sound	+	+	+/-	-	-	-
Air/heat	+	+	+/-	-	-	-
Movement	-	+	+/-	-	-	-

Permeability

DIVIDE THE SPACE IN DIFFERENT DEGREES



SPACIAL FLUIDITY RULES

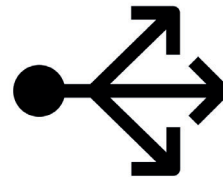


CLEAR ORIENTATION

Make full use of the current path and trees

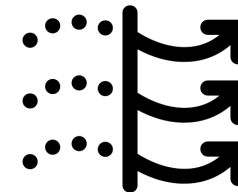
Four corridors in four directions to give basic guidance

Design special courtyards and atriums for different zones



MULTIPLE ROUTES

Use permeability prototypes for the plan design

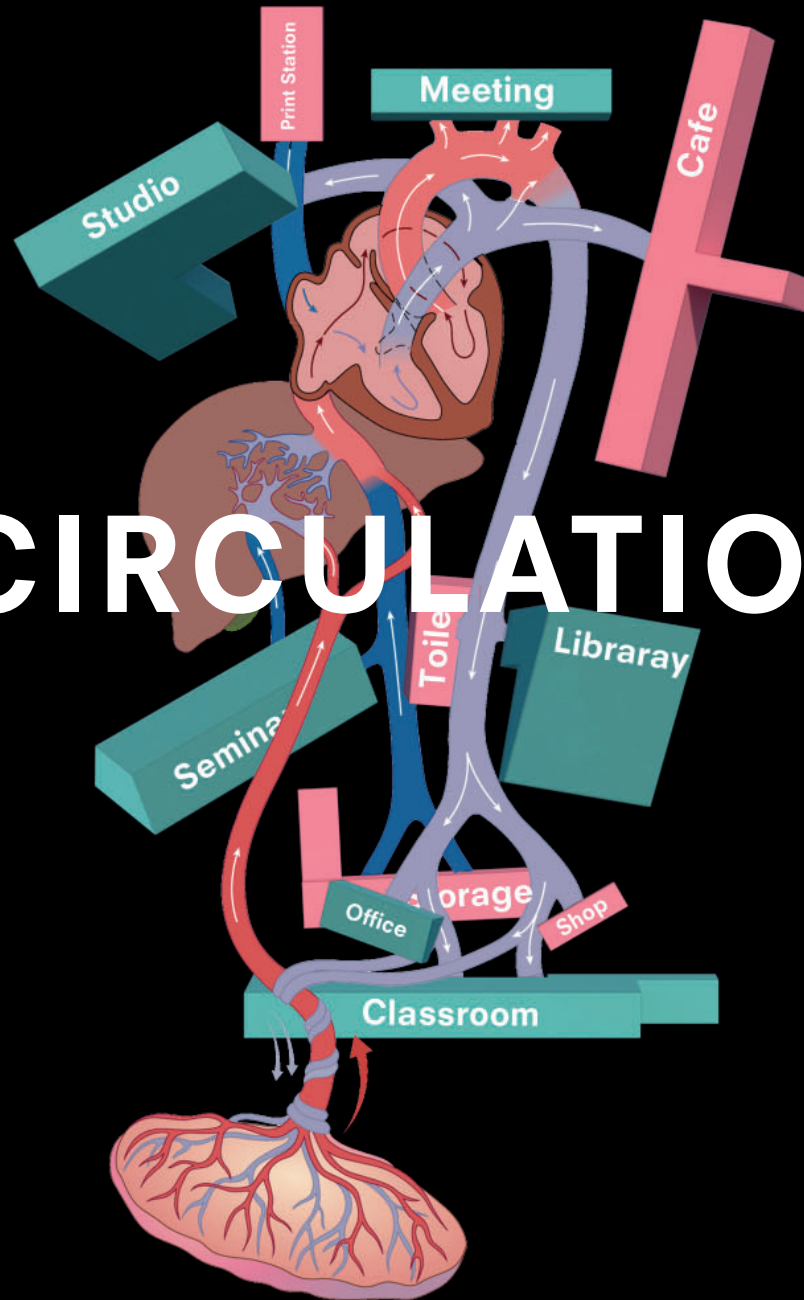


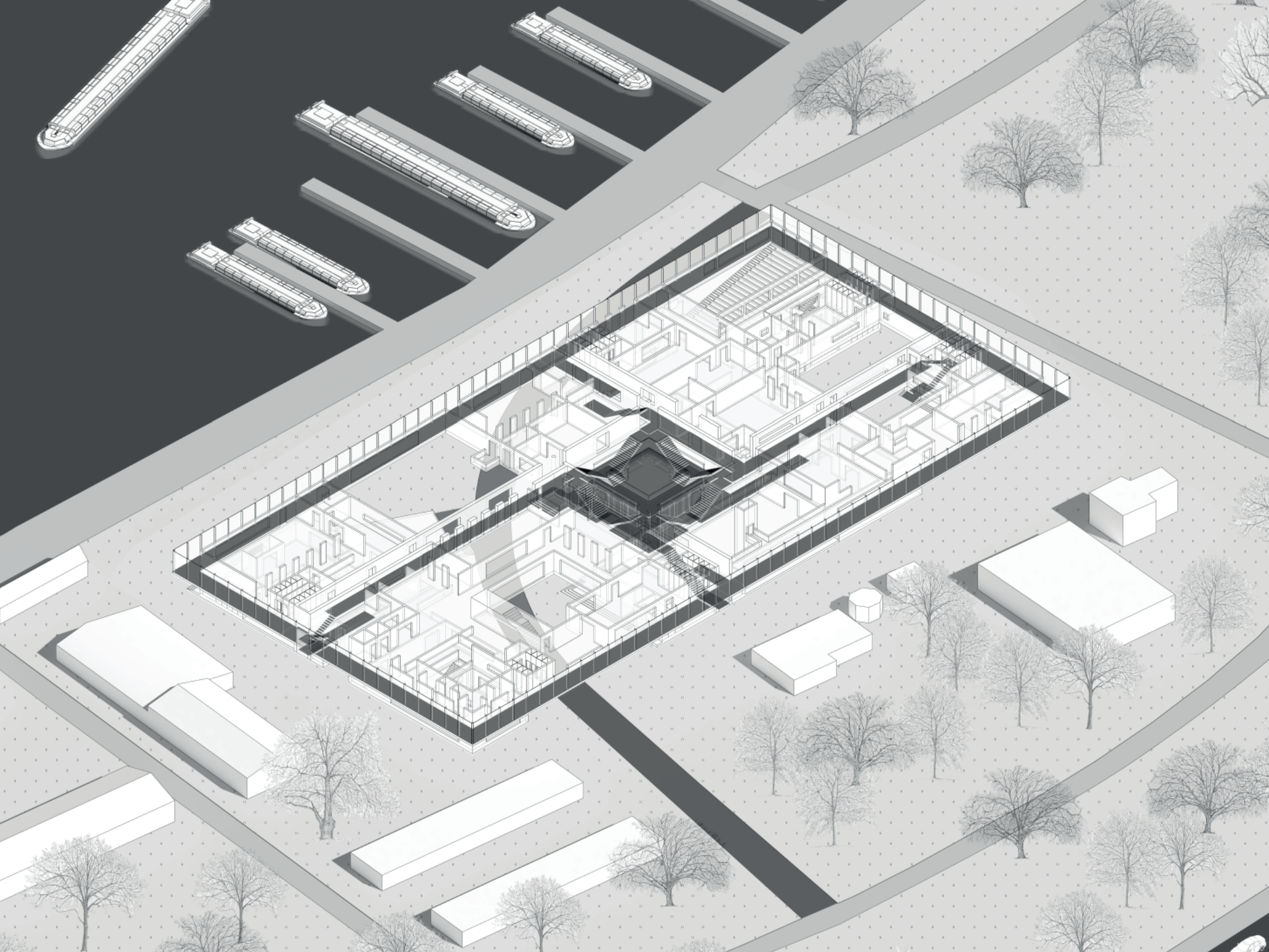
HIGH PERMEABILITY

Use the net circulation

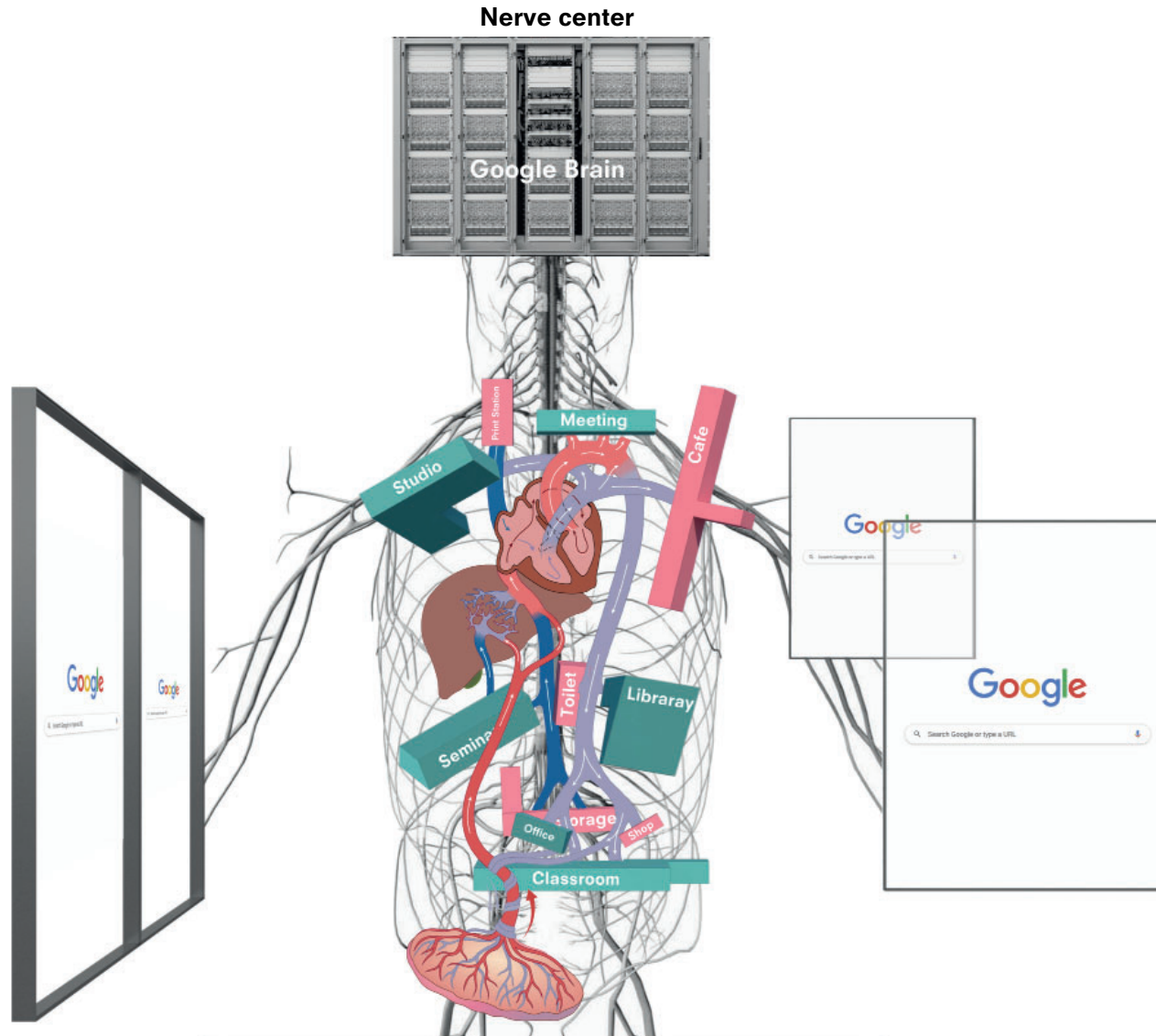
Apply room types which have more flow directions

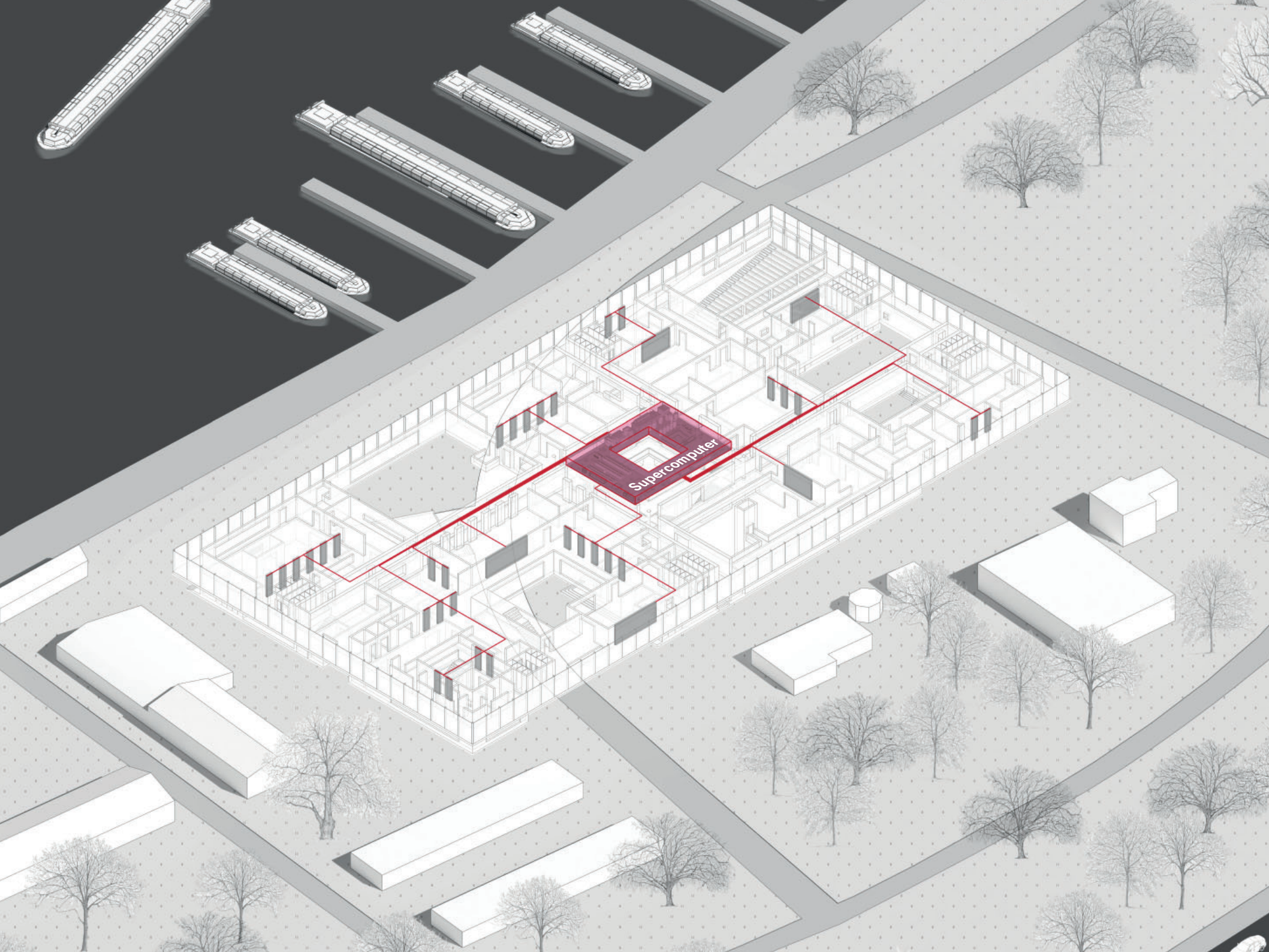
CIRCULATION





Google "NERVOUS SYSTEM"





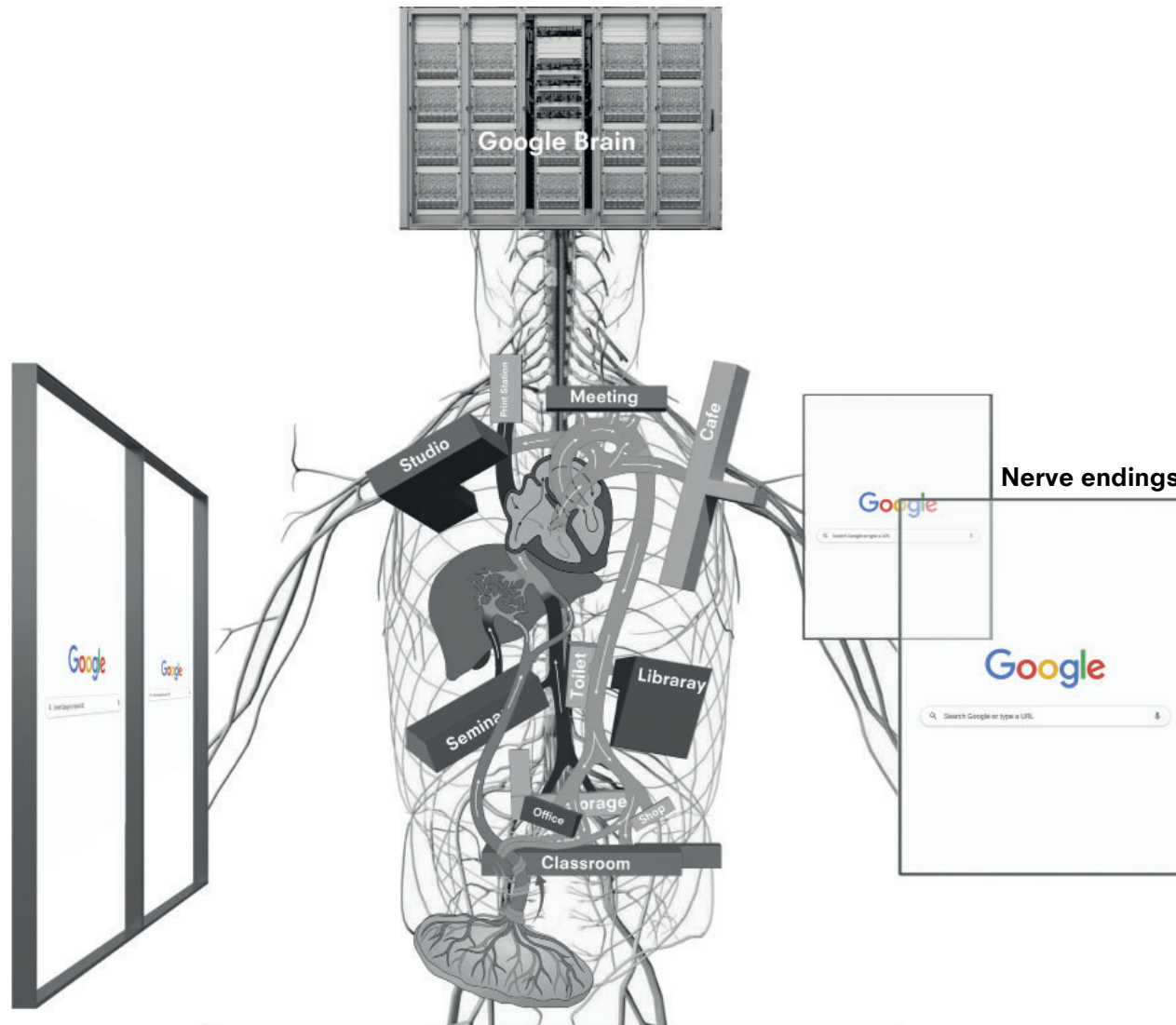
Supercomputer

Google

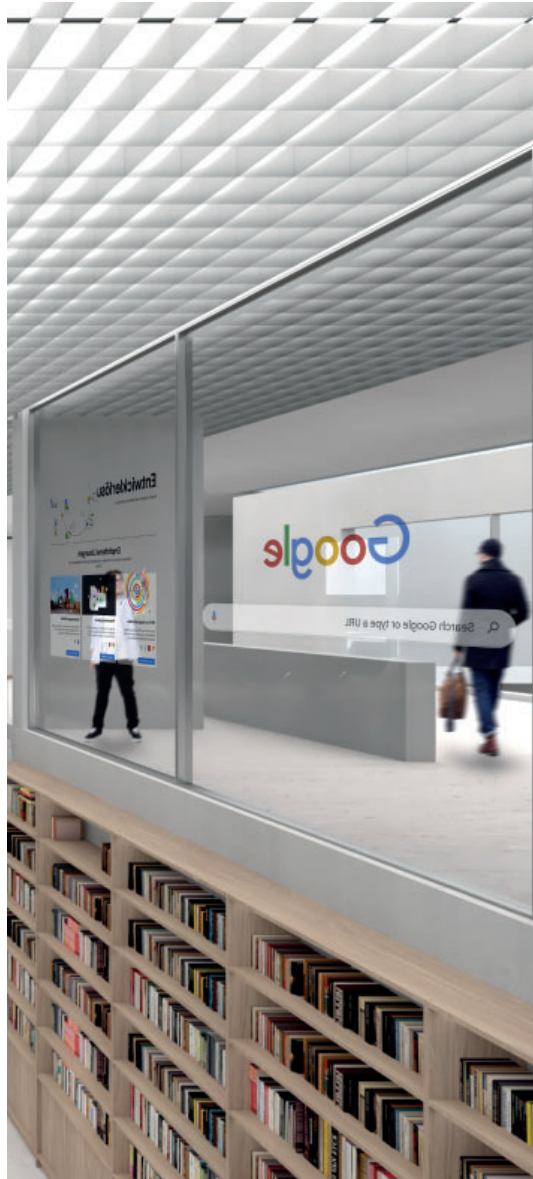
GOOGLE'S INTERACTIVE SCREEN



Google
"NERVOUS SYSTEM"



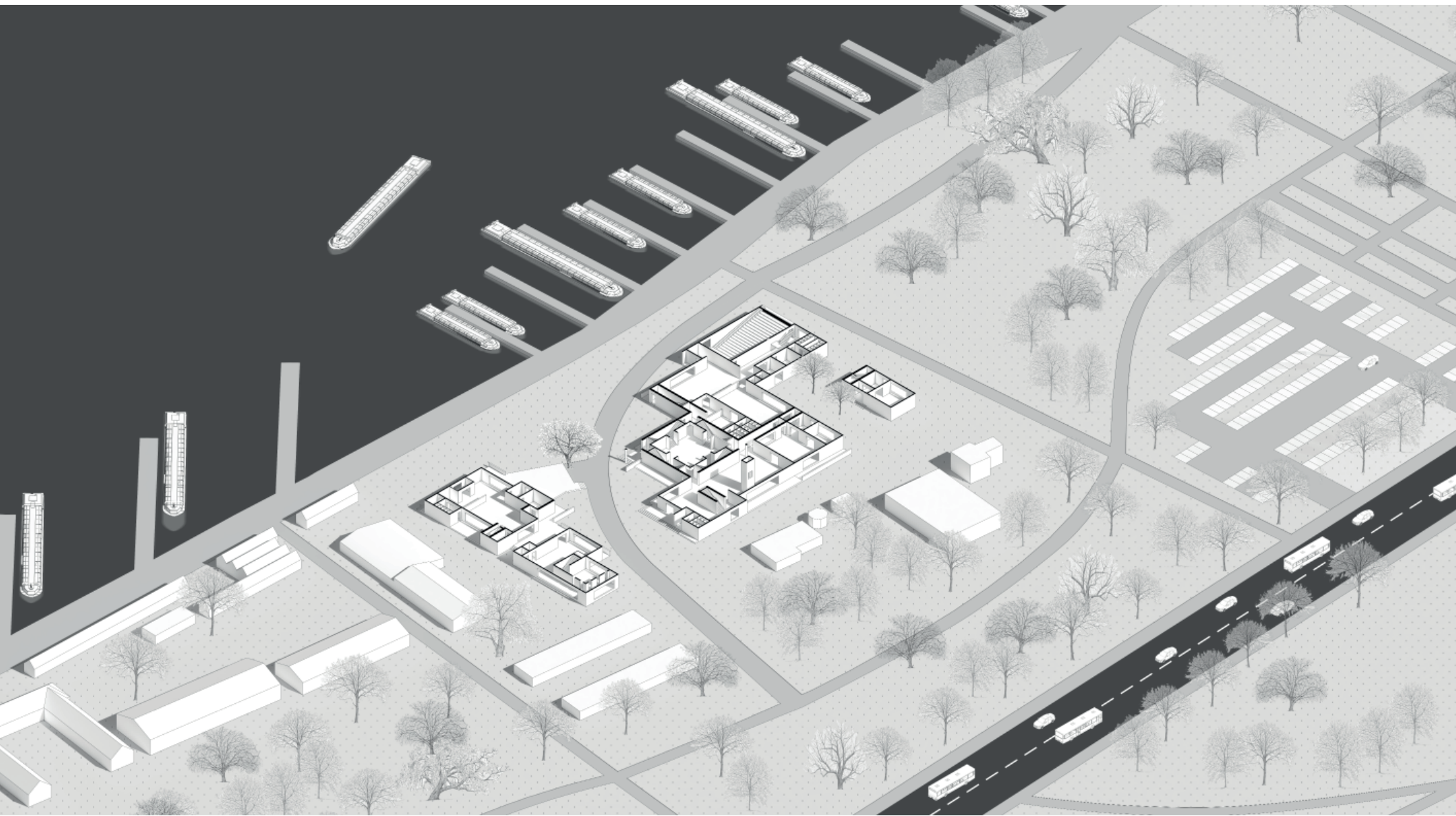
Google TRANSPARENT OLED SCREEN





FLOWING EXPERIENCE

FACULTY OF COMPUTER SCIENCE



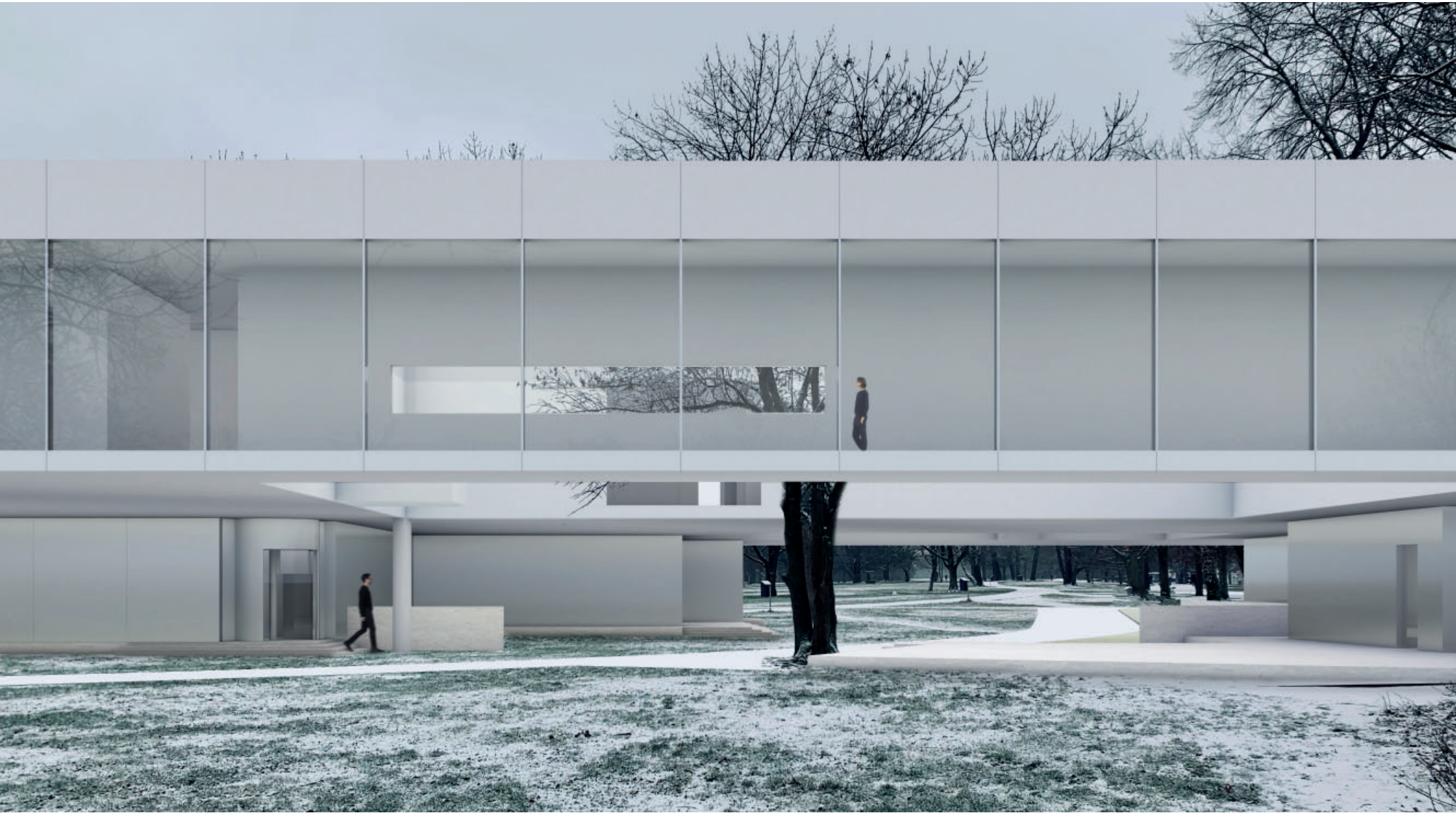
Experience

GUIDED BY THE LITTLE ROAD



Experience

MEET UNDER THE TREE



Experience

LOBBY: CHOOSE A DIRECTION



Experience

SEE THROUGH THE OPENINGS



Experience

GO THROUGH THE COLONNADE



Experience

STAND AT THE CENTER OF A CROSS



Experience
LOOK AROUND...



Experience

ATTRACT BY THE LIGHT



Experience
STUDIO

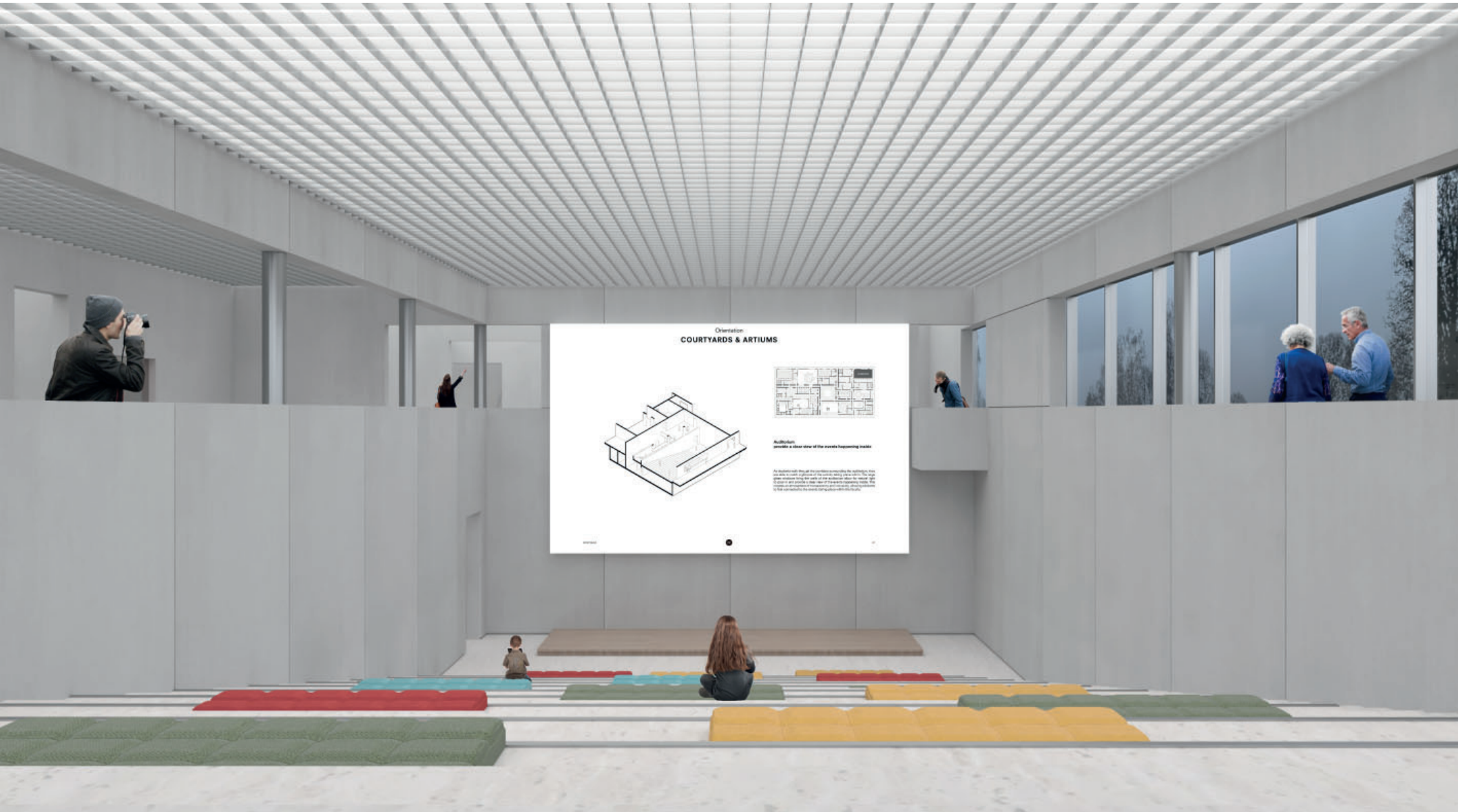


Experience

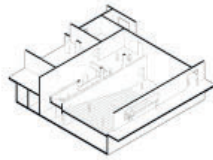
GET TO THE AUDITORIUM



Experience
WALK AROUND



Orientation:
COURTYARDS & ARTIUMS



Multi-level
provides a clear view of the various happening inside.

An outdoor walkway will be provided connecting the building to the courtyard and the courtyard to the courtyard. The walkway will be a clear view of the various happening inside. The walkway will be a clear view of the various happening inside.

Experience

JUXTAPOSITION OF SPACES



Experience

OR WANDER ON THE BOUNDARY?



Experience
CORRIDOR



Experience
STAIR YARD



Experience
LIBRARY



Experience
STAIR YARD

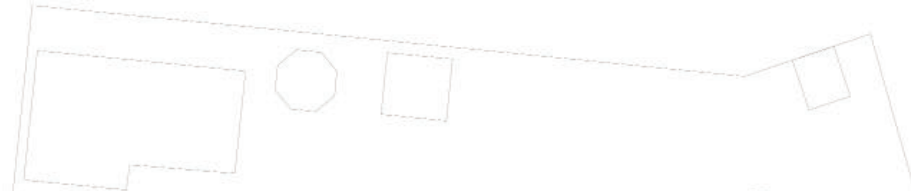
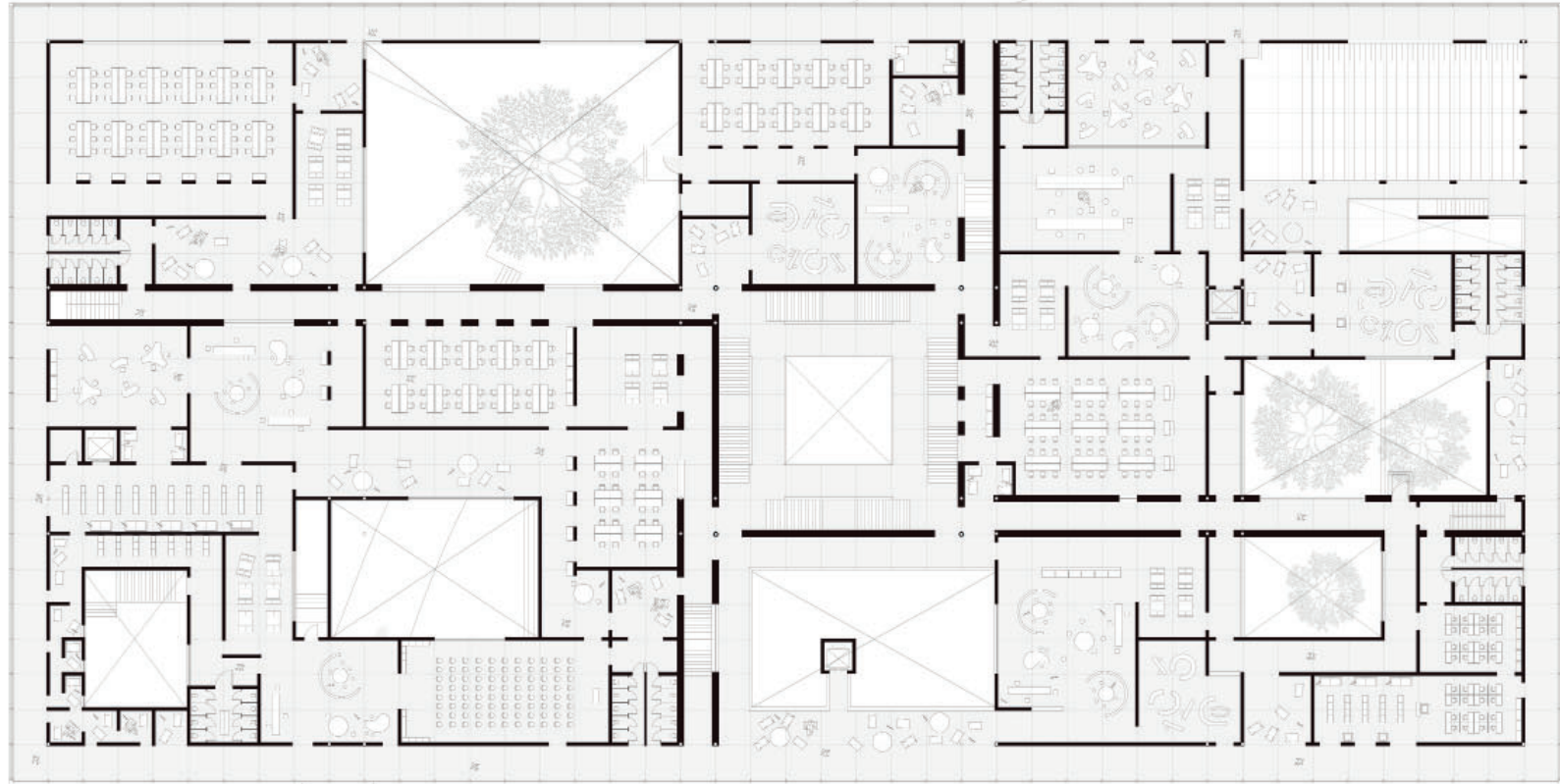


Experience
ROOF GARDEN

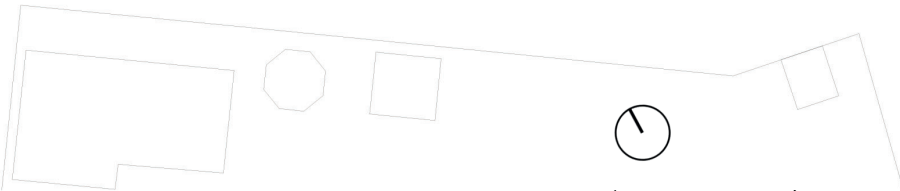
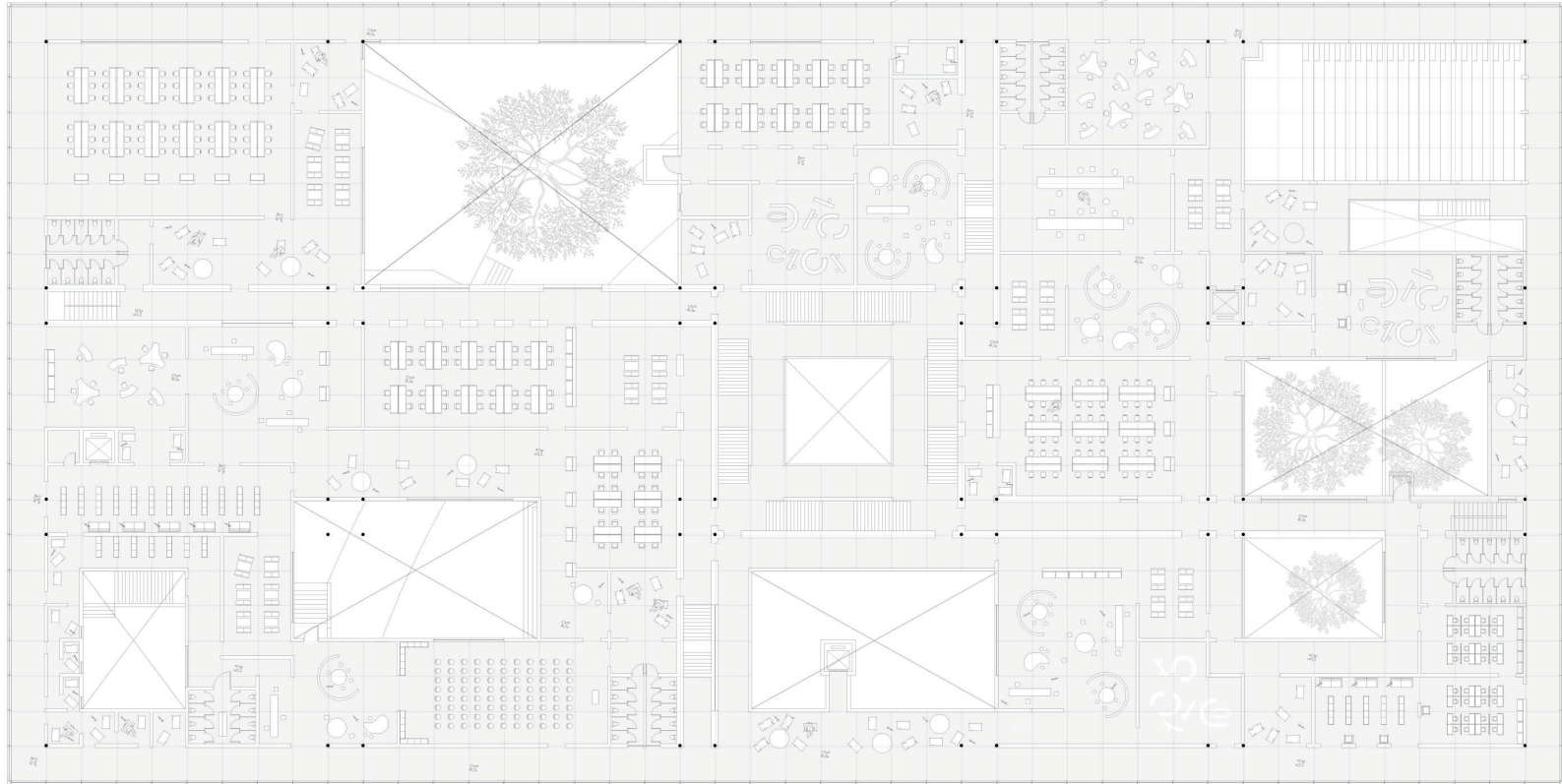


STRUCTURE

Structure **SUPPORT**



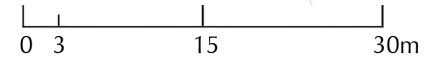
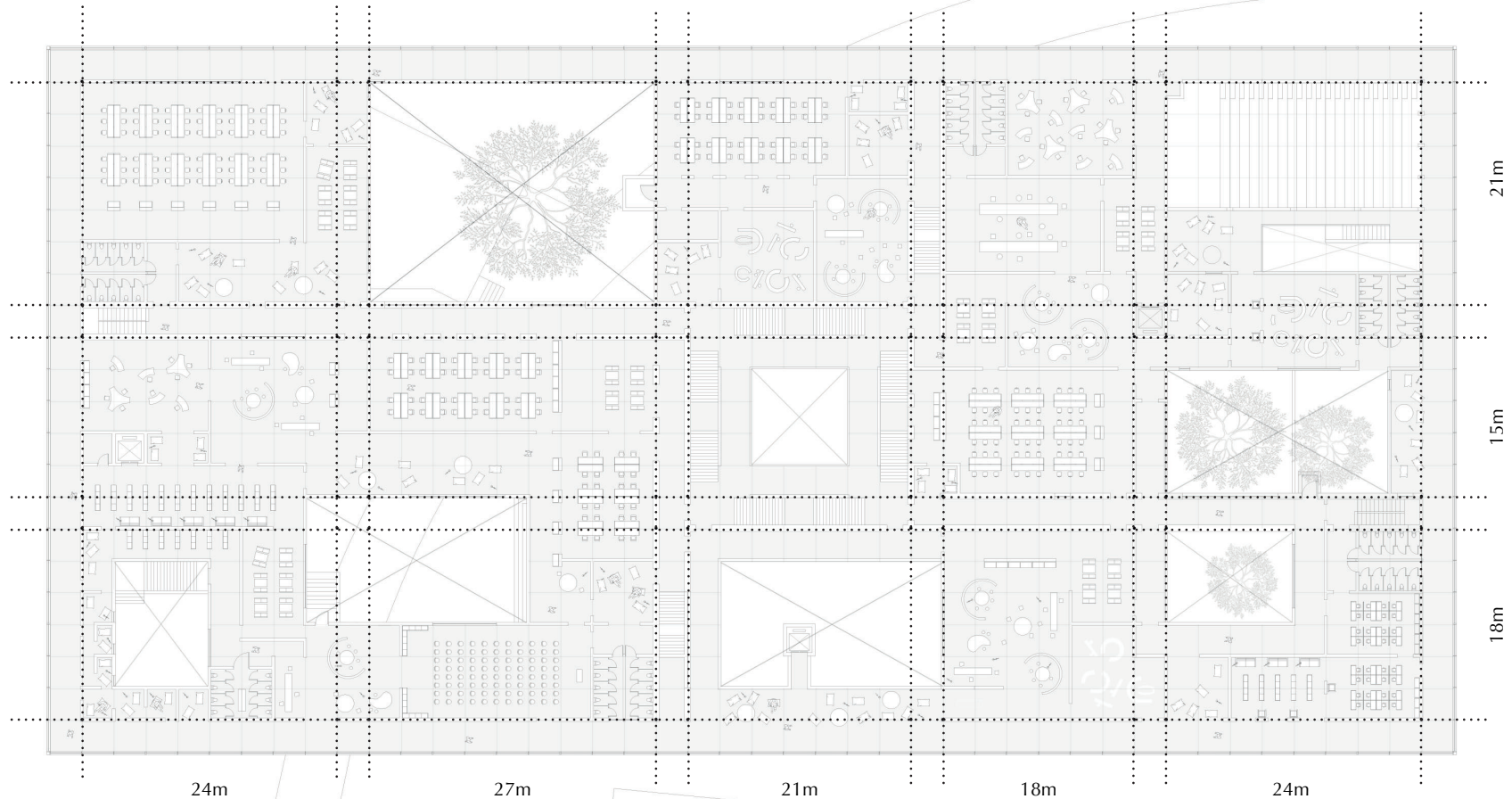
Structure COLUMNS



0 3 15 30m

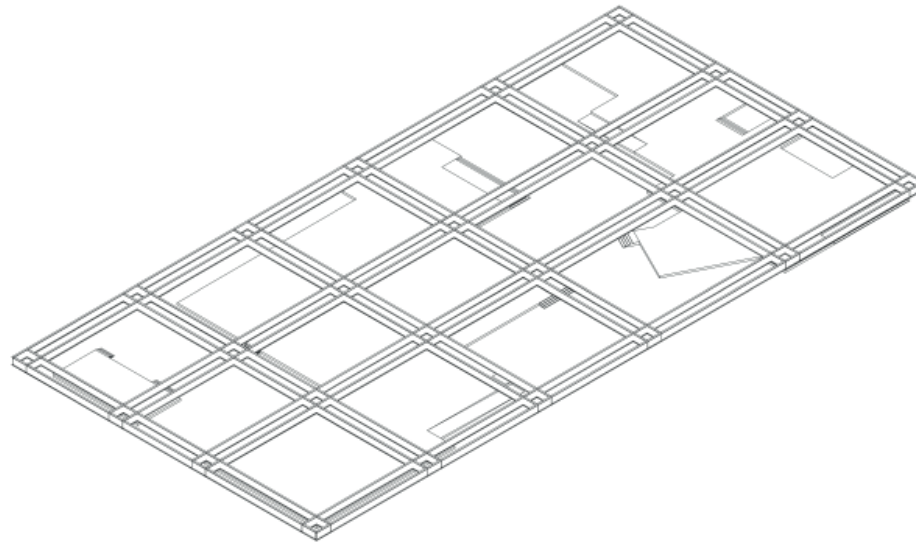
Structure

BEAM-COLUMN STRUCTURE



Structure

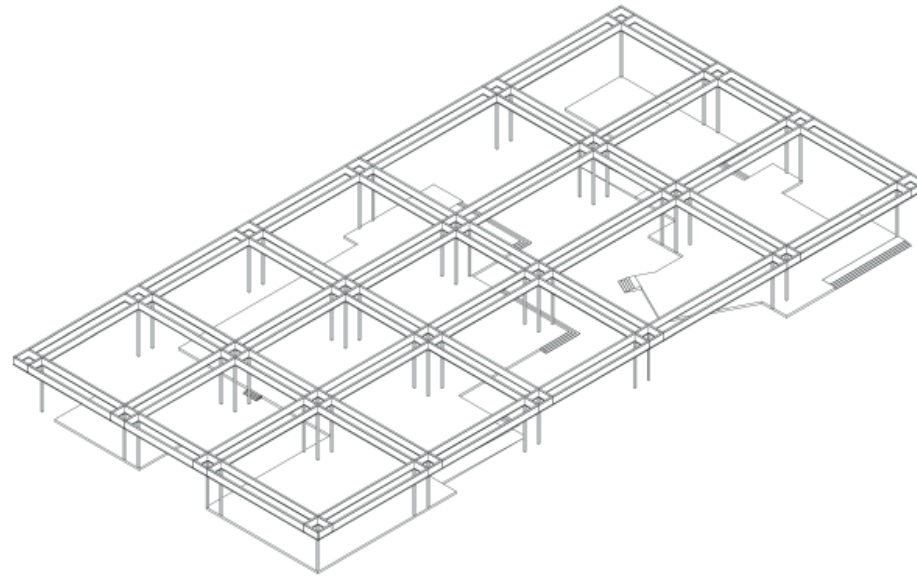
CONSTRUCTION PROCESS



1. Assemble the main beams of the roof on the concrete base

Structure

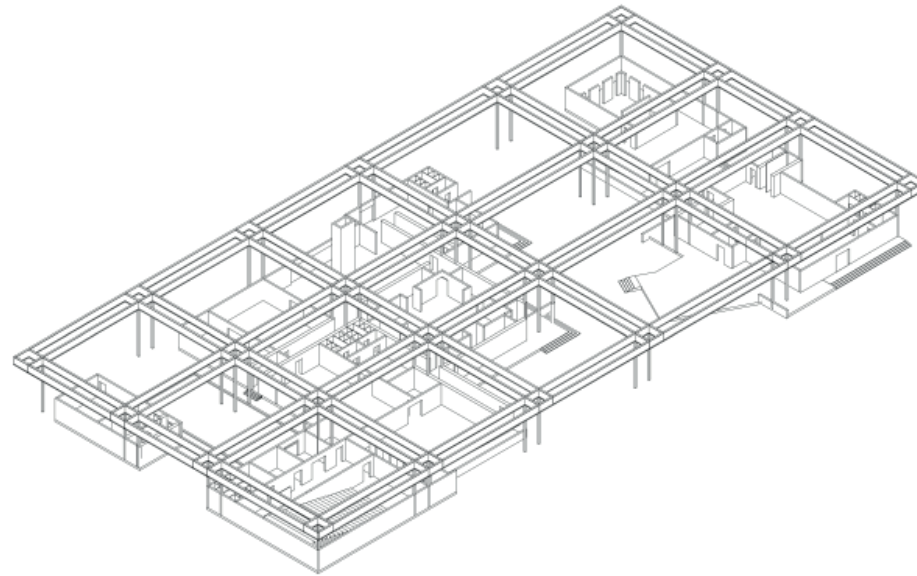
CONSTRUCTION PROCESS



2. Lift the roof up and erect the pillars to support it

Structure

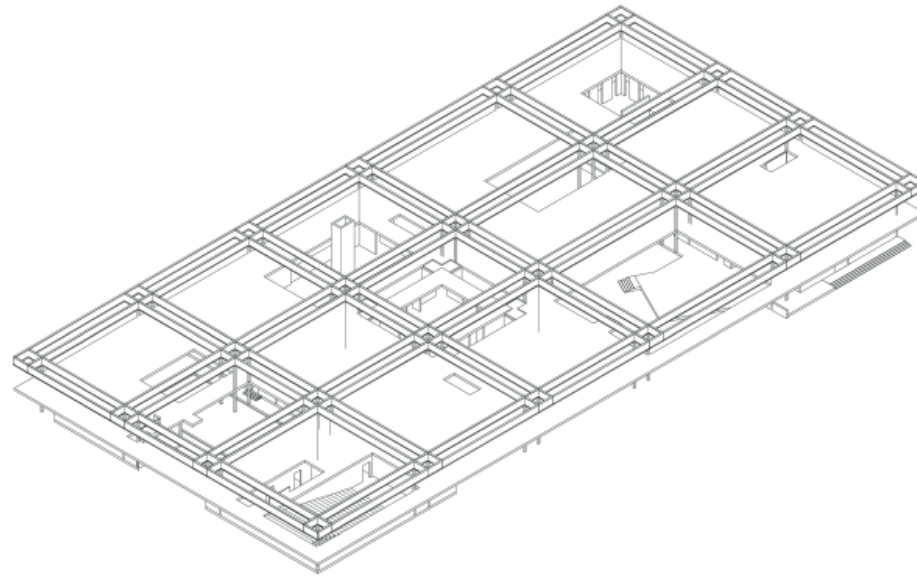
CONSTRUCTION PROCESS



3. Cast the concrete walls to afford the shear force(some of them only act as partition walls)

Structure

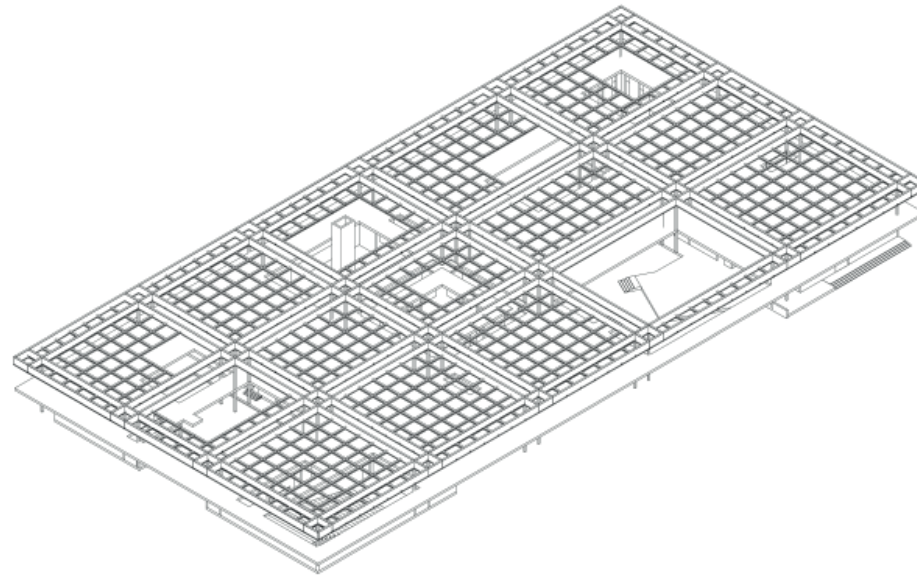
CONSTRUCTION PROCESS



4. Assemble the first floor on the concrete base and lift it up

Structure

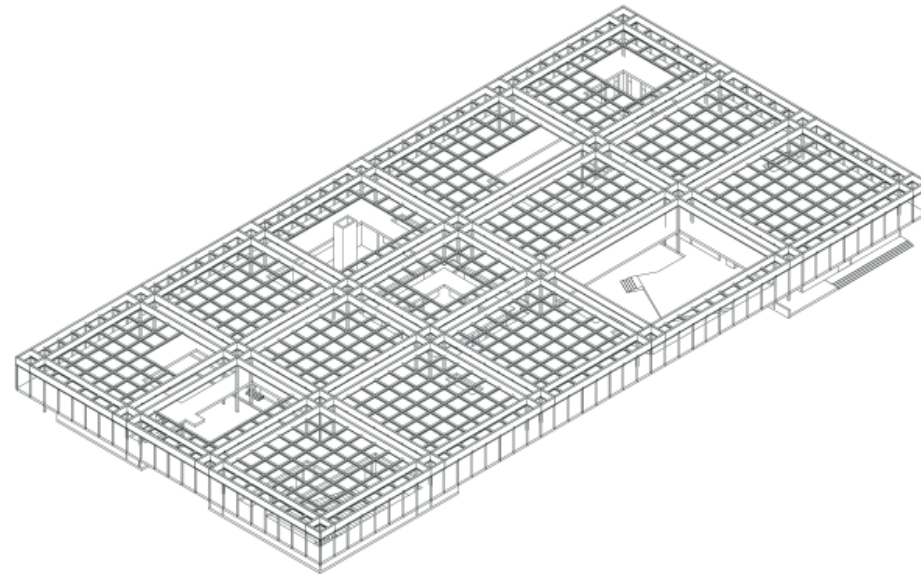
CONSTRUCTION PROCESS



5. Install the sub-beams on the roof

Structure

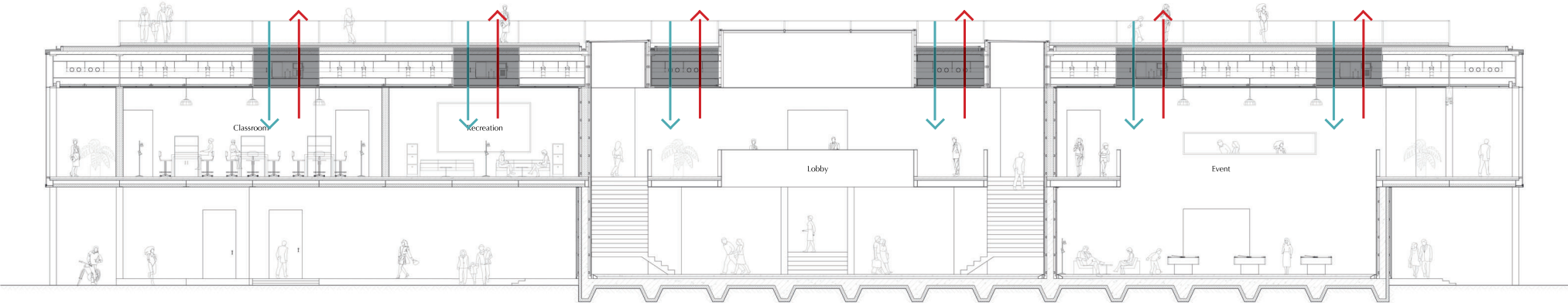
CONSTRUCTION PROCESS



6. Install the cables and add partition walls

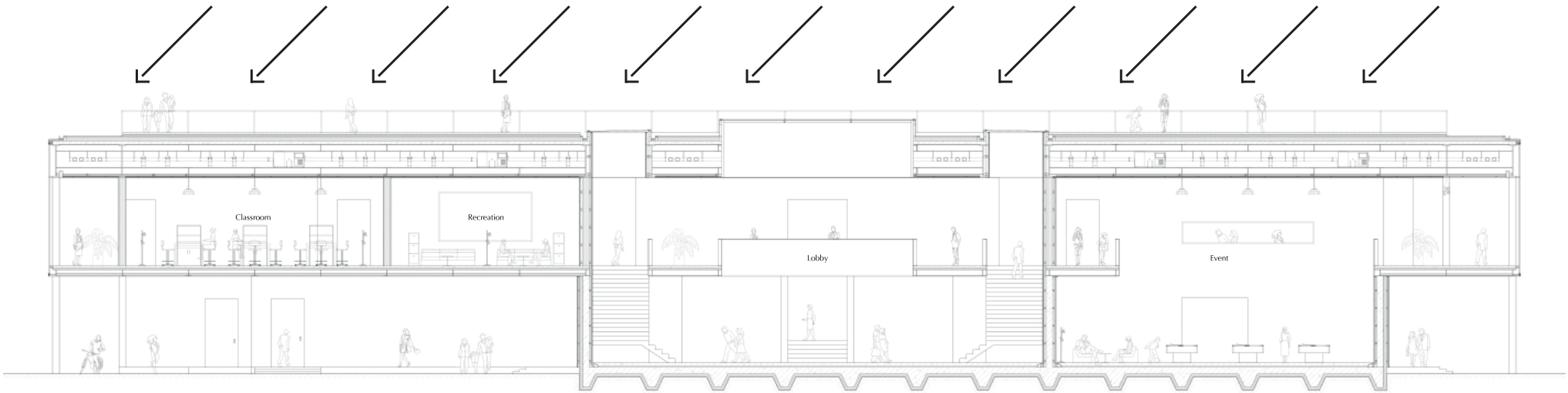
CLIMATE

Climate
ARTIFICIAL VENTILATION



Climate
NATURAL VENTILATION

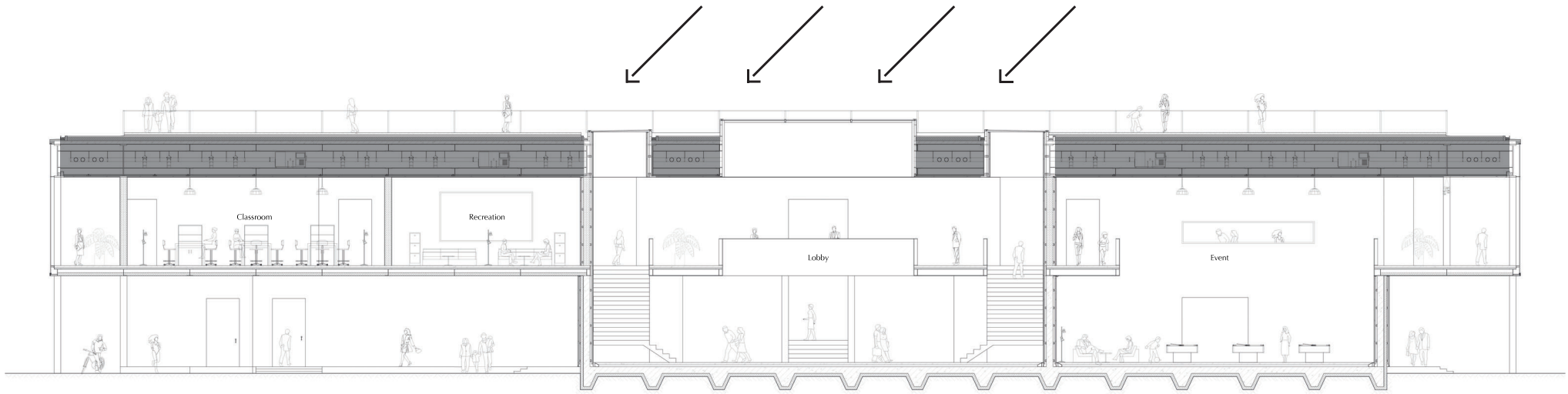
Sunlight



Climate

ROOF AS THE INSULATION

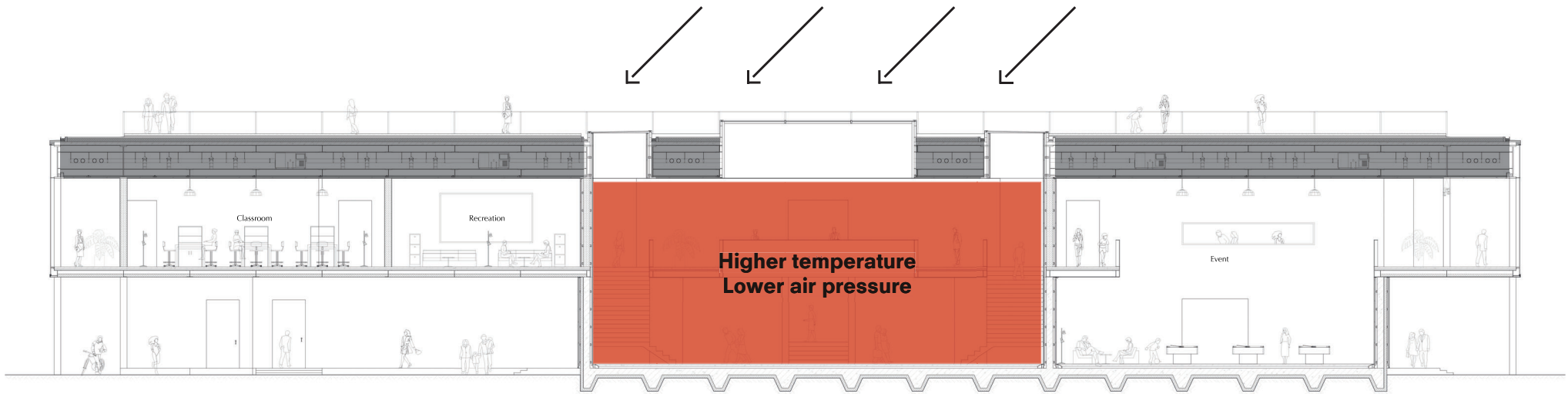
Sunlight



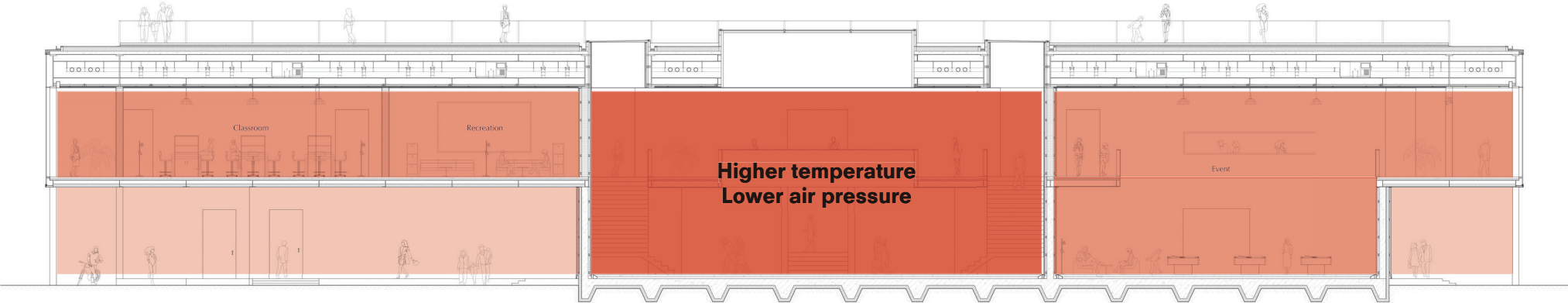
Climate

ROOF AS THE INSULATION

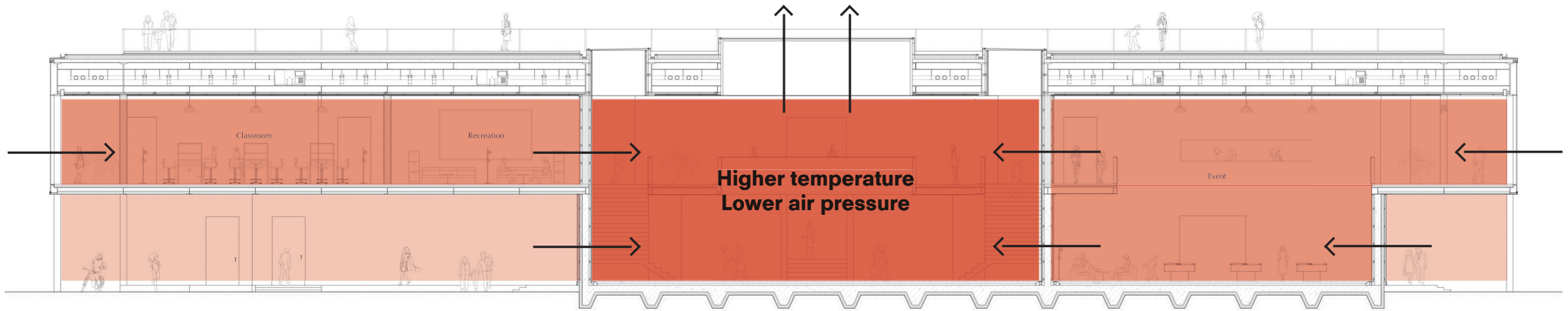
Sunlight



Climate
TEMPERATURE DIFFERENCE



Climate AIR FLOWS



MATERIALIZATION & DETAILING

Material

GOOGLE'S REPRESENTATIVE COLOURS



#4285F4



#EA4335



#FBB03B



#4CAF50

Material

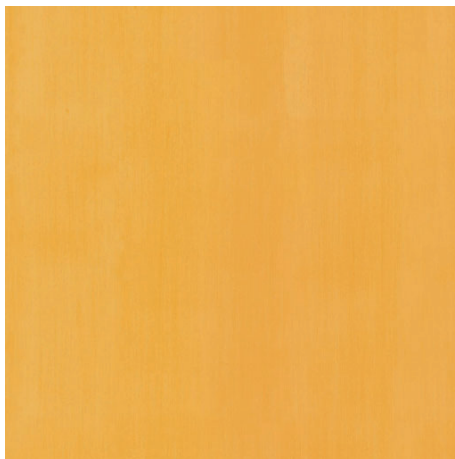
METAL PLATES FOR THE INTERIOR COVERING



Blue Corten Steel



ReCorten Steel



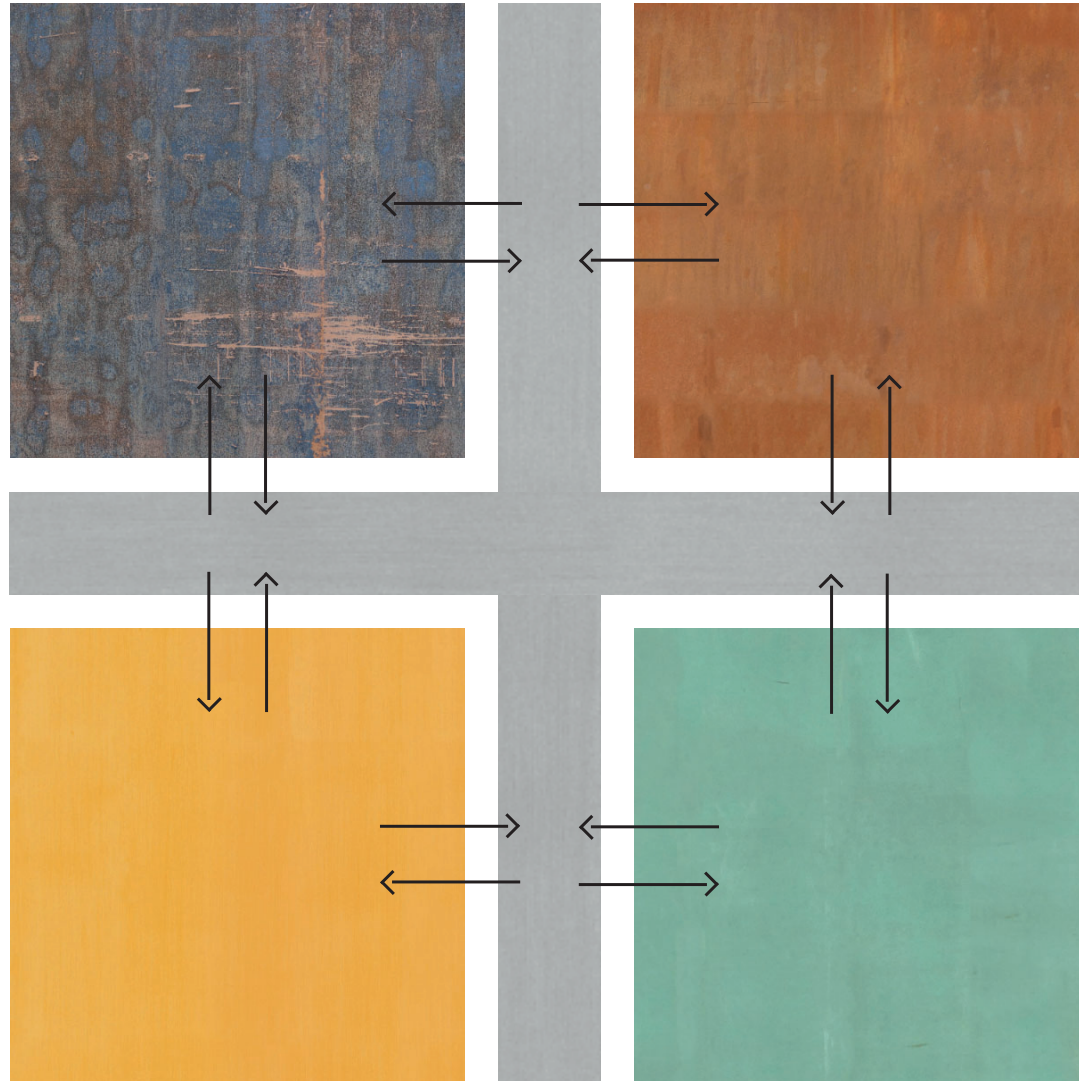
Gold (Painted on aluminum board)



Patinated Copper

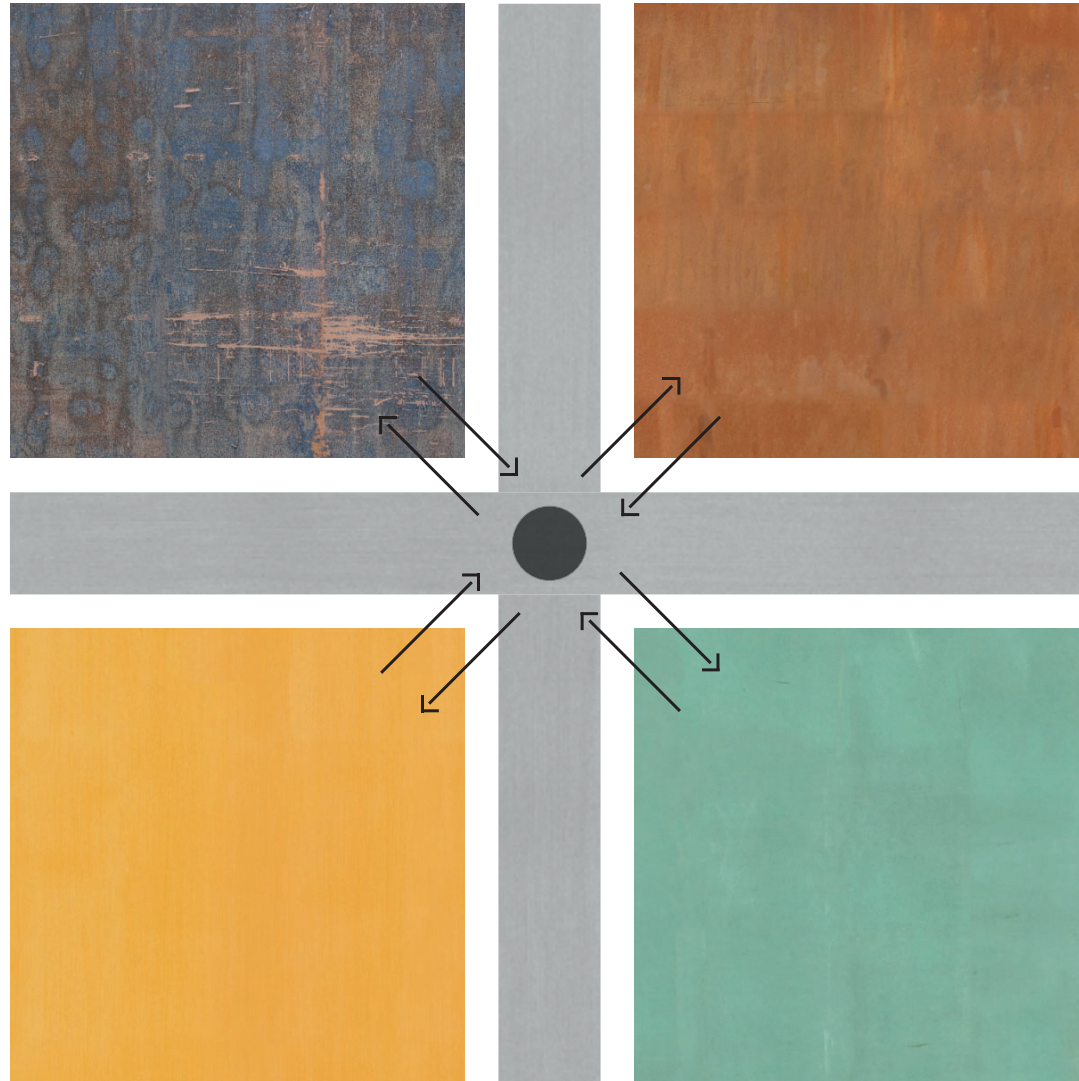
Material

ALUMINIUM FOR BLUR REFLECTION



Material

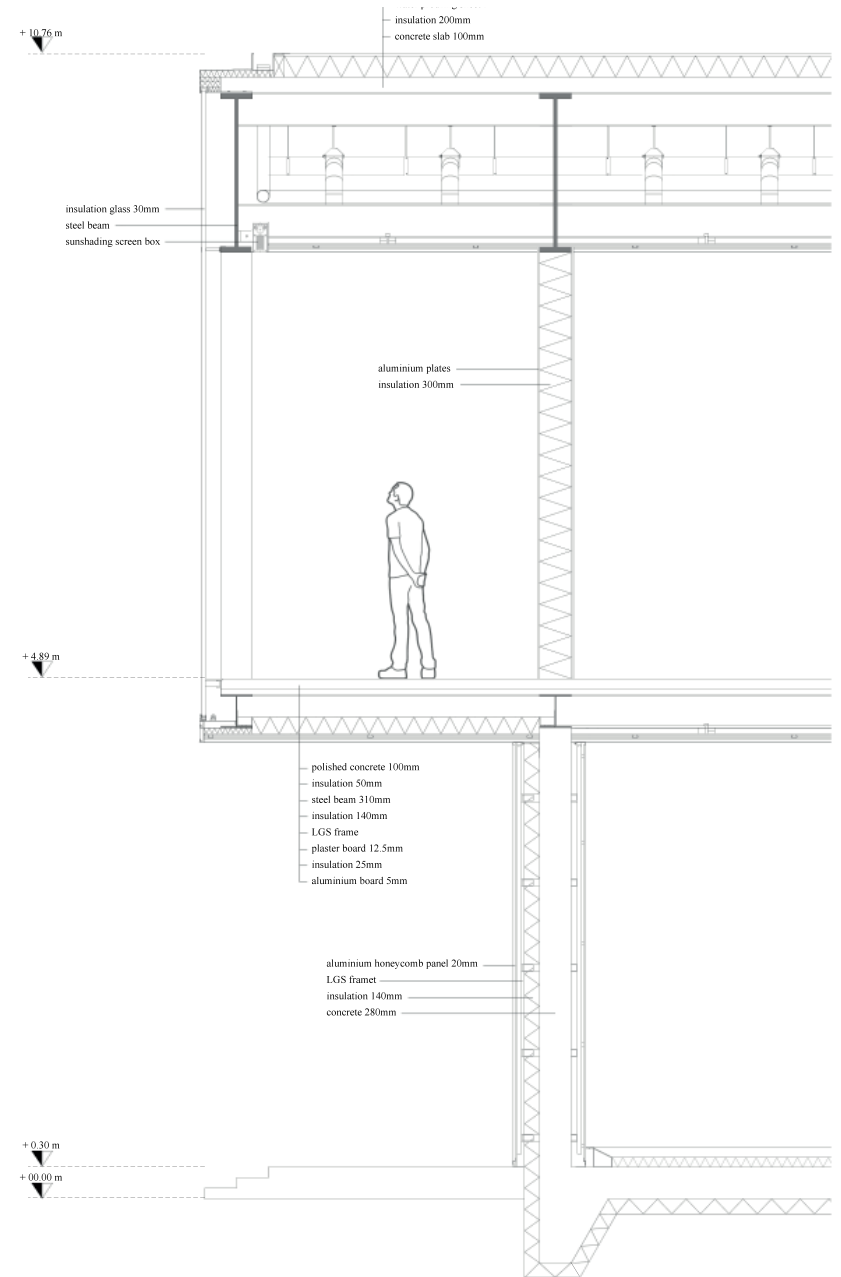
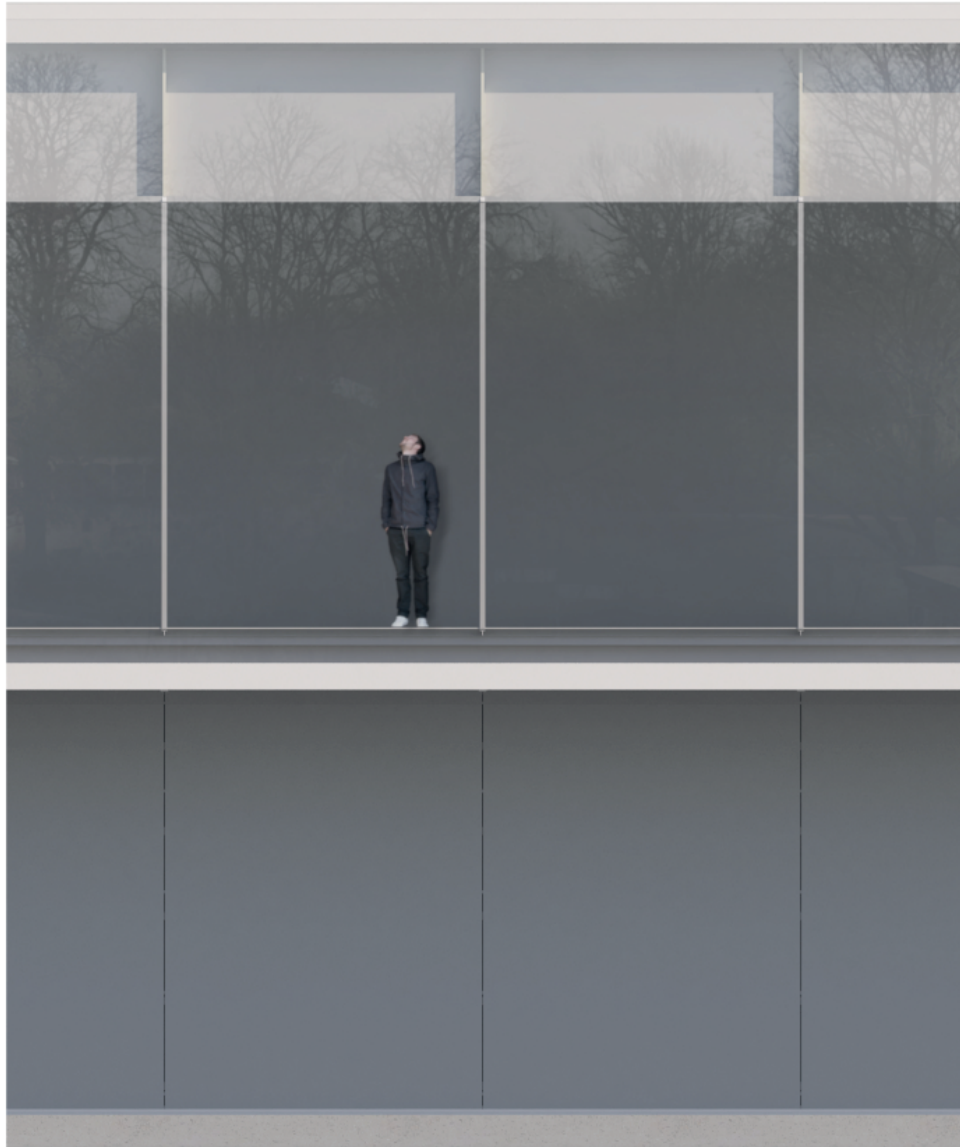
CHROMIUM ALLOY COLUMN FOR SPECULAR REFLECTION





Detailing & Materialization

FACADE



Detailing & Materialization

DETAILS

cladding
anodized aluminum 8mm

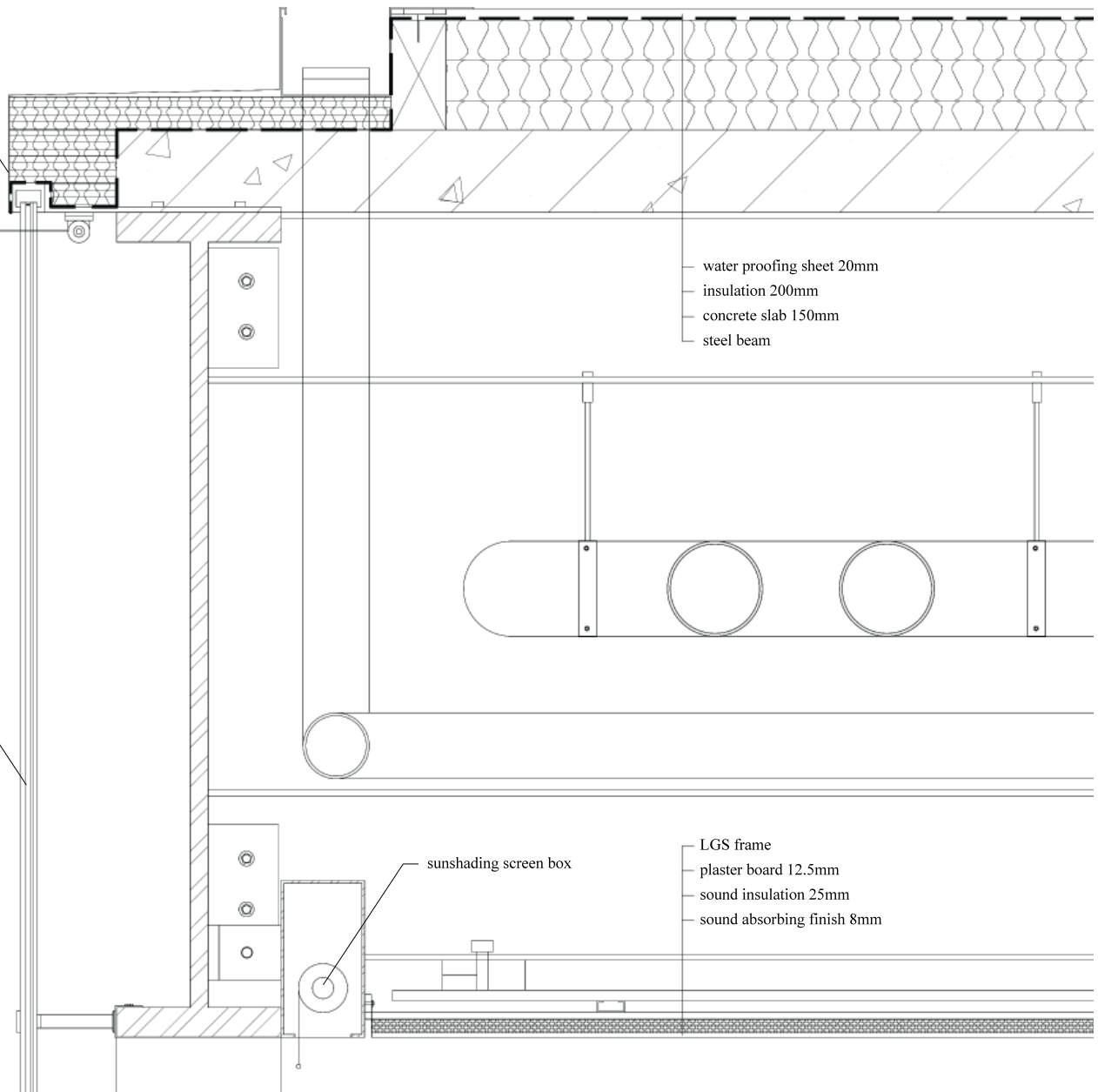
lamp

insulation glass
single glass 10mm
laminated glass 6mm+6mm

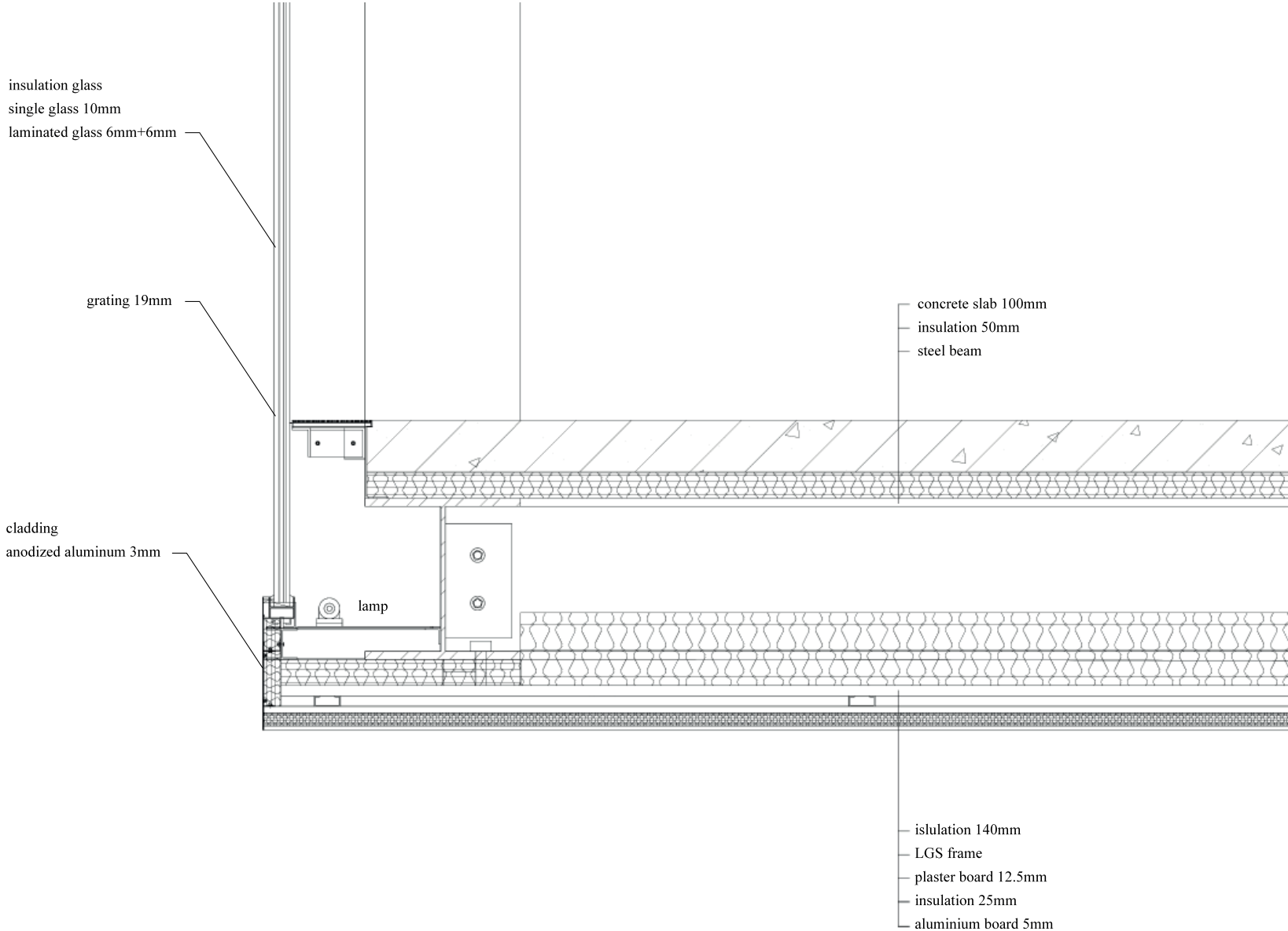
water proofing sheet 20mm
insulation 200mm
concrete slab 150mm
steel beam

sunshading screen box

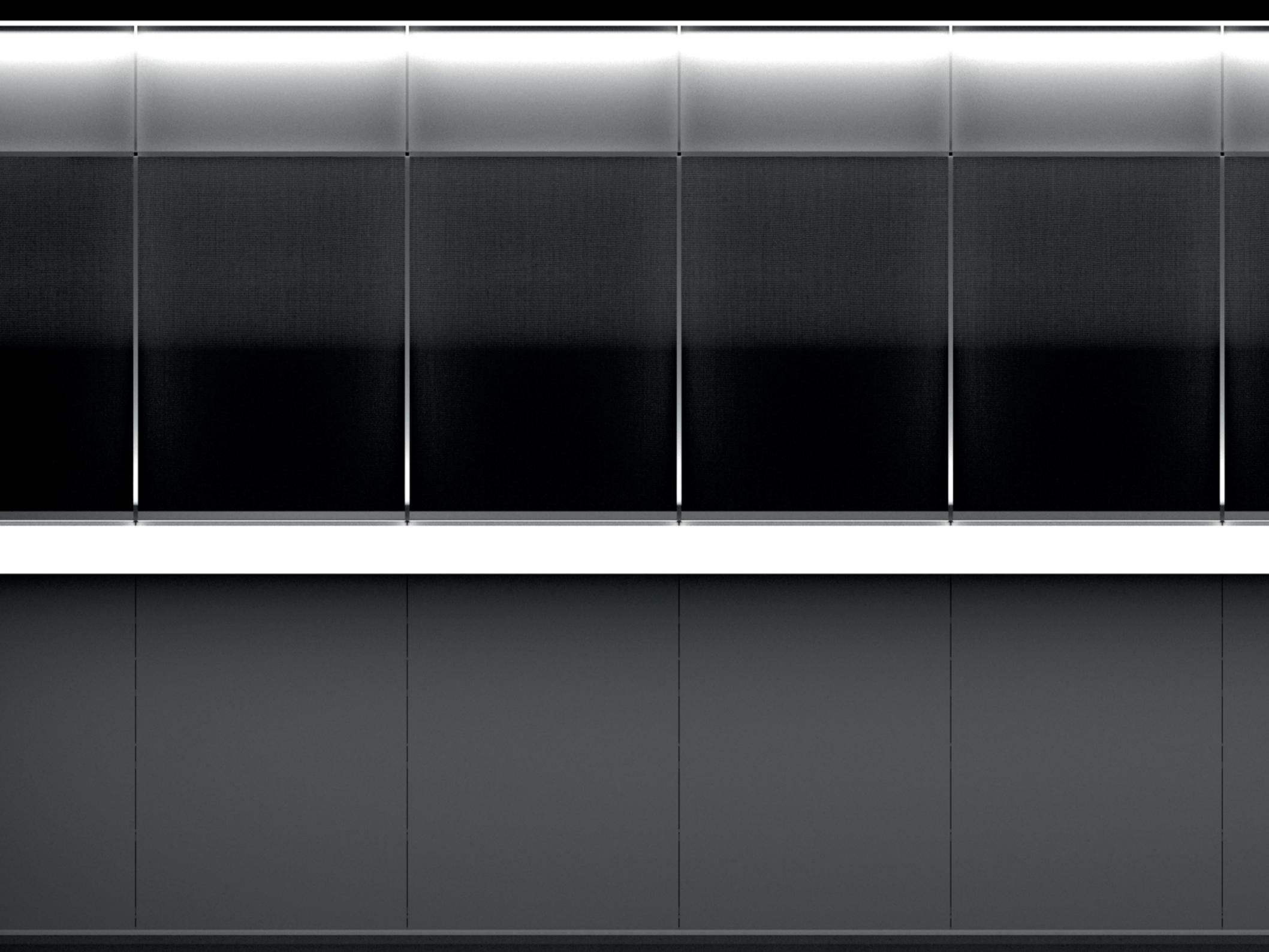
LGS frame
plaster board 12.5mm
sound insulation 25mm
sound absorbing finish 8mm



DETAILS







CONCLUSION

roof garden

Google supercomputer

atrium & courtyards

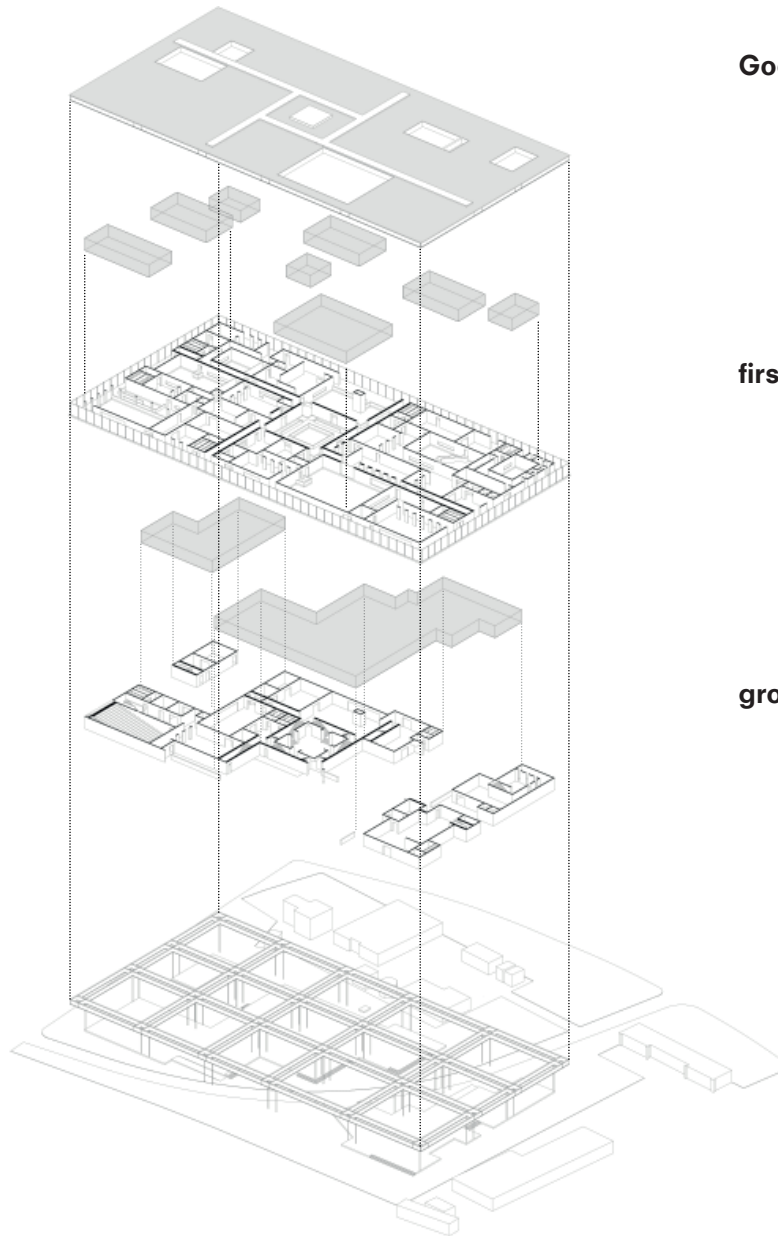
first floor circulation

public square

ground floor circulation

structure

Column-beam steel structure
for a better circularity

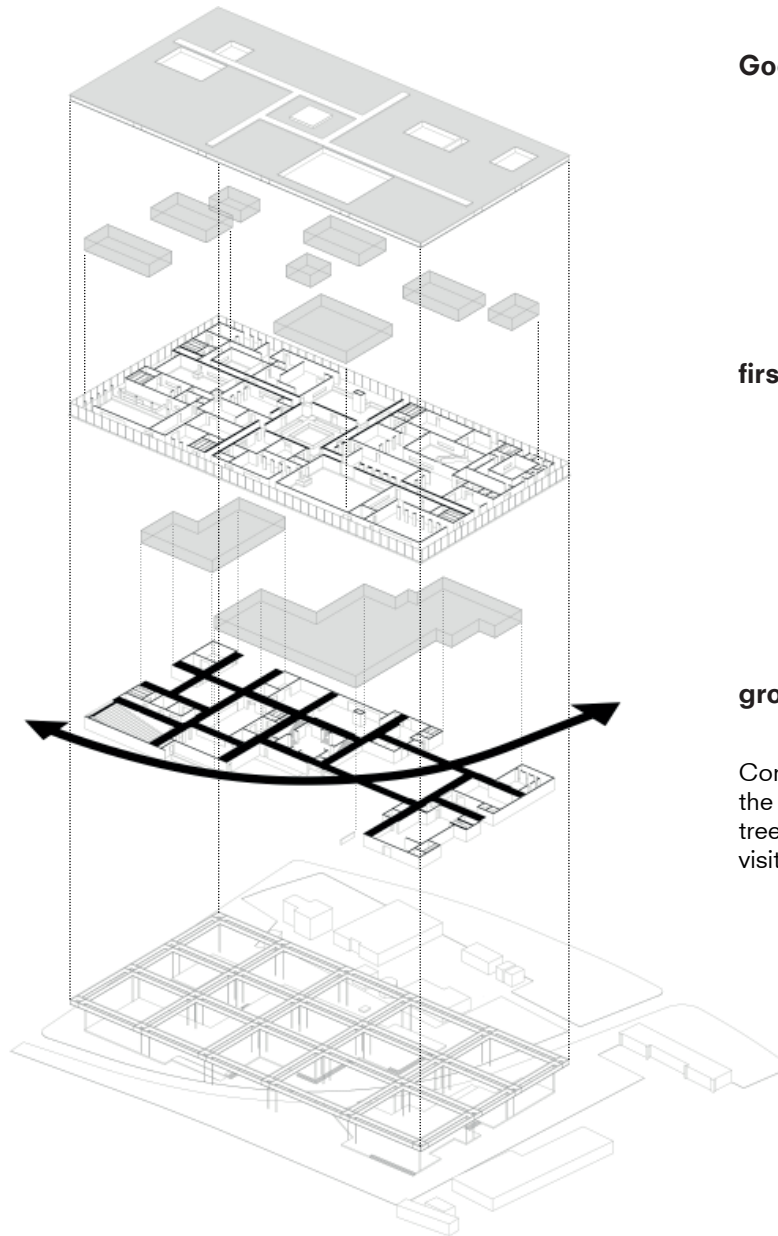


roof garden

atriums & courtyards

public square

structure



Google supercomputer

first floor circulation

ground floor circulation

Connect and integrate with the current site path and the tree to offer orientations for visitors

roof garden

Google supercomputer

atriums & courtyards

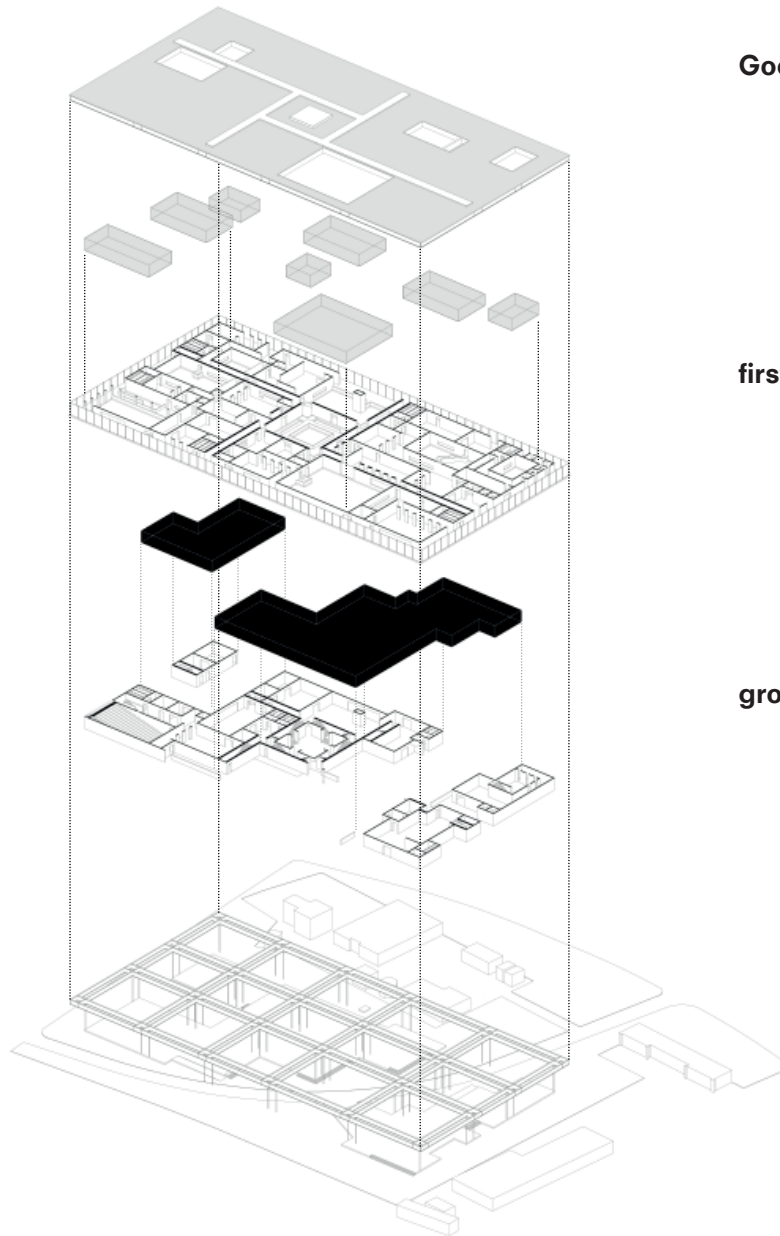
first floor circulation

public square

Open for the citizens and students' exterior activities

ground floor circulation

structure

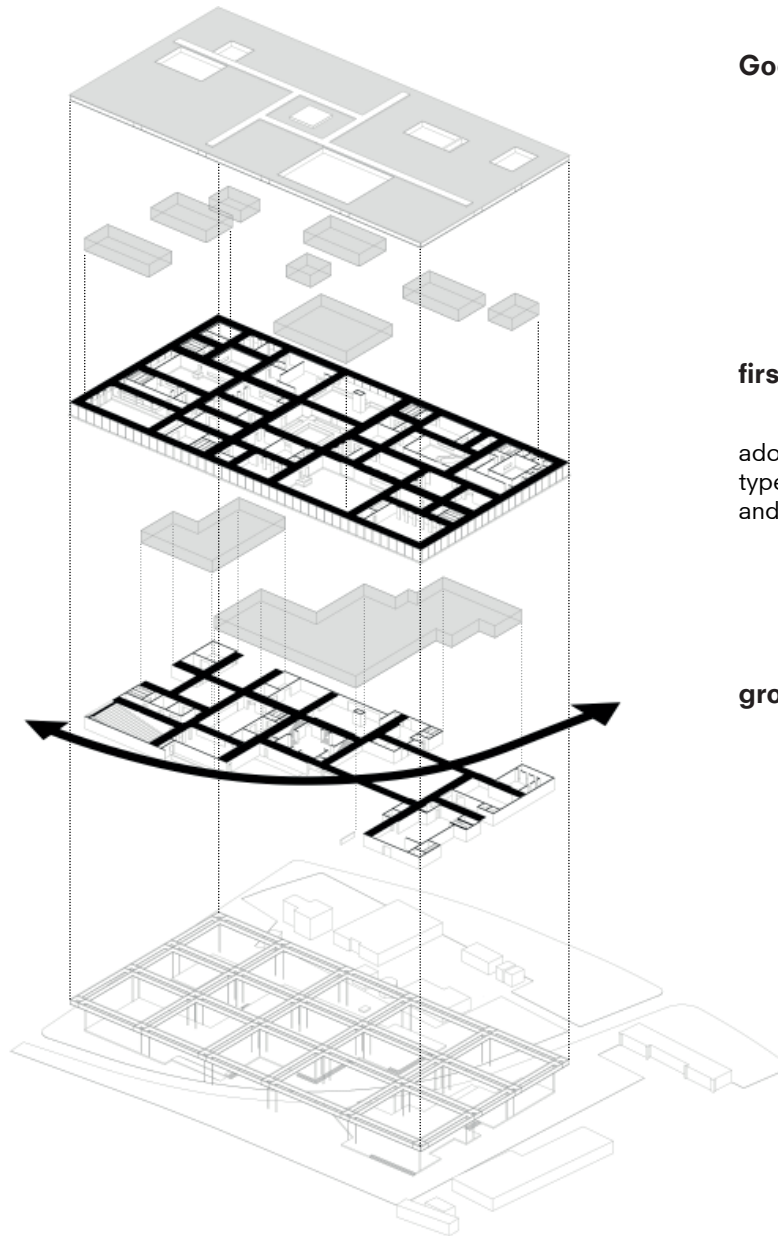


roof garden

atriums & courtyards

public square

structure



Google supercomputer

first floor circulation

adopt a pure net circulation type to offer multiple routes and experience

ground floor circulation

roof garden

Google supercomputer

atriums & courtyards

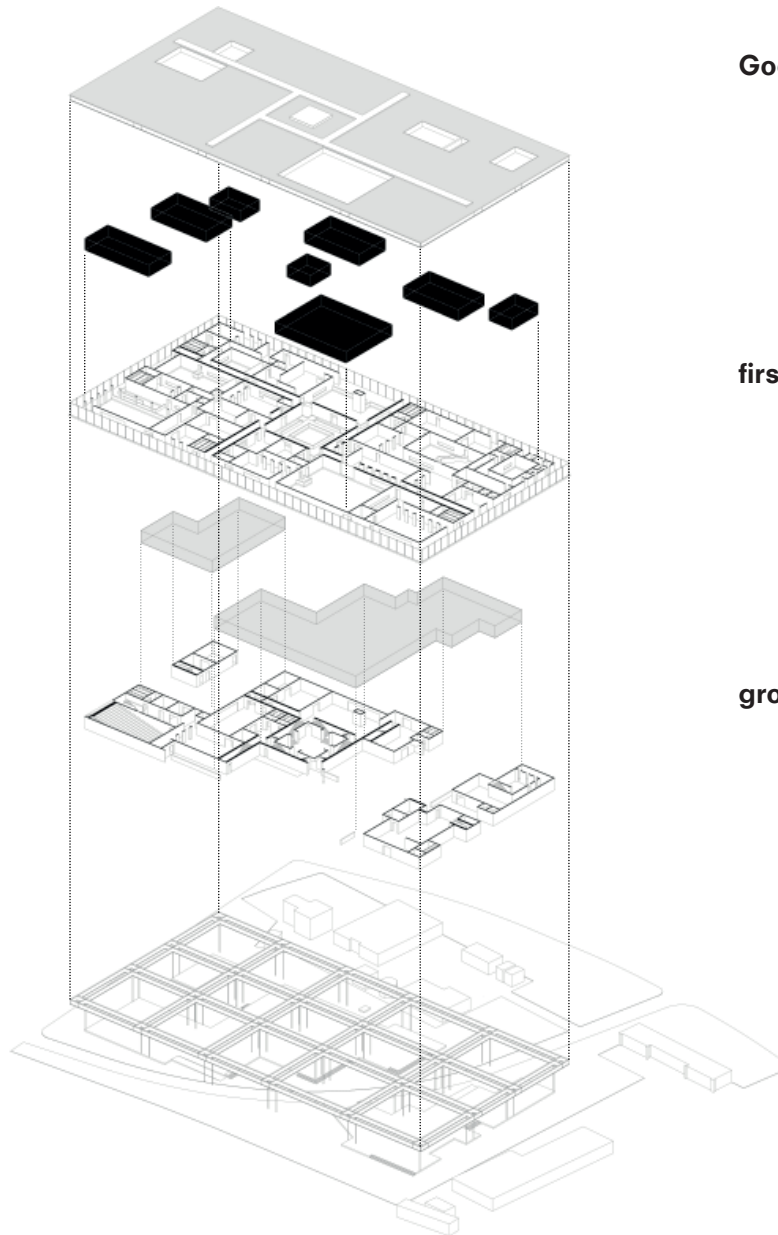
Give different zones with different characters for a clear orientation

first floor circulation

public square

ground floor circulation

structure



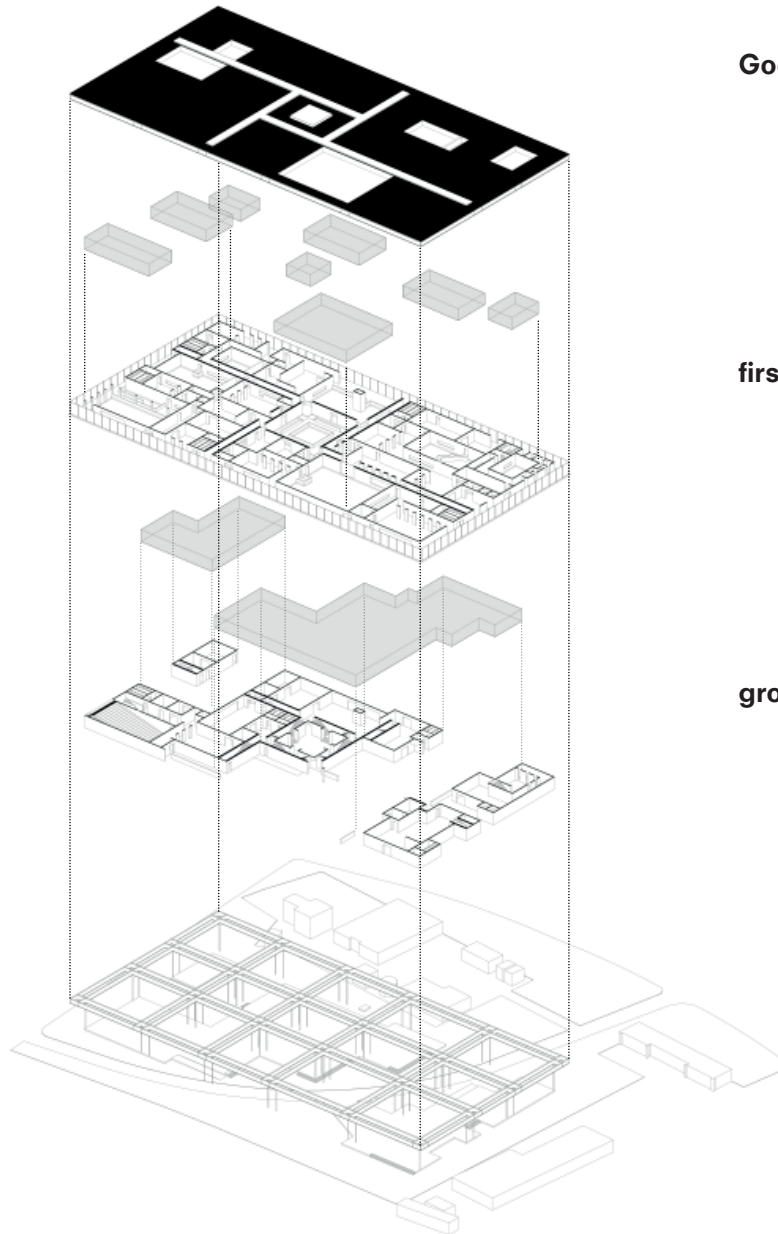
roof garden

Compensation for public green space occupied by the building

atriums & courtyards

public square

structure



Google supercomputer

first floor circulation

ground floor circulation

roof garden

Compensation for public green space occupied by the building

atrium & courtyards

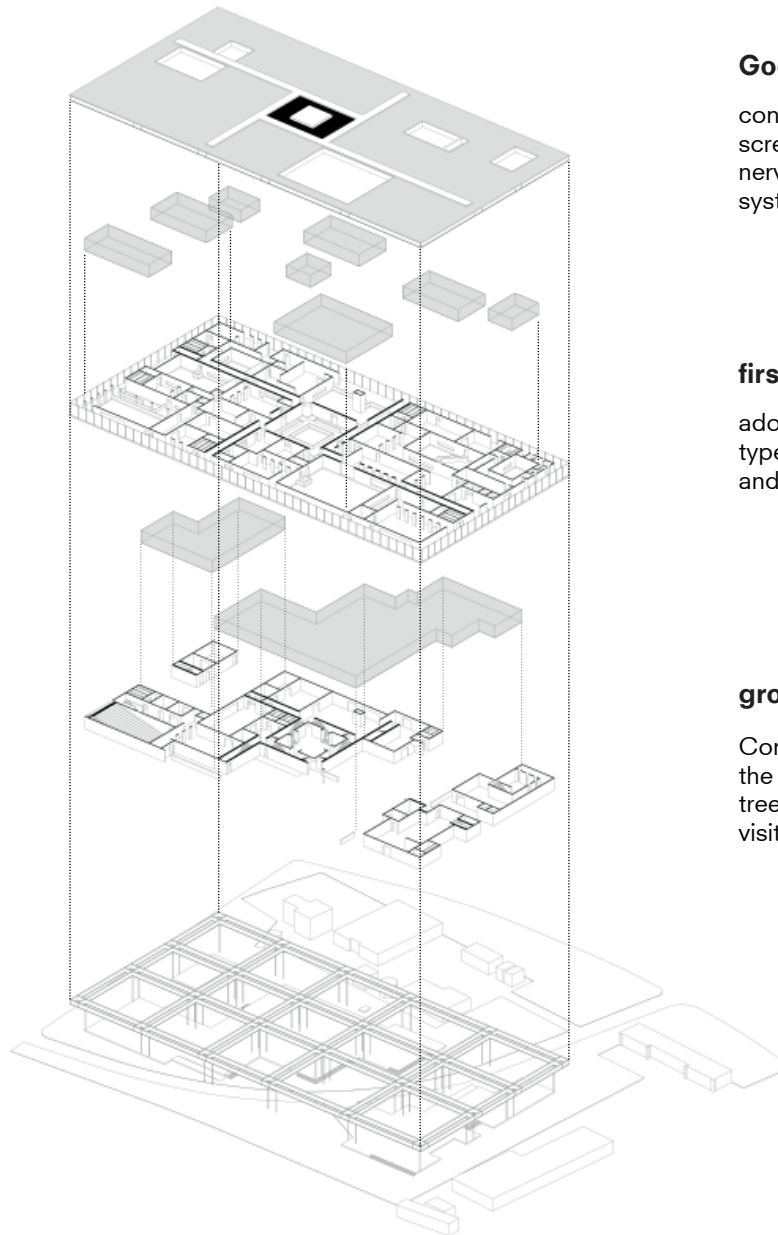
Give different zones with different characters for a clear orientation

public square

Open for the citizens and students' exterior activities

structure

Column-beam steel structure for a better circularity



Google supercomputer

connected with movable screens and acts as the nerve center for the nervous system

first floor circulation

adopt a pure net circulation type to offer multiple routes and experience

ground floor circulation

Connect and integrate with the current site path and the tree to offer orientations for visitors



THANKS